The Status of *Tomistoma schlegelii* (Mueller) in Malaysia

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Abstract

Tomistoma schlegelii has been known from both Peninsular Malaysia and Sarawak since the end of the 19th Century. Investigation of old localities indicates that the species may still be present, though its ability to reproduce in substantially modified habitats may be questioned. New locality records in Malaysia include at least one from a large lake in Terengganu State on the east coast of Peninsular Malaysia, and a possible new record from western Sabah. More than 70 Tomistoma are currently held captive in Malaysia, but have reproduced at only two facilities. The most serious threat to the survival of the species in Malaysia is the draining and conversion of peat and pandan swamps to agriculture on a large scale.

Introduction

In the late 1890s, well before any significant hunting or development activities in Sarawak, William Hornaday commented that he could not obtain a fresh specimen of Tomistoma as this species was "much more rare than the other one" (*C. porosus*). This view has not changed over the last 100 years, though the rarity of the species is now attributed to habitat loss and opportunistic killing.

Sebastian (1993) attempted to compile records of Tomistoma from all parts of Malaysia, which at that time expanded the number of localities known, but viewed the species as endangered. Simpson (1998) spent six weeks looking for Tomistoma in the Tasek Bera region of the Peninsular Malaysian State of Pahang, but despite widespread reports of its continued existence, encountered none. Stuebing *et al.* (1998) reported several new locality records for Malaysia, from Sarawak, including a nesting female in August of 1994, disturbed by an Iban farmer in the Sg Runjing (tributary of the Batang Lupar), several Tomistoma seen near the site of a 1996 crocodile attack in the Sg Tisak, and a Tomistoma observed by a local field researcher in the mid-1990s in the Sg Kakus, a tributary of the Tatau River near Bintulu.

This pattern of discovery of small numbers of Tomistoma either in areas where it was formerly reported, or unsurveyed (but appropriate) habitats, has continued. Following the 2002 Crocodile Specialist Group Meeting in Gainseville (Florida, USA), several of us have made efforts to check up on areas of Malaysia where Tomistoma was historically recorded, to review on any recent references to it in several new field guides recently published from the region, look for existing live collections in various facilities around Malaysia (and determine the origin of their holdings), and to interview anyone potentially with knowledge of the species. As a result, some new and interesting information has come to light, and while the picture of Tomistoma's conservation status in Malaysia is not particularly rosy, there is reason to be hopeful concerning its continued survival.

Recent Records

A list of the most recent known localities for Tomistoma in Malaysia is given in Table 1. Almost all records obtained by the end of 2003 were either from the Perak, Pahang and Sadong (Western Sarawak) River systems.

RBS visited the Malaysian State of Perak in September, 2003, and personally investigated one of the oldest Malaysian records from the species, a locality called "Pulau Tiga" on the Perak River about 10 km upstream of the Sg Kinta (Sg = River in the Malay language). The original settlement, according to local people there, was a Chinese trading outpost disappeared in the early 1900s. Locals, however, were confident that the specimen had come from the area, and specifically mentioned the Sg Kinta (a blackwater river that now runs through largeswaths of oil palm planted in the 1970s) where the crocodile still could be found. Discussions with the Director of the Taiping Zoo (Dr. Kevin Lazarus), where four live Tomistoma are held, revealed that two specimens had been captured in southern Perak in

2003. An interview with Mr. Jasmi Abdul, State Director of the National Parks and Wildlife Office confirmed this story, and dated photos of the animals were produced as proof. There was also confirmation of the "complaints" by villagers along the Sg Kinta of the presence of Tomistoma.

Following this, on a visit to Field Museum of Natural History, RBS referred to a guide to Southeast Asia Reptiles (Chan-ard *et al.* 1999), in which a photograph of a small, juvenile Tomistoma is printed, along with a locality of "Kenyir Lake" (an extensive man-made lake formed above a hydro-electric dam, now a protected area) in the northeastern Peninsular Malaysian state of Terengganu. A follow up by SAMS confirmed that at least one live Tomisotma currently held in the Wildlife and National Parks' Malacca Zoo (west coast of P. Malaysia) originated from this same area of Terengganu.

All recent records (and we assume all previous ones) are derived from areas containing extensive peat swamps, or less commonly, freshwater pandan (*Pandanus* sp.) swamps. These include more vague reports from the Sg Bernam (Selangor) and the lower Sg Baram (Sarawak). Recent discoveries of the species in patches of inland peat swamps, such as those associated with the Kakus River (in the Bintulu District of Sarawak) indicate that Tomistoma may be rather widespread, though restricted to "pockets" of swamp. In March 2004, local people reported that Tomistoma inhabited an area of peat/pandan swamp in the upper Binyo River, a tributary of the Kemena River in Bintulu District.

Prior to 2002, there were no confirmed reports of Tomistoma from Sabah (Whitaker 1984), but Stuebing *et al.* (2002) reported a firsthand sighting of two Tomistoma that had been seen on the south bank of the Klias River in April 2002, about 100 m downstream from Kampung Kota Klias. The upper Klias originates in the only extant peat swamp on the West Coast of Sabah, the now much-degraded Binsuluk Forest Reserve. In April 2003, a tourist reported that he had seen a Tomistoma in an oxbow lake off the Kinabatangan River, above the town of Sukau, in eastern Sabah. Unfortunately, the observer could not been contacted afterwards. Although this record seems dubious as it seems too far from the core of Tomistoma's distribution within northern Borneo, in 2003 RBS was told (by Mr. Rifai of the Tarakan KSDA) of a sighting in the Sg Sebuku (3° 50' N, 117° 10' E) at the Malaysian border with East Kalimantan.

Malaysian Tomistoma in Captivity

The current number of captive Tomistoma held at various facilities around Malaysia is approximagtely 77 animals, details of which are given in Table 2. In Peninsular Malaysia, the largest number is at Malacca Zoo. As far as is known, there are no breeding facilities in Peninsular Malaysia. The length of captivity is not known with precision for any of the facilities except in Kuching. The Sarawak Forest Department's Matang Wildlife Centre has a single female who was discovered on a nest near Engkelili (Runjing River) in 1994. The Tomistoma in captivity for the longest period are undoubtedly those in the Jong Farm in Kuching, several of which were obtained in the 1970s.

Breeding of captive Tomistoma in Malaysia is known from only the the National Zoo in Kuala Lumpur (first four hatchlings in 2003), and the Jong Crocodile Farm outside of Kuching, Sarawak. Success at the National Zoo is new, and at the Jong Farm has been limited. A total of 19 hatchlings were produced from 1996-2001, but in 2002 and 2003, although several nests were constructed, no fertile eggs were laid. So far it appears that even though the ecological conditions for successful breeding may have been achieved in several facilities, problems remain with the breeding animals themselves, in finding compatible pairs both in age and behavior.

Threats

Much of the peat swamp in western Peninsular Malaysia was converted to oil palm in the 1970s and 1980s, leaving only patches of the habitat in northern Selangor State and Southern Perak. The central State of Pahang, where Simpson's 1998 field sites were located, has also continued to drain and develop large areas of its peat swamps, including the last substantially intact piece inland from the east coast town of Pekan. Coastal and interior swamps in Sarawak are facing rapid development for agriculture (oil palm, exotic tree plantations), and about half of the area southwest of Bintulu towards the Mukah and Oya Rivers, has already been converted. *Crocodylus porosus* seems to have survived conversion of forests to oil palm estates in Sabah (Stuebing 2002), but it is unknown whether Tomistoma will be as resilient. To answer this question surveys of such coastal peat swamps, including those converted circa ten years ago, are needed.

Stuebing (2002), working in Sabah on the management on *Crocodylus porosus*, found the latter is now rarely hunted by local people, as there were no local buyers for the skins. As Tomistoma skins are of less value commercially than

Table 1. Records of *Tomistoma schlegelii* in Malaysia 1997-2004. * Records since 1998; ** Wildlife and National Parks Office (PERHILITAN).

Locality	State	Age Class	Date Source, Year
Sg Jengka	Pahang	Subadult, 1995	Simpson *et al.* (1998)
Sg Lepar	Pahang	"All sizes frequently seen"	Simpson *et al.* (1998)
Sg Luit	Pahang	Occurs	Simpson *et al.* (1998)
Sg Pahang	Pahang	"All sizes frequently seen"	Simpson *et al.* (1998)
Sg Rasau	Pahang	"all sizes frequently seen"	Simpson *et al.* (1998)
Sg Rompin	Pahang	Reported	Simpson *et al.* (1998)
Tasek Bera, Sg Bera	Pahang	"3-4 sightings/year	Simpson *et al.* (1998); Dr. Kevin Lazarus, Taiping Zoo, September 2003
Tasek Cini	Pahang	Juv., 1997	Simpson *et al.* (1998); Dr. Kevin Lazarus, Taiping Zoo, September 2003
Sg Kinta *	Perak	"Common", 2003	Villagers reported to Perak Wildlife Office (Ipoh), June 2003
Sg Merah (trib. of Sg Perak)	Perak	Reported, 2003	En. Ahmad Darubi, Kg Pulau Tiga, 2003
Sg Sungkai* (trib. of Sg Perak)	Perak	2.6 m male, June 2003	En. Jasmi Abdul, Perak Wildlife Office (Ipoh), September 2003
Sg Dusun *	Selangor	Occurs	Dr. Kevin Lazarus, Taiping Zoo, Sep. 2003
Sg Erung* (trib. of Sg Bernam)	Selangor	Subadult, January 2003	En. Jasmi Abdul, Perak Wildlife Office ** (Ipoh), September 2003
Kuala Berang*	Terengganu	In Malacca Zoo	SAMS
Sg Terengganu, Lake Kenyir*	Terengganu	Juvenile captured, 1998?	Chan-Ard *et al.* (1999)
Sg Kinabatangan *	Sabah	Reported by tourist, 2003	En. Zainal Abidin, ex-WWF & KOCP, Sukau, 2003
Sg Klias*	Sabah	Pair sighted, April 2002	Stuebing (2002)
Loagan Bunut ?	Sarawak	Reported	Sebastian (1993)
Sg Baram	Sarawak	Occurs (2002)	Simpson, pers. comm. 2002.
Sg Dor	Sarawak	Old record	Stuebing *et al.* (1998) (from 1917 record)
Sg Ensengai	Sarawak	Observed	Cox and Gombek (1985)
Sg Kelauh	Sarawak	Occurs	Cox and Gombek (1985)
Sg Kerang	Sarawak	Occurs	Stuebing *et al.* (1998)
Sg Kroh	Sarawak	Nesting	E. Lading, pers. comm. 1997
Sg Mayeng * (trib. of Sg Tatau, Bintulu Dist.)	Sarawak	Numerous	Dr. C.K. Lim, pers. obs. 2003
Sg Mukah	Sarawak	Old record	Unconfirmed (1917)
Sg Penyilam* (trib. of Sg Kemena, Bintulu Dist.)	Sarawak	Occurs	Report by local residents
Sg Runjing	Sarawak	Nesting	Stuebing *et al.* (1998)
Sg Sadong	Sarawak	Occurs	J. Jong, pers. comm. 1998
Sg Seterap	Sarawak	Reported	Stuebing *et al.* (1998)
Sg Simunjan	Sarawak	Reported	Stuebing *et al.* (1998)
Sg Tisak	Sarawak	Possible attack on human?	Stuebing *et al.* (1998)

those of *C. porosus*, it is unlikely that hunting has been a serious threat in Malaysia, apart from opportunistic killing, especially given the secretive nature of the species. It appears that Tomistoma is also not regarded as food by many people, as we (RBS and EL) have never heard of anyone consuming the species as food in Malaysia.

Although Bezuijen *et al.* (2002) linked the heavy logging of habitats in Sumatra to a decline in Tomistoma abundance over a period of about ten years, fewer sightings may necessarily furnish suffieicent proof of a precipitous decline in a population. Other, perhaps less favored explanations, would include the animals becoming more secretive, or temporarily withdrawing from disturbed area. Death of Tomistoma in suboptimal habitats or through conflicts with *C. porosus* is a clear possibility as well, but difficult to substantiate. Upon seeing the destruction caused by non-selective logging, and being unable to find Tomistoma in that area, it is reasonable to assume that the animals are gone, but it may not be completely accurate to state that they are dead. A long-lived species such as Tomistoma does have the ability to return to an area to breed, even after many years. The purpose in making such a statement here is

Table 2. *Tomistoma schlegelii* currently held in captivity in Malaysia. Source/year: 1= S. Anuar Mohd. Sah 2004; 2 = Dr Kevin Lazarus (Zoo Director), 2003; 3 = farm owner; 4 = J. Jong 2004. * Simpson (pers. comm., 2003) stated that these animals had come from the Baram River, but the owner reported to Mr. C.H. Tan of Miri that the Tomistoma were all imported from Indonesian Borneo (probably West Kalimantan).

Facility	Location	No. animals	Origin	Source, year
Langkawi Crocodile Farm	Pulau Langkawi, Kedah	10	Singapore	1
Taiping Zoo	Taiping, Perak	4	Pahang (1 reportedly from Bera R., Temerloh)	2
Malacca Zoo	Malacca	1M, 6F	Tanjung Karang, Kuala Berang (Terengganu), Perak, Selangor?	1
Taman Buaya	Malacca	1M, 1F	unknown	1
National Zoo	Kuala Lumpur	1M, 3F, 4 juv. (hatched)	unknown	1
Miri Crocodile Farm	Miri, Sarawak	9	Kalimantan*	3
Jong Crocodile Farm	Kuching, Sarawak	Approx. 37	Upper Sadong (tributaries), W. Sarawak	4
Total		77 (approx.)		

not to detract from the seriousness of the situation, but to encourage conservation efforts even in areas which may seem (temporarily) "lost" to development.

In the opinion of the current authors, the most serious threat to the species in Malaysia is the draining of peatlands and pandan swamps, and their conversion to agriculture. Intensive fishing of swamps with *selambau* nets, which block entire channels and could conceivably drown many animals in the process, is also a possible source of mortality. Nevertheless, local Iban people in the Sg Binyo dismissed this idea, and said they almost never caught any crocodiles. Interestingly, some of these swamps are now being adopted (at least in Sarawak) as breeding refuges for the much prized "ikan tapa" (*Wallago* sp.). Conservation of these important fish spawning areas will augment current efforts to conserve Tomistoma, as long as there is an effort to promote public awareness for conservation of all components of the ecosystem.

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