PROCEEDINGS OF THE

WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA

30 June – 2 July 2008, Singapore Zoo

Edited by S. Pantel and S.Y. Chin

Wildlife Reserves Singapore Group

TRAFFIC
the wildlife trade monitoring network

JURONG BIRD PARK
NIGHT SAFARI
Singapore Zoo

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Malayan Pangolin *Manis javanica* – Bjorn Olesen
Bottom left – EW/TRAFFIC Southeast Asia
Bottom centre – EW/TRAFFIC Southeast Asia
Bottom Right – TRAFFIC Southeast Asia

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Acknowledgements

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Foreword

Pangolins are harvested in large numbers for their meat, scales (attributed medicinal properties) and their skins, because of their distinct scale-patterned leather. Pangolin demand for use in traditional medicine and as a delicacy in Asian culture are enormous, hence the high black market price, appealing to so many hunters and traders. Over 30 000 pangolins were seized since 2000 and local anecdotes in Vietnam, Lao P.D.R., Cambodia, Thailand and Malaysia indicate that pangolin populations are declining. During interview surveys carried out this year, several hunters stated: "*They used to be very common, but nowadays there are no more pangolins in my area; everyone is looking out for pangolins because of their good price."* Between livelihood and wildlife protection, what can we do to save these unique animals?

There are three species of pangolin in Southeast Asia (out of eight species in the world). These are the Chinese Pangolin *Manis pentadactyla*, the Malayan (or Sunda) Pangolin *M. javanica* and the Palawan Pangolin *M. culionensis.* Asian pangolins, already listed in Appendix II of CITES, were given a zero quota and a pangolin specialist group was established by IUCN. However, until very recently pangolins have not received much attention from conservation organizations and international donors. Not much has been achieved to protect pangolins, and the pangolin illegal trade is still rampant. This shy creature indeed remains the most visible mammal in trade while very little has been studied in regards to its biology, behaviour and ecology. Pangolins and their ecological role have been overlooked despite their potential ability to control termites and ants, which may save us millions of dollar per year in pest destruction. A pangolin of three kilogrammes can consume up to 300-400 g of termites per feeding.

TRAFFIC has been concerned by the over-exploitation of pangolins since the 1990s and research in pangolin trade has been a major focus in Southeast Asia since 2006. This workshop aims to bring government departments, non-government organizations (NGOs) and research institutions, zoos and rescue centres in Southeast Asia to raise awareness, share information and seek solutions to combat the pangolin trade. TRAFFIC really hopes the workshop objectives will be achieved by creating a platform for all relevant agencies and organizations to work together in pangolin conservation. Pangolins deserve our great attention and we need to highlight the impact unsustainable trade in them in order to ensure the long term survival of these species.

Azrina Abdullah
Regional Director,
TRAFFIC Southeast Asia

Introduction

The Workshop on Trade and Conservation of Pangolins native to South and Southeast Asia was held between the 30th of June and the 2nd of July 2008, at the Singapore Zoo. The workshop was jointly organized by the Singapore Zoo and TRAFFIC Southeast Asia, with financial support from Wildlife Reserves Singapore. It gathered 75 participants from 15 countries representing CITES Management and Scientific Authorities, Police, universities, research institutes, international organizations, zoos, rescue centres and donors. The countries represented were: Brunei Darussalam, Cambodia, China, Hong Kong, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Taiwan, Thailand, United Kingdom, USA and Viet Nam.

The key objective of this Workshop was to gather a 'steering group' of government departments, non-government organizations (NGOs) and research institutions in Southeast Asia to raise awareness of the magnitude of the pangolin trade and discuss how to combat the illegal trade. The outputs included a list of recommendations and follow-up actions to be circulated among relevant organizations, which would assist enforcement agencies in prioritizing and focusing their efforts to halt this illegal trade.

The workshop was preceded by an ice-breaker event where participants had a chance to start meeting each other while enjoying some refreshments. The workshop then started with a welcome address by Ms Fanny Lai, CEO of Wildlife Reserves Singapore, followed by a welcome address by Parliamentary Secretary (National Development), Dr Mohamad Maliki Bin Osman and a welcome address by Mr Chris Shepherd from TRAFFIC Southeast Asia. The agenda included 30 presentations, as well as a working group session. An additional couple of videos were presented to the audience by the Taipei Zoo and WCS Indonesia. During the first session of the workshop, government agencies responsible for wildlife trade management presented on the illegal wildlife trade situation in their respective countries, highlighted successes and problems and clarified how and if they were dealing with the illegal pangolin trade. Other institutions such as NGOs, zoos and universities provided technical inputs on specific aspects related to the trade and conservation of Asian pangolins during the second day of the workshop. During the last session, participants were divided into working groups and were asked to identify top priorities in the fields of biology and ecology, trade and law enforcement, husbandry and rehabilitation, and education and awareness.

The workshop provided a good opportunity for networking as well as information exchange. Following the workshop all participants were invited to join the pangolin list server and a few participants were identified to be part of a Pangolin Working Group. Active participation, interest and focus were sustained throughout the workshop despite the large number of presentations. The working groups produced a detailed list of recommendations and achievable actions to be following-up after the workshop. These will provide useful guidance for pangolin conservation in terms of priority for law enforcement, research and fundraising in the near future.

Welcome Address

Ms Fanny Lai
CEO-Wildlife Reserves Singapore

Good Morning our guest of honour, the honourable Dr Mohamad Maliki bin Osman, Parliamentary Secretary for National Development; Prof Leo Tan, Chairman, WRS Animal Welfare & Ethics Committee and one of Singapore's foremost conservationists; colleagues from TRAFFIC, AVA and NParks, and regional partners in pangolin conservation.

I stand before you with mixed feelings as I welcome you all to the first workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia. Happy and fortunate because WRS has been instrumental in working together with TRAFFIC Southeast Asia to bring together key decision makers from the region to make important and hopefully actionable decisions to save Asian pangolins from extinction; whilst at the same time, sad, because the situation for pangolins has reached such a critical level, that we are forced to resort to such an emergency meeting.

Desperate times call for desperate measures, and the 80 or so participants who have answered this urgent call, come from as varied a background as the threats faced by pangolins today. We have with us for this three-day workshop, colleagues from government enforcement and conservation agencies, CITES authorities, non-governmental conservation agencies as well as academics and scientists working on physiology, ecology as well as captive management of pangolins. All 10 ASEAN countries are represented at this workshop and we also have representatives from China, Hong Kong, the USA, UK and Taiwan.

The objectives of this workshop are simple, to ensure that wild pangolin populations remain in their natural habitats for posterity, and the threats including illegal harvesting and habitat destruction are eliminated, or at best reduced to insignificant levels. How we achieve this, is unfortunately complicated, but what all of us here hope to collectively work on, is a set of recommendations for an action plan to assist enforcement agencies prioritize and focus their efforts towards stopping the illegal trade in pangolins.

WRS has over the years, supported the conservation of pangolins through various means, such as funding a study on the autecology of the pangolin in Singapore; through working with AVA and NParks to conduct veterinary checks, tagging and release of donated or confiscated pangolins, and also through our efforts to currently maintain three pangolins in captivity at the Night Safari. There is much to be learnt about the habits of pangolins, and with the opportunity of closer observation on behavioural and physiological characteristics of captive animals, I hope that we can share this knowledge with other institutions that are also trying to maintain pangolins in captivity as a reserve population to be eventually released into available suitable habitats.

Throughout this workshop, we will hear from various country representatives on the levels of trade and quantity of pangolins both in weight and numbers, being seized. Numbers are staggering, but sadly, this may be just the tip of the ice-berg and the majority of shipments may go undetected. Forming a good and reliable intelligence network to monitor and track, as well as react to such trade is certainly a priority and

with sufficient cooperation and commitment from the governments around the region, will be a reality very quickly.

The pangolin is a unique part of our biodiversity, and through researching and reading up about this animal, I learnt that the common name is derived from the Malay word "Peng-guling" meaning "the Roller" referring to the pangolin's habit of rolling itself up into a ball when confronted with danger. This is a reflection of the pangolin's docile nature, which also unfortunately opens it up to exploitation, easy capture and consumption.

In addition, the genus name "Manis" comes from the Roman religion for the word meaning "spirit of the dead" or "ghost" because of its secretive and nocturnal habits. I bring this up because if we do not act now, the pangolin will indeed live up to its name of being a spirit of the dead.

Wildlife Reserves Singapore, through the Night Safari, Singapore Zoo and Jurong BirdPark will continue to lead, partner and support conservation efforts for the pangolins. With the 3.5 million visitors coming through our parks annually, we are poised and ready to spread the conservation message and raise public awareness to our visitors many of whom come from the pangolins' range countries, as well as major end-point consumers. Our work will never be done, and as long as pangolins face an uncertain future, we will all persevere to do what is necessary to protect them. With this aim in mind I look forward to working together with AVA, NParks and NUS to hopefully initiate a captive breeding programme for our pangolins in Singapore, for their eventual release into our nature reserves and other forested areas.

Ladies and gentlemen, the fate of pangolins lies in our hands, and the outcome of this workshop will be a reflection on how well we have stepped up to the challenge entrusted upon us. Conservation is never an individual effort; the dynamics are too varied and too complex, and the challenges sometimes seemingly insurmountable. However, I am confident that we have at this workshop the expertise, commitment, and will-power to make this happen, and when we depart to head back to our offices in our own countries, we must leave with a conviction that we have changed the pangolins status from being armoured and endangered to armoured and here to stay for good!!

Thank you.

Opening Remarks

Dr. Mohamad Maliki Bin Osman
Parliamentary Secretary for National Development

Ms Fanny Lai, Group CEO, Wildlife Reserves Singapore

Mr Chris Shepherd, Senior Programme Officer, TRAFFIC

Distinguished Participants,

Ladies and Gentlemen,

It is my pleasure to be here for the opening of this workshop on conservation of pangolins in this region.

Balancing conservation with urban developments

Singapore places high emphasis on sustaining our biodiversity even as we grow and develop the city and the economy. Our concerted efforts in balancing biodiversity conservation with urban development over the past few decades have paid off. Today, we are a well-recognised liveable and vibrant city, that is well endowed with lush greenery and a rich biodiversity.

To enhance biodiversity, we need to improve our knowledge on conservation, through the conduct of research and data collection on our native wildlife, and through the collaborative efforts of the public, private and people sectors. Take for example the Oriental Pied Hornbill, which was lost to Singapore for many decades. Through joint studies carried out by the National Parks Board (NParks), Nanyang Technological University (NTU) and the Jurong Birdpark (which is part of the WRS), we have successfully encouraged the breeding of the birds which have now doubled their population to 50 birds in 2008.

Another success story is the collaborative research and efforts by NParks, National University of Singapore (NUS) and the National Environment Agency (NEA) to rehabilitate our coral reefs through the setting up of a Coral Nursery. This has helped conserve our coral species which amounted to a quarter of all known hard coral species worldwide.

Efforts to Conserve Native Pangolins

Similarly, the 2007 study on our native pangolin, the Sunda pangolin, which was carried out by Mr Norman Lim and Prof Peter Ng from the NUS, has provided insights into the home range, activity cycle and natal den usage of a female pangolin on Pulau Tekong. This information is useful for the management of our pangolin population.

NParks will continue to help with efforts to conserve our native wildlife. With regard to pangolins, some of these activities include safeguarding their current habitats in nature reserves, and restricting the level of night activities in the nature reserves, as pangolins are shy, nocturnal animals.

In addition, NParks and the Agri-Food and Veterinary Authority (AVA), also cooperate with the public for return of stray pangolins back to the reserves. There are two or three such occurrences a year in Singapore.

I would also like to thank the Zoo for chipping in to help microchip pangolins which are found before their release back into the forest. This is important for tracing an individual pangolin's history for future management. The Zoo has also been supportive with treating and rehabilitating sick and injured pangolins before their release back to the wild.

Enforcement of Wildlife Trade

Besides making efforts to conserve our local flora and fauna, Singapore also plays its part to ensure that illegal trade in wildlife does not threaten the survival of biodiversity. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) came into force in 1975 to protect endangered species of animals and plants by regulating and monitoring their international trade to prevent it reaching unsustainable levels. Singapore has been a Party to CITES since 1986.

Singapore is a transshipment hub handling large volumes of trade in goods, as well as a busy transportation hub for travellers. While it is impossible to check every single consignment and traveller, AVA works closely with other governmental agencies, such as the Immigration and Checkpoints Authority (ICA) and Police, to ensure Singapore is not used as a conduit for illegal trade in wildlife.

In addition to policing the traffic passing through the borders, AVA also acts on tip-offs from many sources relating to illegal wildlife trade. Our “eyes and ears” include our foreign counterpart agencies, NGOs such as TRAFFIC, as well as local NGOs or persons keen in wildlife conservation. Each year, AVA investigates about 50-100 enforcement cases, many of which involve members of the public keeping wildlife illegally. In addition, AVA carries out risk profiling of suspected cases and conducts surprise checks at targeted premises to ensure compliance with CITES regulations.

To ensure that our Endangered Species (Import and Export) Act, which gives effect to the enforcement of CITES regulations, remains robust and relevant, we had reviewed this legislation in 2006. Among other things, the review has enhanced AVA’s powers to investigate and deal with smuggling offences in CITES-listed wildlife, and increased the penalty for such an offence to a fine of $50,000 per scheduled species (up to an aggregate of $500,000) and/or a jail term of up to two years.

At the regional level, Singapore is a member of the ASEAN Wildlife Enforcement Network (ASEAN-WEN) which comprises wildlife law enforcement agencies in the 10 ASEAN countries. ASEAN-WEN facilitates cross-border collaboration between ASEAN member countries in the combat of the illegal wildlife trade through intelligence sharing and capacity-building.

We believe we are making good and improved efforts in combating illegal wildlife trade.

Public education

Going forward, we will need the strong, continued support of the public in our biodiversity conservation efforts. Public education is key, and AVA has embarked on programmes to highlight the rationale for conservation and issued advisories on illegal wildlife trade for travellers. Workshops such as this also provide another setting for agencies from the region to exchange ideas and formulate strategies on conservation, which can then be communicated effectively to the public.

I wish all participants a fruitful workshop. Thank you.

Overview of Pangolin Trade in Southeast Asia

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ABSTRACT: Pangolins occur throughout most of South-east Asia, and are seriously threatened by illegal hunting to supply international trade, largely to markets in China. ASEAN countries have committed to stopping the international trade in pangolins, their parts and derivatives, by becoming party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). National legislation is also in place to protect pangolins. Despite international trade for commercial purposes being banned and legislative measures being taken, illegal trade in pangolins, and their parts and derivatives, continues to be widespread, and carried out on a large scale. This trade is an urgent threat to the continued survival of these unique species in the wild. Responding to large-scale illegal trade of wildlife in the region, and in order to better combat illegal international wildlife trade, the ASEAN countries have recently come together to form the ASEAN Wildlife Enforcement Network (ASEAN-WEN). Formed in December 2005, this initiative represents the world's largest wildlife enforcement network. It aims to facilitate better intelligence-sharing between national counterparts, increased collaboration, and cross-border cooperation. Until national legislation and enforcement is raised to the required standards under CITES, however, the full potential of ASEAN-WEN to combat illegal trade in species such as pangolins cannot be realized. However, regardless of such measures being taken and 33 years after the formation of CITES, here we are, watching illegal trade push these unique species gravely close to the abyss of extinction.

Keywords: Pangolin trade, CITES

INTRODUCTION

There are four species of pangolins found in Asia, Indian Pangolin *Manis crassicaudata*, Malayan Pangolin *M. javanica (also refered to as Sunda Pangolin)*, Chinese Pangolin *M. pentadactyla* and the Palawan Pangolin *M. culioensis* (Table 1). There is very little information on pangolin populations, biology, ecology and conservation, however, it is known that pangolins are in serious decline throughout their range (Wu, *et al*., 2004; Liou, 2006; Yang, *et al*., 2007; Francis, 2008).

Table 1. Asian pangolin species and their distribution by country

Species	Range
Indian Pangolin *Manis crassicaudata*	India, Pakistan, Sri Lanka, possibly Bangladesh
Malayan Pangolin *M. javanica*	Brunei, Indonesia, Lao PDR, Malaysia, Myanmar, Thailand, and Vietnam
Chinese Pangolin *M. pentadactyla*	China (including Taiwan), India, Lao PDR, Myanmar, Nepal, Thailand and Vietnam
Palawan Pangolin *M. culioensis*	the Philippines

The greatest threat to the conservation of pangolins is illegal hunting for trade, largely to supply demand in China for meat and scales, used for tonics and traditional medicines (Wu, *et al*., 2004; Liou, 2006). Surveys in China have found pangolins (live or scales) to be commonly available in markets (Li and Wang, 1999). Pangolin parts

are also used in other East Asian pharmacopoeia, such as in South Korea (Kang and Phipps, 2003). Scales are particularly targeted in the Chinese and other traditional medicines, and are considered the most valuable part of the pangolin in trade.

Pangolins are exceptionally vulnerable to over-exploitation, as they are easily hunted, have a very slow reproduction rate and do not easily breed in captivity (Lim and Ng, 2007; Wu, *et al*., 2004). While subsistence hunting of pangolins has likely been prevalent for centuries, large-scale commercial harvesting appears to have come about only a matter of decades ago. For example, Harrison and Loh (1965) reported over 60 tonnes of pangolin scales being legally exported from Sarawak, Malaysia, from 1958-1964 (Harrisson and Loh, 1965).

Commercial harvest and trade of this scale are strongly suspected to be unsustainable, and already, over the past couple of decades, pangolins have become scarce in much of their former range.

All pangolins in trade are from the wild. Rumours of commercial scale captive-breeding are false. Pangolins are known to be extremely hard to keep in captivity, and even harder to breed (Yang, *et al*., 2007).

All Asian pangolins were listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), by genus (*Manis*) and therefore automatically including the more recently described *M. culioensis*, since 1975. At the 11th Conference of the Parties to CITES in 2000 it was proposed to transfer the Asian pangolin species from Appendix II to Appendix I, but this was not carried. Parties did agree, however, to a 'zero' trade quota for these species (Kang and Phipps, 2003).

All Asian pangolin range States have committed to controlling the international trade in pangolins, and their parts and derivatives, through their accession to CITES. As Parties to CITES, these countries are obligated to adequately implement and enforce the requirements of the Convention through national legislation. However, many countries are not fulfilling this obligation and as yet do not have legislation that sufficiently allows for CITES to be effective (Shepherd, 2007). All Parties to CITES have been categorized under the CITES National Legislation Project, based on the ability of national legislation to implement and enforce CITES and in Southeast Asia, only four of the ten ASEAN (Association of South-East Asian Nations), including Indonesia, Singapore, Thailand and Vietnam, have national legislation sufficient to implement CITES.

Despite international protection through CITES, and legal protection of varying levels at national levels, the illegal trade of pangolins continues on a large scale. Countries closest to China have seen dramatic declines in the wild populations of pangolins. Pangolin populations in Indochina have been largely depleted and traders are now required to search further, in Indonesia and Malaysia, to meet the demands in China (Liou, 2006). This has been further corroborated by traders who claim that pangolins from Indonesia and Malaysia now make up the bulk of the supply to the markets in East Asia. Some of the largest shipments of Asian pangolins seized in history have originated in Indonesia.

Pangolins are harvested throughout most of their range in Southeast Asia. The trade chains are generally straight forward. Local people living in rural areas are most often well aware of the value of pangolins and opportunistically harvest them. Middlemen visit villages on a regular basis, or set up buying stations where people can bring

pangolins to sell. These middlemen then in turn sell to larger middlemen or to the main dealers, who then ship the pangolins off to the end markets. There are often a few layers of middlemen along the chain. Pangolins are smuggled by air, land and sea, using a number of key routes and methods to move the illicit cargo across international borders. Live pangolins are frequently hidden among other cargo, or mislabeled, often as fish. While many of the pangolins are shipped live, this becomes increasingly difficult as the sources become further from the markets. In these cases, the animals are often slaughtered and frozen before shipping. Scales are sometimes shipped separate from the meat. Frozen pangolins are very often smuggled in large quantities, declared as frozen fish.

ENFORCEMENT EFFORTS

Pangolins are among the most commonly seized wildlife throughout Southeast Asia (Shepherd, *et a*l., 2007; Nooren and Claridge, 2001) reported that the vast majority of confiscations of wildlife in Lao PDR were of pangolins. Malaysia has made at least 34 pangolin seizures with a total of 6,000 specimens confiscated over the past seven years.

Recently, in March 2008, approximately 24 tonnes of frozen pangolins originating from Indonesia was seized in Vietnam. More recently, in July 2008, approximately 14 more tonnes of pangolins were seized by the police in Sumatra, Indonesia. Massive shipments like these from Indonesia are indicative of the scale of the illegal trade, and the conservation challenges ahead.

Here we are, 33 years later, watching illegal trade push these unique species gravely close to the abyss of extinction. Despite all range States in Southeast Asia being Party to CITES, illegal trade continues on a massive scale. At current rates of harvest and trade, it is only a matter of time before pangolins pass a point of no return.

In response to high levels of illegal wildlife trade in Southeast Asia, all 10 ASEAN countries have come together to form the ASEAN Wildlife Enforcement Network (ASEAN-WEN). Launched in December, 2005 at the Joint ASEAN Ministers Meeting, Bangkok, Thailand, the ASEAN-WEN is the largest such network in the world.

If pangolins in Asia are to be saved from extinction, enforcement agencies must work together to tackle this cross-border crime. The recent formation of the ASEAN Wildlife Enforcement Network provides a means to do exactly this. Without the sufficient enforcement of national legislation and CITES, this unique group of species will very likely be lost forever.

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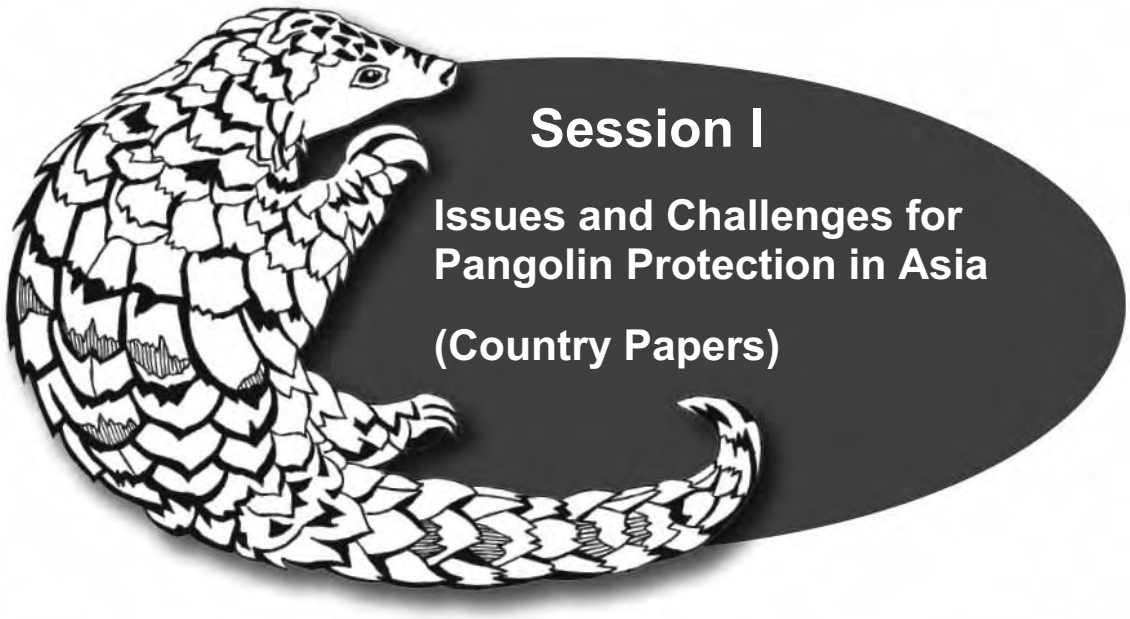
In 2005, momentum at the ASEAN level stepped up with the development and Ministerial endorsement of the *ASEAN Regional Action Plan on Trade in Wild Fauna and Flora 2005-2010*, under which there are several objectives including improved legislation, better regional law enforcement co-operation, and increasing scientific research to inform wildlife trade management decision making. This process in turn catalysed the *ASEAN Wildlife Law Enforcement Network* to be launched in December 2005 to address critical elements of wildlife trade law enforcement co-operation.



Session I

Issues and Challenges for Pangolin Protection in Asia

(Country Papers)

Sunda Pangolin *Manis javanica* Conservation in Indonesia: Status & Problems

Gono Semiadi, Dedy Darnaedi and Ahmad Jauhar Arief
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ABSTRACT: Indonesia is well known as the largest archipelago country in the world**,** with a vast fauna and flora characterized by Indomalayan elements. The implication of such species richness is that managing the country's biodiversity resources is not as simple as one could imagine since there are a number of complicated socio-political-economic complications. The Conservation on Biodiversity and Ecosystems Law no.5/1990 is the backbone foundation in dealing with the conservation, protection and utilization of Indonesian wildlife. Indonesian Management and Scientific Authorities work together to implement the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) convention with a rigid wildlife import and export permit system, as well as many aspects related to wildlife utilization and for international trade systems. Indonesia is the only country within the CITES which implements the quota system not only for species included in the Appendices of CITES but also for non CITES-listed species. Loss of habitat, due to illegal logging, in support to regional autonomy development, illegal trade and mismanagement of forestry policy issues are the main factors that lead to the disappearance of wild species populations. The trade in pangolin *Manis javanica* has long been a global issue, with the main problem being a very high demand of pangolin from China. Unfortunately, the international commitment to curb the illegal pangolin trade endorsed in 2000 seems unsuccessful. At least 49 662 pangolins since 2002 were detected to have been smuggled from Indonesia. An Indonesian proposal is to open up the legal trade under strict monitoring for a short period of time (three to five years), particularly for specimens of Indonesian origin with China as the major end market. Soon after that, population and market surveys should be carried out, trade dynamics should be monitored, biological research should be encouraged and co-operation on monitoring between countries' importers and exporters should be enhanced, as this is the basic ground for reliable NDF study. When the Parties prefer keeping the ban intact, strong law enforcement should be made in the country of origin and international commitment should be enforced to curb the illegal pangolin trade. The effectiveness of such commitment should be reviewed every three years.

Keywords: pangolin, *Manis javanica*, trade, Indonesia, China.

INTRODUCTION

Indonesia is well known as the largest country in the Southeast Asia and as the largest archipelago country in the world, covering an area of 1 920 000 km^2. At its greatest extent, the country stretches for about 5200 km, covering almost 17 000 islands, with 990 permanently inhabited. Human population reaches nearly 240 millions, and yet Indonesia is still a developing country. As an Archipelago country, Indonesia has land and sea borders with six countries (Malaysia, Singapore, Philippine, Papua New Guinea, Timor Leste, Australia).

Indonesian's fauna and flora are characterized by Indomalayan elements. Many of the animals living on the plateau are significantly different from the surrounding region (e.g. Sulawesi, Papua). There are at least 599 species of mammals (second largest of the world), 1598 species of birds (fourth largest): 372 being endemic and 149 migratory, 754 species of reptiles (third largest) and 278 amphibian species (ninth largest) (Natus,

2005; Wilson & Reeder, 2005; Sukmantoro *et al.,* 2007,). Endemic fauna is also ranked in the highest number among other tropical/sub tropical countries. Of all those species, about 40 faunal species are of high utilization in international wildlife trade, and are listed under Appendix II of CITES.

Table 1: List of highly demanded Appendix species from Indonesia

Class	Number of Species
Mammals	2
Reptiles	31
Aves	0
Insects	0
Pisces	7

The implication of such species richness is that managing the country's biodiversity resources is not as simple as one could imagine since there are a number of complicated socio-political-economic conditions.

LEGISLATURE

Since the Dutch colonization, a significant number of measures have been taken to protect wildlife populations and habitats in Indonesia. The Conservation on Biodiversity and Ecosystems Law no.5/1990 (*Undang-undang no. 5, 1990; Undang-undang Konservasi Sumber Daya Alam Hayati dan Ekosistem*) is the backbone foundation for dealing with the Indonesian wildlife conservation, protection and utilization. Supporting regulations were then issued such as Government Regulation no. 7/1999 on Conservation on Flora and Fauna (*Peraturan Pemerintah Nomor 7 Tahun 1999: Pengawetan Tumbuhan dan Satwa*) and the List of Protected Wildlife Species. On the Ministerial level, a number of Minister Regulations were also issued such as regulation on capture and hunting of wildlife for commercial and scientific purposes; regulation on captive breeding establishment and monitoring system; and regulation on harvesting from the wild.

Indonesia ratified the CITES convention through a Presidential Decree in 1978. The Indonesian CITES Management Authority (M.A.) was set up in the Ministry of Forestry (c/q Directorate General of Forest Protection and Nature Conservation, Directorate of Biodiversity Conservation) and the CITES Scientific Authority (S.A.) was set up in the Indonesian Institute for Sciences (c/q Research Centre for Biology LIPI). Both authorities work together to implement the CITES convention with a rigid wildlife import and export permit system, as well as many aspects related to wildlife utilisation and for international trade systems. Collaborative efforts undertaken by both the CITES M.A. and S.A. have always been devoted to the monitoring of wildlife utilization, starting with the evaluation of captive breeding facility for commercial purposes, the control of inter-island traffic of wildlife for commercial purposes through the local transport permit system, and the assessment of wildlife populations for quota recommendation.

Indonesia is the only CITES member to implement a quota system not only for the CITES-listed species but also for non CITES-listed species. This was initiated as a way to control wildlife populations, taken from the wild (for commercial & non-commercial purposes), as early as possible, thus, making it easier for the implementation of national wildlife management and use. Mostly all basic research on wildlife (flora & fauna) for CITES related data are carried out by the Indonesian Institute for Sciences (c/q

Research Centre for Biology LIPI, Research Centre for Oceanic LIPI, Bogor Botanic Garden LIPI). Collaborative studies and data sharing are also conducted with the universities and local and foreign NGOs. Regular meeting are conducted, at least once a year, with local traders, the CITES M.A. and S.A., universities and NGOs, to discuss the quota recommendation, share opinions for the forthcoming year and discuss wildlife issues, including illegal trade and status.

PANGOLIN PROBLEM

The wildlife protection law in Indonesia was initially endorsed more than 18 years ago and many supporting regulations were produced to manage the Indonesian biodiversity. However the burden remains high and even getting heavier as the natural environment and the development of national economy changes rapidly. Loss of habitat, due to illegal logging, in support of regional autonomy development, illegal trade and mismanagement of forestry policy issues are the main factors that lead to the disappearance of wild species populations. Economical problems faced by local impoverished people seems to be the main problem driving illegal wildlife trade. Such a social weakness is then being exploited by "corrupted-mind" benefactors who act as poor people saviours by providing them with a little amount of money for any priceless wildlife specimens. Unfortunately such a basic reasoning has never been dealt with appropriately.

A case study of Malayan Pangolin *Manis javanica* problems can be seen in the Riau Archipelago. In Lingga district, Riau Kepulauan Province, pangolins are widely distributed in every island, big or small, but are predominantly found in the three biggest islands in the district, namely Kepulauan Lingga Dao, Kepulauan Singkep and Kepulauan Senayung. It was reported that pangolins were abundantly and easily found in dry bauxite hills and in rubber plantations covered with some stony area. Harvesting of wild pangolin in those areas has increased over the past three years (2005), mostly done by local people. The harvested pangolins are sold to small collectors within the area, who then transport the specimens to Singkep Island and ship to Jambi province, where bigger collectors are waiting to purchase them or ship them to Singapore, via Batam, for sale in the Singaporean markets. The current price of a live pangolin, paid by the first collector to local hunters, is around IDR15 000-20 000 per kg (USD1.6-2.10 at 2008 rates), and later paid by the big collectors between IDR50 000 and 100,000 per kg (USD5.25 to 10.5). Because pangolin collection started only recently in this area, the average weight of caught specimens is between three and seven kg, giving a significant net income of IDR45 000 to 60 000 (USD4.60 to 6.30) per animal. Local people minimal living cost is estimated at only IDR30,000 (USD3.10) per day due to current economy instability (Wirdateti, 2008, *pers. comm*.).

The international trade in pangolin has long been a global issue. The main problem comes from a very high demand in China. Initially, such a demand could be supplied by the specimens collected locally and from the surrounding countries. But as the supply went down, the demand turned to Malaysia and Indonesia. Anecdotal report of importation of pangolin scales from Java to mainland China occurred as early as 1925, but the growing human population and economy in South China have pushed the demand for pangolin derivatives to an unprecedented high level (Chan, 2001). Table 2 gives a few examples of pangolin smuggling cases; the actual figures could be far worse than that.

There are 22 official international harbours in Indonesia equipped with appropriate measures to tackle smuggling and close to a thousand small harbours without appropriate facilities. Such illegal activity is usually undertaken in the open ocean camouflaged with fishing activity or shipped as fish products. Irregular control at several check points are also conducted when tip off information is obtained. This is obviously problematical for law enforcerment officers in Indonesia. However, this could be tackled by trans-boundary co-operation, with anti-smuggling actions from neighboring countries such as Malaysia, Singapore and the Philippines. Unfortunately, the international commitment to curb the illegal pangolin trade endorsed in 2000 seems unsuccessful and high rates of pangolin smuggling seem undetected (Table 2). Nevertheless, over 15 000 pangolins were confiscated in Thailand in 2002, brought from Indonesia to Lao PDR and eventually China (Thailand Environment Monitor 2004).

SOLVING THE PROBLEM

Such a common commitment might be worth reviewing, and a more realistic method or approach for pangolin trade monitoring might be worth developing. A quota system for pangolin trade might need to be considered, for a short period of time (three to five years), as an alternative to the current CITES' prescription on pangolin trade, since such a ban seems unsuccessful. Soon after the quota system is opened, population and market surveys would be carried out, the dynamic trade monitored, biological research encouraged and co-operation on monitoring between importing and exporting countries enhanced. This is the starting point toward comprehensive and reliable studies for Non Detrimental Finding. Presently, illegal traders are taking advantage of low enforcement of the ban. After all, the major market for pangolins has always been China, where trade monitoring could be undertaken relatively unproblematicaly. At the same time, another more appropriate, method, should be developed, with more rigorous consultation with relevant bureaucracy in the relevant countries.

Public awareness activities have been relentlessly undertaken in Indonesia, but the results do not seem to meet the efforts. Moreover, information on pangolin trade has been lacking. This could worsen the future sustainability of this species as pangolins are easily hunted and hard to keep and breed in captivity (Srikosamatara, 2001). Apart from the Indonesian proposal to open the trade, particularly for pangolin populations of Indonesian origin, more attention should be given to pangolin conservation and management. Any confiscated live animals should be released immediately in their habitat or promptly re-exported to their country of origin and follow-up studies should be done to monitor their survival rate, reproduction and ecology. Current research other than ecology and taxonomy is very limited. So far we only found limited studies on pangolin in Indonesia, i.e. anatomy (Cahyono, 2007; Gofur, 2007), nutrition (Krisna, 2006) and morphology (Nisa, 2005; Ruhyana, 2007; Sari, 2007; Junandar, 2007). When the Parties prefer keeping the ban intact, strong law enforcement should be made in the country of origin and international commitment should be enforced to curbe the illegal pangolin trade. The effectiveness of such commitment should be reviewed every three years.

ACKNOWLEDGMENTS

We thank many contributors for sharing information and data on pangolins in Indonesia.

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Table 2: List of pangolin seizures originating from Indonesian between 2002 and 2008 (brackets indicate an approximative number of animal)

No.	Location of seizure	Destination	Life (Head)	Dead (head)	Carcass (kg)	Scales (kg)	Reference
	2002						
1	Thailand	China	15 000[1)]				CITES data
	2003						
2	Jakarta (Airport)	Hong Kong	149				Suara Pembaruan, 18 March 2003
	2005						
3	Bengkulu		15			11 (22)	Sriwijaya Post, 14 February 2005
4	Jakarta	Hong Kong		784	121.5 (20)	486 (972)	Bisnis Indonésia, 10 December 2005
	2006						
5	Jakarta		33				Kompas, 6 January 2006
6	Medan	Hong Kong	100	500		43 (86)	Kompas, 30 September 2006
7	Lampung (Port)	China		200			Koran Tempo, 10 November 2006
8	Jakarta	China	200				Metronews, 8 November 2006
9	Thailand	Thailand, via Malaysia	180				http://warthai.org/blog/?page_id=4
	2007						
10	Pekanbaru	Malaysia	40				Sriwjaya Post, 30 May 2007
11	Malaysia	China	168				http://www.reuters.com
	2008						
12	Palembang (3 big collectors)	China, Hong Kong	2250/month				Media Indonesia,10 January 2008
13	Padang		9	9			Post Metro Padang, 15 April 2008
14	Banjarmasin		10		20[2)]		Radar Banjarmasin, 30 March 2008
15	Banjarmasin				15[2)]		Kompas, 11 Maret 2008
16	Belawan (Port)		256				Sinar Indonesia Baru, 23 February 2008
17	Banjarbaru (Airport)				41		Banjarbaru Post, 14 March 2008
18	Hai Pong (Vietnam)	China			23 000 (3833)		www.traffic.org
	Sub-total		43200	1493	3929	1080	
TOTAL IN 6.5 YRS		**49 662**					

[1)] Approximate figures from dead, carcass, scales, [2)] approximate number of animal; 0.5 kg scale= 1 adult pangolin; 6 kg carcass=1 adult pangolin.

Trade in Pangolin

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ABSTRACT: The Agri-Food and Veterinary Authority (AVA) is the national authority responsible for CITES in Singapore. This presentation gives an overview of how AVA implements and enforces CITES, including enhancement of the national CITES legislation and measures taken to curb the illegal wildlife and pangolin trade.

Keywords: pangolin, Singapore, AVA, CITES, ASEAN-WEN

INTRODUCTION

All Asian pangolins *Manis* spp. are listed under CITES Appendix II. Since July 2000, there have been zero export quotas for Asian pangolins, which mean that all international trade is banned.

PANGOLIN TRADE IN SOUTHEAST ASIA

There have been several seizures of live pangolins and their parts within Southeast Asian countries and at international borders for the past few years. Measures have been taken to curb any illegal pangolin trade through Singapore.

NATIONAL LEGISLATION

The Agri-Food and Veterinary Authority (AVA) is designated as the CITES Management Authority of Singapore since the implementation of CITES in 1987. The Endangered Species (Import and Export) Act (ESA) was enacted in 1989 to give legal effect to CITES. The Act empowers authorized officers to search, enter and seize any illegal wildlife. It was reviewed and amended in March 2006 to enhance the enforcement powers and impose higher penalties (as shown in the table 1).

Table 1: The Endangered Species (Import and Export) Act (ESA), 1989

Legislations	ESA [Cap.92A] (before 1 Mar'06)	ESA 2006 (after 1 Mar'06)-Amendments
Increased penalties	SGD5000 (USD3400 at 2008 rates) per species; up to 1 year jail term	SGD50 000 (USD34 000) per scheduled specimen; jail term up to 2 years (up to max. of SGD500 000 (USD340 000))
More enforcement powers	Powers to control species in transit not clear	Enable authorized officers to check and seize species in transit
Refinements to definitions	No provision to take action on sale of non-CITES products claimed to be real specimens	Penalties imposed on such offences

INTERAGENCY COOPERATION

AVA works closely with the Immigration and Checkpoints Authority (ICA[1]) and the Singapore Police Force (SPF[2]). Upon receiving tip-offs by any party (AVA/ICA/SPF), the information would be disseminated to each other for follow-up action. There is a 24 hour duty mobile phone to call.

MEASURES

AVA networks with foreign CITES Authorities and non-governmental organizations (NGOs) for information relating to illegal wildlife trade. Training sessions and workshops on CITES issues are conducted regularly for AVA enforcement officers and other enforcement agencies. AVA conducts regular inspections of pet shops, traditional Chinese Medicine (TCM) shops and wildlife consignments. AVA also educates the wildlife traders about CITES regulations and raise public awareness via brochures displayed at checkpoints, circulars, AVA website, hobbyist forums e.g. pet-related internet classifieds and talks etc.

SUCCESS STORIES

Case 1: Illegal import of pangolins

In October 2003, AVA seized a shipment of 34 live pangolins, which was detected by the airport police. The shipment was illegally imported from Jakarta, Indonesia, and was intended for re-export from Singapore. It was falsely declared as plastic wrappers with a fake consignee on the airway bill. The offender, a freight forwarding agent, was compounded SGD1000 (USD680).

Case 2: Transshipment of Asian Box turtles

In June 2006, there was a seizure of 2520 Malayan box turtles at the fishery port. It was the first case involving transit of CITES species without CITES permits under the amended ESA. The shipment was a transit from Indonesia to Hong Kong. The turtles were eventually repatriated to Batam Conservation Unit Office in Indonesia. The captain of vessel was fined SGD20 000 (USD13 610) and sentenced to five month's jail.

Case 3: Illegal import of hard corals

In June 2005, a shipment of 14 CITES species of hard corals and giant clams mixed with ornamental fishes and soft corals which was imported without CITES permits was detected by ICA and subsequently seized by AVA. The offender was fined SGD56 000 (USD38 120).

Case 4: Smuggling of live reptiles

In April 2008, a traveller was detected by airport ICA, smuggling some live geckos and frogs from Thailand. Twenty one of the 25 reptiles were CITES-listed species. The animals were hidden in cloth bags and plastic containers. The offender was fined SGD5500 (USD3740).

[1] Consists of land, sea ad air checkpoints
[2] Includes airport police and coast guard

COLLABORATION

In December 2005, Singapore became a member of the ASEAN-WEN (Association of SEA Nations – Wildlife Enforcement Network). ASEAN-WEN focuses on enhancing wildlife law enforcement at the national level and increasing cooperation between government authorities. The second ASEAN-WEN meeting was held in Malaysia in January 2008 and the third was held in Lao P.D.R. in May 2008.

In September 2007, the China-ASEAN Wildlife Law Enforcement Exchange was held in Guangzhou and it involved enforcement officers from Singapore, Malaysia, Thailand, Indonesia, Philippines and China. Capacity building courses like species identification workshops have been conducted and participated by officers from AVA, ICA and enforcement agencies from neighboring countries. Workshops that have been conducted recently included the Reptile Identification workshop (3 – 5 October 2007), Ramin Identification workshop (30 October – 2 November 2007) and Slow Loris Identification workshop (13 June 2008).

Pangolin Trade in Sabah, Malaysia

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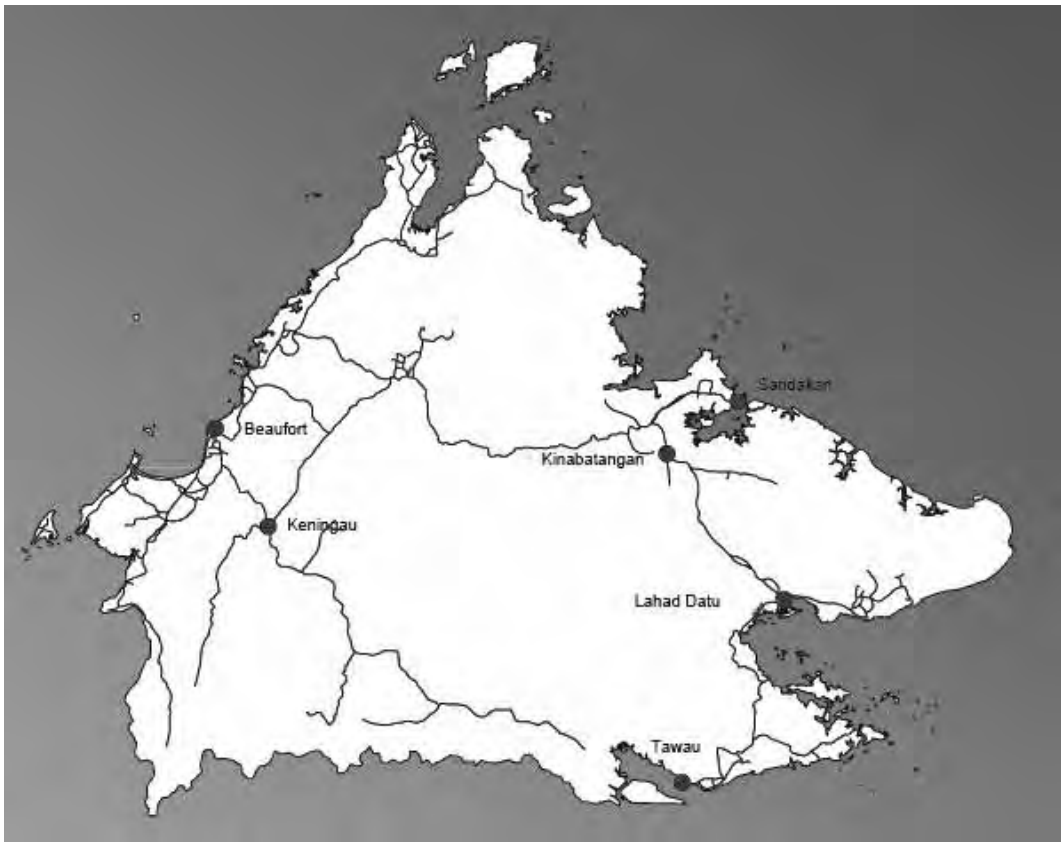
POPULATION STATUS OF PANGOLINS

Pangolins are rarely seen. During a WWF Sabah Wildlife study the survey team did not record many. There is no study on the distribution and abundance of pangolins in Sabah. They are believed to be widely distributed, mostly in secondary forest and in cultivated areas but they are not common. Pangolins are known to local people throughout Sabah. Only small numbers are reported in most of the seizures made in several districts (the biggest seizure included 56 specimens) which confirm they are not common

Figure 1: Map of locations in Sabah where pangolin seizures were reported



PROTECTION STATUS OF PANGOLIN

Pangolins are listed in Part I of Schedule 2 as Protected Animals under the Wildlife Conservation Enactment 1997. This means that a hunting license is required but Sabah has adopted the precautionary principle and do not allow any hunting until a Non Detrimental Finding (NDF) study has been carried out. Therefore all hunting of Schedule 2 listed species is illegal, including pangolin.

There is a penalty for hunting without license and the fine is of MYR50 000 (USD14 320 at 2008 rates) or a five-year imprisonment or both. The penalty for possession of Part I of Schedule 2 and CITES Appendix II listed species without a license is a fine of MYR30 000 (USD8590) or a three-year imprisonment or both. The Penalties for taking specimens out of the State without a permit is a fine of MYR50 000 (USD14 320) or a five-year imprisonment or both

HUNTING LICENSE

The requirement to issue a hunting license for species listed in Part I of Schedule 2 requires the Director to issue a notice published in the *Gazette* providing the following information:

- The total number of animals of each species listed in Part I of Schedule 2 that may be hunted.
- The number of animals of each species listed in Part I of Schedule 2 that may be hunted.
- The maximum number of animals of each species listed in Part Part I of Schedule 2 that any individual may be licensed to hunt.

However, the Sabah Wildlife Department has never issued such notice. Therefore, hunting of Part I Schedule 2 species is not allowed.

HUNTING AND TRAPPING OF PANGOLIN

Hunting of pangolins is mostly opportunistic; they are captured in villages and in the forests whenever encountered by villagers. There is no organised structure for pangolin hunting in Sabah.

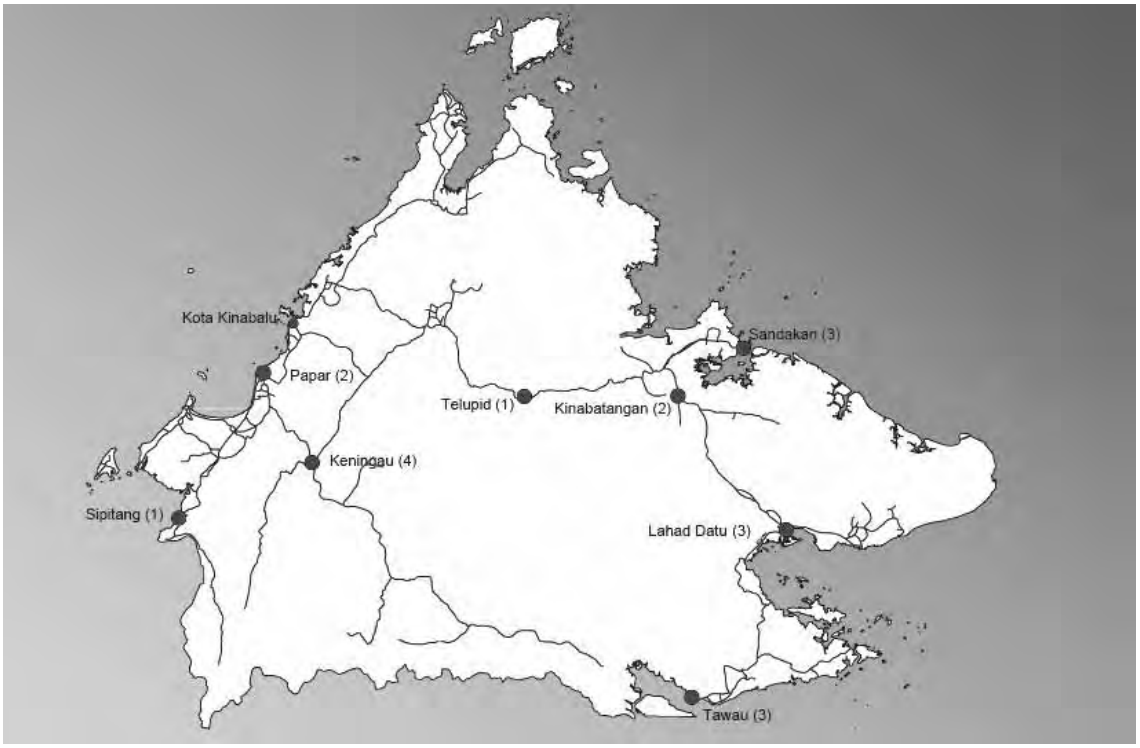
ILLEGAL TRADE

The first case of illegal possession involving pangolin in Sabah appeared in 2002 when a trader was found in possession of 54 kg of pangolin's scales believed to be meant for export. In 2005, a police road block, set along Sandakan-Kota Kinabalu road, arrested a lorry which was carrying 530 frozen pangolins put in 100 polystyrene boxes. The consignment was believed to be meant for smuggling out of Sabah. The Sabah Wildlife Department believe that smuggling methods include mixing frozen pangolin boxes with boxes containing marine products. However most seizures involve live animals and scales. Subsequent law enforcement activities resulted in the arrest of people involved in collecting pangolins from trappers. However, none of the smugglers have been detected so far due to a lack of co-operation from those arrested. Table 2 gives a list of seizures carried out in Sabah between 2002 and 2008 and figure 3 shows the number of seizures by district for the same period.

Figure 2: Pangolin seizure cases in Sabah from 2002 to 2008

Year/District	2002	2005	2006	2007	2008	Total
Tawau	-	-	2	1	-	3
Lahad Datu	-	-	2	1	-	3
Kinabatangan	-	-	2	-	-	2
Sandakan	1	1	1	-	-	3
Telupid	-	-	1	-	-	1
Keningau	-	-	1	3	-	4
Papar	-	-	-	1	1	2
Sipitang	-	-	-	1	-	1
TOTAL	**1**	**1**	**9**	**7**	**1**	**19**

Figure 3: Pangolin seizures by District from 2002 –2008



ENFORCEMENT ACTIONS

Court prosecutions must be carried out to deter offenders. Almost all cases have been prosecuted. The maximum sentence included a fine of MYR20 000 (USD5720) and a four-month jail term. Only one compound was issued to five people in a car for MYR10 000 (USD2860).

Continuous surveillance and enforcement activities, especially dedicated to pangolin trapping and smuggling activities, are required. It is thus important for us to work in colaboration with other Government law enforcement agencies such as the Police, the Forestry Department MMEA, Customs, the Fisheries Department and LKIM to detect illegal activities involving pangolin and other protected species. The Sabah Wildlife Department has also initiated an Honorary Wildlife Warden Programme, including 550 volunters representing different local communities and skateholders in the State. These people have been appointed to help the department in decreasing wildlife crime.

CHALLENGES

With 64 enforcement officers, the Sabah Wildlife Department only has limited number of staff to cover the whole of Sabah. More than half of our manpower is allocated to zoos and rehabilitation centres.

Smugglers, trappers and middlemen are difficult to detect without informers. It is thus very important to identify reliable informers. Informers are often people who work with the smugglers; we often play on the rivalry between gangs. Figure 4 shows some example of smuggling techniques. Most traders use local car brands, like Proton, which are very common in Malaysia.

Figure 4: Example of mode of transport and methods for pangolin smuggling

Pangolin in Brunei Darussalam

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ABSTRACT: Locally known as Tenggiling, *Manis javanica* is the only Pangolin species recorded in Brunei Darussalam. This mammal is not well-known in the country and is not targeted by hunters as most local Bruneians do not eat the meat. In the olden days, natives in Brunei used Pangolin scales for making an armour and netting rings. There is no specific study on Pangolin in Brunei Darussalam. The Brunei Museums Department has recorded only 20 individuals surrendered by members of the public since 1967, stumbled upon crossing the roads. A few of them were kept as specimens in the Natural History Section of the Brunei Museums Department and the rest were released again in protected areas. Most of these individuals were found in towns and residential areas and had been lately seen and elusively crossing the roads. Pangolin is not an endangered species listed in the national Wildlife Act of Brunei Darussalam, however Brunei Darussalam is a member of CITES (Convention on International Trade in Endangered Species of wild fauna and flora) which helps to regulate illegal trade of the species in the region. There are no records of trade and confiscation of the species in the country. Brunei Darussalam is still largely covered by forests and coupled with local people do not hunt this mammal; it has attributed no immediate threat to its local population.

Keywords: pangolin, *Manis javanica*, trade, Brunei

INTRODUCTION

Locally known as Tenggiling, *Manis javanica* is the only known pangolin species occurring in Brunei Darussalam. They are not commonly seen. Usually these nocturnal creatures are claimed to have been seen wandering crossing the roads late at night, especially during the rain. This species is less known nationally and locally. No specific studies have being conducted on habitat preference, population size and ecological roles. They are almost a forgotten odd creature, living in developing areas where bushes, patches of secondary and remnants of primary forests are still thriving around.

Brunei Darussalam has a total land area of 5675 km^2 of which about 80% is forested (Map 1 and Table 1), (Ramos, 1996). Logging concessions have been restricted for local consumption only and therefore there is no large scale and immediate impact of deforestation and land degradation. This suggests that pangolins are still roaming freely without persistent disturbances by drastic physical development.

The human population of Brunei Darussalam reaches about 380 000 people, consisting largely of Malays and Muslims and residing mostly along the developed coastal areas (Benson-Colpi, 2007). Ethnic minorities live in the countryside in the southern part of the country. Muslims consider eating wildlife as unhealthy and many animals are considered sacred by ethnic minorities, for which hunting and killing activities are taboo. In this respect, pangolins are not targeted for delicacy or any other purposes. Their importance as a source of food and medicinal purposes do not prevail. Obviously these factors suggested that these odd and reptile-looking mammals are almost ignored in Brunei Darussalam.

DISTRIBUTION, HABITAT AND STATUS

Manis javanica is known to occur throughout the islands of Borneo, Sumatra, Java and Palawan in the Philippines (Cranbrook, 1987; Payne *et al.*, 1985; Veevers-Carter, 1979). In Brunei Darussalam there has been no specific study on this species. This species is not included in our National Wildlife Protection Act list (The Laws of Brunei, 1981). No overall data on distribution is available for this species. The Department of Brunei Museums, which is responsible for monitoring and enforcement of the national Wildlife Protection Act, has only recorded 20 individuals of pangolin surrendered by members of the public (Table 2). A few were kept as museum specimens and the rest were released in conservation areas such parks and forest reserves.

Considering the above data, their distribution is not very well known in the country. Most collected pangolins were stumbled upon crossing the roads, searching for food in residential areas or were accidentally caught by nets meant to protect crops. This is a clear indication that pangolins are known to occur in surrounding disturbed areas in cities, towns and villages fringing with fragmented forests. We do not have any information on pangolin abundance in primary forests, which represent more than half of Brunei total land area.

HUNTING

In Brunei Darussalam, the Malays, of Muslim religion, comprise about two thirds of the country's total population (Benson-Colpi, 2007). Apart for some species of deer, wild pigeons and doves, the Malays consider eating wildlife meat as unhealthy, especially monkeys and those odd, unique and rare species. Minority ethnic groups, who mostly live in the country side, consider many of the wild animal species as sacred and hunting or killing them is taboo. Definitely, pangolins are odd, reptile-looking animal and are not on the hunting list.

COLLECTION

A few specimens of pangolins, collected in Brunei Darussalam, are exhibited in the Natural History Gallery of the Brunei National Museum at Jalan Kota Batu, in the capital city of Bandar Seri Begawan.

In the olden days, native ethnic groups used pangolin scales for making armors, buttons and netting rings. This traditional practice was however replaced by alternative materials more readily and easily available. These traditional artifacts are not available in the Brunei Museum's collection and I have only seen them personally once kept as private belongings.

TRADE AND MONITORING

Wildlife trade in Brunei Darussalam is insignificant. Rules and regulation on trade have been consistently enforced by several related government authorities comprising the Royal Custom and Exercise Department, the Royal Brunei Police Force, the Museums Department, the Agriculture Department, the Forestry Department and the Fishery Department. These enforcement authorities have been more active since Brunei Darussalam became the 106th member of CITES in 1990. In fact the Brunei Museums Department is a government agency responsible for both managing the Wildlife Protection Act (since 1981) and as the CITES Management Authority (from 1990 till 2004).

Exotic and wild animals are hardly to be seen in local markets, though you may see exotic birds, rabbits, cats, reptiles and fishes in pet shops. However none of those species are internationally protected especially in compliance with CITES (Convention on International Trade in Endangered Species of wild fauna and flora).

CONFISCATION

Though wildlife trade is insignificant in Brunei Darussalam, inbound items or artifacts associated with wildlife products are always of a concern. The front-line, Custom Authority, is always on alert at several check-points; overland, international airport, seaports and waterways had intercepted and confiscated several animal products such as Tiger reproductive organs, claws and skins, elephant tusks, deer trophies and several thousands of marine turtle eggs. There has been no confiscatation associated with scaly pangolins.

THREATS

We are quite aware that habitat conversion, modification and destruction and unregulated trade are the main factors that contribute to pangolins vulnerability to human exploitation. However, in Brunei Darussalam, pangolins are not sought after and trade is thus not a problem. There is no hunting activity specifically targeting pangolins, even for population found nearby residential areas.

The national Wildlife Protection Act of Brunei, which lists only 34 species of birds, mammals and reptiles, does not include pangolins (The Laws of Brunei, 1981). This indicates that most species of wild fauna are not immediately at risk or threatened. It is hoped that this level of high wildlife conservation effort will be maintained in the long run. Internationally however, Brunei Darussalam, a member of CITES, intend to maintain the spirit of regional and global collaboration in regulating the detrimental trade of pangolin meat and scales, occuring in neighbouring countries.

CONCLUSION

Pangolins are not well known in Brunei Darussalam. It can be said that pangolins are an ignored species, and certainly not endangered in this country, as their meat and scales are not known for local consumption. Up to date there is no record of this species being traded locally or nationally.

Brunei Darussalam is a well-educated and rich nation with a small population where trade and the consumption of wildlife are insignificant. Wildlife protection and conservation campaigns are regularly conducted for primary and secondary schools, government enforcement agencies and community leaders. We hope that this trend of lifestyle could also be maintained through regional cooperation among ASEAN member countries in minimizing the impact on wild population of pangolin.

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Conservation and Management of the Malayan Pangolin in Palawan Province, Philippines

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ABSTRACT: In the Philippines, the Malayan Pangolin *Manis culionensis* is endemic to Palawan province wherein the said species is known to be illegally traded as evident from the records of the Palawan Wildlife Rescue and Conservation Center (PWRCC), Provincial and City Prosecutor's Office, Legal Services of the Palawan Council for Sustainable Development Staff (PCSDS); and, as reported by the National Bureau of Investigation (NBI).

This collection pressure, along with the destruction of natural habitat/forest is the principal factor affecting species' survival in the wild. The Philippine government has national and local legislations/policies being enforced addressing the above-said issue. In the province of Palawan, Republic Act 9147 (RA 9147), otherwise known as the Wildlife Resources Conservation and Protection Act, has become the general guiding policy for the conservation, protection and sustainable management of wildlife resources including the Malayan Pangolin. This act is being implemented by the PCSD/S in the province of Palawan.

With all the legislations, policies and initiatives of the PCSD on the protection and conservation of wildlife resources, illegal trading on wildlife still goes on. Thus all factors affecting the situation, especially on Malayan Pangolin, were identified and corresponding remedies and solutions were recommended. These were attained by reviewing the relevant Philippine legislations on the protection and conservation of wildlife resources; by reviewing the implementation of RA 9147 and PCSDS' initiatives and programs; and, analyzing the records from the enforcement and agencies concerned.

Results showed that all the necessary schemes and strategies for conservation and protection of Malayan pangolin, including the reduction of Malayan Pangolin trading, are in place. However, their implementation is hindered by the following issues 1) no financial allocation and financial constraints; 2) weak enforcement; 3) insufficient technical capability; and, 4) population in the wild unknown. Thus, the following are being recommended 1) PCSD should strengthen its partnerships with the Non-government Organizations (NGOs), Local Government Units (LGUs), academe and Law Enforcement Agencies; 2) Enforcement officers to undergo further and extensive training on identification of wildlife species not allowed for trading and detection of concealment methods; 3) Conduct more trainings for the deputation of Wildlife Enforcement Officers (WEOs) and provide economic incentives for them; 4) establish wildlife traffic monitoring units and identified hotspot areas; and, 5) Conduct population survey to estimate population of Malayan Pangolin in the wild.

Keywords: Malayan pangolin, *Manis culionensis*, Palawan, Philippines, PWRCC

INTRODUCTION

Background

The Malayan Pangolin is one of the three species of Pangolins that is widely distributed in Southeast Asian countries. It is scientifically recognized as *Manis javanica* Desmarest, 1822. In the Philippines, Malayan Pangolin is endemic in the province of Palawan, wherein it is commonly called as "Balintong". Presently, this Malayan Pangolin, along with the other wildlife species, is a subject to global trading primarily

because of the demand for wildlife luxury and food products; traditional medicines as well as exotic pets (Traffic, 2007). In Palawan, its scales are believed to cure asthma and used as a protection against witchcraft (Interview 2008); and its meat as food (KFI).

Recently, a study was conducted on wildlife trading in Palawan, Philippines wherein Malayan Pangolin or "Balintong" is said to be one of the frequently traded species in the province (KFI). It is also shown in the records of the Palawan Wildlife Rescue and Conservation Center (PWRCC) of the Department of Natural and Natural Resources (DENR) that there were species being turned-over for custody since 1999 up to the present. The National Bureau of Investigation (NBI) also revealed that during the month of April 2008, there were about 2,000 kilograms of live specimen being transported out of Palawan.

This collection pressure, along with the destruction of natural habitat and forest, which has been occurring for a long time (TRAFFIC) are the principal factors affecting species' survival in the wild. Thus, the Philippine government is committed to addressing this global issue by partnering and forging agreements with the internationally recognized scientific institutions; and, promulgating national legislations.

Philippines is a party/member to a different international agreements geared towards the protection, conservation and sustainable use of the earth's natural resources, which include Malayan Pangolin, such as, among others, the Convention on Biological Diversity (CBD), Convention on International Trade of Endangered Species of flora and fauna (CITES) and International Union for the Conservation of Nature and Natural Resources (IUCN). Further, it has promulgated several relevant national legislations for the protection of natural resources which include wild flora and fauna (Annex A).

In Palawan, there are two legislations being implemented by the Palawan Council for Sustainable Development (PCSD) – the Republic Act 7611 *("Strategic Environmental Plan Law for Palawan", or the SEP Law*) and Republic Act 9147 *("Wildlife Resources Conservation and Protection Act", or the Wildlife Act*). The former is a special law being enforced to ensure the sustainable use of natural resources. It is a landmark legislation which serves as an overall framework for the province through the complementary activities of development and conservation of its natural resources while the latter is a national law which aims to conserve and protect wildlife species and their habitats; regulate the collection and trade of wildlife; pursue with due regard to the national interest the Philippine commitment to international conventions, protection of wildlife and their habitats; and, initiate or support scientific studies on the conservation of biological diversity.

In consonance with the Wildlife Act, the PCSD has formulated and approved for implementation PCSD RESOLUTION No. 06 – 309-A entitled "A Resolution Approving the List of Terrestrial and Marine Wildlife in Palawan and their Categories Pursuant to Republic Act 9147" that enlisted Malayan Pangolin as Endangered (EN).

Objectives

With all the legislations and initiatives of the Philippine Government including the Palawan province on the protection and conservation of wildlife resources, illegal trading on wildlife still goes on. Thus, all factors affecting these situations, especially on Malayan Pangolin trading have to be identified properly in order to efficiently and effectively address the issue towards the end-goal of conserving and protecting the species.

METHODOLOGY

These were the steps and methods used to attain the objective: -

Reviewed the relevant Philippine legislations on the protection and conservation of wildlife resources;

Reviewed the implementation of RA 9147, PCSDS' initiatives and programs and studied some relevant topics;

Collected data from PWRCC; Provincial and City Prosecutor's Office; PCSDS Legal Services as well as its Multipartite Quick Response Team (MPQRT).

RESULTS AND DISCUSSION

Legislations

There is no particular legislation that provides protection and conservation of Malayan Pangolin. Instead, it is encompassed in a Presidential Decree, Presidential Proclamation and a Republic Act. (See Table 1 below):

Table 1: Philippine legislations related to the conservation and protection of wildlife

	Legislation							
Provision/Conservation Measures	PD 705	Act 1798	PP 1578	RA 7586	RA 9147	RA 7611	RA 7060	*EO 515-06
Policy Formulation				x	x	x	x	
Research & Development					x			
Enforcement & Monitoring	x				x			x
Permitting	x	x			x			
Population Enhancement			x	x	x		x	
Information and Education Campaign					x	x		x
Creation of Protected Areas				x	x	x		
Penal Provision	x			x	x			
Funds Appropriation	x					x	x	
Implementing Agency	DENR	Int. Sec	Co-mgt	DENR	PCSD	PCSD	LGU	

Among the legislations cited above, only RA 9147, otherwise known as the Wildlife Resources Conservation and Protection Act or commonly known as the "Wildlife Act" has the most provisions on conserving and protecting wildlife. In PCSDS, this has become the general guiding policy concerning the management and utilization of wildlife in the province, however, no funding support was provided for its implementation

Further, RA 9147 enables the implementation of the agreements made among the member-countries, "Parties" of CITES. This Act does not prohibit the collection of any flora and fauna from the wild. It only regulates the collection through the issuance of necessary permits like Wildlife Collector's Permit and Wildlife Farm Permit. Permits are given only to scientific researches and studies as well as commercial breeding with conservation breeding. In line with this, Malayan Pangolin may be legally traded

locally and even in international markets as long as it is being bred in captivity. At present, the PCSD has not granted any permit to undertake farming or breeding of Malayan Pangolin in captivity. Therefore, all specimens collected from the wild and being traded are considered illegal.

Issues/Problems

The PCSD and its staff have been implementing RA 9147 in the province of Palawan since it was approved on July 30, 2001 without any financial allocation appropriated by the government. This is a very significant factor affecting the efficient and effective implementation of the said law.

Implementation of RA 9147 and the Joint DENR-DA-PCSD Admin. Order # 1: Implementing Rules and Regulations (IRR) of RA 9147 in the Province of Palawan

The ultimate purpose of addressing the issue on Pangolin trading is to ensure that a viable population shall remain in their respective range states for species and genetic perpetuity. Thus, conservation and protection measures for wildlife resources (Table 2) including the Malayan Pangolin, being implemented by the Palawan Council for Sustainable Development (PCSD) in the province of Palawan, Philippines pursuant to RA 9147, are indirectly responding to the issue on Malayan Pangolin trading:

Table 2: PCSDS' initiatives pursuant to RA 9147

Activity	Accomplishment
1.Policy Formulation	PCSD Resolution Nos.: 04-243: Adopting the procedural guidelines pursuant to the Joint DENR-DA-PCSD Admin. Order No. 1;and, fees and other guidelines pertaining to the registration of threatened, non-threatened and exotic faunal species 05-245: Setting the period for registration of threatened, non-threatened and exotic faunal species in the possession of private persons in the province of Palawan 06-278: Guidelines in the enforcement and monitoring of wildlife pursuant to RA 9147 06-309-A: "A Resolution Approving the List of Terrestrial and Marine Wildlife in Palawan and their Categories Pursuant to RA 9147" 06-313-A: Prescribing the requirements and procedures for the deputation and designation of Wildlife Enforcement Officers (WEOs) 06-279: Guidelines for the disposition of confiscated, donated or turned over wildlife 07-332 & 333: Registration of terrestrial and aquatic flora and fauna in the possession of private entities/individuals and gov't. agencies 07-366: Implementing guidelines governing the sustainable use of selected beetle species in Palawan for commercial purposes
2.Research and Development	A study on the sustainable use of beetle was conducted with the technical and financial assistance from Conservation International-Philippines
3.Permitting System	Gratuitous Permit: ; Wildlife Farm Permit: , Wildlife Collector's Permit: ; Local Transport Permit: ; Wildlife Special Use Permit: ; SEP Clearance:*

Activity	Accomplishment
4.Establishment of critical habitats	No critical habitat has been established
5.Deputation and Designation of Wildlife Enforcement Officers (WEOs)	5 Trainings for the deputation and designation of WEOs were conducted in consonance with PCSD Reso. No. 06-313-A Individuals were deputized as WEOs
6. Establishment of National Wildlife Research Center	The Research and Policy Division of the PCSDS operates for the purpose, among its other functions It has environmental library
7. Establishment of Wildlife Rescue Center	Only one center has been established; a guidelines for the establishment has been drafted; conducted initial consultation with the municipality of Brooke's Point and Quezon, Palawan, Philippines for the establishment of a rescue center, through a Memorandum of Agreement (MOA), in their respective municipalities
8. Creation of Wildlife Traffic Monitoring Units	No Wildlife Traffic Monitoring Units have been created, but the supposed functions of the units are embodied in the MOA forged among the members of the Multi-Partite Quick Response Team of the PCSDS (refer to topic D below). Thus, members act as such in their respective jurisdictions
9. Creation of a Wildlife Management Committee	A Wildlife Sub-committee was created under the Environment and Natural Resources Committee of the PCSD The Sub-committtee has made its research agenda, of which, Malayan Pangolin is one of the target species identified.
10. Establishment of a List of Economically Important Species	Enjoined to a workshop where the guidelines were reviewed for implementation in Manila, Pilippines

PCSD Resolutions are issued once a certain policy/guideline is approved by the Council itself for implementation. Six out of the seven PCSD Resolutions, directly and/or indirectly, cover the Malayan Pangolin.

No research has been conducted pertaining to pangolin conservation, specifically, estimating the wild population through surveys. It is necessary to determine the number of species left in the wild in relation to their habitats wherein an appropriate specific management action can be done.

PCSDS issues the necessary permits for the utilization of wildlife including Malayan Pangolin. Gratuitous permit is being issued for the collection of wildlife for scientific researches; Wildlife Collector's Permit for the collection of wildlife for scientific, commercial or conservation purposes; Wildlife Farm Permit for breeding; Wildlife Special Use Permit for special uses eg. exhibition, educational, documentary filming; Local Transport Permit may be issued only to those who have GP or WCP and WFP, or WSUP, or SEP Clearance. But the shipment is applicable only for transport going out of Palawan to another province within the Country. Up to now, none of these permits was issued involving Malayan Pangolin.

Establishment of Wildlife Rescue Centers play an important role in the survival of pangolins seized from illegal trading. There are only two rescue centers in Palawan, Philippines. The PWRCC is under the jurisdiction of the Department of Environment and Natural Resources (DENR) while the other one is managed through a Tripartite

MOA among the DENR, City Government of Puerto Princesa and PCSD. Thus, PCSDS has sought the assistance of the Local Government Units for its establishment in municipalities identified as "hotspot areas".

Creation of Wildlife Traffic Monitoring Units will definitely help to reduce illegal pangolin trading. But, as indicated above, there are none being created.

The creation of a Wildlife sub-committee (with research and IEC Teams) will augment the research need for pangolins and even increase awareness of the community on pangolin trading vis-à-vis wildlife conservation. The said sub-committee is composed of representatives from the academe, locally recognized scientific institutions/entity, NGO with advocacy on the conservation of wildlife and concerned government agencies.

Issues/Problems

Above all these, financial constraints limit the effective and efficient management and conservation of wildlife resources.

Trading/Collection

Turn over at PWRCC

PWRCC is the only repository in Palawan for confiscated, donated or turned over wildlife. It keeps a baseline data of Malayan Pangolin being subjected to illegal trading as shown in Table 3 below, but such data do not reflect the actual number of Pangolin involved in illegal trade. Among the animals that were turn over and kept at the center, pangolins have a lesser number. But, turn over of pangolin occurs almost every year.

Table 3: Annual turn over of Malayan Pangolin at PWRCC

Year	No. of Individuals
1998	6
1999	3
2000	4
2001	2
2002	0
2003	2
2004	1
2005	7
2006	0
2007	3
2008	2

Lesser number of pangolin being traded would imply two things; 1) its number/population in the wild/natural habitat is low thus, the number of individuals collected is less and/or 2) enforcement is weak, allowing illegal trading without having been apprehended a violator and confiscated the subject pangolin.

Apprehensions Involving Violations of WLDL Act

Apprehension or arrest of individuals involved in illegal pangolin trading is a deterent scheme thus, may reduce illegal trading. Table 4 below indicates the total annual apprehension as recorded at the City and Provincial Prosecutor's Office and the Legal Services of the PCSDS.

Table 4. Annual apprehension involving wildlife

Year	No. of Apprehensions
2002	3
2003	2
2004	6
2005	4
2006	8
2007	13
TOTAL	**36***

*Excluding cases directly filed at the MTCs

Of the 36 apprehensions, no pangolin was involved. But it cannot be deduced that illegal trading does not occur.

Issues/Problems

Sometimes failure to apprehend a violator and seize the involved wildlife is caused by the lack of knowledge of concerned enforcement officer on the identification of wildlife species not allowed for trading. Or, no knowledge at all in detecting the concealment methods used by the trader.

Cases filed in court by PCSDS Involving Wildlife

Filing of cases against violator/s is also a deterring factor that may lessen the number of pangolin involved in illegal trading. Table 5 below shows the number of cases filed in court involving wildlife.

Table 5: Cases filed in court involving wildlife

Taxon Group	No. of Cases
Mammals	11%
Birds	42%
Shell	22%
Insects	11%
Reptiles	11%
Fishes	3%

The 11% of cases involving mammal does not include pangolin. However, it cannot be assumed that there was no illegal trading involving Malayan Pangolin.

Issues/Problems

Definitely, due to the chain-effect principle, there was no case filed involving pangolin. There is a direct correlation between "apprehension" and "case filed". Thus, it can be assumed also that the lack of knowledge affects the filing of cases.

ENFORCEMENT AND MONITORING

Deputation and designation of Wildlife Enforcement Officers (WEOs); and, the creation of Wildlife Traffic Monitoring Units as described in Table 2 hereof are PCSDS' actions that can help reduce wildlife trade. However, with a few individuals being deputized as WEOs and the absence of Wildlife Traffic Monitoring Units, these may not significantly serve for the purpose. With this, members of the MPQRT, thru the PCSD Konek program are the ones addressing the illegal wildlife trading in Palawan, Philippines.

The MPQRT is a Provincial Multi-partite Quick Response Team that provides immediate action to reported illegal activities. It is composed of Apprehension, Legal, Prosecution and IEC Teams from 17 different member agencies (law enforcement officers, government agencies, non-government organizations, Local Government Units) which executed a Memorandum of Agreement (MOA) for the purpose.

The PCSD Konek 7007611 is an SMS based comprehensive Quick reporting/Response System linking PCSD/S to the general public anytime, anywhere with just a click of a finger (using mobile phone). It serves as a "Sumbungan" hotline which responds to different information received. It has a computer-based "centralized information system" featuring (encoding): Tipsters Reports, PCSD Activities, Accomplishments, Survey and Environmental Education content lines

The PCSD Konek Operation was launched on February 25, 2005. Its first phase ended in April 2007. Of the 300 reports filed in a SMS (23% on wildlife collection, 28% illegal fishing, 23% illegal timber cutting, 14% mangrove conversion cutting, 8% illegal quarry, 5% poaching/foreign vessel encroachment), about 70% acted upon by MPQRT.

Issues/Problems

Problems were encountered such as only the apprehension team was active; informants/tipsters have doubts on the credibility of certain agencies (identified certain agencies as less credible; financial limitations (fuel, operational costs); most operations resulted to confiscations of abandoned items and violators were unidentified; no "post-operation feedbacks" filed back to PCSD Konek; insufficient documentation resulting to unfilled cases; custody of evidence and apprehended person was weak resulting to escape of violator or release of evidence; appreciation of evidence by prosecution.

SUMMARY

There are eight Philippine national legislations related to the protection and conservation of wildlife resources, including Malayan Pangolin. One of these is the Republic Act 9147 or the "Wildlife Act" which has become the general guiding policy concerning the management and utilization of wildlife in the province of Palawan. It provides a comprehensive measures for conservation and management of wildlife resources that includes policy formulation; research and development; enforcement and monitoring; permitting; population enhancement; information and education campaign; creation of protected areas and penal provision/penalties.

In accordance with RA 9147, the PCSD, together with its partner-agencies has plans/programs/initiatives addressing the issue on Malayan Pangolin trading and conservation of the same species, along with the plans/programs for all the other wildlife resources in Palawan. These plans/programs include formulation of policies; research and development; issuance of permits prior to utilization; establishment of critical habitats; deputation of Wildlife Enforcement Officers (WEOs); establishment of Wildlife Research center; establishment of Wildlife Rescue Center; creation of Wildlife Traffic Monitoring Units (WTMUs), creation of Wildlife Management Committee; and, establishment of a list of economically important species.

Enforcement actions to reduce wildlife trade are evident from the records of the PWRCC on the turn over of confiscated Malayan Pangolin; records of the City and Provincial Prosecutor's Office and the Legal services of the PCSDS of the apprehensions made and cases filed in court involving wildlife.

The PCSD has created a Multi-partite Quick Response Team, under the PCSD Konek Operation, to augment the enforcement needs for wildlife protection and conservation.

CONCLUSION AND RECOMMENDATION

All the necessary schemes/strategies for conservation and protection of Malayan Pangolin, including the reduction of Malayan Pangolin trading, are in place. However, their implementation is hindered by certain issues/problems that need to be addressed in order to have an effective and efficient implementation.

Implementation of RA 9147 in the province of Palawan has no corresponding financial allocation appropriated by the government. This implies that all the programs/plans of the PCSD presented in this paper have no corresponding funds. With this, PCSD may strengthen its partnership with several NGOs to augment its technical needs for the conduct of researches and capability building trainings. It may also enjoin the Local Government Units for the establishment of wildlife rescue center. This should also strengthen its partnership with the different law enforcement agencies for better enforcement of the said act.

Seemingly, the enforcement of RA 9147, specifically on the collection and trading, is weak due to insufficient technical capability of the enforcement officers, allowing the illegal trading exist and even without apprehending the violators as well as confiscate the said species; or, the actual number of pangolin left in the wild is less thus numbers of pangolin collected is also less which resulted the absence of pangolin in confiscation data/reports.

With these, enforcement officers are recommended to undergo further and extensive training on identification of wildlife species not allowed for trading; and, training on detection of concealment methods for trading. Likewise, population survey on pangolin must be conducted in order to estimate/determine their population in the wild.

Operation of the PCSD Konek through the MPQRT seemed to be an efficient tool to reduce wildlife trade. However, due to financial constraints, along with the other secondary reasons, it did not operate for a long time. It is foreseen that re-activation of the PCSD Konek program will significantly reduce wildlife trade in Palawan including Malayan Pangolin.

ANNEX "A": PHILIPPINE LEGISLATIONS

National level

There is no particular legislation that specifically provides for the protection and conservation of Malayan Pangolin instead, it is being encompassed under the Philippine Constitution, in a Presidential Decree, Act, Presidential Proclamation and Republic Act, to wit:

The Philippine Constitution. This is the Supreme Law of the land which recognizes the presence of wildlife fauna, including Malayan Pangolin, and the need for its protection. Section 2 Article XII states that "All lands of the public domain, waters, minerals, coal, petroleum, and other mineral soils, all forces of potential energy, fisheries, forests or timber, wildlife, flora and fauna and other natural resources are owned by the State. With the exception of agricultural lands, all other natural resources shall not be alienated".

Presidential Decree No. 705 (Revised Forestry Code). PD 705 was approved on May 19, 1975 and was amended several times. This provides that all measures shall be adopted to conserve wildlife. It further provides that the Director of the Forest Management Bureau of the Department of Environment and Natural Resources (DENR) shall regulate the hunting of wildlife in forest lands in order to maintain the ecological balance of flora and fauna.

Destruction of wildlife resources is penalized with a fine of not less than PHP100.00 (USD2.10 at 2008 rates) for each violation and an additional penalty of denial of a permit for a period of three years from the date of violation.

Act No. 1798: "An Act to Provide for the Protection of Animal Life in the Philippine Islands"; Enacted October 12, 1907

Presidential Proclamation No. 1578: "Declaring the Calauit Island as a Game Preserve and Wildlife Sanctuary". Calauit Island is inhabited by Malayan Pangolin. (Truth: Field Laboratory of UPLB).

Republic Act No. 7586 (National Integrated Protected Areas System Act). NIPAS shall encompass outstandingly remarkable areas and biologically important public lands that are habitats of rare and endangered species of plants and animals, biogeographic zones and related ecosystems, whether terrestrial, wetland or marine which are designated as protected areas.

Under this RA, hunting, destroying disturbing or mere possession of any plants and animals or products derived therefrom without a permit is penalized. Fine of not less than PHP5 000.00 (USD105.60) or more than PHP500 000.00 (USD10 560), exclusive of the value of the thing damaged and/or an imprisonment for not less than one year but not more than six years. (Truth: Protected Areas Established> El Nido, etc)

Republic Act 9147 (Wildlife Resources Conservation and Protection Act). This was enacted on July 30, 2001 to enable the implementation in the Philippines the agreements made by and among the country members of the CITES. In its nationwide implementation, the DENR has the jurisdiction over all terrestrial species of wild fauna and flora while the DA over aquatic/marines species, except Dugong. However, in the province of Palawan, jurisdiction of the said agencies over terrestrial and marine/aquatic species is given to the PCSD pursuant to Republic Act 7611 (Strategic Environmental Plan for Palawan Act) or the SEP Law for Palawan.

The Law specifically provides a comprehensive conservation measures for all wildlife species such as the conduct of scientific researches; regulation for the collection and utilization of wildlife resources, local transport, importation, exportation; introduction, re-introduction or re-stocking of endemic or indigenous wildlife; creation of a Wildlife Management Committee for updating of wildlife information; establishment of Wildlife Traffic Monitoring Units (WTMU); deputation and designation of Wildlife Enforcement Officers (WEO); establishment of Rescue Centers; establishment of critical habitats.

Further, violation of the acts prohibited under this law has corresponding fines and penalties depending on the conservation status of the species involved.

Pangolin Conservation in Viet Nam

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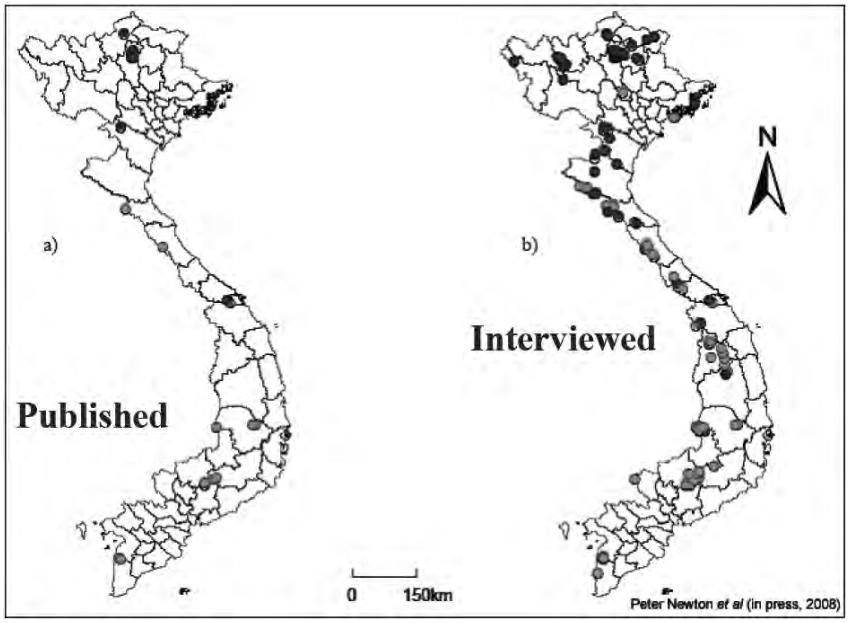
ABSTRACT: Being one of countries having the richest biodiversity values in the word, Viet Nam is home for many beautiful wild creatures. Nonetheless, wildlife in Viet Nam is critically endangered and threatened due to diffferent causes including poaching, habitat degradation, and illegal trade. There are two species of pangolin distributed nationwide in Viet Nam (*Manis pentadactyla* and *Manis javanica*). Nevertheless, these species are one of the most confiscated species from the illegal wildlife trade in Viet Nam. They are the victim of high demand and soaring price in domestic and international black wildlife market despite supporting legislations and conservation efforts from the Vietnamese government. Premilinary achievements of pagolin conservation on the ground in Viet Nam have been gained and promoted including scientific reseach, rescue effort, awareness raising, and law enforcement. However, threats to the survival of these species remain in Viet Nam. More conservation, law enforcement and rescue actions, , as well as further co-operation and support efforts from the Vietnammese government and outside are needed to secure the survival, recovery, and development of these species in Viet Nam.

Keywords: *Manis pentadactyla, Manis javanica*, Vietnam

INTRODUCTION

Two out of eight pangolin species are distributed in Viet Nam (*Manis pentadactyla* and *M. javanica*). Figure 1 shows the distribution of these two species, based on published reports and interviews with local people. Pangolins are one of the species confiscated in Viet Nam from the illegal poaching and trade. Viet Nam is identified as a route and transit point for illegal trade in Asia and has a long history of using wildlife for medicinal preparations. High demand and soaring price were recorded in markets, especially in some countries, for scales and meat.

Figure 1: Distribution of pangolin



SUPPORTING LEGISLATIONS AND CONSERVATION STATUS

- Group IIB/Decision No: 32-2006 (formerly Group IB/Decision No: 48-2002)
- Viet Nam Red Data Book -2007 (Endangered)
- Appendix II of CITES (Zero quota)
- IUCN Red Data Book -2007 (Nearly Threatened)

WILDLIFE MANAGEMENT AND CONSERVATION

A System of 144 Protected Areas (PAs) was established, including 30 National Parks, 58 Nature Reserves, 11 Species Protected Areas and 45 Landscape Protected Areas for a total area of 2.2 mio hectares.

A network of rescue centers (not pangolin specific) is available nationwide, including in Ha Noi, Cuc Phuong National Park, Ho Chi Minh City, and other National Parks.

The Forest Protection Department of Viet Nam is committed to field research with several field studies carried out in the country, including Pangolin surveys.

The Carnivore and Pangolin Conservation Program (CPCP), formerly known as Asian Pangolin conservation project (APCP), located in the Cuc Phoung National Park, is committed to securing a future for wild populations of threatened pangolins and carnivores in Viet Nam.

LAW ENFORCEMENT

Figure 2-5 presents some figures related to enforcement actions carried out in Viet Nam. Generally, the number of confiscated animals is decreasing which mean enforcement is in place.

Figure 2: Number of wildlife trade violations in Viet Nam

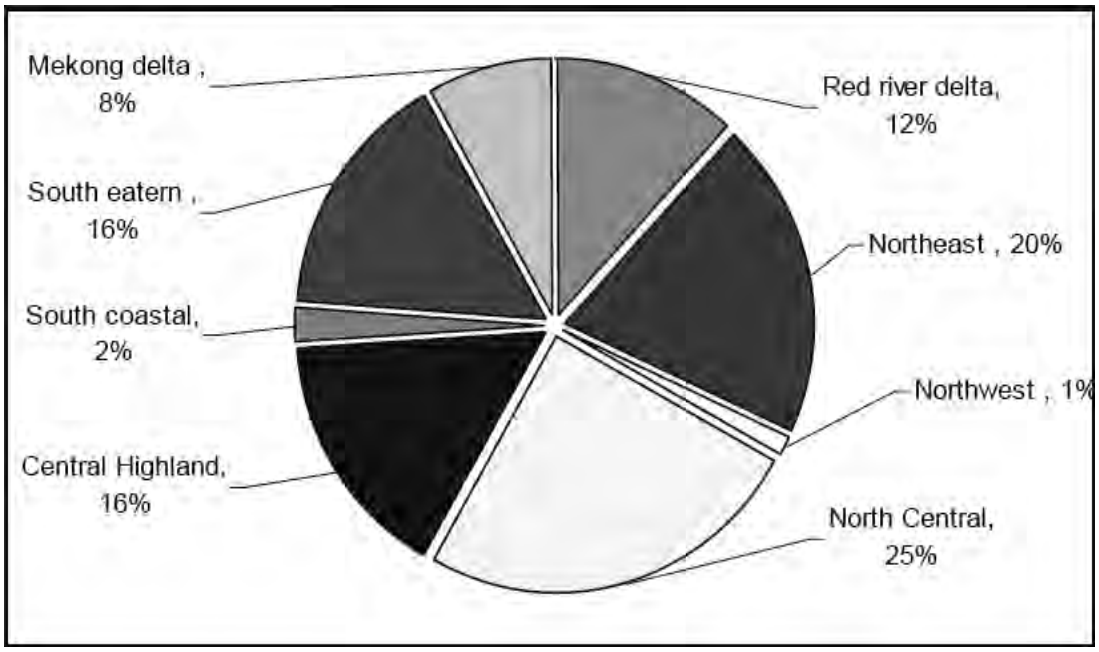


Figure 3: Violations cases of wild fauna management and protection (1997-3/2007)

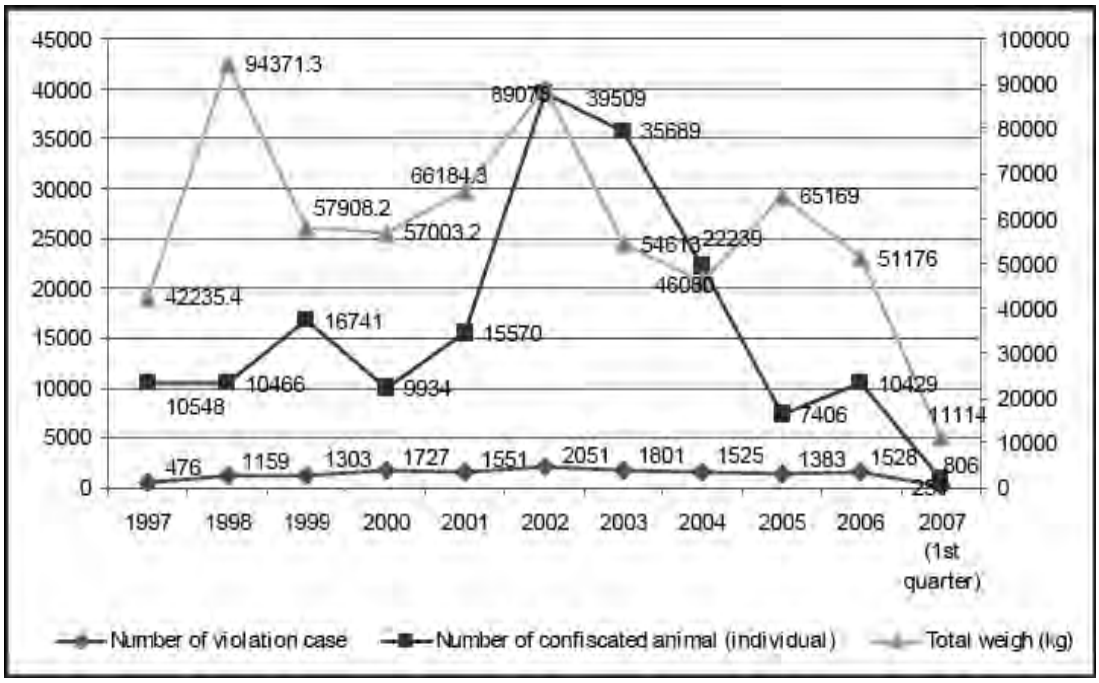


Figure 4: Confiscated animals from 1997 to March 2007

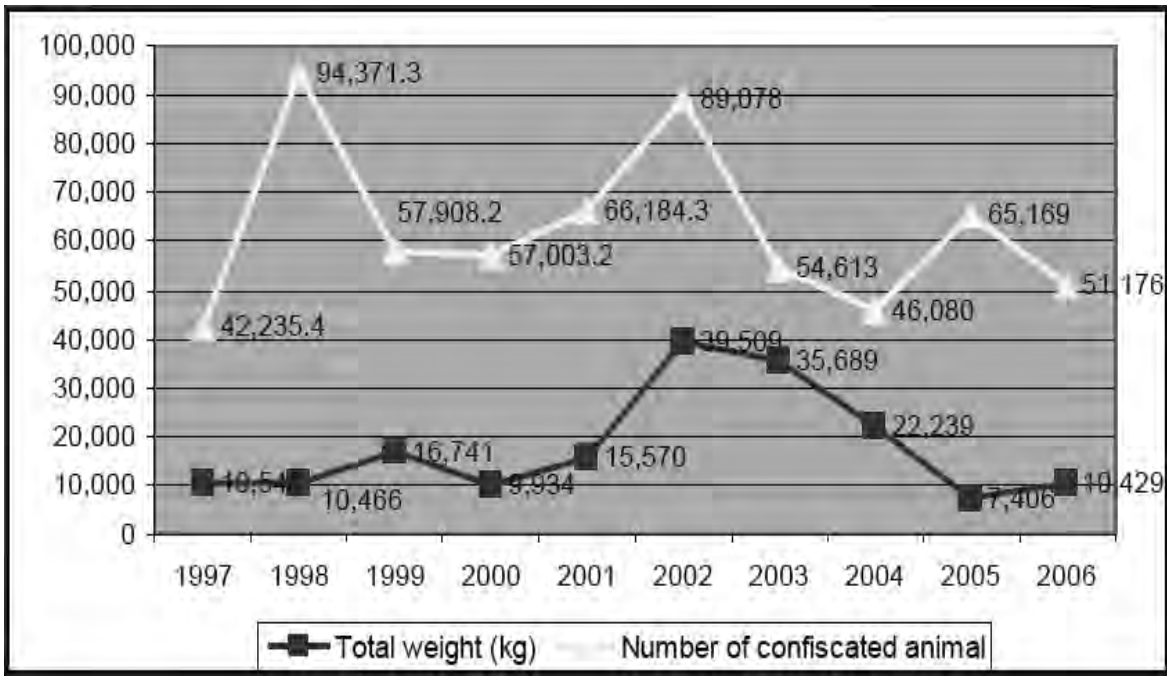
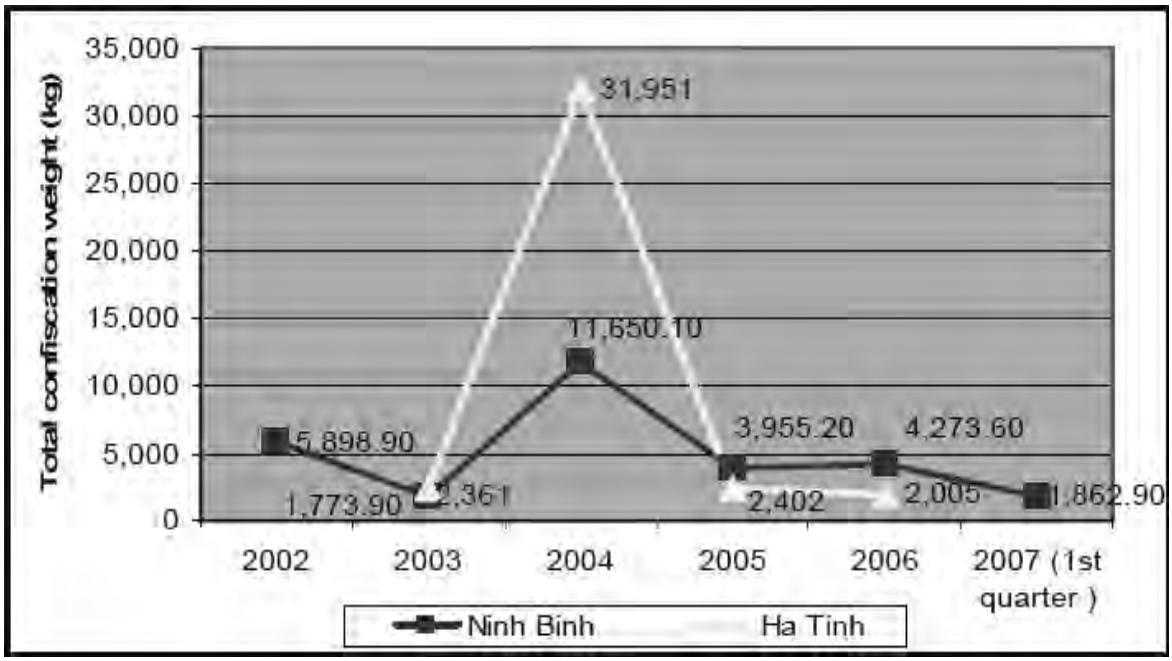


Figure 5: Confiscated animals from Ha Tinh and NinhBinh



OBSTACLES

- The trafficking of wildlife is difficult to tackle because of the high prices, the high demand and the fact that many different countries are involved.
- Damage and fragmentation of forests causes natural habitat loss.
- We lack scientific information on ecological behaviour.
- The Rescue and release of confiscated pangolin, particularly when involving a large number of specimens, represents a burden for Viet Nam. For example, in 2004, 60 tons of live pangolins were seized. Most died because no suitable location for release or rescue could be found.
- There is a poor awareness towards pangolin conservation and, generally, a need for more scientific information, necessary to promote wildlife conservation.

CONCLUSIONS AND RECOMMENDATIONS

The two species of pangolin found in Viet Nam are now critically endangered. Pangolins are protected under Vietnamese current policies and preliminary achievements on pangolin conservation exist in Viet Nam. The CPCP is a good example. The obstacles mentioned above remain the pending challenges to Viet Nam pangolin conservation.

There is an urgent need for capacity building for forest rangers, customs and other relevant government agencies on law enforcement, rescue techniques and scientific research. Information sharing and collaboration with trading countries and ASEAN-WEN should also be encouraged. Finally, a regional rescue network of pangolin should be established.

Conservation and Management of Pangolins in Cambodia

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ABSTRACT: Sunda Pangolin *Manis javanica* is found in Cambodia. *Manis javanica* is protected under the law on forestry, 2002. It is currently listed in a group of rare species. All activities including harass, harm, hunt, net, trap, poison, possess, stock, maintain as a zoo or pet, transport, trade, export and import of *pangolins* shall be prohibited (article 49). Hunt, kill, trade or export *M. javinica* shall be punished subject to one to five years and/or court fines of KHR 10 million (USD2390 at 2008 rates), and confiscation of all evidence as state property (art.98). Since Cambodia became a member of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), on 02-October 1997, no CITES documents have been issued for exporting or importing this species. Furthermore, in 2006, the sub-decree No. 53 Or Nor Kror Bor Kor on International trade in Endangered wild animal and plant species had also been signed by the Prime Minister of the Royal Government of Cambodia. This sub-decree provides more power to relevant enforcement agencies as well as the implementation of the convention on CITES. Therefore, trade in pangolin is absolutely prohibited.

Keywords: Sunda Pangolin, Cambodia, trade

OVERVIEW

Pangolins can be used for a range of products; below is a list of utilization types recorded in Cambodia:

- The meat is used as a local source of protein
- Foetuses are use for traditional medicine
- The scales are used in traditional medicine, as well as for the production of souvenirs
- The blood is used in traditional medicine and can be found in restaurants
- Stuffed pangolins are sold as souvenir
- The skin is used for the production of leather accessories such as bags and shoes

Figure 1: Stuffed pangolin can be sold at USD100

LEGAL INTERNATIONAL TRADE

Import and export data extracted from the IUCN-WCMC CITES Trade Database: between 1985 and 1997 provides the following information:

- *M. javanica* Import: 180 102* + 4230 kg and derivatives 2200 kg (*: No units indicated)
- *M. javanica* Export: 60 600* + 1847 kg and derivatives 8000 kg (*: No units indicated)
- *M. javanica* Gross Exports between 1999 and 2003 included 50 live specimens, 57 708 skins and 870 kg of skin.

ILLEGAL TRADE

Since Cambodia became a CITES's member (02-Oct.-1997), no CITES documents have been issued for exporting or importing *M. javanica* specimens. Pangolin hunting (e.g. hunt, trap, collecting) and trade (e.g. selling, exporting, buying, selling) is absolutely prohibited in Cambodia. No captive breeding facilities have been established. All pangolin traded are collected from the wild.

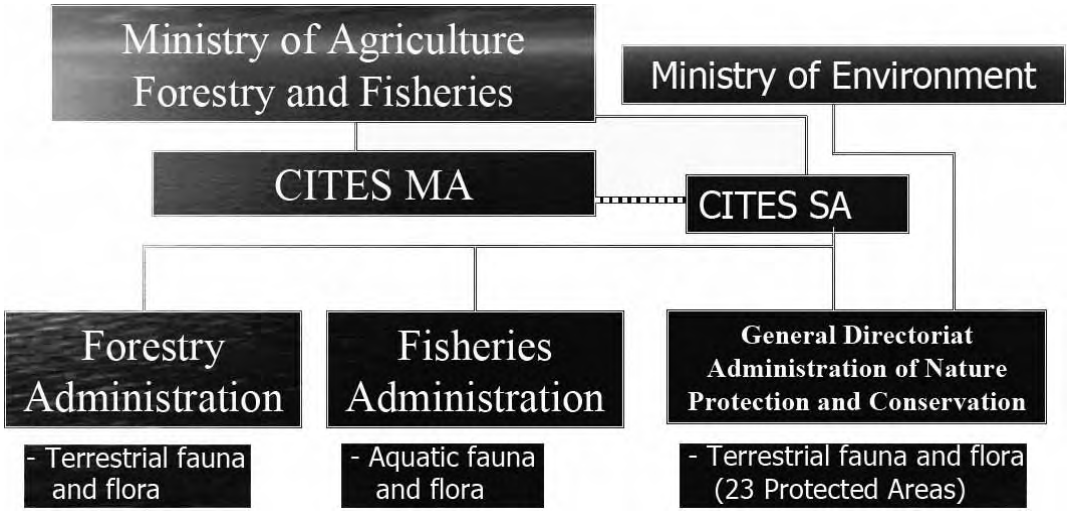
M. javanica are illegally smuggled from Cambodia to Viet Nam (TRAFFIC Greater Mekong Programme Survey report on the illegal trade in wild animals from Cambodia to Viet Nam, 2006) Traders hire local people to carry and transport pangolins across the borders to neighboring countries. For example in 2001, a confiscation of 4266 kg was made in Gia Lai Province. This included species of monitor lizards, turtles, pangolins, pythons and snakes.

CONSERVATION AND MANAGEMENT

National agencies

At the national level, two ministries have jurisdiction over wilidfe conservation: The Ministry of Agriculture Forestry and Fisheries (MAFF) and the Ministry of Environment (MoE). MAFF includes the Forestry Administration (law on Forestry, 2002) and the CITES Management Authority (sub sub-decree, 2006). Figure 2 shows the structure of the CITES M.A. in Cambodia. MoE includes the Department of Nature Protection and Conservation (DNCP), which is responsible for the protection of wildlife within 23 Protected Areas.

Figure 2: Cambodian CITES Management Authority



National Legal Status

Below is a list of legislation, including laws, decrets and declarations, which can be applied to the protection of pangolins:

- Decree No. 35, 1988: Hunting* all wildlife species including mammals, birds, and reptiles shall be banned. All wildlife species shall be determined by a declaration of Agricultural Ministry (Article 22).
  * Hunting included: hunt, trapping, transporting and trading (sell selling and buying).
- Declaration No 359 MAFF, 1994: *Manis javanica* were listed in this declaration.
- Forestry Law, 2002: All wildlife species are divided in three categories: Endangered, Rare and Common and listed in declaration of MAFF. (Article 48)
- Declaration No 020 MAFF, 25 January 2007: *Manis javanica* is listed in Group of Rare Species.
- All activities including harass, harm, hunt, net, trap, poison, possess, stock, maintain as a zoo or pet, transport, trade, export and import of pangolins shall be prohibited (article 49 of Forestry Law).
- Hunt, kill, trade or export *Manis javanica* shall be punished subject to one to five years and/or court fines of 10 million Riel, and confiscation of all evidence as state property (art. 98, FL).
- Law on Protected Area (PAL) 15 15-02 02-2008: All wildlife species inside the area established by a Royal Decree or a new area established in the jurisdiction of MoE, are divided in two categories (Rare and Endangered species) and shall be determined by declaration of MoE.
- Catch, trap, hunt, cause injury, poison, kill, take out, collect eggs and offspring of rare and endangered wildlife species as specified in the declaration of MoE shall be punished subject to one to five years and/or court fines from KHR 15 million to 150 million, (USD3590 to 35 910 at 2008 rates) and confiscation of all evidence as state property (art. 61, PAL).

International legal status

- *Manis javanica* has been listed in appendix II of CITES since 1975 (Cambodia became member of CITES in 1997)
- International Trade in Pangolin is not Permitted (Zero quota since 2000 – see resolution 12.3 Rev. CoP 14)
- Sub Sub-decree No 53 អនក្រ.បក dated 29-May-2006 on International Trade in endangered wild Animals and Plants species.
- CITES export quota 2008 : CAMBODIA zero export

Control measure

Despite the fact that Cambodia has sufficient regulation to protect threatened wildlife species, pangolins are still displayed in markets and smuggled to other countries. Major problems include a lack of coordination between the different law enforcement agencies and lack of information sharing from the partner NGOs.

Research and monitoring measure

The harvest and trade of pangolins is banned within Cambodia. *M. javanica* is classified in the Group of Rare Species under the Forestry Law. Conservation

International (CI) implements a Pangolin Research Program in collaboration with the Forestry Administration.

PROTECTION FORESTS AND PROTECTED AREAS

Protected Areas (PAs)

On the first November 1996, 23 Protected Areas were designated by the Royal Decree. Table 1 gives a breakdown of the size of these protected Areas per designation. Protected Areas are under the jurisdiction of M.o.E.

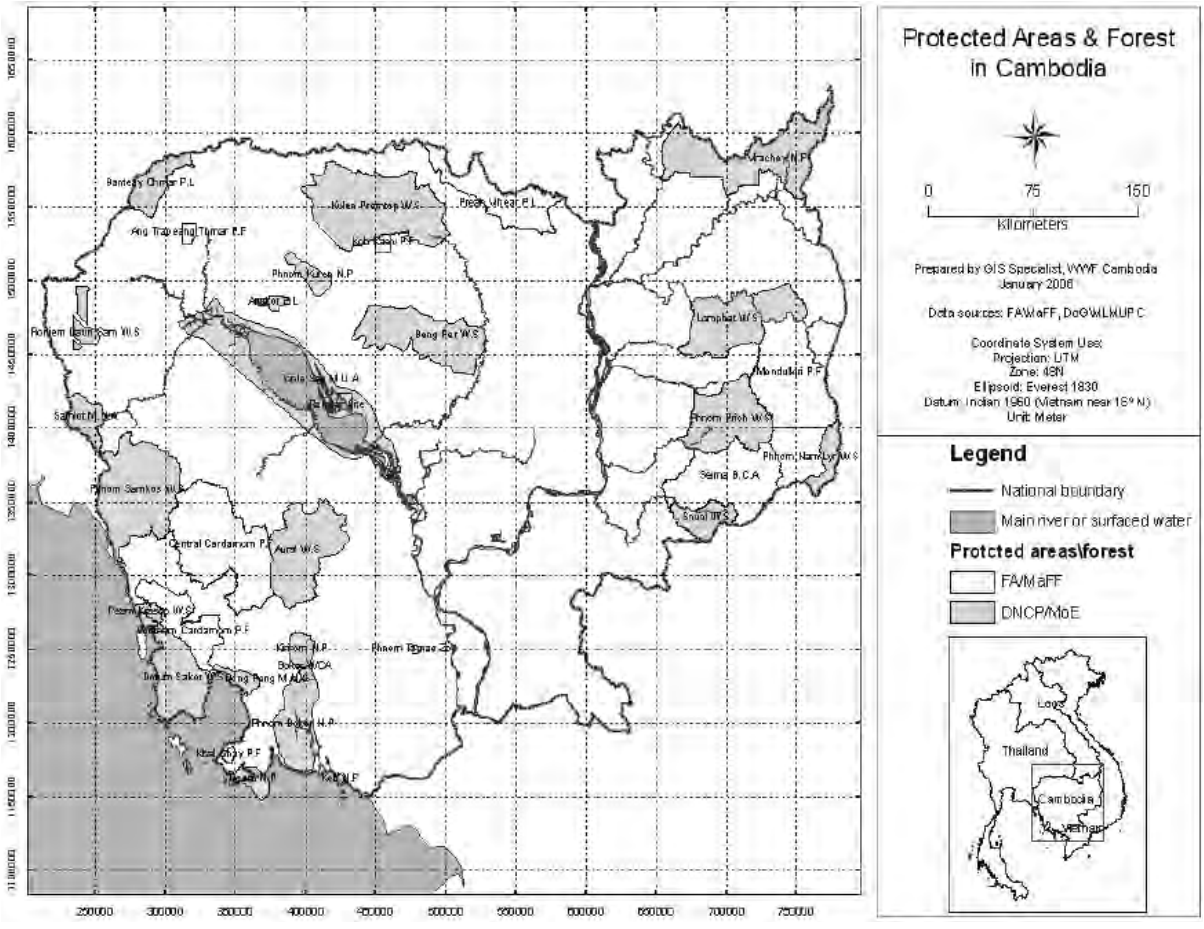
Table 1: Protected Areas designated in Cambodia

Designation	Total area (ha)
National Parks	742 250
Wildlife Sanctuary	2 030 000
Protected Landscape	9 700
Multiple Use Areas	403 950

Protection Forests

The Protection Forest Areas were established and are under the jurisdiction of MAFF; they cover an area of more than 1.49 million ha (Figure 3).

Figure 3: Protected areas and forest in Cambodia



LAW ENFORCEMENT

Cambodia uses a comparable law system. Every enforcement agency uses their own jurisdiction as defined in each environmental law to stop, arrest or investigate the offenders. For instance forestry officials only implement the Forestry Law and Park rangers have to implement the Protected Area law. Lack of cooperation among the different law enforcement agencies is a major issue for the protection and conservation of endangered wildlife species.

RECOMMENDATIONS

Cooperation at a national level to improve working to control the illegal trade through domestic laws and law enforcement action is needed. International cooperation among ASEAN countries through CITES implementation is needed and important to reduce in the illegal trade in threatened wildlife specimens.

Figure 4: Pangolins confiscated by Forestry Officials and Military Police

Issues and Challenges of Pangolin Enforcement in Thailand

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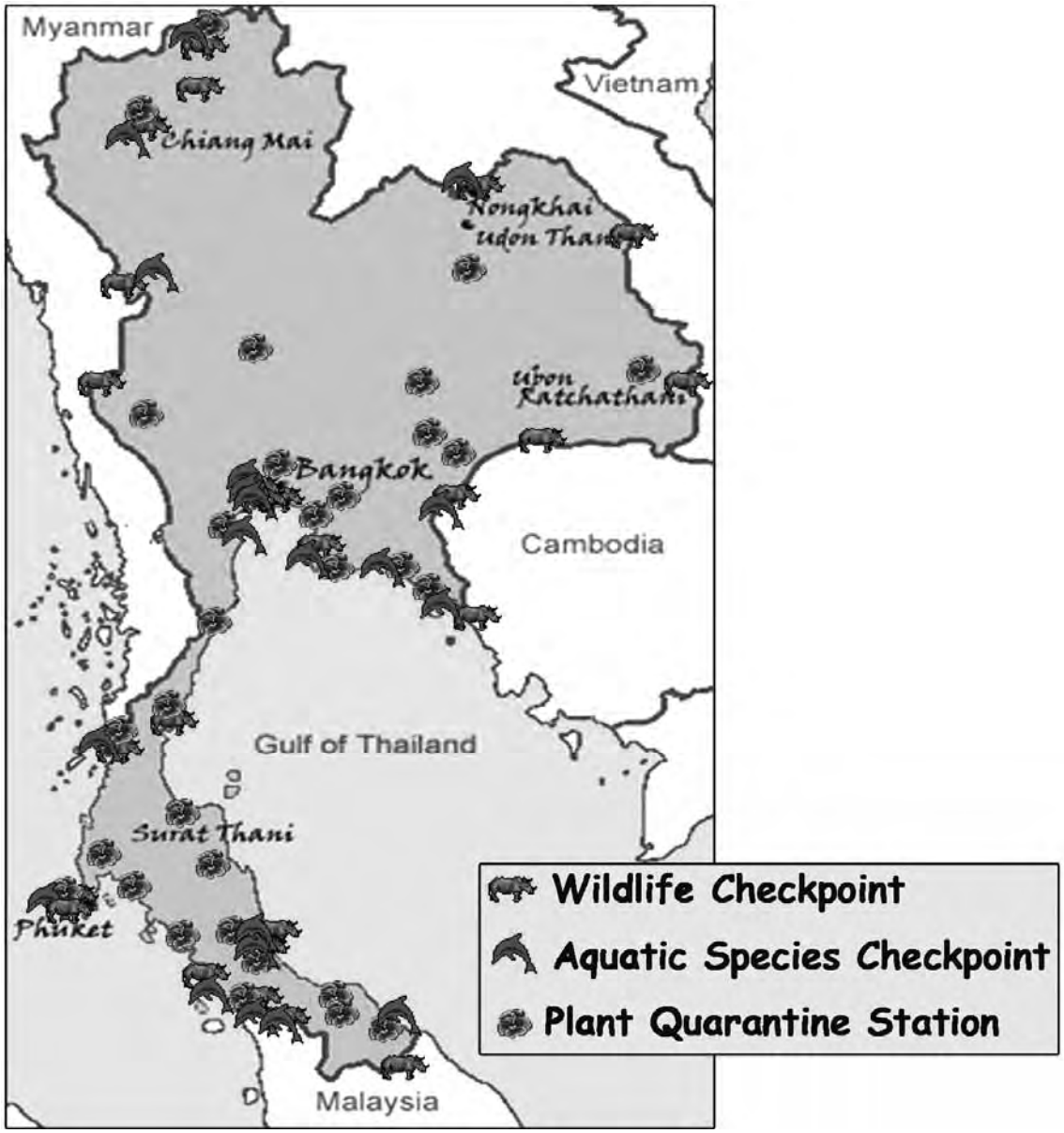
INTRODUCTION

There are 144 checkpoints in Thailand which includes 35 Plant Quarantine Checkpoints, 28 Wildlife Checkpoint, 20 Aquatic Species Checkpoint and 61 Customs Checkpoints (figure 1).

Figure 1: Location of checkpoints in Thailand



SUPPORTING LEGISLATION IN THAILAND FOR PANGOLIN CONSERVATION

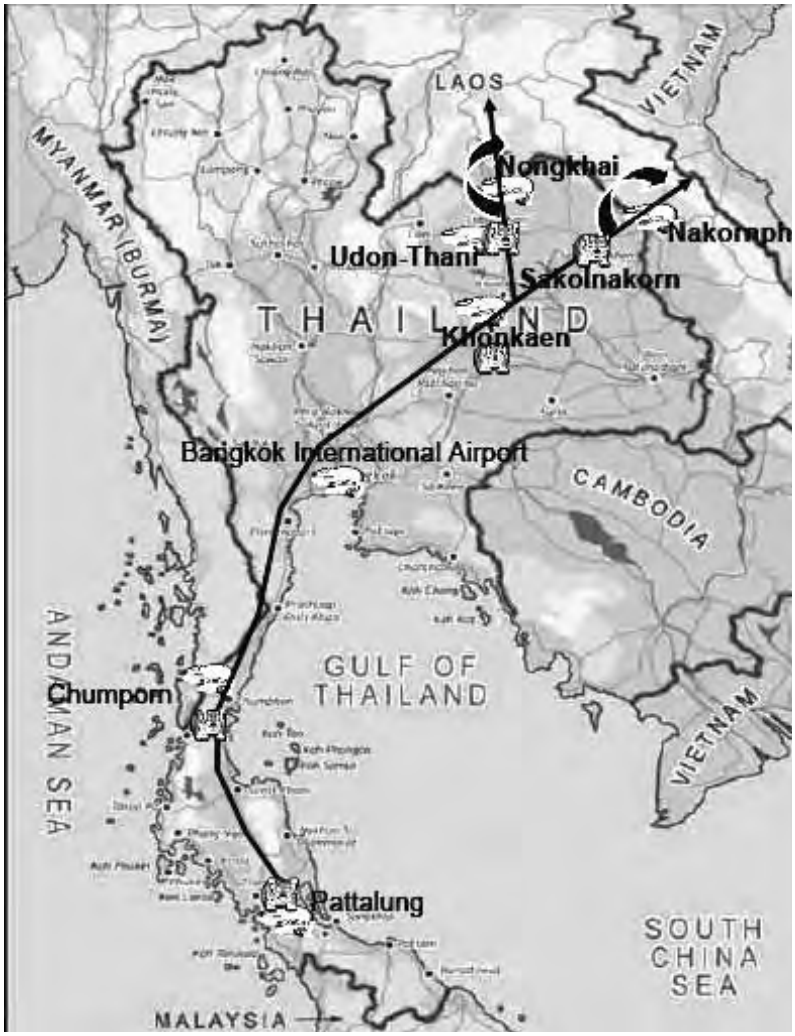
– Wild Animal Reservation and Protection Act 1992 (WARPA)
– Custom Act 1926
– Animal Epidemics Act 1956

ENFORCEMENT ACTIONS

Issues Facing Pangolin Conservation

Pangolins pass through Thailand, in different directions, on their way to neighbouring countries (Figure 2). Often, the pangolin trade is linked to the tiger trade. Wildlife is carried accross the country and crosses borders both in South and Northeast Thailand.

Figure 2: Locations and transit routes of tiger and pangolin seizure in Tahiland



ENFORCEMENT

Below is a selection of pangolin seizures taking place in Thailand between year 2003 and June 2008. This information was provided by the Department of National Parks (DoNP), Wildlife and Plant Conservation, Royal Thai Police, Royal Thai Customs

On 26 June 2006, 245 pangolins were seized at the Suvarnabhumi International Airport, in presence of DoNP, TRAFFIC and former WildAid (figure 3a-d).

Figure 3: Pangolin seizure at Bangkok airport, June 2006

3.a

3.b

3.c

3.d

On 3 July 2007, 102 pangolins were seized during a routine check-up at Pranburi Customs Checkpoint (Southern Thailand). The pangolins were consigned in a truck.

On 29 August 2007, 48 pangolins were seized by the Sadao Customs House in Southern Thailand (figure 4a-c).

Figuer 4: Pangolin seizure in Southern Thailand, August 2007

4.a

4.b

4.c

On 01 April 2008, a Customs Check-Post in Southern Thailand consfiscated two packages of pangolin scales weighting 30 kg in a bus compartment (figure 5a-b). The shipment was estimated at THB60 000 (USD1760 at 2008 rates).

Figure 5: Pangolin scales seized at border crossing, April 2008

5.a

5.b

On 29 January 2008, the Thai Police and the Thai Navy confiscated 11 tigers and 275 pangolins from two dealers in Thatphanom district, Changwat Nakhon Phanom (figure 6a-c). The investigation is still going on to catch the criminals. Thailand welcomes information and co-operation from ASEAN Countries regarding the investigation on this case.

Figure 6: Pangolin seized at border with Lao P.D.R., January 2008

6.a

6.b

6.c

6.d

In all, a total of 7734 pangolins were seized, in Thailand, between 2003 and June 2008 by the DoNP, the Police and Customs (table 1).

Table 1: Pangolin seizures in Thailand between 2003 and June 2008)

Organization	No. of cases	Offenders	No. of Pangolins
DoNP	91	104	5,060
Police	15	18	1,013
Customs	21	-	1,661
Total	127	122	7,734

Remark: The information is not complete.

POLITICAL SUPPORT

Political support was generated by a campaign organised on 21 February 2007, by ASEAN-WEN to end the illegal wildlife trade in Chatuchak Market. This event was presided by the Prime Minister of Thailand (figure 7).

Figure 7: ASEAN-WEN meeting on 21 February 2007, Chatutak market, Bangkok

Policies & Laws

- Ministerial order to set up National Task Force
- May 22, 2007: Cabinet Resolution approved PCU (ASEAN-WEN)
- January 22 , 2008: Cabinet Resolution acknowledged CoP14 Report

Structures & Mechanisms

- Wildlife Reservation and Protection National Committee
- CITES National Committee
- Inter-agency National Committee/ National Task Force to support the activities of Thai WEN & ASEAN-WEN
- Join meetings, trainings & actions

Network: Thai-WEN

- March 3-4, 2008: Nakhaburiakhaburi Resort Hotel,
- Udon Thani Province: Cross Border Workshop on
- Wildlife Enforcement Network

Network: Prosecutors

- March 11-14, 2008: Judiciary Workshop on Wildlife Crime and Prosecution

Public Awareness Campaign

To build up public awareness, the CITES M.A.s of Thailand, Customs, and Police have continuously carried out education and awareness campaigns. Some examples include the distribution of printed materials, brochures and leaflets on illegal wildlife trade campaign at airports, tourist spots, local markets and hotels, as well as at wildlife check points and the setting-up of signs to campaign against the illegal wildlife trade along the borders between Thai and Lao P.D.R. in five provinces (Figure 8).

Figure 3: Location of installed signs to campaign on illegal wildlife trade along the border between Thai –Lao

COLLABORATION WITH OTHER COUNTRIES

The government of Thailand actively participates in transboundary initiative as demonstrated below:

AEG-CITES & ASEAN-WEN

- May 21-23, 2008: 6th AEG-CITES, Chonburi,Thailand

- May 26-27, 2008: 3rd ASEAN-WEN, Vientiane, Lao PDR

Bilateral Activities

- July 16-18, 2007, Chonburi Province: Bilateral meeting between Thailand and Malaysia

Public Relations: Thai-China

- Kunming Division, Endangered Species of Wild Fauna and Flora Import & Export Administrative Office (CITES), P.R. of China

The government of Thailand will also be involved in the following bilateral activities:

2008/9

- Bilateral meeting between Thailand -Laos PDR
- Bilateral meeting between Thailand-China

2009

- Bilateral meeting between Thailand-Cambodia

ISSUES AND CHALLENGES

Issues

Some of the issues encountered by Enforcement agencies include the dificiculty to obtain reliable sources of information to support investigations, the determination of the countries of origin, the lack of adequate rescue centers and training on handling confiscated specimens.

More work needs to be carried in the field of biological research and its applications, such as DNA in support to forensic and breeding. The building of a contact network is also crucial.

For more information, please contact the following agencies:

- The CITES M.A.s of Thailand
- The DoNP (http://www.dnp.go.th)
- The Department of Agriculture (http:// www.doa.go.th)
- The Department of Fisheries: http:// www.fisheries.go.th
- The Customs Department (http://www.customs.go.th)
- The Royal Thai Police (http://Royal Thai Police (http://www.royalthaipolice.go.th/)
- The Natural Resources and Environmental Crime Division (http://www.forest.police.go.th/news.php)

Pangolin Conservation in Lao PDR

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INTRODUCTION

Lao PDR is a landlocked country with an area of 236 800 km², bordering with Viet Nam, Cambodia, Thailand, Myanmar and China (Figure 1).

Figure 1: Map of Lao P.D.R. and neighbouring countries

BACKGROUND

Lao PDR became a member of the Convention on International Trade in Endangered Species of wild Fauna and Flora (CITES) on May 30, 2004.

After ratifying the Convention, the Government of Lao PDR designated two officials to be responsible for the implementation of CITES as followed:

- The Department of Forestry is designated as CITES Management Authority (M.A.) for Lao PDR and is alone responsible for the issuance of import permits, export permits and re-export certificated in accordance with the provision of CITES and the laws of Lao PDR.
- The Science Research Institute of NSTA is designated as the CITES Scientific Authority (S.A.) and is responsible for providing advice to the designated CITES M.A., in accordance with the provision of CITES.

WILDLIFE CONSERVATION IN LAO P.D.R.

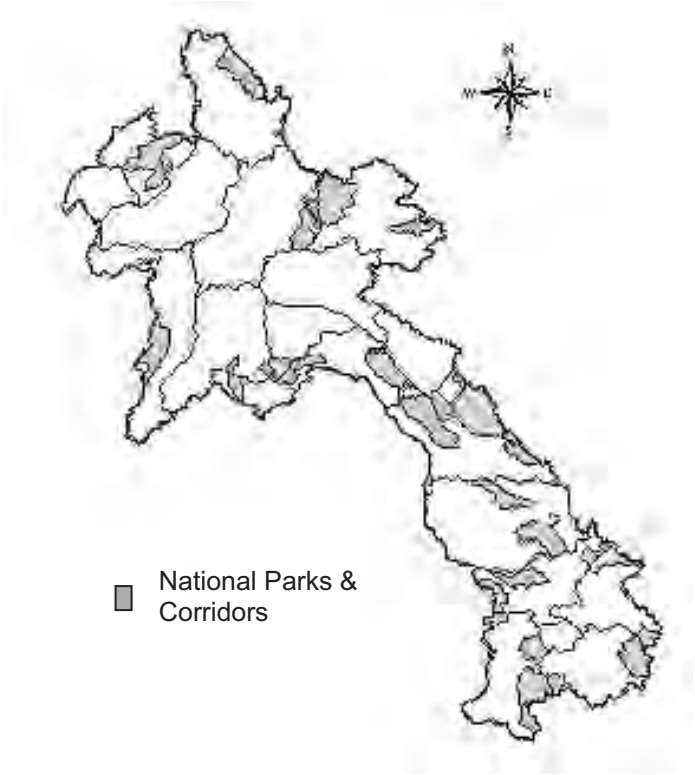
Lao P.D.R. is rich in species of both fauna and flora and has a high degree of endemism and biological distinctiveness, with, at least, 8100 species of flowering plants, 166 species of reptiles and amphibians, 700 species of birds, and over 100 species of large mammals.

However the country has experienced and still experiences rapid declines in biodiversity as a result of unsustainable trade and subsistence hunting, and habitat conversion.

A National Protected Area (NPA) system was established in 1993. It comprises 20 NPAs and two Corridors, covering about 3.4 million ha or 14.3 % of total land area (Figure 2).

The goal of the system is to conserve a minimum of five and a maximum of 20 % of the estimated original extent of each major habitat (forest) type. NPAs are the only national-level areas devoted to nature conservation in the Lao PDR.

Figure 2: National Biodiversity Conservation Areas in Lao P.D.R.



NATIONAL LEGISLATIONS

Wildlife in Lao P.D.R. is the property of the State. Presently, the utilization and protection of wildlife is regulated by legal documents such as:

- Prime Minister Decree No: 185/CCM, 1986 on the Prohibition of wildlife Trade
- Prime Minister Decree No: 118/CCM, 1989 on Management and Protection of Aquatic and wild Animals.
- Penal Code of Lao P.D.R., 1990.
- Forestry law (1996).
- Prime Minister Degree No 164 (1993) on the establishment of a NPA system.

- MAF Regulation No 0360 (2003) on the management of NPAs and wildlife Conservation.
- Wildlife law (2007).

ENFORCEMENT ACTIONS

In Lao P.D.R., conservation and the implementation of forest policies are the responsibility of the Provincial Department of Agriculture and Department of Forestry, ministry of Agriculture and Forestry.

The Department of Forestry, Division of Forest Resource Conservation (DFRC) acts as a central agency but has no enforcement arm. It is confined to a role of coordination, support and external liaison,

Collaboration with trading partners such as China, Malaysia, Viet Nam and Thailand is essential.

OBSTACLES

Lao P.D.R. is a transit point for many different wildlife species obtained from neighbouring countries, which makes wildlife trade at border crossings very difficult to control. There is a definite need for better enforcement. However, the number of staff is insufficient, there is no proper personnel responsible for law enforcement, experience in the implementation of CITES and financial support are lacking.

In order to reduce transboundary wildlife trade, the ASEAN-Wildlife Enforcement Network (ASEAN-WEN) need to be strengthened, collaboration between government agencies such as Forestry, Police and Customs need to be improved and Capacity building should be increased.

Pangolin Conservation in Myanmar

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BACKGROUND

Biodiversity Status in Myanmar

Myanmar is home to 360 species of mammal, 1027 species of bird and 278 species of reptile (table 1)

Table 1: Number of species per taxonomic group in Myanmar

Groups	No.
Mammal species	360
Bird species	1,027
Reptiles	
Snake	153
Lizard	87
Turtle & Tortoise	36
Crocodile	2
Amphibian	
Frog	79
Caecilians	2
Salamander	1
Fresh water fish species	310
Marine water fish species	465
Medicinal plant species	841
Bamboo species	90
Species of vascular plants of gymnosperms and angiosperms	11,800

Protected areas

There are 43 Protected Areas (PAS) in Myanmar, among which 34 have been Notified, with a total area of 26 612 km^2 and nine, proposed, with a total area of 22 844 km^2.

PANGOLIN STATUS

Two species of pangolin, *Manis pentadactyla* and *M. javanica*, are found in Myanmar. There is very few information on pangolins as no specific survey and research have been carried out. According to the Protection of Wildlife and Protected Areas Law in Myanmar, Pangolin species are in the Completely Protected Animals list. Figure 2 shows the distribution of the tow species across their range countries.

Figure 1: Wildlife Sanctuaries and National Parks in Myanmar

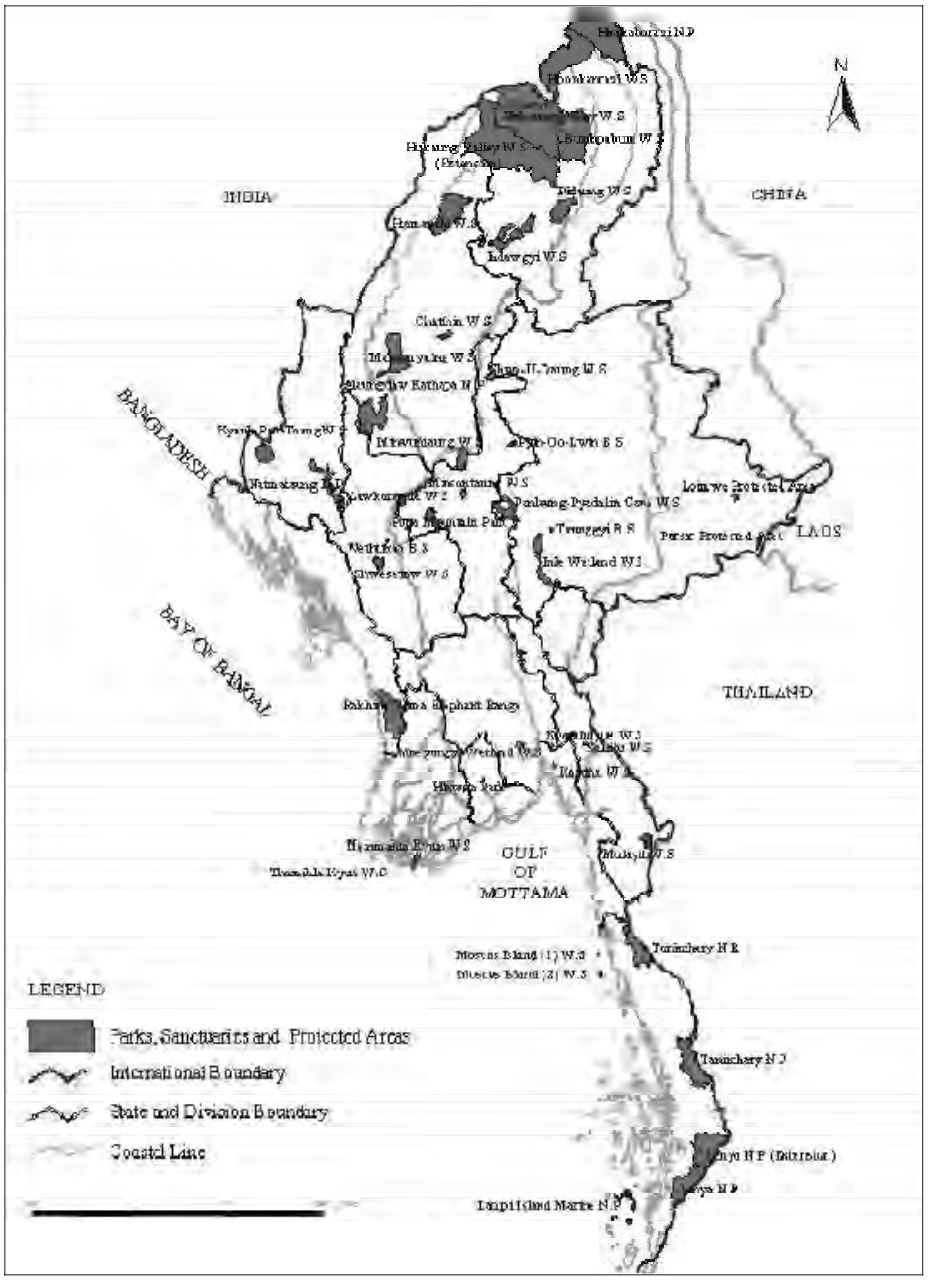
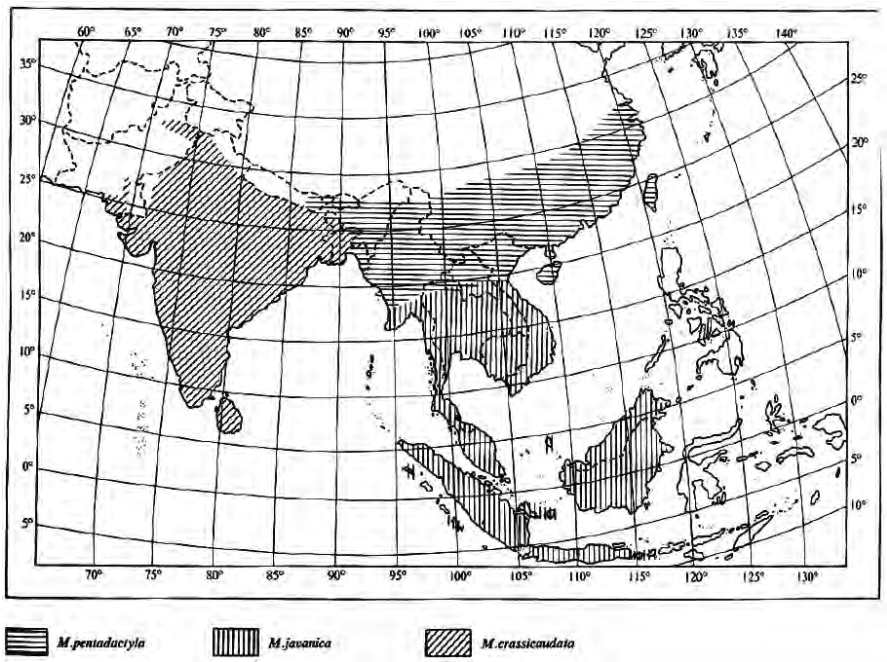


Figure 2: Range of M. pentadactyla and M. javanica



LEGISLATION

Wildlife trade is well managed and controlled by the following laws and rules:

- Forest Law (1992)
- Forest Rules (1995)
- The Protection of Wildlife and Protected Areas Law (1994)
- Rules relating to the Protection of Wildlife and Protected Areas Laws (2002)

Penalties for illegal wildlife trade

According to Article 37 of the Wildlife Law (1994), the maximum penalties for violation are defined as follows:

Exporting a completely protected wildlife or protected wild plant species or any of its part without permission of the Director General, is an offence liable to imprisonment for up to seven years or a fine of MMK50 000 (USD7677 at 2008 rates) or both.

The existing wildlife law is currently being reviewed for amendment to meet the CITES requirements. It is almost at the final stage to be approved. The Law that will fulfill the CITES requirements will be amended and adopted after getting cabinet approval. No new laws and plans have been adopted since the ASEAN Wildlife Enforcement Network (ASEAN-WEN) was launched.

ENFORCEMENT

Seizure data

Table 1 presents a list of seizure cases carried out in 2006 and 2007. This is followed by a series of pictures illustrating seizures carried out before 2004 (figure 3a-f).

Table 1: Pangolin Seizures in 2006 and 2007

Sr.	Year	Location	Quantity	Type
1.	2006	Monywa	5	skin
2.	2006	Mandalay	120	skin
3.	2006	Mandalay	100	skin
4.	2007	Mandalay	8	skin
5.	2007	Kwanlon	1	alive

Figure 3: Pangolin seizures carried out in markets and restaurants prior to year 2004.

a

b

c

d

e

f

National Focal Point (Task Force)

The Director General of the Forest Department has been the National Focal Point of the Wildlife Enforcement Network Task Force since the 4th July 2007. He is also supervising Myanmar CITES Management Authority and plays a leading role in carrying out law enforcement activities.

The Forest Department, which is under the supervision of the Ministry of Forestry, is currently coordinating interagency co-operation to fight wildlife crime.

The co-operation agencies are (figure 4):

- Forest Department (as National Focal Point)
- Myanmar Police Force
- Custom Department
- Border Trade Department
- General Administrative Department
- Attorney General's Office
- Supreme Court
- Progress of Border Areas and National Races Department

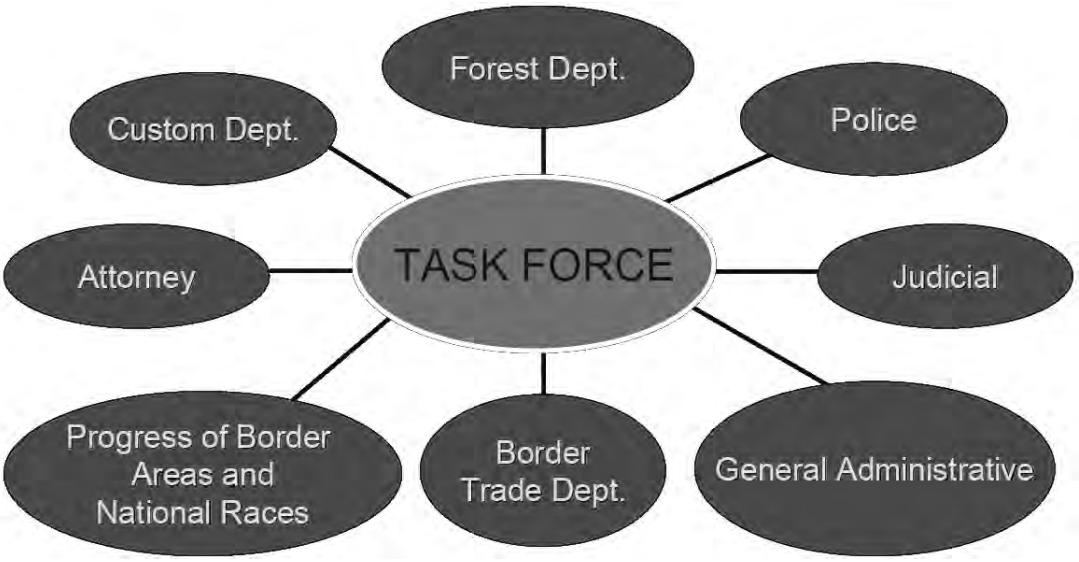
Other Relevant agencies such as Customs, the Police Force and the Forest Department staff are working together at border check points to control the illegal wildlife trade. The staff from the Forest Department, down to the township level in states and divisions, is closely taking part in combating illegal wildlife trade. Members of the Task Force, Attorney and Judicial Department are co-operating to take action, in accordance with the legislation, against illegal wildlife trade offences.

Custom check-points

Myanmar has seven check points with four neighbouring countries as listed below (figure 5):

- Myanmar-India border: Tamu
- Myanmar-China border: Muse, Kyukoke, Loi Jai
- Myanmar-Thai border: Tachileik, Myawadykaw Thaung
- Myanmar-Bangladesh: Maung Daw

Figure 4 : Wildlife Enforcement Network inter-agencies in Myanmar



Constraints for Enforcement

There is not enough staff to implement CITES and it is difficult to control the wildlife trade at borders. There is also a lack of information and technical expertise and inadequacy in communication within the relevant enforcement agencies. There is limited awareness of wildlife enforcement in the public.

RECOMMENDATIONS

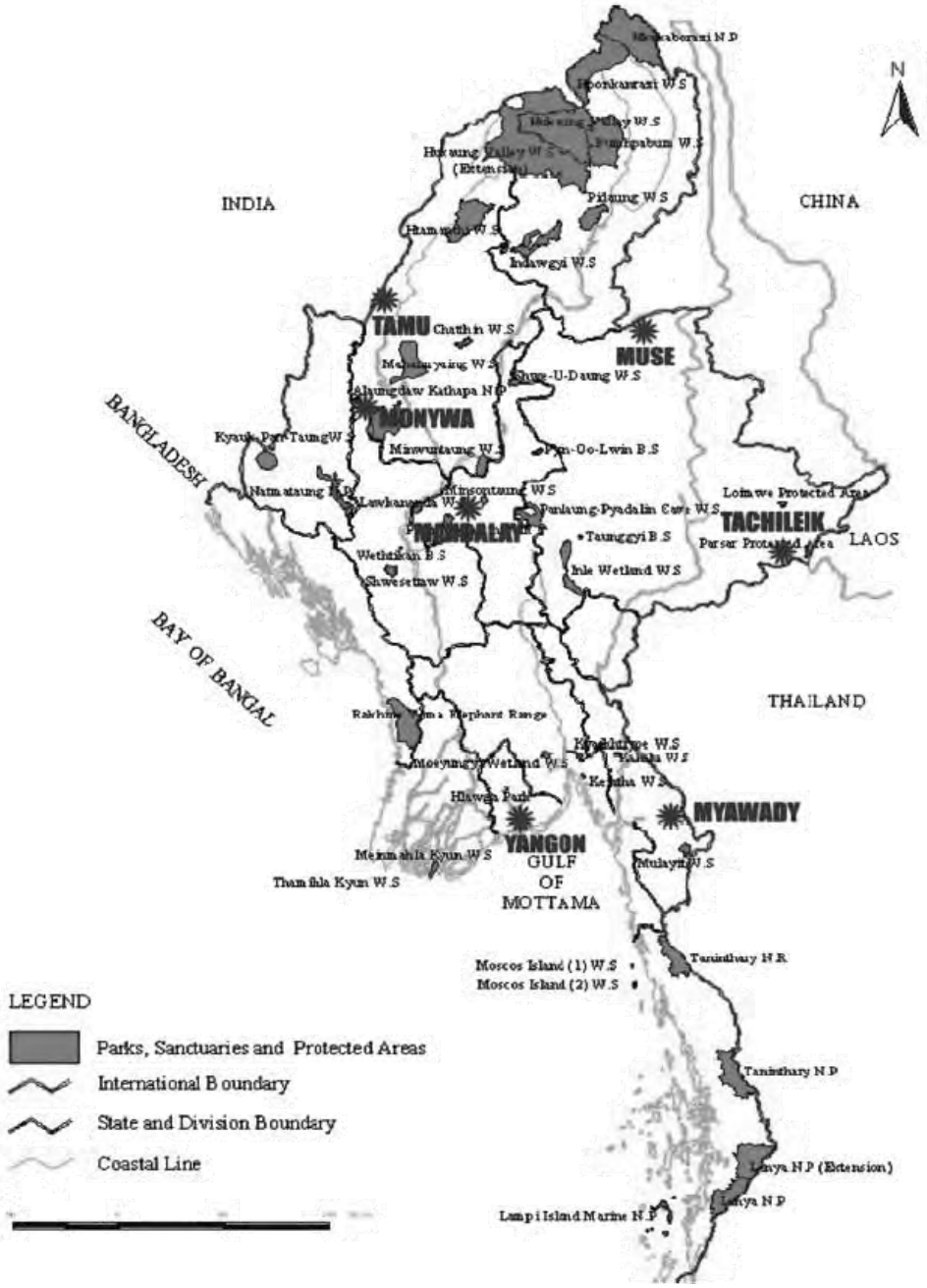
Effectiveness in combating illegal trade could be improved with the following actions:

- Establish strong relationship between CITES members and the relevant enforcement agencies
- Strengthen capacity building, especially for wildlife enforcement activities
- Improve public awareness on wildlife protection and enforcement, starting with relevant enforcement staff
- Strengthen collaboration with neighbouring countries in wildlife trade control along the borders
- Share information on CITES implementation between countries in the ASEAN region
- Improve mutual understanding and trust between ASEAN countries, and particularly with border countries

CONCLUSION

Myanmar is keen to co-operate with the members of ASEAN-WEN and other relevant organizations which participate in ASEAN-WEN activities. Collaboration with the member countries in the region is crucial to combat the illegal wildlife trade. Myanmar makes effort to increase capacity building in accordance with the CITES convention. Myanmar warmly welcomes advices and comments from other member countries and relevant organization such as TRAFFIC, which are of real value to Myanmar wildlife trade management.

Figure 5: Custom check points in Myanmar



Conservation and Trade Control of Pangolins in China

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ABSTRACT: The pangolin species occurring in China mainly refers to *Manis pentadactyla*, whose population has presumably dropped by 80% over the end of 1960's, predominantly due to hunting pressure for utilization. As a producing and consuming country, China has been dedicated to the conservation and trade control of pangolins through improving legislation, restricting utilization and intensifying law enforcement. There is still room for improvement in such aspects as inter-agency co-ordination, domestic regulating and monitoring mechanisms and inter-regional co-operation, to tackle the challenges arising from the illegal trade in pangolins.

Keywords: Pangolin, conservation, trade

INTRODUCTION

Pangolin species occurring in South, Southeast and East Asia comprise the Indian Pangolin *Manis crassicaudata*, Malayan Pangolin *M. javanica* and Chinese Pangolin *M. pentadactyla*, and all of which have been included in CITES Appendix II since 1 July 1975 and classified by IUCN (1996) as lower risk (near threatened). At the 11th meeting of the Conference of the Parties (CoP 11, Gigiri, 10-20 April 2000), India, Nepal, Sri Lanka and the USA proposed the uplisting of the three Asian pangolin species to Appendix I. This proposal was subsequently amended and adopted by consensus as retaining the three species in Appendix II with an annotation of a zero annual export quota for specimens removed from the wild and traded for primarily commercial purposes, effective from 19 July 2000.

The pangolin species native to China mainly refers to *M. pentadactyla*, formerly widespread in hills and mountainous regions throughout south China from the southern border as far north as the Yangtze River, and relatively abundant in the provinces of Fujian, Guangdong, Yunnan, Guizhou, Hainan, Hunan and Taiwan and Guangxi Zhuang Autonomous Region. Although *M. crassicaudata* is possibly found in extreme western areas of southwest China's Yunnan Province, this occurrence appears to be considerably to the east of other records of this species. There are no definite records for the presence of *M. javanica* in China. However, the reference to the presence of *M. crassicaudata* in extreme western Yunnan may conceivably refer to *M. javanica*.

Hunting for utilization is believed to be the prime threat to China's *M. pentadactyla* population. Besides harvest pressure, secondary threats to this species include the loss, deterioration and insularity of available habitat as well as fragmented distribution pattern. In additional to such external factors, the threatened status can also partly be attributed to the inherent characteristics of this species, including its monotypic taxonomy, low reproductive rate, poor capability of defense and highly specialized food. China Red Data Book of Endangered Animals (1998) categorized *M. pentadactyla* as vulnerable. Some scholars estimated the current population of *M. pentadactyla* in China has declined to 50 000-100 000 individuals, as little as 20% of the levels at the end of 1960's. Virtually no information is available on the population

levels of *M. crassicaudata* or *M. javanica*, since either of them possibly occurs marginally in China.

LEGISLATION FOR PANGOLIN CONSERVATION

For the purpose of conserving wildlife resources and fulfilling CITES obligations, the National People's Congress (NPC), China's top legislature, and the State Council have successively enacted a serial of laws and regulations, including the Law on the Protection of Wild Animals in 1988, Regulations on the Implementation of Protection of Terrestrial Wild Animals in 1992, Regulations on the Management of Nature Reserve in 1994 and Regulations on the Import and Export Management of Endangered Species of Wild Fauna and Flora in 2006. In conjunction with other integrated laws, e.g. Criminal Law, Customs Law, and judicial interpretations, a relatively comprehensive legal system has been established on the implementation of CITES and on domestic wildlife conservation in China. At its 54th meeting (Geneva, 2-6 October 2006), the Standing Committee of CITES resolved that China qualified for category I status in the National Legislation Project, implying that China has enacted adequate legislation for CITES implementation.

M. pentadactyla is listed as a State Category II Protected Species in the Schedule of State Key Protected Animal Species effective from 10 December 1988. In accordance with the Law on the Protection of Wild Animals and the Regulations on the Implementation of Protection of Terrestrial Wild Animals, hunting or catching of *M. pentadactyla* requires a license from the competent forestry department at the provincial level. A prior approval should also be obtained from the provincial forestry department for the sale, purchase or transport of *M. pentadactyla* and products thereof. As for import, export or re-export of specimens of *Manis* spp., it is subject to a CITES permit issued by the CITES Management Authority. Before the issuance of CITES certifying documentation, both the auditing document from the provincial forestry department where the applicant is located and the approval document from the State Forestry Administration are required, and a Non-Detrimental Finding (NFD) should be carried out by the Endangered Species Scientific Commission, China's CITES Scientific Authority, in case of export. CITES documentation issued by the CITES Management Authority must be submitted to customs for declaration and clearance.

Pursuant to provisions of Article 40, the Law on the Protection of Wild Animals and Article 24, Regulations on the Implementation of Protection of Terrestrial Wild Animals, the Ministry of Forestry (currently known as the State Forestry Administration) resolved on 14 April 1993 that all wild animal species listed in CITES Appendix I and II that are not indigenous to China shall be designated as State Category I and II Protected Species respectively. *M. crassicaudata* and *M. javanica* entering into China from overseas are accordingly treated as State Category II Protected Species. As a result, the management of specimens of these two species imported to China is automatically applied to China's domestic legislation on wildlife conservation.

The Criminal Law revised in 1997 raises the maximum level of penalties to ensure an effective deterrence against smuggling, illegal hunting and trafficking of endangered wildlife species. According to it, an offender smuggling endangered animal species or products thereof shall be sentenced to fixed-term imprisonment of not less than five years and concurrently to a fine; and for relatively minor circumstances, fixed-term imprisonment of not more than five years and concurrently a fine shall be imposed. If the circumstance is especially serious, the offender shall be sentenced to life

imprisonment or death and concurrently to confiscation of property. In addition to that, whoever illegally hunts, catches or kills endangered animal species, or illegally purchases, sells or transports endangered animal species or products thereof, shall be sentenced to criminal detention or fixed-term imprisonment ranging from not more than five years to not less than 10 years, and concurrently to a fine or confiscation of property, in light of the seriousness degree of circumstances.

In order to guarantee the practical implementation of the aforementioned provisions of the Criminal Law, the Supreme People's Court successively promulgated two judicial interpretations in 2000, which defines in detail the criteria for imposing penalties of wildlife-related criminal offences. Based on them, an offender smuggling of up to eight pangolins or pangolin products valued between CNY100 000 (USD14 286 at 2008 rates) and CNY200 000 (USD28 571) shall be liable to fixed-term imprisonment of not less than five years and concurrently to a fine. Smuggling of pangolins less than 8 individuals or pangolin products valued under CNY100 000 (USD14 286) is categorized as a criminal offence with relatively minor circumstances. It is subject to especially serious circumstances for smuggling of up to 16 pangolins or pangolin products valued over CNY200 000 (USD28 571). In terms of domestic linkage, involving illegally hunting, catching or killing of pangolins, and purchasing, selling or transporting of pangolins or products thereof, "Circumstances of serious offence" refer to 8 individuals, total value involved between RMB100 000 yuan (USD14 286) and CNY200 000 (USD28 571), or illegal profit between CNY50 000 (USD7143) and CNY100 000 (USD14 286). "Circumstances of especially serious offence" refer to 16 individuals, over CNY200 000 (USD28 571) of total value involved, or over CNY100 000 (USD14 286) of illegal profit. Also, the two judicial interpretations further provided that the value of endangered terrestrial animal species shall be assessed in accordance with the provisions laid down by forestry authorities, and that actual trade value shall be identified as the value in case that the assessed value is lower than that. In enforcing practices, the value of a pangolin individual and one kg of pangolin scales is assessed at CNY1670 (USD239) and CNY1336 (USD191) respectively.

ORGANIZATIONAL STRUCTURE AND FUNCTIONS IN RELATION TO PANGOLIN CONSERVATION

Chinese laws and regulations have clearly defined the mandates and responsibilities of the various government agencies in terms of wildlife conservation and law enforcement. The forestry authorities at various levels are mandated to take charge of the conservation and management of terrestrial wildlife within their jurisdiction. The CITES Management Authority, affiliated to the State Forestry Administration, is responsible for issuing CITES permits or certificates and coordinating relevant government agencies, involving forestry, fisheries, customs and public security, etc to implement CITES on behalf of the Chinese Government. The forest public security organs administered by the forestry authorities at various levels, with a force of 60 000 policemen, take responsibility for enforcing terrestrial wildlife-related administrative and criminal laws. The anti-smuggling police organs administered by Customs at various levels, with around 9000 staff, are specialized in combating smuggling of endangered species. The industry and commerce administrations are responsible for regulating and supervising wildlife and products thereof in markets. The drug administrations are in charge of regulating the activities of utilizing endangered species in medicines. The nature reserve management agencies set up by forestry or environmental protection authorities are tasked to routine management and patrolling in

nature reserves. Furthermore, frontier defense, border control and other types of police organs also have their respective responsibilities in wildlife administrative and criminal enforcement.

The CITES Management Authority is working closely with relevant government agencies such as forestry, fisheries, customs, public security and industry and commerce to intensify the implementation and enforcement of CITES, domestic laws and regulations on wildlife conservation. Over the past six years, co-operative memoranda have been signed between the Headquarters of the CITES Management Authority and the General Administration of Customs, and between the 22 branches of the CITES Management Authority and corresponding customs administrations at provincial level where these branches are located. This is to further clarify the responsibilities and obligations of both sides, and establish a long-term cooperative mechanism between the two sides in information sharing, species identification, counter-smuggling operations, public education and capacity building programmes, as well as in disposal of seized specimens. The CITES Management Authority annually organizes dozens of training seminars and workshops related to the implementation and enforcement of CITES, which are attended by law-enforcing officers from relevant government agencies, in particular those working at front line of customs. The CITES Management Authority has also actively participated in inter-agency law enforcement operations by providing intelligence and technical support, to assist in investigating and prosecuting various cross-border smuggling cases of endangered species.

With regard to collaboration with trading countries, the exchange between China and other CITES Parties, particularly its neighboring countries, is becoming increasingly extensive and the wildlife law enforcement co-operation has been markedly enhanced. More importantly, the existing framework, ASEAN Wildlife Enforcement Network (ASEAN-WEN) and the Mekong River Sub-regional co-operative mechanism, has laid a solid foundation for international co-operation in combating illegal wildlife trade, including the trade of pangolins.

UTILIZATION AND TRADE CONTROL

M. pentadactyla had been intensively used for its scales and meat in China. Pangolin scales are widely recognized for their medicinal value and used whole, or in powdered form, in preparing traditional medicines. As early as 16th century, records in Compendium of Materia Medica complied by the prestigious herbalist Li Shizhen showed that pangolins scales are effective in eliminating turgescence, discharging purulence, dredging main and collateral channels, invigorating the circulation of blood and stimulating milk secretion. Modern studies in traditional Chinese medicines (TCM) believe pangolin scales are an important ingredient for treating a variety of ailments, involving infertility due to tubal obstruction, erythema nodosum, hysteromyoma, thymion, scleroderma, psoriasis, urinary calculus, men acyesis, prostatitis, mastitis, infantile malnutrition etc. Pangolin meat is favored as a local source of protein in some southern parts of China, especially Guangdong Province and Guangxi Zhuang Autonomous Region, where it is believed to have the effects of nourishing the kidney and removing heat and toxic elements among the populace.

China was basically self-sufficient in pangolins for medicinal purposes before the 1990's. The records from Guangdong Provincial Mederia Medica Company indicate that over 20 000 pangolins had been harvested annually in Guangdong Province around the 1960's. Considering the population status and utilizing situation in provinces of

Fujian, Hunan, Guizhou and Guangxi Zhuang Autonomous Region are similar with that in Guangdong Province, the overall harvest volume in these five provinces probably amounted to 100 000 individuals. Adding a population size of 50 000 to 60 000 in other areas due to uneven distribution, relatively scarce resources or less hunting pressure, thus the annual harvest volume nationwide would be deduced at 150 000 to 160 000 individuals during the same period. Since then, the population of *M. pentadactyla* in China has been greatly reduced by heavy collection pressure, especially in the 1980's. The species is either rarely seen or on the verge of extinction in at least half of the habitats in provinces of Guangdong and Fujian as well as Guangxi Zhuang Autonomous Region where they formerly existed densely.

Since the early 1990's, the supply of pangolin scales has been largely dependent upon imports from other range states, in particular Viet Nam and Myanmar. At the same time, smuggling of pangolins from neighbouring countries has continuously taken place. A large number of pangolins were illegally imported to Guangxi Zhuang Autonomous Region and Yunnan Province each year, and then transferred to provinces of Guangdong, Hainan and Fujian for sale. Investigation showed that the illegal cross-border trade in pangolins in Guangxi Zhuang Autonomous Region in 1991 and 1992 reached 60 000 and 30 000 animals separately, and the figure was 2000 animals and 500 to 800 kg of scales annually for Yunnan Province during the same period. In the mid-1990's, a trade survey on pangolin scales in China's major Mederia Medica markets was carried out, revealing that the magnitude of annually traded pangolin scales totaled 80 000 kg to 100 000 kg, among which a considerable portion originated in neighbouring countries.

The declining population and increasingly intensified efforts of trade control also lead to a dramatic rise in prices for pangolin products. Average wholesale prices for pangolin scales in China have dramatically increased from CNY80 (USD10) per kg in the early 1990's to CNY420 to 450 (USD52.5 to 57.3) in the early 2000's, and it has presumedly surged to CNY1200 (USD171.4) in black markets at present. With regard to live pangolins, it reportedly increased by 10-fold to CNY420 to 680 (USD52.5 to 85) per kg in the late 1990's, compared to CNY40 to 60 (USD5 to 7.5) in the early 1990's in the black markets of Guangdong Province.

The legal international trade in pangolins recorded by the CITES Management Authority of China primarily involves Chinese patent medicine and medicinal liquor containing an ingredient of *M. pentadactyla* scales. Although the amount of export of pangolin derivatives was relatively large, and interpretation of the data is difficult as trade was recorded by cartons, boxes, pills, etc., the number of animals converted from these derivatives appears to be rather low, because there is usually an extremely small proportion of pangolin scales contained in these medicines and medicinal liquor. As for importing destinations, the pangolin derivatives were mostly exported to Southeast Asian countries. Since the Appendix amendment to Asian pangolin species came into force on 19 July 2000, China has never authorized any export or import of specimens of species involved for primarily commercial purposes.

The Chinese Government has taken a series of administrative measures to reinforce the conservation and trade control of pangolins to ensure the sustainability of pangolin resources, which is outlined as follows.

- As early as 1990, official rules were issued by the Ministry of Forestry (currently the State Forestry Administration) detailing the correct procedures in compliance with CITES and the Law on the Protection of Wild Animals for the

export of medicines containing endangered wild animal species, in which 31 medicines containing pangolin scales were listed.

- As of 1998, the CITES Management Authority of China and the General Administration of Customs have jointly developed and implemented the HS Commodity Catalogue of Import and Export on Wild Fauna and Flora, with ten-digit HS Codes relevant to specimens of CITES-listed species or national regulated species being annotated by surveillance requirement of a permit. For an application to import or export specimens of wildlife species under the ten-digit HS codes with presentation of a permit, the computerized declaration system of customs would automatically alert the application and customs officers that a permit from the CITES Management Authority is required. This HS Commodity Catalogue is timely revised along with the updates of CITES Appendices and lists for national protected wild animal and plant species, which have greatly improved the supervision efficiency of customs as to the specimens of endangered species in international trade.

- The State Forestry Administration, jointly with other 11 ministries and administrations concerned, promulgated rules in July 2003, putting in place a complete ban on the hunting and catching of terrestrial wild animals from the wild for primarily commercial purposes, in particular for food consumption, and strictly prohibiting the trading of the wild-taken terrestrial animals used as food materials.

- On 29 September 2007, the State Forestry Administration, jointly with the Ministry of Public Health, State Administration for Industry and Commerce, State Food and Drug Administration and State Administration of Traditional Chinese Medicine, enacted Rules on Strengthening the Conservation of Saiga Antelopes, Pangolins and Endangered Snake Species and Standardizing the Management of Their Products Used for Medicinal Purposes. These rules reiterated the total ban on hunting or catching of pangolins for primarily commercial purposes. Hunting or catching activities shall be only authorized by the forestry authorities at the provincial level under exceptional circumstances, such as for scientific research or other non-commercial purposes. In terms of the management of trade control, pangolin scales are only allowed to be used in clinical treatment of designated hospitals and for the manufacturing of patent Chinese medicines, and are not authorized to be sold by retail to the public out of the designated hospitals. In order to reach the management goal, a pilot programme for the labeling of patent medicines containing pangolin scales is being launched based on verification, registration and standardized packaging of legal-sourced stockpiles of pangolin scales. According to the rules, patent medicines containing pangolin scales without affixing to universal labels issued by the State Forestry Administration would not be authorized to access to commercial circulation from 1 March 2008.

ENFORCEMENT CASES

China has always maintained a strong momentum in curbing illegal trade in endangered species. In recent years, the wildlife enforcement agencies at various levels have investigated and prosecuted several pangolin-related criminal cases through special and

regular law enforcement actions, in which some typical serious cases with significant seizures will be highlighted as follows.

On 25 May 2006, customs officials with China's southeastern city of Xiamen intercepted a shipment of 2849 frozen pangolins and 2600 frozen large geckos concealed in a container worth CNY six million (USD857 143) during a routine inspection. The shipment was declared as frozen golden thread fish on the Bill of Lading and was originated from Indonesia. Further investigation found that it was an organized crime committed by offenders at home and abroad in collusion with each other. The overseas offenders illegally purchased pangolin products in Indonesia and then transported them through sea shipping to China by hiding them among common frozen fish. Their counterparts in China took charge of customs clearance by fraudulent declaration, intending to sell them in China. Evidences indicated from October 2005 to April 2006, the gang smuggled 17 containers of frozen meat and scales of pangolin, comprising around 68 000 kg meat and 900 kg of scales worth CNY23.4 million (USD3.3 million), from Indonesia to Xiamen and then on to Guangzhou and Shantou in Guangdong Province. On 6 November, the Xiamen Intermediate Court sentenced the two principal offenders of the five accused to death penalty, suspended for two years, and immediately depriving them of any political rights and confiscating their personal property worth CNY1.5 million (USD214 286). Of the remaining three gang members, two were sentenced to life imprisonment with their personal properties duly confiscated worth up to CNY one million (USD142 857) and CNY500 000 (USD71 429) respectively. The last of the five accused was sentenced to 10 years' imprisonment with a fine of CNY100 000 (USD14 286).

In August 2007, the forest police in Menglian County, southwest China's Yunnan Province smashed a criminal gang that smuggled pangolin scales, with 11 suspects detained, nearly 3000 kg of pangolin sales seized, four vehicles detained and over CNY400 000 (USD57 143) of illicit earning frozen. Following a five-month investigation, Yunnan forest police found the gang was working with smugglers abroad in a conspiracy to smuggle illegal-sourced pangolin scales from Myanmar into Yunnan through land border crossings, and then illegally mail them to domestic clients by bribing an employee at the local post office. During the preliminary interrogation, the principal suspect surnamed Li confessed that roughly 4000 kg of pangolin scales had been smuggled to Yunnan and sold to provinces of Hebei, Anhui and Hunan etc. by his gang, just from January 2007 till under arrest. This case has currently been transferred to the procuratorate organization for prosecution.

On 24 March 2007, customs officers from Dongxing, a port city bordering Viet Nam in Southwest China's Guangxi Zhuang Autonomous Region, intercepted a suspicious shipment that included 160 sacks, 32 000 kg in weight. The shipment was declared as fish skins imported from Viet Nam and for border trade. Through subsequent inspection, a total of 930.4 kg pangolin scales were discovered to be hidden among the fish skins. The scales were seized and two men were arrested for their suspected involvement in smuggling products of endangered animal species.

CONCLUSION

China is committed to its obligations under CITES including the conservation and trade control of pangolins through adequate legislation, severe penalties and great law enforcement efforts. However, the sharp decline of pangolin populations in the wild

and continuous significant seizures illustrate the lucrative nature of illegal trade driven by a strong demand in China.

In dealing with the domestic methods of pangolin utilization, the different policies China has taken are undoubtedly objective and impartial. As an important component of 5000-year-old Chinese culture, TCM has been playing a crucial role in securing the public health, and hence is deeply rooted among its people. Therefore, TCMs containing pangolin scales have been widely accepted in China, thanks to both their practical curative effects and the psychological receptivity they have generated among the Chinese through hundreds of year's application. Under the circumstances of nearly depleted pangolin resources, China has taken strict measures to regulate and control the trade in pangolin scales for medicinal use, while respecting the needs for preserving the traditional culture. As for food consumption of pangolin meat as a tonic, extensive educational campaigns should be launched, as supplementary measures to the prohibitive administrative provisions, to encourage the public to foster a civilized dietetic concept.

China's newly adopted trade control policies for pangolins, with focus on restriction to the use and labeling system, will be definitely providing a substantial basis for inter-agency coordination and co-operation in a joint effort to curb the illegal domestic trade in pangolins. Nevertheless, it should be noted that the detailed operational mechanisms need to be further improved, among which a Chain-of-Custody (CoC) covering the whole procedure from verification of legal-sourced stockpiles to processing and circulation is given top priority. Meanwhile, a standardized approach for measuring the pangolin scales contained in medicines, an integral part of the labeling system, should be urgently introduced to ensure the effective monitoring of actual consumption in this area. Also, the R&D programmes on captive breeding for pangolin species and substitutes for pangolin scales in medicinal use should be taken into consideration, in order to alleviate the demand pressure on the wild population of pangolins.

China is still facing huge challenges in combating cross-border pangolin smugglings. Well-organized criminal network, porous border crossings with neighbouring countries and lack of timely information exchange and verification among various agencies, all these factors impose serious negative impacts upon effective law enforcement actions. In addition, China's co-operative efforts with other CITES Parties need to be further strengthened, with more emphasis given to improved communication and exchange of intelligence information, since the inter-regional co-operation between producing and consuming countries is vital in coping with illegal cross-border trade in pangolins.

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Pangolin Trafficking-related Crimes in China

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ABSTRACT: The China forest police are responsible for investigating crimes involving wildlife resources. China has established a series of laws for wildlife protection, but there are still a lot of pangolin trafficking-related crimes in China. Market demand and benefits-driven faultiness of laws and regulations are the main reasons of these crimes. Because the methods use to commit these crimes are becoming more sophisticated, it is more difficult for law enforcement agencies to crack down on these crimes than it used to be. International cooperation and criminal information studying system become more important.

Keywords: Pangolin trafficking, China

CHINA FOREST POLICE LAW ENFORCEMENT ACTIONS ON PANGOLIN TRAFFICKING

China forest police role

China forest police is responsible for investigating and cracking down on crimes involving wildlife resources. China forest police currently have agencies covering the whole country, with 50 000 staff experienced in protecting wildlife.

Legislation

Relevant regulations from administrative laws

(a) Article 9 from Law on the Protection of Wildlife stipulates that national key-protected wildlife species are divided into two groups, namely, first-class protected and second-class protected. Pangolins are listed in the second category.

(b) Article 33 from Regulations on Land Wild Fauna Protection and Article 26 from Regulations on Aquatic Wild Fauna Protection stipulate that if illegal hunting and killing of national key-protected wildlife have been carried out, the agency in charge of wildlife protection shall confiscate the specimens, the weapons and the gains, revoke any concessionary certificates for hunting and impose a fine up to ten times the value of the seizure. When no specimen was collected, the fine should be below USD150.

(c) Article 37 from Regulations on Land Wild Fauna Protection and Article 28 from Regulations on Aquatic Wild Fauna Protection stipulate that for crimes involving selling, purchasing, transporting and carrying national key-protected wildlife or its products, the industrial and commercial administrative agency or the agency in charge of wildlife protection authorized by the former, shall confiscate any items involved and derivated gains, and execute a fine up to ten times the value of the items involved.

Relevant articles from the Criminal Law

For severe crimes beyond the capability of the above-mentioned laws and regulations, the Criminal Law has some stipulations.

(a) Hunt and kill of protected and endangered wildlife (Section 1, Article 141)

According to this article, if less than eight pangolins were illegally hunted and killed, the pubishement should be up to five years of imprisonment as well as a fine; if more

than eight, but less than 16 pangolins were illegally hunted and killed, the pubishement should be up to ten years and more than five years of imprisonment as well as a fine; if more than 16 pangolins were illegally hunted and killed, the pubishement should be more than ten years of imprisonment as well as a fine or confiscation of property.

(b) Trafficking of protected animals and their derivatives (Section 2, Article 151)

According to this article, if less than eight pangolins or up to USD15 000 worth of pangolin derivated products were smuggled, the punishment should be less than five years of imprisonment as well as a fine; if more than eight pangolins, or more than USD15 000 to 30 000 worth in pangolin derivated productsderivatives were smuggled, a punishment of more than five years of imprisonment as well as a fine shall be executed; to smuggle more than 16 pangolins, or more than USD30 000 of its products, life imprisonment or death penalty and also property confiscation shall be executed.

(c) Purchase, transport and sale of protected and endangered wild species and their derivatives

According to this article, the illegal purchase, transport or sale of less than eight pangolins, can be punished with up to five years of imprisonment and a fine; if more than eight pangolins, or more than USD15 000 worth of pangolin derivatives, were illegally purchased, transported or sold, or more than USD7500 profit was made from the sale of pangolins and derivatives, the punishment should be of more than five years and less than ten years of imprisonment and a fine; if more than 16 pangolins, or more than USD4500 of pangolin derivatives were illegally purchased, transported or sold, or more than USD2250 profit was made from the sale of pangolin or their derivative, punishment should be more than ten years of imprisonment and a fine or confiscation of property .

THE CAUSE OF PANGOLIN TRAFFICKING IN CHINA

Market demand

As long as there is a demand in the market, and available supply, wildlife crime will continue. Presently pangolins and their products mainly go to two places:

1. Restaurants

   Wildlife trafficking for wild meat makes up a heavy percentage. According to a survey carried out in China, in 2003, by the Wildlife Conservation Association, 2.81% of city residents interviewed often consume wildlife, 52.5% of them out of curiosity, 36.7% for nutrition, 22.4% for showing off, fashion and enjoyment.

2. Traditional Chinese Medicine

   According to the Chinese traditional medicinal culture, many wild animals and their products are of much medicinal value which leads to a huge demand for wildlife. The scales of Pangolin are claimed to adjust internal secretion and treat gout. According to our information, scales are sold at a price of USD65 per kg out of China, and in China USD160 per kg. In some cities such as Hebei and Anhui Sichuan, the price can reach up to USD250.

Benefits-driven

Huge benefits are the fundamental cause of wildlife crimes. As a suspect was saying in his confession: "I know pangolins are protected by the government, but no other business will bring me as much money."

According to an investigation, one kilogramme of pangolin in Southeast Asia costs USD15, in Guangdong it can reach up to USD100 and, as a dish, one kilogramme costs USD160. A seven-kilogramme pangolin can ultimately sell at a price of USD1250, which is ten times the original price.

The huge profit is the main driving power of wildlife crimes. Sometimes criminal groups will even report each other's illegal activity to remove competition for access to the wildlife market and resources.

Legislation loopholes and weaknesses

Relevant laws and regulations such as Law on the Protection of Wildlife, Regulations on Protection and Management was established almost 20 years ago and has not been revised since. However, the situation of wildlife protection and management has greatly changed. Wild pangolin populations have reduced rapidly, yet they are still listed as second-class protected species. On the other side, many wild species have been successfully bred, but still belong to first-class protected animals.

There is currently only one province in China (Guangdong), which provides legal basis to punish the consumption of illegally processed national key protected wild species with a fine between USD150 and 1500. However, as wildlife consumers mainly belong to high social status groups, fines are not sufficiently deterrent to keep them away from wildlife. More severe legal penalties such as custody should thus be applied.

THE CHARACTERISTICS

Group-oriented

In the past, cases used to involve one to two suspects and less than five wild specimens. Nowardays a case usually involves more than six suspects, with each definite tasks such as purchase, transport or sale, and organised in trans-provincial criminal organizations.

Difficult to detect

Wildlife crimes are very difficult to detect mainly because:

Pull wires

Most criminals will not do business in person, but will instead hire unwitting drivers to transport, transfer and deliver wildlife specimens and derivated products. In such cases, the enforcement authorities can only seize the wildlife.

Communicate one-way

Some criminals will only sell wildlife to regular clients and will be very cautious with demands from strangers.

Keep away from goods

To avoid detection, criminals are not present during the transporting, storage and transaction of wild species and tend to stay away from the goods. For example, when selling wildlife, criminals will not bring the goods with them, but will store them

elsewhere using false ID cards. When a potential buyer is interested, they will take him/her to the storehouse. This action will only take few minutes, making any detection very difficul.

Various transporting channels and complex criminal routes

Generally speaking there are two main kinds of transporting channels:

1. The pangolins are purchased in Southeast Asia, brought to China by sea, using ports along the coastal areas of Guangdong, Fujian, Yantai and Shandong. Such cases involve a large number of specimens (in the order of several thousands), usually dead bodies. For instance, from September 2005 to April 2006, Xiamen Customs reported that 68 000 kg of frozen pangolin meat and 900 kg of scales, worth CNY23 400 000 (USD3 421 553 at 2008 rates), were imported into China. The shipments were declared as Indonesian frozen fish.
2. Live pangolins and scales are mainly smuggled to China by land. For example, pangolins coming from Viet Nam and Lao P.D.R. are transported to Guangxi and Yunnan.

Scales can also be delivered using couriers and postal services.

Investigation reveals that criminals are organised in a group capable of smuggling, selling, transporting, storing, packaging, delivering and purchasing protected species. The group is strongly organized, with definite task assignment, stable demand and supply and have been active along the border area of Yunnan for a long time. The animal products flow through Burma from countries such as India, Thailand, Nepal and Lao P.D.R., and are sent to various provinces of China.

The head of the group cleverly stays away from the goods and only makes transactions by phone using a tea business for protection. He bribed some of the post office clerks in the Menlian County, and sent pangolin scales to producers of traditional medicine in places such as Anguo Hebei, Bozhou Anhui, Sichuan and Hunan. Members of the group are specifically trained to be responsible for transport, communication, purchase, packaging and storing.

COUNTERMEASURES AGAINST WILDLIFE CRIMES

Enhance cooperation with other agencies

The battle against wildlife crimes involves agencies such as forestry, police, Customs, industries and businesses. It is almost impossible, for one single agency, to entirely smash criminal organizations and curb crimes. Strength from all these agencies should be integrated and a specialized crime-combating alliance, relying on a multi-layer co-operation system, should be launched.

Enhance international cooperation

Wildlife crimes are trans-boundary activities. The members of CITES should assume responsibility and use political and economic measures to fulfill the tasks assigned by CITES seriously so as to help the survival of wildlife. These precious resources belong to all the human kind. We suggest that Interpol and wildlife conservation organizations establish a law enforcement alliance on wildlife protection, involving relevant countries, enhance judicial assistance among these countries, and co-operate by providing information on activities such as wildlife collection, tracking and delivery.

Establish a criminal information platform

Without the help of timely and accurate information, it is difficult to improve the efficiency of combating pangolin crimes and to develop effective countermeasures. Therefore, we must establish a criminal information platform to ensure the collection, flow and analysis of criminal information.

Enhance education and increase public awareness

Media such as the television, the Internet and newspapers have been utilized to publicize cleared cases. Pictures of seizures carried out in places such as airports, train and bus stations, hotels, flower and bird markets, storage place, as well as relevant legislation have been posted to educate and alarm the public.

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Pangolin Conservation in Taiwan

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ABSTRACT: Formosan Pangolins *Manis pentadactyla pentadactyla*, an endemic subspecies of the Chinese pangolin, are widely distributed throughout Taiwan, mainly hills at lower elevations, with upper limit of 2000 m. Used in the Traditional Chinese Medicine (TCM), the processed pangolin scales are said to have the functions of activating blood circulation, stimulating lactation, dispersing swelling, and expelling pus. All species of pangolins around the world, including Taiwan subspecies, are protected under Taiwan's Wildlife Conservation Act. The Department of Health banned pangolin scales from medicinal use at the end of 2000. Researches of substitutes recommended that Wang Bu Liu Xing, or dried seeds of cowherb *Vaccaria segetalis*, can be used as a substitute for pangolin scales with the same effectiveness.

Keywords: Formosan pangolin, Traditional Chinese Medicine, substitute

BACKGROUND

Taiwan is a small island off the southeast coast of Mainland China. Roughly 36 000 km^2 in area, nearly 4000 m in altitude from the seashore to the highest peak; this unique island is full of various ecosystems and diverse fauna and flora. The Formosan Pangolin *Manis pentadactyla pentadactyla* is an endemic subspecies of the Chinese pangolin, Family *Manidae*, Order *Pholidota*, Class *Mammalia*. Formosan Pangolins are widely distributed throughout the island, mainly hills at lower elevations, with upper limit of 2000 m.

Taiwan was once known internationally for its "economic miracle". Along with the rapid development into an industrial nation is the vast disappearance of natural environments. Formosan Pangolins were once hunted heavily for the use in leather industry, it was estimated that the number of harvest reached 60 000 per year during the climax between 1950 and 1970.

Long been used in the Traditional Chinese Medicine (TCM), the processed pangolin scales, combined with other materials for medicinal use, have the functions of activating blood circulation, stimulating lactation, dispersing swelling, and expelling pus. In "Bencao Gangmu", or the Compendium of Materia Medica, published in Ming Dynasty (1596), it says that the scales can be used to cure malignant sore and aggressive malaria, unblock the meridian channels* and increase lactation.

* The meridian channels are the pathways of running qi and blood in human body according to TCM.

SUPPORTING LEGISLATION

Habitat protection

To maintain the integrity of ecosystems, Taiwan has set up many protected areas with different authorities under various legal bases. For example, National Parks under the National Parks Act, Nature Reserves under the Cultural Heritage Preservation Act, Forest Reserves under the Forest Act, and Major Wildlife Habitats and Wildlife Refuges

under the Wildlife Conservation Act (WCA). The relevant authorities include the Construction and Planning Administration, Ministry of Interior; the Council of Agriculture, Executive Yuan (COA); as well as the Municipal and County/City governments. The range of the above-mentioned protected areas has reached 680 320 ha, which represents about 18.89% of Taiwan. However, no protected areas are specifically designated for the purpose of pangolin conservation.

Species management

The major legal basis for pangolin management is the Wildlife Conservation Act (WCA), promulgated by the Taiwan President in 1989. Under the WCA, the central competent authority is the Council of Agriculture (COA), and the local competent authorities are the Municipal and County/City governments. The COA has decreed all seven species of pangolins around the world (including Taiwan's endemic subspecies) as Protected Species in the Rare and Valuable category.

In accordance with the WCA, Protected Species shall not be disturbed, abused, hunted, killed, traded, exhibited, displayed, owned, imported, exported, raised or bred, unless under special circumstances recognized in WCA or related legislation (Art. 16). Protected Species shall not be disturbed, abused, hunted, killed or otherwise utilized, except for academic research or educational purposes and with proper approval from the COA (Art. 18). No import or export of Protected Species (live or products thereof) is allowed without prior approval from the COA, and the transaction of live Protected Species is limited to academic research institutes, colleges or universities, public or licensed private zoos for education or academic research (Art. 24). Live Protected Species and the products thereof shall not be traded or displayed or exhibited in public areas without the permission of the local authorities (Art. 35).

Those who violate the above regulations will face punishment, which the maximum is five years of imprisonment and/or a fine of TWD1 500 000 (USD50 000 at 2008 rates), and the subject live Protected Species and products thereof will be confiscated. Additionally, a person who falsely labels merchandise as containing Protected Species or its products shall be subjected to a fine of not less than TWD150 000 (USD5000) and not more than TWD750 000 (USD25 000) (Art.48).

According to the regulations of the Bureau of Foreign Trade, Ministry of Economic Affairs, under the Trade Act, to import or export pangolins (live specimens or parts thereof), the relevant CITES permit must be obtained in advance and presented to the Customs for clearance. Besides, to import Manidis squama (pangolin scales) for Chinese drugs, a photocopy of business license for dealing with Chinese raw medicine or pharmaceutical manufacturing license issued by the Department of Health (DOH) is required.

ENFORCEMENT ACTIONS

From 1989 (the WCA enacted) till now, in 15 pangolin-related cases suspects were found guilty by the court. Five were prosecuted for smuggling, four for selling, five for hunting, and one for abuse, with sentences ranging from six to 18 months in prison, and a fine between TWD100 000 (USD3333) and TWD540 000 (USD18 000). The pangolins and their products thereof were confiscated. Taiwan Customs seized a total of 7940 kg of pangolin scales, originating from Mainland China, Cambodia, Malaysia, and Indonesia. It was estimated that the amount represented 15 880 individuals with an average weight of 500 g of scales per pangolin.

In 2000, due to a debate on TCM issues, pangolins became the focus of social attention. The COA listed pangolins as Protected Species, and banned the commercial use of their products. The DOH, on the other hand, continued issuing pangolin-based pharmaceutical licenses, which was against the WCA and the legal administration principle. At first, the two government agencies did not co-ordinate well to solve the problem. Then, the Control Yuan, citing Article 24 of the Control (Supervision) Act, launched a correction investigation of COA and DOH, accusing their administrative fault and sectionalism, which undermined Taiwan's national conservation image, and demanded the problem to be solved. Subsequently, the COA instructed the local governments to reinforce the crack down on illegal selling of pangolin-based pharmaceuticals. On 18 Nov. 2000, the DOH issued a gazette, requesting that those who possessed protected species-based (e.g. pangolin, bear bile, musk, and Saiga antelope horn) pharmaceutical licenses should stop using these ingredients and apply to the DOH for the replacement of the altered licenses within three months after the gazette. The relevant actions taken by COA and DOH were reported to the Control Yuan and the case was finally closed on 18 Dec. 2000.

RESEARCH AND PUBLIC PARTICIPATION

To promote a better understanding of Formosan pangolin's life history and ecological requirements, the COA has provided funding over TWD11 000 000 (USD366 667) to support projects on various facets of pangolin research, including home range, activity pattern, ecological needs (1989-1993); captive breeding, nutrition and food analysis, activity pattern and habitat investigation (2002-2005); identification techniques of products thereof (2002); and a workshop on Chinese pangolin population and habitat viability assessment (2004).

Although wild populations of Formosan Pangolins are not large, there are usually several occasions of pangolins picked up by people each year. Taiwan has set up a standard procedure, directed by the local governments, to handle the injured or strayed pangolins. Individuals are sent to zoos or wildlife rescue centers for treatments and a database was built. Pangolins are released to the wild after regaining health.

In 1995, several research institutes, funded by the DOH, carried out studies on various aspects of the use of protected species in TCM, including market survey, ingredient analysis, and search for alternatives. The results showed that the availability of pangolin scales was limited, and counterfeits made with gelatin were found in the market. It was recommended that Wang Bu Liu Xing, or dried seeds of cowherb (*Vaccaria segetalis*, Family *Caryophyllaceae*), can be used as a substitute for pangolin scales with the same effectiveness. A survey of TCM traders and doctors showed that around half of the interviewees (54.2% were traders, 60.7% doctors) supported a ban on the use of pangolin scales in TCM. However, because pangolin scales have been used in TCM for thousands of years, the belief of their curing effects is deeply rooted; most TCM practitioners showed reservations about the effectiveness of substitutes. Another research in 2003 on the comparison between pangolin scale and cowherb seed on lactation performance, immuno-modulation, and anti-tumor effects of rats revealed that the effects of cowherb seed were equal to or even better than that of pangolin scales, suggesting the prospect of an ideal substitute in helping pangolin conservation.

According to a recent news report, the first pangolin safeguard team was established on 29 April 2008, by the Luanshan aboriginal tribe located in Yenping Township, Taitung County, in Southeastern Taiwan. This example shows that local communities have not

only recognized the importance of pangolin existence, but also actively takes part in its conservation.

INTERNATIONAL COLLABORATION

Recognizing that international collaboration is essential to support global conservation efforts, since 1996 the COA has allocated budget every year to sponsor international conservation projects proposed by many foreign institutions, such as TRAFFIC, Birdlife International, Lusaka Agreement Task Force (in Africa), and various specialist groups under IUCN/SSC. For example, projects supported by the COA includes the rehabilitation and reintroduction of Cape pangolins confiscated from traders in Namibia; saving the last remaining lowland rainforests in Sumatra, and sea turtle research in Sabah, Malaysia. Additionally, in 2007 the COA was planning to support Conservation International proposal on protecting Asia's pangolins from illegal wildlife trade, but the institute withdrew the proposal because of priority reasons, and the grant was eventually transferred to support other projects.

OBSTACLES AND NEEDS

Due to the international politics, Taiwan is not able to join international conventions such as CITES, nonetheless, it has introduced effective domestic measures to fulfill the obligations as a member of global village. More international communication and information sharing may help Taiwan to make a better contribution to global pangolin conservation.

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Question & Answers

Questions addressed to Mr. Gono Semiadi, Indonesia

Mark Auliya, T-SEA: If LIPI recommends a quota for pangolins, will this be easily accepted by the CITES Management Authority (M.A.), how will you work together and what are the obstacles?

Gono Semiadi: LIPI make this suggestion from a scientific point of view, there is no official discussion yet. The Management Authority relies on LIPI and is likely to follow. If beneficial, an easy way out for controlling the trade could start with a low (quota) number, but we haven't really discussed at depth on the next step as we don't have any official data. There is a need for more data on requirement and demand from the destination countries.

Wu Shibao, SCNU: In response to Mr. Semiadi, it is difficult to estimate how many pangolins are illegally smuggled because they are difficult to detect as camouflaged as fish product. China do not have any legal trade figures as commercial trade of pangolins is banned under CITES. When did the high level of trade happen in Indonesia and what is the current status of pangolins in Indonesia?

Gono Semiadi: LIPI does not have any figure.

Leanne Clark, CPCP: How to get accurate data with just using a quota system? Given the value and demand and the size of Indonesia, the trade will still be equally difficult to monitor. Will there be an illegal above-quota system?

Gono Semiadi: It looks controversial but it is the first time of evaluation. When open, that official data will go to the key players. We can play on rivalry between legal and illegal players which will give us access to go deep into the system, starting from collection points. This was proven to be useful for the reptile and amphibian data exercise for quota.

Questions addressed to Mr. Augustine Tuuga, Sabah, Malaysia

Shujin Luo, NCI: With the hypotheses that smuggling, especially in Malaysia and Indonesia, is probably linked to a large scale conversion of pristine forest to plantation (possible palm oil), what is the situation in Sabah and what is the linkage between the two?

Augustine Tuuga: Most of the clearing for plantation was done between 1990 and 2000; very few areas are being opened currently. At that time, the department carried out translocation of elephants and orang utans to other areas but did not find any evidence of pangolin hunting for the illegal trade. For Sabah, I disagree with this hypotheses but I can not tell for other areas.

Sabine Schoppe, KFI: Any idea of what is the source of the animals seized?

Augustine Tuuga: We know the modus operandi: many collectors, very high price (sources indicate MYR530 (USD150 at 2008 rates) for a pangolin). I don't think pangolins are shipped from outside Sabah but if seized in big numbers, many other sources, maybe other places.

Gono Semiadi, Indonesia: Could you extrapolate from the number of cases to individual numbers of pangolins? Are they coming from Indonesia or Sabah?

Augustine Tuuga: 17 cases in all, most very small. The biggest case recorded 530 specimens. We are looking at a syndicate which can collect that number within the state not from Indonesia. The next biggest case recorded 56 kg, the rest only summed up to 10, five and three specimens.

Questions addressed to Ms. Levita Acosta Lagrada, Philippines

Sabine Schoppe, KFI: You mention a NBI report of 2000 kg in April. Nothing was reported in the press, could you elaborate on the location and origin of seizure?

Levita Acosta Lagrada: This was a verbal communication, I don't know if they have anything official. They did not reveal the source of shipment.

Questions addressed to Mr. Nguyen Manh Hiep, Viet Nam

Noviar Andayani, WCS: Do you use the IUCN reintroduction guidelines, or did you develop your own set of guidelines?

Nguyen Manh Hiep: Managers try their best to conserve wildlife, they shorten the time of cases to release, and do not rely uniquely on IUCN guidelines. The healthy ones are selected to be released first. The weak ones go through rehabilitation before release. The guidelines are something to adapt in front of the situation, not strict figures to follow.

Noviar Andayani, WCS: How many access points does Viet Nam have with China?

Nguyen Manh Hiep: If we had all information it will be easy to control but there is a range of different options. The government only controls the main gates; the traders use alternatives way, to avoid government check points.

Gono Semiadi, Indonesia: What is the proportion of confiscated pangolins that come from outside Viet Nam?

Nguyen Manh Hiep: We know the species through the CITES Scientific Authority (S.A.) and we follow the CITES procedures. Depending on species and permits, we inform the neighbouring countries and check for further information from source country. For example, for dead pangolins, we inform the source country and ask if we can send them back. Usually the source country refuses. According to CITES resolutions, we have to bury and burn the dead pangolins. We find it difficult to separate the specimens with different source countries, because the traders at the border might pick specimens from different locations and put in the same container to Viet Nam.

Questions addressed to Mr. Suon Phalla, Cambodia

Julie Scardina, SWBG: One of the obstacles mentioned was the lack of co-operation between the NGOs; what would you be looking for from outside organizations?

Suon Phalla: By law NGOs are required to sign a Memorandum of Understanding (MoU) with the co-operating agency, and have to implement the terms of this MoU. I am not sure if information sharing between NGO and Government is requested in MoUs. As a government officer, I have difficulty finding information on confiscations. I work for the CITES M.A., I am responsible for writing reports for the Conference of the Parties (CoP), but I find difficult to access information and generally have to write to the minister and ask for a support letter to request information from the NGOs. More protocols are needed for information sharing.

Questions addressed to Dr. Ronasit Maneesai, Thailand

Mark Auliya, T-SEA: Could it be an alternative option to collaborate with crocodile farms in Thailand to use facilities to care for and maintain confiscated pangolins?

Ronasit Maneesai: If sufficient place is available, confiscated specimens can sometimes be placed in a farm, but the farm owners have to sign a paper stating that the animal is the property of the government. If we have our own facilities, we handle the specimens ourselves.

Leanne Clark, APCP: Are there any breeding centres, or successful record of breeding of pangolins in Thailand?

Ronasit Maneesai: There are none and it is very difficult. I am hoping to learn from this group.

Questions addressed to Mr. Win Naing, Myanmar

Fanny Lai, WRS: How has the cyclone affected the wildlife in Myanmar, and what are the rescue efforts?

Win Naing: We are working to combat the wildlife trade

Questions addressed to Mr. Zhang Yue, China

Van Anh Thi Nguyen, ENV: Does China use meat or just scales, and is it just from *M. javanica*?

Zhang Yue: The consumption of meat is completely illegal in China and strict measures are in place. In regards to the species, in China, most scale stockpiles were taken from *M. javanica* as *M. pentadactyla* is difficult to find.

Van Anh Thi Nguyen, ENV: Do you export or re-export, and in what form?

Zhang Yue: No (re)-export since 2000, as there is a zero quota. China never authorized any export, import or re-export for commercial purposes.

Leanne Clark, CPCP: China still issues hunting permit and it is still legal to use scales. Do you have figures of permits issued and the number of scales used?

Zhang Yue: The Department of Wildlife Conservation under SFA is responsible for the registration of stockpiles, not the CITES M.A. There is a synchronizing system but it is still at a beginning stage. Although hunting at provincial levels occurs, no permit for hunting has been issued.

Gono Semiadi, Indonesia: TCM (from pangolin) is still allowed, but hunting is illegal and there is a ban on the consumption of meat. What is the mechanism for controlling the production of the scales? Are the scales from Chinese pangolin, or are scales for TCM supplied from other countries?

Zhang Yue: We have recommendation to standardize our approach for scales in TCM and ensure an effective monitoring of the actual consumption. The first stage of the labelling process is a verification of stockpiles. This is important to us as Forestry Department Officials supervise investigations on the consumption of scales.

Sabine Schoppe, KFI: Considering the importance of estimating existing populations, what method was used to estimate the remaining population in china (50 000 to 100 000)?

Zhang Yue: Aster Zhang from CI will provide information on population status in his presentation.

Questions addressed to Mr. Geng Yong Ping, China

Loretta Ann Soosayraj, MYCAT/T-SEA: What has the response been from the Chinese public to the awareness work conducted?

Geng Yong Ping: we displayed some posters at airports and markets, and policemen go to schools and restaurants to explain that it is illegal to eat wildlife.

Van Anh Thi Nguyen, T-SEA: You told us the law allows the use of scales for TCM. How many kilograms of scales does your country need per year for TCM, and how much is imported?

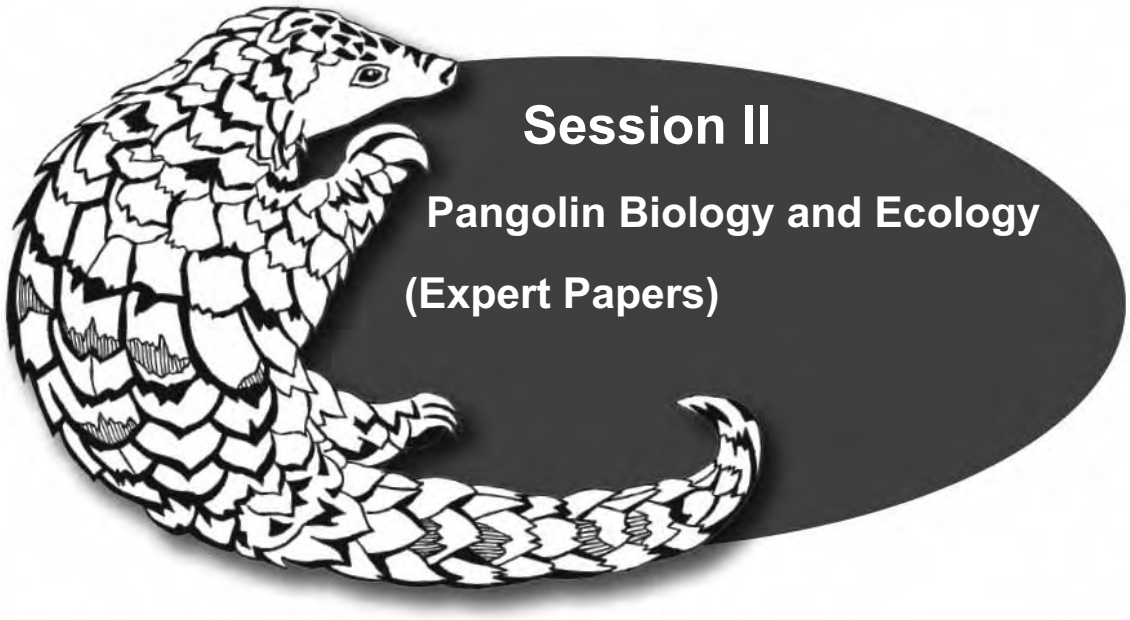
Geng Yong Ping: My department does not have the figures.

Nguyen Van Thai, CPCP: Is there a different price for live and dead pangolin?

Li Zhang, CI: In Kunan and Hunan the price of a local pangolin can go as high as one third more than an imported one.

Nguyen Van Thai, CPCP: Does your awareness programme focus on consumption? Does your awareness programme extend to companies to reduce the number of scales used in TCM.

Li Zhang, CI: I am not in proper position to reply to this question, but this is certainly a problem.



Session II

Pangolin Biology and Ecology

(Expert Papers)

Ecological Research and Conservation of Sunda Pangolin *Manis javanica* in Singapore

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ABSTRACT: The Sunda Pangolin *Manis javanica*, like other members of the family Manidae, is a poorly known species and currently affected by illegal trade for their meat and scales. Wild *M. javanica* were captured and radio-marked on both mainland Singapore and Pulau Tekong from 2005 to 2006. Pangolins were monitored using radio-telemetry equipment to observe activity cycle, space use, prey preference and habitat preference. Infrared-triggered camera-traps were also deployed for one female pangolin and her young. Four adult pangolins were successfully monitored; they were active for 165 ± 14 min (mean ± S.E.) every night and their mean 100% minimum-convex polygon (MCP) home-range was 43.3 ha. For the female pangolin, only one young was recorded and the period of maternal care was approximately three to four months. Three natal dens were used throughout and all were associated with hollows of large trees (> 50 cm diameter-at-breast-height). Her 100% MCP home range was 6.97 ha. The daily active period of the female was 127 ± 13.1 min and peak activity was between 03:00 and 06:00 hrs. Ants and termites made up 67.0% and 33.0% of the foraging time respectively and 11 genera of ants were foraged upon by the male pangolins. *Anoplolepis gracilipes* was significantly preferred while *Philidris*, *Crematogaster* and *Myrmicaria* were avoided. Challenges and priorities for future research and recommendations for the conservation of *M. javanica* were also discussed.

INTRODUCTION

The Sunda Pangolin *Manis javanica* is one of the eight species of pangolins in the world. It is listed under Appendix II of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), "zero-trade quota", and classified as Lower Risk: near threatened by the IUCN (International Union for Conservation of Nature) (Inskipp & Gillet, 2005; IUCN, 2006).

Unfortunately, even though it is protected by law in most of its range states, the Sunda Pangolin is highly sought after and traded for its meat and scales (e.g., Bräutigam *et al*., 1994).

In addition, very little is known about the biology of this species, except that it is nocturnal in habits and has a specialized diet of ants and termites (Lekagul & McNeely, 1988). Lastly, the species also do not survive well in captivity and captive breeding is mostly unsuccessful (Wilson, 1994).

This study aims to investigate the habitat preference and prey preference of *M. javanica*, as well as recording its natural behaviour to obtain more baseline information.

MATERIALS AND METHODS

Study site

The study site of this study is Pulau Tekong, a military island about 2350 ha and is situated off the northeastern coast of Singapore. The island has been exclusively used

the military since the mid-1980s. The vegetation of the island comprises of low secondary forest, monoculture, grassland and mangrove forests (Chou *et al*., 2006).

Methodology

Pangolins were captured by hand on Pulau Tekong, and fitted with a radio-transmitter (216 MHz) on the dorsal scales near the base of the tail (Richer *et al*., 1997). Radio-tracking is performed by a portable radio-receiver and portable H-antenna.

In addition, infrared-triggered camera-traps (fitted with digital compact cameras) were also deployed at entrances of dens whenever possible to record exit and re-entry time.

The data collected for the home-range analysis were then analysed with RANGES VII software. Habitat preference was analyzed using compositional analysis (Aebischer *et al.*, 1993), while prey preference was analyzed with the Jacobs' index (Jacobs, 1974).

RESULTS

Capture data

A total of 22 pangolins were captured from September 2005 to November 2006. Of which, six were females (three adults, three juveniles) and 14 were males (10 adults and four juveniles). Unfortunately, the drop-off rate of the radio-transmitter was about 80% during the first two weeks (when the habituation process took place). As a result, data could only be collected from four adult male pangolins. In addition, during the sampling period, a tagged female was found to have given birth and minimal tracking was carried out to minimise the disturbance to the mother and young.

Activity cycle

The average activity duration of the four adult male pangolins was 165 ± 13 (mean ± standard error) min. While there exists a peak activity period for each of the adult males, the peaks occurred at different times of the night.

Home-range

The average 100% minimum convex polygon (MCP) home-range of the adult male pangolins was 43.3 ha. As the home-ranges of all (if not most) pangolins at the study site were not mapped, it was not possible to assess the overlap in home-range within and between the sexes.

Habitat preference

When analyzing the habitat preference of adult male pangolins, using compositional analysis, habitat selection was assessed at two levels: second-order selection (i.e. assessing habitat composition of MCP home-range versus total study area) and third-order selection (i.e. assessing habitat composition of buffered radio-locations versus MCP home-range).

At the second-order selection, the order of preference was Secondary Forest > Monoculture > Urban >> Mangrove, with significant avoidance for mangrove habitat. After removing the lowest rank of the second-order selection, the order of the third-order selection was Secondary Forest > Monoculture > Urban, without any significant preference or avoidance. Of note is that secondary forest turned up as the top-ranked habitat type that was selected for at both level of analyses, albeit without significant differences from the second-ranked habitat.

Prey preference

By analyzing the proportion of time spent foraging on either ants or termites, it was found that three of the adult male pangolins spent an average of 67.0% of their foraging time on feeding on ants and the remainder on termites. (Tracking on foot was not performed on one of the adult male pangolins as it was still not habituated to human presence after a month.) The mean feeding bout of the three male pangolins was 2.29 min.

A total of 11 ant genera were found to be foraged upon by the pangolins. (Expertise for termite identification was not available during the study period.) When analysing the prey preference by Jacob's index at the genus level, it was found that *Philidris* spp. and *Myrmicaria* spp. were significantly avoided, while *Polyrachis* spp. and *Anoplolepis gracilipes* were preferred. At the subfamily level, Dolichoderinae was found to be significantly avoided, and no significant preference was detected.

Female pangolin with young

Three dens were found to be utilized by MJ6, the female pangolin with a young during the study period. All the dens were associated with big trees (> 50 cm DBH; diameter-at-breast-height). Her 100% MCP home-range was 6.97 ha; her daily activity period was 127 ± 13.1 min and peak activity was from 03:00 to 06:00 hrs.

DISCUSSION

The lack of strong preference for both habitat types and prey items are key characteristics that make *M. javanica* an adaptable species in the modern-day heterogeneous habitat-matrix. The latter is also aided by the specialized diet of ants and termite, because the ubiquitous nature of the ants and termites meant the availability of prey items almost everywhere. Furthermore, the large quantities at the nests are also advantageous to such a diet, since finding a nest implied a large number of preys at a location. All these suggest an abundant supply of food for the pangolins, and thus diet is unlikely to be a limiting factor.

In addition, the lack in preference for habitat types exhibited by the adult males is also easily witnessed from the numerous reports of pangolins occurring in locations outside forested areas. Tagged pangolins were also observed utilizing urban structures (e.g. drains, houses) for resting purposes during the day.

Nevertheless, while the lack of strong preference may be true for adult male pangolins, it is to be emphasized that the female pangolin with her young (i.e. MJ6) was always found to be using natal dens associated with big trees (> 50 cm DBH). This implies that mature forest is required for *M. javanica* during their reproductive phase, and the continued existence of mature forests is critical for the long-term survival of the species.

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Preliminary Observation on Food Habits and Foraging Behaviour in Chinese Pangolin *Manis pentadactyla*

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ABSTRACT: The food habits of Chinese pangolin *Manis pentadactyla* were surveyed by using the methods of field observation and the analysis of droppings and stomach contents, at Maoming Dawuling Natural Reserve, during 1985-2003. The foraging behaviours, for a total of 12 observations, were classified into six categories, as follows: walking, searching, walking and searching, digging, feeding, pause. Most feeding sites occurred in needle broad-leaved mixed forest (44.6%), and mainly located at the base of grass, tree, and shrub, under leaf litter, near fallen log and dead stump, and in termite nests. A total of 44 species of ants and termites were recorded at the Reserve. However Chinese Pangolins showed obviously selection and preference to these ants and termites. The species of ants and termites rejected accounted for 83.87% (26/31) and 53.85% (7/13) respectively. Favorite ants and termites were *Coptotermes formosanus*, *Macrotermes barneyi*, *Polyrhachis dive*. The diet was composed of 11 species of ants and termites, including five genera and five species of ants, and four genera and six species of termites. Ants constituted the major component of the summer diet, while termites formed that of the winter diet. *Coptotermes formosanus* and *Macrotermes barneyi* were probably key species in Chinese pangolin's diet.

Keywords: Chinese Pangolin *Manis pentadactyla*, food habit, diet, foraging behavior

For full article, please refer to Wu, S.B., N. F. Liu, Y. Y. Li, R. Y. Sun (2005). Observation on food habits and foraging behavior of Chinese Pangolin *Manis pentadactyla*. *Chinese Journal of Applied Environment Biology* 11(3):337-341 (In Chinese)

Asian Pangolins: How Behavioural Research can Contribute to their Conservation

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ABSTRACT: This paper discusses how research into the behaviour of Asian pangolins can contribute to their conservation and specifically why a comprehensive understanding of pangolin behaviour in captivity and in the wild is a prerequisite for the successful conservation of *Manis* spp. The main threats facing Asian pangolins, high levels of trade and the difficulty of maintaining these species in captivity are acknowledged prior to discussion of behavioural research undertaken to date. Some preliminary results of research on the behaviour of captive Sunda Pangolins *Manis javanica,* undertaken in early 2008 at the Carnivore and Pangolin Conservation Programme (CPCP) facility in Viet Nam are then discussed. Further research investigating social, foraging and reproductive behaviour is advocated and the benefits of such research to pangolin conservation are summarised.

Keywords: Behaviour, captive Asian pangolins, CPCP

INTRODUCTION

Pangolins are traded in large numbers, and confiscated in all countries along the trade route. Keeping pangolins in captivity is therefore likely to become an increasingly important aspect of their conservation.

They have been kept in captivity successfully for varying periods, but knowledge of how best to do so is still lacking. With only a few exceptions, their life expectancy in captivity has been short.

Comprehensive knowledge of pangolin behaviour both in captivity and in the wild will be central to assessing the welfare and management of the animals, for the development of rehabilitation and release protocols and for potential captive breeding programmes.

Studies of wild free ranging animals will contribute to our understanding of the needs of captive animals and in turn studies of captive animals can contribute to our understanding of the conservation needs of pangolins.

This paper highlights the need for behavioural research on Asian pangolins. It provides a brief summary of research to date, focusing on the Chinese Pangolin *Manis pentadactyla,* and the Sunda Pangolin *Manis javanica*. It briefly indicates some of the findings of research undertaken on the captive behaviour of *M. javanica* and discusses the necessity of behavioural research for the successful conservation of *Manis* spp.

THE CURRENT SITUATION

In all countries along the trade route, pangolins are traded in vast quantities. The seizure of 24 t of pangolins in Viet Nam in early 2008 demonstrates the magnitude of the trade and the threat posed by hunting on wild populations.

Maintaining pangolins in captivity will become an increasingly important aspect of their conservation because of;

1. The number of pangolins confiscated from the trade that require a period of rehabilitation, and

2. If the high level of hunting for trade persists it will be necessary to implement conservation breeding programmes for particular species such as *M. pentadactyla.*

Despite the anticipated increase in the number of Asian pangolins requiring captive care, a comprehensive knowledge of how best to maintain them is lacking. Pangolins have been maintained in captivity since at least the 19th century (Yang *et al.*, 2007) but for varying periods of time. Time in captivity has ranged from a few days (Yang *et al*, 2007) to over 12 (Jones, 1977) and 19 years (Wilson, 1994), though the latter instances must be considered exceptional.

It has been suggested pangolins can be easily maintained in a captive environment (Heath & Vanderlip, 1988) though general consensus is that they are difficult to maintain in captivity (Crandall, 1964; Tenaza & Schultz, 1977; Yang *et al.*, 2007). Mortality rates of 71% in the first year and 89% after two and a half years (Hoyt, 1987) in captivity are evidence that a broad knowledge of their captive requirements is lacking. Many factors can be attributed including their specialist dietary requirements (see Yang *et al.*, 1999; 2007). A lack of understanding of their wild social behaviour, foraging ecology and reproductive behaviour has also likely contributed to the species failure to thrive in captivity.

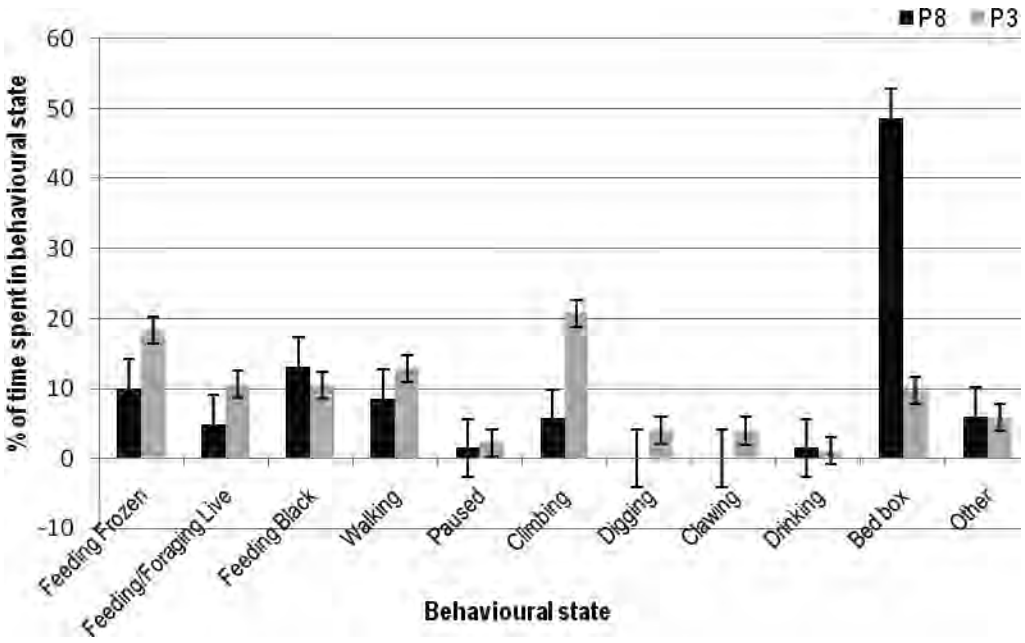
Contributions to an understanding of pangolin behaviour include research undertaken by Heath (1987) and Heath and Vanderlip (1988) who reported aspects of husbandry and biology, and the temporal activity patterns in captive *M. pentadactyla*. Activity patterns were also discussed by Chen *et al.* (2005) with regard to *M. pentadactyla* maintained at Taipei Zoo. Research conducted on the behaviour of wild *M. javanica* includes the work of Lim and Ng (2007) who reported on circadian activity patterns, natal den usage and home range of a free ranging female. To date it is understood no research has been conducted on the captive behaviour of *M. javanica* with the exception of the study discussed in this paper (Challender *et al.*, in prep.). Little research has been conducted on the Palawan Pangolin *M. culionensis* or the Indian Pangolin *M. crassicaudata*.

SUNDA PANGOLIN CAPTIVE BEHAVIOUR

The research discussed here is an investigation into the captive behaviour of *M. javanica* undertaken in early 2008 at the CPCP in Viet Nam. The aim of the research was to assess the behaviour of captive *M. javanica* in order to suggest ways of improving care and management. The behaviours recorded were derived from an ethogram and focal animal sampling (Altmann, 1974) was used in conjunction with the continuous recording method. Time budgets and activity patterns produced provided information both on when the subjects were active and how they allocated their active time. A full methodology and analyses of the data including the relationship of time budgets to environmental variables such as rainfall, temperature and rH are reported by Challender *et al.* (in prep.).

The preliminary analysis presented here suggests that whilst individuals show similarities in the time devoted to maintenance activities such as feeding and drinking they differ in the time allocated to climbing and time spent in the bed box, Figure 1. One of the animals, P3 showed the behaviours 'Digging' and 'Clawing' which were not seen in P8.

Figure 1: Descriptive time budgets derived from at least 30 focal animal samples, mean ± SE of % of time. Animal P3 was an adult female and P8 an adult male.

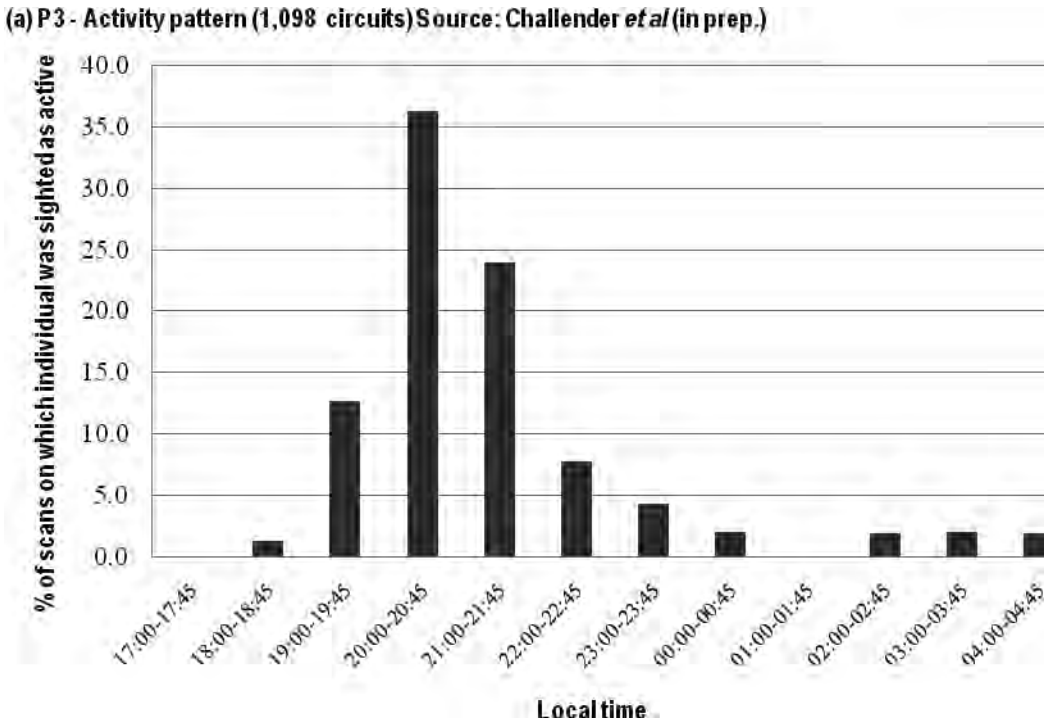


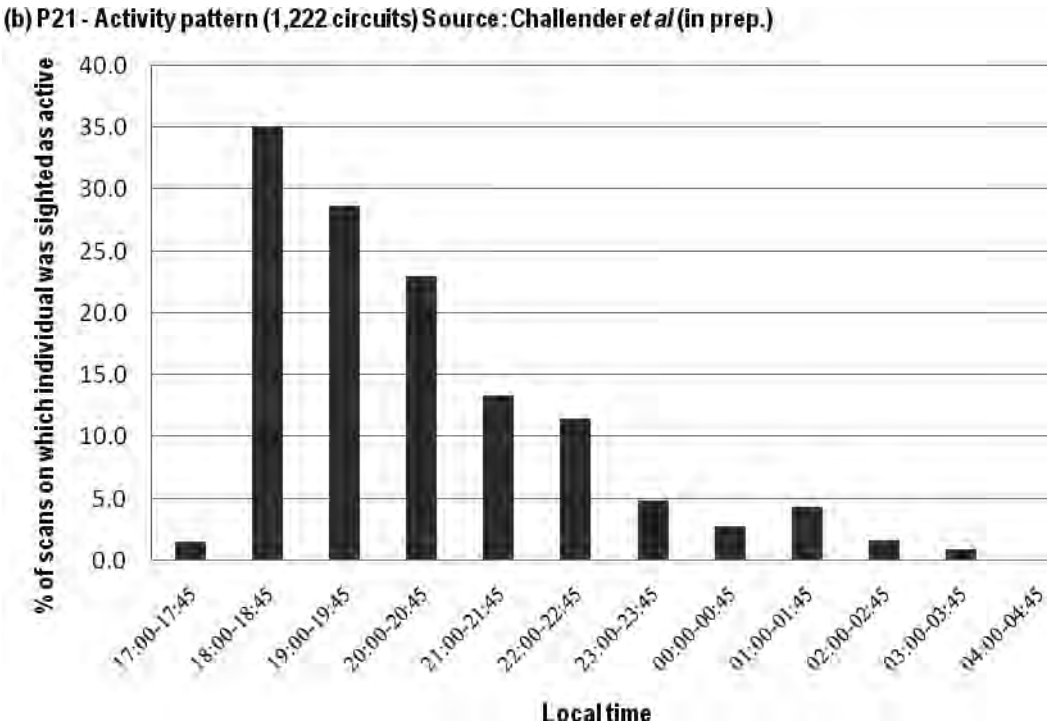
'Clawing' behaviour observed is believed to be related to stress and was exhibited at the CPCP by pangolins rapidly putting their forelimbs and head backwards and forwards through the fencing. This behaviour has caused superficial wounds to the noses and claws of the subjects. In an attempt to reduce the amount of time spent in this behaviour by the subjects enclosures were manipulated part way through the study. A more detailed analysis embracing all subjects is in preparation.

Activity patterns are recognised as important for understanding behaviour (Weller & Bennett, 2001) and can aid in assessing housing and husbandry practices (Heath & Vanderlip, 1988). Scan samples taken at intervals throughout the night were used to determine activity patterns, Figure 2.

Variation between subjects implies idiosyncrasies in when subjects were active. Of the seven subjects studied, one of two individuals, P21 or P8 was always active first suggesting their activity patterns are adapted to a captive environment. On occasion observations were made where these two individuals appeared to be waiting to be fed. Although the subjects were not observed prior to 17:00 hrs, comparable with Heath (1987), the subjects in this study were usually first sighted after 18:00 hrs.

Figure 2: Activity patterns





In contrast to the study of *M. pentadactyla* by Heath & Vanderlip (1988) where activity ceased by 02:30 hrs, activity was observed up to 05:00 hrs on occasion in various individuals. This suggests great variation in activity within and between subjects (Figure 2). As well as demonstrating the applicability of behavioural research to understanding pangolin behaviour in captivity, this research also provides a basis for

comparison with future research, including, if and how captive activity differs to that of wild individuals.

Complete recommendations of improvements to captive care and management as a result of analyses from this study are reported in Challender *et al.* (in prep.). Recommendations presented here are based on observations from the study and include:

1. Trialling the use of arboreal bed boxes based on the intrinsic nature of *M. javanica* and observations of subjects resting amongst high branches.
2. Enclosure furniture should not only be provided but manipulated periodically in an effort to reduce/prevent possible stereotypic behaviour. Subjects were observed to repeatedly walk certain routes despite enclosures being 29 m² in size, planted with vegetation and branches of varying diameters provided.
3. Chain link fencing should not be used as an enclosure material to reduce the probability of self-inflicted superficial wounds. Determining optimum housing materials remains an iterative process though toughened glass has been suggested as an alternative. Young pangolins have been observed to escape through two inch chain link fencing further suggesting the use of alternative materials.

FUTURE RESEARCH

As noted earlier research undertaken on wild individuals will aid the management of captive pangolins and research undertaken in captivity will allow us to more fully understand the behaviour of wild individuals and populations. In particular such complimentary research needs to be undertaken in the following areas;

SOCIAL BEHAVIOUR

There is a strong consensus that pangolins are solitary though it has been suggested adults can associate in pairs (Nowak, 1991). The degree of possible social associations remain unknown but evidence clarifying either a solitary or more social lifestyle would allow captive individuals to be housed most appropriately. The study of wild social behaviour may also allow for estimates of a suitable male: female ratio in captivity to be made. The size and use of home ranges could provide insights into how to improve enclosures of captive individuals with regards to size, furniture and related to burrow usage, the appropriate number of bed boxes. Whether enclosures require modification if housing more than one individual, a male and female or lactating female and young for example, could be determined. The proximity of males in captivity is understood to be important to avoid behaviour related to stress (Clark L, pers. comms.) which could be elucidated by investigating the social behaviour of wild males.

The study of social behaviour may allow for the recognition of normal and abnormal behaviours. For example it could determine if it is normal for a female to mount a female conspecific, behaviour previously observed. Knowledge of 'normal' behaviour will be central to assessing the welfare of animals. It will, for example, be fundamental in the development of rehabilitation and release protocols for confiscated animals as a behavioural assessment could give some indication of condition. An understanding of pangolin behaviour is also imperative to the establishment and management of potential captive breeding programmes. Recognising normal, abnormal, mating or other behaviours for example, will be fundamental to the success of any programmes.

FORAGING BEHAVIOUR

One of the principal obstacles to maintaining pangolins in captivity is replicating their diet of ants and termites. The majority of research investigating this has been undertaken by Taipei Zoo. Research investigating the foraging behaviour of wild pangolins could provide further detail on dietary requirements and foraging habits. This is particularly relevant at different latitudes where diet compositions may differ and could aid the development of artificial diets by providing nutritional information. One possible problem of feeding an artificial diet is that it may be consumed much more rapidly than the normal diet of ants and termites necessitating investigation into schemes for behavioural enrichment.

REPRODUCTIVE BEHAVIOUR

Little is known about pangolin reproduction. Future research, most feasibly undertaken in captivity, will enable a greater understanding of pangolin reproduction and provide much needed guidance to the management of captive individuals enabling informed decisions to be made.

Estimates of gestation periods are limited. Yang *et al.* (2007) suggest 169+ days for *M. pentadactyla* but for most species including *M. javanica* no records exist (Payne & Francis, 1998). Although understood to usually give birth to one offspring, it has been suggested that births involving two or even three offspring have occurred (Nowak, 1991; MacDonald, 2006). Estimates of periods of maternal care are three months (Payne & Francis, 1998) and three to four months (Lim & Ng, 2007) for *M. javanica* while up to six months has been observed in *M. pentadactyla* at Taipei Zoo (Chen S.F., pers. comms.). There are suggestions that age at sexual maturity in pangolins is two years (MacDonald, 2006) though there is no consensus on this. Yang *et al.* (2007) have observed elevated levels of mating behaviour in captive *M. pentadactyla* in May and June suggesting the possibility of a preferred mating season. Other reports (e.g. Nowak, 1991; Lim & Ng, 2007) suggest pangolins may breed all year round.

Research estimating parameters such as gestation periods, number of offspring and weaning ages and weight would have inherent benefits to the management of captive individuals. For example, knowledge of such parameters would allow for preparation regarding parturition and allow offspring to be housed independently at the appropriate age and/or weight. Estimates of age at sexual maturity and knowledge of a preference for mating at a particular time of year would also benefit captive management. For example, determining when a primiparous female could first be housed with a male and whether individuals should be paired at a certain time of year.

Further research into pangolin reproduction is required if we are to increase our knowledge of the behaviour of mothers and infants and their requirements in captivity. For example the needs of lactating females may differ from those of a non-lactating adult female. Juveniles have been observed to 'wrestle' with their mothers in captivity, but this behaviour is not well understood. Whether it occurs naturally is unknown. It may be induced by captivity and be related to space, food resources or use of a bed box. Such a situation is an example of where future research can provide answers to ensure the most appropriate housing and resources are provided.

WILD POPULATIONS

Undertaking elements of the research above would provide knowledge pertaining to how wild populations behave. Knowledge of home range sizes and how they are organised would, for example, allow estimates of population densities to be made. Such knowledge would enable population estimates to be made on different scales. The long term potential of this knowledge would be its contribution to future status assessments of *Manis* spp.

Knowledge of parameters such as age at sexual maturity could also be further applied to future conservation efforts. Twinned with additional knowledge in the future, for example, on harvest rates, generation times could be estimated which would be conducive to ascertaining how wild populations behave.

THE IMPLICATIONS FOR PANGOLIN CONSERVATION

The threats facing Asian pangolins mean they have an uncertain future while little knowledge of their wild and captive behaviour is prohibitive to the conservation effort to save them. As demonstrated, behavioural research can increase our understanding of the species and contribute to the current conservation effort. The implications of future research advocated in this paper are contributions to this effort, summarised as: (1) a greater understanding of social behaviour, (2) a greater understanding of captive requirements and the ability to make informed captive management decisions (3) the development of rehabilitation and release protocols (4) a greater understanding of dietary requirements and foraging habits (5) a greater knowledge of pangolin reproduction and (6) the long term potential for estimates of generation times and population estimates.

ACKNOWLEDGEMENTS

I would like to extend my thanks to all those who facilitated and helped in the planning and undertaking of the project considered in this paper specifically, Nguyen Van Thai, Leanne Clark, Tran Quang Phuong and all staff at the CPCP, Viet Nam, Dr. Martin Jones, Dr. Les May and Dr Jan Chapman of Manchester Metropolitan University and staff of Cuc Phuong National Park, Viet Nam.

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Current Status of Chinese Pangolin *Manis pentadactyla* in the Wild: A Rapid Range Wide Population Assessment

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ABSTRACT: A range wide survey was conducted on the population and density of Chinese Pangolin *Manis pentadactyla* in Zhejiang, Anhui, Fujian, Guangdong, Guangxi, Chongqing, Yunnan, Guizhou, Hunan and Jiangxi provinces in China. With the methods of transect sampling and local people interviewing, we recorded the vegetation types, nest burrows (old or new) and other relevant habitat information. The population density of Chinese Pangolins was estimated by the number of new burrows (one new burrow represented an individual) divided by the area of investigation. During the survey, old burrows found in the research area were not added to the population density. The survey covered 133 transects in a total of 30 nature reserves in the 10 pangolin range provinces. It was estimated that the wild population of Chinese Pangolin, in China, ranged from 25 100 to 49 450. The result indicated that almost all wild pangolin populations declined rapidly since the national territorial vertebrates survey was carried out in year 2000. Some populations in Guangdong and Hunan have dropped as low as 10% comparing to the population size estimated eight years ago. The situation is even worse, in Hainan, Henan and Jiangsu provinces where pangolin populations are probably extinct. Intensive harvest and habitat loss are the major threats driving the population decline of Chinese Pangolins in the wild. We suggested Chinese Pangolins to be upgraded as a first class national protected mammal species, and enforcement measures to be strengthened as they are critical to stop the poaching and ban the trade for consumption.

Question & Answers

Questions addressed to Norman Lim, Singapore Raffles Museum

Gary Ades, Kadoorie Farm: What is the population size on your island?

Norman Lim: We do not have this type of data because we could not use a mark and recapture method due to high drop off rate. This being said we have been catching animals not caught before, suggesting a potential high density. On a 2000 ha area we caught 22 specimens.

Li Zhang, CI: How do you define habitat type?

Norman Lim: NParks Board's categorization goes as follows:
- Monoculture
- Urban
- Secondary (degraded because of plantations in the past)
- Mangrove

Question: What was the sex ratio? Did you record more males than females?

Norman Lim: It is difficult to establish a sex ratio based on these data. I suspect males are more active so chances of getting them are higher. Females can be very skittish, particularly when they have a juvenile with them. This could explain why fewer females were observed.

Luo Shujin, NCI: Does the females range overlap with males?

Norman Lim: Yes, this is casual, we captured female within male range. There is definitely an overlap but we are not sure how many females within. It is possible that they are organised in a harem with territorial males. I suspect males defend areas where they encounter few females.

Samhan Nyawa, Brunei: What type of tree species do you have in secondary forest?

Norman Lim: I am not familiar with this subject but the island was cleared for plantation in the past. The forest came back after the 60s. The habitat is different from the mainland. Tekong trees are about 10 m high, but the soil structure (muddy) could affect the forest status.

Questions addressed to Prof. Wu Shibao, South China Normal University

Leanne Clark, CPCP: Did you ever see Chinese pangolins climbing trees?

Wu Shibao: Yes, sometimes we found them on trees.

Shukor Md. Nor, UKM: Is there any specific reasons why they choose certain group of termites/ants?

Wu Shibao: Yes, the quality of the food could be one of the factors.

Questions addressed to Mr. Dan Challender, Manchester Metropolitan University

Douglas Richardson, WRS: Most of the literature we use in management for the Sunda Pangolin is based on the Chinese pangolin. When reviewing the literature available, have you seen any differences between the two species?

Dan Challender: I haven't observed *M. pentadactyla* myself. I know that *M. javanic*a is more arboreal.

Leanne Clark, CPCP: We have had one *M. pentadactyla* specimen; we do think that captive behaviour and diet preference is very different. They are not very good climbers and prefer being on the ground. The species of ant they eat is also different.

Douglas Richardson, WRS: There is a danger of basing too much our work on *M. pentadactyla* and we have to accept that there are differences.

Questions addressed to Dr. Li Zhang, Conservation International

Sabine Schoppe, KFI: My question refers to your method: transect sampling of nesting burrows. How do you calculate from the burrows the total number of individuals? Are you referring to burrows nesting with offspring or sleeping burrows?

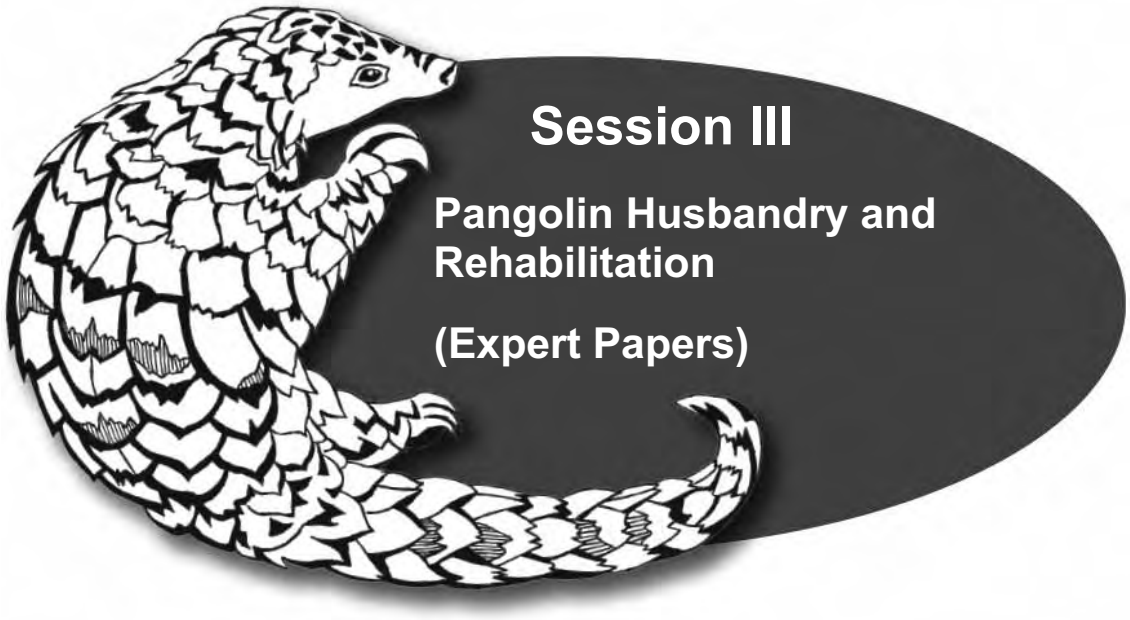
Li Zhang: There are different definitions. We counted only new burrows, not breeding burrows, only for females. We based our calculation on one burrow equal one individual. A published paper stated that pangolins do not use old burrow. We did find old burrows, but no pangolins were found.

Gono Semiadi, LIPI: What is the lifespan of a burrow?

Li Zhang: This question should be addressed to a specialist such as Professor Wu Shibao.
I would like to add a note on our final conclusion and recommendations in regards to consumption. There is no mention of pangolin use in TCM; can the scales of pangolins be replaced with something else? Meat in southern china is also a big issue. We can find alternatives for TCM but for meat consumption, it is more of a problem as people believe it to be delicious and good for health. We are about to publish a paper about trade and consumption, based on the interesting results of our survey.

Gono Semiadi, LIPI: Do you often see Chinese Pangolin in old burrows and natural burrows? When interviewed, hunters say pangolins use old burrows.

Li Zhang: I am not a pangolin expert, but maybe Prof. Wu Shibao can answer this later. In this study we but only counted new ones. We have several photos illustrating that pangolins use nature burrows.



Session III

Pangolin Husbandry and Rehabilitation

(Expert Papers)

Formosan Pangolin Rescue, Rehabilitation and Conservation

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ABSTRACT: Nineteen years ago Taiwan created Wildlife Conservation laws and Taipei Zoo was able to create a Wildlife Rescue Center. Pangolins are the strangest mammals with some atypical morphological characteristics resulting from a highly specialized diet of ants and termites. During the past decade, humans have exploited their environment intensively for housing, industry, and agriculture. Several pangolins were found in these areas and most of the recues were sent to the Taipei zoo, in Taiwan. A10-year retrospective review of Formosan Pangolin autopsies was carried out at the Taipei zoo. The male-to-female ratio was almost 2:1(44:24). Pangolin mortality rates were high due to hemorrhagic gastric ulcers and pneumonia. Pneumonia and gastric ulcer lesions were found in over 50% of dead Formosan Pangolins. Some inorganic and organic ingredients seem to be important factor to maintain the stability of microflora in digestive system. Every rescued pangolin should be considered to be a unique source of data. Tapei zoo's major field of research, for pangolins, includes studies to adjust the diet formula; disease surveys and the monitoring of reproductive hormones. Radio tracking is another topic of interest for field research. Pangolin scales were analyzed to assist in the identification of components used in the preparation of traditional Asian medicine and support the prosecution of cases linked to the illegal trade of endangered animal body parts. Feedback for government agencies setting up proper conservation polices for pangolin are very important. The lack of data on pangolin population size and biology in range countries needs to be addressed.

Keywords: gastric ulcer, pneumonia, microflora

HISTORY

Nineteen years ago Taiwan created Wildlife Conservation laws, the Taiwanese society increased its interest in conservation and the Taipei Zoo was able to create a Wildlife Rescue Centre. The Taipei Zoo Veterinary Department has a special position in Taiwan's efforts towards wildlife conservation as the veterinarians' wildlife medicine experience is known on the whole island. The Taipei Zoo veterinarians have gladly shared their expertise in wildlife diagnostics, anesthesia, surgery and nutrition, with other organizations, for the benefit of Taiwan's native wildlife. Among the many different species of wild animals rescued, pangolins are the strangest mammals, with some atypical morphological characteristics resulting from a highly specialized diet of ants and termites. Formosan Pangolin *Manis pentadactyla pentadactyla* belongs to a subspecies of Chinese Pangolin, which only ranges in Taiwan Island. This solitary, nocturnal, and burrowing species, hide themselves underground during the day. Most Formosan Pangolins live in habitats below 1000 m in elevation. During the past decade, humans have exploited this altitudinal zone intensively for housing, industry, and agriculture. Most pangolins rescued were found in these areas. A review of the rescued animal records showed that maintaining pangolins in captivity has always been problematic. The Formosan Pangolin was of special interest.

FORMOSAN PANGOLIN

Pangolin scales are a popular ingredient in the Traditional Chinese Medicine (TCM) and its meat is considered a health restorative. All pangolin species have no teeth and all are insectivores; ants and termites are their favorite foods. The Formosan Pangolin's plight has created special interest in Taiwan. Formosan Pangolins are covered in scales, and roll in a ball to protect themselves, making it thus difficult to obtain physical data. As it is difficult to see them in the wild, there are very few scientific papers on Formosan Pangolin ecology and physiology or giving medical information. Pangolins also have unique dietary and environmental needs and a history of short survival rate in captivity. Most pangolins rescued were sent to the Taipei zoo in Taiwan. Traditionally difficult to maintain in captivity, pangolin high mortality rates are due to hemorrhagic gastric ulcers and pneumonia. A 10-year retrospective review of Formosan Pangolin autopsies was carried out at the Taipei zoo. The male-to-female ratio was almost 2:1(44:24). Pneumonia and gastric ulcer lesions were found in over 50% of dead Formosan Pangolins.

RESCUE AND REHABILITATION

Because of the Taipei Zoo Veterinarian Department's unique location in Taiwan, many rescued pangolins are brought here for medical care. Their injuries, like for other wildlife species throughout the world, are due to increased human population numbers and increased development, leading to road accidents and altercations with domestic pets. Taipei Zoo does not exhibit pangolins brought in for medical care, however, as much data as possible is gathered systemically from these individuals to help future specimens. The major fields of study started with an adjustment of diet formula and a research of nutrient ingredients. Through the years, the maintenance of pangolins in captivity has consequently improved gradually. For example, the first pangolins rescued only survived about six months from the time they were brought in for examination. Nowardays animals can survive over five years, with one individual who has been at the zoo for 10 years. However more work needs to be carried out on determining a suitable formula diet as some inorganic and organic ingredients seem to be important factors to maintain the stability of the microflora in the digestive system. The special digestive system function and mechanism are still unclear. More systemic study still needs to focus on this subject. With the exception of animals in very good health, most rescued specimens were not suitable for release and were thus kept for study. Additionaly habitat maintenance nearby developed areas is too unpredictable.

RESEARCH

Each rescued pangolin should be considered to be a unique source of data and biometric data should be systematically collected.

The adjustment of diet formula, the survey of disease, and the monitoring of reproductive hormones are the major fields of study at the Taipei zoo. Radio tracking is another interesting topic for field research. Additionaly, pangolin scales have been analyzed to identify derivated component used in traditional Asian medicine preparations in support to the prosecution of cases dealing with the illegal trade of endangered animal body parts.

FOLLOW-UP STUDIES

The nocturnal living habits of pangolins and rough terrain access make the conduct of field research difficult. However questions related to subject such as territorial behaviour, home range size, survival adaptation for cold winter and mating habits needs to be studied to provide information to government agencies in support to the set up of proper conservation polices for pangolin. Follow-up actions are crucial for the survival of these mysterious species.

CONCLUSION

Pangolins face a problem of heavy hunting and habitat lost, while so much data on their population size and biology is lacking. There is an urgent need to improve conservation policies protecting pangolins. The Taipei Zoo Veterinarians welcome requests for information and also welcome information from other zoos across Asia and Africa, who are studying local pangolin populations.

A Long Way from Home: the Health Status of Asian Pangolins Confiscated from the Illegal Wildlife Trade in Viet Nam

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ABSTRACT: Mammals, reptiles and birds are traded in massive quantities in Southeast Asia. Illegal hunting, to supply this demand, is now considered to be the greatest threat to the conservation of biodiversity in Southeast Asia. Pangolins are currently one of the most commonly confiscated mammals in Viet Nam. While hunting of pangolins continues in Viet Nam, population levels are experiencing rapid declines. Pangolins confiscated from the illegal trade in Viet Nam are more to be sourced from other countries in Southeast Asia.

The Carnivore and Pangolin Conservation Program (CPCP) runs a purpose built pangolin rescue centre in Cuc Phuong National Park, Viet Nam. The centre is developing practical guidelines for the quarantine and rehabilitation of pangolins. Animals in the trade are transported without regard to their welfare, and are often kept without food or water, in stressful, unhygienic conditions. Pangolins confiscated in Viet Nam have traveled far from their origin. They are generally in very poor health by the time of confiscation.

Pangolins have been found to carry heavy parasite burdens, traumatic wounds (mainly snare trap and dog bite wounds), abrasions, ocular ulceration and severe dermatitis beneath the scales. Many are juveniles, including one pre-weaned individual. Traders in Viet Nam commonly force feed or inject liquids under the skin to increase the sale weight of each animal. On post mortem, most pangolins have extensive gastric and esophageal ulceration.

The health status of animals must be considered when deciding the most suitable placement option. Animals released into the wild in poor condition are not only less likely to survive, but may represent a serious disease risk to local wild populations.

Keywords: Pangolin health, Viet Nam, CPCP, Asian pangolin

INTRODUCTION

Despite national laws and international treaties designed to protect endangered wildlife, mammals, reptiles and birds are traded in massive quantities in Southeast Asia (Van Song 2008). The increasing demand for wildlife and wildlife products is believed to be related to a rise in affluence in the region, particularly in Viet Nam (Bina Venkataraman, 2007; Van Song 2008). Illegal hunting to supply this demand is now considered to be the greatest threat to the conservation of biodiversity in Southeast Asia (Bennet *et al*. 2002; Roberton, 2007; Van Song, 2008). While it is difficult to estimate the total number of pangolins within the wildlife trade, they are currently one of the most commonly confiscated mammals in Viet Nam (Newton, 2007; Newton *et al*., 2008).

It is currently believed that Pangolins captured from the wild in Viet Nam currently represent a relatively small proportion of the overall number of pangolins confiscated by authorities in the country. A paucity of reliable field data on pangolins in Viet Nam makes estimating wild population levels difficult. However, while hunting of both *Manis javanica* and *M. pentadactyla* does continue in Viet Nam, it is generally believed that wild populations of both species are declining (Newton 2007; Newton *et al*., 2008).

Increasing market demand for pangolins (Bina Venkataraman, 2007), in the face of declining local populations, means that traders are likely to source a greater proportion of pangolins from other countries in Southeast Asia - countries such as Cambodia, Laos, Malaysia or Indonesia. This factor has unique and serious implications for the health status of pangolins by the time they are confiscated in Viet Nam, particularly when compared to those animals confiscated closer to their origin.

It is generally believed that wild animals in the trade are in progressively declining health status, and are highly susceptible to infectious disease (Leighton, 2002; Bell *et al*., 2004; Karesh *et al*., 2007). According to the IUCN Guidelines for Placement of Confiscated Animals (IUCN, 2002), the health status of animals at the time of confiscation must be considered when deciding the most suitable placement option. Animals released into the wild in poor condition are not only less likely to survive, but may represent a serious disease risk to local wild populations and the existing ecosystem.

In 2006, the Carnivore and Pangolin Conservation Program (CPCP) established a purpose built pangolin rescue centre in Cuc Phuong National Park, Viet Nam. The aim of this centre was to provide a viable alternative for the placement of confiscated pangolins. The centre is currently developing practical guidelines for the quarantine and rehabilitation of pangolins.

This presentation will outline the results of physical examination of confiscated pangolins transferred to the CPCP from October 2006 to June 2008. It will then discuss the implications of animal health on making decisions for the appropriate placement of confiscated animals.

HEALTH ASSESSMENT OF CONFISCATED ASIAN PANGOLINS

The relatively long time from the point of capture to confiscation in Viet Nam has a significant impact on the health status and condition of animals at the time of confiscation. Animals are generally shipped without regard to their welfare, in stressful, unhygienic conditions. All pangolins transferred to the CPCP have been transported in a curled-up position, inside tightly tied individual netting sacks (Figure 1). These sacks remain tied throughout the shipping process, and there are often many live pangolins stacked together inside crates. This means that provision of food or water for individual animals is impossible. The poor hygiene associated with these shipments is evidenced by the fact that pangolins arriving in the CPCP are normally covered in faeces and urine.

Pangolins in Viet Nam are sold according to weight. The health of live pangolins in the trade is further compromised by a cruel practice designed to increase the live weight of pangolins for sale. Corn flower mixed with water or other liquids are often force fed or injected under the skin of pangolins.

Between October 2006 and June 2008, a total of 20 confiscated Asian Pangolins (19 Sunda Pangolins *M. javanica* and one Chinese Pangolin *M. pentadactyla*) were transferred to the CPCP's pangolin rescue centre in Cuc Phuong National Park. Of these, two female Sunda Pangolins were pregnant at the time of capture from the wild. Both females subsequently completed gestation and gave birth at the centre.

All pangolins arriving in the centre are given a thorough health examination by a veterinarian and a trained assistant. While initial visual inspection of pangolins often suggests that the animal may be strong, a thorough health examination normally reveals

otherwise. Given the methods of capture and the conditions of transport it is not surprising that most of the animals arriving in the CPCP are in generally poor body condition and are assumed to be dehydrated. The following list outlines the conditions seen in pangolins transferred to the CPCP between October 2006 and June 2008.

Figure 1: Two confiscated pangolins, one M. javanica and one M. pentadactyla still in their individual transport sacks. Pangolins confiscated by Ninh Binh Forest Protection Department in August 2007. Photo credit: L. Clark, CPCP

Traumatic wounds

Hunting dogs, guns and snare traps are commonly used by hunters throughout Southeast Asia (Newton, et al. 2008). The traumatic wounds seen at the CPCP are most likely to be associated with the method of capture from the wild. Dog bite wounds have been seen around the base of the tail. Snare trap wounds (Figure 2) can vary in severity, depending on the location of the wound, the time the animal remained ensnared, and the general condition of the animal. If left untreated these wounds become infected, and may lead to complete loss of limbs or loss of limb functionality. Infected wounds can quickly progress to fatal septicemia.

One animal arrived in the CPCP with superficial ocular ulceration. Her cornea appeared pale grey in colour, and there was a creamy yellow discharge. Her eye healed after application of antibiotic eye ointment three times per day for one week. This eye damage may have occurred during capture or during transport in the trade.

Figure 2: Severe snare trap wound. Confiscating rangers intended to release this pangolin immediately. The animal was transferred to the CPCP. Loss of blood supply to the nail beds lead to the loss of two nails. After one month of intensive wound management the snare wound healed, however the nail beds were permanently damaged. Photo credit: L. Clark, CPCP

Infectious disease

Many recent reviews have recognized the serious risk posed by the trade in wildlife as a mechanism for the spread of infectious diseases (Bell *et al*., 2004; Karesh *et al*., 2007; Jones *et al*., 2008). While very few studies have investigated the actual prevalence of infectious diseases in animals confiscated from the trade, it is hypothesized that once captured, immunologically naïve wild animals are exposed to a wide variety of novel viral, bacterial, fungal and parasitic pathogens from other wild animals, domestic animal species and humans.

Moist, ulcerative, bacterial dermatitis beneath the scales is a very common presenting condition in confiscated pangolins. This condition is most severe in those animals which arrive in transport sacks which are very dirty, and animals which are particularly soiled by their faeces.

All animals arriving in the CPCP are thoroughly searched for external parasites (ticks and mites) and faeces from every animal are checked for signs of gastrointestinal parasites. 100% of pangolins arriving in the CPCP have had high burdens of ticks, an external parasite (which may or may not be pathogenic), and a very high percentage of animals shed gastrointestinal worm eggs (not identified to species) in their faeces.

Three pangolins have died secondary to gastrointestinal Coccidiosis. Coccidia are host specific protozoan parasites which are highly contagious between animals. The clinical signs of coccidiosis are diarrhea, fever, weight loss, inappetence and sometimes death. However, in most species, healthy, mature animals in good body condition carry the parasite but do not show signs of being unwell. Clinical coccidiosis is most commonly seen when animals are kept in overcrowded conditions, with poor sanitation and poor nutrition (Kahn, 2008). The conditions in which animals are transported in the illegal wildlife trade are highly suited to the development of clinical Coccidiosis.

To date no research has focused on diseases of viral or fungal aetiology in pangolins. It is possible that as the number of animals transferred to suitable rehabilitation facilities increases, and the diagnostic capacity of veterinary laboratories in the range of Asian pangolins improves, diseases caused by novel infectious pathogens may be found.

Age of confiscated animals

Since very little is known about the reproductive ecology of these animals, it is difficult to know the normal age at weaning for pangolins. However, many of the pangolins transferred to the CPCP have weighed less than two kilogrammes. These animals commonly display juvenile behaviours, including riding on the back of other animals, which would suggest that they should still be with their mother, learning essential skills for survival in the wild. At least one individual, weighing 700 g on arrival in the centre, was unable to maintain body temperature and weight by eating solid food alone. This animal was successfully hand-reared (Figure 3) by staff at the centre.

Figure 3: Baby pangolin which arrived in the centre weighing 700 g and was successfully hand reared using a commercially available, powdered kitten milk formula. Photo credit: L. Clark, CPCP

Gastric and esophageal ulceration in pangolins

Ulceration of the gastric and esophageal mucosa is a very common gross post mortem finding in pangolins. In some severe cases ulcerative lesions cover large areas of the gastric mucosa. The etiology of these lesions is currently under investigation, however early histopathological examination has revealed no signs of an infectious cause. It is believed that physiological and nutritional stress is likely to play a significant role in the development of these lesions (Dr. Judy St Ledger, pers comm.).

Implications of the health status of confiscated pangolins

It is currently common practice to recommend immediate release for confiscated pangolins in Southeast Asia. This may be historically due to the very high mortality

rate (approaching 100%) of pangolins transferred to captive centres in the past. There is also a common perception that release 'into the wild' will be less stressful than transfer to captivity, even when the origin of the confiscated animals is unknown. Immediate release of confiscated animals requires minimal resources, is relatively quick, and can provide a positive public perception.

However, there are compelling arguments against immediate release of animals of unknown health status and unknown origin. The impacts of immediate release are rarely monitored, and may not represent the desired positive outcome for the individual animal. Stressed, juvenile, sick or debilitated animals are less likely to survive when released into an alien (albeit 'natural') environment. A brief review of the health status of pangolins transferred to the CPCP suggests that many of these individuals would have been unlikely to survive if released due to the nature of their wounds, the parasite burdens they carried, their nutritional status at the time of confiscation, or their young age.

Release of animals without disease surveillance and quarantine into wilderness areas also represents a significant disease risk to existing wildlife at the site of release. Given the wide geographic range of source countries for pangolins there is a significant risk of transmission of infectious pathogens between and within Southeast Asian nations.

The health assessment of pangolins transferred to the CPCP in Viet Nam would suggest that a more sensible alternative would be to transfer confiscated pangolins to suitable rescue centres. This would allow for quarantine, disease surveillance and rehabilitation of sick and debilitated pangolins. Monitoring of released individuals would then enable an assessment of the success (or otherwise) of this process.

However, there is currently a very significant lack of resources, in terms of finance, suitable rescue centres, trained staff and veterinary capacity within the geographic distribution of Asian Pangolins. The rescue centre run by the CPCP in Cuc Phuong National Park is the only purpose built pangolin rescue centre in Viet Nam. Many other rescue centres do not have appropriate facilities to adequately care for pangolins.

A further complication is that, in much of the geographic range of pangolins, euthanasia is not readily accepted as a solution for dealing with sick and debilitated confiscated animals.

CONCLUSION

As wildlife law enforcement improves in Southeast Asia a corresponding increase in confiscations of live animals can be expected. However, the current options for placement of confiscated pangolins are completely inadequate.

Release of confiscated pangolins of unknown origin to the wild without prior disease screening, suitable quarantine and the rehabilitation of sick or debilitated pangolins will, in most cases, represent a negative outcome for the individual animal, has the potential to alter the genetic make-up of existing pangolin populations and poses a significant disease risk for wild species at the release site. While release of pangolins to the wild continues to be rarely monitored (if at all) it is all too easy to ignore the potentially negative impact of this practice.

There is an urgent need to focus on providing appropriate, practical and cost effective options for confiscated pangolins. The solution is likely to include a combination of increased development of adequately resourced rescue and captive care facilities, improved veterinary capacity in range countries, evaluation of the success of

rehabilitation of pangolins, and open and honest discussions on euthanasia as an appropriate option for a proportion of confiscated animals.

The CPCP is working to improve placement options for pangolins confiscated in Viet Nam by developing practical guidelines for quarantine and rehabilitation of sick and injured pangolins, investigating the pathogenesis of disease, and developing training modules for basic health assessment and animal care. Continuing research into the common diseases and rehabilitation of these animals will progressively result in a lower mortality rate and a higher success rate for the rehabilitation of confiscated animals.

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Captive Management of Malayan Pangolins *Manis javanica* in the Night Safari

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ABSTRACT: The Malayan Pangolin *Manis javanica* has been hunted across Southeast Asia as a food source, and its scales touted as having traditional medicinal properties. Every year tonnes of pangolins are seized and confiscated en-route to their demise in restaurants and medical shops around the world. The Night Safari has been looking into establishing a viable captive management programme. The foremost goal was to formulate a sustainable captive diet, and to initiate a comprehensive husbandry protocol. The long term goal of this captive management programme is to head towards a captive breeding programme; to breed the Malayan Pangolin in captivity for conservation purposes to support the declining wild population.

INTRODUCTION

Pangolins, also known as scaly anteaters, are mammals in the order Pholidota (Nowak & Paradiso, 1983). They are found in Asia and Africa in a variety of habitats and are specialised feeders of ants and termites. They play an important ecological role as predators of eusocial insects (Corlett, 2007).

There are three species in East Asia – the Malayan or Sunda Pangolin *Manis javanica*, Philippine Pangolin *M. culionensis* and Chinese Pangolin *M. pentadactyla*. Pangolins are considered Low Risk (IUCN, 2007), and are classified under Appendix II, with zero quota, of the Convention of International Trade in Endangered Species of Wild Flora and Fauna (UNEP-WCMC, 2008). Commercial trade of these species is thus illegal. Despite the legislative protection, they are the most highly traded mammal in East Asia (Soosayraj, 2006). They are hunted and traded for their meat and scales, which are used in traditional medicines (Li & Wang, 1999). Pangolins have a low rate of reproduction and are thus highly susceptible to over harvesting (Lim & Ng, 2007).

Wildlife Reserves Singapore (WRS) receives rescued *M. javanica* every year. This provides a valuable opportunity for research and other conservation opportunities. In 2005, a viable captive management programme was attempted in the Night Safari (NS), which is managed by WRS. The aim of this programme is to aid in the conservation of the species, with the long-term goal of exploring the possibility of reintroducing captive-bred animals into the wild to augment the declining wild population. The difficulties and successes of this programme to date are shared in this paper.

ACQUISITION OF PANGOLINS

Individuals in the NS captive management programme are taken opportunistically from rescued pangolins that are donated to the NS and that meet strict guidelines. None are taken from the wild specifically for the purpose of this programme. Donated pangolins are brought to the NS by government agencies, such as the police, the National Parks Board (Nparks, the government agency that manages Singapore's nature reserves), members of the public and WRS staff. These animals are caught because of involvement in traffic accidents or they wander into urban or residential areas (Table 1).

Table 1: Examples of M. javanica brought to the Night Safari, Wildlife Reserves Singapore, that have been included in the captive management programme

Arrival Date	Source	Sex	Weight on arrival (kg)	Remarks
14 Oct 05	Police	Male	2	Developed lesion on face. Suspected insect bite. Euthanased.
4 Apr 05	Public donation	Male	3.1	Did not eat. Released by Nparks at designated areas.
29 Jun 06	SPCA	Female	1.8	Injured. Euthanased.
28 Nov 06	Public donation	Male	1.8	In captive management.
26 Jan 07	Police	Male	1.9	Did not eat. Released by Nparks at designated areas.
3 Aug 07	Public donation	Male	1.7	Did not eat. Released by Nparks at designated areas.
31 Oct 07	Singapore Zoo	Male	4.7	Did not eat. Released by Nparks at designated areas.
16 Nov 07	AVA	Female	2.6	Died due to septicemia.
29 Dec 07	Public donation	Male	2.6	In captive management.
4 Mar 08	AVA	Female	1.5	In captive management.

AVA = Agri-food and Veterinary Authority. NParks = National Parks Board of Singapore. SPCA = Society for the Prevention of Cruelty to Animals.

Upon arrival, all pangolins are received by the Veterinary department. General health checks are performed, and x-rays are taken to check for skeletal fractures. All individuals are de-wormed with Ivomectin (0.2mg/kg) or Fenbendazole (20mg/kg) and ticks, if present, are removed. A Trovan® transponder microchip is inserted into the left clavicle of each individual for identification purposes. Simple morphometric measurements, such as weight and body and tail lengths, are also recorded. Individuals that require Veterinary attention are treated accordingly. Healthy individuals are then assessed for suitability of inclusion into the captive management programme. Strict guidelines are followed, namely:

1. Females must not be pregnant.
2. Females must not be lactating and/or have young with them.
3. Individuals must be between 1.5 and five kilogrammes in weight upon arrival at WRS.
4. Individuals must accept the artificial diet within one week.

It is assumed that individuals that weigh less are younger compared to those that are heavier, and that young animals will adapt more readily to the captive environment. All individuals that do not meet these guidelines and do not require extended Veterinary treatment are released into the wild within one day as close as possible to their source location. Pangolins found naturally on-site in WRS are released in WRS. All others are released in partnership with NParks at suitable sites in the nature reserves.

Once a specimen suitable for the captive programme is identified, it is immediately placed into a purpose-built den. It is left alone for about two days, with minimal disturbance, to settle into its new environment and monitored closely. There are currently a total of three individuals of varying weights in the programme (Table 2).

Table 2: Details of Sunda Pangolins Manis javanica currently in captive management at the Night Safari, Wildlife Reserves Singapore. 30 June 2008

Arrival date	Source	Name	Sex	Weight on arrival (kg)	Current weight (kg)	Duration in captivity
28 Nov 06	Public donation	Hook	Male	1.8	5.4	19 months
29 Dec 07	Public donation	Bukit	Male	2.6	4.6	6 months
4 Mar 08	AVA	Ros	Female	1.6	2.6	3 months

HOUSING FACILITIES

Pangolins are strong diggers and climbers and are superb escape artists. This is one of the reasons they are difficult to keep in captivity. It was therefore apparent that an escape-proof den had to be constructed that could also house them comfortably and safely.

In the Night Safari, pangolins are housed individually in dens. Each den is completely enclosed to prevent escape and measures 3 x 2 x 2 m (Figure 1). The floor and walls are constructed of brick and cement up to 1.2 m high. The roof and upper portions of the walls are made of 2 x 2 in galvanised iron mesh, overlaid with 0.5 x 0.5 in stainless steel mesh (Figure 2). This ensures that potential predators, such as pythons, are not able to enter the den. The entire structure is covered with a corrugated zinc roof to provide shelter from sun and rain. A Keoyu® heat lamp is also provisioned if additional heat is required.

Figure 1: External features of a den used to house Manis javanica in the Night Safari

Figure 2: The roof and upper portions of the wall are made of 2 x 2 in galvanised iron mesh, overlaid with 0.5 x 0.5 in stainless steel mesh

Within each den, the walls are coated with smooth epoxy paint (Figure 3). This prevents abrasions on the chin, nose and fore feet of pangolins that attempt to climb up the walls. The footage from a closed-circuit television installed in the den was crucial in discovering the cause of the abrasions. It was noticed that when they tried to climb the walls, they rubbed their chins in a side-ways motion against the walls, resulting in wounds. These were successfully treated with repeated applications of Bacitracin and Neomycin powder or Zymox® spray.

Figure 3. Internal features of a den used to house Manis javanica in the Night Safari

Walls are coated with a smooth epoxy paint and rubber mats are used as substrate.

A number of substrates, such as soil and dry leaves, were experimented with. However, each of them posed problems, for example, abrasions on the pangolins' feet or deterioration of substrate quality. Rubber mats, six millimetres thick, were discovered to be the most ideal and are currently used in all dens. However, a disadvantage with this substrate is that the pangolins' claws do not naturally wear down and need to be

trimmed about every two months. A summary of the different types of substrates and the outcomes are presented in Table 3.

Table 3: Outcomes of different types of substrates utilised in Manis javanica dens

Substrate used in den	Duration used	Outcome and comments
None (cement floor)	One month	Abrasions were noticed on pangolins' feet
Soil	Six months	Soil got muddy after washing the den, and it got rancid after a few washings, which affected the animals' health
Dry leaves	One month	Abrasions were noticed on the feet
Wood chips	Four weeks	Lasted for a few weeks, but got acidic after a few washings, which affected the animals' health
Rubber mats	Six months	Long lasting and durable even after months of daily washings, plus the soft texture prevented abrasions on the feet from occurring. However to note that the claws do not wear down and may need to be cut every two months.

HOUSING FURNITURE

Natural branches are placed in the dens as furniture and changed from time to time. Activity levels of the pangolins increase whenever new branches replace the old ones. A lot of time is spent investigating and exploring the new branches and layout of furniture. Some individuals even sleep in the forks of branches (Figure 3).

However, the pangolins initially got their claws stuck in the 0.5 x 0.5 in mesh and some injuries occurred to their toes when they pulled away from the mesh. The den furniture is therefore currently placed in the middle of the den in such a way that the pangolins are prevented from climbing onto the mesh. The position and quality of the branches are constantly monitored to ensure the safety of the animals, and changed whenever necessary.

Other furniture items include large earthen flower pots placed on their sides for the pangolins to hide or rest in. The pots must be secured to ensure that they do not roll around. A pungkis basket, which is a shallow basket made of plastic or rattan, is also occasionally placed in each den. They are tied securely to the branches and serve as an elevated resting location. Some pangolins utilise these as sleeping sites (Figure 4).

Figure 4: Pungkis basket placed in den. a) These baskets (arrow) serve as elevated resting sites. b) M. javanica, Hook, sleeping in basket.

A nest box is also provided in each den and the base of each box measures 1 x 0.5 m. The roof is sloping and at the shallowest point has a height of 0.3 m; at the deepest, 0.7 m. It is constructed out of marine plywood, which has proven to be more durable than ordinary plywood. A hole measuring 0.27 x 0.5 m is cut into one side to serve as an entry and exit point. The box is lined with shredded paper and the roof is hinged and can be opened to ensure ease of access to the interior for keeping staff (Figure 5a). The temperature in the boxes naturally remains fairly constant at about 26 or 27 degree Celsius. The pangolins have taken readily to these nest boxes and frequently sleep inside.

Figure 5: A nest box, constructed from marine plywood, provided in each M. javanica den in the Night Safari

Dimensions of the base of each box are 1 x 0.5 m. The roof is sloping, and has a height of 0.27 and 0.5 m at the shallowest and deepest ends. Each box is lined with shredded paper and has a hinged roof that can be opened.

NUTRITION

Pangolins are myrmecophagous and their highly specialised diet poses an obstacle in captive management. In the Night Safari, it is not feasible in the long-term to search for and collect sufficient amounts of ants and termites to meet the requirements of the captive pangolins as it is too time consuming. Moreover, during the monsoon seasons, ants and termites become scarcer. Thus, it was critical that an artificial diet had to be

formulated for captive *M. javanica* in the Night Safari, as has been done in Taipei Zoo for *M. pentadactyla*.

Initially, the diet from Taipei Zoo was followed as closely as possible, but it became evident that it was not suitable for *M. javanica* in the NS. With advice from Taipei Zoo and the Veterinary staff in WRS, the diet was modified until the current one was achieved (Table 4). Three out of 13 pangolins have been successfully managed on this diet since 2005. Success is measured by degree of acceptance of the artificial diet and increase in weight of individual pangolins over time.

Table 4: Ingredients of an individual portion of current artificial diet for M. javanica in the Night Safari, 30 June 2008

Ingredient	Amount
Egg (hard boiled)	2
Nutroplex® multi-vitamin liquid	2 tablespoons
Horse meat	120 g
Water	350 ml
Mealworms	150 g
Mazuri® Insectivore pellets	80g
Salmon oil	1 pump
Powdered termite mound	4 tablespoons

Vitamin K has been important in the treatment of faecal occult blood. Powder from crushed termite mound has also been significant as it slows down the passage of food through the gut and thus increases absorption of nutrients. Nutritional analyses for crude protein, crude fat, fatty acids and amino acids have been carried out. Results of these tests are presented in Appendix 1.

The ingredients (Table 4) are blended together into a paste and presented to the pangolins on a large, shallow, uncovered dish that is heavy enough so it cannot be overturned easily (Figure 6). Feeding is done only at night after the pangolins have woken up. When introducing a new pangolin to the artificial diet, cooled, torpid live ants are sprinkled generously over the blended mixture to encourage the pangolins to eat. When individuals have been observed to consume the diet regularly, the amount of ants is gradually decreased until they have mostly been removed from the diet. Water is provided *ad libitum* in an open dish.

After the artificial diet has been readily accepted by the individual pangolin, a wide mesh is secured over the food dish. This prevents the pangolin from stepping into the food and getting food on itself. If food on the body of the pangolin is left uncleaned, fungus may be observed to grow on it.

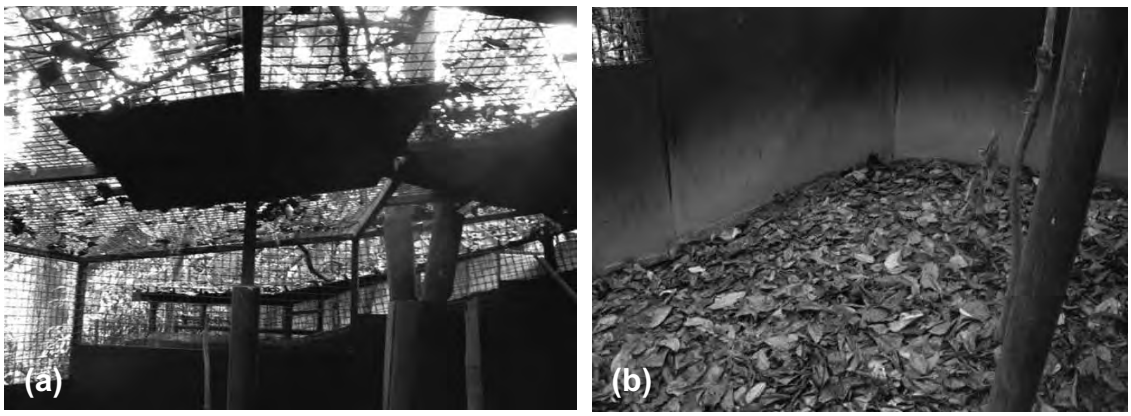
As mentioned in the section Acquisition of Pangolins, individuals that do not take accept the artificial diet within one week of arrival are released into the wild.

Figure 6: M. javanica, Hook, which has been in the Night Safari for one year and seven months, consuming the artificial diet.

ENRICHMENT

An exercise yard is provided for the pangolins as a form of enrichment (Figure 7). It is irregularly shaped with a surface area of 14.12 m^2 and is made of 2 x 2 in galvanised steel mesh for the walls and roof. The perimeter of the yard is covered with aluminium sheets to prevent the pangolins from climbing up the mesh. The floor is natural soil and a thin layer of leaf litter. To prevent the pangolins from digging out, aluminium cladding is buried to a depth of three feet. A sheet of aluminium is also placed on the roof above any vertical branches so the pangolins are unable to climb on the roof. The yard is not directly connected to the dens and pangolins are manually transferred to the exercise pen by hand by the keeping staff. Weather permitting, individual pangolins are allowed rotational use of the yard every night, depending on which one wakes up first.

Figure 7: Exercise yard provided for the pangolins.



a) It is irregularly-shaped with a surface area of 14.12 m^2 and is made of 2 x 2 in galvanised steel mesh. An aluminium sheet covers part of the roof to prevent the pangolins from climbing onto the roof. b) The perimeter of the yard is covered with aluminium sheets to prevent the pangolins from climbing the mesh. The cladding is buried to a depth of three feet to prevent the animals from digging out.

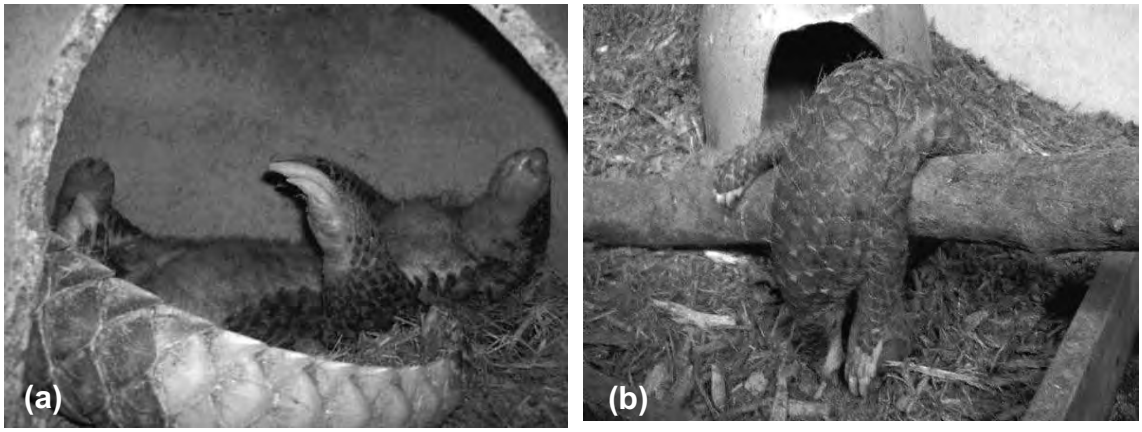
When released into the yard, increased activity has been observed in the pangolins as they explore the area. They have also been observed to dig in the natural substrate and lick at ants found naturally in the yard. The yard can also be utilised in future as neutral ground in which to introduce two or more individuals to one another.

Large logs with ant nests within have also been successful enrichment tools. When presented, pangolins enthusiastically climb all over the log and lick up the ants crawling around. On average, 15 to 20 min are spent on this activity.

OTHER BEHAVIOURS NOTED

Since the captive management programme of *M. javanica* started in 2005 in the Night Safari, a number of interesting behaviours have been observed. One of them is that when the pangolins have settled into their new environment, they often sleep in a very relaxed manner. They have been seen sleeping on their backs while uncurled and even draped, limply, over a branch (Figure 8).

Figure 8: Two examples of relaxed sleeping positions in M. javanica that have settled into their captive environment



a) Resting on its back while uncurled. b) Draped over a branch.

Another aspect of sleeping behaviour to note is that the one male *M. javanica* in particular preferentially chooses to sleep in an elevated position rather than on the ground. He does so either in the pungkis baskets, on a branch, or wedged in a fork of the branches. The other two individuals occasionally do so, but also utilise the nest box on the ground more frequently.

It was also observed that the males urinate and defecate into a basin of water all the time. The female does so less frequently. This is done by climbing into a basin of water provided in the den, and standing on their hind legs, employing their tails to aid in balance, like a tripod. Two dishes of water are therefore provisioned – one for consumption and one for urination and defecation.

CONSERVATION EDUCATION

Apart from captive management, another aspect to the conservation of *M. javanica* WRS has embarked on is conservation education. WRS has a public outreach programme, Critter Encounter, held at the Night Safari, every week. Species such as African Pygmy Hedgehogs *Atelerix albiventris* and Jungle Nymphs *Heteropteryx dilatata* are used for the programme. Occasionally, an individual *M. javanica* from within the collection is brought out for public interaction. Only individuals that are habituated to human presence are used, and interactions are kept to a maximum of twice a month. Of the three currently in the collection, only two are involved in this programme. They are taken out singly and individuals are rotated from session to session to minimise disturbance and stress to each individual. Members of the public are allowed to touch the pangolins but not to hold them. The general biology and

ecology of this species are explained, as well as the conservation status and situation if *Manis* spp. This programme also serves to raise awareness of local wildlife in urban Singapore. These sessions are well-received and most visitors, who have never seen a pangolin, express enthusiasm and interest in these animals.

CONCLUSIONS AND FUTURE DIRECTIONS

WRS' captive management programme of *M. javanica* started in 2005. Through numerous modifications, the housing, diet and enrichment aspects of this initiative are now successful. However, the programme will continuously be improved upon. Nutrition will continue to be a key focus in the programme and individual components will be investigated to determine which ones are most crucial in achieving a balanced and nutritious diet. Housing facilities will be modified as natural substrate – soil – will be most ideal. However, the drainage in the dens will need to be increased to prevent the soil from turning rancid.

An exhibit will also be built to display the pangolins at the Night Safari. This will expand the education component of the conservation programme as the exhibit will be a good tool to showcase the ecological importance of *Manis* spp. and the possible impact of unsustainable harvest and trade of these animals. This can be achieved through eye-catching, attractive and informative educational interpretives, juxtaposed with the exhibit display of *M. javanica*.

WRS also seeks to increase research on this species as the captive collection provides an invaluable source for research that will be difficult to be carried out in wild. Apart from nutrition as mentioned before, behaviour and reproduction will be also focused on. Endocrinology may also be explored. This will aid WRS' conservation efforts of *Manis* spp., with the long-term goal of possible reintroductions from the captive management programme to augment the wild population.

ACKNOWLEDGEMENTS

We are grateful to the National Parks Board of Singapore and Kumar Pillai, Assistant Director of Night Safari, for giving us the opportunity to embark on the captive management programme of *M. javanica*.

We would like to thank Yang Ci Wen and Jason Chin from Taipei Zoo for their invaluable advice and information on nutrition and captive management of *M. pentadactyla*, and how the information can be altered to suit *M. javanica*.

We would also like to thank our colleagues in the Veterinary department in Wildlife Reserves Singapore for their assistance in Veterinary treatment and guidance in the formulation of the artificial diet. We are grateful to our fellow colleagues in the Night Safari for their support.

This programme would not have been possible without the dedication and cohesion of the other pangolin keepers at the Night Safari, namely Chen Xiuting, Cynthia Chang, Dino Mahdi, Ernie F. Ismail, Faizal Hussin, Sabrina binte Abdul Jabbar, and Suman d/o Krishnamoorthy.

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APPENDIX

Appendix 1: Nutritional analyses and results of crude protein, crude fat, fatty acids and amino acids of artificial diet for Manis javanica in Night Safari.

Test	Value (mg/100g)	Value (%)
Crude protein (N x 6.25)/FN-1.1.3/05		10.66
Crude fat (Ether extract) / FN-1.1.2/05		4.97
Fatty acid docosahexaneoic	49.1	
Fatty acid eicosapentaenoic	46.2	
Fatty acid linolenic	54.5	
Fatty acid eicosadienoic	Not Detected	
Fatty acid palmitoleic methyl	155	
Fatty acid oleic acid	1514	
Fatty acid arachidonic	71.1	
Caprylic acid	Not Detected	
Capric acid	Not Detected	
Fatty acid eicosenoic	25.7	
Fatty acid linoleic / FN-8.0/05	1331	
Fatty acid lauric acid / FN-8.0/05	7.35	
Fatty acid myristic / FN-8.0/05	72.0	
Fatty acid palmitic / FN-8.0/05	907	
Fatty acid stearic / FN-8.0/05	272	
A-A aspartic acid		0.46
A-A glutamic acid		0.67
A-A ferine		0.23
A-A kistidine		0.12
A-A glycine		0.31
A-A threonine		0.21
A-A alanine		0.36
A-A arginine		0.34
A-A tyrosine		0.19
A-A cystine		0.02
A-A valine		0.30
A-A methionine		0.08
A-A isoleucine		0.22
A-A phenylalanine		0.23
A-A leucine		0.39
A-A lysine		0.24
A-A roline		0.26

Question & Answers

Questions addressed to Dr. Leanne Clark, Carnivore and Pangolin Conservation Program

Markus Handschuh, ACCB: How many pangolins have you received since you were established and how many did you rehabilitate successfully?

Leanne Clark: We received 23, including one *M. pentadactyla*. Most confiscated specimens are released straight away by the authorities, or resold into trade. We haven't released any of the specimens we have received. Rehabilitation is only assessed successful if the specimen is released. The challenge is to find safe sites. We currently have seven pangolins at the centre; the first one arrived on 10 October 2006 and is still alive. There is a 50 per cent fatality, but this is better than in the past.

Session IV

Pangolin Trade and Conservation

(Expert Papers)

Malayan Pangolin *Manis javanica* Trade in Sumatra, Indonesia

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ABSTRACT: Malayan (or Sunda) Pangolins, *Manis javanica*, are distributed widely in Indonesia. The species is found in Sumatra, Java, Kalimantan, and several smaller islands such as Bangka, Mentawai, Bali, Nias, and other islands. Due to its low population and endangered status, Indonesia has included pangolins as protected species under Act No. 5 of 1990 on Natural Resource Conservation and Government Decree No. 7 of 1999 on Protection of Plant and Animal Species. Pangolin trade in Indonesia started before the 1990s and has been on the rise ever since. In Indonesia, the volume of pangolin trade is even greater than those of other protected species. The high price offered for pangolins is one of the driving factors to the great amount of trade in the country. Many local villagers traded their farming jobs to become pangolin hunters, or often hunt in addition to being farmers. From 2004 to 2006, the price of a 10 kg pangolin at the hand of a second-level collector was equal to the price of a calf. From 2007 to 2008, the price of pangolins started to decrease. The Indonesian government has shown efforts in law enforcement actions targetting pangolin traders. As a result, traders are becoming more careful and discreet. However pangolin trade is still happening at a large scale and more effort is needed to stop the top-level collectors and middlemen, who, too often, remained untouched. There is an urgent need for an integrated program between related government agencies, NGOs and other institutions, to develop training and education programs for hunters in villages, and increase law enforcement efforts.

Keywords: *Manis javanica*, Indonesia, pangolin trade

INTRODUCTION

Malayan Pangolins *Manis javanica* are distributed widely in Indonesia. The species is found in Sumatra, Java, Kalimantan, as well as in smaller islands such as Bangka, Mentaway, Bali and Nias. Due to their rare and endangered status, pangolins in Indonesia are protected under Conservation Act No. 5 of 1990 as well as Government Regulation Act No. 7 of 1999.

Pangolin trade in Indonesia started before the 1990s, and increased ever since to be one of the most traded protected species in Indonesia. The high price offered for pangolins is one of the main driving factors to the magnitude of the trade in the country. Many villagers who used to work as traditional farmers became opportunistic pangolin hunters. From 2004 to 2006, a 10 kg pangolin could be sold from the hunter to the collector for as much as the price of a young cow. From 2007 to 2008, pangolin prices drastically decreased. However, the trade still continues.

Law enforcement actions for pangolin traders have been taken, but the top level traders are still untouched. The arrest of local hunters and middlemen has not been enough to stop the illegal trade. To this day, the pangolin trade still continues, but is now becoming more secretive.

There is a need for an integrated programme between relevant government agencies and Non-Governmental Organizations (NGOs) to develop awareness raising programmes in local villages, and increase law enforcement toward pangolin exporters.

PANGOLIN SURVEY

Pangolin surveys were conducted in Sumatra from August 2007 to August 2008. Field research was carried out both on pangolin habitat and on the illegal trade. Data on pangolin habitat was collected both by direct observations, in the field and by interviews of pangolin hunters. Trade data was collected by visiting collectors and exporters.

Pangolin Habitat Survey

In March 2008, TRAFFIC co-operated with a team from the Indonesia Institute of Science (LIPI) to conduct a 10-day survey covering Ketenong Village, Lebong Regency and Bengkulu. Methods used included transects, as well as interviews with local hunters and farmers who had already encountered pangolins in the wild.

A total of 17 pangolin dens were recorded. Ten of the dens entrances were located underneath fallen logs (figure 2), while the entrance of the other seven dens was located at the base of trees. The entrances of the pangolin dens were of round shape with average diameters of 15 x 25 cm or 20 x 25 cm. The dens were found to extend horizontally with depths from 60 to 350 cm. Decomposing logs as well as ant and termite nests were found near the dens (about 50-100 m away from the dens).

Among the 17 dens recorded, only four were classified as active (table 1). Active dens were characterized by the presence of pangolin scratches or tracks around the entrance. The entrances of non-active dens were overgrown with moss or grass, and/or the presence of spider webs was recorded.

Table 1: Pangolin dens observed in Lebong Regency, Bengkulu.

Transect	Distance from River	Topography	Elevation (m)	Vegetation	No. of Den	
					Active	Non-active
East	2 -10 m	Flat	200-300	Rubber plantation (25 years)	1	2
West	500 m	Hilly	700-800	Secondary forest	0	2
South	2 - 7 m	Sloped	450-650	Undergrowth	2	5
North	3 - 6 m	Sloped	350-400	Undergrowth	1	4
Total					4	13
Total dens					17	

Pangolin dens were found in mature secondary forest, where rotting logs, often colonized by ants, can generally be found easily in this type of habitat. In addition, the vegetation in old undergrowth and shrubs are dense enough to provide shade from the sun.

Several hunters also reported the presence of pangolins under fallen logs and on Aren trees *Arenga pinnata*. However, those locations are thought to be used as hideout or feeding sites rather then dens. The type of vegetation recorded around the dens, in secondary forests and shrubs, included species of fig trees, palm trees, bamboos, ferns and rattan. No dens were recorded in rubber or coffee plantations aged less than seven years.

Figure 2. An active pangolin den located underneath a fallen log

Pangolin Hunting Methods

Three main hunting methods were reported by local hunters as follows:

1. Tracking at night (18:00-04:00) using oil lamps or flashlights. Pangolins are captured by hand.
2. Tracking at night (18:00-04:00) using trained dogs.
3. Smoking of dens during the day, while pangolins are resting, using hay.

History of Pangolin Trade

Based on information reported by collectors, the pangolin trade, in Sumatra, has been on going since the 1990s. In these early years, specimens were only traded for their skin. The skins were sold to produce leather acessories such as bags and wallets. The demand for skin has now stopped and two of the collectors interviewed have accumulated stockpiles of 300-400 skins (figure 3).

Figure 3: Pangolin skins stored by collectors because of a lack of demand

In the early 2000s, the international market demand shifted to scales. Scales are used in the preparation of Traditional Chine Medicine (TCM) (figure 4). In 2002, the demand increased to include meat and internal organs. This demand has been supplied continuously to this day.

Figure 4: Example of Traditional medicine based on pangolin ingredients

a) Pangolin foetus soup is believed to increase men's stamina; b) Medicine containing pangolin scales, claiming to treat allergies, is freely sold over the counter.

Pangolin Trade Survey

Processing of pangolins and their scales

Pangolins are temporarily stored inside wooden boxes, while waiting to be slaughtered (figure 5.a). The slaughter is performed by cutting the throat (figure 5.b). The pangolins are then boiled in water at 90°C for two to five minutes (figure 5.c). After boiling the scales are removed from the body, starting from the tail (figure 5.d). Once all scales have been removed, a slit is made in the abodomen (figure 5.e) and the internal organs (i.e. heart, gall bladder, stomach, liver, intestines, etc.) are removed (figure 5.f). These are then washed and individually wrapped inside plastic bags before being re-introduced inside the body cavity (figure 5.g). In turn, the pangolins are placed inside plastic bags and stored in freezers (figure 5.h). Once the freezers are full, pangolins are packed and shipped out of the country.

The fresh scales are sun-dried for up to six hours (figure 6.a), and packed into large bags (figure 6.b). This particular type of packaging is characteristic of shipments sent to Jakarta using trucks.

Figure 5: Preparation of pangolins for international export

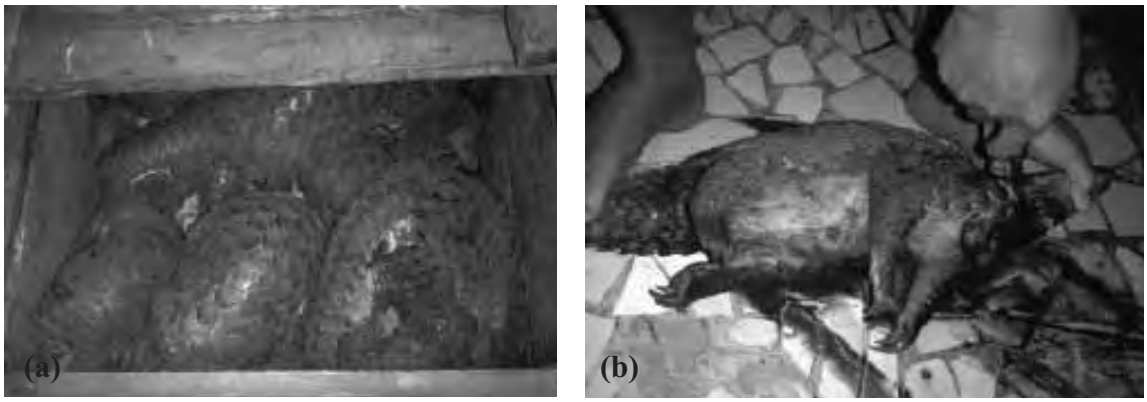
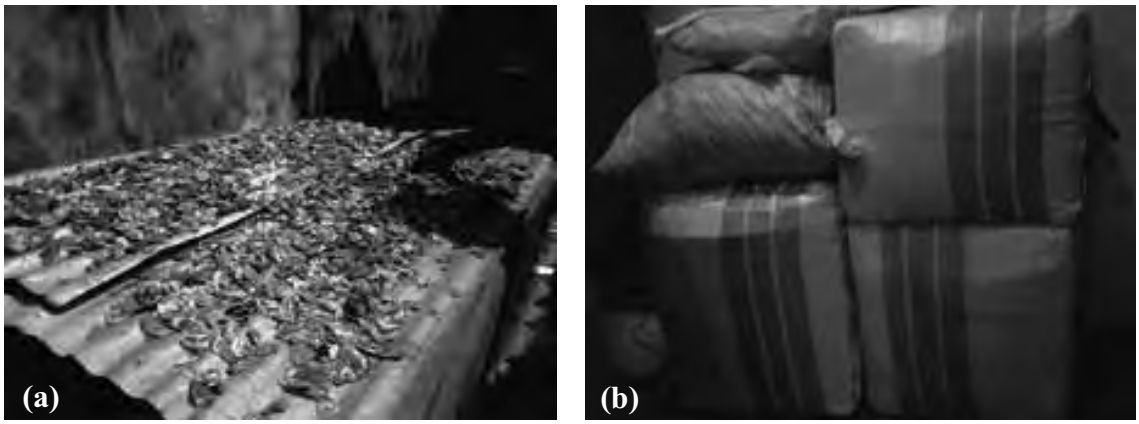


Figure 6: Preparation of pangolin scales for international export



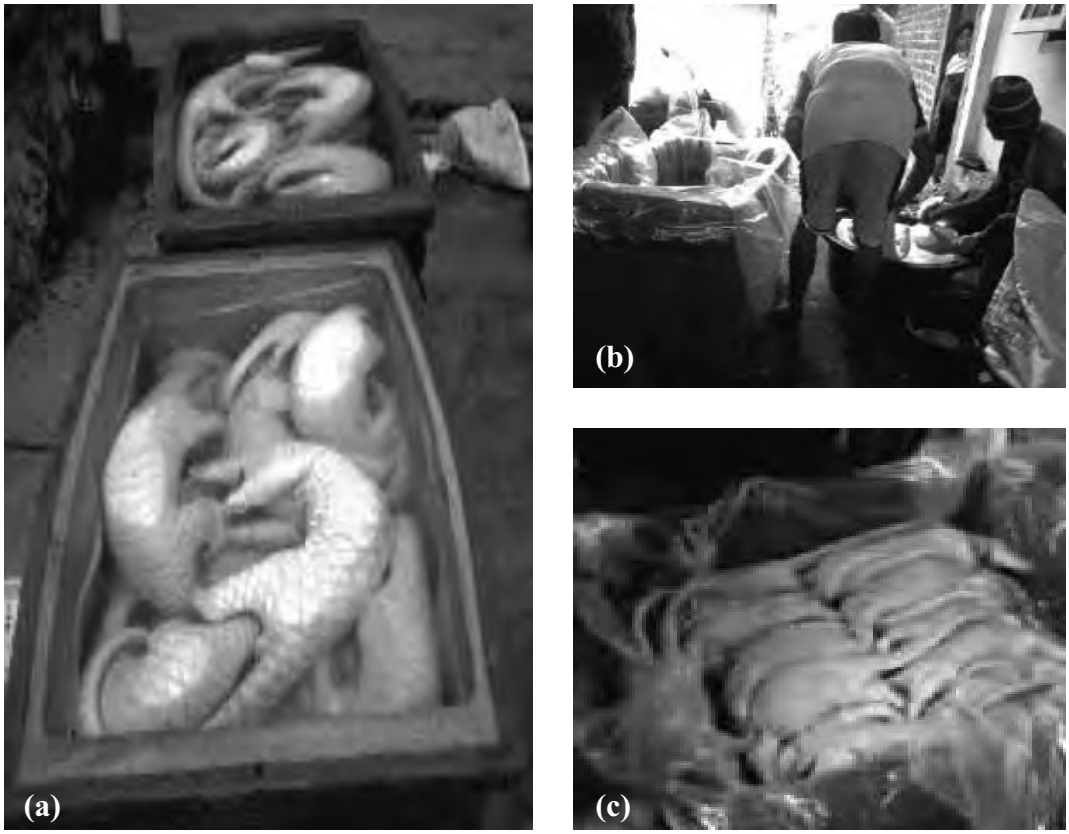
Modus of Trade

The pangolin traders usually use a legal business as camouflage. This include the use of legal wildlife collection business and captive breeding centres but also a variety of small businesses such as bakery, grocery, home decoration and construction suppliers.

Animals are processed and transported in packages miss-labeled as products derivated from non-protected species (figure 7). Local transport is done using private vehicle such as minivans painted with food or cigarette labels or public transportation such as bus (figure 8).

Bribery in the form of money and gifts is used to pay off authorities and guards to facilitate the movement of protected species.

Figure 7: Packing for export



a) Cleaned pangolin waiting to be packaged; b) Coolers filled with ice; c) Pangolins packed into coolers with ice, ready for exported.

Figure 8: Types of vehicles and packaging used by middlemen to transport the pangolins to the slaughterhouses

Volumes Traded

The volumes of pangolins processed in various slaughterhouses, in Sumatra, were collected every month for a period of one year, through direct observations and interviews with local hunters, collectors, and informants. The trade volume was calculated from the sum of pangolins collected in slaughterhouses in one month and based on an average of seven kilogrammes per pangolin (table 2).

Table 2: Volume of pangolins collected in slaughterhouse

Supplying areas	Slaughterhouse (Data collection sites)	Volume per month
- Java - Lampung - Bangka Belitung - Sekayu, Baturaja, Muba, Lahat, Sei Lilin (S. Sumatra) - Several regencies in Jambi	Palembang, S. Sumatra	2-3 t (300 to 400 heads)
- Manna, Seluma, Muko-muko, Argamakmur (Bengkulu) - Several regencies in W. Sumatra	Bengkulu	1 t (>143 heads)
- Lebong Regency - Rejang Lebong Regency - Kepahiyang Regency - Kota Padang District	Rejang Lebong Regency, Bengkulu	1 t (>143 heads)
- Muara Bungo Regency, Jambi - Several regencies in W. Sumatra - Several regencies in Riau	Kuto Baru Sub-district, Darma Seraya Regency, W. Sumatra	2-3 t (300 to 400 heads)
- Bulian, Sarko, Matang Merangin Singkut Regencies, Jambi - Several districts in Lubuk Linggau, Bengkulu	Musi Rawas Regency, S. Sumatra (2 pangolin slaughterhouses)	2-3 t (300 to 400 heads)

Table 3 presents the volume recorded for two of the slaughterhouses, base uniquely on direct observations, during a period of three months. It can be noted that 100 pangolins were collected each month in each collection site with a higher proportion in females (two third of the stock). Collectors were actually able to supply these quantities between one to two weeks.

Based on these data it can be deducted that eight to 11 t of pangolins are processed every month in Sumatra. Exporters in Palembang reported they can send one shipment of pangolins out of the country every one to two months. TRAFFIC was able to observe the preparation of two of these shipments for export. The first one, witnessed in December 2006, consisted of 25 t of pangolins. The second, observed in November 2007, consisted of eight tonnes. Two shipments were also seized earlier this year in Viet Nam for a total of 24 t. Both shipments originated from Indonesia.

Table 2: Sex ratio of pangolins recorded at collectors premises

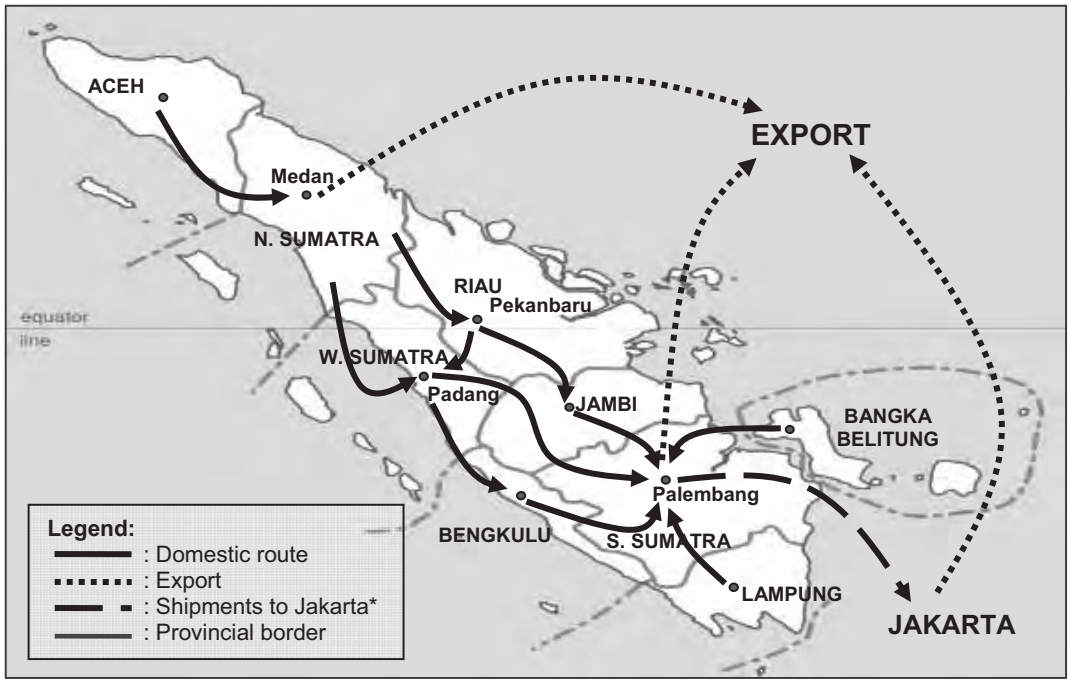
Supplying areas	Data collection site	Month					
		Nov. 07		Dec. 07		Jan. 08	
		M	F	M	F	M	F
Lebong, Rejang Lebong, and Kepahiyang Regencies, Bengkulu	Rejang Lebong Regency, Bengkulu	30	70	35	65	30	70
Regencies in Jambi Districts in Lubuk Linggau, S. Sumatra	Musi Rawas Regency, S. Sumatra	35	65	30	70	40	60

Notes: M: Males, F: Females.

Trade Routes (2007 -2008)

Pangolin are hunted throughout Sumatra and exported out of the country via Medan and Palembang (figure 9). Shipments to/from Jakarta only consist of pangolin scales. Scales and meat are not always exported together in the same shipments. A proportion of the scales are first sent to Jakarta, where they are reduced into powder before export.

Figure 9: Pangolin trade route (2007-2008)

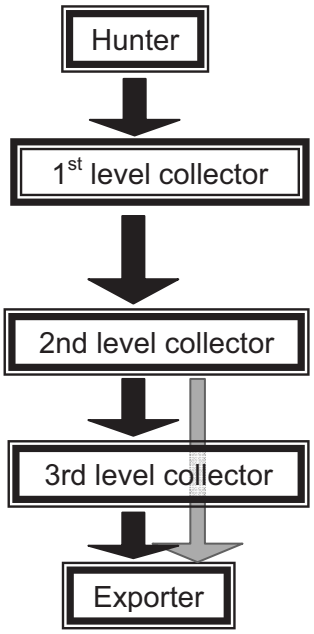


Structure of the pangolin trade network

There are between four to five levels of organization from the pangolin collectors to the exporters (figure 10). The hunters generally come from outside the villages or can be traditional farmers living around plantations. They are hunting pangolins opportunistically and belong to the lower social class. They obtain loans from the first level of collectors to cover their daily basic expenses. Hunters sell their catch to collectors located at the village, sub-district or regency level. These traders usually are Chinese ethnic and own small shops as main business. They are part of an extensive network that link them to the hunters and other collectors. They sometimes receive financial support from the second level collectors. The second level of collectors is located at the Regency or province level. Some deals directly with exporters, others sell their stock to slaughthouses (thirs level of collectors). Slaughterhouse owners work at

the regency or province level. They sometimes invest money in the second level collectors. In the end, all collectors send their pangolins to exporters located at the province level. Exporter are Chinese ethnics, they have commections with government officials, the police and the army and have developed important international networks. They act as investors, particularly towards slaughterhouses.

Figure 10: Organization of the different levels of collection



RECOMMENDATIONS

- To help countries fight the constant increase in the illegal trade, pangolins should be uplisted to CITES Appendix I.
- Further research on wild pangolins biology and ecology is deeply needed, in Sumatra, to provide baseline data for all relevant stakeholders.
- There is also a crucial need to educate local villagers on the importance of pangolin conservation as well as their protection status. This could be achieved through awareness campaigns organised in collaboration with relevant local authorities and NGOs.

Pangolin Capture and Trade in Malaysia

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ABSTRACT: To date, volumes, values and uses of wildlife in trade are still poorly documented, including those for the Sunda Pangolin *Manis javanica*, Malaysia's only native pangolin species. According to the WCMC-UNEP CITES (1990-2007) trade database most pangolins and products thereof exported from Malaysia were composed of skins and scales prior to the ban in 2000. The majority of skins were exported to Singapore and re-exported to Japan and Mexico for the production of leather goods, while scales were exported to China and Hong Kong for use in traditional medicines. Despite trade suspensions, reports from government agencies, press articles and seizure data reveal that the pangolin trade is still very active in Southeast Asia and East Asia after the pangolin trade ban in 2000.

Information provided though locals is essential to understand the dynamics of the ongoing pangolin trade and to assess the current status of wild populations in Malaysia. In 2008, TRAFFIC Southeast Asia carried out surveys and interviews, collecting data from a total of 202 respondents from 10 different states in Peninsular Malaysia, through a semi-structured interview process to get an overview of the current pangolin trade. Of these, 175 respondents were aware of or directly involved in the pangolin trade.

Pangolins continue to be largely captured for the international trade, with a lesser amount used locally for subsistence and traditional purposes. Pangolins are captured either opportunistically (69%) or specifically targeted (33%) from oil palm plantations, primary and secondary forest, rubber estates and other habitats, in descending order. The capture techniques used include tracking, spotlighting, hunting with dogs and trapping. Pangolins are sold on an average of MYR95 per kg (USD27 at 2008 rates).

This study revealed that the pangolin trade is widespread in Malaysia. Pangolin populations have decreased over the past five years and local extinction can be expected due to high prices and continued demand. Prioritizing and focusing enforcement efforts to combat the illegal pangolin trade is urgent.

Keywords: Sunda pangolin, trade, pangolin capture, TRAFFIC, Malaysia

INTRODUCTION

Pangolins (*Manis* spp.) have been listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and currently have a "zero quota" in place for all Asian pangolin species, *Manis crassicaudata, M. pentadactyla, M. javanica, M. culionensis*, which bans all international trade. The ban was implemented in 2000 (CITES CoP 11, 2000; UNEP-WCMC, 2008). Regardless of this trade prohibition, more than 30 000 pangolins were seized between 2000 and 2007 across East and Southeast Asia. Most pangolins seized were bound for China via Thailand or Viet Nam (CITES Prop. 11.13, 2000; TRAFFIC SEA, 2004; Idris, 2005). It is believed that most pangolins observed in trade originated from Malaysia and Indonesia, as populations in most other range countries have already been significantly reduced (TRAFFIC SEA, 2004; TRAFFIC EA, 2006). A large amount of the illegal pangolin trade is undetectable and seizures may only reveal the tip of the iceberg, with the amount of pangolins being traded illegally very likely representing a multiple amount of those seized. Further studies in Malaysia are crucial

to assess the extent of the pangolin trade in Malaysia which, if not halted, may threaten the survival of wild populations.

Pangolins belong to the order Pholidota which means "scaled animals". They are secretive, mostly nocturnal and semi-arboreal, and are specialized in feeding on ants and termites (Payne *et al*., 1985; Nowak, 1991). Thus, they are also known as 'scaly anteaters'. Eight species of pangolins are currently recognized, of which four are found in Asia. Among the four Asian pangolins, three species of pangolins (*M. javanica, M. pentadactyla, M. culionensis*) are distributed in Southeast Asia (Nowak, 1991; Gaubert & Antunes, 2005; Lim & Ng, 2007). Traditionally, *M. javanica* and *M. pentadactyla* are harvested in large numbers for their meat, scales (attributed medicinal properties) and their skins for distinct scale-patterned leather (UNEP-WCMC, 2008).

The current illegal trade in pangolins is mainly to meet the demand from China (Michael *et al.* 1997), especially for meat and scales which are utilized in the traditional Chinese medicine (TCM) (Li, 1596 in: Wu *et al*., 2002; Wu *et al*., 2007). An average estimate between 100 000 and 135 000 pangolins are needed to meet the demand in China (Wu *et al.*, 2007). In total, an estimate of 117 500 of pangolins per year is in demand, assuming that meat and scales are utilized from every specimen. In order to meet the local demand, since the 1990s pangolins have been imported from other ASEAN countries (Li & Li, 1998; Wu *et al*., 2007; Zhang *et al*., in press), resulting in the decline of pangolin populations in other range states. Thus, research on the pangolin trade in Malaysia is essential to provide a detailed analysis of the trade situation with particular regard to levels and dynamics. These findings will assist relevant enforcement agencies in prioritizing and focusing their efforts to halt the illegal trade. The current impact on wild populations most likely is detrimental to the survival of populations in Malaysia.

Background of the study

The Sunda Pangolin *Manis javanica* is totally protected under the Wildlife Protection Act No. 72 of 1972 in Peninsular Malaysia. It is widely distributed in continental Southeast Asia and the Greater Sundas, and is the only species found in Malaysia. To date, the population status, biology and ecology of this species still remain largely unknown (Misra, 2000; Prop. 11.13, 2000; Lim & Ng, 2007). Only one field study was conducted on a population from Singapore, where insights could be gained on home range, activity cycle and natal den usage of a female Sunda Pangolin (Lim & Ng, 2007). Despite the high numbers of pangolins observed in seizures and also road kills, the Sunda Pangolin is hardly seen in the forest due to it secretive behavior. It is suspected that there has been a drastic decline in the pangolin population in the wild in recent years. In addition, volumes, values and uses of wildlife in trade (Roe *et al*., 2002; WCS & TRAFFIC, 2004) including the Sunda Pangolin remain poorly documented.

Objective of the study

This is a preliminary survey investigating the capture and trade of pangolins to better understand the situation at the ground level in Malaysia. This information, obtained from local people, will be linked up with pangolin trade in other Southeast Asian countries to gain an insight of the trade dynamics. Specific objectives of this study were (1) to collect capture data of the Sunda Pangolin in Malaysia and (2) to understand the trade dynamics through interviews with respondents and (3) therefore to assess the current situation and issues surrounding the pangolin trade. Finally, this study aims to

generate recommendations for further research and management on the conservation status of *M. javanica*.

Challenges of the study

There is limited information available on the Sunda Pangolin and this is the first study to be conducted on the pangolin trade in Malaysia. Nevertheless, sensitivity of the issue was evident and respondents were often reluctant to implicate themselves in the illegal trade. Therefore, respondents may choose not to respond or the authenticity of their responses may be questionable.

METHODOLOGY

Desktop Study

Information on pangolin trade in East and Southeast Asia was compiled through a desktop study. This included export/import data, as declared by CITES Parties, from the UNEP-WCMC CITES Trade Database, a collection of press articles referring to pangolin seizures and seizure data provided by relevant authorities in Indonesia, Malaysia, Singapore and Thailand.

Field Surveys

The illegal wildlife trade is carried out in the underground and due to the practical and dynamic circumstances in the field, no standard illegal trade survey can be applied (WCS & TRAFFIC, 2004). The number of pangolin traders and collectors is unknown, thus, sample sizes cannot be accurately determined. Snow-ball sampling (Goodman, 1961 in: Heckathorn, 1997; Warchol *et al.*, 2003) and random sampling strategies were used to pick the respondents in different states of Peninsular Malaysia. Sabah and Sarawak are not covered here due to time and budget constraints. A questionnaire (Appendix I) was developed, pre-tested and applied for semi-structured interviews (Bernard, 2006) through casual conversation either in Bahasa Malaysia or Mandarin. The survey was conducted by the same surveyor from 24 March to 16 May 2008.

RESULTS

Desktop Study

An analysis of data recorded in the UNEP-WCMC CITES Trade Database (1990-2007), with Malaysia as a source country, revealed that pangolins *Manis javanica* used to be traded legally between 1998 and 2003, from Malaysia, for their skin and scales. Figure 1 provides an overview of the destination of pangolin skins harvested in Malaysia before the ban in 2000. Japan and Mexico used to be the main destinations.

Figure 1: Countries declaring importing pangolin skins with Malaysia as a source country (1998 -2003)

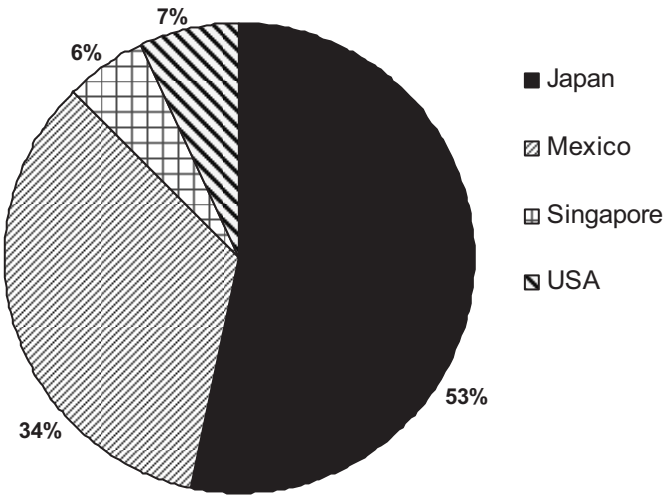
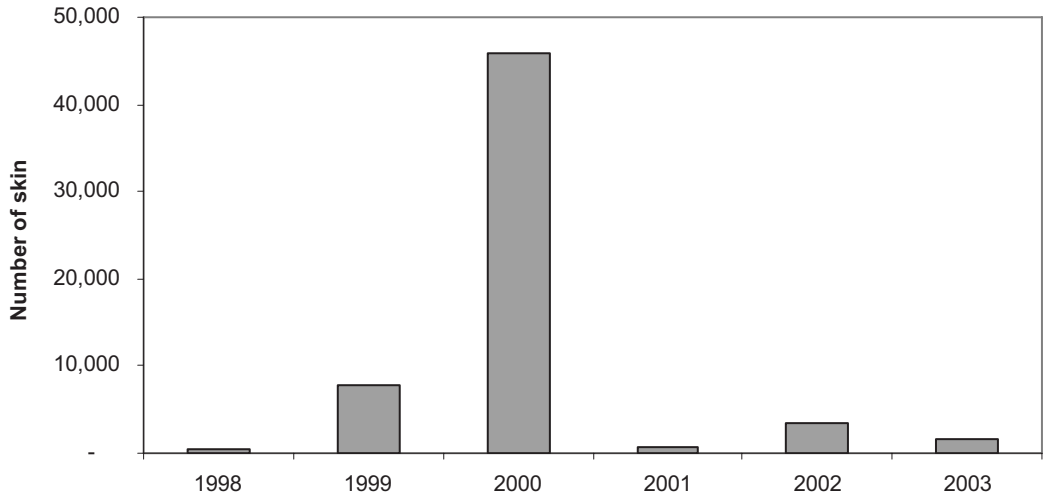


Figure 2 gives a breakdown of the skin trade per year. According to data declared by importing countries, most of the shipments occur during the year of the ban. Some of the skins were still imported after the ban but this could refer to stock accumulated before 2000.

Figure 2: Import of pangolin skins, as declared by importing countries, with Malaysia as source country.



The trade in scales took place few years earlier with most of the imports recorded between 1994 and 1998 (figure 3). Interestingly, the trade of pangolin scales originating from Malaysia was already documented ten years ago.

Figure 3: Import of pangolin scales, as declared by importing countries, with Malaysia as source country

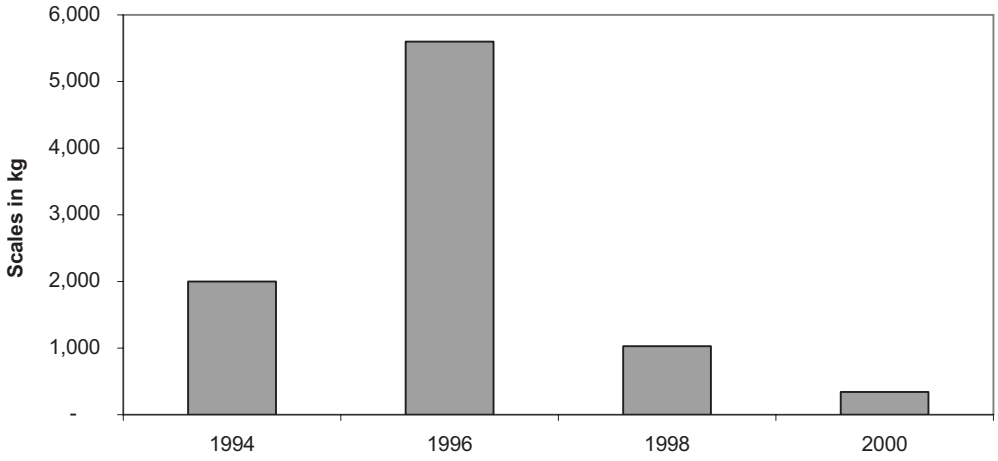
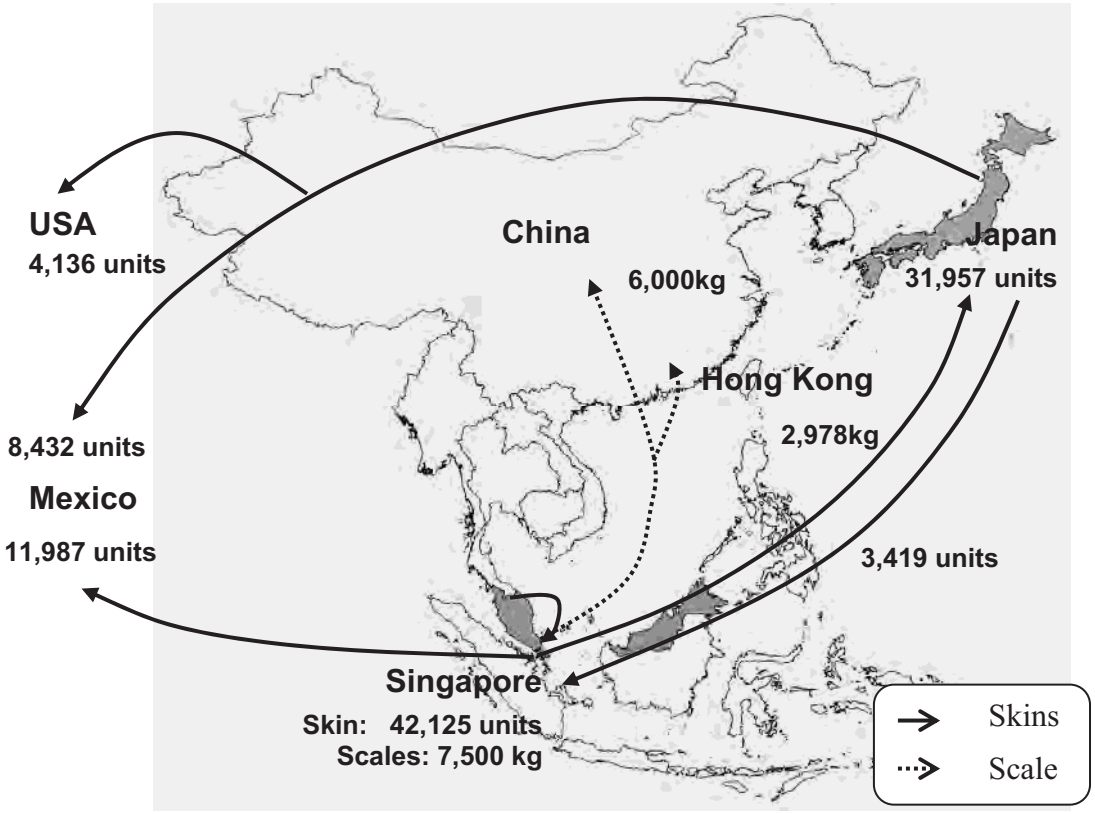


Figure 4 shows the flows of pangolin skins and scales originally collected from Malaysian individuals. Both skins and scales were exported via Singapore. While the scales were imported by China and Hong Kong, the skins were imported by Mexico and Japan. Part of the skins imported by Japan were re-exported to Mexico, the USA and back to Singapore.

Figure 4: Trade routes and destination countries of pangolin products (scales and skins), originating from Malaysia, as declared by importing countries



Source: WCMC-UNEP CITES Trade Database (1990-2007)

Seizure data gathered from the press and provided by the relevant CITES Management Authorities in Southeast Asia, for the years 2000-2007, show that the trade continued

very actively after the ban (figure 5). According to these records more than 30 000 specimens were confiscated across the region during that period. A conversion factor of one pangolin equal to four kg was used, when seizures were reported in kg.

Figure 5: Compilation of seizure data provided by Government agencies and reported in the press between 2000 and 2007 for Southeast and East Asia

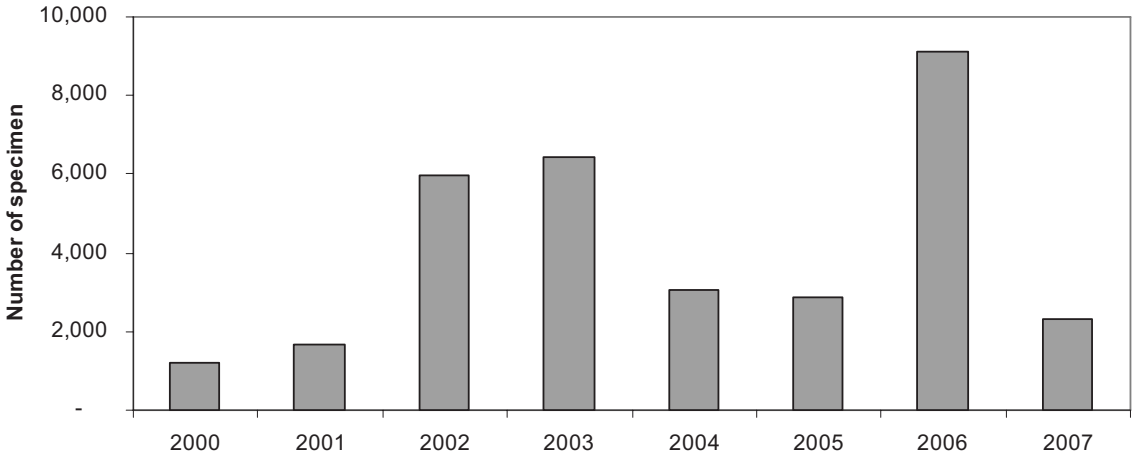
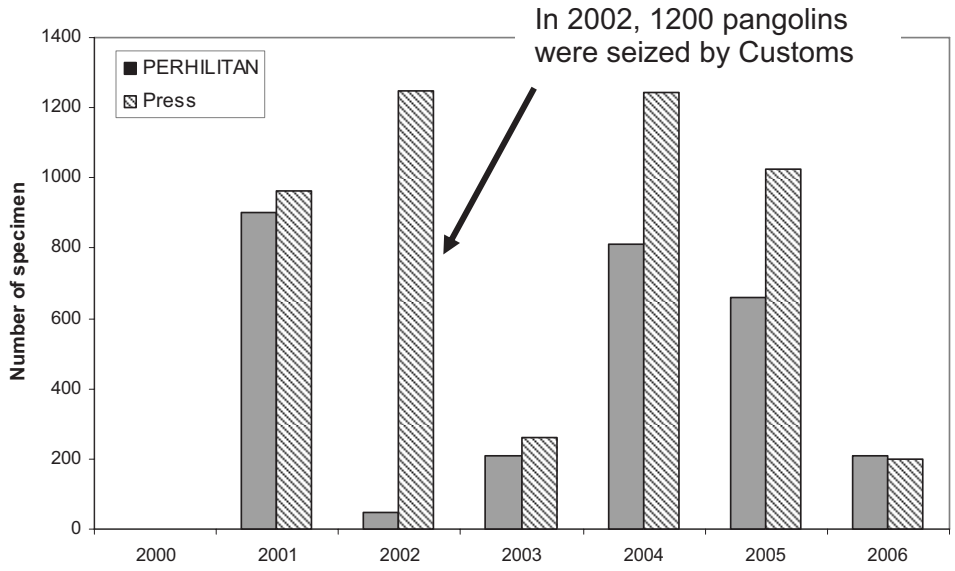


Figure 6 shows a closer look at the situation in Peninsular Malaysia. Data were compiled from the Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN) annual reports (plain) and as reported by the press (stripes). It should be noted that press reports also include seizures made by other agencies like Customs, and therefore not recorded by PERHILITAN.

Figure 6: Compilation of Seizure data for Peninsular Malaysia



Field Surveys

A total of 202 respondents from ten states in Peninsular Malaysia were interviewed. Of these, a total of 44 (22%) respondents admitted to being involved in the trade, with 36 being pangolin collectors and eight are either agents or middlemen. Of the remaining 158 non-collectors/traders, 131 of them (83%) claimed to be aware of pangolin trade occurring around their village or town. This refers to respondents who have heard and

know of someone who captures pangolins, are aware of the market price of pangolins, or who know about the pangolin trade. In total, 175 respondents were aware of, or directly involved in the pangolin trade.

Pangolin capture

Reason for pangolin capture

Based on a total of 175 respondents who are either involved or aware of the pangolin trade, pangolins are mainly captured for trade (88%), local consumption (31%) and for local traditional medicine use (3%).*

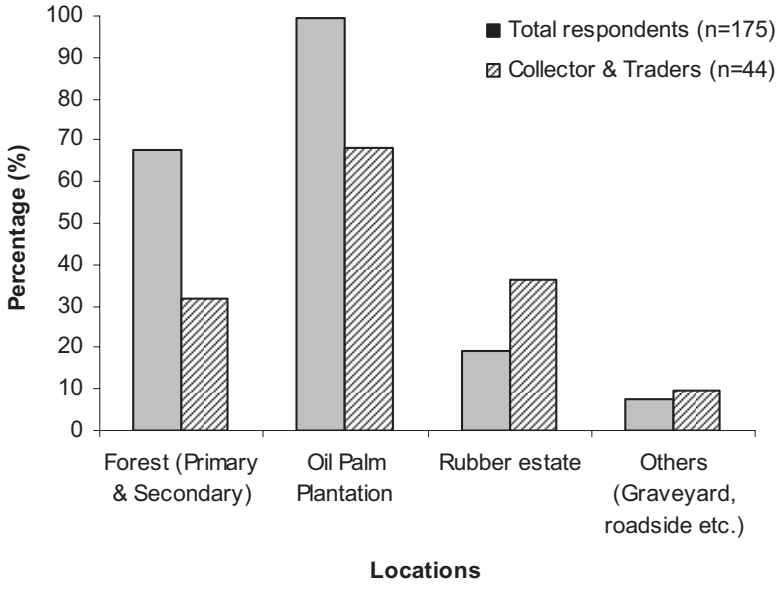
Characteristics of pangolin hunting

About 49% of the respondents stated that pangolins are captured opportunistically, while 13% actively searched for pangolins on a regular basis (targeted searching). However, about 19% capture pangolins both in a regular and opportunistic manner. Based on capture frequency, approximately 69% of pangolin captures are opportunistic, 33% from a regular direct search and 18% did not respond to the question.*

Area where pangolins are captured

Pangolins are commonly captured in oil palm plantations, forests (primary and secondary), rubber estates and other disturbed places such as graveyards, roadsides etc. in descending order (figure 7). However, respondents from plantations indicated that pangolins are more common in plantations with bushes, dead logs, nearer to forest, with less management practices (e.g., site clearing, flown trimming) and less disturbance.

Figure 7: Pangolin capture in relation to areas. A comparison of results based upon 175 respondents and 42 collectors and traders in Malaysia.

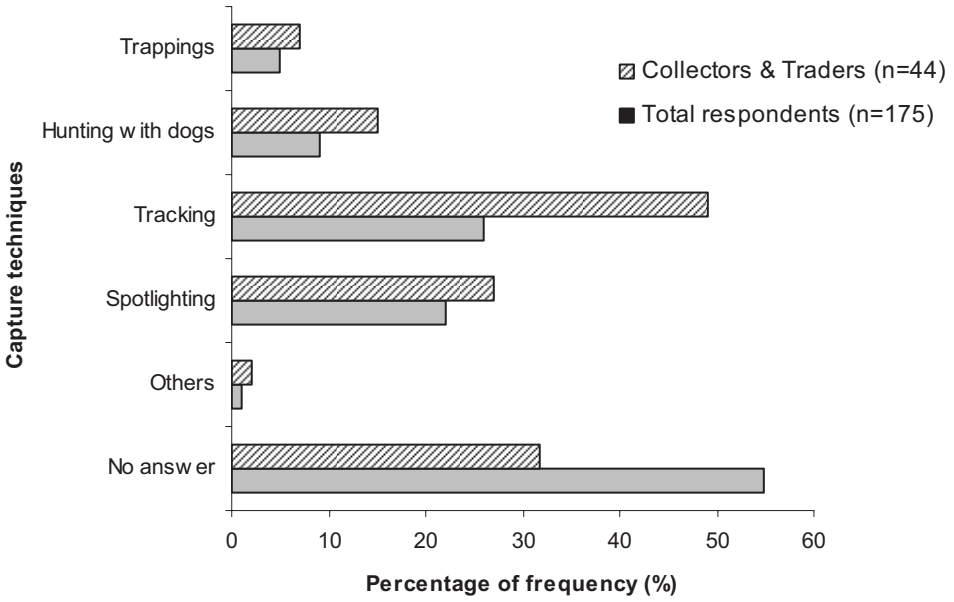


* The total percentage exceeds 100% as it is a multiple-choice question and calculation is based on the frequency of each answer.

Capture techniques

Tracking is the most commonly used technique to capture pangolins, followed by spotlighting (following the sound and using torchlight to search for pangolins at night), hunting with dogs, trapping (with net or wire cage) and others (Figure 8). Tracking, which requires extensive experience and skill, is conducted during the day and usually after light rain has fallen the previous night. Indirect signs such as scratches (claw mark) and mud stain on tree trunks, footprints, burrows are observed to track pangolins. Some pangolin collectors use candle lights/lanterns as light traps to attract pangolins which will come for insects at night.

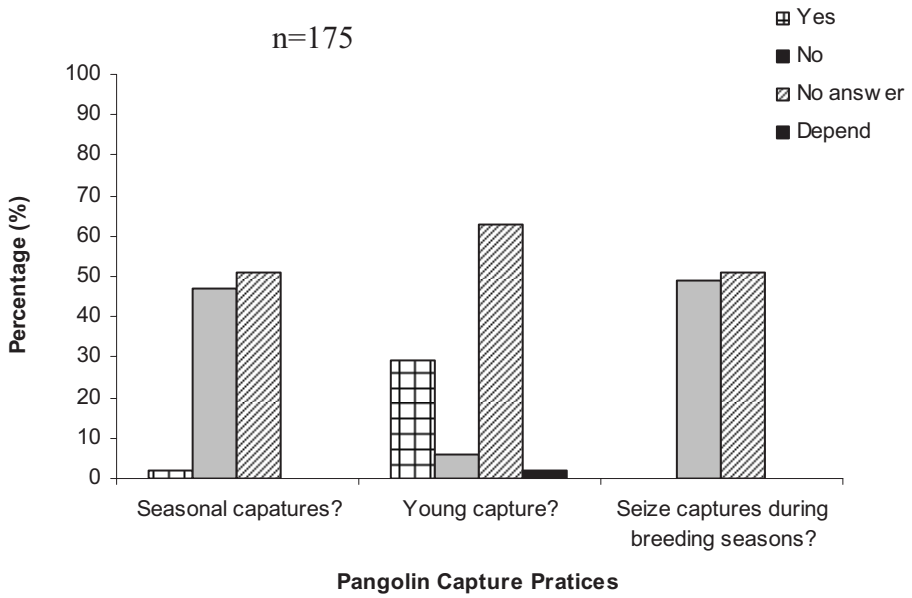
Figure 8: Pangolin capture techniques used by pangolin collectors in Peninsular Malaysia based on frequency.



Pangolin capture practices

There is no seasonal variation in capturing pangolins, thus they are captured thoughout the year (figure 9). Most collectors capture pangolins regardless of their size. Only four respondents said they do not capture juvenile pangolins.

Figure 9: Pangolin capture practices among collectors in Peninsular Malaysia (n=175)



Claimed size of captured pangolins

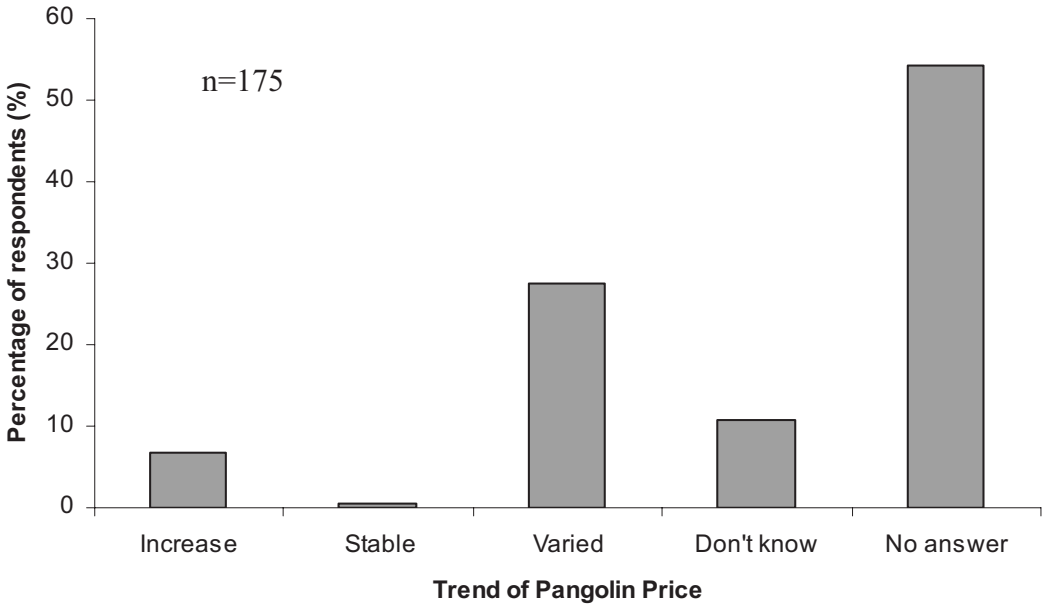
The sizes of pangolins captured range from two to 9.5kg, with a mean body weight of five kilogrammes (n=66) and a maximum of 11 kg (n=70). The maximum ever recorded (or reported) body weight of a Sunda pangolin was 20 kg (back in the 1970s, in 1988 and 1997). However, one respondent claimed to have personally caught an individual of 26 kg in 1988.

Pangolin trade dynamics in Malaysia

Price dynamics

Pangolins can be sold from MYR30 per kg (USD9) to MYR330 per kg (USD100) depending on the prevailing market price, agent, location and climate season in the consuming country. Prices ranged from MYR0.80 per kg (USD0.24) in the 1970s, MYR5-15 per kg (USD1.51-4.55) in the 1980s and MYR40-50 per kg (USD12-15) in the 1990s when pangolins were still relatively abundant and in low demand. The average price for the past five years is MYR95 per kg (USD28.8) based on 103 respondents. Generally, the price is increasing but varies from day to day or month to month depending on the market price (figure 10). Respondents claimed that the prices are related to demand and supply (e.g., higher demand during winter time in China) and enforcement activities on the ground.

Figure 10: Trend of Pangolin Price over the past five years (2002-2007)



Collectors

The majority of the pangolin collectors are farmers, plantation workers in the oil palm and rubber estates and hunters. The "Orang Asli" (indigenous people), Malays, Indonesians are actively involved in the capture of pangolins. The majority are part time collectors who capture pangolins opportunistically. However, skilled and serious collectors conduct targeted searches for pangolin, either alone or in groups, when prices are high. Not many collectors captured pangolins when price were low in the late 1990s. All collectors stated that they have to sell the pangolins immediately after their capture. This is due to the high risk of keeping the animal illegally while ensuring the maximum profit they can gain because pangolins lose weight over time. Collectors maintain a low profile in order to avoid speculation among the people in the area which may lead to attention from enforcement agencies.

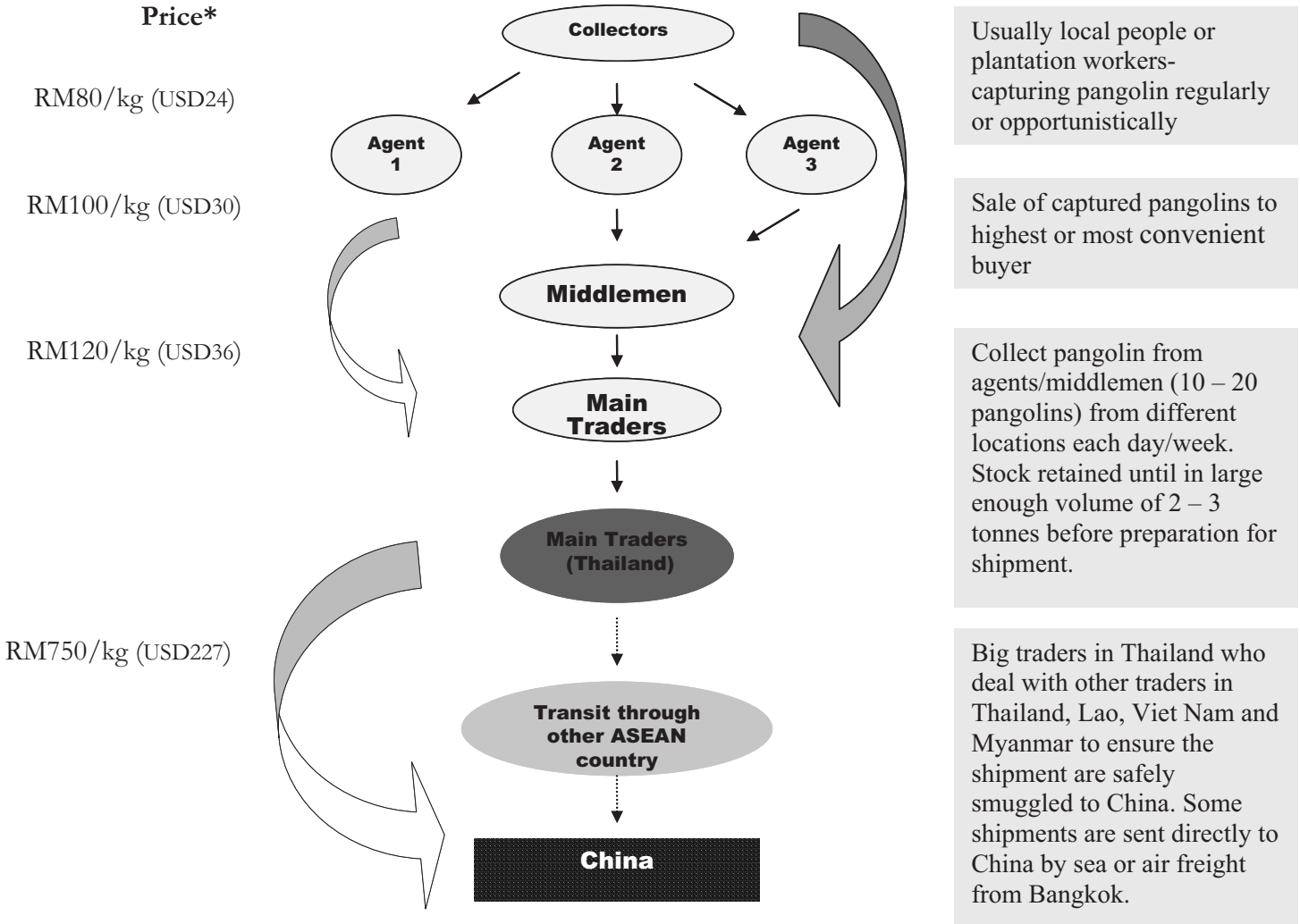
Traders

Most traders (agents/middlemen) are Malaysian Chinese (seven out of eight) who own businesses (e.g., grocery shops, licensed wildlife traders etc.) and are involved in the pangolin trade for a side income. However, two of the traders are no longer active in the business because the pangolin price is inconsistent and the business risk is high. One of them stopped operating because of the regular spot checks and enforcement work by the PERHILITAN which created much inconvenience to his business. There are Malays and "Orang Asli" (OA) who operate as agents for the middlemen. Usually, agents offer a lower price compared to the middlemen. All traders have well established networks of collectors in different localities. All traders stated that the pangolin business was primarily catered to the Chinese international market and they are sent alive via Thailand or transit through other ASEAN countries based on convenience. Some seaports/transit points mentioned in Malaysia include Kuantan, Terengganu, Sg. Golok.

Market structure

The pangolin trade involves many agents along the market chain as it is a lucrative business. Whoever is willing to breach the law and know the middlemen can be a pangolin agent with a profit margin of MYR20 (USD6) – MYR30 (USD10) per kg. The market price of pangolins can vary from agent to middleman due to business competition. Thus, pangolin collectors are relatively selective of their agents or middleman depending on the prices they offer or the convenience they provide for trading activities. Collectors who get to deal directly with the middleman usually sell their pangolins at a much higher price compared to the smaller agent. According to the traders, pangolins are then sold on to dealers in Thailand who will supply the pangolins to China. The market structure is illustrated in figure 11.

Figure 11: Pangolin trade dynamics in Malaysia



** Prices are not based on current market price and may vary from time to time depending on the location, supply and demand.*

Volume in Trade

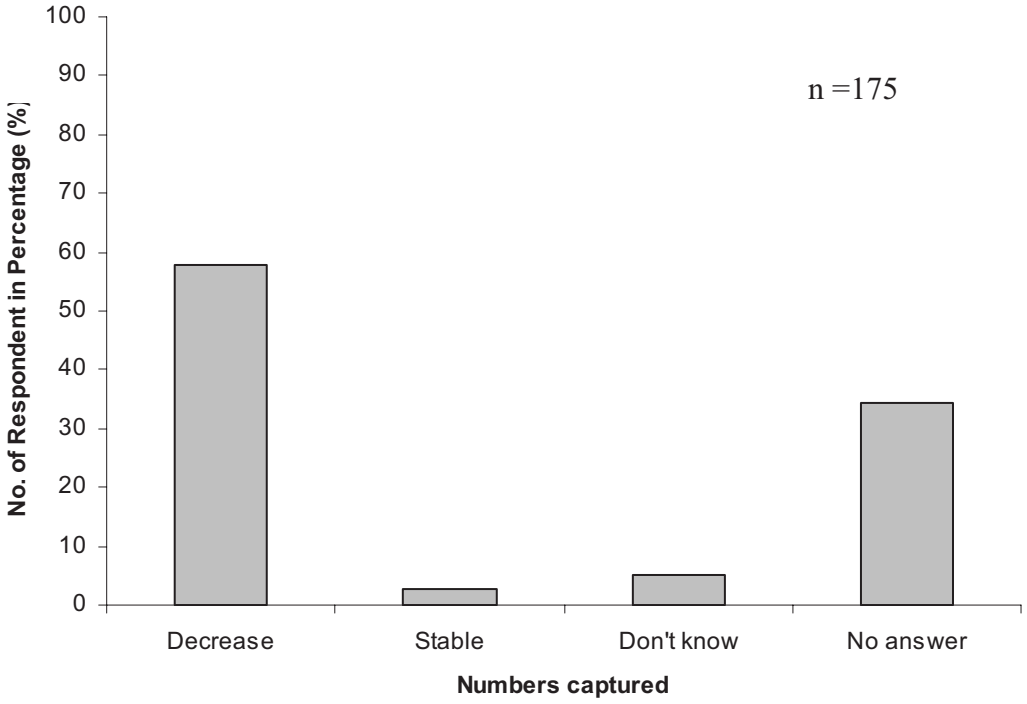
The volume of pangolins in trade can be subjective and varies according to supply demand and location. Due to the illicit nature of the business, the actual volume of pangolins cannot be calculated/assessed. Therefore an estimated volume of pangolin can only be provided (table 1). Nevertheless, both the volume in trade and the numbers of pangolins being captured within the last five years (Figure 12) has decreased based on the information obtained from the respondents. This is due to the intensive harvest of pangolins and habitat loss for development and plantation.

Table 1: Estimated volume of pangolins in trade in Peninsular Malaysia based on the information obtained from the respondents

	Collector	Middleman	Main Trader
2005	About 3-5 pangolins per week	About 50-60 pangolins per day (peak 200-300kg)	About 3 t (max 10 t) of pangolin exported per week ≈ 600 pangolins per week*
2008	About 1 pangolin every 3-6 months	About one/two per day/week (either population has decreased or there are more agents)	About 1 t per week ≈ 200 pangolins per week*

* Calculation based on an average sized pangolin of five kilogrammes
Estimated pangolins in trade (minimum numbers):
2005: 600 x 4 weeks x 12 months = 28 800 pangolins per year
2008:200 x 4 weeks x 12 months = 9 600 pangolins per year

Figure 12: Population trends of pangolins capture/hunting in the period 2003-2007 (n=175)



Pangolin Conservation

All respondents are aware that the Sunda Pangolin is a protected species and it is therefore illegal to be involved in its capture and trade. However, most respondents are still active in this business due to the species' high and lucrative price. The respondents indicated that pangolins are rare nowadays due to extensive harvesting. According to respondents, pangolin numbers have been decreasing over the last five years and may become extinct if the current rate of capture continues and the trade remains uncontrolled. Skilled collectors do not think that pangolins will become extinct as long as their natural habitat (forest) is protected, however, extra effort (time and energy) is needed to capture pangolins compared to five years ago. Thus, whether the pangolin will be extinct within the next five years is subjective among the respondents (figure 13). A compilation of the reasons given by the respondents for capturing or not capturing pangolins is presented here to offer a wider perspective to understand the pangolin trade and traders mentality (table 2).

Some respondents discussed the importance of habitat protection in pangolin conservation. Several plantation workers have observed that management practices of the plantation which result in less vegetative cover has also resulted in a corresponding reduction in the number of pangolins observed and caught. They also stated that the number of pangolins is higher in those parts of the plantation which has a forest area adjoining the plantation. In addition, the explosion of ant and termite populations, apparently reflect the decline of pangolins in the plantations and estates in recent years.

Figure 13: Do you think the Pangolin will be extinct within the next five years? (n=175)

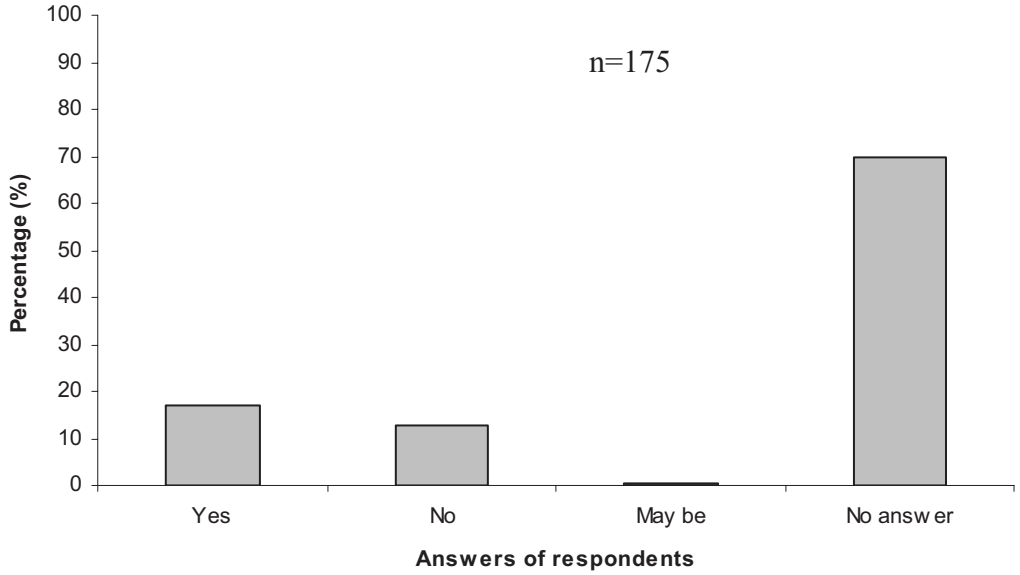


Table 2: Summaries of pangolin trade

	Reason for capturing pangolin	Reason for not capturing pangolin
Economics of the pangolin trade	Good price, high demand, request from middleman, high risk but good money	
Socio-economic conditions	Low pay, no stable income (collector), corruption in poor country where personnel of relevant agencies can be easily bribed (middleman)	Have stable income - hunting is time and energy consuming
Legislation and law enforcement	Penalties not imposed based on the numbers of animals. Business profit is lucrative enough to cover the fine (Middleman)	It's illegal and the fine is high; regular patrolling or enforcement work is annoying and worrying (Collector)
Attitude towards the animals	View pangolins as a source of food and extra income	It is not harmful to people but helps to control termite and ant problems in orchards and plantations
Pangolin population	Pangolin are still around but are difficult to find	High effort, low return (2008), no more pangolins
Skills	Does not require effort when pangolins are encountered	Do not have the skill to track pangolin, require experience
Cultural belief	No - "It's consider strike a lottery if you see pangolin nowadays"	Eg. It's bad luck to see a pangolin (Chinese), pangolins are transformed from umbilical cord (OA-Jahud), pregnant women and their husbands should not capture/eat pangolin. If not, the mother will have complications during pregnancy. (OA-Temuan, Temiar)

DISCUSSION

The trade volume of pangolins is appalling. From the study, it appears that the pangolin trade is widespread in Peninsular Malaysia and pangolin capture is price driven based on market demand. This study implies that most of the pangolins are captured for the international trade to cater to the mainland Chinese market (Zhang *et al*.; Wu & Ma, 2007). Based on this study, local people admitted that pangolin population has noticeably decline due to the intensive capture rate and huge demand from the middleman and consuming countries. The capture practices appealed to be unsustainable for the long term survival of the species.

From the study, it is obvious that the pangolin trade is complex and enforcement is lacking at all levels due to insufficient information, lack of co-operation among relevant agencies and the existence of an extremely organized pangolin trade which may resort to bribery. Thus, curtailing the demand by revising the current legislation and imposing higher penalties for pangolin traders (e.g., based on the number of animals), while strengthening the enforcement effort is the only visible solution at the current stage to terminate the trade in pangolins. The relevant agencies should be made aware of the seriousness of the illegal trade of pangolins and act upon the issues immediately.

The pangolin demand in TCM is enormous (Wu & Ma, 2007). This study revealed that the pangolin population is declining due to the high capture rate and huge demand. If the pangolin market price and demand remain high, the survival rate of the study species is extremely low whenever they come into contact with human. Although a zero quota is implemented, the pangolin trade is still ongoing in alarming rate. The pros and cons of a wildlife trade ban is controversial (Hogan, 2000; Rivalan *et al*, 2007) and can be judgmental. Thus, any strategy to control the pangolin trade has to deal effectively with the enormous demand for this animal. Suppressing supply and demand within the trade will be extremely challenging and the development of an alternative substitute is crucial to suppress this enormous demand.

Habitat protection for pangolin conservation should not be overlooked. Pangolins can be found in the forests, plantations or villages as long as their food source (ants and termites) is available. Pangolins appear to be more common in plantations compared to forested areas. However, their foraging sites and habitats still cannot be clearly distinguished as information concerning the habitat use of this animal is lacking and it is difficult to track pangolins in the forest. The high capture rate of pangolins in plantations can be due to the more open vegetation in the plantations and easy accessibility to pangolin collectors compared to forest habitats. The integration of plantation management practices, protected areas and forest reserves into pangolin conservation is needed.

CONCLUSION AND RECOMMENDATIONS

The pangolin trade is rampant and alarming in Southeast Asia, especially in Malaysia and Indonesia which are the major source countries of pangolins in the illegal trade to meet the Chinese market. A pragmatic approach is needed to combat the growing illegal trade, considering the huge number of pangolins being seized in the ASEAN region as well as in China. An integration of biological knowledge, trade information and awareness programmes is important for pangolin conservation. The cooperation among the government agencies, NGOs, research institutions and local community groups are important to control the current rampant illegal trade. Without the strong commitment and will of all relevant parties, pangolin conservation efforts may be hampered and the future of the pangolin is in question.

- Basic information such as the population status and behavioral studies of *M. javanica* is severely lacking. Therefore, a comprehensive and in-depth field study of the population status, biology, ethoecology etc. of the species is urgently required. There is an immediate need for the evidence-based conservation (Sutherland, 2000) and population monitoring programme in order to raise the conservation profile of this species.
- The illegal trade in pangolins is extremely organized. An advanced intelligence network and reliable accurate information (e.g., mode of smuggling, tactic, transit point, storage house, profile of the traders) is needed in order to track and breach the illegal trade and routes of the pangolin trade. The co-operation and involvement of Interpol police in combating the illegal trade is essential and needs to be strengthened.
- Increased penalties for pangolin traders and strengthening the enforcement effort at all levels. International and local collaboration and information sharing among the enforcement agencies and countries (eg. cross-boarder operation in Thailand-

Malaysia, Vietnam-China etc.) are important to combat the illegal trade of pangolins.

- Capacity building and awareness raising of the enforcement agencies (e.g. customs, Anti Smuggling Unit (UPP), police, port authority, PERHILITAN etc.) on the illegal wildlife trade are the most fundamental needs to control and halt the illegal trade.
- The development of an alternative substitute in consuming country is crucial to suppress this enormous demand of pangolins in the TCM. Collaboration with medical research institute and TCM School need to be foster to raise awareness of the impact of pangolins population and encourage the use of alternative substitute.
- Follow-up trade survey work and revisiting the pangolin collectors in the habitats where pangolins still occur to obtain in-depth information about the impact of pangolins capture in Peninsular Malaysia. The survey should be extended to Sabah and Sarawak to get an overview of pangolin trade in Malaysia.
- The involvement of locals (especially low income group) and nature guide association in an informant network through a reward system or an incentive-driven approach (Hutton & Leader-Williams, 2003) may decelerate the pangolin trade. A bottom-up conservation strategies need to be develops to strengthen enforcement work at the ground level.
- Integration of plantation management practices, protected areas and forest reserves into a pangolin conservation plan. Given the fact that Malaysia has a large agricultural industry, the pangolin represents a potential bio-control agent for termites and ants (Wu *et al*., 2002), which should be explored further to raise the profile of this animal and therefore receive attention for conservation measures and to raise awareness among the public.

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Appendix I

Datasheet ID:

Field Datasheet

Date:	Latitude:	Longitude:
	Location:	Recorder:

A. Information of Respondent

Race/Tribe _____ Age: _____

Address: _____

Phone: Fax: E-Mail:

Principal occupation: ☐ Hunter ☐ Farmer /estate holder ☐ Plantation Worker ☐ Other Specify: _____

Main source of income: _____

Do you collect pangolin? ☐ Yes ☐ No If no, are you aware of any pangolin being traded/hunted? ☐ Yes ☐ No

Purpose of colleting pangolin ☐ Self subsistence ☐ Traditional Medicine ☐ Trade ☐ Other _____

Role in the trade: ☐ Collector ☐ Middle man ☐ Exporter ☐ Other Specify: _____

How long has the trader been active in the trade? ☐ <1y ☐ 1y-5y ☐ 5-10y ☐ >10y

Time involved in hunting/trading activity: ☐ <10% ☐ 10-25% ☐ 25-50% ☐ 50-75% ☐ >75%

Percentage of income from the trade: ☐ <10% ☐ 10-25% ☐ 25-50% ☐ 50-75% ☐ >75%

Other species hunted/traded? (please specify): _____

Notes: _____

B. Information on Pangolin Capture

Information on pangolin capture

How often you/they collect pangolin? ☐ Regular ☐ Opportunistic

If regular, what is the capture effort (time spent to catch one specimen): _____

Average pangolins captured in one go: _____

Location(s) where taken from wild : _____

Habitat where captured: ☐ Forest ☐ Palm oil ☐ Rubber estate ☐ Other Specify _____

Capture technique: ☐1. Trapping ☐ 2. Hunting with dog ☐3.Tracking ☐ 4.Torching ☐ 5. Other

Capture time: ☐ Day Capture Technique: _____

☐ Night Capture Technique: _____

Season for capture: Yes / No Season: _____

Young captured: Yes / No Season: _____ Stop capture during breeding season: Yes / No Season: _____

Average size of pangolin being captured: _____ Max size: _____

Destination (location sold):

Datasheet ID:

Price sold: _____

Price fluctuation within the last five years: ☐ Increase ☐ Decrease ☐ Stable ☐ Varied ☐ Don't know

Reason for price fluctuation? _____ ☐ Don't know

Trend in specimen collected/traded within the year: ☐ Increase ☐ Decrease ☐ Stable ☐ Don't know

Trend in specimen collected/traded within the last five years: ☐ Increase ☐ Decrease ☐ Stable ☐ Don't know

How many pangolin collectors does this person know? _____

Traditional Ecological Knowledge

Where is the pangolin usually found? _____

How frequent does it give birth? ☐ Monthly ☐ Yearly ☐ Don't know

How many young per time? ☐ One ☐ Two ☐ Don't know

What is their diet? _____

What is the traditional use of pangolin? _____

Others interesting observation/believed: _____

Conservation Status and Legislation

Does the respondent/collector know the trade in pangolins is illegal: Yes / No

Does the respondent/collector know of any cases of people being arrested for hunting/trading Pangolin? Yes / No Specify: _____

What does the respondent/ collector think the way to protect the pangolin or increase pangolin population?

☐ Legalised/controlled pangolin trade
☐ Habitat protection
☐ Captive breeding
☐ Better enforcement
☐ Others

Do you think the pangolin will extinct? ☐ Yes ☐ No Why? _____

Notes

Tapping into Local Knowledge to Help Conserve Pangolins in Viet Nam

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ABSTRACT: Chinese pangolin *Manis Pentadactyla* and Sunda Pangolin *Manis javanica* are both distributed in Viet Nam. Both species are currently very common in the illegal wildlife trade in Southeast Asia. While field biologists rarely sight pangolins during biodiversity surveys, and published field data is rare, both species appear to be commercially hunted in large quantities in Viet Nam. We investigated the methods used by hunters in Viet Nam to locate and capture pangolins, in order to develop field detection methods for conservation monitoring. We also aimed to improve our understanding of the dynamics of the illegal trade in pangolins operating throughout the country. Interview surveys were carried out with professional hunters in three protected areas in Viet Nam: Cuc Phuong National Park in the North, the contiguous forest of Ke Go Nature Reserve and Khe Net Proposed Nature Reserve, and Song Thanh Nature Reserve in Central Viet Nam. These protected areas are within the recorded range of one or both pangolin species. Hunters reported four main methods to detect and catch pangolins: 1) pangolin sign (e.g. claw marks, burrow entrances, tail tracks); 2) traps aimed specifically at pangolins; 3) trained hunting dogs, and 4) non-specific cable snares or snap traps. Hunters rarely use guns for hunting pangolins. Hunters reported different methods for catching *M. javanica* and *M. pentadactyla* because of the different behavioural ecology of the two species. It was suggested that the more terrestrial nature of *M. Pentadactyla* means that this species be easily caught using any of the four methods discussed. In contrast, the more aboreal *M. javanica* is more difficult to catch. Hunters living in areas where both species occur suggest that this makes *M. pentadactyla* easier to catch, and they believe that has resulted in more rapid local declines of this species. In the early 1990s the Vietnamese economy underwent significant change, as the government shifted to market-based economic policies. This change also impacted upon the dynamics of the trade in wildlife. Prior to 1990, hunters reported that pangolins were hunted for local consumption of meat, and scales for traditional medicines. With the development of trading networks since 1990, both species of pangolin are currently hunted solely for sale into the wildlife trade, both for domestic consumption and to supply international demand. Viet Nam has since become an important transit country for pangolins traded within and across the region. This study confirmed that hunting of both species of pangolins still occurs in Viet Nam. Hunting to supply the illegal wildlife trade continues to be a major threat to the conservation of Vietnamese pangolins. The Carnivore and Pangolin Conservation Program (CPCP) is working with Viet Nam's forest rangers to help reduce the threats to pangolins associated with hunting. More field research is required to determine population levels of both species, particularly *M. pentadactyla*, in Viet Nam. It is hoped that the information gathered from hunters in this study can be used to develop more successful field techniques to locate pangolins in the wild. The CPCP is already undertaking pangolin field research in Southern Viet Nam, and will expand this program to improve understanding of the behaviour and ecology of *M. javanica* and *M. pentadactyla* in other protected areas in Central and Northern Viet Nam.

For full article, please refer to Newton, P., T. Nguyen Van, S. Roberton, and D. Bell (2008) Pangolins in peril: using local hunters' knowledge to conserve elusive species in Vietnam. *Endangered Species Research* 6:41-53

The Pangolin Trade in Viet Nam

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ABSTRACT: Two species of pangolin *Manis penctadactyla* and *M. javanica* are found in Viet Nam. These species are highly valued for their meat and scales, and are available through restaurants and traditional medicine practitioners in and around the country's two main urban centres, Ha Noi and Ho Chi Minh City. Consumption of pangolins occurs despite their listing as endangered species under the Viet Nam Red Book, and the prohibition of the trade in pangolins under national legislation. This report constitutes the result of a trade survey undertaken in April 2008. The survey reviewed the current state of trade in northern and southern Viet Nam around routes where pangolins are known to be traded. Results indicate that the populations of pangolins in Viet Nam are severely depleted and that traders are turning to sources in and/or through Lao P.D.R. and Cambodia to sustain the trade. The decline in pangolin populations has led to a substantial rise in the value of meat and scales, subsequently restricting the availability of these products to wealthy consumers and contributing to a continued overland trade into China. While there have been ongoing successful enforcement efforts by Vietnamese authorities, a lack of investment in enforcement capacity and restricted legal powers are preventing the government from clamping down on the trade.

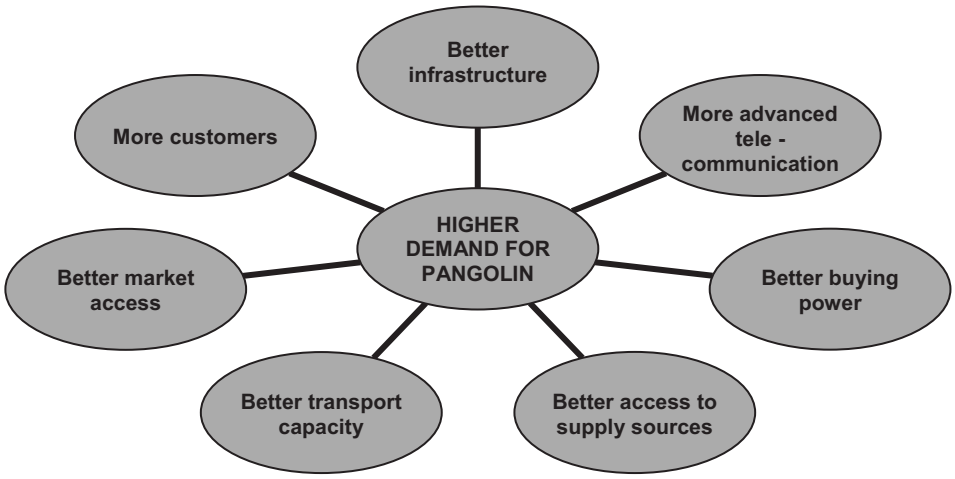
Keywords: Pangolin trade, Viet Nam

INTRODUCTION

The Pangolin Trade Survey in Viet Nam, which is presented here, focuses on the market for pangolins and figures as part of the 'Pangolin Conservation Project'. This survey consisted of a literature review and an undercover survey in North and Southern Viet Nam between the 10 and 25 April 2008. Findings are complemented by interviews with experts that were familiar with the wildlife trade. In particular, the team identified hot-spots of the trade and the trade network associated with them. Furthermore, this survey extensively identifies the common forms of use.

Both species of pangolin that are native to Viet Nam, the Chinese Pangolin *Manis pentadactyla* and the Malayan Pangolin *M. javanica* are endangered. Poaching and widespread consumption both for food and medicine has led to the depletion of Viet Nam's population. Any conservation awareness is dwarfed by the deeply-rooted Vietnamese custom of using wildlife. The underlying variables that drive the pangolin trade are shown in the spider diagram (Figure 1) below:

Figure 1: Variables that Drive the Pagolin Trade in Viet Nam.



Although various legal instruments are in place, enforcement is still insufficient for countering the significant threat to the pangolin population. Capacity is limited and their resources are easily matched by criminals. Furthermore, enforcement agencies tend to fine offenders leniently instead of initiating a prosecution, while detention of suspects by the Forest Protection Department cannot exceed 24 hours. Indeed, fines are based on economic value rather than the conservation value of the animals. Confiscations are estimated to present only ten percent of the entire trade (see Figure 2 for some examples of recent seizures). A reason for this is that pangolins are infrequently kept on the premises and are additionally stored in private houses, which cannot be searched unless permitted by local authorities.

Figure 2: Examples of Recent Seizures

February – March '08: 24 tones of frozen pangolin meat and nearly one tonne of scales from Indonesia transit Hai Phong port

March '08: Ha Tinh police and Forest Protection Sub-department confiscated 165 live pangolins (669 kg)

March '07: Hải Phòng Police seized 75 kg of pangolins on the way to Móng Cái City for export to China.

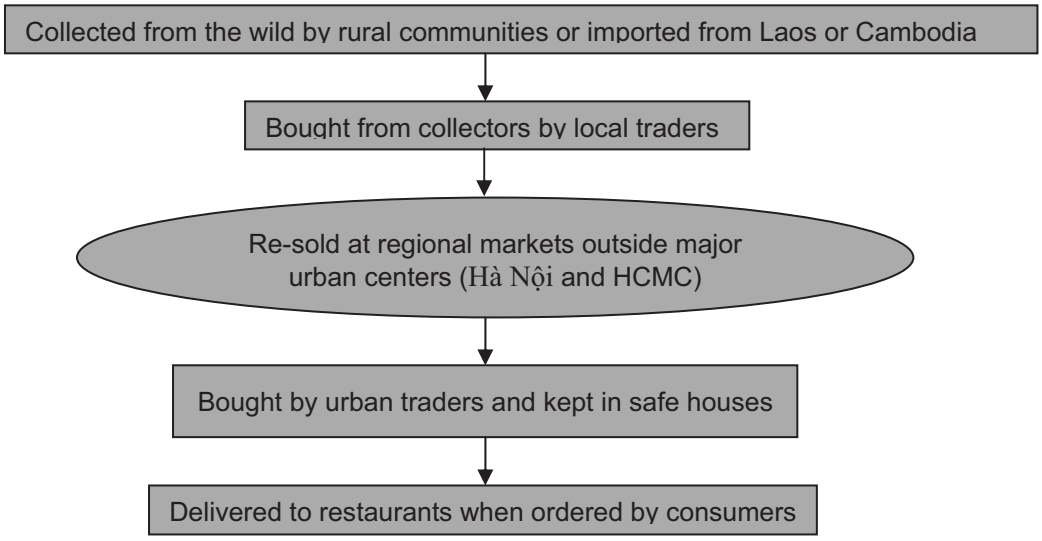
February '07: Quảng Ninh Forest protection sub-department confiscated 100 long-tailed monkeys and 70 pangolins on the route to Móng Cai City.

March '07: Quảng Trị Customs discovered 41.5 kg of pangolins, grass-snakes, turtles and monitor lizards transported from Lao P.D.R. to Viet Nam.

Through observations and interviews the survey team pinpointed six survey locations in Hà Nội, Hồ Chí Minh City (HCMC) and An Giang Province for consumption and export (see figure 3). Source areas are rural provinces, and increasingly, as anecdotal evidence suggest, Lao P.D.R. and Cambodia. However, the Cambodia-Viet Nam trade in pangolins has received little attention and little is known about source areas and border crossings.

Figure 3: Map of Survey Locations in Hà Nội, Hồ Chí Minh City (HCMC) and An Giang Province for Consumption and Export of Pangolins.

Figure 4: A Common Distribution Pattern of Pangolin Trade in Viet Nam.



Pangolins are sold for consumption and traditional medicine. Tourist souvenirs and stuffed animals figure less, if at all in the former case. Pangolins are usually served from live and whole in high-end specialty restaurants with animals being sold by weight. Due to its high value pangolin meat is mostly bought to impress guests and demonstrate social class. Medicine is commonly used to fight cancers, malaria, rheumatism and circulation problems. Interestingly, pangolin scales fetch vastly different prices around the country the North being more expensive. Table 1 shows the distribution of specimen products in relation to Northern and Southern Viet Nam.

Table 1:..The Distribution of Specimen Products in relation to Northern and Southern Viet Nam.

North	South
Live Meat	Live and Frozen Meat
Popular in Traditional Chinese Medicine	Very Popular in Traditional Chinese Medicine
Pangolin Wine	Stuffed Pangolin
No dermatological products	

Catching pangolins is profitable with a pre-market value of up to USD125 per live kg and USD225 per kg for scales. Table 2 below is a summary of the observations and prices:

Table 2: Summary of Observations and Prices

Location	Results	Meat				Scale			
		Live	*Frozen*	*B. Price* (USD/kg)	*S. Price* (USD/kg)	*Raw*	*Dried*	*B. Price* (USD/kg)	*S. Price* (USD/kg)
Ha Noi (Restaurants)	4/5	✓		75 – 100	156 – 188	✓		44 – 50	
Lan Ong Market (Medicine)	6/10						✓	94 - 126	210 - 250
Ninh Hiep Market (Medicine)	4/5						✓	125 – 156	160 – 225
Hoa Lac and Xuan Mai's (Restaurants)		✓		62 – 94	125		✓		160
Luong Son (Restaurants)	8/10	✓			125 -156				
			✓		63 - 94				
L. Son (Medicine)							✓		94
Restaurants in HCMC		✓			113 – 156				
Traditional Medicine Shops	20/20						✓		156 – 188
Chau Doc – An Giang (Wholesale)		✓			94		✓		156
Chau Doc – An Giang (Medicine)	4/4						✓		156
Chau Doc – An Giang (Restaurants)	No								
Nha Bang (Medicine)	4/10						✓		156
Tinh Bien Market		✓			94		✓		163
Nui Cam (Medicine)	2/20						✓		0.3/scale
Tri Ton Town		✓		125					
Tri Ton (Medicine)	2/2						✓		188

The findings of the survey warrant several recommendations:

- To promote educational campaigns to raise awareness
- To strengthen the enforceability of legal documents on wildlife protection by upgrading the capacity of staff and improving coordination among agencies.

- The general public should have an open communication channel to disclose any illegal activity on wildlife and specifically pangolin trade to the authorities.
- To establish new pangolin rescue centres with adequate facilities, funding and locations. For the time being, existing centers (Sóc Sơn, Pù Mát, Củ Chi etc.) need more support provided.
- To prepare guidance on how to treat seized pangolins – this should be distributed to all relevant agencies.
- To secure additional funds to set up a network that is easily accessed and holds information in regard to the discovery, seizure, temporary keeping and transfer of pangolins.
- To promote co-operation between relevant agencies in Viet Nam, Lao P.D.R., Cambodia and China in an attempt to control the trade with special attention given to various border gates at Lạng Sơn, Móng Cái (Quảng Ninh), Cầu Treo (Nghệ An), Lao Bảo (Quảng Trị), and Tịnh Biên (An Giang) and others.

ENV Wildlife Crime Unit's Efforts to Combat Illegal Wildlife Trade in Viet Nam

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ABSTRACT: The illegal wildlife trade is a nationwide problem in Viet Nam, which flies in the face of the laws. In addition, Viet Nam is considered the back door of the wildlife trade, especially pangolin trade, to China. In 2005, Education for Nature Viet Nam (ENV) established a Wildlife Crime Unit to monitor and track wildlife crimes. At the same time, the National free – toll hotline was established to facilitate the reporting of wildlife crimes to the appropriate functional authorities. The special telephone line (1800-1522) helps people file a report to provincial authorities, particularly relating to observations that might otherwise go unreported. This and other services are intended to increase the effectiveness of the Forest Protection Department and other authorities in fighting wildlife crime. Pangolin trade as revealed from the wildlife crime hotline accounts for a major portion of the illegal wildlife trade in Viet Nam. The Wildlife Crime Unit aims at combating the illegal wildlife trade and commits to work with the relevant authorities to improve the enforcement quality in Viet Nam.

INTRODUCING ENV

Education for Nature-Vietnam (ENV) was established in 2000 as Viet Nam's first non-governmental organization focused on conservation of nature and the environment. Our mission is to foster greater understanding amongst the Vietnamese public about environmental issues of local, national and global significance, ranging from the protection of wildlife and natural ecosystems to climate change. We employ creative and innovative strategies to influence attitudes and behaviour, not only highlighting the need to protect Viet Nam's rich natural heritage and the living world around us, but also encouraging greater public participation in achieving this important and challenging task.

ENV WILDLIFE CRIME UNIT AND WILDLIFE TRADE HOTLINE

There has been an increase in illegal trade of wildlife in Viet Nam. In order to combat the illegal wildlife trade and protect the wildlife, in early 2005, ENV Established the wildlife crime unit to monitor and track wildlife crimes, and assist the authorities in enforcing relevant wildlife protection laws. The WCU operates a national free-toll hotline which allows members of the public to report wildlife crimes, anonymously and free of charge. We then track each case through to the end, often assisting with the placement of confiscated wildlife. These cases are documented on ENV's wildlife crimes database, which contains the circumstances and outcomes of more than 1300 cases recorded since January 2005. Among these 1300 cases, hundreds of cases have resulted in favorable outcomes (animals placed at rescue centres, subject punished, imprisoned, restaurant license pulled, or voluntary compliance with the law).

In addition, the wildlife crime hotline is operating in combination with public awareness and environmental education programs. We advertised the hotline through our Nature Magazines, monthly Voice of Viet Nam Show and other awareness materials.

WILDLIFE TRADE VOLUNTEER MONITORING NETWORK

In 2007, ENV also established a national Wildlife Protection Volunteer Network comprised of volunteers throughout the country with a common interest in helping to protect their country's wildlife, by reporting wildlife violations and assisting with monitoring of wildlife consumer establishments. The volunteers are mainly recruited through ENV Mobile Wildlife Trade Awareness Unit that was established in 2007. The mobile unit travels around the country, particularly to urban centers and protected areas, to raise awareness and promote greater protection for wildlife threatened by hunting and trade. Activities range from carrying out a school-based wildlife trade lesson plan to puppet shows, public performances, lectures at universities, training, and meetings with provincial authorities. The volunteer recruitment is integrated within student programs at universities and colleges. The mobile awareness unit will enable ENV to expand its reach to many areas of the country, promoting the opportunity to join the volunteer wildlife trade monitoring network. There are now more than 700 volunteers thoughout the country joining the network.

PANGOLIN TRADE REPORTED TO THE WILDLIFE CRIME HOTLINE SINCE 2005

Since the Hotline commenced, 131 cases out of 1300 related to the trade of pangolins and pangolin confiscations summed up to a total of 33 208.3 kg. These included:

- 58 cases related to trade seizures
- 45 cases involved restaurants offering pangolins on their menu
- 22 cases related to pangolins wine displayed in shops and restaurants
- A few number of cases involved the possession of pangolins

In addition, Viet Nam is considered as the back door to the pangolin trade in China. Most of the pangolins seized were reportedly heading for China. The following examples are some of the cases documented by ENV Wildlife Crime Unit.

- On 26 June 2007: 332 kg of pangolins destined for China were seized in Hai Phong on the way to Mong Cai.
- On 14 and 29 Septembre. 2007: 16.3 and 25 kg originated from Cambodia seized in Ho Chi Minh and Quang Binh respectively.
- On 29 October 2007: 300 kg of pangolin originating from Lao P.D.R. were seized in Nghe An
- On 16 March 2008: another 614.45 kg of pangolins originating from Lao P.D.R. were seized in Ha Tinh.
- On 29 February and 6 March 2008: More than 23 t of pangolins and 920 kg of pangolin scales were seized in Hai Phong. They originated from Indonesia and were heading to China.

ENV, together with Hai Phong Customs investigated the 23 t seizure made in Hai Phong to find out where exactly, in Indonesia, the shipment came from. The Wildlife Conservation Society (WCS) Indonesia Programme helped forwarding the findings to the Indonesian wildlife protection authorities. ENV is now following-up closely with the Hai Phong authorities regarding the settlement of the confiscated pangolins.

CONCLUSION

The pangolin trade accounts for a major portion of the illegal wildlife trade in Viet Nam. ENV Wildlife Crime Unit not only focuses on combating the illegal pangolin trade but also on the illegal trade of other protected species in Viet Nam. We commit to combat the illegal wildlife trade and work with the relevant authorities to improve the quality of the law enforcement in Viet Nam.

Pangolin Research in Cambodia

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ABSTRACT: The Sunda Pangolin *Manis Javanica* is originally widespread in Cambodia. However, high demands for live pangolins and pangolin parts for exotic food and traditional medicine have lead to high levels of illegal hunting and trade in pangolins in Cambodia. It is protected in Cambodia by the MAFF Brakas 359 (released in 2007) as a 'rare' species.

Interview-based surveys were undertaken to assess the types and levels of threats to the pangolins throughout Cambodia. The results from these surveys indicated that populations of pangolins have declined dramatically in several areas over the last decade. As the market price for pangolins is high, they are now only rarely used for food and medicine in rural areas; the majority of hunted individuals are sold to the international trade, mainly to Viet Nam.

When rangers throughout Cambodia confiscate pangolins from hunters and traders they are almost immediately released back into the wild. There is no facility to keep and care for rescued pangolins, and often individuals have snare or dog-bite wounds, or other injuries caused by the handling. Previously, there has been no monitoring of released pangolins to assess the survival rates and behaviour. A radio-tracking project was initiated to monitor released pangolins. So far only a few pilot studies have been carried out, but these studies will be continued for at least another year. This will guide protected area managers throughout the country as to the best way to release confiscated pangolins.

We are collaborating with the National Cancer Institute and US National Institute of Health to collect DNA samples from Cambodian pangolins. This will be used to determine the origin of pangolins in the trade in the region, and thereby improve the law enforcement activities where needed.

INTRODUCTION

The Sunda Pangolin *Manis javanica* is originally widespread in Cambodia. However, high demands for live pangolins and pangolin parts for exotic food and traditional medicine have lead to high levels of illegal hunting and trade in pangolins in Cambodia. The trend is very worrying, as it shows a very high and increasing level of hunting and trade of pangolins across the country. The lack of biological knowledge on the pangolin makes it extremely difficult to assess the impact of this trade on wild populations, and to identify and assess possible measures to protect this elusive and ancient species from extinction.

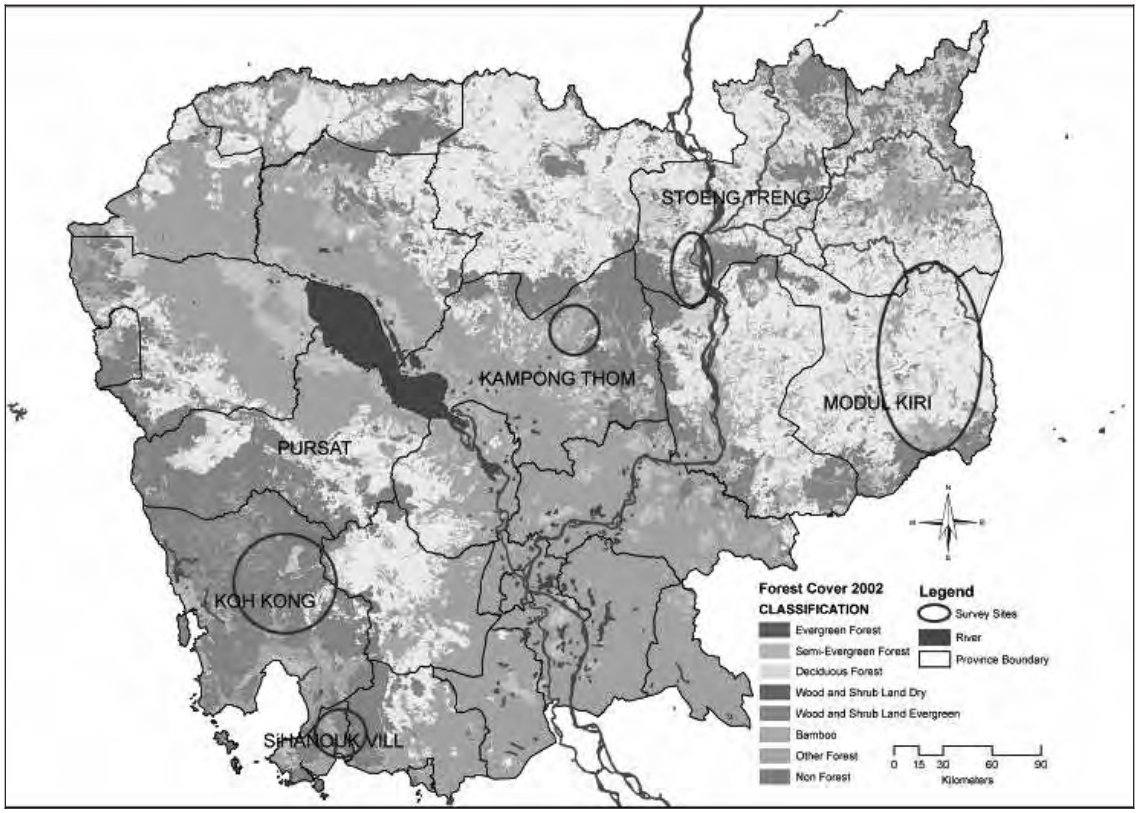
The pangolin is protected in Cambodia under the Forestry Law, where it is listed as a 'rare' species. The article listing species for protection was released in early 2007.

We are undertaking interview-based surveys to assess the types and levels of threats to the pangolins throughout Cambodia. The objectives are to be able to map the relative status of pangolins, to identify strongholds and areas where few pangolins are left. We are also aiming to identify the markets for pangolins and pangolin parts, the trade routes, and the spatial and temporal trends in the pangolin trade in Cambodia.

STUDY AREAS AND METHODS

So far four general areas have been surveyed, these including both evergreen forest, dry deciduous forests and grasslands (figure 1). We used a combination of one-to-one in depth interviews and group discussions. Target groups for interviews were local hunters, traders and shop owners. When surveying in or near a protected area, law enforcement rangers were also interviewed.

Figure 1: Map showing the survey sites in Cambodia.



RESULTS

Interviewees reported pangolins to habitate evergreen, semi-evergreen, and deciduous forest where there are appropriate food and water sources. Pangolin stay close to water sources during the dry season and disperse more widely during the rainy season, when access to water is wide. Pangolins prefer to sleep in a hole up in a tree rather in burrows and hollows on the ground. Pangolins have been found up to 20 m above the ground. Interviewees have reported that pangolins sometimes 'catch' ants and termites by opening up the scales so that the insects cam get underneath, and then closing the scales tightly. When released (in water or on the ground) the pangolin will then eat.

The two main factors that affect pangolins in Cambodia is high level hunting and habitat destruction. The results from these surveys indicate that populations of pangolins have declined dramatically in several areas over the last decade. As the market price for pangolins is high, they are now only rarely used for food and medicine in rural areas; the majority of hunted individuals are sold to the international trade, mainly to Viet Nam.

PANGOLIN TRADE

Pangolins are among the most valuable wild animals on the Cambodian market at the moment. With an increased demand and declining populations, the prices have raised. The fluctuation in the price of pangolins depends on the market demand, especially in China. Generally the market price is divided into three groups according to the weight of the pangolin. An individual weighing 2-4.5 kg will cost approximately USD50-60 per kg, an individual weighing 5-7.5 kg will cost approximately USD20-50 per kg, and an individual weighing above 7.5 kg will cost approximately USD5-20 per kg.

The flow of pangolin trade is complicated as many middlemen normally are involved. Most pangolins are exported to Viet Nam and China. Depending on the area of hunting, the pangolins may be transported from the local village to provincial towns and through Phnom Penh before heading for the border to Viet Nam.

People in different areas hunt pangolins in different ways. The most common method is by using nylon snares. These are set in long lines of up to 100 snares. Individual snares can also be set near a known pangolin resting tree or hole. In some areas, people have developed excellent skills at finding the pangolins in the forest by tracking their signs. Hunting dogs are trained to locate wildlife such as pangolins and tortoises. People catch the most pangolins during the dry season between October and May, when the forest is more accessible and people have the spare time from the rice farming. Table 2 shows the numbers of pangolins confiscated from a wide range of sites throughout Cambodia since 2001, based on available data from government and NGOs*.

Table 2: The numbers of pangolins confiscated from a wide range of sites throughout Cambodia since 2001.

Year	Alive	Dead	Total
2001	41	-	41
2002	38	-	38
2003	114	3	117
2004	67	2	69
2005	147	-	148
2006	40	7	47
2007	66	12	78
2008	20	-	20

*Data kindly provided by Wildlife Alliance Cambodia, Wildlife Alliance Thailand, WWF, WCS, FFI, CI, MJP Project, Forestry Administration, Ministry of Environment.

Law enforcement rangers working at protected sites throughout Cambodia confiscate pangolins from hunters and traders in the area. As the trade system is well set-up, complex, and mostly under-ground the majority of the illegal trade is not known about or mitigated. The table summarizes the confiscations being done by a number of institutions working at protected areas over the last five years. This is believed though to only be the 'top of the iceberg' with far more individuals successfully being exported by traders.

Habitat destruction is another factor that affects pangolin in Cambodia, although not as high a degree as hunting. In some areas, shifting cultivation is widely used, and land encroachment is becoming an increasingly big issue in Cambodia. Cashew and other cash crops are also increasing in popularity, demanding clearing of forest habitats. The

development of infrastructure such as roads is giving better access to previously secluded forest, increasing the hunting pressure and land clearing.

TRADITIONAL MEDICINE

Pangolins are traditionally used as a medicine in Cambodia. The most important part of the pangolin that people use as medicine is blood, which, mixed with wine, is believed to cure many illnesses such as nose blood, fever, brain diseases, and cancer. Furthermore, pangolin scales are used to cure some kinds of diseases such as asthma and some people believe that it can protect children from bad spirits by hanging it on their neck or wrist. Some people use the whole pangolin as medicine by soaking it in wine and then drink the wine as medicine.

MONITORING RELEASED PANGOLINS

When rangers throughout Cambodia confiscate pangolins from hunters and traders they are almost immediately released back into the wild. There is no facility to keep and care for rescued pangolins, and often individuals have snare or dog-bite wounds, or other injuries caused by the handling. Previously, there has been no monitoring of released pangolins to assess the survival rates and behavior. Conservation International (CI) initiated a radio-tracking project to monitor released pangolins. So far only a few pilot studies have been carried out, but these studies will be continued for at least another year. This will guide protected area managers throughout the country as to the best way to release confiscated pangolins.

CI is furthermore collaborating with the National Cancer Institute and US National Institute of Health to collect DNA samples from Cambodian pangolins. This will be used to determine the origin of pangolins in the trade in the region, and thereby improve the law enforcement activities where needed.

FUTURE ACTIVITIES

Interview-based surveys will be continued to gather information from as many sites as possible. Radio-tracking studies will be continued to monitor confiscated and released individuals, and to learn more about pangolins in the wild in Cambodia.

CI will hold a training and awareness building workshop for law enforcement rangers, local government and local communities in Southwest Cambodia about pangolin conservation. Outreach and awareness to the local communities, which are most involved in pangolin hunting for trade, will also be carried out to change attitudes and activities.

The Palawan Pangolin *Manis culionensis*

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ABSTRACT: The Palawan Pangolin *Manis culionensis* is one of four pangolin species that occur in Asia. All Asian pangolins are in high demand for international trade of skin, scales and meat, most especially for China. Hence international trade became as early as 1975 regulated through their listing under Appendix II and later in 2000 through the implementation of a zero quota. Illegal trade is however still rampant. The Palawan endemic species is of especially high conservation concern due to its very restricted range. In view of the general lack of information on the Palawan Pangolin and at the same time increasing demand for it for the international trade, the present study aimed at providing initial information on the biology and ecology of the species, the local legislation, the trade levels and dynamics and potential other threats to the survival of the species. To do so, Katala Foundation Incorporated (KFI). conducted a literature review, and a short-term study on the trade of the Palawan Pangolin *Manis culionensis* in municipalities in Southern Palawan, namely Rizal, Quezon, Bataraza, and Balabac. Undercover interviews were conducted from 20 to 29 February 2008. A total of 13 informants – five of which were hunters, two were middlemen and one was an exporter - were interviewed in a structured manner. The information obtained indicates that the Palawan Pangolin is a rare species in the survey area which is, along with other wildlife species, hunted for subsistence. Hunting for trade is still relatively rare and only one exporter claimed to export the species in small volumes to Malaysia. The middlemen supply pangolins occasionally for the local food and traditional medicine market in Puerto Princesa City and Manila. Increasing habitat destruction in the form of logging and slash and burn farming practices cause another problem for the species. The combination of both, hunting and habitat destruction is believed to pose a serious threat to the species considering its very restricted range. It is recommended that more intensive surveys are conducted which would include the northern parts of the province and would examine local use, trade and abundance of the species in the wild.

Keywords: *Manis culionensis*, pangolin trade

INTRODUCTION

Four species of pangolin are recognized in Asia, including Chinese Pangolin *Manis pentadactyla*, Indian Pangolin *M. crassicaudata*, Sunda Pangolin *M. javanica*, and Palawan Pangolin *M. culionensis* (Lim & Ng, 2007). The Palawan Pangolin was only recently recognized as a valid species (Feiler, 1998; Esselstyn *et al*., 2004; Gaubert & Antunes, 2005). It is endemic to Palawan and Culion Islands in the Province of Palawan, Philippines (Esselstyn *et al*., 2004, Heaney *et al*., 1998). Gaubert and Antunes (2005) were the first to provide diagnostic morphological characters that distinguishes the two species. The external ones are the total number of lateral scale rows, the size of scales in the head region and the ratio of head and body to tail length. In the same publication the authors clarify that other morphological features such as colour and appearance of scales etc. are variable and not significantly different in the two species.

All Asian pangolin species are in high demand for international trade, most especially for China. They are traded for skin (leather goods like boots and shoes), scales (traditional medicine), and meat (food and traditional medicine). Pangolins are the most visible (and most voluminous) mammals in trade (Chris R. Shepherd, TRAFFIC Southeast Asia, pers. comm. to S. Schoppe, 9 November, 2007). All species are listed in Appendix II of the Convention on International Trade in Endangered Species of Wild

Fauna and Flora (CITES) since 1975 (UNEP-WCMC, 2008). Appendix II regulates the trade of species that may otherwise be at risk of extinction. Since 2000, all *Manis* species have a zero quota (CITES, 2007). In the IUCN Red List of Threatened Species of the International Union for the Conservation of Nature and Natural Resources (IUCN) all Asian *Manis* species are considered Low Risk/near threatened (IUCN, 2007). However the surveys that led to this category are long out dated (Pangolin Specialist Group, 1996).

The IUCN does not yet list *M. culionensis* as a separate species but rather treats it under *M. javanica* (IUCN, 2007). Esselstyn *et al*. (2004) assume that *M. culionensis* probably deserves the same IUCN status as *M. javanica*. Gaubert and Antunes (2005) underline the high conservation concern of the species that has a very restricted range. Almost nothing is known on the distribution, biology and ecology of the Palawan Pangolin. The species is hunted for local consumption and for traditional Chinese medicine (Esselstyn *et al*., 2004). As per recent information from poachers in Southern Palawan, the demand and therewith the price for Palawan Pangolin had increased from USD1.5 per kg to USD3.8 per kg, live, in the fourth quarter of 2007 (Misal Radjak *pers. comm*. to R. Cruz, 8 Sept. 2007). It is assumed that the increase in price is related to the high demand in China that eventually has led to decreasing populations in Malaysia and Indonesia. Generally, wildlife hunting ranks number one among the ten major threats to Palawan´s biodiversity (Lasmarias, 2004).

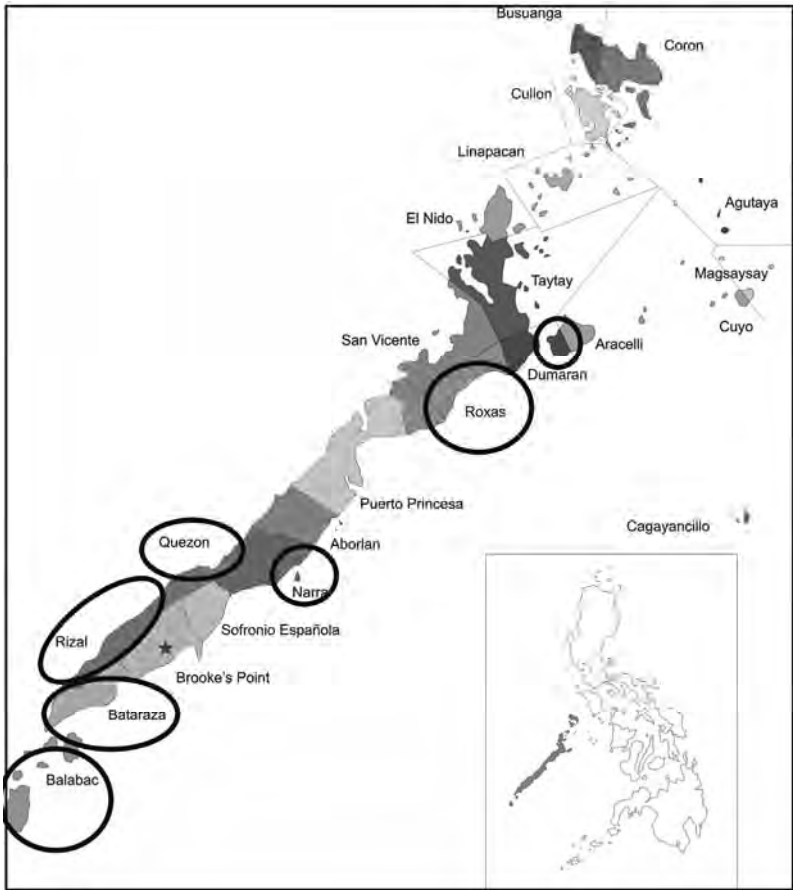
In view of the general lack of information on the Palawan Pangolin and at the same time increasing demand for it for the international trade, the present study aimed at providing initial information on the biology and ecology of species, the local legislation covering the species, the trade levels and dynamics and potential other threats to the survival of the species in Palawan.

METHODOLOGY

Information on the biology and ecology of the species was mainly gathered through a literature review. Additional information was gathered through interviews with subsistence hunters in Palawan. The local wildlife legislation was consulted and relevant parts covering the Palawan Pangolin are presented including penalties.

A survey to gather information on the reasons for hunting, and the extent and dynamics of hunting and trade was conducted in Southern Palawan. Undercover interviews were conducted in the municipalities of Quezon, Rizal, Bataraza and Balabac (Figure 1) for 10 days (20-29 February, 2008) including travel time. Interviews included questions outlined in a questionnaire developed by TRAFFIC Southeast Asia. Interviews were conducted in Filipino, the national language. Additional information on the local use of the Palawan Pangolin was gathered from pangolin hunters in Roxas, Dumaran Island and Narra in February/March 2008. Prices of traded specimens are provided in USD using a conversion rate of PHP40.64 in 2008, PHP46.62 in 2007 and PHP51.57 in 2006 (http://www.xe.com/ucc/, http://www.oanda.com/convert/fxhistory). Conversion of the Malayan Ringgit to USD in 2006, 2007 and 2008 was set at MYR3.67, 3.45 and 3.24, respectively, and at IDR9183.77, 9138.50, and 9258.93 per USD1.00 in 2006, 2007, and 2008, respectively.

Figure 1: Map of the Province of Palawan and its general location within the Philippines (inset). Localities where surveys were conducted (Quezon, Rizal, Bataraza, & Balabac) or information gathered (Narra, Roxas & Dumaran) are encircled.



RESULTS AND DISCUSSION

Distribution, Biology and Ecology

Interviewees from Southern Palawan stated that pangolins – locally called *balintong* – can be found in primary and secondary lowland forest but also near human habitations as long as logs and trees to hide are present. The use of altered habitats was also noted by Esselstyn *et al.* (2004) who have records of the species from lowland grassland/forest mosaics in Aborlan and from logged-over lowland forests in Taytay. Primary and secondary lowland forests are considered as the natural habitat of the species; and these have also been identified as such in earlier publications (Allen, 1910; Taylor, 1934; Hoogstraal, 1951; Sanborn, 1952). The vicinity to humans of this otherwise very secluded and shy species might be interpreted as a result of increasing habitat reduction that forces individual to occupy less preferred habitats. Interviewees indicated a certain affinity of the Palawan Pangolin to fig trees (*Ficus* spp.) since these trees usually provide hiding space while at the same time the fruits attract ants, the main food of the pangolin.

Results of this study indicate that the species is rather rare in Southern Palawan and probably more common in the northern part of the island. Early researches already assumed that the species is probably not equally distributed over its range but localized in distribution (Allen, 1910; Taylor, 1934; Hoogstraal, 1951; Sanborn, 1952). This

seems to be supported by data gathered during an ethnobiological survey in the Calamianes group of Islands in 2006 (Edmund Rico pers. comm. to SS. on 1 May 2008). In the island group the species was reported from 25 locations, and respondents claimed that it used to be very common and that hunting for trade and subsistence seem to be the main reasons for its decline. Also local informants from central and northern parts of Palawan described the species as fairly common (Esselstyn *et al.,* 2004). Unfortunately there are no quantitative data on the abundance of the species from anywhere in Palawan and Culion available. The status of its populations is poorly known (Esselstyn *et al*., 2004; Heaney *et al*., 1998).

All interviewees agreed that the animals are mainly active during the night. This is in line with finding on the Sunda Pangolin that shows peak activity between 03:00 and 06:00 hrs (Lim & Ng, 2007). Farmers in the northern part of Palawan mentioned that the best season to hunt pangolin is summer (March to May) during *kaingin* (slash and burn farming practice). The farmers said that this is the time when the animals are more commonly seen and easily hunted. If this proves to be true it could be caused by either burned hides or an increasing number of termites attracted by the partially burned vegetation. Since pangolins are specialists that live on a diet of mainly ants and termites (Yang *et al*., 1999) they might be attracted by the termites on the burned fields.

The farmers added that female pangolins with young are usually seen in August. In a study in Singapore, Lim and Ng (2007) found a female with newborn in September. Gestation and maternal care of the Sunda Pangolin were estimated by Payne and Francis (1998) to be two to three and three months, respectively. Lim and Ng (2007) found one female to care for three to four months for its young. Nothing is known on gestation and maternal care of the Palawan Pangolin.

Few data exist on the morphology of the species. The two male specimens of the Palawan Pangolin that were encountered during this study measured 450 mm and 320 mm in head-body and 390 cm and 280 cm in tail length, respectively. They weighed 2700 g and 1250 g, respectively. The larger one was considered adult, the smaller juvenile (figure 2). Earlier studies recorded for two adult and two subadult individuals a head-body length of 325-540 mm and a tail length of 290-500 mm (P. Gaubert in litt. to S. Schoppe, 21 July 2008). The Sunda Pangolin weighs between five and seven kilogrammes, measures 400-550 mm in head-body and 400 mm in tail length (Lim & Ng, 2007).

Figure 2: Juvenile male Palawan Pangolin that was turned over to KFI facility in Narra.

Nothing has been published on external sexual dimorphism in the Palawan Pangolin. In the Sunda Pangolin males are larger than females (Breen, 2003).

Legislation

Philippine / Palawan Wildlife Legislation

Asian pangolins were first listed under Appendix II of CITES in 1975. The Philippines is Party to CITES since 1981, and the Department of Environment and Natural Resources (DENR) is the Management Authority (M.A.) for terrestrial animals and therewith in charge of implementing CITES regulations for the pangolin in the Philippines. In 1994, the Philippines stopped the export stop of all wild caught fauna including the Palawan Pangolin. But only on 20 June 1996 a notification was send to the Parties. Since 2000, all CITES member parties are implementing a zero quota for pangolins.

The Philippine Wildlife Act 9147 otherwise known as the "Wildlife Resources Conservation and Protection Act" is the latest national legislation covering all wildlife. The act provides for the conservation and protection of wildlife resources and their habitats (Republic of the Philippines, 2001). Jurisdiction over all terrestrial animal species including the pangolin has the Department of Environment and Natural Resources (DENR) in all Provinces except Palawan. In the Province of Palawan, jurisdiction is vested to the Palawan Council of Sustainable Development (PCSD) pursuant to Republic Act No. 7611. The staff of PCSD (PCSDS) is the main enforcement agency in Palawan, but the provincial (PENRO) and community (CENRO) offices of DENR, as well as the City and Municipal Natural Environment Resources Officers (City ENRO and MENRO), the Philippine National Police, Kilusan Sagip Kalikasan (KSK – a provincial wildlife task force), municipal and city mayors and village chairmen, deputized wildlife enforcement officers, Civilian auxiliary force geographical unit (CAFGU), and eventual special enforcement bodies at the lower local level have the power to enforce the wildlife act.

The Wildlife Act does not always follow the threatened categories of IUCN, and the threatened categories applied in Palawan and in the rest of the Philippines vary too. The Palawan Pangolin is classified Low risk/near threatened by IUCN (2007) but it is categorized *Vulnerable* by DENR (DENR AO 2004-15) and *Endangered* by PCSDS (PCSD Res. 06-309-A 2006). Offence and penalties under the Wildlife Act vary with threatened status of the species. Trade in the Palawan Pangolin is penalized with one to two years imprisonment and/or a fine of USD487-4876 in Palawan and with six to 12 months imprisonment and/or a fine of USD24-2438 in the rest of the Philippines (table 1).

Collection of wildlife by indigenous people like the *Palaw'an* and other tribes may be allowed for traditional uses and not primarily for trade provided that collection and utilization for said purpose shall not cover threatened species (Republic of the Philippines, 2001). Consequently the collection of the threatened Palawan Pangolin is not even allowed for subsistence by tribal members.

Table 1: Offences and penalties under the Wildlife Act if dealing with the Palawan Pangolin or other species that are classified Vulnerable or Endangered in the Act.

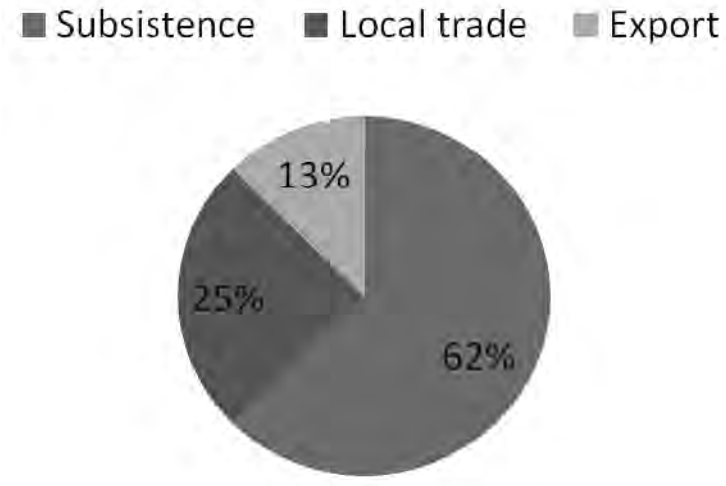
Offence under Republic Act 9147	Vulnerable (VU)	Endangered (EN)
Killing and destroying wildlife species	2-4 years imprisonment and/or USD731-7315 fine	4-6 years imprisonment and/or USD1219-12 192 fine
Inflicting injury which cripples and / or impairs the reproductive system of wildlife species	1-2 years imprisonment and/or USD487-4876 fine	2-4 years imprisonment and/or USD731-7315 fine
Trading of Wildlife	6-12 months imprisonment and/or USD24-2438 fine	1-2 years imprisonment and/or USD487-4876 fine
Collecting, hunting, possessing wildlife, their by-products and derivatives. Gathering or destroying of active nests, nest trees, host plants and the like.	6-12 months imprisonment and/or USD24-2438 fine	1-2 years imprisonment and/or USD487-4876 fine
Maltreating and / or inflicting injuries not covered by the preceding paragraph.	1-3 months imprisonment and/or USD121-487 fine	3-6 months imprisonment and/or USD487-1219 fine
Transporting of wildlife	1-3 months imprisonment and/or USD121-487 fine	3-6 months imprisonment and/or USD487-1219 fine

Conversion rate of PHP41.01 for USD1 as of July 31, 2008 was used to calculate fine.

Pangolin Hunting

In the study area in Southern Palawan, 13 people were encountered who could provide information on the collection of the Palawan Pangolin. Of these five were hunters, two were middlemen, one was exporter, and the remainder (five) were not directly involved in hunting or trading but were aware of it. Among the eight informants that were actively involved in hunting and/or trade 62.5% indicated that they hunt for subsistence consumption. Twenty-five percent (25%) were involved for reasons of local trade, and 12.5% were involved with international trade (figure 3). The hunters were all members of the *Palaw'an* tribe, who are indigenous people of Palawan.

Figure 3: Purpose of pangolin hunting in Southern Palawan (n=8).



Subsistence Hunting

All five subsistence hunters agreed that the Palawan Pangolin is rather rare in Southern Palawan. Usually they do not catch more than one individual per month. The maximum number some of them can sometimes catch is one to three per week. Based on interviews with 50 hunters the Palawan Pangolin ranked number 37 among 56 wildlife species that were hunted in 2005 in Southern Palawan (van den Beukel *et al*., 2006). The same survey indicated that on average one hunter caught 0.26 individual per year in 2005. Esselstyn *et al.* (2004) describe the hunting pressure as moderate and stated that the species is hunted for its skin, which is used to treat asthma. The report does however not clarify whether animals are traded or whether the hunters themselves use individuals for medicinal uses. On 24 of February, KFI staff witnessed the slaughtering of a pangolin and the processing of the meat (figure 4). Esselstyn *et al.* (2004) who studied the mammalian fauna of Palawan noted that many medium to large sized mammals are under significant hunting pressure for their meat, the live animal trade, and medicinal use. They further noted that the recent and on-going shift from subsistence to market economies among members of the *Tagbanua* and other ethnic groups may contribute to the decline of some species (Lacerna & Widmann, 1999), such as *Sus barbatus, Pteropus vampyrus,* and *Hystrix pumila* for meat, *Macaca fascicularis* and *Arctictis binturong* as pets, and *Manis culionensis* for traditional Chinese medicine.

Figure 4: Palawan Pangolin slaughtered for subsistence consumption in Roxas, Palawan.

Local trade

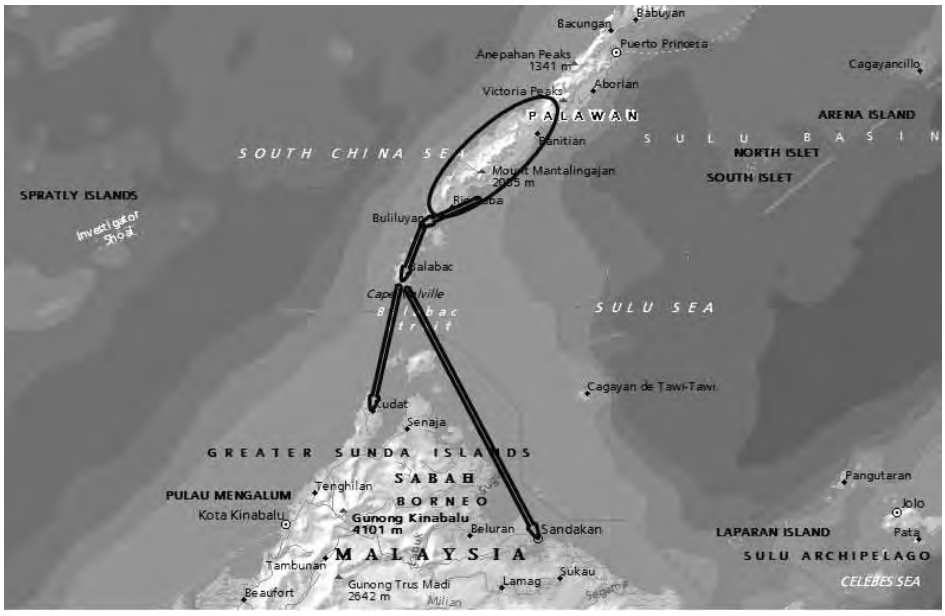
The species is traded for food and traditional medicine within Palawan and from Palawan to Manila according to the informants. None of the two traders that were identified trade the species on a regular and/or professional basis. One was a live fish trader who transports marine fishes from Southern Palawan to Puerto Princesa City. Every now and then this business proprietor buys pangolin from hunters and brings them to Puerto to please her Taiwanese bosses who drink the blood in wine and cook the meat believing in the medicinal value of the species. The fish dealer indicated that it is easier to get pangolin in the northern part of Palawan than in the south, and that there are renowned buying stations in Roxas and Taytay. The other trader is a professional pet bird trader who regularly ships pet birds with hired boats from Northern Palawan to Luzon. Occasionally he sends some pangolins with those shipments but he mentioned that there is no real market for it in Manila.

Interviews with some farmers and hunters in Roxas and Dumaran revealed that especially the villages Dumarao, Sandoval, Mendoza and Magara in Roxas and Capayaz in Dumaran were involved in pangolin trade in the 1980s. They used to supply Puerto Princesa City with pangolin meat and scales. Ex-poachers on Dumaran Island stated that pangolins are still abundant on the island and that they were hunted by the locals for food consumption until few years ago. With the implementation of KFI's Philippine Cockatoo Conservation Project in 2003 hunting stopped, they claimed. It is however believed that hunting for local consumption still sporadically happens.

International trade

The only person that was encountered to export the Palawan Pangolin was a businessman who monthly exports dried fish to Kudat and Sandakan in Sabah, Malaysia. He has been trading pangolins for several years but trades them only on an irregular basis. He gets his pangolin supplies from hunters within the municipalities of Bataraza, Rizal and Quezon. Pangolins are transported with motorcycles from source areas to the traders house in Bataraza town. He does not want to keep pangolins for long in his place because they are difficult to maintain due to their feeding preferences. He has to keep them though until he has a minimum of 10 pangolins since lower volumes are economically not feasible. If animals die while keeping them at the exporter´s house, he trades the dry skins. He stores up to five pangolins together in metal cages that are covered with tarpaulin during the shipment. Means of transportation are the private fishing boat of the exporter from Sitio Sapa on the west coast of Bataraza where additional pangolins are loaded. From there he ships them with the same boat to Balabac. Upon arrival in Balabac, the pangolins are transferred to a larger passenger boat called *Lancha* that heads to Sandakan or Kudat in Sabah, Malaysia (figure 5). According the exporter his buyer in Sabah is a middleman who supplies a Chinese pangolin trader who exports the animals to China for TCM. The middleman is known to transport wildlife from the Philippines and to ship it to Johor or directly to China (C. Shepherd *in litt*. to S. Schoppe, 4 March 2008).

Figure 5: Pangolin trade route to Malaysia. Oval shows the source areas and the arrows indicate the trade route from Rio Tuba at the east coast to Sitio Sapa at the west coast, to Balabac and from there to Kudat or Sandakan in Malaysia. (Source basemap: Rand McNally & Co.)



Prices

According to the Palawan exporter and confirmed by the other informants the amount paid to collectors was USD4.3 per kg in 2008 at the time of the study (table 2). This is a considerable increase compared to the two previous years. In 2007, hunters were paid USD3.8 per kg (Misla Radjak *pers. comm*. to R. Cruz, 8 Sept. 2007) and in 2006 they were only paid about USD1.5 per kg (Cruz *et al*., in press). On their way to Malaysia prices increase more than five times. According to the Palawan exporter he receives USD24.6 per kg live pangolin and USD7.3-12.3 per dried skin from his Malayan business partner in Sabah.

In Indonesia and Malaysia where the pangolin trade is more extensive than in Palawan the price development is different. In 2006, when the illegal pangolin trade still flourished in Indonesia and Malaysia, poachers were paid about 20 times the amount a Palawan poacher could earn at the same time (table 2). In 2007, the prices paid to poachers had yet increased to USD23.2-43.5 per kg in Malaysia (Chin Sing Yun *pers. comm*. to SS on 1 July 2008) and to USD35.0 per kg in Indonesia (Erwin Sopyan *in litt*. to SS on 30 Sept. 2008). This is even higher than the Palawan exporter got paid (USD24.6 per kg). In 2008, prices paid to hunters in Malaysia had slightly increased, while prices had decreased considerably in Indonesia (table 2). According to E. Sopyan (*pers. comm*. to SS on 1 July 2008) the drop in price was related to increasing risk of shipments getting seized.

Table 2: Amounts (USD) paid per kilogram pangolin to hunters in Palawan, Malaysia and Indonesia between 2006 and 2008.

Year	Palawan	Malaysia	Indonesia
2006	USD1.5/kg (Cruz *et al*., *in press*)	USD27.1-32.5/kg (SS *pers. obs*., 2006)	USD27.1-32.5/kg (SS *pers. obs*., 2006) USD32.8/kg (Erwin Sopyan *in. litt*. to SS on 30 Sept. 2008)
2007	USD3.8/kg	USD23.2-43.5/kg (Chin Sing Yun *pers. comm*. to SS on 1 July 2008)	USD35.0/kg (Erwin Sopyan *in. litt*. to SS on 30 Sept. 2008)
2008	USD4.3/kg	USD26.2-49.4/kg (Chin Sing Yun *pers. comm*. to SS on 1 July 2008)	USD20.5-27.0/kg (Erwin Sopyan *in. litt*. to SS on 30 Sept. 2008)

The price of scales remained relatively stable over the years, since these are easy to conceal and rarely seized (E. Sopyan *pers. comm*. to SS on 1 July 2008). Since 2004 until today about USD21.9 per kg are paid to Indonesian poachers and 60.2 per kg to Indonesian exporters

Trade volumes

From 1981 to 1994 before the Philippines banned the export of wildlife and before the zero quota for pangolin was established, the Philippines had exported pangolins to Japan and the USA (CITES WCMC Trade Statistics). During these years a total of seven bodies (six of which were seized), 9650 skins, 33 pair of shoes, 537 live, and three leather items were officially exported. This is little compared to Malaysia and Indonesia that had reported exports of 45 000 and 12 000 skins, respectively for the same time period (CITES WCMC Trade Statistics).

Once trade became illegal data on volumes became much more difficult to obtain. Compiled confiscations records from government organizations in Puerto Princesa City show that 18 individuals were confiscated in Palawan between 2000-2008, of these two were confiscated in 2001, seven in 2003, one in 2004 and eight in 2005 (KFI, 2007). Recent turn-over data at the local rescue centre report four individuals in 2007 and three in 2008 (Joanne Justo, PWRCC, in litt. to SS on 30 June 2008). The low number of confiscation events of this and other wildlife species in Palawan (compare Cruz *et al*., in press) speaks for the weak law enforcement in the province as far as wildlife is concerned. This seems to be also the case in Manila were only one individual was confiscated between 2000 and 2008 (CITES WCMC Trade Statistics). We agree with Lasmarias (2004) that the volume of confiscated wildlife is probably only a small portion of the total number poached.

Other threats

Primary and secondary lowland forests are the natural habitat of the Palawan Pangolin. These are however among the most threatened ecosystems in Palawan. According to Esselstyn *et al*. (2004) lowland primary forest has been eliminated from many parts of Palawan. Large scale logging ranks third among the 10 major threats to Palawan´s biodiversity (Lasmarias, 2004). Illegal logging and conversion of forests to other uses such as shifting cultivation, permanent agricultural crops and industrial tree plantations were identified as the major causes of forest degradation in Palawan and remain a threat to its forest resources (Orbeta, 2004).

CONCLUSIONS AND RECOMMENDATIONS

Despite the limited period of the survey a number of conclusions can be drawn. First and foremost, the Palawan Pangolin is regularly hunted for subsistence by members of the *Palaw´an* tribe in Southern Palawan as well as by farmers and hunters in central and northern parts of the province. Regardless of the traditional nature of hunting by the *Palaw´an*, the act is illegal since the Palawan Pangolin is a threatened species and thus hunting prohibited under the Wildlife Act. Volumes of pangolins confiscated represent only a small percentage of the volumes illegal hunted. Populations near hunting communities are expected to be at risk if hunting cannot be controlled.

Hunters in Southern Palawan indicated that the species is rare but they could not provide trends. Hunting though is not the only threat. Increasing destruction of its natural habitat – lowland forests - in the form of logging and slash and burn farming practices cause another problem for the species. The combination of both, hunting and habitat destruction is believed to pose a serious threat to the species considering its very restricted range.

Few of the hunters sporadically sell the species for consumption within Palawan or for international trade to Malaysia. So far, it appears that this species is exported only in small volumes – mainly alive – from Southern Palawan to Malaysia. Hunting for trade constitutes an additional threat to the remaining populations of the Palawan Pangolin.

More information on trade is of upmost importance. It is therefore recommended to conduct an intensive follow up study in Southern Palawan which tries to qualify and quantify local use, international trade, and population trends in the area. Furthermore, we strongly suggest that a follow-up survey be conducted in the source areas revealed by the Palawan exporter. To further strengthen the findings of the survey, the buyer in Malaysia and the trade activities between Sabah and Palawan should be monitored.

There is reason to believe that Northern Palawan, particularly the municipalities of Roxas and Taytay, constitute an important source area for the Palawan Pangolin. Whether the species is mainly hunted for subsistence consumption or for trade remains to be found out. It is recommended to conduct surveys and interviews in that area aimed at revealing local use, trade and population trends in the wild.

Law enforcement in Palawan is weak which is evident by the low confiscation rate while the trade and illegal activities are rampant. Some southern municipalities such as Rizal have however recently shown interest in combating wildlife trade through the establishment of a special Wildlife Task Force. Such activities should be supported technically and eventually financially. Check points should be established at minor ports and in offshore areas, and prosecution should follow apprehension. At the same time conservation measures such as the establishment of protected areas, and the conduct of information education campaigns should be implemented.

The knowledge on the biology and ecology of the Palawan Pangolin remains insufficient, especially information on population sizes, structure, density, and the reproduction biology is however very important in determining the effects of hunting and habitat destruction to the survival of the Palawan endemic *M. culionensis*. Priority should therefore be given to such studies.

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The Pangolin Trade in China

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ABSTRACT: China has a long history of consuming pangolin as meat and in traditional medicine. Due to continual demand and the decreasing Chinese wild population, in the past few years pangolin smuggling from Southeast Asia has resulted in great declines in these producing countries' wild populations, as well. From December 2007 to January 2008, market surveys in five South China cities (Kunming, Nanning, Fuzhou, Guangzhou and Haikou) were carried out in order to assess the status of illegal trade in pangolin meat in restaurants and agricultural markets, and in pangolin scales in Traditional Chinese Medicine (TCM) markets. The results showed that 18% of restaurants (n=50) claimed to serve pangolin meat at an average price of CNY1200 (USD175 at 2008 rates) per kg, while two of 25 agricultural markets sold pangolin meat for CNY700-800 (USD100-120) per kg. 81.5% of TCM retail shops (n=200) sold raw or processed scales for an average price of CNY10.82 (USD1.6) per 10 g, while 12.5% of TCM wholesale shops (n=40) sold scales for an average of CNY900 (USD130) per kg. Relevant departments should take effective action against illegal trade in pangolin meat and prohibit the use of scales as an ingredient of TCM, excepting in patent medicine legally labeled by central government authorities.

Keywords: China, pangolin trade

INTRODUCTION

Beginning with the liberation of China's economy in the 1980s, a wide range of animals, including small mammals, birds, reptiles and amphibians, have been consumed at increasing rates throughout South China, where the practice of eating wild meat is much more prevalent than in other areas of China. Many of the species consumed have become depleted in China, and sourcing has shifted to countries in Southeast Asia and even South Asia. Pangolins, for example, are practically commercially extinct in the wild in China, due to over-exploitation. As a result, wild pangolins from all of the ASEAN countries and as far as the Indian subcontinent are being smuggled into China to satisfy consumer demand.

To analyze the current status of South China's pangolin products trade and promote effective enforcement measures to combat the illegal pangolin trade, TRAFFIC conducted a survey of illegal pangolin product sellers in five South China cities from December 2007 to January 2008. In addition, internet pangolin product seizures were also researched to further analyze the current status of illegal pangolin trade in China.

METHODOLOGY

From December 2006 to January 2007, TRAFFIC partnered with the China Wildlife Conservation Association (CWCA) and the China Wildlife Trade Monitoring Network (CWTMN) to conduct a survey of agricultural markets, restaurants and TCM wholesale/retail shops in the following five cities - Kunming, Nanning, Fuzhou, Guangzhou and Haikou - where illegal pangolin trade is concentrated (table 1).

Table 1: Places surveyed by city (December 2006 to January 2007)

City, Province	Agricultural markets	Restaurants	TCM Wholesale shops	TCM retail shops
Kunming, Yunanan Province	5	10	20	40
Nanning, Guangxi Province	5	10	0	40
Fuzhou, Fujian Province	5	10	0	40
Guangzhou, Guangdong Province	5	10	20	40
Haikou, Hainan Province	5	10	0	40
Total	**25**	**50**	**40**	**200**

RESULTS AND DISCUSSIONS

Seizures Review

According to incomplete statistics, there have been a total of 70 pangolin seizures published online since 2005, and 6363 pangolins as well as 8736 kg of pangolins scale were confiscated (table 2). In 2005, 10 seizures were recorded for a total of 629 pangolins and 469 kg of scales; in 2006, the number of seizures and the volume of confiscated products increased sharply to 25 seizures, with a total of 4534 pangolins and 1938 kg of scales. In May 2006, the Xiamen Customs seized 2849 pangolins, smuggled from Indonesia and Malaysia. In 2007, although the volume of seized pangolins decreased, more than 4000 kg of scales were confiscated. This year, up to now, there have already been 14 seizures, for a total of 534 pangolins and over 2000 kg of scales.

Table 2: A review of recent published pangolin seizures

Year	No. seizures	No. pangolins	No. scales (kg)
2005	10	629	469
2006	25	4534	1938
2007	21	666	4040
2008 (Jan.to Jun.)	14	534	2289
Total	**70**	**6363**	**8736**

Market Survey

As most pangolin seizures happened in South China, 5 representative South China cities were chosen for a study aiming at understanding the current status of pangolin products trade in China.

Availability

A total of 20 Agriculture markets, 50 restaurants, 40 TCM wholesale shops and 200 TCM retail shops were surveyed for availability of pangolin products: meat, raw or processed scales. The results showed that 18% of restaurants (n=50) claimed to serve pangolin meat, while two of 25 agricultural markets sold pangolin meat. 12.5% of TCM

wholesale shops (n=40) sold raw or processed scales, while 81.5% of TCM retail shops (n=200) sold raw or processed scales (table 3).

Table 3: Availability of pangolin products in different markets in 2005-2006

Market	Total numbers	Markets/shops serving pangolin products	
		Number	Percentage
Agricultural market	20	2	10.0%
Restaurant	50	9	18.0%
TCM wholesale shop	40	5	12.5%
TCM retail shop	200	163	81.5%

Pangolin meat was not displayed openly in any of the markets and restaurants surveyed. Consumers have to make reservations several days in advance. In TCM wholesale markets pangolin scales were shown on request, while in TCM retail markets, they were sold openly.

Table 4 showed the availability of pangolin products in different cities. Only two of Nanning markets claimed to sell pangolin meat. Among the areas where restaurant did claim to sell pangolin meat, Naning (40.0%) and Haikou (40.0%) stands out for the number of shops claiming to serve pangolin meat. Among the cities surveyed, only Kunming and Guangzhou had TCM wholesale markets – Juhuayuan (Kunming) and Qingping (Guangzhou). Three shops in Juhuayuan and two shops in Qingping claimed to sell raw or processed pangolin scales. Retail shops, however were very well represented in each city. With the exception of Kunming, almost all shops in the other four cities sold pangolin scales.

Table 4: Availability of pangolin products in different cities in 2005-2006

City	Number (%) of markets serving pangolin meat	Number (%) of restaurants serving pangolin meat	Number (%) of TCM wholesale Shops serving pangolin scales	Number (%) of TCM retail Shops serving pangolin scales
Kunming	0	0	3 (15.0%)	12 (30.0%)
Nanning	2 (40.0%)	4 (40.0%)	-	36 (90.0%)
Fuzhou	0	1 (10.0%)	-	39 (97.5%)
Guangzhou	0	0	2 (10.0%)	39 (97.5%)
Haikou	0	4 (40.0%)	-	37 (92.5%)

Price

The price of live pangolins has increased rapidly since 1990. In the early 1990s, the highest price was only CNY80 (USD12) per kg; in the middle 1990s, it reached CNY240 (USD35) per kg; in the later 1990, it was CNY690 (USD100) per kg (Wu *et al.*, 2005). The lowest and highest prices quoted for live pangolins in this survey were CNY800 (USD117) per kg and CNY1500 (USD220) per kg, respectively (table 5), which were almost 20 times higher than those in the early 1990s.

Similarly, the price of pangolin scales has increased since 1980. The lowest and highest prices quoted in this survey were CNY900 (USD132) per kg and CNY1200 (USD175) per kg, respectively (table 5), which were 100 times higher than those in the early 1980s (Wu *et al.*, 2005).

The increase of price reflects both the high demand for pangolin products in China's markets and the fact wild pangolin are becoming rare. An additional factor could be the gradual improvement in law enforcement.

Table 5: Price comparisons of pangolin products (Prices in CNY per kilogram)

Year	Live pangolins		Pangolin scales	
	lowest	highest	lowest	highest
Early 1980s*	-	-	8	12
Early 1990s*	40	80	70	90
Middle 1990s*	160	240	110	130
Later 1990s*	420	690	320	400
Early 2000*	-	-	420	450
2006-2007	800	1500	900	1200

**Source:* Wu Shibao, Ma Guangzhi and Liao Qingxiang, *et al.*, 2005. Research on the conservation biology of Chinese pangolin *Manis pentadactyla*. Beijing: China Forestry Publishing House.

Trade route

Based on survey results and seizure information, there are three main smuggling routes for pangolin meat. Shipments are sent by road either from Myanmar and Lao P.D.R. to Yunnan via Guangdong or from Viet Nam to Guangxi; shipments also arrive to Guangdong by sea. Guangdong is not the sole destination for pangolin meat, pangolins are also illegally transported to Fujian, Zhejiang, Shanghai, Henan and Beijing.

Pangolin scales are generally smuggled from Myanmar to Yunnan, then to the two national biggest TCM wholesale markets, namely Hebei Anguo and Anhui Bozhou. From there scales are sent to other TCM wholesale markets, such as Juhuayuan and Qingping. In addition, a small quantity of scales was reported smuggled from Lao P.D.R. and Viet Nam.

CONCLUSIONS

An Internet survey indicate that pangolin seizures, as well as volume on pangolin products confiscated, increased after 2006. This can be attributed to an increase in transparency from the government and stronger enforcement efforts carried out in recent years.

However, the demand for pangolin products in China's markets is still high and encouraged by people making important profits from the wildlife trade, especially in South China. Pangolin meat was not displayed openly in any of markets and restaurants surveyed, but consumers can still make reservations in Nanning, Haikou and Fuzhou. Although Guangzhou is believed to remain the biggest destination for smuggled pangolins, no trade activity was recorded due to joint enforcement actions carried out by the local forest police and other relevant departments against illegal wildlife trade at the time of the survey. Additionally, restaurants serving wild meat are said to have been moved to Guangzhou suburb. Pangolin scales, on the contrary were sold openly and widely in TCM markets.

The price both for meat and scales has gone up sharply since the early 1980s due to a high demand in pangolin products, low level of wild populations and effective enforcement. The current price for live pangolins was found almost 20 times higher

than that in the early 1990s; while the current price for pangolin scales was 100 times higher than that in the early 1980s.

The trade routes for pangolin are becoming more and more complicated. While some pangolins are smuggled by land from Southeast Asia (Myanmar, Lao P.D.R. and Viet Nam) to Yunnan and Guangxi, in South China; others are sent by sea from Southeast Asia to Guangdong.

RECOMMENDATIONS

Law and enforcement

Based on the findings from this study, it is clear that the commercial trade in pangolin products in South China is still rampant. All pangolin species are listed as the national second-class protected animals and very strict legislation and regulations on the pangolin trade are already in place, but enforcement actions tend not to be sufficient. More capacity building is therefore needed for enforcement officials, especially those in key locations.

Market Survey

The pangolin trade is dynamic and is constantly changing, regular survey is thus essential to monitor any changes and/or trend in markets so as to provide an early warning system. Moreover, market monitoring can provide an indication of enforcement effectiveness. It is recommended that one visit should be carried out every three months to key markets in Southern China using the support of volunteers from the China Wildlife Trade Monitoring Network.

Public Awareness

Recently more effort was deployed in raising public awareness on wildlife trade issue. For example, in 2007, TRAFFIC published a poster, entitled "*Don't Eat Wild Meat"*, to encourage the general public to completely change its consumption habits toward wildlife. More effort should be focused on re-educating the public.

A Pilot Study of Genetic Surveillance of Illegal Pangolin Trade in Asia

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ABSTRACT: Pangolins are strange mammals having atypical morphological characteristics in part resulting from a highly specialized diet of ants and termites. Curiously, the Pholidota have as sister group the Carnivora, with which they share a common ancestor around 70 million years ago. Pangolins are found into two distinct geographical regions: Africa and Asia, with four species on each continent. The genetic study of pangolins is important not only because of their divergent evolutionary characters, but also because of their perilous conservation status. All pangolin species are protected in CITES II. However, they are hunted indiscriminately throughout most of their range, primarily to consume their meat for food and their scales for medicinal purposes. With this project we set out to elucidate the evolutionary history of the *Manis* species and address questions of importance for taxonomic classification and conservation management of the pangolins. Molecular markers developed within this project are applied for forensic studies, including the identification of pangolin products, sex, species composition, and their geographic origin, in samples confiscated from illegal trade in China and Southeast Asia. Results from the project will be informative to numerous interest groups, including the Pangolin Specialist Group, The World Conservation Union (IUCN), Zoos Organizations (such as SEAZA), TRAFFIC, and CITES, to identify conservation priorities and to develop more effective conservation plans.

For sampling protocol, please refer to Appendix III

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Question & Answers

Questions addressed to Mr. Erwin Sopyan, TRAFFIC Southeast Asia

Shukor Md. Nor, UKM: Several places in the north of Peninsular Malaysia reported seizures. Any idea whether these animals originated from Indonesia, particularly Sumatra? I am asking this question because I wonder if it could be a problem if the authorities release them after rescue and treatment into a new environment without knowing the genetics.

Erwin Sopyan: Pangolins usually arrive frozen from Sumatra. If there is less than six hours transport, then they might be shipped live. We have to do something to stop pangolin specimens from Indonesia entering other countries.

Gono Semiadi, LIPI: Is there are live trade from Sumatra?

Erwin Sopyan: Not from South Sumatra, but there is a possibility that live pangolins are transported to Malaysia from Kalimantan, but we can not give information on this because we did not carry out sufficient study there. In a business perceptive the longer they are kept alive, the greater loss of weight, meaning less profit when sold. Pangolins thus have to be sold live as fast as possible, or sold frozen.

Leanne Clark, CPCP: My question relates to your research on wild pangolins: we noticed that individuals in captivity use two burrows (one sleep, one used); do wild ones have more than one active burrow?

Erwin Sopyan: This was only a short survey, mainly oriented on trade.

Questions addressed to Ms. Chin Sing Yun, TRAFFIC Southeast Asia

Jason Chin, Taipei Zoo: My question relates to the price of pangolins: is there a difference for meat and scales during the passing years?

Chin Sing Yun: Yes, the prices are generally increasing. For scales it also depends on the location; it can range from MYR20 to 100 (USD6-28) per kg. If the location is too far, there is no point selling to another middleman for higher price.

Questions addressed to Mr. Nguyen Van Thai, Carnivore and Pangolin Conservation Program

Shukor Md. Nor, UKM: How people trap pangolins? Are they caught live, in traps, or dead? Is there a method to catch pangolins live?

Nguyen Van Thai: Hunters generally use snares to make more money.

Chris Shepherd, T-SEA: Has anyone ever used pangolin hunting dogs for research?

Leanne Clark: No.

Questions addressed to Ms. Nguyen Dao Ngoc Van, TRAFFIC Southeast Asia

Scott Roberton, WCS: How was the statement that confiscation represents 10 per cent of real trade volume derived, since the information is from the Forest Department and details generally include all wildlife trade confiscation?

Nguyen Manh Hiep, Viet Nam: This is an estimation and not an official report from APD. This is a general estimation for wildlife, including plants and animals, but do not represent specifically the pangolin trade. If the trade is 10 times higher, we have a real problem with the CITES Secretariat, which means Viet Nam is really bad in terms of law enforcement.

Nguyen Dao Ngoc Van: We do not to criticize, but just try to get an estimation of the problem in term of forest protection, including pangolins. To give an idea that confiscation only represents 10-20% of the actual trade.

Li Zhang, CI: What are the major routes from Southeast Asia to the final destination? Do you have an estimation of how many percent of pangolin is consumed within the country and how many are sent through the north to China?

Nguyen Dao Ngoc Van: There is no exact answer. The idea is to show that the volume of meat consumption is very low. In the north, only live pangolins are consumed. The biggest restaurants have up to 10 pangolins per month, and smaller ones, two to three pangolins per month. So what does it mean? The demand for food is there but the volume is not big.

Gono Semiadi, LIPI: Apart from the March 2008 seizure of 24 tonnes, any data from earlier seizures? Looks like this shipment was for local consumption and not transit?

Nguyen Dao Ngoc Van: Not wrong but not quite right. The 24 tonnes arrived at a sea port and were meant to transit to China. For pangolins sent live to China by land, we do not have comprehensive seizure records.

Questions addressed to Ms. Van Anh Thi Nguyen, Education for Nature - Viet Nam

Gono Semiadi, LIPI: How do NGOs connect with ASEAN-WEN? When contacting Indonesian authorities with regards to smuggling, would it be possible to contact ASEAN-WEN?

Van Anh Thi Nguyen: For this particular case (24 tonnes), we will do this.

Chris Shepherd, T-SEA: We have already given the information to the CITES M.A. in Jakarta (PHKA) and the enforcement arm in Palembang (BKSDA).

Questions addressed to Mr. Heng Namyi, Conservation International

Leanne Clark, CPCP: How long did you track this pangolin for?

Heng Namyi: 10 nights, the pangolin was active from six in the evening to six in the morning, but we only track it from six to 12. When we went to look for it the next morning, it had returned to the same place. This lasted three nights, and then it died.

Sandrine Pantel, T-SEA: My question relates to the price of pangolins: are small specimens more expensive than big and why do you think they are? Is the price you gave us per kg or per unit?

Heng Namyi: There are three sizes. Most specimens are between 1.5 and 4.5 kg and the price is the highest, the next class is 4.5 to 7.5 kg and the third 7.5 kg and above. Middlemen are very clever, for big pangolins, the price is relatively low.

Questions addressed to Dr. Sabine Schoppe, Katala Foundation Incorporated

Chairun Nisa, Bogor Agricultural University: My question relates to the species *M. culionensis*: before they published the paper, there were seven species, now eight species. Do you think we really have a new species or is it a subspecies of *M. javanica.* If they are different species, they should not meet, and if they do, they can not produce fertile descendants.

Sabine Schoppe: Already 100 years ago, some suggested that they were different species, while other only considered it 20 years ago. The Palawan Pangolin is now recognised by the scientific authority as a valid species although the IUCN list still treat them as *M. javanica* for now but it will be treated separately on the revised, coming list.

Adininggar Ul-Hasanah, T-SEA: With the recognition of *M. culionensis* as a separate species, what are the legal implications? For example if laws specify *M. javanica*, and what are the legal changes needed?

Sabine Schoppe: Internationally this is not a problem. Domestically, there is no implication because this is the only species that occurs in the Philippines.

Questions addressed to Ms. Xu Ling, TRAFFIC East Asia

Li Zhang, CI: What is the source of your data? There are so many enforcement agencies with different reporting system. For example, in 2006 there were several cases of confiscation by sea, thousands were confiscated, but this is not captured in your presentation, so where does your data from?

Xu Ling: The data came from an Internet search and included data provided by customs, forest and enforcement departments.

Augustine Tuuga, Malaysia: What about TCM manufacturers and producers?

Xu Ling: We did not carry out a study with manufacturers, but this would be interesting for future research.

Augustine Tuuga, Malaysia: Some stories report that illegal traders from Sabah have connection with fisherman in China. Is it true that pangolins from Sabah could be transported into Chinese fishing boats/ship?

Xu Ling: There is only little information on that in Malaysia. I only know of one case reported in Malaysian newspapers. More information is needed from Malaysia.

Shujin Luo, NCI: Why is there a particular increase of seizures in 2006?

Xu Ling: In 2006, the government carried out several special actions; this is the main reason which explains the increase.

Questions addressed to Dr. Shujin Luo, National Cancer Institute

Leanne Clark, CPCP: It would be simpler to get more vouchers with less stress for the animals, by using hair samples, now that you have the molecular vouchers.

Shujin Luo: Yes, follicle contains DNA and if fresh enough it is relatively feasible but requires a lot of manpower, so when possible, we do not want to advocate hair samples. We do not encourage invasive method without veterinary in field. If the specimen is found in a local market, it is likely to be from local regions.

Douglas Richardson, WRS: I appreciate that you do not have that many vouchers, but in your current analysis, have any distinct populations appeared?

Shujin Luo: Even though we can not tell geographic origins without comparison, we can tell that for example, if the specimens from a given confiscation are from one population or several. The analysis is still ongoing. Our hypotheses is that for confiscations of shipments sent by sea, it is highly likely that pangolins are from a single region, a single source population, but for land shipment we can have a mixture of species, and we are also likely to have a mixture of populations.

Douglas Richardson, WRS: Is there any genetic distance within the two recognised species?

Shujin Luo: Research is ongoing; it is not based on a distance but on a clustering method, into one group.

Chris Shepherd, T-SEA: Is not it a bit of a risk to assume that all specimens in a seizure comes from the same region, just because they came by sea or air? Middlemen often compile from many different islands before shipping out.

Shujin Luo: I recognise this is not part of my expertise, maybe I can learn from TRAFFIC. However this does not represent a risk for our hypotheses as long as we have a solid method to test; if this is not right, then we are not making a statement, hypotheses can always be wrong.

Markus Handschuh, ACCB: From an enforcement assistance point of view, when will it be possible to make a seizure and say these came from Malaysia or Indonesia?

Shujin Luo: It will be possible once we have a reference sample.

Markus Handschuh, ACCB: What do you need for a sample?

Shujin Luo: Most confiscations involve dead or frozen specimen; in that case a piece of muscle or tongue. In restaurants to avoid many samples from the same individuals, you can cut the tip of the tongue. We do not recommend taking sample from live, confiscated specimen when sick, in bad health and has not seen a veterinary. For live specimen blood samples are best. We can get voucher samples from zoo, where specimens are in good condition. In this case try to have blood samples.

Note: Someone from the audience reminded that CITES permits are needed to export/import pangolin samples.

Gary Ades, Kadoorie Farm: Would a mouth swab from a wild pangolin be useful?

Shujin Luo: If you catch one, ask your veterinarian to take a blood sample. If not possible we can give it a try; we have collected many domestic samples. Good suggestion.

Sing Yun, T-SEA: How many minimum reference samples are needed from each country?

Shujin Luo: This is a problem of sample size. In the tiger example, to differentiate between Indochinese, Malayan and Sumatran we took voucher from 10 to 15 specimens for each sub-species. So 10 could be a good number. It depends on what level of accuracy we want. This will not tell which population but if there is a structure between Malayan and Sumatran, then 10 would be sufficient to tell.

Van Anh Thi Nguyen, ENV: On the 24 tonnes shipment, could you help identifying if I can send you a sample?

Shujin Luo: Only at a species level. We can tell if the shipment contain a mixture of different populations, but we can't tell where they from.

Session V

Recommendations & Priority Actions

(Working Groups)

Recommendation	Action	Responsibility
ALL PARTICIPANTS		
Improve information sharing/coordination of efforts	Establish formal Pangolin Working Group: - initially for Asian species, to be extended to all species in the future - possibly convert to IUCN Specialist Group in a later stage	Leanne to facilitate Pangolin Working Group, which will coordinate fundraising and designate chair persons to coordinate specific tasks (trade, rehabilitation, ecology, etc.). Leanne Clark to invite all participants to join the pangolin list server (http://groups.google.com/group/pangolins?hl=en-GB)
Joint statements as an output of the workshop	Write a statement on the feasibility of commercial farming of pangolins and recommend the conduct of a study on the biological and economical feasibity of commercial pangolin breeding.	Pangolin working group should coordinate this effort
ECOLOGY AND BIOLOGY		
Population and Habitat usage studies required	Develop a questionnaire and supporting guidelines for interviewing pangolin hunters (tracking and catching methods). Results to be used to develop a standardized survey method to assess the density of wild pangolin populations.	Norman Lim to coordinate the development of the questionnaire and supporting guidelines. NGOs and Universities to carry out interview surveys and send organized data to Norman Lim. Norman to coordinate the analysis of the data.
	Assess feasibility of using hunting dogs in field research	Norman Lim to discuss with working group to further explore this, should previous item fail to yield an efficient and rapid method of assessment.
	Research on habitat: Habitat preferences (e.g. primary/secondary/plantation) Habitat usage in different life stages Habitat requirements for long term population sustainability – limiting factors for reproduction?	For action of all NGOs to collaborate with academic institutions and involve students. For example: - KFBG to support ecological research work on the wild population of Chinese Pangolins within Hong Kong protected areas. - ACCB to scope out potential for study in Cambodia to complement CI's work.

Recommendation	Action	Responsibility
	Determination of suitable release sites Recommended methods: - Radio tracking - Make use of information obtained from hunters interview survey	
Determine source of confiscated animals and monitor trade dynamics **methods:** **- Genetics (phylogeography)** **- Carbon** **NB: collection and transport of samples to be carried out in accordance with CITES and national legislation**	Establish a range of protocols (listed in order of preference) for sampling and data collection from wild and seized specimens (live and dead)	Shujin to coordinate the development of non-invasive collection protocols, for genetic research, that does not require specialist equiment and skills.
	Reference 'voucher' repository to be built up	Pangolin Working Group to investigate the feasibility of creating a basic pangolin genetic databank
	Share knowledge from carbon studies	Scott to share results of Carbon work (stable isotope analysis?) carried out by WCS with the Pangolin Working Group
Morphometrics of confiscated animals collected	Standardised methods for morphometrics on confiscated animals	Tapei Zoo and WRS to share datasheet and provide guidelines to record morphometric data NGOs and Universities to collaborate with enforcement agencies to record morphometric data on live and frozen seized specimens
Research on medicinal properties	Conduct research on medicinal properties of scales/meat and identify alternatives	Pangolin Working Group to identify Institutions with the capacity to perform chemical analysis of pangolin scales

Recommendation	Action	Responsibility
EDUCATION AND AWARENESS RAISING		
Build capacity of Government (Enforcement Officers)	Pangolin Enforcement Handbook to include: 1-Identification 2-What should be done after seizure (including immediate care and first aid for live animals), in accordance with national legislation 3-Support network 4-Legislation	The Pangolin Working Group to research existing material (e.g. as produced by EWCL, TRAFFIC, etc.) and assess suitability for inclusion in the enforcement handbook The ASEAN-WEN Support Program to help introduce pangolin experts and kits (once these are ready) to ASEAN-WEN National Task Forces and other enforcement agencies. This will be done through the ASEAN-WEN PCU (Program Coordination Unit which acts like the WEN's secretariat) The Pangolin Group to forward information to enforcement officers in China.
Raise awareness among high level government officials	Create a presentation for two levels of govt. officials (1 hour/full day presentation/training) which will lead to pangolins being listed as CITES I	TRAFFIC will prepare a template presentation which can be passed on to other countries
Raise awareness among Judiciary	ASEAN WEN workshop to be the platform	The ASEAN-WEN Support Program
Raise awareness among Schools/Zoos	Year of the Pangolin – Asia-wide effort	Singapore Zoo to contact SEAZA to help coordinate a pangolin educational effort (By end of this year)
	Produce education kit for children, translated in different languages. Prototype ready by Dec 2008 Education material shared with zoos and NGOs and available on the Internet	WRS to coordinate the development of education kit Charlene as focal person for any photographic and video material available on pangolins Gary/KFBG: will initiate this idea with KFBG Education Dept and share any material produced Tapei Zoo to be approach about available education material WRS to bring pangolin conservation and educational kit at the SEAZA meeting in Sept/Oct 08.

Recommendation	Action	Responsibility
Raise awareness among members of the public and the media	Identify consumers (depending on country) and use shock tactics to raise awareness	
	Create Media kit and carry out campaign, to include material from governement and children kit	TRAFFIC/Singapore Zoo by mid 2009
	Publicise availability of wildlife Hotlines in various countries	NGOs (e.g. ENV in Viet Nam, PneunPa in Thailand, TRAFFIC, etc.)
Raise awareness among tourists and tourism industry	Work with tour agencies, tourism boards, tour guide association and airports to discourage tourists from eating bushmeat, focus on violation of laws.	NGOs in collaboration with Government representative in each country
	Educate the tour guides regarding the consumption.	
	Provide the Pangolin Media kit to tourism companies	
Raise awareness among TCM practitioners	Investigate published available alternatives and publicise this.	Pangolin Working Group to ensure coordinated efforts. WRS to investigate potential collaboration with Eu Yan Sang and TCM practitioners in Singapore on a joint statement/media story on alternatives to pangolin TCM products
Raise awareness among Business	Share information with relevant Businesses such as oil palm plantations, airlines and airports.	TRAFFIC to contact the plantation association in Malaysia and share research information with plantation owners regarding the pest control benefits of pangolins and illegal activities of poaching on their land. (investigate potential collaboration with WildAsia) The ASEAN-WEN Support Program to approach airlines/airport authorities since large numbers of pangolins are also shipped by air cargo

Recommendation	Action	Responsibility
Raise awareness among donors and encourage massive long term financial support	Materials (inc. workshop proceedings where appropriate) produced for media and other target audiences to be shared with potential donors.	Pangolin Working Group to coordinate fundraising activities. Individuals/organisations conducting pangolin projects to use the materials that will be put together after this workshop to supplement proposals
Contact pangolin programs in Africa and India	Contact people who work with pangolins in Africa and India and share information on Asian pangolin crisis. Share info to highlight possible shift in trade to Africa in light of heavy exploitation in Asia.	Julie Scardina to use her contacts in Africa. Leanne to contact members of the pangolin list server based in Africa for up-to-date information (e.g. Lisa Hywood from the Tikki Hywood Trust). Leanne Clark to invite researchers working on pangolins in Africa to join the pangolin list server. Onkuri Majumdar, PuenPa Thailand, to investigate contacts in India and circulate a summary document of the workshop and pangolin threats. TRAFFIC Southeast Asia to contact their offices in India and Africa. WRS to contact Sally Walker and Nandankanan Zoo, Orissa
HUSBANDRY AND REHABILITATION		
Networking - Improve access to existing information so that we can learn from each other's experiences, and not 're-create the wheel'	Current documents/protocols relating to husbandry, quarantine, health examination of pangolins to be shared – email	Pangolin Working Group to coordinate that all parties with draft/published documents to share via the pangolin list server or potential future Pangolin Working Group/IUCN Specialist Group website ("member only" section)
Networking - Improve communication with governments	Ensure governments are aware of existing rescue centres as recommended by CITES	Pangolin Working Group to circulate enforcement handbook and coordinate development of training on how to use the guide
	Seek government endorsement of centres to ensure pangolins are transferred to centres with high standards of care	Pangolin Working Group in collaboration with rescue centres

Recommendation	Action	Responsibility
	Improve utilization of existing networks, eg CITES authorities, to facilitate transfer of pangolins between rescue centres in country and between countries.	CITES M.A. and S.A. WRS available to provide assistance and support large confiscations, where possible Gary/KFBG to investigate the possibility of transfer of live pangolins between China centers and HKG (China Rescue Centre WKSP in November 2008)
Networking - Capacity building in existing centres	Staff exchanges/training between existing centres so that expertise can be shared	Pangolin Working Group to coordinate identification of institutions available for staff exchange/training (e.g. WRS)
	Cooperate on funding initiatives to cover costs of staff exchanges/training workshops etc – ie projects which will benefit all existing rescue centres	Pangolin Group to assist in the coordination of fundraising activities in collaboration with rescue centres
Confiscations - Improve enforcement officer's ability to deal with confiscations	Develop 'decision making tree', country specific, to help guide enforcement officers towards appropriate placement of confiscated animals, to be included in the enforcement handbook	Carnivore and Pangolin Conservation Program (CPCP) Vietnam to develop draft decision making tree. CPCP to share protocols developed for Viet Nam in rescue/basic veterinary care of confiscated pangolins with inputs from WRS. Pangolin Working Group to seek support from zoos, rescue centres, etc. to provide training to law enforcement officers on first aid for confiscated live pangolins
	Create protocol/instructions for enforcement officers	Refer to enforcement handbook

Recommendation	Action	Responsibility
Rescue Centre Network – Ensure that there is at least one specialist pangolin rescue centre in each 'hot spot'. **Develop protocols to develop standard procedures across the region, to enable comparisons and ensure minimum standards of care (ensuring that species and country differences are taken into account)**	Create list of current rescue centres with capacity to deal with confiscated pangolins, and then assess to see if there is at least one centre with capacity in each confiscation 'hot spot'.	CPCP to share their complete list of rescue centres in Vietnam with the Pangolin Group (pangolin list sever or website). Representatives from each country to add to this – please provide details on location, contact details, carrying capacity etc. - Gary/KFBG to provide details for Hong Kong - Markus/ACCB to provide details for Cambodia - TRAFFIC China Programme to compile a list for China (nearly every province in China has its rescue centre)
	Share current designs for enclosure/furnishings/husbandry – aim to create a minimum husbandry standard in future	For all protocols, existing centres to share current documents (e.g. WRS and CPCP). NB: Information available from the KFBG Rescue Centre Standard Operational Guidelines (English, Chinese and Vietnamese). See www.kfbg.org
	Health examination protocol	For all protocols, existing centres to share current documents (e.g. WRS and CPCP)
	Rehabilitation/Quarantine Protocol	For all protocols, existing centres to share current documents (e.g. WRS and CPCP)
	Pangolin Husbandry Protocol	For all protocols, existing centres to share current documents (e.g. CPCP)
	Euthanasia Protocol	For all protocols, existing centres to share current documents
	Protocol to deal with mass seizures of pangolins	For all protocols, existing centres to share current documents
	Release Protocol (species ID, genetics, environmental requirements, health/behavioural criteria for release, post release monitoring, microchipping)	For all protocols, existing centres to share current documents Rescue centres In collaboration with universities and NGOs carrying out biological/ecological research on pangolins (e.g. radio tracking, collection of samples)

Recommendation	Action	Responsibility
Research – Coordinated research required on physiological data (morphometrics, physiological, behavioural) to allow comparison, and to increase overall numbers	See Biological section	
Research – Improved understanding of regional genetic variations to enable tracking of trade dynamics and source of animals (for appropriate release)	See Biological section	
Research – Improved understanding of nutritional requirements and development of artificial diets (species specific).	Nutritional research with captive pangolins	Rescue centres to share result of their research and coordinate with researcher working on pangolin ecology: - Taipei Zoo to share their information on *M. pentadactyla* - CPCP to share results of nutritional analysis of different life stages of three species of ants (Oecophylla, Polyrachis and Crematogaster), and is in process of developing artificial diet made with locally available ingredients (no commercial insectivore mix, as this is not available in Vietnam) - WRS to continue investigations and share findings, including nutritional analysis of artificial diet
Research – Further research required on husbandry requirements other than nutrition to improve welfare of captive pangolins (in collaboration with biology/ecology group)	Research on Husbandry requirements – enclosure size, utilization, space, social grouping, captive behaviour	Rescue centres to share result of their research: - CPCP to share results of behavioural monitoring on captive animals - Taipei Zoo to share results of study on pangolin captive activity patterns in different seasons and the effect of different environment factors - ACCB to share future findings from captive study

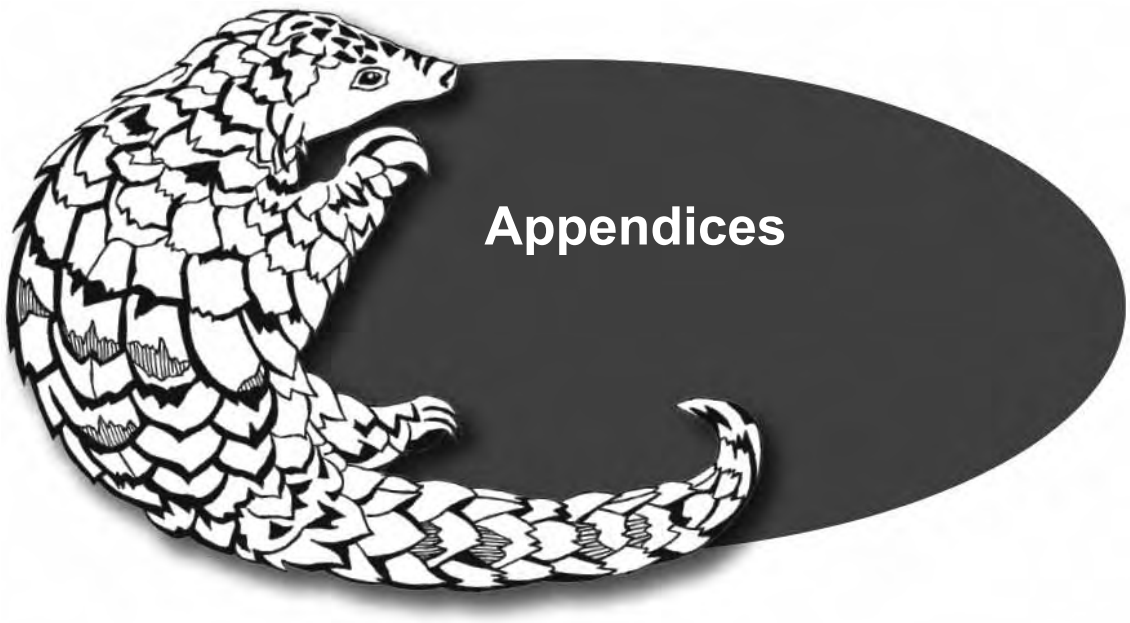
Recommendation	Action	Responsibility
Research – Sharing information/cooperation on field research between captive care specialists and field biologists	Captive facilities to share information on aspects of pangolin life history which are difficult to research in the field (eg reproduction – gestation period)	Zoos, rescue centres, universities and NGOs to share findings using the pangolin list server/website
	Captive facilities to suggest areas of field research needed to improve captive care – eg, natural foraging ecology, milk composition, social behaviour, home range, reproductive behaviour (inc. duration, time of year, birth interval, courtship)	
TRADE AND LAW ENFORCEMENT		
Improve information sharing both between countries and within countries (including communication channels between NGOs, GOs and government agencies at all levels)	Set up contact list for improved networking – Focal points Set up strong and standardised channels of information flow between governments and NGOs	PeunPa and TRAFFIC to work with the ASEAN-WEN Support Program to bring NGOs together and facilitate an initial flow of information from this working group to the WEN. NB: The support programme is already working out Standard Operating Procedures for NGOs to: 1. Collect information that is useful to an enforcement agency 2. Make that information available to governments The Support Program is currently facilitating the creation of a Special Investigation Group on Pangolins
	Develop central database for seizure information and enforcement data (may require restricted access)	TRAFFIC
	Secondary focal points for ASEAN-WEN (people on the ground, at check points or airports)	The ASEAN-WEN Support Program will draft that list with inputs from member countries

Recommendation	Action	Responsibility
Upgrade conservation status of all pangolin species	Upgrade all national listings	Pangolin working group
	Upgrade IUCN listing to Endangered	Pangolin working group
	Preparation of submission for Appendix I listing in CITES *Some participants questioned whether an up-listing to CITES Appendix I would address the challenges Parties are facing in combating trans-boundary smugglings of pangolins	Pangolin working group
	Recommend improved national legislation to protect pangolins	Pangolin working group
Improve monitoring of pangolin trade	Develop trade monitoring network	TRAFFIC/Pangolin working group
	Develop a coordinated method of collecting/sharing trade information – Centralised Reporting System	TRAFFIC/Pangolin working group
	Ensure that pangolin trade becomes a top priority for the ASEAN-WEN agenda.	TRAFFIC/Wildlife Alliance/Pangolin working group. PeunPa and TRAFFIC to provide support to the ASEAN-WEN Special Investigation Group on Pangolins.
	Research by NGOs/Universities to help assist enforcement agencies, including conducting investigations with traders, collectors, etc. Development of country specific pangolin trade monitoring methods	NGOs and universities

Recommendation	Action	Responsibility
	Monitor trade expansion to Africa/India	NGOs, for example: PeunPa to contact NGO's in India (particularly the northeast) to alert them TRAFFIC to inform and request assistance from their office in India and Africa
Improve law enforcement within country	Improve domestic inter-agency coordination	PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Establish quick reporting response system - see information sharing	PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Improve enforcement at source (eg protected areas)	Pangolin working group
	Wherever possible, Increase the number of law enforcement officers (and effectiveness – refer to training)	Government agencies
	Empower relevant government agencies to make arrests	Government agencies
	Increase integrity within government agencies	PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Rewarding/acknowledgement of efforts	Government agencies
Improve ability of enforcement officers to make appropriate decisions for disposal of seized pangolins	Develop guidelines for post-seizure process, in accordaqnce with national legislation and CITES Resolutions	Refer to handbook for law enforcement officers from education group

Recommendation	Action	Responsibility
Capacity building required for enforcement officers	Training courses for enforcement officers, built into academy training. Should include wildlife crime knowledge, training to help raise integrity	Make use of material developed for education purpose. PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Study tours to exchange experiences	PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Identification material for enforcement staff including national laws and penalties	Refer to handbook for law enforcement officers from education section
	National Liaison officer	PeunPa and TRAFFIC will communicate the final recommendations of the workshop to the ASEAN-WEN Secretariat and request for assistance
	Develop handbook for enforcement officers (refer to handbook)	Refer to handbook for law enforcement officers from education section
Information from this workshop to be shared	Circulate proceedings to ASEAN-WEN, CITES, range countries, Wildlife Crime Bureau (India), NGOs, Customs & Excise departments, Scientific Authorities and Judiciary. Africa to be included	TRAFFIC Network to circulate the proceedings. PeunPa to draft a brief information letter about the workshop recommendation for enforcement agencies
Joint statements to be created as an output of this workshop	Statement on destruction of seized dead pangolins and their products (while keeping some for training purposes, forensics, museum) in accordance with CITES resolution 9.10 *Following disagreement from main destination countries, further investigation should be carried out.	Pangolin working group

Recommendation	Action	Responsibility
	Statement against regulated trade in pangolins. *Following desagreement from main destination countries, further investigation should be carried out.	Pangolin working group



Appendices

Appendixes I

Workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia

Date: 30 June- 2 July 2008
Venue: Forest Lodge, Singapore Zoo
Programme

29 June 2008 (Sunday)	
16:45	Bus from hotels to Singapore Zoo
18:00-20:00	Registration + Ice breaker at Singapore Zoo
20:00-21:30	Free-and-easy at Night Safari.
20:30-21:15	Creatures of the Night Show at the Night Safari
21:30	Bus from Night Safari back to hotels

30 June 2008 (Monday)	
07:00	Bus from hotels to Singapore Zoo
8.15	Arrival of participants and registration
9.00	Arrival of invited guests
9.10	All guest & participants to be seated
9.15	Arrival of Guest of Honour, Parliamentary Secretary (National Development), Dr Mohamad Maliki Bin Osman
9.20	Welcome address by Ms Fanny Lai, CEO-WRS
9.25	Official Address by Parliamentary Secretary (National Development), Dr Mohamad Maliki Bin Osman
9.35	Welcome address by Mr Chris Shepherd, Senior Programme Officer, TRAFFIC Southeast Asia
	To be followed by Presentation of Token of Appreciation to Guest of Honour
9.40	An overview of Pangolin Trade in Southeast-Asia, Chris Shepherd, TRAFFIC SEA
10.00	Reception
10.20	Group Photo
Session 1	**Issues and Challenges of Pangolin Enforcement in Asia**
10.40-11.00	Indonesia *Pangolin Manis javanica conservation in Indonesia: status & problems* Mr. Gono Semiadi, Research Center for biology - LIPI
11.00-11.20	Singapore *Trade in Pangolin* Ms. Janice Yap, Agri-Food and Veterinary Authority (AVA)
11.20-11.40	Malaysia (Sabah) *Pangolin Trade in Sabah* Mr. Augustine Tuuga, Sabah Wildlife Department
11.40-12.00	Brunei Darussalam Mr. Samhan Nyawa, Brunei Museums Department
12.00	**Lunch**
13.00-13.20	Philippines *Conservation and Management of Malayan Pangolin Manis javanica culionensis in Palawan Province, Philippines*

	Ms. Levita Acosta Lagrada, Palawan Council for Sustainable Development
13.20-13.40	Viet Nam Dr. Ha Cong Tuan, Viet Nam CITES Management Authority (extra time is allocated for translation)
13.40-14.00	Cambodia *Conservation and Management of Pangolins in Cambodia* Mr. Suon Phalla, CITES Management Authority of Cambodia, Ministry of Agriculture, Forestry and Fisheries (MAFF)
14.00-14.40	Thailand Dr. Ronasit Maneesai, CITES Management Authority, Department of National Park, Wildlife and Plant Conservation
14.40-15.00	Lao P.D.R. Mr Bouaphanh, Cites Management Authority, Ministry of Agriculture and Forestry
15.00	**Tea break**
15.20-15.40	Myanmar Mr. Win Naing, Forest Department, Ministry of Forestry
15.40-16.00	China *Conservation and Trade Control of Pangolins in China* Mr. Zhang Yue, The Endangered Species of Wild Fauna and Flora Import & Export Management Office of The People's Republic of China
16.00-16.20	China *Pangolin Trafficking-related Crimes in China* Mr. Geng Yong Ping, Bureau of Forestry Police, State Forestry Administration, The People's Republic of China
16.20-16.40	Taiwan *Pangolin Conservation in Taiwan* Mr. Guan-Bang Wang, Council of Agriculture
16.40-17.10	Wrap-up and adjournment of day 1
18:00-20:00	Welcome dinner at Night Safari
20:00– 22:00	Guided tram tour of Night Safari
22:15	Bus from Night Safari back to hotels

1 July 2008 (Tuesday)	
07:15	Bus from hotels to Singapore Zoo
8.45	Briefing of the day
Session 2	**Pangolin Ecology and Biology**
9.00-9.20	*Ecological research findings on Manis javanica in Singapore, and future directions* Norman Lim, The Raffles Museum of Biodiversity Research, Singapore
9.20-9.40	*Preliminary Observation on food habits and foraging behavior in Chinese Pangolin Manis pentadactyla* Dr. Wu Shi Bao, Southern China Normal University
9.40-10.00	*Asian pangolins: How behavioural research can contribute to their conservation* Mr. Dan Challender
10.00-10.20	*Current Status of Chinese Pangolin in the Wild* Dr. Li Zhang, Conservation International, China Programme
10.20	**Tea break – Video from Taipei Zoo**

Session 3	**Pangolin Husbandry**
10.40-11.00	*Formosan Pangolin Rescue, Rehabilitation and Conservation* Mr. Jason S. C. Chin, Taipei Zoo
11.00-11.20	*A long way from home: the health status of Asian Pangolins confiscated from the illegal wildlife trade in Vietnam* Dr. Leanne Clark, the Carnivore and Pangolin Conservation Program, Vietnam
11.20-12.00	*Captive Management of Malayan Pangolins Manis javanica in Night Safari* Mr. Madhavan Vijayan, the Night Safari, Wildlife Reserves Singapore
12.00	**Lunch**
13.00-13.50	**Tour of the Singapore Zoo**
Session 4	**Pangolin Trade and Conservation**
13.50-14.30	*Pangolin Trade Manis javanica in Sumatra, Indonesia* Mr. Erwin Sopyan, TRAFFIC Southeast Asia (extra time is allocated for translation)
14.30-14.50	*The Sunda Pangolin Manis javanica Capture and Trade in Malaysia* Ms. Chin Sing Yun and Ms. Sandrine Pantel, TRAFFIC Southeast Asia
14.50-15.10	*Tapping into local knowledge to help conserve Pangolins in Vietnam* Mr. Nguyen Van Thai, the Carnivore and Pangolin Conservation Program, Vietnam
15.10	**Tea break**
15.30-15.50	Consumption in Vietnam - Result of market and TCM shops survey Ms. Nguyen Dao Ngoc Van, TRAFFIC Southeast, Greater Mekong Programme
15.50-16.10	*ENV Wildlife Crime Unit's efforts to combat illegal wildlife trade in Vietnam* Ms. Van Anh Thi Nguyen, Education for Nature – Vietnam
16.10-16.30	*Pangolin Research in Cambodia* Mr. Heng Namyi, Conservation International, Cambodia Programme
16.30-16.50	*The Palawan Pangolin Manis culionensis* Dr. Sabine Schoppe, Katala Foundation Incorported
16.50- 17.10	*The Pangolin Trade in China* Ms. Xu Ling, TRAFFIC East Asia, China Programme
17.10-17.30	*A pilot study of genetic surveillance of illegal pangolin trade in Asia* Dr. Shujin Luo, US National Institute of Health
18:15	Bus from Singapore Zoo to hotels

2 July 2008 (Wednesday)	
07:15	Bus from hotels to Singapore Zoo
8.45	Briefing of the day
Session 5	**Workshop discussion and presentation**
9.00-10.00	Facilitated group discussion: sharing ideas
10.00	**Tea break**
10.20-12.30	Facilitated group discussion: discussion and vote
12.30	**Lunch**
Session 5	**The way forward**
13.30-13.50	Group 1 presentation + Q/A
13.50-14.10	Group 2 presentation + Q/A
14.10-14.30	Group 3 presentation + Q/A
14.30-14.50	Group 4 presentation + Q/A
14.50-15.00	Wrap up of group discussion

15.00	**Tea break**
15.20-16.40	Reaching agreement on recommendations / priority actions and how these will be achieved
16.40-17.00	Conclusion of the workshop
17.00-17.30	Closing remarks, presentation of certificates and group photo
18:15	Bus from Singapore Zoo to hotels

Appendixes II

List of Participants

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Appendixes III

A Pilot Study of Genetic Surveillance of Illegal Pangolin Trade in Asia – Sampling Protocols

Objectives

1. To collect samples from pangolin with known geographic origins (voucher specimens) to consist of the reference sample repository for phylogeography study and for identifying the origins of confiscated animals. Eight reference regions are identified in East and Southeast Asia:

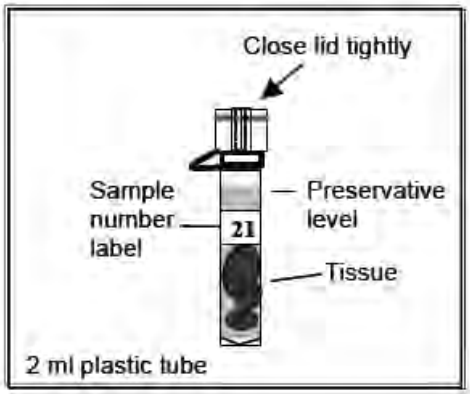
(1) Mainland China
(2) Taiwan
(3) Northern Indochina (N. Thailand, Cambodia, Vietnam, Laos)
(4) Malayan Peninsula (S. Thailand, Malaysia, Singapore)
(5) Borneo (Malaysia, Brunei, Indonesia)
(6) Sumatra (Indonesia)
(7) Java/Bali (Indonesia)
(8) Palawan (Philippines)

2. To collect samples from illegally traded and confiscated pangolins without known geographic origins, to monitor the composition and dynamics of illegal pangolin trade in Asia.

3. To develop forensic database and methodology to provide tools and information for relevant law enforcement and conservation agencies to combat the illegal pangolin trade in Asia.

INSTRUCTIONS FOR TISSUE SAMPLING FROM DEAD ANIMALS

1. Cut **2 to 3 pieces of muscle tissue** (muscle) of about 0.8cm^3 (reference size ) from each animal using a clean scalpel. To avoid cross-contamination, use a new scalpel for each individual, or flame burn the scalpel between animals. Muscle from any part of the body is fine and you may consider tongue for the ease of manipulation.
2. Put the samples into the 2ml plastic tube and **completely submerge in preservative (75% alcohol)** liquid and be sure that the alcohol volume is at least twice larger than the tissue sample (see figure below).
3. **Close lid tightly** (or the alcohol will evaporate).
4. **Label** the tubes and record on the **Data Recording Form** as detailed as possible the following information: Tube/sample number, Species, Location, Sex, Age (adult or subadult), Date, Photo Number, Suspected origin, and other special observations.
5. Take a photo of animals if possible.
6. If preservative tubes run out, keep frozen in regular freezers; if freezer is not available, keep and dry the samples in paper envelopes; samples in preservative can be stored at room temperature before shipment.
7. Before **shipping**, please save a copy of the data collection in case one copy gets lost or damaged. On the package (or customs form) write the following: "Samples for scientific research, gift with no commercial value." We will provide a free FedEx shipping account to cover the cost.



Tubes and scalpels could be provided and shipped to you, given 2-week notification.

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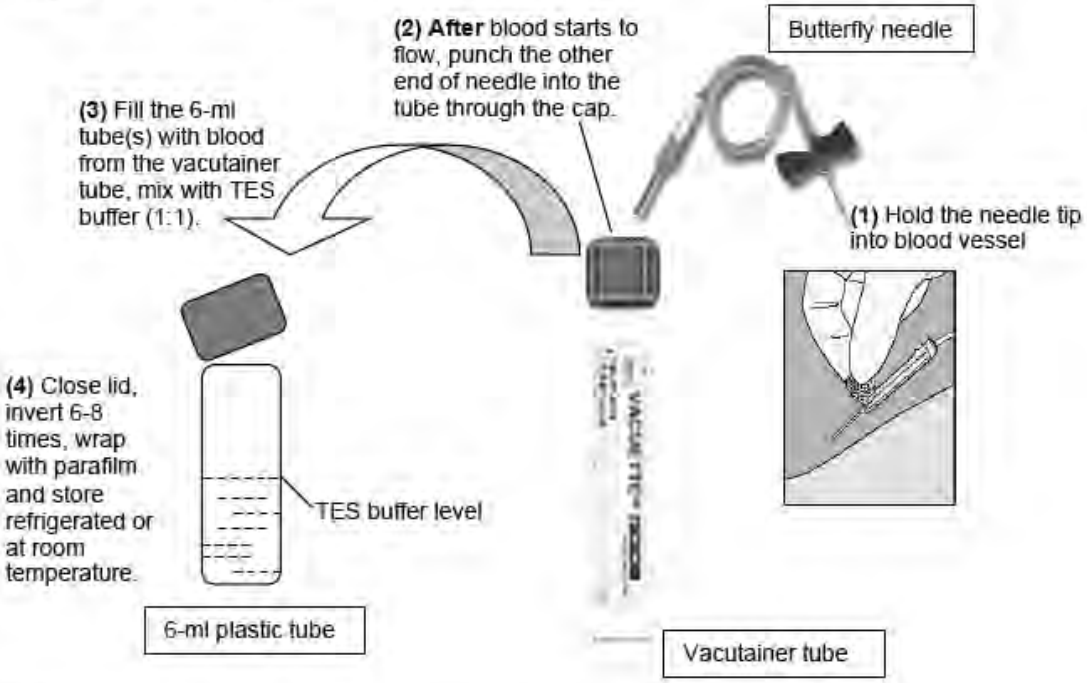
INSTRUCTIONS FOR ENHANCED BLOOD SAMPLING FROM LIVE ANIMALS

NOTE: This protocol should be used only when there is veterinary assistance.

1. Draw **2 to 5 cc blood** into a BD Vacutainer ® tubes (lavender tops) using the butterfly needles or regular syringe (see figure for more instructions).
2. **Pour** the blood into one or several 6-ml plastic tubes (green tops), mixed with equal volume of **TES buffer** (provided).
3. **Close lid tightly** and wrap with parafilm to top of tubes.
4. **Mix** well the blood and TES buffer by inverting tube 6-8 times and shaking.
5. **Label** the tubes and record on the **Data Recording Form** as detailed as possible the following information: Tube/sample number, Species, Location, Sex, Age (adult or subadult), Date, Photo Number, Suspected origin, and other special observations.
6. Take a photo of animals if possible.
7. Store refrigerated (preferred) or room temperature, and ship at ambient temperature.
8. Before **shipping**, please save a copy of the data collection in case one copy gets lost or damaged. On the package (or customs form) write the following: "Samples for scientific research, gift with no commercial value." We will provide a free FedEx shipping account to cover the cost.



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INSTRUCTIONS FOR MINIMUM BLOOD/SALIVA SAMPLING FROM LIVE ANIMALS

NOTE: This protocol can be used when there is no veterinary assistance.

1. When the amount of blood drawn from an animal is not high enough (e.g., 2-5 cc) to put into a tube, or only buccal swap (saliva) can be obtained, **spread evenly and widely** the trace amount of blood or saliva onto a piece of FTA® PAPER, use **ONE piece of FTA® paper PER animal.**
2. For clear sample such as saliva, **circle** the application spot with a ballpoint pen or pencil; otherwise the sample will not be able to be located after it is dry.
3. **Label** the FTA® paper and record on the **Data Recording Form** as detailed as possible the following information: Tube/sample number, Species, Location, Sex, Age (adult or subadult), Date, Photo Number, Suspected origin, and other special observations.
4. Take a photo of animals if possible.
5. Store and transport at room temperature.
6. Before **shipping**, please save a copy of the data collection in case one copy gets lost or damaged. On the package (or customs form) write the following: "Samples for scientific research, gift with no commercial value." We will provide a free FedEx shipping account to cover the cost.

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TRAFFIC, the wildlife trade monitoring network, works to ensure that trade in wild plants and animals is not a threat to the conservation of nature. It has offices covering most parts of the world and works in close co-operation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

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