

Short Communication

The chelonian trade in the largest pet market in China: scale, scope and impact on turtle conservation

SHI-PING GONG, ALEX T. CHOW, JONATHAN J. FONG and HAI-TAO SHI

Abstract China is the largest consumer of turtles in the world and international trade has been cited as the greatest threat to Asian turtles. Two main types of trade in live turtles occur in China: for food and traditional Chinese medicine, and for pets, including those for release by Buddhists. The food trade involves the largest quantities of turtles. In recent years, however, the international pet turtle trade has increased dramatically. Yuehe Pet Market in Guangzhou is the largest pet market in China, selling live chelonians and other animals. To understand the potential impacts of the pet trade on chelonians we conducted seven surveys in Yuehe Pet Market from August 2006 to March 2008. Over 39,000 individual chelonians of 61 species were recorded (19.1% of the global total of 319 species). Fifteen (24.6%) of these species are native to China and 46 (75.4%) are native to other countries. Two are designated as grade II key state-protected species in China. Thirty-eight (62.3%) are CITES listed species (four in CITES Appendix I, 26 in CITES II and eight in CITES III). Four are categorized on the IUCN Red List as Critically Endangered, 16 as Endangered and 19 as Vulnerable. Our surveys indicate that increasing demand and the illegal international pet trade could be having a severe impact on chelonian conservation, and we make recommendations for law enforcement and conservation.

Keywords Chelonia, China, CITES, Guangzhou, Red List, trade, Yuehe Pet Market.

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Traditionally, turtles have been used for meat, pets, oil, medicine and manufactured products (Ceballos &

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Fitzgerald, 2004). Currently, international trade is regarded as the greatest threat to Asian turtles (van Dijk, 2000; Cheung & Dudgeon, 2006) and as China is the largest consumer of turtles (Compton, 2000; van Dijk, 2000; Moll & Moll, 2004) the country's demand determines the size and dynamics of this trade (Meng et al., 2002). The economic development of China since the 1980s increased this demand for turtles and has depleted the country's wild turtle populations (Zhao, 1998; DeBruin & Artner, 1999; Lau & Shi, 2000; Gong et al., 2005, 2006) and led to high exports of turtles from Asian countries and North America (Lau & Shi, 2000; Meng et al., 2002). Although many turtle species are protected by CITES and the China Wild Animals Protection Law, they are still commonly traded in pet and food markets in China (Lau et al., 1996; Lau & Shi, 2000; Shi et al., 2002; Wang et al., 2005; Cheung & Dudgeon, 2006; Gong et al., 2007). This trade has led to unsustainable over-collection.

Turtle trade in China is for food and traditional Chinese medicine, and for pets, including those for release by Buddhists. Turtles sold as food formerly accounted for > 70% of individuals found in markets (Cheung & Dudgeon, 2006). However, trade in pet turtles has increased because of greater demand (Lau et al., 1996; Lee et al., 2004; Cheung & Dudgeon, 2006). Cheung & Dudgeon (2006) reported that 155 of 157 turtle species traded in southern China were sold as pets. Guangzhou, capital of Guangdong Province, is the biggest turtle trade centre in China (Lau & Shi, 2000; Lee et al., 2004; Cheung & Dudgeon, 2006) and there are two major markets, Qingping Market and Yuehe Pet Market. Qingping Market is one of the largest Chinese traditional medicine markets in China, and some surveys have already been conducted there (Lau et al., 1996; Artner & Hofer, 2001; Lee et al., 2004). Yuehe Pet Market is the largest pet market in China, selling live turtles and other animals. Market surveys of pet chelonians is important for management and conservation (Shi, 2002; Gong et al., 2005), facilitating detection of changes in species' composition and volume, and providing information to help understand trade dynamics and check the effect of enforcement and management. However, the turtle trade in Yuehe Pet Market has never been systematically surveyed. We therefore conducted surveys in this market during 2006–2008 to describe and quantify the pet turtle trade and present recommendations for management.

We visited Yuehe Pet Market seven times (August 2006, May, June, July, October and November 2007, and March 2008). Surveys lasted 1–2 days and were carried out covertly. Traders were generally aware of the relevant legal issues and were reluctant to allow us to record data and take photographs. We pretended to be potential buyers, to gather information (including species, quantities, prices and origins of turtles on display) and take photographs (Plate 1), especially for turtles that needed further identification. There were two types of stores: market stalls and shops. The market stalls were in a large, common, open area and shops consisted of rooms with their own entrance.

Data were either recorded in small, secret notebooks or memorized and then recorded in notebooks a short distance from the store. If a large number of species or individuals were present, the stall or shop was revisited until we were confident of the accuracy of the information gathered. However it was not always possible to make exact counts because large numbers of turtles were often packed into nets, cages or containers. Information about the origin of individuals was often unknown. It is possible that traders had this information but did not wish to share it.

In addition, we visited turtle traders in Yuehe Pet Market and officers at the local customs, Forestry Bureau, and Industry and Commerce Management Bureau to gain an understanding of the current conservation programme and problems encountered when dealing with the turtle trade in Guangzhou.

There were c. 20 market stalls and eight shops selling chelonians in Yuehe Pet Market and in the seven surveys we recorded a total of > 39,000 individual chelonians of 61 species, i.e. 19.1% of the global total of 319 chelonian species (Bickham et al., 2007; Appendix 1). In general the market size in winter (from December to March) was smaller than at other times. From some traders that were more inclined



PLATE 1 A stall with the CITES Appendix II listed species *Cuora galbinifrons*, *Cuora mouhotii*, *Platysternon megacephalum* and *Manouria emys* for sale in Yuehe Pet Market.

to talk to us we determined that, in general, the average turnover period of turtles in the market is c. 2 weeks. Such a turnover could represent an annual trade volume of > 145,000 individuals (i.e. $[39,000/7] \times [365/14]$). Based on known geographical distributions we determined the origin of the species in the market (Appendix 1). Fifteen of the 61 species are native to China (but also found in other countries), and 46 to other countries, especially in South-east Asia, Africa and America. We were unable to determine unequivocally whether the turtles found in the market were wild-caught or captive bred. However, based on the data collected and the condition of the animals, we speculate that most of the CITES I and II listed species were wild-caught.

Two of the species observed in Yuehe Pet Market are designated as grade II key state-protected species in the China Wild Animals Protection Law (Zhou, 2004), 38 are CITES listed species (four, 26 and eight on CITES Appendices I, II and III, respectively; CITES, 2008), and four are categorized on the IUCN Red List as Critically Endangered, 16 as Endangered and 19 as Vulnerable (IUCN, 2008; Appendix 1).

In contrast to Qingping Market (Lau et al., 1996; Artnert & Hofer, 2001; Lee et al., 2004), where turtles are sold as food, the numbers of juveniles were greater in Yuehe Pet Market (which included nearly all of the species sold in Qingping; Lee et al., 2004). Pet turtles have specific value based on the species rather than on size, and therefore pet traders prefer to sell small turtles. Five common turtle species (*Trachemys scripta elegans*, *Mauremys sinensis*, *Mauremys reevesii*, *Mauremys mutica* and *Pelodiscus sinensis*) constituted c. 70% of total trade volume in Yuehe Pet Market (Appendix 1).

During the surveys it was impossible to determine the exact numbers of species and individuals because large numbers were often packed in the same container, trade in some species is conducted covertly, the frequency of turnover is unclear and there is the possibility that some individuals were double counted, and some rare species that seldom appear may have been missed. Although we are uncertain how these factors may have affected the counts of individuals, we believe that 61 is probably an underestimate of the number of turtle species.

As China is a member of CITES any CITES listed species are protected by national legislation (Meng et al., 2002). International and national trade in CITES I species is therefore forbidden, and the trade in state-protected species is forbidden by the China Wild Animals Protection Law. Nevertheless, CITES I listed species and grade II key state-protected species were observed in Yuehe Pet Market. In addition, although international and national trade in CITES II species in China is controlled by permits, a large number of individuals of 26 CITES II listed species (only seven species of which native to China) were observed. Since 2003 the China CITES authority has not permitted commercial importation of chelonians except for some

common species such as *Trachemys scripta elegans*, *Pelodiscus sinensis*, *Mauremys reevesii*, *Mauremys sinensis* and *Chelydra serpentina*, which have been successfully bred in turtle farms (Zhou, 2006a, b). However, a significant number of smuggled turtles have been confiscated by local customs in Guangdong. Customs officers told us that only 5–10% of goods are examined, and thus we suspect that large numbers of smuggled turtles probably enter Yuehe and other markets illegally. Our results suggest that > 50% of the species (CITES I and II listed) and c. 20% of individuals in Yuehe Pet Market are illegally traded.

Our surveys suggest that the pet trade is a severe threat to turtle conservation and that law enforcement needs to increase. After visiting the local government officers we know that law enforcement is inadequate because of a lack of well-trained staff to identify turtles, inadequate inspection of imported turtles, and an unclear division of enforcement responsibility between departments. We therefore make the following recommendations: (1) The local government needs to strengthen enforcement of existing legislation and regulations concerning the protection of turtles; this will require a clear division of enforcement responsibilities between departments and the training of staff in turtle identification. (2) Turtle traders should be required to show the appropriate permits and documentation to buyers and enforcement officers, with information on species, number, and origins of turtles to prove legitimacy. (3) Local government, academic institutes and NGOs need to collaborate in long-term monitoring of the dynamics of the pet turtle trade.

We have passed our results and recommendations to the appropriate authorities of Guangdong Provincial Forestry Bureau, Guangzhou CITES and Guangdong customs. In April 2008 SPG was invited by Guangzhou CITES and Guangdong customs to train their staff in identification of traded turtles. To help staff of customs, Forestry Bureau, and Industry and Commerce Management Bureau to identify turtles, HTS has produced an *Identification Manual for Traded Turtles in China* (Shi, 2008). Our future plans are to cooperate with local government, academic institutes and NGOs to initiate long-term monitoring of the pet turtle trade in China.

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Appendix

The appendix for this article is available online at <http://journals.cambridge.org>

Biographical sketches

SHI-PING GONG is interested in the population ecology, captive breeding, trade and conservation of turtles in China. Over 2002–2008 he surveyed and monitored the dynamics of the turtle trade in south China. Currently, his interests include the ecology, captive breeding and conservation of other reptiles and amphibians in south China. ALEX T. CHOW is interested in turtle conservation, with a research focus on the impacts of climate change and urban development on turtle habitat and distribution. JONATHAN J. FONG is interested in molecular systematics, and specifically in its utility to guide turtle conservation in China. HAI-TAO SHI is interested in the study and protection of the birds, reptiles and amphibians of China, and especially the ecology, captive breeding, trade and conservation of threatened turtles.

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Appendix 1 Approximate number of individual turtles per species found in Yuehe Pet Market from August 2006 to March 2008, with their IUCN Red List category (IUCN, 2008) and CITES Appendix listing (CITES, 2008), and the countries to which they are native (Zhou, 2004; Shi, 2008).

Species	No. of Individuals ¹	Red List category ²	CITES Appendix	Native to
<i>Apalone ferox</i>	++			USA
<i>Cuora galbinifrons</i>	++++	CR	II	China, Cambodia, Laos, Vietnam
<i>Cuora amboinensis</i>	++++	VU	II	Bangladesh, Cambodia, Indonesia, India, Malaysia, Myanmar, Thailand, Vietnam
<i>Cuora flavomarginata</i>	++++	EN	II	China, Japan
<i>Cuora mouhotii</i>	++++	EN	II	China, India, Myanmar, Thailand, Vietnam
<i>Carettochelys insculpta</i>	++++	VU	II	Australia, New Guinea
<i>Cyclemys dentata</i>	++++			China, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand, Vietnam
<i>Cyclemys tcheponensis</i>	++			Laos, Thailand, Vietnam
<i>Chelydra serpentina</i>	++++	VU		Canada, Colombia, Ecuador, Mexico, USA
<i>Chelus fimbriata</i>	+			Brazil, Colombia, Ecuador, Peru, Venezuela
<i>Chelodina siebenrocki</i>	++++			Indonesia, New Guinea
<i>Chrysemys picta</i>	++			Canada, Mexico, USA
<i>Clemmys guttata</i>	+	VU		Canada, USA
<i>Geoemyda spengleri</i> ³	++++	EN	III (China)	China, Indonesia, Vietnam
<i>Geochelone carbonaria</i>	++++		II	Argentina, Brazil, Colombia, Paraguay, Panama, Venezuela
<i>Geochelone platynota</i>	++++	CR	II	Myanmar
<i>Geochelone sulcata</i>	++++	VU	II	Central Africa
<i>Geochelone elegans</i>	+++		II	India, Pakistan, Sri Lanka
<i>Geochelone pardalis</i>	++		II	East and Southern Africa
<i>Geochelone radiata</i>	+++	VU	I	Madagascar
<i>Geoclemys hamiltonii</i>	++	VU	I	Bangladesh, India, Nepal, Pakistan
<i>Graptemys pseudogeographica</i>	+++++		III (USA)	USA
<i>Hardella thurjii</i>	+++	VU		Bangladesh, India, Nepal, Pakistan
<i>Heosemys depressa</i>	++	CR	II	Myanmar
<i>Heosemys grandis</i>	++++	VU	II	Cambodia, Laos, Malaysia, Myanmar, Thailand, Vietnam
<i>Heosemys spinosa</i>	+	EN	II	Indonesia, Malaysia, Myanmar, Thailand, Philippines
<i>Heosemys annandalii</i>	+++	EN	II	Cambodia, Malaysia, Thailand, Vietnam
<i>Indotestudo elongata</i>	+++++	EN	II	China, India, Malaysia, Myanmar, Nepal

Appendix 1 (Continued)

Species	No. of Individuals ¹	Red List category ²	CITES Appendix	Native to
<i>Kinosternon leucostomum</i>	++			Colombia, Ecuador, Mexico, Nigaragua, Peru
<i>Kinosternon odoratum</i>	++			Canada, USA
<i>Kinosternon minor</i>	+			USA
<i>Lissemys punctata</i>	++		II	Bangladesh, India, Myanmar, Nepal, Pakistan, Sri Lanka
<i>Malacochersus tornieri</i>	++	VU	II	Kenya, Tanzania
<i>Macrolemys temminckii</i>	++++	VU	III (USA)	USA
<i>Malayemys subtrijuga</i>	+++	VU		Cambodia, Indonesia, Malaysia, Myanmar, Thailand, Vietnam
<i>Manouria impressa</i> ³	++++	VU	II	China, Cambodia, Malaysia, Myanmar, Thailand, Vietnam
<i>Manouria emys</i>	++	EN	II	India, Bangladesh, Indonesia, Malaysia, Myanmar, Thailand
<i>Mauremys japonica</i>	+			Japan
<i>Mauremys reevesii</i>	++++++	EN	III (China)	China, Japan, North Korea
<i>Mauremys nigricans</i>	+	EN	III (China)	China, Vietnam
<i>Mauremys annamensis</i>	++	CR	II	Vietnam
<i>Mauremys mutica</i>	++++++	EN	II	China, Japan, Vietnam
<i>Mauremys sinensis</i>	++++++	EN	III (China)	China, Vietnam
<i>Melanochelys trijuga</i>	++++			Bangladesh, India, Myanmar, Nepal, Sri Lanka
<i>Melanochelys tricarinata</i>	+	VU	I	Bangladesh, India, Nepal
<i>Morenia ocellata</i>	++	VU	I	Myanmar
<i>Notochelys platynota</i>	++	VU	II	Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Thailand, Vietnam
<i>Orlitia borneensis</i>	+	EN	II	Indonesia, Malaysia
<i>Pelodiscus sinensis</i>	++++++	VU		China, Japan, Korea, Russia, Vietnam
<i>Platysternon megacephalum</i>	+++	EN	II	China, Cambodia, Laos, Myanmar, Thailand, Vietnam
<i>Podocnemis unifilis</i>	++	VU	II	Bolivia, Brazil, Colombia, Ecuador, Peru, Venezuela
<i>Pseudemys nelsoni</i>	+			USA
<i>Pseudemys alabamensis</i>	+++++	EN		USA
<i>Rhinoclemmys pulcherrima</i>	+			Brazil, Costa Rica, Mexico, Honduras, Nicaragua
<i>Sacalia quadriocellata</i>	++	EN	III (China)	China, Laos, Vietnam
<i>Sacalia bealei</i>	+	EN	III (China)	China, Vietnam
<i>Siebenrockiella crassicollis</i>	++++	VU	II	Cambodia, Indonesia, Malaysia, Myanmar, Thailand, Vietnam
<i>Staurotypus triporcatus</i>	++			Central America
<i>Staurotypus salvinii</i>	+			Brazil, Mexico
<i>Trachemys scripta elegans</i>	++++++			Mexico, USA
<i>Trachemys scripta troostii</i>	++++	□	□	USA

¹+, 1–10; ++, 11–50; +++, 51–100; +++++, 101–500; ++++++, 501–1,000; ++++++, >1,000

²CR, Critically Endangered; EN, Endangered; VU, Vulnerable

³*Geoemyda spengleri* and *Manouria impressa* are designated as grade II key state-protected species under the China Wild Animal Protection Law.