Trade in Malagasy reptiles and amphibians in Thailand

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A TRAFFIC SOUTHEAST ASIA REPORT

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Cover: Panther Chameleon *Furcifer pardalis*

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Matthew Todd

Panther chameleon *Furcifer pardalis*

CONTENTS

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EXECUTIVE SUMMARY

Wild-caught Malagasy reptiles and amphibians occur widely in Thailand's pet trade. These animals are largely endemic to specific areas of Madagascar and are frequently captured and traded illegally, often for the international market. Loopholes exist in Thailand's wildlife legislation that keep legislation from adequately protecting non-native species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), thus perpetuating trade.

During 2004 and 2005, origins of Malagasy chameleons were intentionally mis-declared by Thai wildlife dealers to obtain excessive "legal" CITES import permits covering a maximum of 3738 individuals. This is thought to be the paperwork foundation for the laundering of smuggled animals into trade in recent years. Possession of these permits allows issuance of re-export permits and legitimizes specimens retained in national trade. The Thai reptile industry directly supplies smuggled taxa for domestic trade and may be a major source of laundered Malagasy reptiles into international trade. This trade route (with Thailand as the main hub) for wild caught taxa was also reported to figure prominently in the laundering of South American poison arrow frogs by Nijman and Shepherd (2010).

A total of 591 specimens were observed, representing 24 reptile species and seven amphibian species native to Madagascar during covert surveys conducted during January 2010 over 15 days across 32 vendors in Bangkok and eight vendors in provincial areas.

Malagasy chameleons and tortoises were the most frequently encountered of all globally threatened wild-caught reptiles during this investigation. Of particular concern was the large scale trade in endemic Malagasy chameleons. These included specimens of both *Calumma* and *Furcifer* genera, all species of which are listed in Appendix II of CITES and the Antsingy Leaf Chameleon *Brookesia perarmata*, listed in Appendix I of CITES. Large scale trade in the Testudinidae family included three endemic and Critically Endangered species, all of which are listed in Appendix I of CITES; the Radiated Tortoise *Astrochelys radiata,* Ploughshare Tortoise *A. yniphora* and Spider Tortoise *Pyxis arachnoides*. By far the most heavily traded of all the Malagasy species encountered, were the Radiated Tortoise (106 individuals), Madagascan Horned Frog *Scaphiophryne madagascariensis* (67 individuals), Panther Chameleon *Furcifer pardalis* (60 individuals) and Brown Mantella *Mantella betsileo* (50 individuals).

Traditionally, Chatuchak Market (or Weekend Market) in Bangkok has been the principal location for Thailand's trade in endangered reptilian taxa (Shepherd and Nijman, 2008). However, during this investigation, a decentralisation of trade has been observed with a significant proportion of trade carried out via the internet and from residential addresses. E-commerce was identified in the proceedings of the 15th Conference of the Parties to CITES (CoP 15) as one of the most rapidly expanding global threats to endangered species (CITES, 2010c). Trade was also observed to be spreading to provincial cities and to other markets in the Bangkok area.

Results of this investigation show that Thailand's reptile trade is rapidly expanding both in volume and by range of taxa represented, despite stable or decreasing availability at Chatuchak Market. The trade in illegal and high value species can effectively be considered "mobile" and operating "underground" in terms of physical location. A now mature and efficient network of dealers as well as both national and international clientele exist (TRAFFIC, 2008). In response to increased detection and surveillance, this network is able to function via the internet and from residential addresses without using public venues such

as markets and shops. This has important implications for future surveying, monitoring and enforcement efforts by authorities, enforcement officials and NGOs.

Based on the results of this investigation and an analysis of data from the UNEP-WCMC CITES trade database, TRAFFIC makes the following recommendations:

1. Amend the *Wild Animal Reservation and Protection Act* (WARPA) 1992 to require that burden of proof of legal acquisition be borne by the possessor, as recommended by Shepherd and Nijman (2008). Currently, Section 23 of the WARPA 1992 requires enforcement agencies to prove that non-native CITES-listed species have been illegally acquired by the possessor.

2. Conduct rigorous enforcement actions in the markets and investigate cases where dealers have been proven to manipulate the legal CITES system fraudulently and where illegally sourced Malagasy taxa are traded or possessed in business premises, at residential addresses or in transit. Penalties to those found violating the law should be severe enough as to act as a deterrent.

3. Increase the current training and capacity building programmes for staff working in all relevant agencies beyond the National Park, Wildlife and Plant Conservation Department (NWPCD), especially the police, immigration, Customs and other agencies. Training should address CITES-related law and implementation to facilitate effective detection of illegal wildlife shipments and subsequent confiscations and prosecutions further. Training programmes should also include utilization of the UNEP-WCMC CITES trade database for enforcement staff charged with monitoring and investigating cases of possible illegal trade.

4. Conduct species identification training programmes for key enforcement agencies. This is crucial as there has been an increase of Malagasy reptile trade, and many of these taxa are often very similar in appearance. Enforcement officers should be equipped with species identification skills and materials to ensure effective law enforcement.

5. Establish dedicated units within enforcement agencies specifically to address illegal wildlife trade on the internet and investigate associated dealers. Traditional venues such as Chatuchak Market are not the only reliable observation posts for wildlife trade in Thailand. Rigorous covert infiltration of the trading network paired with regular trade monitoring and profiling of dealers is crucial if authorities are to continue with successful seizures, prosecutions and enforcement of wildlife legislation.

6. Establish and increase checkpoints at known hotspots. Roadside checks along Highways 4 and 41 must be conducted for the detection of illegal wildlife shipments in the southernmost provinces where border crossings to Malaysia are utilized by agents working for wildlife dealers to smuggle fauna. This will assist in stemming the flow of illegally sourced specimens into the international pet trade. Further to this, increased checks should be carried out at the border towns of Sadao and Betong, identified as the two main crossings used by wildlife smuggling operations.

7. Encourage the judiciary to increase the penalties given for wildlife crimes, so they serve as a real deterrent to wildlife criminals.

8. Authorities and NGOs should implement public awareness programmes focussing on the consequences of the illegal trade in threatened reptiles and amphibians.

9. Establish and implement a system of intelligence sharing between the NWPCD (Thailand), The General Directorate for Environment, Water and Forests (CITES Management Authority of Madagascar) and associated enforcement agencies in both countries to combat the illegal export and import of Malagasy taxa from the range-state to Thailand's pet trade.

10. Increase intelligence sharing between NWPCD (Thailand), the Department of Wildlife and National Parks (CITES Management Authority of Peninsular Malaysia) and associated enforcement agencies to combat the ongoing supply of Malagasy reptiles from Thailand to the Malaysian pet trade.

INTRODUCTION

Malagasy reptiles are widely traded globally (Carpenter *et al*. 2004; Robson *et al*., 2005). This occurs despite long-term suspensions dating from 1994 to present for the majority of chameleon species and around half of the Day Gecko species *Phelsuma* spp. endemic to the island (CITES, 2010a). The international pet trade in particular severely impacts wild populations of Malagasy reptiles (Carpenter *et al*., 2004; Carpenter and Robson, 2005) and amphibians (Andreone *et al*., 2005) and has recently been identified by the Wildlife Conservation Society (2010) as the main cause of local extinctions of Radiated Tortoise *Astrochelys radiata* (listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and therefore prohibited from international trade for commercial purposes). Collection for the pet trade has also been listed by the International Union for Conservation of Nature (IUCN) Species Survival Commission (SSC) Amphibian Specialist Group as one of the main threats to the future persistence of many amphibian taxa endemic to Madagascar (Gascon *et al*., 2005). With few successful captive breeding projects (Carpenter *et al*., 2004) and a combined output that cannot account for the volume of individuals in trade (R. Hall, pers. comm. to M. Todd, January 2010), it is assumed the vast majority of these animals are sourced from the wild, both legally and illegally (Brady and Griffiths, 1999). In Thailand, some of the most popular non-native wild-caught reptiles represented in trade are Malagasy chameleons of the genera *Furcifer* and *Calumma* which are mainly restricted in Asia to the pet trades of Japan, Singapore, Taiwan, Hong Kong and Thailand; and tortoises which occur throughout the pet trade in Asia (O'Brien *et al*., 2003; and Anon, 2010). Frogs of the genera *Mantella* and *Scaphiophryne* are also widely traded along with other amphibian taxa (see Trenton *et al*., 2009). Collection for the pet trade and degraded habitats were identified by Andreone and Luiselli (2003) as the main threats to wild populations of Malagasy amphibians.

Of the 79 species of Malagasy chameleons (in three genera) only the Carpet Chameleon *Furcifer lateralis*, Panther Chameleon *Furcifer pardalis* and Oustalet's Giant Chameleon *Furcifer oustaleti* have adapted to existence in severly degraded habitats (Glaw and Vences, 2007). The ongoing degradation of wild habitats (Seddon *et al*., 2000) combined with illegal collection for the pet trade is therefore significantly compromising the future of the vast majority of chameleon taxa in Madagascar (Jenkins *et al*., 1999).

The commonly traded Panther Chameleon *Furcifer pardalis* exhibiting turquoise base colour consistent with specimens from Nosy Be, Madagascar. Male specimen encountered in trade in the UK, August 2009.

All Malagasy chameleons are listed in CITES Appendix I or II and four species are listed as Vulnerable by the IUCN Red List.

Radiated Tortoises *Astrochelys radiata* from Madagascar are commonly observed for sale in Thailand

Another endemic reptile species from Madagascar of particular concern is the Critically Endangered Ploughshare Tortoise *Astrochelys yniphora*, one of the rarest tortoises in the world with a wild population of 100 to 400 individuals and a range of only 1500 km^2 (Pedrono and Sarovy, 2000). Although rare in the wild, they widely occur in the pet trade in Indonesia, Malaysia and Thailand (Shepherd and Nijman, 2007; Shepherd and Nijman, 2008; TRAFFIC, 2010). Besides collection for the pet trade, all Malagasy Tortoises face the additional threat of predation by humans as a food item in Madagascar (O' Brien *et al.*, 2003).

Prior to this investigation, general observations of Thailand's legal and illegal pet trade by a TRAFFIC researcher since 2004 revealed that of the three chameleon genera mostly endemic to Madagascar, it is the often large and colourful *Calumma* and *Furcifer* taxa that occur in trade. By far the most commonly encountered species is the Panther Chameleon *Furcifer pardalis* occurring in many highly sought-after locality-specific colour morphs; the bright turquoise Nosy Be variant and red Maroantsetra / Nosy Mangabe variants being the most popular and also the most expensive. The two largest extant chameleon taxa, Parson's Giant Chameleon *Calumma parsonii* and Oustalet's Giant Chameleon *Furcifer oustaleti* are also widely traded. With the exception of the Antsingy Leaf Chameleon *Brookesia perarmata*, the smaller, cryptic and less colourful Leaf Chameleon *Brookesia* spp. have never been observed in the Thai pet trade by this researcher. The Antsingy Leaf Chameleon is the only Malagasy chameleon listed on Appendix I of CITES and thought to be endemic to Tsingy de Bemaraha Reserve in west central Madagascar (Vences and Glaw, 2008). Demand in Thailand is for both rare and charismatic taxa.

Chatuchak Market has been documented as the main hub for the reptile trade in Thailand (Shepherd and Nijman, 2008). However, trade was reported to occur at numerous markets across Bangkok including Chatuchak 2 Market in the Minburi suburb of Bangkok (C.R. Shepherd, TRAFFIC Southeast Asia, pers. comm. to M. Todd, January 2010), from residential addresses and on the internet. The latter applies especially to Malagasy reptiles and amphibians which are largely encountered in trade via the web. Dealers state this decentralisation away from Chatuchak Market is due more to the expansion of trade and the sim plicity of internet-based operations and less to increased detection and seizures of wildlife since the establishment of the Thai Wildlife Enforcement Network (Thai WEN) (see ASEAN-WEN, 2005).

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The red variant of Panther Chameleon, originating from Nosy Mangabe, Madagascar. This morph is highly sought after due to its striking colouration. Male specimen observed in trade at a dealer's house in Saraburi city, Thailand, January 2010.

Prior to these surveys TRAFFIC researchers were informed, by an aquarium fish dealer based in the north-eastern city of Buriram, that limited amounts of non-native reptiles have occurred in trade in provincial cities since 2008 and that some traditional aquatics-only shops in Bangkok have started to trade reptiles. Decentralisation of the market and a shift underground creates increased challenges for trade monitoring.

A significant proportion of the trade in live reptiles in Bangkok appears to be illegal (Shepherd and Nijman, 2008). In the case of Malagasy chameleons, these activities are rapidly being withdrawn from public view at traditional venues and the internet is instead becoming the main sales venue. Therefore, it cannot be assumed that the illegal chameleon trade is declining based only on observations of reduced or stabilized availability of animals at Chatuchak Market. It is essential to review the monitoring strategies of this expanding and often hidden trade. Conversely, open trade in Malagasy tortoises (see Nijman and Shepherd, 2007), and amphibians (see Upton, 2008) from markets and pet shops persist. In the case of tortoises, this is possibly due to the rapid rate at which these animals sell to impulse buyers (as opposed to the more specialized trade in chameleons where collectors will search for a specific species via internet forums). Amphibians are usually offered for sale in small tubs which may easily be removed from the shop or hidden from view during inspections by enforcement officials.

With these general observations noted, TRAFFIC carried out surveys and informal interviews during January 2010. These were conducted with dealers at:

- 14 shops in Chatuchak Market
- 11 shops in Chatuchak 2 Market
- Three shops within the Bangkok metropolitan area at Wong Wen Yai, Saphan Taksin and Dao Khanong
- Four shops in the north-eastern cities of Buriram, Surin and Nakorn Ratchasima
- One shop in Prakonchai Market, Buriram province
- At the residential addresses of seven traders

The objectives of the surveys and interviews were to:

- Gauge the extent of the trade in Malagasy chameleons and other key Malagasy reptile and amphibian taxa including the widely globally traded Madagascan Day Geckos *Phelsuma* spp., Leaf-Tailed Geckos *Uroplatus* spp., Ground Geckos *Paroedura* spp. and Mantella frogs *Mantella* spp. within Thailand;

- Identify new locations in the Bangkok area, outside of Chatuchak Market, where Malagasy taxa are sold;

- Estimate the turnover of Malagasy reptiles at Chatuchak Market during the survey period;

- Establish whether this trade is spreading to provincial cities;

- Establish the relative proportions of trade carried out in the physical market place versus the internet and residential addresses;

- Record new observations on the trade in general through *ad hoc* conversations with dealers to establish methods of acquisition, processes of laundering, details concerning smuggling of specimens into and out of Thailand and to assess death rates and husbandry techniques, both of which influence demand; and

- Record retail and wholesale pricing information across all taxa encountered.

Panther Chameleons are widely encountered in Thailand's reptile trade. Female specimen encountered in trade at a dealer's house in Saraburi city, Thailand, January 2010.

Shepherd and Nijman (2008) reported that Thai dealers mis-declare the origins of Star Tortoises *Geochelone* spp. so that they can obtain "legal" CITES import permits; a prerequisite for the issuance of re-export permits. During this investigation, data held at the UNEP-WCMC CITES trade database was analysed to ascertain whether this is also true for Malagasy reptiles listed in Appendix II of CITES.

LEGISLATION

Range State legislation and effectiveness

Madagascar became a signatory to CITES in 1975 with The General Directorate for Environment, Water and Forests (GDEWF) as the body responsible for implementing CITES regulations. Although one of the first countries to establish a protected area network (UNEP/UNCTAD, 2008) and with legislation on wildlife trade dating back to 1959 (*Order 2023/1959* on 14 May 1959 governing royalties and permits pertaining to the collection of butterflies), it was not until the establishment of *Law No. 2005-018* on international trade in species of wild fauna and flora, 17 October 2005, that the country implemented clear legislation governing the wildlife trade. In previous decades such legislation was hastily approved and applied in the wake of species-specific crises or political turmoil thus resulting in a plethora of, and sometimes conflicting, legislation which was rarely understood in its entirety by stakeholders (UNEP/UNCTAD, 2008). These reactionary measures include two moratoriums:

1. 1998 moratorium on chameleons and Day Geckos where only eight species were permitted for export for commercial purposes and all endemic chameleons and Day Geckos were included in Appendix II of CITES (UNEP/UNCTAD, 2008).

2. 2002 moratorium on all wildlife exports due to political upheaval where over-collection of wildlife may have gone unchecked. The moratorium was lifted in 2003 with CITES and TRAFFIC International providing guidance during the recovery period (UNEP / UNC TAD, 2008).

A review of Malagasy wildlife trade policy reported that procedures frequently change, communication between agencies and participants in trade is weak, CITES agency staff regularly change and this area is underfunded leading to poor implementation of wildlife legislation. Further observations in this review report exports exceeding quotas, questionable data employed in the setting of quotas and widespread illegal trafficking. Implementation of national wildlife laws remain inadequate allowing the persistence of illegal trade in threatened taxa (see UNEP / UNCTAD, 2008).

Currently a CITES trade suspension of most Malagasy chameleon taxa is in place (effective since 1994). This does not include the CITES Appendix II-listed Panther Chameleon, Carpet Chameleon *Furcifer lateralis*, Oustalet's Giant Chameleon or Madagascar Giant Spiny Chameleon *Furcifer verrucosus* (CITES, 2009).

Thai legislation and effectiveness

The National Park, Wildlife and Plant Conservation Department (NWPCD) is the lead CITES implementation authority of Thailand. Thailand became a signatory to CITES in 1983. Under the CITES National Legislation Project, the country's legislation was assessed as Category 1 (the highest category) suggesting current legislation is capable of properly implementing CITES regulations. Despite this, significant loopholes in Thailand's legislation remain that help perpetuate the illegal trade in protected species.

The Wild Animal Reservation and Protection Act BE 2535 (WARPA) regulates trade in both native and

exotic (non-native) species in Thailand. However, fundamental loopholes in WARPA exist which compromise its effectiveness in regulating trade in exotic (non-native) fauna. The chief concern centres around the issue that dealers holding exotic protected species are not required to prove the origin of any specimen unless they are in the process of exporting or importing. Effectively, once animals have been smuggled into Thailand, they may be traded openly unless the authorities can prove they were illegally imported. The fact that the burden of proof currently rests on the shoulders of enforcement authorities, deters them from carrying out investigations to address illegal wildlife trade effectively. In some cases it might be possible to collect enough evidence to bring a prosecution based on information held by the NWPCD, UNEP-WCMC trade database and evidence from surveys, but this rarely occurs.

METHODS

Survey methodology

Surveys of trade locations for Malagasy reptilian and amphibian taxa were conducted over 15 days between the 2 and 24 of January 2010. Identification of chameleon taxa was undertaken by a researcher with 20 years of experience working with captive reptiles and 15+ years of experience observing trade at Chatuchak Market. In the few cases where precise species identification was not possible, Malagasy chameleons with occipital lobes but lacking ventral crests or prominent casques were recorded as "*Calumma* spp." and all specimens with large rounded casques in place of occipital lobes were recorded as "*Furcifer* spp.".

Surveys covered 33 reptile/pet shops and seven internet/private dealers located in the Bangkok/Thonburi metropolitan area and provincial cities (Table 1). One dealer at Chatuchak Market attended meetings with a TRAFFIC researcher on three occasions. Another accompanied this researcher to Buriram province in north-eastern Thailand, allowing an extensive survey of Prakonchai Market. It is important to note that some dealers observed at Chatuchak Market were also visited at their residential addresses since they sell animals over the internet. A single dealer may account for two trading entities if they hold stock for trade at their business premises and stock specifically for trade through the internet. Regular stock availability updates were requested by text message or email.

Dealers operating via the internet and from residential addresses were identified through extensive monitoring of the main Thai online forum for reptile hobbyists; advertisements placed in a Thai reptile hobbyist magazine; *ad hoc* conversations with dealers and clients at Chatuchak Market and Chatuchak 2 Market; enquiries to a Bangkok-based veterinary surgeon who regularly advertises in reptile magazines; and through conversations with a Taiwan-based exporter of reptile husbandry equipment to Thailand. Contact with this exporter was initiated by telephone and subsequent conversations were related to the viability of establishing a new reptile retail outlet in Thailand, requesting information on possible competitor locations and suppliers of livestock.

Table 1
Locations of surveyed premises

Location	City / Province	Number of premises visited	Number of occasions visited
Commercial premises			
Chatuchak Market	Bangkok	14	8
Chatuchak 2 Market	Minburi, Bangkok	11	6
Dao Khanong	Thonburi, Bangkok	1	1
Saphan Taksin	Thonburi, Bangkok	1	1
Wong Wen Yai	Thonburi, Bangkok	1	1
Nakorn Ratchasima city	Nakorn Ratchasima province	1	1
Buriram city	Buriram province	2	2
Prakonchai market	Buriram province	1	1
Surin city	Surin province	1	1
Residential addresses			
Klong Toei	Bangkok	1	1
Bang Pa - In	Bangkok	1	1
Wat Lao	Thonburi, Bangkok	1	1
Krung Thonburi	Thonburi, Bangkok	1	1
Saraburi city	Saraburi province	1	1
Rayong city	Rayong province	1	1
Prakonchai	Buriram province	1	1

TRAFFIC researchers posed as potential exporters, or traders willing to sell nationally via the internet. All vendors were asked for the following information:

- Prices of focal taxa at both retail and wholesale for export or national retail trade via the internet
- Whether the specimens were captive-bred / farmed and if not where they had originated
- If the specimens had been smuggled, then how the dealer would convince enforcement officials of their legal acquisition
- Which countries the dealers had exported to in the past
- Methods employed in the illegal export of specimens
- If smuggling techniques had been undertaken in the past, then how successful had they been *vis-à-vis* detection and/or prosecution
- Estimation of death rates during importation to Thailand and during the time held in the dealer's premises

Questions concerning mortality rates were related to the process of unit pricing by taking into account loss of stock, thus staying consistent with TRAFFIC researchers' cover as traders. Responses by dealers were positive due to the engagement of one TRAFFIC researcher in the (legal) European reptile industry over the last 15 years. This allowed lengthy conversations with dealers concerning origins of specimens and strategies to smuggle reptiles out of Thailand. Dealers refused to name range state suppliers. Questioning was carried out mainly in English with Thai, Lao or Khmer employed where needed.

Assignment of trade category and avoiding miscounts

When locations were surveyed on more than one occasion, to avoid counting the same specimens multiple times, assessment was made as to the actual number encountered based on a system of checks concerning visual features such as size, age, sex, colouration and pattern. Due to the nature of covert work, this system sometimes produced estimations and not definite figures. Where possible, information on turnover between visits was sought from dealers. Estimations of quantity from these two sources were cross-referenced to increase accuracy.

Subsequent to counting, each specimen was assigned to one of two trade categories; defined as:

1. "Residential" (R); which was essentially web-based activity with animals supplied from residential addresses. In some cases "residential" dealers also owned a business premises selling wildlife
2. "Trade" (T); which encompassed all public trade from business premises

When encountering specimens at residential addresses of dealers who also run business premises, further investigation was carried out to ascertain the intended sales destination. In this way, accurate assignation to trade category was enabled.

Methodology for the analysis of data concerning CITES trade

Records held at the UNEP-WCMC CITES trade database were analysed for each taxon since listed until 2009 to:

- Identify which countries are recorded as supplying large amounts of Malagasy taxa, declared captive-bred, to Thailand
- Assess the viability of claimed source countries as participating in the large scale captive propagation of Malagasy reptiles and amphibians
- Identify regular recipient countries for re-exports of Malagasy reptiles and amphibians from Thailand
- Determine whether reported legal imports of Malagasy species adequately cover the volume of Malagasy reptiles and amphibians in national trade

Analysis was carried out in two ways. Firstly, all records of imports from countries claimed as sources of captive-bred animals, usually Lebanon (LB) and Kazakhstan (KZ), by Thailand were analysed to ascertain the likelihood of breeding populations in those countries. All exports of Malagasy reptiles reported by all CITES parties to these countries were also analysed. Kazakhstan has been a CITES party since 2000, but little data has been submitted to the database, whilst Lebanon is not a signatory to CITES and therefore not required to report trade. Thus, data held by UNEP-WCMC CITES trade database submitted by these countries is scarce. However, as importing countries are required to submit details of all imports (whether the exporting country is a signatory to CITES or not) it is possible to collect data concerning shipments of CITES-listed taxa from Lebanon and Kazakhstan.

Secondly, reporting by Thailand of imports was compared to reports made by claimed source countries of exports to Thailand. Discrepancies in reporting between import and export countries highlight whether

Thai dealers may have mis-declared the origins or quantities of specimens to facilitate the acquisition of re-export permits for smuggled specimens. Either of these activities would generate a supply of illegally sourced reptiles into international trade.

Analysis of official seizure data

Seizure records concerning illegal shipments of reptiles and amphibians (both native and non-native) between 2005 and 2010 were obtained from the Thai government. The data were analysed to establish whether detection of illegal shipments of Malagasy reptiles has been successful during this period. It should be noted that a consequence of the apparent loophole in WARPA is that seizures of non-native CITES-listed taxa are only possible where the specimens are encountered during the smuggling process. The seizure of animals encountered in national trade at shops or on the internet may not be successful unless authorities can prove that the specimens entered Thailand illegally. Therefore, data concerning seizures of Malagasy reptiles and amphibians are scarce.

RESULTS

Market surveys and meetings attended with internet dealers

Surveys carried out across 33 shops and the homes of seven internet dealers resulted in the observation of 591 Malagasy reptiles and amphibians (Figure 1). The surveyed total included: 233 Malagasy chameleons representing 16 species in three genera, two Pictus Geckos *Paroedura picta*, 140 Malagasy tortoises representing three species in two genera and eight Malagasy snakes representing four species in three genera (Table 2). Seven amphibian species (208 individuals) were also recorded accounting for four genera. Two subspecies of the Spider Tortoises were observed, i.e. *P. a. arachnoides* (yellow plastron with hinge) and *P. a. brygooi* (yellow and black plastron without hinge). One mammal, the Lesser Madagascan Tenrec *Echinops telfairi* was also encountered (12 individuals).

Fig. 1
Quantities of Malagasy reptiles and amphibians encountered in trade in Thailand during January 2010

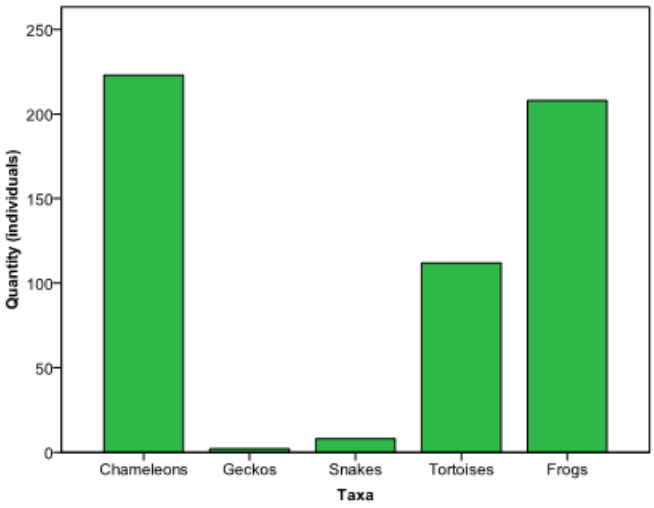

Table 2

Quantities of Malagasy taxa encountered in Thailand's pet trade during January 2010

Taxa	Genus	Species	Individuals
Chameleons	*Furcifer*	8	107
	Calumma	7	115
	Brookesia	1	11
Geckos	*Paroedura*	1	2
Snakes	*Acantrophis*	2	3
	Sanzinia	1	2
	Leioheterodon	1	3
Tortoises	*Astrochelys*	2	109
	Pyxis	1	3
Frogs	*Dyscophus*	2	48
	Scaphiophryne	2	84
	Heterixalus	2	26
	Mantella	1	50

Trade turnover of Malagasy reptiles

Turnover could not be quantified from dealers who were web-based or operating from residential addresses as surveys were carried out only once and the response to regular stock update requests made by TRAFFIC researchers was low. However, turnover of chameleons and tortoises at Chatuchak Market during January 2010 was observed (Table 3). Availability of Malagasy chameleons (14 individuals), and therefore turnover, was low at this location. Only one tortoise endemic to Madagascar, the Flat-tailed Tortoise *Pyxis planicauda*, was not observed during this study. Trade in tortoises at this market was high even though dealers consistently complained that current trade was slow due to current political instability and the global recession. Stock turnover was measured roughly in weeks as opposed to days, in contrast to the rapid turnover rate for tortoises in 2007 and 2008 reported by Shepherd and Nijman (2008).

Pictus Gecko observed at Chatuchak Market, Bangkok, January 2010.

Table 3
Turnover of Malagasy reptiles and amphibians at Chatuchak Market, Bangkok from 1 January 2010 to 24 January 2010

Species name	Quantity sold	Percentage rate of turnover (January 2010)
Panther Chameleon *Furifer pardalis*	10	100
Canopy Chameleon *Furcifer willsii*	2	100
O'Shaughnessy's Chameleon *Calumma oshaughnessyi*	2	100
Radiated Tortoise *Astrochelys radiata*	36	75
Ploughshare Tortoise *Astrochelys yniphora*	3	100
Spider Tortoise *Pyxis arachnoides*	14	67
Madagascan Horned Frog *Scaphiophryne madagascariensis*	40	100

Results of surveys carried out at residential addresses

Two hundred and forty-five Malagasy reptiles representing 22 species and eight genera were recorded and assigned to the residential category. Dealers were located both within the Bangkok metropolitan area (one each in Wat Lao, Klong Toei, Bang Pa-In and Krung Thonburi) and in provincial areas (one each in Saraburi, Saraburi Province; Rayong, Rayong Province and Prakonchai, Buriram Province). The majority of specimens in trade were held by internet dealers (five of which also owned business premises in Bangkok) for dispersal from residential addresses. Total figures for specimens in residential trade include those held at the houses of dealers with shops which, due to the species rare occurrence in trade, could attract the attention of officials if sold openly. Trade from residential addresses was heavily orientated towards chameleons (see Fig. 2) with all 16 species recorded occurring in the residential category. Only the Panther Chameleon, Canopy Chameleon and O'Shaughnessy's Chameleon also occurred in the trade category.

Results of surveys carried out at Chatuchak Market, Bangkok

Eighty-eight Malagasy reptiles representing seven species and five genera were recorded at Chatuchak market, although this included only 14 chameleons. Trade at Chatuchak Market was heavily orientated towards Malagasy tortoises. This market was also the main outlet for Malagasy amphibians with the Madagascan Horned Frog *Scaphiophyrne madagascariensis* (52 individuals), Emerald Burrowing Frog *Scaphiophryne menabensis* (17 individuals), Brown Mantella *Mantella betsileo* (~50 individuals) and Madagascan Spotted Treefrog *Heterixalus alboguttatus* (17 individuals), recorded. These specimens accounted for 65% of all Malagasy amphibians encountered during the investigation. One Malagasy mammal, the Lesser Madagascan Tenrec *Echinops telfairi* (12 individuals) was noted at one shop dealing in reptiles, primates and other mammals.

Results of surveys carried out at Chatuchak 2 Market, Minburi, Bangkok

Thirty-two Malagasy reptiles representing seven species and five genera were recorded at Chatuchak 2 market. This was the only location where Malagasy snakes were encountered, including all three taxa endemic to Madagascar: Dumeril's Boa *Acantrophis dumerili* (2 individuals); Malagasy Ground Boa *Acantrophis madagascariensis* (1 individual); Madagascan Tree Boa *Sanzinia madagascariensis* (2 individuals); and one colubrid, the Malagasy Hognose Snake *Leioheterodon madagascariensis* (three

individuals). The Antsingy Leaf Chameleon (7 individuals) was the only chameleon species encountered. Both Radiated Tortoises (14 individuals) and Spider Tortoises (three individuals) were observed.

Thailand's trade in Malagasy species does not exclusively cover reptiles. TRAFFIC researchers recorded 12 Lesser Madagascan Tenrec at one shop in Chatuchak Market. Unsexed specimen encountered in at Chatuchak Market, Bangkok, January, 2010

The specimens listed above were noted at one shop and on only one occasion. The dealer related that these animals were just for display and not on sale at this location. However, it was further explained to TRAFFIC researchers that he was related to a vendor at Chatuchak Market and the majority of these animals were due for sale via the internet by the Chatuchak dealer, however the tortoises would be sold in Chatuchak Market. Most traders at Chatuchak 2 agreed that their location was firmly orientated towards the family pet market and was not a location for illegal wildlife trade. Subsequent surveys went some way to supporting this view with not one further illegal specimen (according to Thai wildlife legislation), native or non-native, observed. However, dealers operating at this location must still be regarded as contributing to the illegal trade of Malagasy reptiles if they engage in the holding of specimens intended for sale elsewhere.

Results of surveys carried out at shops in Wong Wen Yai, Saphan Taksin and Dao Khanong, Bangkok

Seven Panther Chameleons and five Radiated Tortoises were recorded between the two shops at Saphan Taksin and Dao Khanong. Dealers reported they had recently started selling popular reptile species to boost revenue. The shop in Wong Wen Yai did not stock reptiles. However, Tomato Frogs *Dyscophus antongilii* (10 individuals), False Tomato Frogs *Dyscophus guineti* (24 individuals) and Madagascan Horned Frogs *Scaphiophryne madagascariensis* (15 individuals) were encountered at this location.

Results of surveys carried out at shops in the provincial cities of Buriram, Surin and Nakhorn Ratchasima

Malagasy reptiles were not offered for sale at the shop in Buriram city. Similarly, at one shop in Prakonchai Market (Buriram province), no Malagasy reptiles were recorded. However, three Spider Tortoises observed at the house of the shop owner's brother were due for imminent delivery to the shop in Prakonchai Market. At one shop in Surin city, three chameleons were encountered but due to poor health and severe stress, lack of colouration did not allow the species to be identified. These animals were recorded as unidentified chameleons belonging to the *Furcifer* genus. In Nakorn Ratchasima one adult pair of Panther Chameleons and a single Radiated Tortoise were recorded. Although a small market in its infancy, the reptile trade at provincial venues can be expected to rise as dealers reported positive sales.

Analysis of market share

From a total of 591 Malagasy reptiles and amphibians observed at residential addresses and markets in Thailand, 225 specimens were assigned to the residential category and 366 specimens were assigned to the trade category. The trade category held the largest market share (Figure 2). This was due to the large-scale public vending of Radiated Tortoises (105 specimens), and amphibians (199 specimens) in the trade category. Malagasy mammals (12 individuals) were assigned to the trade category but discounted from market analysis as this investigation was focussed on the trade in reptiles and amphibians only.

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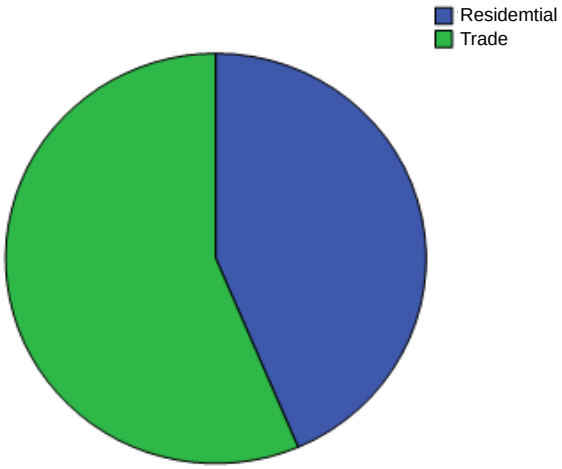
False Tomato Frog encountered at an aquatics shop in Dao Khanong, Bangkok, January 2010

Fig. 2

Market share by trade (T) and residential (R) categories: T=61.9%; R=38.1%.



Further analysis of the survey data showed that Malagasy chameleons mainly occured in the residential trade category (n = 206, N = 233, f = 0.88) and tortoises occurred almost solely in the trade category (n = 139, N = 140, f = 0.99). Amphibians were always encountered in commercial premises excepting the Chameleon Treefrog *Heterixalus madgascariensis* which was encountered at a dealer's house in Prakonchai, Buriram province (nine individuals).

Pricing of Malagasy reptiles and amphibians

Pricing of chameleons appeared to be somewhat opportunistic. Quotes given to the Western TRAFFIC researcher, provably engaged in the reptile trade, were generally lower than those quoted for the Thai researchers.

In comparing the retail and wholesale pricing for Malagasy reptiles between Northern Europe and Thailand, it was observed that prices were broadly similar. The prices of five chameleon species were either the same or marginally more expensive in Thai trade, seven species were marginally cheaper. Malagasy tortoises are largely unavailable in Northern Europe, although two suppliers of Radiated Tortoises were located in the UK, both quoting prices of GBP3000 (USD4800 at 2010 rates) for specimens approximately two years old. The unit price for specimens of similar age in Thailand was significantly lower at THB9000 (USD273 at 2010 rates).

Prices for Tomato frogs in Northern Europe were unavailable. Brown Mantella were twice as expensive in Thailand than in Northern Europe. See Table 4.

Table 4
Wholesale and retail prices for Malagasy reptiles in Northern Europe and Thailand

Common Name	Northern Europe				Thailand			
	Retail		Trade		Retail		Trade	
	USD	THB	USD	THB	USD	THB	USD	THB
Panther Chameleon	288	9500	155	5100	303	10 000	197	6500
Labord's Chameleon	303	10 000	155	5100	364	12 000	152	5000
Canopy Chameleon	303	10 000	158	5200	303	10 000	182	6000
South-central Chameleon	303	10 000	152	5000	273	9000	_	_
Oustalet's Giant Chameleon	621	20 500	511	16 850	455	15 000	303	10 000
Two-horned Chameleon	309	10 200	110	3630	364	12 000	_	_
Rhinoceros Chameleon	_	_	_	_	364	12 000	242	8000
Carpet Chameleon	232	7650	101	3320	242	8000	167	5500
Parson's Giant Chameleon	621	20 500	500	16 500	485	16 000	364	12 000
Yellow-green Chameleon	273	9000	152	5000	182	6000	145	4800
Flat-casqued Chameleon	288	9500	158	5200	212	7000	_	_
Oshaughnessyi's Chameleon	273	9000	167	5500	227	7500	158	5200
Blade Chameleon	_	_	_	_	_	_	167	5500
Big-nosed Chameleon	_	_	_	_	174	5750	_	_
Vencesi's Chameleon	_	_	_	_	270	8900	182	6000
Antsingy Leaf Chameleon	758	25 000	_	_	469	15 500	_	_
Pictus Ground Gecko	116	3825	46	1530	20	650	_	_
Dumeril's Boa	167	5500	116	3825	288	9500	_	_
Malagasy Ground Boa	288	9500	185	6120	_	_	_	_
Madagascan Tree Boa	424	14 000	270	8925	386	12 750	_	_
Malagasy Hognose Snake	216	7140	67	2200	76	2500	53	1750
Radiated Tortoise	4636	153 000	_	_	273	9000	182	6000
Ploughshare Tortoise	_	_	_	_	_	_	303	10 000
Spider Tortoise	_	_	_	_	288	9500	187	6200
Brown Mantella	20	650	10	325	40	1300	_	_
Tomato Frog					50	1425		

Sources: For Northern Europe pricing information: K. Charam, Pit Viper Lodge, *in litt.* to M. Todd, December 2009; B. Sutcliffe, Viper & Vine, pers. comm., to M. Todd, January 2010; R. Hall, pers comm., to M. Todd, January 2010; and various Germany, Netherlands and UK-based reptile outlets.
All figures were calculated as an average of at least three quotes from independent sources.
THB to USD conversion carried out at January 2010 rates USD1 : THB33.

IUCN classifications and CITES status of Malagasy reptiles and amphibians encountered in Thailand's pet trade

Table 5

Quantities of Malagasy taxa encountered in Thailand's pet trade during January 2010 with IUCN classifications and CITES listings

Notations: (*) reported import/export quantity is smaller than the number of specimens observed during this survey (-) unlisted (LC) Least Concern (NT) Near Threatened (VU) Vulnerable (CR) Critically Endangered

Species Name	IUCN	CITES	Quantity
Panther Chameleon *Furifer pardalis*	_	II	60
Labord's Chameleon *Furcifer labordi*	VU	II	18
Canopy Chameleon *Furcifer willsii*	_	II	8
South-central Chameleon *Furcifer minor**	VU	II	7
Oustalet's Giant Chameleon *Furcifer oustaleti*	_	II	4
Two-horned Chameleon *Furcifer bifidus*	_	II	3
Rhinoceros Chameleon *Furcifer rhinoceratus*	_	II	2
Carpet Chameleon *Furcifer lateralis*	_	II	2
Furcifer spp.	_	II	3
Parson's Giant Chameleon *Calumma parsonii*	_	II	28
Yellow-green Chameleon *Calumma malthe*	_	II	28
Flat-casqued Chameleon *Calumma globifer*	_	II	24
Oshaughnessy's Chameleon *Calumma oshaughnessyi*	_	II	19
Blade Chameleon *Calumma gallus* *	_	II	13
Big-nosed Chameleon *Calumma nasuta*	_	II	2
Vencesi's Chameleon *Calumma vencesi* *	_	II	1
Antsingy Leaf Chameleon *Brookesia perarmata* *	VU	I	11
Pictus Ground Gecko *Paroedura picta*	_	_	2
Dumeril's Boa *Acantrophis dumerili* *	VU	I	2
Malagasy Ground Boa *Acantrophis madagascariensis**	VU	I	1
Madagascan Tree Boa *Sanzinia madagascariensis* *	VU	I	2
Malagasy Hognose Snake *Leioheterodon madagascariensis*	_	_	3
Radiated Tortoise *Astrochelys radiata* *	CR	I	106
Ploughshare Tortoise *Astrochelys yniphora* *	CR	I	3
Spider Tortoise *Pyxis arachnoides* *	CR	I	31
Tomato Frog *Dyscophus antongilii* *	NT	I	24
False Tomato Frog *Dyscophus guineti*	LC	_	24
Madagascan Horned Frog *Scaphiophryne madagascariensis*	NT	_	67
Emerald Burrowing Frog *Scaphiophryne menabensis*	VU	_	17
Madagascan Spotted Treefrog *Heterixalus alboguttatus*	LC	_	17
Chameleon Treefrog *Heterixalus madagascariensis*	LC	_	9
Brown Mantella *Mantella betsileo*	LC	II	~50
Lesser Madagascan Tenrec *Echinops telfairi*	_	LC	12

Sources: IUCN Red List, UNEP-WCMC CITES trade database

All but two of the reptile species encountered during this research were listed in either CITES Appendix I (Antsingy Leaf Chameleon; all three tortoise species; three boa species) or Appendix II (15 chameleon species). The Malagasy Hognose Snake and Pictus Gecko are currently unlisted and their status has not, as of yet, been classified by the IUCN Red List. Two CITES-listed amphibians were encountered: the Tomato Frog listed in Appendix I and the Brown Mantella listed in Appendix II. Of the non-CITES amphibians recorded, the Emerald Burrowing Frog is classified as Vulnerable by the IUCN and both the Madagascan Horned Frog and Tomato Frog are classified as Near Threatened. See Table 5.

The Brown Mantellas is listed on Appendix II of CITES. These specimens observed at Chatuchak Market, Bangkok, January 2010.

The Labord's Chameleon, South-central Chameleon, Antsingy Leaf Chameleon (accounting for 36 individuals encountered during this investigation) and all three species of Boa (5 individuals) are classified as Vulnerable by the IUCN Red List. All Malagasy tortoises (140 individuals) are classified as Critically Endangered with the exception of the Bell's Hinged-back Tortoise *Kinixys belliana*, which was probably introduced to Madagascar (Andreone *et al*., 2003).

Malagasy frogs encountered in the Thai pet trade, January, 2010. Above left: Chameleon Treefrog. Above right: Emerald Burrowing Frog, classified as Vulnerable by the IUCN Red Lists

Discussion and results of data analysis from the UNEP-WCMC CITES trade database

There are no reports of Thai imports for five of the Malagasy reptile species recorded by these surveys since the inception of CITES in 1975 (see Table 5). As there are no reported breeding operations in Thailand for any of these species, it is likely that all specimens of Vencesi's Chameleon, Blade Chameleon, Malagasy Ground Boa, Madagascan Tree Boa and Ploughshare Tortoise encountered during the surveys entered the country illegally. There should be no commercial import or export for Spider Tortoises, Ploughshare Tortoises or Radiated Tortoises as these are all listed in CITES Appendix I which prohibits commercial trade. Again, there are no breeding operations within Thailand producing these three species, and trade in these should be considered illegal. Only one specimen of Dumeril's Boa has been reportedly imported into Thailand (listed only as an export from Denmark in 1995 and not reported by Thailand) and this cannot account for the two juveniles observed at Chatuchak 2 Market which should also be considered illegal.

Dumeril's Boa shown above at a shop in Chatuchak Market 2, Minburi, Bangkok, January 2010

Prior to 2003, the Antsingy Leaf Chameleon was not listed by CITES. Therefore it is possible that specimens encountered during the survey were offspring produced by legally imported founding stock prior to the inclusion of this species in Appendix I in 2003. However, there are no known breeding operations in Thailand for this species.

Large numbers of reptilian taxa listed in CITES Appendix II imported to Thailand were reported as re-exported from Lebanon and often declared as captive-bred in Kazakhstan (Shepherd and Nijman, 2008). Whilst Malagasy chameleons of the genera *Furcifer* and *Calumma* may be bred in captivity, regular successes are only recorded in Panther Chameleons and the majority of taxa have never been bred in the commercial context (R. Hall, pers. comm. to M. Todd, December 2009). Between the hundreds of zoos that are part of the International Species Information System (ISIS) there were no offspring reportedly produced by any chameleon species belonging to either *Furcifer* or *Calumma* in the last 12 months despite a total stock of 219 animals across these two genera (ISIS, 2010). Due to low hatch rates and poor neonate survival (Anderson, 1998) it is doubtful whether these are produced on a commercial scale in either Lebanon or Kazakhstan. Kazakhstan has not reported a single importation of Malagasy chameleons across all range state genera since the inception of CITES and no CITES party has ever reported an export to Kazakhstan, therefore the presence of a captive chameleon population in this country remains doubtful. Across all three chameleon genera endemic to Madagascar, only three exports have been reported (by Czech Republic**)** to Lebanon since 1975. These exports totalled 32 individuals of *Calumma* species from three taxa, an insufficient captive population to produce offspring on a commercial scale. If the 32 individuals were comprised of 16 male–female pairs then the maximum breeding capacity of the group in 2005 would have been ~320 offspring (presuming maximum clutch size for each species and 100% hatch rates and neonate survival rates). These individuals could not be the founding stock for the captive breeding operation that

reportedly resulted in the 3738 animals imported as captive bred by Thailand through Lebanon and/or Kazakhstan during 2004 and 2005. Furthermore, all three imports of Malagasy chameleons to Lebanon occurred in 2005 and so imports reported by Thailand during 2004 with origin Lebanon may have been fraudulent applications made to generate surplus import permits. Nijman and Shepherd (2010) reported the same route to market for CITES Appendix II-listed Poison Arrow Frogs with Thailand reporting the import of >2500 specimens (captive-bred in Kazakhstan) during 2004 – 2008; Kazakhstan reported no exports of these animals during the same period.

2004 and 2005 were identified as the only years when Thailand reported the import of 3778 Malagasy chameleons (*Calumma* and *Furcifer* genera only) stating Lebanon as the country of re-export and Kazakhstan as the origin with source code C (captive-bred). Total reported imports by Thailand from all other countries for the same years were 1066 individuals. Thus, during the period 2004 – 2005, the Lebanon/Kazakhstan route accounted for 78% of all imports to Thailand. Crucially, two dealers reported to TRAFFIC researchers that the purpose of applying for import permits was to cover export requirements when animals smuggled to Thailand from Madagascar are sold into international trade since proof of legal importation is required before export permits can be issued.

Exports of Malagasy chameleons from Thailand (reported by Thailand) from 2004 – 2009 numbered 1259 individuals. However, importing countries reported this number as 1555 individuals. The gross export figure for the period (allowing for instances where quantities were not reported by either the exporting or importing country) was 1783 individuals. Underreporting, by Thailand, of exported individuals may be an attempt by dealers to expand the use of import permits to allow the re-export of more specimens than the original quantity declared.

Thailand's export of Malagasy chameleons is mainly shipped to Japan, Hong Kong and Taiwan. During the period 2004 – 2009 Japan reported the import of 1369 Malagasy chameleons from Thailand, accounting for ~70% of the gross export figure for Thailand and ~12% of the total import of Malagasy chameleons by Japan. It is possible that fauna laundered through Thailand may contribute significantly to the proportion of illegal specimens in trade in other consumer states.

Close cooperation between Thai and Japanese wildlife dealers cannot be ruled out. Further analysis revealed that Japan is the only country apart from Thailand which reports Lebanon as a source or re-export country and Kazakhstan as a country of origin for Malagasy chameleons. The first utilization of the Lebanon/Kazakhstan route for an import of any Malagasy species was by Japan in 2003 when 100 live Spider Tortoises reportedly captive-bred in Kazakhstan were re-exported through Lebanon to Japan. Spider Tortoises are noted for producing annual clutches of a single large egg (Glaw and Vences, 2008). Kazakhstan has never reported any import of this species. Since CITES was established, no CITES party has reported any export to Kazakhstan, therefore the existence of a captive population capable of producing 100 offspring in the country is doubtful. Furthermore, the first utilization of this route for Star Tortoises was also by Japan when 700 Indian Star Tortoises *Geochelone elegans* reportedly captive-bred in Lebanon were imported in 2000. In 2004, the same route was used again when Thailand received two shipments of Indian Star Tortoises from Japan re-exported through Lebanon the previous year. Across all signatories to CITES this route has only ever been utilized by Thailand and Japan directly, with Japan making the first imports across all taxa encountered during this survey. Subsequent to original Japan imports from Lebanon and/or Kazakhstan, Thailand invariably follows with multiple shipments of the same taxa with the majority of these animals being offered for sale in Thailand and a significant proportion re-exported to Japan.

In the period 2004 – 2009, 2096 Mantella Frogs were imported to Thailand from Madagascar with no imports reported by Thailand from other countries; in addition 10 Tomato Frogs were imported from the Czech Republic during 2004.

Results of analysis of official seizure data held by the Thai government

From 2005 – 2010, Thailand recorded seizures of lizards on one occasion in 2005 (1 individual); one occasion in 2008 (113 individuals); and two occasions in 2009 (total: 1140 individuals). However, as these animals were listed as either "live lizards" or "live geckos" and no information concerning the shipments origins were recorded, it was not possible to determine if these figures included Malagasy animals. Other recently reported seizures involving reptiles from Madagascar include one Ploughshare Tortoise seized by police in the Chatuchak Market in March 2009 and another Ploughshare Tortoise and 217 Radiated Tortoises seized by Customs at the airport in October 2010.

OBSERVATIONS AND DISCUSSION

Increasing demand for amphibians was reported by dealers and clients. This Madagascan Spotted Treefrog was on sale at Chatuchak Market, January 2010

Despite a trade suspension by CITES (2009) on all Malagasy chameleons of the genera *Calumma* and *Furcifer* (except the Panther Chameleon, Carpet Chameleon, Oustalet's Giant Chameleon and Madagascar Giant Spiny Chameleon *Furcifer verrucosus*) and the fact that all Malagasy tortoises are Appendix I-listed species (therefore, international trade for commercial purposes is prohibited), Thailand's trade in Malagasy reptiles is focused mostly on these animals. Whilst clients and dealers reported little demand for other Malagasy reptiles, demand was reported as increasing for Malagasy amphibians. Although widely traded globally (Auliya, 2003), Madagascan Day Geckos and Leaf-Tailed Geckos were not observed in trade in Thailand; only two Pictus Geckos were recorded at one shop and were reported to have been there for over a year.

Overview of trade processing: illegal importation, laundering and re-export

It was openly disclosed to TRAFFIC researchers by dealers that Malagasy reptiles and amphibians are smuggled into Thailand by both Thai and Malagasy nationals. Advice was openly given on smuggling reptiles out of Thailand to clients and to TRAFFIC researchers. One dealer reported that he has two regular clients from Malaysia who smuggle reptiles out of Thailand on a monthly basis. This highlights failings in the methods employed in the detection of illegal wildlife shipments by authorities.

From results of analysis of the UNEP-WCMC CITES trade database and through corroboration with a Thai reptile dealer during a trip to Buriram province with one TRAFFIC researcher during this investigation (and widely related by other dealers on numerous occasions), it was identified that the laundering process of species listed in Appendix II of CITES (species listed in Appendix I are effectively prohibited from international trade) takes place in two main stages:

1. Application for Thai import permit with dealers often submitting Lebanon as the country of origin or re-export and / or Kazakhstan as the source country with the origins of specimens reported as captive-bred. Shipments of animals from these countries do not actually take place but the process of application generates CITES permits which can subsequently be used for animals smuggled from Madagascar. It was not established whether this process is utilized by most dealers for their own trading activities or organized by a handful of key dealers on behalf of the industry as a whole.

2. NWPCD requires the production of original CITES export permits (for example in this case, from Lebanon or, Kazakhstan) to prove the specimens were acquired legally before a CITES re-export permit can be issued. Thai CITES import permits have already been generated in stage one, however this is not sufficient to generate (re)export permits. It is unclear whether customs are (in contravention to CITES regulations) clearing shipments for re-export based solely on Thai permits or whether fraudulently acquired permits from Lebanon or Kazakhstan are presented. However, re-export permits are issued by the Thai government and it is in this way that Thailand has become a source of illegally acquired wild-caught Malagasy reptiles into international trade.

Dealers related that illegally sourced Appendix II-listed specimens accompanied by fraudulently acquired CITES permits are sent by air, mainly to Japan, Hong Kong and Taiwan, from where they may be again re-exported. According to dealers, as export permits are not issued for Appendix I specimens intended for trade purposes, these animals are smuggled via established overland routes to Malaysia through the border towns of Sadao and Betong.

Captive breeding of Malagasy chameleons in Thailand

Attempts by dealers have been made to breed chameleons. Founding stock was reported to have been carefully selected as captive-bred as these specimens have the best chance of reproducing successfully in captivity. However, this has been relatively unsuccessful with few positive results noted. One dealer stated that motivation towards establishing captive breeding projects has waned as there is no clear procedure enabling the legal registration of offspring. This hampers any hope of a Thailand-based source of captive-bred chameleons since both officials and trade observers alike assume all chameleons to have been smuggled as dealers are unable to prove otherwise.

One dealer at Chatuchak Market related that he could establish fake captive breeding operations for Malagasy reptiles and then export illegally sourced specimens to Europe, USA and Japan. Further conversation revealed that one internet company also offers to do this and that “fake” breeding operations can be established to convince the Thai authorities of legal propagation activity. In reality, this is a way of laundering illegal animals into the legal CITES system in Thailand. When questioned as to how the legal importation of breeding stock could be proven to authorities, the dealer reported that he held surplus import permits for Malagasy species which could serve this purpose. The dealer was not willing to discuss how CITES permits were obtained. He further related that even if legal export from Thailand was not possible, animals could be smuggled to Indonesia and subsequently laundered by registered chameleon ranching operations in those countries. These facilities were reported as being owned by Indonesian, Malaysian, North American and European (UK and German) nationals. Crucially, two of the European owners also were noted to run companies supplying live reptiles, exported from these operations, to the pet trade in Northern Europe. This highlights the potential for an illegal trade chain spanning Africa, Asia and Europe.

Occurrence of Malagasy chameleons in trade in Thailand under CITES export quotas

Annual export quotas for wild-caught chameleons are sometimes issued by the General Directorate for Environment Water and Forests (as the body in charge of implementing CITES regulations in Madagascar) (CITES, 2010b). Across all chameleon species encountered in trade in Thailand, export quotas have only been consistently issued for CITES Appendix II-listed Panther Chameleons, Carpet Chameleons and Oustalet's Giant Chameleons; 2000 of each species per year 1999 – 2009 (CITES, 2010). Thailand began importing chameleons from Madagascar under quota in 2002.

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Neonate Malagasy chameleons were offered to TRAFFIC researchers. Neonates were only available as captive-bred specimens. This specimen was encountered in trade in UK, July 2009

In the period prior to reporting of the Lebanon / Kazakhstan route (2002 – 2004), Thailand imported 1624 wild-caught individuals from Madagascar across these three species, accounting for 9.02% of the total quota (18 000 individuals). However, since reporting of the Lebanon / Kazakhstan route (2005 – 2009), direct legal imports under the quota dropped dramatically, with Thailand importing only 308 individuals, accounting for only 1.02% of the export quota (30 000 individuals). By contrast, in 2004 and 2005 alone, 3738 Malagasy chameleons, declared as captive bred, were reported as originating in Kazakhstan and re-exported through Lebanon, or directly imported from Lebanon or Kazakhstan, to Thailand. Due to the unlikelihood of either Lebanon or Kazakhstan being sources of captive-bred chameleons of any species, these records probably reflect import permits issued, fraudulently acquired by mis-declaraing the origin of the animals to be used for smuggled specimens.

According to dealers, the reason for the low number of imports to Thailand whilst quotas are in force, is that quotas for Madagascar are usually filled by exports to countries willing to pay higher prices for animals than Thailand. This would account for the ongoing smuggling and laundering of taxa even during years when exports are legally covered by quota. Since prices for chameleons in Thailand are roughly in line with those in Europe (see Table 4), and the trade largely takes place from residential addresses (avoiding the costs associated with operating a business premises), the smuggling process is a symptom of profit maximization. Engagement in smuggling during periods when a legal source of chameleons exists highlights that the law is serving as little or no deterrent to illegal wildlife traders, as their perception is the likelihood of being caught is negligible.

Shifting trade locations and increasing utilization of residential addresses and the internet

Trade in Malagasy reptiles in Thailand is expanding both in volume and by range of taxa offered (K. Charam, Pit Viper Lodge, *in litt.*, to M. Todd, December 2009). The non-native reptile trade in Thailand has traditionally been confined to Bangkok, specifically Chatuchak Market. Results of these surveys show that the trade is currently spreading to provincial towns, evidenced by the limited trade observed in the north-eastern provinces of Buriram, Surin and Nakorn Ratchasima. This provincial trade is still in its infancy. As the presence of these animals in the market place often creates new demand, and with approximately half of the dealers surveyed in Bangkok maintaining family homes in rural areas, provincial trade can be expected to increase. The trade in reptiles has also spread to the aquatics industry as traditional aquarium fish suppliers now stock limited supplies of live reptiles and amphibians in the Wong Wen Yai, Saphan Taksin and Dao Khanong districts of Bangkok.

A general pattern of decentralisation away from Chatuchak Market was observed throughout this research. Results of these surveys recorded similar levels of trade in Malagasy tortoises as those previously recorded in this location by Shepherd and Nijman (2008). However, across other groups of Malagasy reptiles, including chameleons, the trade has shifted almost entirely to the internet and private addresses. Dealers are aware of renewed efforts by enforcement agencies to combat the illegal trade in wildlife, especially where it may be observed by the international community at tourist venues such as Chatuchak Market. Dealers have reacted by using the web as their main vector of sale; allowing them to vet clients before they are allowed to view stock. This may be a tactical response to the potential for increased seizures, prosecutions and renewed drive by authorities to combat wildlife crime. Chatuchak Market 2 in the Minburi suburb of Bangkok is located approximately 20km from Chatuchak Market. However, according to observations made during these surveys, this market is not currently a location where illegal taxa of any kind are supplied. At least one extended family connection does exist between a dealer at this location and a dealer at Chatuchak Market, therefore the future trade of reptiles at this location should not be ruled out.

Malagasy amphibians are currently growing in popularity in Thailand. The Madagascan Horned Frogs shown above were encountered at an aquarium shop in Wong Wen Yai, Bangkok, January 2010

Strategies employed by dealers to avoid detection

Trade in Malagasy chameleons takes place mainly from the residential addresses of dealers who also own business premises at Chatuchak Market. Dealer's homes were located in both Bangkok and provincial cities. A small number of private dealers with no commercial premises were also found to be actively trading.

Entrance to Chatuchak Market 2, Minburi, Bangkok

It was observed that four main dealers (all of whom own businesses in public markets) utilized the main Thailand-based reptile forum. Although a plethora of linked banners and advertisements exist on the site, many of these lead to the same mobile phone numbers or email addresses. Photo banners frequently displayed species known to be legally bred within Thailand or imported from proven captive sources; for example colour morphs of the Royal Python *Python regius* or Bearded Dragon *Pogona vitticeps* developed in captivity. This is possibly a strategy employed to deflect further enquiry by trade researchers. If links are followed to their conclusion, then many more wild-caught and threatened species are offered. During this research, this site was used by dealers to announce large shipments of reptiles including 180 Aldabra Giant Tortoises *Aldabrachelys gigantea* and 120 Spider Tortoises.

One dealer in Saraburi commented that established national and international clientele regularly consult this forum for information pertaining to new stock and will subsequently contact their regular suppliers when announcements are made. New clients unknown to dealers are usually asked to visit the business premises before details regarding stock and prices are discussed. This is effectively an "audition" to allow for the vetting of prospective clients. If the client is successful in gaining the dealer's trust, then trade may be discussed and purchases made. Information concerning species held at the dealer's residence, rather than in the shop, may be acquired in this way.

Implications for further surveys across the Bangkok metropolitan area

Rapid surveys of all markets in the Bangkok metropolitan area would be useful as intelligence received late during the investigation revealed low levels of trade in reptiles at further locations, including various markets in the Bang Pa-In suburb, Rangsit Market and Sanam Luang 2 Market, in the Thonburi market complex. Sanam Luang 2 was the location of the Weekend Market (now Chatuchak Market) prior to 1982. A rapid visit during the last day of this investigation confirmed that limited sale of native and non-native reptiles occurs openly at this location. It should be noted that even limited initial counts, when pooled across several locations, could account for significant total numbers.

Malagasy reptiles: consequences of trade

The implications of short life spans (as low as < 1 year for Carpet Chameleons) (Glaw and Vences, 2008), specific husbandry requirements (Ferguson *et al*., 2002) and relatively few breeding successes (ISIS, 2010)

for the trade turnover of Malagasy chameleons in Thailand cannot be understated. Essentially, an ongoing trade in these taxa involves higher death rates in comparison to other lizards encountered in trade due to the ease with which chameleons succumb to stress when housed communally, the narrow parameters of temperature and humidity in which they are able to survive, and natural turnover due to short life-spans.

Both Malagasy chameleons (with the exception of certain Leaf Chameleons dwelling in the leaf-litter of the forest floor) and tortoises require UVB lighting or access to unfiltered sunlight for successful synthesis of vitamin D3 (De Vosjoli, 2004). However, as all taxa encountered were kept behind glass or plastic with no provision made for access to UVB lighting, with one exception at Chatuchak Market, it can be assumed that animals encountered in trade are at risk, in the long term, of metabolic bone disease (MBD). This is frequently fatal as, due to weakened bone structure, animals succumb to stress and remain unable to perch and in some cases, to feed (see Barten, 1993).

Clearly sustained fatal flaws in husbandry practices, often continued post-sale (evidenced by *ad hoc* conversations with end customers), lead to high death rates. Rather than high death rates causing a decline in demand, these reptiles have become thought of as almost disposable and easily replaced in a climate of increasing demand, as evidenced by the long term occurrence of these taxa in Thailand's pet trade (since 2002).

Dehydrated Carpet Chameleons offered for sale by a private dealer in Wat Lao, Bangkok, January 2010

Implications of high death rates on the trade in chameleons

It was stated to TRAFFIC researchers that in comparison to other lizards, Malagasy chameleons experience high fatalities in transit during the import process; the percentage frequently reported was between 10% - 50%; 100% in two cases, with average expected rates of roughly 25%. During the trade process, a further loss of approximately 10% in the first week occurred with additional small losses incurred during extremely hot weather and in one case, a total loss of stock in these species experienced by one trader. When questioned as to how specimens were kept cool during hot spells, it was most frequently reported that ice would be placed in the enclosures. The employment of chilling equipment, which is available in Thailand, was not described. In contrast, deaths of Malagasy tortoises were reportedly infrequent during the smuggling and trade process, rising post-sale when in the hands of the consumer.

Dealers reported a positive outlook towards business and towards Malagasy chameleons in particular, due to the high repeat business generated from customer needs for medication and supplementation products as these species were reported to have constant health problems. This perhaps relates to the low level of advice given at the time of sale and a lack of knowledge concerning these animals held by local retail customers. Clients were described as "fanatical" and the subsequent high death rates experienced by captive chameleons generated further sales rather than decreasing demand.

CONCLUSION

There is a robust trade in both illegally and legally imported reptiles and amphibians in Thailand. Thailand has previously been identified as a hub for the supply of illegal wildlife into trade (Shepherd and Nijman, 2008). This particularly applies to Malagasy reptiles which are infrequently bred in Thailand and often prohibited in international trade due to CITES suspensions or listing in Appendix I. Smuggled specimens are often laundered into international trade by manipulation of the CITES system (see Nijman and Shepherd, 2009). Therefore it appears there are failings in the import and export permit granting processes not only executed by the NWPCD (CITES management authority in Thailand) but also by the CITES management authorities based in countries exporting to, or importing from, Thailand.

Alarmingly, even when a genuine source of a particular species is available, illegal trade seems to be prefered to legal trade. This is evidenced by the ongoing sale of smuggled Panther Chameleons which could be alternatively sourced from legal ranching operations in certain countries; and the failure to import other Malagasy chameleon taxa legally when these animals are available for export from Madagascar under CITES quota. *Ad hoc* conversations with trade stakeholders revealed it is cheaper to smuggle animals from Madagascar than to import them legally. This highlights shortcomings in the system of detection of illegal wildlife shipments and inadequate penalties for participants in the illegal wildlife trade.

The trade is also perpetuated by fundamental flaws in Thailand's existing legislation. Thailand's current wildlife legislation does allow for the effective protection of native species, however it prevents enforcement officials from adequately enforcing CITES regulations for the trade in non-native taxa; a situation which is recognized by both traders and officials.

The trade in Malagasy reptiles in Thailand is shifting underground, is expanding in volume and by number of taxa offered for sale. Without necessary changes to WARPA, successful implementation of CITES legislation will remain impossible. WARPA is currently being revised to address key loopholes exploited by dealers.

RECOMMENDATIONS

TRAFFIC makes these recommendations based on the results of this investigation:

1. Amend the *Wild Animal Reservation and Protection Act* (WARPA) 1992 to require that burden of proof of legal acquisition be borne by the possessor, as recommended by Shepherd and Nijman (2008). Currently, Section 23 of the WARPA 1992 requires enforcement agencies to prove that non-native CITES-listed species have been illegally acquired by the possessor.

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Reptiles occurring in Thai markets are frequently subjected to stressful conditions caused by overcrowding, lack of correct lighting and / or heating and lack of cage furnishings
From top: Dab-tailed Lizards *Uromastyx* sp.; Gila Monster *Heloderma suspectum*. All specimens observed at Chatuchak Market, Bangkok, January 2010

2. Conduct rigorous enforcement actions in the markets and investigate cases where dealers have been proven to manipulate the legal CITES system fraudulently and where illegally sourced Malagasy taxa are traded or possessed in business premises, at residential addresses or in transit. Penalties to those found violating the law should be severe enough as to act as a deterrent.

3. Increase the current training and capacity building programmes for staff working in all relevant agencies beyond the National Park, Wildlife and Plant Conservation Department (NWPCD), especially the police, immigration, Customs and other agencies. Training should address CITES-related law and implementation to facilitate effective detection of illegal wildlife shipments and subsequent confiscations and prosecutions further. Training programmes should also include utilization of the UNEP-WCMC CITES trade database for enforcement staff charged with monitoring and investigating cases of possible illegal trade.

4. Conduct species identification training programmes for key enforcement agencies. This is crucial as there has been an increase of Malagasy reptile trade, and many of these taxa are often very similar in appearance. Enforcement officers should be equipped with species identification skills and materials to ensure effective law enforcement.

5. Establish dedicated units within enforcement agencies specifically to address illegal wildlife trade on the internet and investigate associated dealers. Traditional venues such as Chatuchak Market are not the only reliable observation posts for wildlife trade in Thailand. Rigorous covert infiltration of the trading network paired with regular trade monitoring and profiling of dealers is crucial if authorities are to continue with successful seizures, prosecutions and enforcement of wildlife legislation.

6. Establish and increase checkpoints at known hotspots. Roadside checks along Highways 4 and 41 must be conducted for the detection of illegal wildlife shipments in the southernmost provinces where border crossings to Malaysia are utilized by agents working for wildlife dealers to smuggle fauna. This will assist in stemming the flow of illegally sourced specimens into the international pet trade. Further to this, increased checks should be carried out at the border towns of Sadao and Betong, identified as the two main crossings used by wildlife smuggling operations.

7. Encourage the judiciary to increase the penalties given for wildlife crimes, so they serve as a real deterrent to wildlife criminals.

8. Authorities and NGOs should implement public awareness programmes focussing on the consequences of the illegal trade in threatened reptiles and amphibians.

9. Establish and implement a system of intelligence sharing between the NWPCD (Thailand), The General Directorate for Environment, Water and Forests (CITES Management Authority of Madagascar) and associated enforcement agencies in both countries to combat the illegal export and import of Malagasy taxa from the range-state to Thailand's pet trade.

10. Increase intelligence sharing between NWPCD (Thailand), the Department of Wildlife and National Parks (CITES Management Authority of Peninsular Malaysia) and associated enforcement agencies to combat the ongoing supply of Malagasy reptiles from Thailand to the Malaysian pet trade.

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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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