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Update of Freshwater Turtles' Distributions for Trinidad and Possible Threat of an Exotic Introduction

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ABSTRACT

The distribution patterns for *Kinosternon scorpioides scorpioides* is now inclusive of the western portion of Trinidad. So too *Rhinoclemmys punctularia punctularia*'s distribution pattern has widened to include a greater southern area. *Mesodemmys gibbus* is still the rarest of all three aquatic species. There is now threat of naturalization of a fourth species, *Trachemys scripta elegans* which is native to the southern region of North America. Reports of their escapes as well as wild sightings across Trinidad are documented.

Key words: *Kinosternon scorpioides scorpioides*, *Rhinoclemmys punctularia punctularia*, *Phrynops gibbus*, *Mesodemmys gibbus*, *Trachemys scripta elegans*.

INTRODUCTION

Murphy (1997) has the most comprehensive distribution and description of Trinidad and Tobago's herpetological fauna. Boos (2001) has since addressed the snakes of the twin islands and Manickchan (2004) has addressed the Order of Anurans (frogs and toads) within Trinidad. We now aim to update Murphy's 1997 distribution of Trinidad's freshwater turtles (Order: Chelonia).

The high diversity and number of the island's wetland habitats, both lotic and lentic, result in the habitats for these turtles. The island has three species that can be considered native and has documented breeding populations (Murphy 1997), all of which are locally referred to as 'galap'. These include *Mesodemmys gibbus* (Schweigger) (Family: Chelidae) formerly *Phrynops gibbus* (Family: Chelidae, Austro-American side-necked turtles) (Mc Cord 2001), *Rhinoclemmys punctularia punctularia* (Daudin) (Family: Emydidae, pond and river turtles) and *Kinosternon scorpioides scorpioides* (Linnaeus) (Family: Kinosternidae, American mud and musk turtles). *M. gibbus* is easily identified by its side folding, non-retractable neck, whilst only *R. punctularia punctularia* has noticeable bright orange markings on a dark head whilst of the three only *K. scorpioides scorpioides* has a hinged plastron at the humeral scutes (Murphy 1997). All three species display some degree of webbing between toes.

Murphy (1997) gives details of other species (Chelidae: *Chelus fimbriatus*, Pelomedusidae: *Podocnemis expansa* and *Podocnemis unifilis*) that have historical occurrences along Trinidad's coastline. Our surveys did

not find any evidence to support the presence of breeding populations of these Chelonians. It seemed unlikely that these turtles were in Trinidad or Tobago in 1997 (Murphy 1997), but comments about their presence were scattered throughout the literature and there are museum specimens of at least one of them with Trinidad listed as the locality of origin. However, limited work has been done to investigate the distribution of freshwater turtles in Tobago.

METHODOLOGY

Samples were obtained via seining rivers and ponds, but were not targeted specifically for capturing turtles. Observations were made opportunistically along hiking trails as well. The data set spans approximately a decade.

Notes regarding the observations of all species interacting were made during five, one-hour sessions at the Emperor Valley Zoo during December 2009.

RESULTS

Fig. 1 shows the updated occurrences of *K. scorpioides scorpioides* and Fig. 2 shows the updated occurrences of *R. punctularia punctularia*. Thriving populations are suspected along the westerly draining waterways for *K. scorpioides scorpioides*, whilst *R. punctularia punctularia* populations are scattered along the southern portion of the island. The southeastern forested region is common to both species. *K. scorpioides scorpioides* specimens from the southeastern forest of Guayaguayare sometimes have a lighter coloured carapace compared to those from central Trinidad.

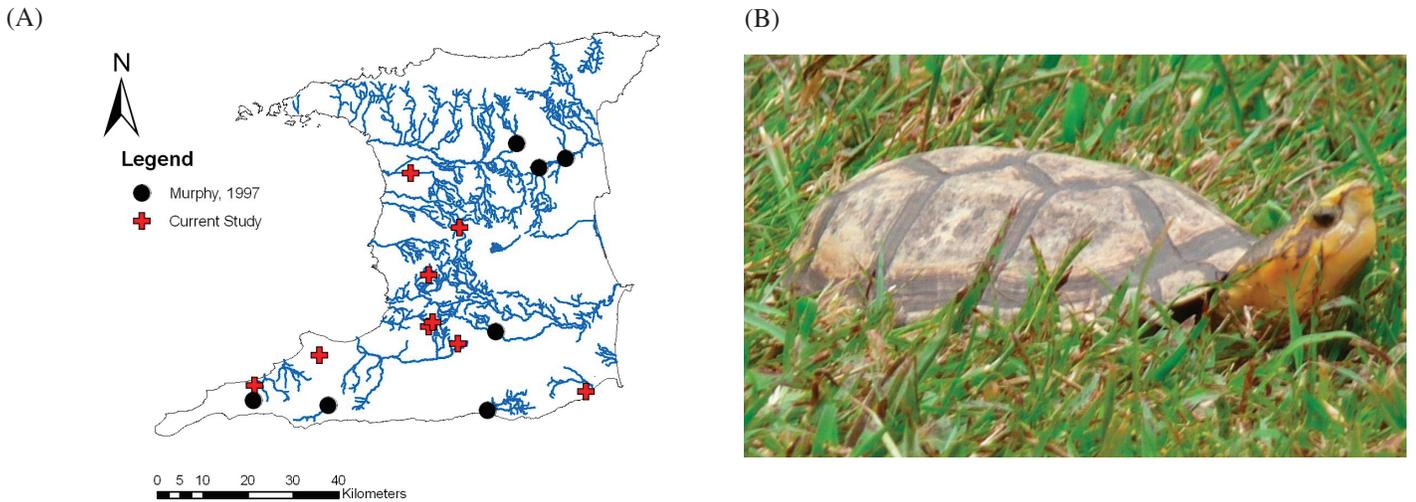


Fig. 1. (A) Updated occurrences of *Kinosternon scorpioides scorpioides* (B) for Trinidad, adapted from Murphy (1997).

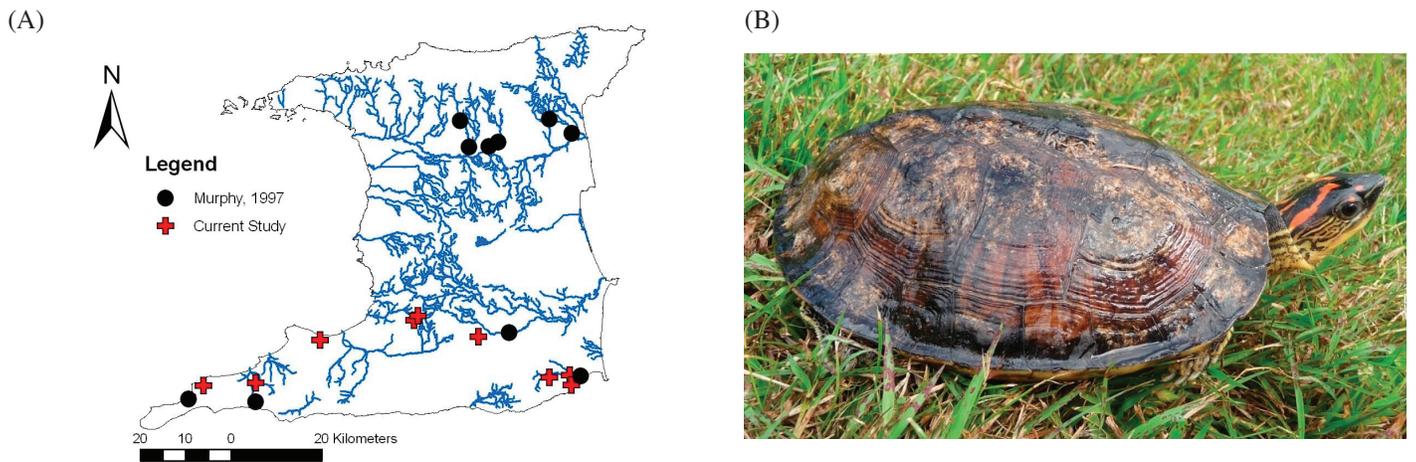


Fig. 2. (A) Updated occurrences of *Rhinoclemmys punctularia punctularia* (B) for Trinidad, adapted from Murphy (1997).

Fig. 3 shows the updated occurrences of *M. gibbus*. An isolated population within the south-westerly drainages of the South Oropuche catchment was deduced. Anecdotal evidence from persons living close to the upper reaches of this catchment (within the Penal district) suggests reliable observations of *M. gibbus*, giving vivid descriptions of the characteristic side folding neck.

Figure 3 also illustrates the sites from which the exotic species *Trachemys scripta elegans* (Red-eared pond slider) has allegedly escaped. Floyd B. Lucas observed an adult female *T. scripta elegans* (Red-eared pond slider) (Family: Emydidae) along the upper reaches of the Caura River (Caroni Drainage) the rainy season of 1988. Even more recently during February 2010, a large adult with a carapace length greater than 20 cm was observed basking along the banks of the reservoir of the Bamboo Grove Fish Farm located adjacent to the St. Joseph River (also of the Caroni Drainage). There are numerous accounts from owners of

escapes within the last decade. The occurrences ranged from the Port of Spain area near the St. Ann’s Drainage to south-central within the Princes Town district. Please view Appendix 1 for all accounts noted.

Observations were made at the Emperor Valley Zoo (Port of Spain), where *K. scorpioides scorpioides*, *R. punctularia punctularia* and *T. scripta elegans* are kept within the same enclosure. *Trachemys* were observed to be swift, feeding faster and dominating the energy rich food such as pawpaw, banana and bread. During five, one-hour sessions of observation, only two instances of inter-species aggression have been noted: *Trachemys* took food from a *Rhinoclemmys*’ mouth and a juvenile *Trachemys* exhibited a penchant association with a juvenile *Rhinoclemmys*, the *Trachemys* orienting itself face to face (head on) with the *Rhinoclemmys* and persistently clawing at the face of the *Rhinoclemmys* with both fore claws. The zookeeper in charge of the enclosure claims the *Trachemys*

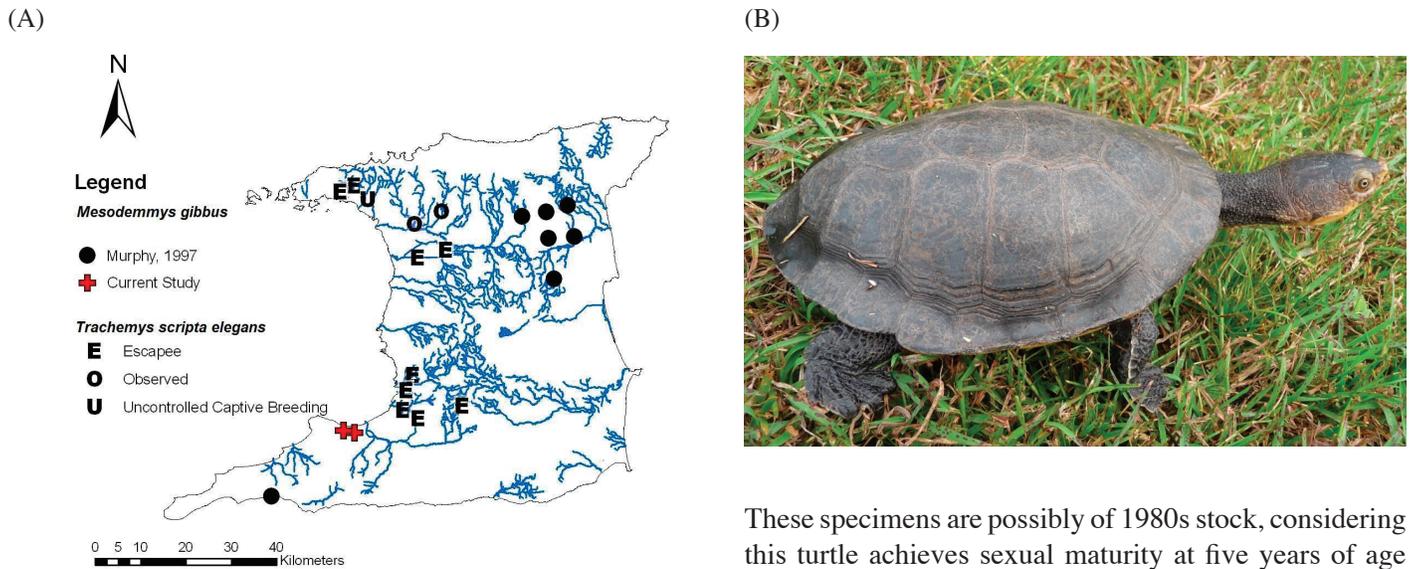


Fig. 3. (A) Updated occurrences of *Mesodemmys gibbus* (B), adapted from Murphy (1997) and notes on *Trachemys scripta elegans* (C) for Trinidad.

ate the eggs and babies of other species and is noted as a voracious feeder consuming mice as well. There was also competition for basking areas between *Rhinoclemmys* and *Trachemy*. *Kinosternon* preferred to be submerged within the enclosure while the other two species preferred to bask during observation periods.

DISCUSSION

Juveniles of *Trachemys scripta elegans* were imported in large numbers during the 1980s as part of the pet trade. Anecdotal evidence tells of several escapees across the island during that time. Their import was halted later in that decade. Currently, in addition to the Emperor Valley Zoo, there are at least three other privately owned collections of this American species where successful breeding occurs and of these, one is uncontrolled and weather determined.

These specimens are possibly of 1980s stock, considering this turtle achieves sexual maturity at five years of age (Wibbels *et al.* 1998). There has now been resurgence in the popularity of this species and once again import has been permitted within the last four years. It should be noted that with the exception of these two adults, no other individuals have been recorded for the island. Communication with J.C. Murphy revealed the existence of some individuals at a pond within the Arima Valley during the 1980s and 1990s.

The natural distribution of *T. scripta elegans* occurs within the Mississippi Valley, from northern Illinois to south of the Gulf of Mexico (Lever 2003). There are records of its naturalization in over 30 countries, from Europe to Asia, Africa, South America, the West Indies, Australasia, the Indian Ocean and the Pacific Ocean. This species has also naturalized in a wider territory within North America (Lever 2003). The natural breeding habits and requirement for this species (Wibbels *et al.* 1998) are very similar to the local species (Murphy 1997) and it is possible that with the continued occurrence of escapes, they will colonize Trinidad. Similar to our local species, they are also omnivorous (Hart 1983), giving rise to the speculation of potential niche competition and potentially a new introduced exotic vertebrate to our drainages. Pritchard and Trebbau (1984) noted a much generalized diet for *R. punctularia punctularia*, feeding equally readily on land and in water. Our observations support this school of thought, but it should be noted that these feeding habits were aspects of specific captive behavior, and they were observed for *Trachemys scripta elegans* as well.

The Emperor Valley Zoo has in the past housed this exotic species together with the agouti as a means of population control (the agoutis ate eggs of the turtles). Whilst the unnaturally high density of all species housed within the enclosure does not reflect the wild scenario, it demonstrates to some extent the potential niche competition and aggression the exotic species are capable of inflicting upon

our native species. In a previous study, the endangered European pond turtle (*Emys orbicularis galloitalica*) shifted their basking activity toward places seemingly inferior sites, while *Trachemys* occupied the better basking site, thus suggesting a dominance of the latter in the use of basking sites (Cadi and Joly 2003). *Trachemys* has been introduced into several Asian countries and have been said to compete with indigenous species for food and basking resources as well (Ramsay *et al.* 2007, Salzberg 2000). It is also suspected to be a niche competitor with *Malaclemmys* in Bermuda where nesting sites are very important on this remote oceanic island (Outerbridge 2008). The feet structure of *Trachemys* is also most similar to *Rhinoclemmys*. Both *Trachemys* and *Rhinoclemmys* feet have less webbing than *Mesodemmys gibbus*, but more than *Kinosternon scorpioides scorpioides*' feet. *Mesodemmys gibbus* feet are notably webbed and adapted for almost complete aquatic life, whilst *Kinosternon scorpioides scorpioides*' feet are shorter with shorter toes in comparison to the toes of the other three species in Trinidad. With similar adaptations, life cycles, feeding requirements and basking requirements, it seems niche competition is imminent. Thus far, areas where *Kinosternon* have been found seem to be 'hot spots' for *Trachemys* as seen in Figures 1(A) and 3(A). There may be reduced competition for resources, resulting in an eventual breeding population of *Trachemys*. Whilst this may be considered speculative, this has been the trend as seen in the literature.

It should also be noted that the new distribution of the three local freshwater turtle species does not necessarily mean a distribution expansion, but could be an artifact of previous under-sampling. Pritchard and Trebbau (1984) noted a widespread distribution of *R. punctularia punctularia* in Trinidad, occurring in almost all habitats except cane fields. Our 1987 specimen was however collected within a cane field in Princes Town. Most of our findings were revealed via river seining and hiking. Our data set also spans more than a decade. The land use types within the new distributions have not changed severely within this time implying that these species have now been eradicated from previous distributions. The southeastern populations of both *K. scorpioides scorpioides* and *R. punctularia punctularia* can be described as isolated based on the drainage, vegetation distribution and topography of the area. Our surveys within central and northeastern Trinidad have not yielded any species, but one cannot rule out the existence of these three naturally existing species. One can therefore expect to see an overlap of the distribution of all three natives inclusive of Murphy's (1997) record and those of this study.

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APPENDIX 1.

Table 1. Point occurrences and notes for freshwater turtle species of Trinidad.

Species	Date	Site Location	GPS	
<i>Rhinoclemmys punctularia punctularia</i>	Mar-87	Princes Town	0677678	1133804
	Sep-96	Princes Town	0678451	1134770
	Jun-98	Princes Town	0678451	1134770
	May-03	Guayaguayare	0711973	1121678
	9-May-07	Tributary of the Poole/Ortoire	0691795	1130116
	May-08	Princes Town	0678451	1134770
	3-Feb-09	South Fyzabad drainage	0642759	1120031
	Nov-09	Guayaguayare	0707407	1121221
	Nov-09	Guayaguayare	0712329	1119470
	12-Feb-10	Cedros	0622555	1115645
	Currently	Rousillac	0656882	1129414
<i>Kinosternon scorpioides scorpioides</i>	Apr-88	Princes Town	0677678	1133804
	Mar-87	Princes Town	0677678	1133804
	Jun-98	Princes Town	0678451	1134770
	31-Mar-07	Princes Town	0678451	1134770
	5-Apr-06	Chatham	0639295	1120839
	25-May-06	Mahaut River	0653520	1127539
	Apr-06	Mayo	0677649	1145228
	2007	Mammoral, Lynch Trace	0684459	1155652
	4-May-07	Tributary of South Oropuche	0684101	1130035
	Jul-09	Cunupia drainage	0673675	1167660
	Nov-09	Guayaguayare	0712329	1119470
	<i>Mesodemmys gibbus</i>	4-Feb-09	Berridge Trace, Upper Taruba River	0659333
Currently		Rousillac	0656882	1129414
<i>Trachemys scripta elegans</i>	1988	Upper Caura (observed)	0678551	1177759
	1989	Gasparillo, escapee	0672345	1140637
	1994	Princes Town, escapee	Not available	Not available
	Jun-99	Marabella, escapee	Not available	Not available
	2006	Cunupia drainage, escapee	673294	1167660
	2007	Oropuche, escapee	670042	1133936
	2007	St. Ann's, escapee	662551	1180460
	2007	Cunupia, 2 escapees (male and female)	Not available	Not available
	2009	Diego Martin, escapee	Not available	Not available
	Dec-09	La Romain, 2 released (male and female)	Not available	Not available
	Feb-10	Bamboo Grove Fish Farm (observed)	672407	1175779
	Currently	Uncontrolled captive breeding	662353	1180424