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CHAPTER 21

LAND SNAILS OF MUA ISLAND, TORRES STRAIT

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The results of a survey of the land snails of Mua island, Torres Strait, far northern Queensland are presented. The distribution of the Mua's land snails are discussed in relation to the diverse geology and vegetation communities of the island. The majority of species live in pockets of vine thicket and vine forest scatted over the island. The land snails of Mua largely comprise species that are encountered on many other islands in Torres Strait. An exception is an arboreal camaenid, *Noctepuna porietiana muensis* (Hedley, 1912), which is endemic to Mua. In the current survey *N. p. muensis* was found to occur only in the dry strandline vine thickets on the eastern edge of the island. ❑ *Torres Strait, land snails, distribution, vine thickets, Noctepuna poiretiana muensis.*

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The first expedition to seriously collect land snails in the Torres Strait was the Chevert Expedition of 1875. Funded by Sydney (New South Wales) naturalist William John Macleay (1820-1891), this expedition explored the central and western islands of the Strait as well as localities on Cape York Peninsula. Mua (=Moa) island was among those surveyed. A number of new land snails were described as a result of this expedition (Brazier, 1876), but none from Mua. In the following hundred years or so no specific land snail surveys took place on the islands of the Strait, although some specimens were recovered from time to time as part of broader faunal surveys and itinerant collecting largely by non-malacologists. It was not until 1985 that the then Queensland Department of Primary Industries, on behalf of the Australian Quarantine and Inspection Service, funded a Queensland Museum (QM) land snail expedition to survey the Torres Strait islands for the Giant African Snail *Achatina fulica* Bowdich, 1822. Six islands (Badu, Warraber [=Sue], Iama [=Yam], Mer [=Murray], Waibene [=Thursday], Ngurupai [=Horn], Saibai) were surveyed by the author and an assistant. The Giant African Snail was not found but the expedition was able to produce substantial inventories of other land snail species for these islands. Mua was not included in that survey because of accessibility problems and therefore remained somewhat of a 'black hole' in the world of Torres Strait land snails. The current survey was undertaken primarily as part of a greater interdisciplinary study of Mua island (see other works in this volume), but also in an attempt to fill that historical collecting void. Accessing records from the Queensland Museum's land snail database, together with additional information from the land snail database of Sydney's Australian Museum (AM), it has also been possible to place the Mua land snails into broader regional context.

STUDY SITES

Land snails in eastern Australia are largely confined to rainforest, whether humid, wet or dry (Stanisic & Ponder, 2004). Hence, study site selection on this brief survey was based on the identification of suitable snail habitats across a large part of the island. Areas surveyed include the lower slopes of Mt Augustus, the upper slopes of Mua Peak (=Banks Peak), vine thickets on granite headlands near Kubin Village and dunal and sub-dunal vine thickets on the northeastern fringe of the island. Additional collecting was carried out in vine thickets adjacent to mangrove communities (Table 1). Woodland communities were also searched to confirm habitat preferences for the snails. The survey was conducted over the period 26-30 April 2004 when prevailing weather conditions were fine and dry.

SURVEY METHODOLOGY

Standard snail survey methodology developed at the Queensland Museum was employed. Sites

TABLE 1. Locality and habitat data for sites at which land snails were collected during the survey.

SITE 1	Headland, near Kubin Village	10° 14.302'S, 142° 13.042'E	Dry vine thicket
SITE 2	Foredunes, northeastern Mua	10° 08.300'S, 142° 18.430'E	Dry vine thicket
SITE 3	Lower slopes, Mt Augustus	10° 09.104'S, 142° 17.046'E	Vine forest
SITE 4	Subdunal lowland, northeastern Mua	10° 08.235'S, 142° 18.230'E	Dry vine thicket
SITE 5	Behind mangroves, northeastern Mua	10° 07.929'S, 142° 17.729'E	Dry vine thicket
SITE 6	Upper slopes, Mua (=Banks) Peak	10° 08.650'S, 142° 19.230'E	Vine forest

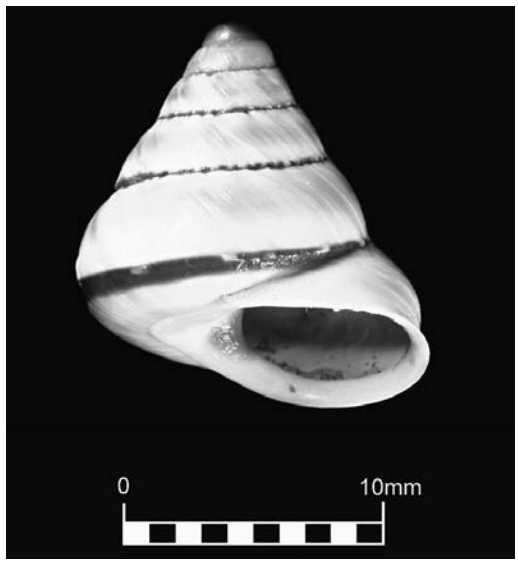

FIG. 1. Mua's only endemic land snail, the arboreal camaenid *Noctepuna poiretiana muensis* (Hedley, 1912). Scale in mm units.

were sampled for periods of 1 hour each during which time known snail microhabitats were searched. These included on and under rocks, under logs, on vegetation (ground and arboreal) and in litter. Live snails and dead shells were collected. Additionally a small sample of ground litter was taken for subsequent sorting in the laboratory. The latter technique is critical in recovering many of the smaller snail species (less then 5mm in shell height or diameter) which are difficult to locate in a particularly cryptic and complex part of the landscape. Litter sorting recovers mainly dead shells, but these can usually be identified to species level without much difficulty. Because their shells linger in the litter for some considerable time after death, land snails are unusual in being able to be sampled *post mortem*. The presence of dead shells in the litter is generally considered sufficient evidence to indicate the presence of living colonies.

RESULTS

All snails were collected from vine forest and vine thicket communities on the island. Woodland collecting failed to yield a single specimen. Land snails recorded from the respective study sites during the survey were as follows:

SITE 1. *Pleuropoma gouldiana*, *Torresiropa spaldingi*, *Pravonitor kreffti*, *Austrochloritis buxtoni*, *Eremopeas tuckeri*, *Liardetia scandens*, Helicarionidae CY 2.

SITE 2: *Leptopoma perlucida*, *Liardetia scandens*, *Pravonitor kreffti*, *Austrochloritis buxtoni*, *Trachiopsis strangulata*, *Torresitrachia torresiana, Noctepuna poiretiana muensis*.

SITE 3: *Signepupina bilinguis*, Helicarionidae CY 2.

SITE 4: *Liardetia scandens*, *Hadra funiculata*.

SITE 5: *Pravonitor kreffti*, *Torresitrachia torresiana*.

SITE 6: *Hadra funiculata*.

DISCUSSION

The islands of the Torres Strait comprise small and large land masses of varying geologies that support diverse vegetation communities. Mua is the largest of the western islands (and second-largest of the islands of Torres Strait, after Muralag) and has geological and vegetational attributes in common with many of the other islands in the strait (Wannan, this volume). It is therefore not surprising that a large number of the land snails found on other islands should also occur here. Table 2 shows the distribution of land snails on selected islands of Torres Strait based on the collections of the Queensland and Australian Museums. These lists are not

	Mua	Badu	Iama	Warraber	Burrar	Saibai	Erub	Mer	Waibene	Ngurupai	Regional distribution of species
Pleuropoma gouldiana	+	+							+		Wet Tropics-Torres Strait islands
Leptopoma perlucida	+										Wet Tropics-Torres Strait islands, PNG
Signepupina bilinguis	+										Cape York-Torres Strait islands
Atopos australis								+			Widespread in eastern Australia
Tornatelliops mastersi							+				Wet Tropics-Torres Strait islands
Gastrocopta pediculus		+	+								Widespread in eastern Australia
G. macdonnelli		+	+	+	+	+		+			Wet Tropics-Torres Strait islands
Pupoides pacificus		+	+	+	+			+	+		Widespread in eastern Australia
Nesopupa scotti		+									Widespread in eastern Australia
Pupisoma porti								+			Widespread in eastern Australia
Amimopina macleayi									+		Widespread in northern Australia
Eremopeas tuckeri	+	+	+	+	+		+	+	+		Widespread in eastern Australia
Torresiropa spaldingi	+		+	+	+				+	+	Cape York-Torres Strait islands
Discocharopa aperta								+			Wet Tropics-Torres Strait islands
Coneuplecta calculosa							+	+			Widespread in eastern Australia
Liardetia scandens	+				+		+				Widespread in eastern Australia
Liardetia doliolum								+			Torres Strait islands-PNG
Nevelasta pampini							+				Widespread in eastern Australia
Helicarionidae CY 2	+	+							+		Cape York-Torres Strait islands
Pravonitor kreffti	+	+	+				+	+	+		Cape York-Torres Strait islands
Austrochloritis buxtoni	+	+		+				+	+	+	Cape York-Torres Strait islands
Austrochloritis layardi			+					+	+		Cape York-Torres Strait islands
Trachiopsis strangulata	+	+	+	+					+	+	Cape York-Torres Strait islands
Noctepuna p. muensis	+										Mua
Hadra bartschi							+	+			Western Torres Strait islands
Hadra funiculata	+		+	+	+	+					Eastern and Central Torres Strait islands
Torresitr. torresiana	+	+	+	+	+	+	+	+	+	+	Cape York-Torres Strait islands

TABLE 2. Distribution of native land snails on selected islands in the Torres Strait. [+ = presence]. Based on QM and AM databases.

considered to be exhaustive inventories, although they do provide a means of giving geographic context to the Mua species.

The single most noteworthy find was the arboreal land snail, *Noctepuna poiretiana muensis* (Hedley, 1912) (Fig. 1). Arboreal camaenids are rare in Australia (nine species) and all are confined to the eastern rainforests. *N. p. muensis* has close relatives in the rainforests of the Iron Range, Batavia Downs and Coen areas of Cape York Peninsula. This wide distribution gap probably indicates a very old connection between these regions that predates the development of a regional 'Cape York-Torres Strait' land snail community discussed below.

With the exception of the tree snail *Noctepuna poiretiana muensis*, the snail species collected on Mua are consistent with a regional 'Cape York-Torres Strait' land snail community (Table 2). This snail community is largely confined to the western and central islands of the Strait and the tip of Cape York Peninsula and is indicative of environmentally similar, yet geographically isolated, habitats which share similar geologies and flora. They are the dry vine thickets that occur on a range of lithologies: enriched quaternary sands, granite outcrops and alluvial back-swamps. The formation of this regional snail community most likely dates to the Quaternary when episodes of lowered sea levels provided connectivity between the land masses of Torres Strait and Cape York. Subsequent sea level rises would eventually isolate populations on islands and the mainland and climatic sifting of biota, in particular flora, would have restricted this land snail community to the now refugial vine thicket archipelago.

This is not an unexpected result and one that reinforces the close contemporary and historical liaison between land snails and rainforest vegetation commented on many times previously (Stanisic, 1994, 1997; Stanisic and Ponder, 2004). It shows that even on a relatively small and isolated land mass such as Mua, the land snails (and presumably other invertebrates) have

undergone considerable environmental sifting to produce geographically localised snail communities. These communities are now presumably also trapped within isolated refugia by contemporary and historical synanthropic influences, particularly fire, that affect the intervening woodland communities. These woodlands would normally provide dispersal corridors during wetter climatic periods as rainforest expands. Rowe (chapter 18, this volume) has identified burning during the Holocene as a major factor in altering, and now maintaining, landscapes on Mua. Such human factors will presumably continue to override any natural shifts in vegetation distribution due to climate change. This will ensure the long-term restriction of both rainforest vegetation and land snails to pockets of fire-free landscape such as rock outcrops, dunes and the rocky talus slopes of Mua's peaks. It also highlights the importance of these communities to the survival of this fauna.

The absence of the pupillids *Gastrocopta pediculus*, *Gastrocopta macdonnelli* and *Pupoides pacificus*, from the capture list is perplexing. These minute snails are found in great proliferation in most dry vine thicket habitats throughout Queensland along with a number of other species that form a 'tramp' snail community. Land have been recorded from a number of other Torres Strait islands (Table 2). Reasons for the absences are not obvious. Both *Eremopeas tuckeri* (Subulinidae) and *Liardetia scandens* (Helicarionidae), which were recovered, are members of this widespread 'tramp' fauna suggesting that local conditions are also suitable for pupillids. A follow-up survey to confirm this anomalous finding would be required before unequivocally excluding the Pupillidae from the faunal inventory for Mua.

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