

## A Survey on Alien Pet Reptiles in Taiwan

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**ABSTRACT:** In the recent past, the rate of alien species introduction has increased enormously, which is one of the main causes of the loss of biodiversity throughout the world. Pet trade is one of the important channels that lead alien species to invade local ecosystems. In Taiwan, alien reptiles have become popular pets in recent years that increased the risk of invasion. In order to evaluate the probability of alien reptile invasion, it is essential to know how many species of alien reptiles are present in the pet market. From March 2004 to February 2005, we investigated the alien pet reptiles in Taiwan. We checked the pet shops, aquaria and night markets to record the sales of reptiles in Northern, Central, and Southern Taiwan. We visited a total of 341 vendors, some of which were visited more than once, and identified 239 species of alien reptiles. From this list, we suggested 10 popular, 14 dangerous, and 8 CITES I species for careful management and strict regulation. A small number of large pet shops carry most of the species, which suggests the sources of importation is limited to a few wholesalers, probably distributed in a few major ports within the island. It would be more efficient to focus on the upstream wholesalers in order to monitor the reptile trade markets. The sheer number of animals found in the pet trade poses the risk of invasion. Other factors, such as the similarity between the pet's original and new environment, reproductive potential, habitat requirement, and diets of these reptiles, are suggested to be crucial in evaluating the risk of alien pets.

**KEY WORDS:** Invasion, Trade, Biodiversity.

### INTRODUCTION

In recent years, the rate of alien species introduction has increased enormously because human population and human activities altering the environment have escalated rapidly (Pimentel et al., 2000). Humans are traveling faster and farther and in greater numbers than ever before. Merchandise is being traded more freely among nations. These human activities increase the spread of species of plants, animals and, microbes worldwide (Pimentel et al., 2001). Some non-native species may be introduced originally for agriculture, but have since become pests. These pests not only cause serious damage in agriculture and animal husbandry, but also threaten the human health (Wittenberg and Cock, 2001). In addition, alien species introduction is one of the main causes of the loss of biodiversity throughout the world (Wilcove et al., 1998; Mack et al., 2000). Invasions of alien species are thought to be responsible for 42 % of the decline of native species listed as endangered or

threatened (Pimentel, 2002). According to researches of the Nature Conservancy of North America and Environmental Defense Fund, invasion of alien species is the second most common factor that threatens the survival of 6,500 species in USA (Lavers, 2001). Alien species could displace native species by predation, competition and hybridization, and might even change the local ecosystem. The impact of alien species to biodiversity is more severe in islands than that on continents because island ecosystem has less resistance to alien species (Whittaker, 1998).

In a preliminary survey, more than 120,000 species of non-native species of plants, animals and microbes are established in the United States, British, Australia, South Africa, India, and Brazil (Pimentel et al., 2001; Pimentel, 2002). About 20-30% of introduced species are pests and cause major environmental problems. The invasion of these non-native organisms caused more than \$314 billion/year in damage and control costs in these six nations (Pimentel et al., 2001; Pimentel, 2002). Alien species invasion will be an ongoing problem in the future. Many countries are actively investigating areas such as the mechanisms of successful invasion (Moyle and Light, 1996; Williamson and Fitter, 1996), and assessment and prediction of alien invasions (Kareiva et al., 1996;

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Pimentel et al., 2000; Pimentel, 2001; Leung et al., 2004; Weigle et al., 2005).

Alien reptile species can cause tremendous damages to native ecosystems. One of the most famous examples is the brown tree snake (*Boiga irregularis*), which was accidentally introduced to Guam immediately after World War II. Soon afterwards, the snake population reached a density of 100 per hectare, and dramatically reduced native bird, mammal and lizard populations. Of 13 species of native birds in Guam, only 3 still exist in the wild (Rodda et al., 1997). Other than the damage to Guam's biodiversity, the brown tree snake also caused public health problems due to its venom. The total cost to deal with the problem caused by the brown tree snake is more than US\$5.6 million/year (Pimentel, 2001).

In Taiwan, three alien reptiles species have established populations in the field. Two are lizards (*Mabuya multifasciata*; *Anolis sageri*) and one is a turtle (*Trachemys scripta*) (Lue et al., 2002). It is suspected that both lizards accidentally reached Taiwan through cargo transport, but the truth remains unclear. However, it is clear that *T. scripta* was introduced to Taiwan more than 30 years ago via pet business. Many turtles had been released to the field when the interests of their owners oozed away. The feral populations of *T. scripta* (red-eared sliders) had been recorded in the wild (Chen and Lue, 1998). How, and to what extent these invasive reptiles affect native species or ecosystem remains unknown. In recent years, keeping reptiles as pets has become popular in some European and North American countries, (Telecky, 2001; Langton, 1990). Similar situation is also true in Taiwan. This results in more and more escapes or releases of the pets by their owners. In order to assess the risk of alien reptile invasion in Taiwan, it is essential to know how many species, and in what amount of alien reptiles are on the pet market. We report our survey in this paper.

## METHODS

Because pet shops are mostly clustered at big cities, we investigated pet shops in metropolis in northern, central, and southern Taiwan. Areas in northern Taiwan include Taipei city and Taipei county; Taichung city and county are included in the central Taiwan area; southern Taiwan includes Chiayi city and county, Tainan city and county, Kaohsiung city and county and Pingtung county. We visited the pet shops, aquaria and night markets that might sell pet reptiles in three areas at least once. Several large shops were chosen and were visited seasonally. From March 2004 to February 2005, four seasonal surveys were conducted in northern Taiwan, two in central Taiwan, and three in southern Taiwan.

We identified the species in the shops by their special characters and recorded species name, amount, price, and names of the shops. For certain species that cannot be identified on site, we used spy video camera (FBI 0204; 1.2GHz) to record the images of the animals for later identification.

## RESULTS AND DISCUSSION

We recorded a total of 341 venders from which 428 shop-time records were obtained. Among the 341 venders, 167 (49%) did not carry, and 174 (51%) carried alien pet reptiles. The number of venders that selling alien pet reptiles in northern, central, and southern Taiwan were 113 (50%), 13 (100%), and 41 (41%), respectively, whereas the checked shop-times in these three areas were 137, 13, and 94, respectively. We recorded a total of 239 species of alien reptiles. These included 2 species of Crocodylia (1 family, 2 genera); 85 species of Testudines (11 families, 50 genera); 126 species of Sauria (17 families, 66 genera), and 26 species of Serpentes (3 families, 9 genera) (Table 1, Appendix 1). We have 23, 26 and 10 records that could not identify their family, genus and species respectively. More lizard species are present on the market than any other reptile groups; this is probably due to fact that lizards are docile and includes the most species (4450) among reptiles. Number of species, however is not so important as docile character. For example, snakes have the second highest number of species (2,900) in the world, but only 26 species were found in the market. On the other hand, turtles had 85 species in pet market although its total species is only 285 in the world. Both turtles and lizards had around 30%, but snakes had less than 1% of the species in the pet market.

Normally, when a pet is more popular more shops will carry them and the quantity of each species in pet market is a reasonable index of popularity. From this index, the top ten popular animals include 6 turtles, 3 lizards, and 1 snake (Table 2). Turtle clearly is the most popular pet reptiles in Taiwan. As the numbers of animals and/or popularity are high in the market, it will also have a higher chance of escape from or abandoned by its owner. Consequently, for invasive species management we suggested the top ten species merit tight attention. Other than threatening the survival of native species and local ecosystems, alien reptiles may also be harmful to humans. In this study we found 14 species of reptiles that fit this category (Table 3). These species have either large body size or powerful jaws that may be harmful to

Table 1. Taxonomic arrangement of pet reptile species in Taiwan.

Class	Order	Family	Genus	Species +Subspecies
Reptilia	Crocodylia (1 family)	Alligatoridae	2	2
Reptilia	Testudines (11 families)	Bataguridae	14	18+2
		Carettochelyidae	1	1
		Chelidae	7	11
		Chelydridae	2	2
		Emydidae	7	14+1
		Kinosternidae	3	8+1
		Pelomedusidae	2	3
		Platysternidae	1	1
		Podocnemididae	1	1
		Testudinidae	7	22+3
		Trionychidae	2	4
Reptilia	Squamata	Agamidae	11	17+1
	Sauria	Anguinae	1	1
	(17 families)	Chamaeleonidae	5	15
		Cordylidae	1	1
		Corytophanidae	3	4
		Crotaphytidae	2	2
		Gekkonidae	24	38
		Hoplocercidae	1	1
		Iguanidae	3	3
		Lacertidae	2	3
		Opluridae	2	3
		Phrynosomatidae	2	4
		Polychrotidae	1	3
		Scincidae	7	10
		Teiidae	2	4
		Tropiduridae	1	1
		Varanidae	1	16
	Squamata	Boidae	6	6+2
	Serpentes	Colubridae	5	12+13
	(3 families)	Pythonidae	2	8+1

Table 2. Ten most popular alien pet reptiles in Taiwan.

Species name	Common name	Number of animal	Frequency <sup>1</sup>	IS <sup>2</sup>
<i>Trachemys scripta</i>	Red-eared Slider	3764	0.70	Yes
<i>Carettochelys insculpta</i>	Pig-nosed Turtle	734	0.28	No
<i>Iguana iguana</i>	Green Iguana	546	0.33	No
<i>Macrolemys temminckii</i>	Alligator Snapping Turtle	487	0.28	No
<i>Geochelone elegans</i>	Indian Star Tortoise	426	0.29	No
<i>Eublepharis macularius</i>	Leopard Gecko	335	0.29	No
<i>Pogona vitticeps</i>	Bearded Dragon	209	0.24	No
<i>Pseudemys concinna</i>	Eastern River Cooter	165	0.16	No
<i>Geochelone carbonaria</i>	Red-foot Tortoise	164	0.19	No
<i>Lampropeltis getula</i>	Common King Snake	124	0.26	No

<sup>1</sup> Frequency = found shops-times / 248 investigated shops-times

<sup>2</sup> IS = invasive species (Yes) in Taiwan or not (No)

humans or even cause death. These animals also need to be monitored carefully. What is more, a total of 111 species are listed as CITES I, II, or III species (<http://www.cites.org/eng/disc/species.shtml>) (appendix 1). International trade already threatens these species, and their trade must be regulated strictly.

In our survey, we found there were seasonal differences in the reptiles' species composition. For example, we found more than 22 additional new species in each new season from 4 pet shops in northern Taiwan (Table 4). This suggested the

Whole sales imported different animals from different countries in different seasons. We also found larger shops had more species and in greater quantities. Over 89% (213/239) of all species were found in just 10 large shops from 173 shops. This indicates that a few wholesalers are responsible for the importation of most of the species. Small pet shops seemed to have obtained their sources from these few wholesalers, and often had only the most popular species in the stores. However, the wholesalers in different area of Taiwan might be



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Appendix 1. List of alien pet reptiles in Taiwan.

Order (Suborder) Family	Species name	Locality <sup>1</sup>	CITES <sup>2</sup>
<b>Crocodylia</b>			
Alligatoridae	<i>Alligator mississippiensis</i>	C	II
	<i>Caiman entate es</i>	NS	II
<b>Testudines</b>			
Bataguridae	<i>Chinemys kwantungensis</i>	C	
	<i>Cuora amboinensis</i>	NS	II
	<i>Cuora galbinifrons</i>	NS	II
	<i>Cuora trifasciata</i>	S	II
	<i>Cyclemys entate</i>	N	
	<i>Geoclemys hamiltonii</i>	N	I
	<i>Geoemyda spengleri</i>	C	III
	<i>Heosemys grandis</i>	N	II
	<i>Heosemys spinosa</i>	CS	II
	<i>Malaclemys terrapin marcrospilota</i>	NCS	
	<i>Malaclemys terrapin terrapin</i>	NCS	
	<i>Mauremys caspica</i>	NCS	
	<i>Melanochelys trijuga</i>	N	
	<i>Morenia ocellata</i>	N	I
	<i>Orlitia borneensis</i>	C	II
	<i>Pyxidea mouhotii</i>	NCS	II
	<i>Rhinoclemmys pulcherrima</i>	NC	
	<i>Rhinoclemmys pulcherrima manni</i>	NC	
	<i>Sacalia quadriocellata</i>	N	
	<i>Siebenrockiella crassicolis</i>	N	
Carettochelyidae	<i>Carettochelys insculpta</i>	NCS	II
Chelidae	<i>Chelodina longicillis</i>	N	
	<i>Chelodina siebenrocki</i>	NCS	
	<i>Chelus fimbriatus</i>	NCS	
	<i>Elseya novaeguineae</i>	N	
	<i>Emydura subglobosa</i>	NCS	
	<i>Hydromedusa tectifera</i>	NS	
	<i>Phrynops geoffroanus</i>	N	
	<i>Phrynops hilarii</i>	NS	
	<i>Phrynops rufipes</i>	N	
	<i>Phrynops williamsi</i>	S	
	<i>Platemys platycephala</i>	C	

## Appendix 1. (Continued)

Order (Suborder) Family	Species name	Locality <sup>1</sup>	CITES <sup>2</sup>	
Chelydridae	<i>Chelydra serpentina</i>	NCS		
	<i>Macroclemys temminckii</i>	NCS		
Emydidae	<i>Chrysemys picta dorsalis</i>	NCS		
	<i>Chrysemys picta</i>	NCS		
	<i>Clemmys guttata</i>	S		
	<i>Emys orbicularis</i>	NS		
	<i>Graptemys geographica</i>	N		
	<i>Graptemys kohnii</i>	NCS		
	<i>Graptemys nigronoda</i>	NCS		
	<i>Graptemys pseudogeographica</i>	N		
	<i>Graptemys pulchra</i>			
	<i>Graptemys versa</i>	NC		
	<i>Pseudemys floridana peninsularis</i>	S		
	<i>Pseudemys nelsoni</i>	NS		
	<i>Pseudernys concinna</i>	NCS		
	<i>Terrapene carolina</i>	N	II	
	<i>Trachemys scripta</i>	NCS		
	Kinosternidae	<i>Kinosternon baurii</i>	N	
		<i>Kinosternon leucostomum</i>	NS	
<i>Kinosternon scorpioides cruentatum</i>		NC		
<i>Kinosternon scorpioides</i>		NC		
<i>Kinosternon subrubrum</i>		NS		
<i>Kinosternon subrubrum hippocrepis</i>		NS		
<i>Staurotypus triporcatus</i>		N		
<i>Sternotherus carinatus</i>		NCS		
<i>Sternotherus minor</i>		N		
<i>Sternotherus odoratum</i>		NS		
Pelomedusidae		<i>Pelomedusa subrufa</i>	NS	III
	<i>Pelusios sinuatus</i>	S		
	<i>Pelusios subniger</i>	NS		
Platysternidae	<i>Platysternon megacephalum</i>	NC	II	
Podocnemididae	<i>Podocnemis unifilis</i>	NS		
Testudinidae	<i>Geochelone carbonaria</i>	NCS	II	
	<i>Geochelone chilensis</i>	NC	II	
	<i>Geochelone deitriculata</i>	NCS	II	
	<i>Geochelone elegans</i>	NCS	II	
	<i>Geochelone gigantea</i>	NCS	II	
	<i>Geochelone pardalis babcoeci</i>	CS	II	
	<i>Geochelone pardalis</i>	CS	II	
	<i>Geochelone platynota</i>	S	II	
	<i>Geochelone radiata</i>	NC	I	
	<i>Geochelone sulcata</i>	NCS	II	
	<i>Indotestudo elongata</i>	NC	II	
	<i>Kinixys natalensis</i>	NC	II	
	<i>Kinixys belliana</i>	NC	II	
	<i>Kinixys erosa</i>	C	II	
	<i>Malacochersus tormieri</i>	NCS	II	
	<i>Manouria emys</i>	NC	II	
	<i>Manouria impressa</i>	N	II	
	<i>Pyxis arachnoides</i>	NCS	I	
	<i>Pyxis planicauda</i>	S	I	
	<i>Testudo graeca graeca</i>	NCS	II	
	<i>Testudo graeca terrestris</i>	NCS	II	
	<i>Testudo graeca</i>	NCS	II	
	<i>Testudo hermanni</i>	NCS	II	
	<i>Testudo horsfieldi</i>	NCS	II	
	<i>Testudo marginata</i>	NCS	II	
	Trionychidae	<i>Apalone ferox</i>	NCS	
		<i>Apalone mutica</i>	S	
<i>Apalone spinifera</i>		NCS		
<i>Chitra indica</i>		C	II	
<b>Squamata</b> (Sauria)				
Agamidae	<i>Ceratophora stoddartii</i>	S		
	<i>Chlamydosaurus kingii</i>	NCS		

## Appendix 1. (Continued)

Order (Suborder) Family	Species name	Locality <sup>1</sup>	CITES <sup>2</sup>
	<i>Hydrosaurus pustulatus</i>	NS	
	<i>Leiolepis belliana</i>	NS	
	<i>Lyriocephalus scutatus</i>	S	
	<i>Phrynocephalus maculatus</i>	N	
	<i>Physignathus cocincinus</i>	NS	
	<i>Physignathus lesueuri</i>	NS	
	<i>Pogona barbata</i>	N	
	<i>Pogona vitticeps</i>	NCS	
	<i>Stellio (Laudakia) stellio</i>	N	
	<i>Uromastyx acanthinurus</i>	NS	II
	<i>Uromastyx aegyptius</i>	NCS	II
	<i>Uromastyx hardwicki</i>	NS	II
	<i>Uromastyx maliensis</i>	N	II
	<i>Uromastyx ocellatus ornatus</i>	NCS	II
	<i>Uromastyx ocellatus</i>	NS	II
	<i>Xenagama taylori</i>	NS	
Anguidae	<i>Ophisaurus apodus</i>	N	
Chamaeleonidae	<i>Bradypodion fischeri tavetanum</i>	N	II
	<i>Brookesia perarmata</i>	N	I
	<i>Brookesia stumpffi</i>	S	II
	<i>Calumma parsonii</i>	S	II
	<i>Chamaeleo calyprtratus</i>	NCS	II
	<i>Chamaeleo deremensis</i>	N	II
	<i>Chamaeleo dilepis</i>	NS	II
	<i>Chamaeleo hoehnelii</i>	S	II
	<i>Chamaeleo jocksoni</i>	N	II
	<i>Chamaeleo johnstoni</i>	NS	II
	<i>Chamaeleo melleri</i>	NS	II
	<i>Furcifer lateralis</i>	N	II
	<i>Furcifer oustaleti</i>	NS	II
	<i>Furcifer pardalis</i>	NS	II
	<i>Furcifer(Chamaeleo) verrucosus</i>	N	II
Corytophanidae	<i>Basiliscus plumifrons</i>	S	
	<i>Basiliscus vittatus</i>	NS	
	<i>Corytophanes cristatus</i>	S	
	<i>Laemactus longipes</i>	N	
Crodylidae	<i>Crodylus cataphractus</i>	N	
Crotaphytidae	<i>Crotaphytus collaris</i>	NS	
	<i>Gambelia wislizenii</i>	S	
Gekkonidae	<i>Agamura persica</i>	N	
	<i>Chondrodactylus angulifer</i>	N	
	<i>Cloeonyx brevis</i>	N	
	<i>Cosymbotus platyurus</i>	N	
	<i>Eublepharis macularius</i>	NCS	
	<i>Geckonia chazaliae</i>	NS	
	<i>Gekko gekko</i>	NS	
	<i>Goniurosaurus kuroiwae</i>	N	
	<i>Goniurosaurus luii</i>	NS	
	<i>Hemitheconyx caudicinctus</i>	NCS	
	<i>Homopholis wahlbergii</i>	N	
	<i>Lialis burtonis</i>	N	
	<i>Nephrurus amyaie</i>	N	
	<i>Nephrurus levis</i>	N	
	<i>Oedura castelnaui</i>	N	
	<i>Paroedura pictus</i>	NS	
	<i>Phelsuma lineata</i>	NS	II
	<i>Phelsuma madagascariensis</i>	NS	II
	<i>Phelsuma laticauda</i>	N	II
	<i>Phelsuma quadriocellata</i>	N	II
	<i>Ptychozoon kuhii</i>	N	
	<i>Ptyodactylus hasselquistii</i>	S	
	<i>Rhacodactylus auriculatus</i>	N	
	<i>Rhacodactylus ciliatus</i>	NCS	
	<i>Rhacodactylus leachianus</i>	NS	
	<i>Stenodactylus sthenodactylus</i>	N	

## Appendix 1. (Continued)

Order (Suborder) Family	Species name	Locality <sup>1</sup>	CITES <sup>2</sup>
	<i>Tarentola mauritanica</i>	NS	
	<i>Teratolepis fasciata</i>	NS	
	<i>Teratoscincus microlepis</i>	N	
	<i>Teratoscincus roborowski</i>	N	
	<i>Teratoscincus scincus keyserlingii</i>	N	
	<i>Tropicolotes tripolitanus</i>	N	
	<i>Uroplatus ebenau</i>	N	II
	<i>Uroplatus fimbriatus</i>	NS	II
	<i>Uroplatus henkeli</i>	N	II
	<i>Uroplatus lineatus</i>	N	II
	<i>Uroplatus phantasticus</i>	N	II
	<i>Uroplatus sikorae</i>	N	II
Hoplocercidae	<i>Hoplocercus spinosus</i>	N	
Iguanidae	<i>Ctenosaura oinset</i>	N	
	<i>Dipsosaurus dorsalis</i>	NS	
	<i>Iguana iguana</i>	NCS	II
Lacertidae	<i>Lacerta lepida</i>	S	
	<i>Lacerta trilineata</i>	N	
	<i>Meroles oinsettia</i>	N	
Opluridae	<i>Chalarodon madagascariensis</i>	N	
	<i>Oplurus cyclurus</i>	N	
	<i>Oplurus quadrimaculatus</i>	N	
Phrynosomatidae	<i>Phrynosoma modestum</i>	N	
	<i>Phrynosoma platyrhinos</i>	NS	
	<i>Sceloporus malachiticus</i>	N	
	<i>Sceloporus oinsettia</i>	S	
Polychrotidae	<i>Anolis carolinensis</i>	N	
	<i>Anolis equestris</i>	NS	
	<i>Anolis garmanni</i>	S	
Scincidae	<i>Chalcides ocellatus</i>	NS	
	<i>Corucia zebrata</i>	N	II
	<i>Egernia depressa</i>	N	
	<i>Eumeces schneideri</i>	N	
	<i>Scincus scincus</i>	NS	
	<i>Tiliqua gerrardi</i>	N	
	<i>Tiliqua nigrolutea</i>	S	
	<i>Tiliqua scincoides</i>	N	
	<i>Tiliqua(Trachydosaurus) rugosus</i>	NC	
	<i>Tribolonotus gracilis</i>	NS	
Teiidae	<i>Cnemidophorus uniparens</i>	N	
	<i>Tupinambis merianae</i>	S	II
	<i>Tupinambis rufescens</i>	NS	II
	<i>Tupinambis teguixin</i>	NCS	II
Tropiduridae	<i>Leocephalus personatus</i>	S	
Varanidae	<i>Varanus acanthurus</i>	N	II
	<i>Varanus beccarii</i>	N	II
	<i>Varanus bengalensis</i>	N	I
	<i>Varanus doreanus</i>	N	II
	<i>Varanus exanthematicus</i>	NCS	II
	<i>Varanus flavescens</i>	N	I
	<i>Varanus gouldii</i>	NS	II
	<i>Varanus indicus</i>	N	II
	<i>Varanus jobiensis</i>	N	II
	<i>Varanus macraei</i>	N	II
	<i>Varanus niloticus</i>	NS	II
	<i>Varanus prasinus</i>	N	II
	<i>Varanus rudicollis</i>	N	II
	<i>Varanus salvadorii</i>	N	II
	<i>Varanus salvator</i>	NS	II
	<i>Varanus timorensis</i>	N	II
<b>Squamata</b> (Serpentes)			
Boidae	<i>Boa constrictor domesticus</i>	NS	II
	<i>Boa constrictor</i>	NS	II
	<i>Candoia carinata</i>	N	II



## Appendix 1. (Continued)

Order (Suborder) Family	Species name	Locality <sup>1</sup>	CITES <sup>2</sup>
Colubridae	<i>Epicrates cenchria cenchria</i>	NS	II
	<i>Epicrates cenchria maurus</i>	NS	II
	<i>Eryx colubrinus</i>	NS	II
	<i>Eunectes murinus</i>	N	II
	<i>Lichanura(Charina) trivirgata</i>	NS	II
	<i>Ahaetulla prasins</i>	S	
	<i>Dendrelaphis pictus</i>	N	
	<i>Elaphe guttata</i>	NCS	
	<i>Elaphe guttata emoryi</i>	NS	
	<i>Elaphe guttata guttata</i>	NCS	
	<i>Elaphe obsoleta lindheimerii</i>	N	
	<i>Elaphe obsoleta quadrivittata</i>	N	
	<i>Heterodon nasicus</i>	NS	
	<i>Heterodon platyrhinos</i>	S	
	<i>Lampropeltis alterna</i>	N	
	<i>Lampropeltis calligastra</i>	NS	
	<i>Lampropeltis getula californiae</i>	NCS	
	<i>Lampropeltis getula floridana</i>	NS	
	<i>Lampropeltis getula getula</i>	N	
	<i>Lampropeltis getula holbrooki</i>	N	
	<i>Lampropeltis getula nigrata</i>	NS	
	<i>Lampropeltis getula</i>	NCS	
	<i>Lampropeltis mexicana</i>	NS	
	<i>Lampropeltis pyromelana</i>	N	
	<i>Lampropeltis triangulum amaaura</i>	N	
	<i>Lampropeltis triangulum annulata</i>	S	
	<i>Lampropeltis triangulum campbelli</i>	NCS	
<i>Lampropeltis triangulum elapsoides</i>	N		
<i>Lampropeltis triangulum sinaloae</i>	N		
<i>Lampropeltis triangulum stuarti</i>	N		
Pythonidae	<i>Morelia amethystina</i>	N	II
	<i>Morelia spilota</i>	NS	II
	<i>Morelia viridis</i>	NS	II
	<i>Python curtus</i>	NCS	II
	<i>Python curtus brongersmai</i>	NCS	II
	<i>Python molurus bivittatus</i>	NCS	II
	<i>Python regius</i>	NCS	II
	<i>Python reticulatus</i>	N	II
<i>Python sebae</i>	N	II	

<sup>1</sup>Species was found in N: Northern Taiwan, M: Central Taiwan, S: Southern Taiwan.<sup>2</sup>CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora.

## 臺灣外來種爬行寵物的初步調查

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### 摘 要

近年來世界各地外來種的引進快速的成長並造成當地生物多樣性的破壞。而寵物交易行為是外來種引進的重要管道之一。在臺灣，外來種爬行動物在寵物市場的交易日漸活絡，這些物種入侵的可能性也就相對提高。為了評估這些外來種爬行動物入侵的可能，先行了解有多少種類在寵物市場上是首要工作。從 2004 年 3 月至 2005 年 2 月，我們調察臺灣北中南三地 341 家的水族館，共發現 239 種外來種爬行動物。從其中我們建議了 10 種最熱門、14 種危險及 8 種屬於 CITES I 的物種，這些物種需優先管理及追蹤調查。在我們的調查中發現少數大型的商家擁有大多數的外來種爬行動物，這可能是因為主要引進的通路僅限制在少數進口商中。所以在未來監測外來種寵物市場，針對上游的進口商進行管理應可獲得較有效率的結果。外來種引進的數量、原生地和當地環境相似度、生殖潛力、棲地需求及食性都可能是評估入侵風險相當重要的因子。

關鍵詞：入侵、買賣、生物多樣性。

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