

NOTES, INFORMATION & NEWS

Arboreal Neritidae

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Neritidae are snails of marine, brackish, and freshwater aquatic environments. This note reports a species *Neritodryas cornea* (Linnaeus, 1758), living in trees on the island of Babeldaob in the Palau archipelago of the western Pacific. This observation is noteworthy because there are few other explicit reports in the literature of neritids living in trees, an apparently unusual habitat for the family.

Neritodryas cornea were observed and collected at a site in the southwest part of Babeldaob (Imeliik State) (134°30.7'E, 7°24.2'N) on 5 June 1996. The site is a grove of pandanus trees, *Pandanus* cf. *kanehirae* Martelli in Kanehira, 1933, growing between the inland boundary of a mangrove forest and the unpaved road that travels north-south in this part of the island, approximately 6.5 km north of the Koror-Babeldaob ("KB") Bridge (now collapsed). A small stream runs under the road, through the pandanus grove and into the mangroves. The ground under the pandanus was waterlogged.

No *Neritodryas cornea* were found on the ground at this site, or in the adjacent mangroves or stream. The snails were found in the pandanus trees, predominantly at the bases of the leaves where they joined the stem of the tree and where small amounts of water collected, but also on other parts of the upper surfaces of the leaves. They were found in some of the tallest pandanus trees, up to 3 m above ground.

There was no evidence that the snails were in the trees by accident, as a result of being stranded after receding floods. The area clearly does not flood to the height at which the snails were found, and there had been no recent storm activity. Thus we consider the snails' presence at these heights in the pandanus to be normal. Whether they move up and down the trees is not known, or whether and how they move between trees. Whether they have a short-lived larval stage or none, as might perhaps be appropriate for their arboreal habit, is also not known.

It is known that some neritid species, including *Neritodryas cornea*, are frequently found above water. Indeed *N. cornea* has been collected previously (but not reported) from the same arboreal habitat in Palau (B. Holthuis, personal communication), and from similar habitat in New

Guinea (M. Pouliceck, personal communication). And other species in the genus are usually somewhat terrestrial (e.g., Baker, 1923), found on vegetation in the vicinity of water (Franc, 1956; B. Holthuis, personal communication; C. Unabia, personal communication). Also on Babeldaob, Smith (unpublished report to The Nature Conservancy, University of Guam Marine Laboratory, 1991) reported *Neritodryas subsulcata* (Sowerby, 1836) up to 2 m above the waterline on river banks. In Papua New Guinea, *Nerita planospira* Anton, 1839, has been found in pandanus and other trees in the mangrove forest (L. M. Cook, personal communication).

Neritodryas cornea is a widely distributed species, reported not only from Palau but also from New Guinea (van Benthem Jutting, 1963; Pouliceck et al., 1994); Solomon Islands (Haynes, 1990, 1993); and from the Nicobar Islands, through Java and the Malay archipelago to the Philippines and New Caledonia (van Benthem Jutting, 1956). Given the many misidentifications of neritids in the literature, it could in reality be more (or less) widely distributed.

Other neritids recorded in the collection area were *Neritina turrita* (Gmelin, 1791) on the muddy substrate at the edge of the mangroves immediately adjacent to the pandanus grove, but not in the grove itself, and *Neritina squamaepicta* (Récluz, 1843) in the stream as it flowed into the grove.

All specimens are deposited in the Malacology collections of Bishop Museum (Honolulu): catalog numbers BPBM 253989 (*Neritodryas cornea*), BPBM 253990 (*Neritina turrita*), BPBM 253992 (*Neritina squamaepicta*).

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Paleogeographic Implications of Late Paleocene *Onestia onestae* (Bivalvia: Cardiidae) in Arctic Alaska

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Introduction

The northernmost and youngest occurrence of the cardiid bivalve *Onestia onestae* (McLearn, 1931) is reported from Upper Paleocene beds (Marincovich, 1996; Bice et al., 1996) in the Prince Creek Formation near Ocean Point, northern Alaska (70°04'N, 151°22'W). The only previous occurrences of *O. onestae* are in middle Cretaceous strata of central Alberta, Canada: the upper Aptian Clearwater Shale (McLearn, 1933) (approx. 57°N, 112°W) and the lower Albian lower sandstone member of the Peace River Formation (McLearn, 1931) (approx. 56°N, 117°W). This is the only occurrence of *Onestia* in the northern hemisphere. Three other species of *Onestia* occur in Aptian and Albian faunas of Australia (Day, 1978).

Systematic Paleontology

Family CARDIIDAE Lamarck, 1809

Subfamily LAHILLIINAE Finlay & Marwick, 1937

Genus *Onestia* McLearn, 1933

Onestia onestae (McLearn, 1931)

(Figures 1–7)

Laevicardium onestae McLearn, 1931:7, pl. 1, fig. 1.

Integricardium (*Onestia*) *onestae* (McLearn) McLearn, 1933:152–153, pl. 2, figs. 8–10.

Onestia onestae (McLearn) McLearn, 1945:10, pl. 3, fig. 9;

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Table 1

Dimensions of complete valves of *Onestia onestae*. See Schneider (1995, in press) for explanations of height, length, and anterior length.

	Dimensions (mm)			
	Height	Length	Anterior length	Inflation
GSC 6345	24.7	31.6	10.1	9.1
GSC 8004	26.0	31.0	13.0	10.0
USGS [M9158] (right valve)	16.4	18.9	7.7	5.3
USGS [M8120] (left valve)	26.2	31.9	12.5	9.3
USGS [M8120] (right valve)	27.6	30.7	14.4	9.4

Jeletzky, 1964:9, 76, pl. 24, figs. 9, 11; Day, 1978:38, pl. 1, figs. 1–3.

Description: Elliptical in shape, moderately inflated, umbones located slightly anteriorly (see Table 1 for measurements). Anterior and ventral margins convex, posterior margin less convex and slightly oblique. Sculpture consists of growth lines only. Beaks low, slightly prosogyrous. Ligament groove short. Pallial sinus absent. Adductor muscles subcircular, faintly impressed. Hinge teeth arranged as in *Protocardia* and *Integricardium* (see Schneider, 1995), but anterior cardinals more robust. Right anterior cardinal thick and blunt, right posterior cardinal strong, subconical, and pointed. Right anterior cardinal socket deep and conical. Right posterior cardinal socket shallower and usually broader. Right anterior lateral tooth weak; overlying anterior lateral socket shallow. Right posterior lateral long, narrow, but not bladelike. Overlying posterior lateral socket moderately deep. No known specimens of left valves are well-preserved enough to describe hinge in detail.

Material: Holotype, Geological Survey of Canada-GSC 6345, left valve (Figure 1), lower Albian Peace River Formation, Alberta; plesiotypes GSC 8003 (left valve) and 8004 (right valve, Figure 2), upper Aptian Clearwater Shale, Alberta; University of California Museum of Paleontology, Berkeley, California. UCMP 154061 (right valve, Figures 3 and 6) and UCMP 154062 (left valve, Figures 4, 5), United States Geological Survey, USGS locality M8120, Ocean Point, Alaska; UCMP 154063 (Figure 7) and 154064 (two right valves), USGS locality M9158, Ocean Point, Alaska; UCMP 154065, 154066, and 154067 (three right valves), USGS locality M8120; all UCMP specimens from Upper Paleocene Ocean Point beds of Prince Creek Formation.

Discussion

There is a stratigraphic gap of some 45 to 50 million years (Harland et al., 1990) between the Canadian and Alaskan occurrences of *O. onestae*, but the Paleocene



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