A revision of the western Atlantic Ocean genus Engina with notes on Hesperisternia (Gastropoda: Buccinidae: Pisaninae)

G. Thomas Watters
Department of Evolution, Ecology, and Organismal Biology
The Ohio State University
Columbus, Ohio 43212 USA
watters.1@osu.edu

Koen Fraussen
Leuvensestraat 25
B-3200 Aarschot, BELGIUM
koen.fraussen@skynet.be

ABSTRACT


INTRODUCTION

The systematics of Engina is confusing as the genus has a complicated taxonomic history. Early species were described in the genus Voluta by Linnaeus (1758) and Wood (1828), in Buccinum by Lamarck (1822), in Columbella by Sowerby (1832) and Duclos (1840), and in Purpura by Kiener (1836). Even after the description of the genus Engina in 1839 species continued to be described in Buccinum by Kuster (1858), in Pollia by Dunker (1860), in Tritonidea by E.A. Smith (1884), and other genera, but especially in Reticula by Reeve (1846). In addition, aside from actual buccinid species, members of other families (Muricidae, Columbellidae, etc.) also were included in those genera and, for the simple reason that many of those small shells look similar, it was not until Pease (1860), Melvill (1893; 1894; 1895) and Melvill and Standen (1895) that the name Engina was finally used in publications. Tryon (1883) and Pace (1902) considered Engina to be a columbellid genus.

Engina was introduced by J.E. Gray in The Zoology of Captain Beechey's Voyage. In the Introduction to this publication, Beechey (in Gray, 1839: vii) stated that "I wish I could with sincerity have included with the above-mentioned [acknowledged] names that of Mr. J. E. Gray, who undertook to describe the shells, but the publication has suffered so much by delay in consequence of his having been connected with it, that it is a matter of the greatest regret to me that I ever acceded to his offer to engage in it... [This eight year delay] has been occasioned entirely by Mr. Gray's failing to furnish his part in spite of every intercession from myself and others." Beechey continued in this vein for another page. Gray had listed two species in the genus, neither collected during the voyage, both new but unillustrated, and did not select a type of the genus. Both species, E. zonata and E. elegans, have been the subject of debate due not only to Gray's lack of illustration, but to his apparent gross mis-measurement of the specimens, giving lengths 10 times greater than the actual shells, and the vague type localities for both: "Atlantic Ocean." Gray subsequently (1847) picked E. zonata as the type while misspelling Engina as Enzina (also misspelled in 1842).

Landau and Vermeij (2012) considered Engina to be a group of intertidal and shallow subtidal species. However, most of the species considered here occur in significantly deeper water; live individuals often occur in depths > 45 m, some to hundreds of meters. Of the western Atlantic species only E. turbinella truly occurs predominately in shallow water. Most species are associated with rocky reefs or coral debris, whereas some occur in caves. As with many other gastropod genera, Engina harbors a number of species that are common or even abundant whereas several species are quite rare and rarely represented in collections.

The type species of Engina, E. turbinella, is a member of the shallow water fauna and therefore shows the shell characteristics that are representative of Engina species from that fauna. Most, or all, shallow water Engina species bear the characteristic radially oriented lirae on the columella that are seen in the type species. Nevertheless many Engina live in deeper water and differ slightly or even radically from the shallow water morphs. In deeper water (ca. > 45 m) species may lack these radially oriented lirae on the parietal part. The shallow and deep water morphs are not well separated and it remains a question of whether this is the result of variability (the opinion followed in the present paper) or rather that our current concept of Engina is based on a heterogeneous group (the result of the presence of unrecognized genera).
In the present paper we regard Engina in a rather conservative way, grouping together the shallow and deep-water species. Further study may indicate that additional genera are required.

The type species of Engina, together with the species discussed in the present paper, are members of the Atlantic Ocean fauna. A much larger number of Engina species is known from the Indo-West Pacific and eastern Pacific oceans. We believe that both the Atlantic and Indo-West Pacific species belong to the same genus, as so many other genera do, and we see no reason to split Engina into distinct groups based on geographical distribution.

Apart from a higher biodiversity in the Indian and Pacific oceans, the morphological variability within the genus is also higher there than in the Atlantic Ocean. Slender, fusiform shells are a frequent shape in the Indo-West Pacific whereas none are known to us from the Atlantic Ocean. Those slender species have a different appearance than do broad ones and tend to live in deeper water; nevertheless we regard them as included within the variability of the genus. “Typical” species have radiating columnar riblets. In some species those are well expressed and striking but other species show this sculpture only under magnification.

Many Western Atlantic Ocean species have eastern Pacific Ocean cognates. Atlantic taxa such as E. turbinella and E. permata resemble Pacific species such as E. numilensis Bartsch, 1928, E. maura (Sowerby, 1832), and E. tabogaensis Bartsch, 1931. The Pacific E. yulehra (Reeve, 1846) is particularly close to the Atlantic E. demani. But taxa such as the Pacific E. fusiiformis Stearns, 1894, and the Atlantic E. goncalvesi do not have similar cognates. Vermeij (2006) recognized the close relationship between the Pacific Hesperistemia jugosa (Dans, 1852), previously considered an Engina (Keen, 1971), H. latula (Reeve, 1846), previously considered a Cantharus (Keen, 1971), and the Atlantic H. karinae (reviewed here).

A fossil record for Engina was nearly lacking until Landau and Vermeij (2012) reviewed the western Atlantic taxa. They identified Engina cantaurana Landau and Vermeij (2012) from the early Miocene of Venezuela as the oldest known member of the genus but did not believe it was closely related to any Recent species. They found that Engina latior Landau and Vermeij (2012) from the early Pliocene of the Dominican Republic, E. meinensis Landau and Vermeij (2012) from the early Pleistocene of Panama, and E. floridana Olsson and Harbison, 1953, from the early Pleistocene of Florida, were more similar to Recent species. Engina meinensis, in particular, is very similar to the two rare, deep-water Yucatan taxa discussed here: E. itzamnai and E. lignea. The extant E. turbinella was recognized from the middle Miocene of Panama (Woodring, 1973) and the late Pleistocene of the Dominican Republic (Landau and Vermeij, 2012).

Spiral and axial sculpture are features with a remarkably low degree of infraspecific variability within the genus Engina. Variability in pattern and color, to the contrary, is remarkably high for some Engina. While most species are moderately uniform in these character-istics, without displaying much variation in pattern or color, a number of other species are strikingly variable. This was first discussed concerning a Philippine species (Fraussen and Chino, 2012); in the present paper we show a similar level of variability in at least two species.

As remarked by Cernohorsky (1975) and Faber (2007), Engina cantaurana de Jong and Coomans (1988) was transferred to Anna by Watters (2009) and to Ameranna by Landau and Vermeij (2012). Engina slootsi de Jong and Coomans (1988) is Habromorula bicincta (Blainville, 1832) (Muricidae) from the Pacific Ocean (fide Houart, 1994).

MATERIALS AND METHODS

Length is measured from the tip of the apex to the end of the siphonal canal. Width is measured as the maximum dimension in a plane with facing the aperture. Spiral sculpture is counted from the suture to the end of the siphonal canal. Descriptions of apertural features are based on the terminology adopted by Landau and Vermeij (2012). Lirae counts within the outer lip may include bifurcating lirae. The number of whorls was determined using the 1 D method of Van Osselaer (1999). Locality information, aside from type locality designations, may be amplified from the original label for clarification. Given the generalized nature of most label information, no attempt has been made to georeference sites that did not originally include coordinates. Dimensions in captions refer to shell length. Numbers in ( ) following catalog numbers indicate the number of specimens in the lot.


SYSTEMATICS

Family Buccinidae Rafinesque, 1815
Subfamily Pisaniinae Gray, 1857

Genus Engina Gray, 1839

Type Species: *Engina zonata* Gray, 1839, by subsequent designation of Gray (1847) [= *Purpura turbinate* Kien. 1835, see Orr (1962)].

Discussion: The morphological limits and unique features of *Engina* have not been easy to define. Cernohorsky (1975: 176) characterized the genus by "the radially oriented lirae [which] are found only in species of *Engina," a feature that Landau and Vermeij (2012) nevertheless noted was not present in all *Engina*. Landau and Vermeij (2012: 121) defined the genus by "a shell with a narrow, strongly denticulate aperture and the presence of distinct columellar folds" but admitted that "not all species...conform to this characterization." Definitive differences between *Engina* and *Hesperistemia* appear to be particularly ambiguous. Vermeij (2009) noted that some *Hesperistemia* had shell sculpture and apertural features that were convergent with *Engina*. Watters (2009) placed *E. janowskyi* and his species *itzamnaei in Hesperistemia*; Landau and Vermeij (2012) reallocated them to *Engina*. That reallocation is followed here and we confirm the importance of the presence of internal lirae that extend far into the aperture as an important feature to distinguish *Hesperistemia* from *Engina*.

Adding to the problems of identifying the western Atlantic species is the great variability seen in conchological features. Coloration, sculpture, degree of elongation, and apertural features are highly plastic. Given a small number of specimens it is easy to conclude that numerous taxa are involved. However, when larger lots are studied it is apparent that there are intergrades that unite such disparate forms.

The species recognized in this review are presented in alphabetical order, including the type species of *Engina, E. turbinate* (Kien, 1835).

*Engina annae* new species
(Figures 1–4, 13)


Description (based on 2 adult specimens): Larger adult specimen seen, 15.6 mm in length (holotype); smaller specimen seen, 12.9 mm in length; holotype 15.6 mm length × 8.9 mm width. Shell biconic; spire ca. 50% total length. Protoconch minute, of 1.5 smooth, pale tan whorls. Teleoconch of 5.5 whorls, demarcated from protoconch. Teleoconch sculpture of 9–10 primary rounded spiral cords, between the suture and the anterior limit of the siphonal canal, three grouped at periphery; concave or flat, wide subsutural slope with a single thin primary cord. Secondary microscopic spiral threads between primary spiral sculpture. Primary axial sculpture of broad, low, rounded ribs, very weak on subsutural slope; 10 ribs on penultimate whorl, 10 on final whorl. Extremely fine secondary wrinkles occur along axial ribs. Terminal varix weak. Aperture oval, elongate. Anal canal bounded by single parietal denticle on columella and single anal denticle on outer lip. Outer lip with 5–7 denticles, decreasing in size from posterior to anterior, the posterior-most two with a tendency to be weakly fused. The thin rib that projects deep into the aperture and delimits the siphonal canal found in other species is weak. Five radial lirae present at posterior end, barely distinct from columellar folds. Anterior to these are 6–8 columellar folds irregular, some lirate, others pustulose. One or more denticles extending deep into aperture, forming an interior ledge to columella. Parietal lip erect for most of its length. Siphonal canal short, open. Color gray with a tan subsutural band; axial ribs dark brown, often with a white adapertural face forming a series of dark and light spots; there is a continuous, white spiral band just below the periphery. Aperture tan with white teeth. Operculum, radula, and anatomy unknown.

Holotype: UF 479323 (ex Mark Johnson coll. 0142).

Type Locality: 33 m, 45 km off Masonboro Inlet, Wrightsville Beach, New Hanover Co., North Carolina, USA.

Paratype(s): Charlotte Thorpe coll. (1), Amberjack Hole, E of Mayport, Duval Co., Florida, USA.

Distribution: Only known from offshore of southernmost North Carolina and northeast-most Florida. We assume it occurs off the intervening South Carolina and Georgia coasts as well.

Habitat: The holotype was a crabbred specimen from 33 m, collected on sandy rubble near rocky outcrops with sponges.

Shell Variation: The known specimens are remarkably uniform in sculpture and coloration.

Etymology: Named for Ann Johnson, mother of the collector of the holotype, Mark Johnson.

Comparison with Other Species: The peculiar coloration of dark brown and white spots on a gray background has not been found in any other western Atlantic species. See Table 1 for a comparison with other species.

Discussion: This extremely rare species is the northernmost member of *Engina* in the western Atlantic Ocean. Like most of the species discussed here, it is an offshore species seldom encountered. It was first recognized as distinct by Lee (2009).

*Engina corinnae* Crovo, 1974
(Figures 14–33, 34)


*Engina corinnae* of authors, non Crovo, 1971.—Lee, 2009: 108, fig. 518.

Description (based on 38 adult specimens): Largest adult specimen, 14.8 mm in length; smallest specimen, 9.2 mm in length. Shell biconic; spire ca. 50% total
Figures 1–12. *Engina* species. 1–4. *Engina annae* new species. 1–2. Holotype, UF 47923, 15.7 mm. 3–4. Paratype Charlotte Thorpe coll., Amberjack Hole, E of Mayport, Duval Co., Florida, 12.9 mm. 5–9. *Engina goncalvesi* Coltro, 2005. 5–6. GTW 12447a, 40–50 m, in cave, off Arraial do Cabo, Rio de Janeiro State, Brazil, 11.3 mm. 7. GTW 12447b, 150–160 m, off Cabo Frio, Rio de Janeiro State, Brazil, 13.9 mm. 8. HGL, 40–44 m, in cave, off Arraial do Cabo, Rio de Janeiro State, Brazil, 9.5 mm. 9. GTW 12479a, 40–50 m, in cave, off Arraial do Cabo, Rio de Janeiro State, Brazil, 11.3 mm. 10–12. *Engina lignea* new species. 10–11. Holotype, UF 479325, 14.3 mm. 12. Paratype, BMSM 76001, 50–55 m, 146 km WSW of Arrecife Aleran, Campeche Bank, Campeche State, Mexico, 11.5 mm.

Length. Protoconch minute, of 1.5 smooth whorls, white with tan patches or bands. Teleoconch of 4.75–5.25 whorls, demarcated from protoconch. Teleoconch sculpture of 9–12 (mode=11) primary sharp spiral cords between the suture and the anterior limit of the siphonal canal, weakest on concave or flat subsutural slope; elsewhere of uniform strength except that spiral cords on siphonal canal are slightly stronger. Secondary microscopic...
spiral threads between primary spiral sculpture. Primary axial sculpture of broad, low ribs, absent from subsutural slope; 7–10 (mode = 9) ribs on penultimate whorl, 6–13 (mode = 10) on last whorl, most pronounced at periphery. Coarse secondary wrinkles occur between axial ribs which may be lamellate. Terminal varix weak. Aperture oval, elongate. Anal canal bounded by single parietal denticle on columella and single anal denticle on outer lip. Outer lip with 6–8 (mode = 6) denticles. The thin rib that projects deep into the aperture and delimits the siphonal canal found in other species is weak but always present. 2–5 (mode = 3) radial lirae present at posterior end, weak and irregular, not distinct from columellar folds. Anterior to these are 4–7 (mode = 6) semi-lirate columellar folds irregular, often limited to edge of parietal wall, weakest or absent on middle of columella. First or second anterior denticle often extending deep into aperture forming an interior ledge to columella. Parietal lip erect for most of its length. Siphonal canal short, open. Color white or pale tan with brown blotches, darkest between axial ribs, particularly on the spire, with a wide, white subperipheral band; usually two fine, dark threads posterior to this band on the final whorl. Aperture white, faint tan, or mauve, darkest at anterior end. Operculum rounded, leaf-shaped, yellow with brown central radius. Radula and anatomy unknown.

Holotype: MCZ 277496.

Type Locality: Off Boynton Beach, Palm Beach County, Florida, USA, 30° 00' N, -79° 57'30" W. Depth unknown.

Paratype(s): MCZ 277497 (unstated number of specimens); PRI 28273 (1); all from the type locality.

Other Material Examined (124 specimens): East Florida: MW (1), 27 m, off eastern Florida; MW (1), 34 m, off Mayport, Duval Co.; MW (1), HGL (6), 30–46 m, off St. Augustine, St. Johns Co.; UF 35241 (1), 18 m, off Boynton Beach, Palm Beach Co.; UF 128074 (66), 27 m, off Boynton Beach, Palm Beach Co.; UF 128051 (3), 27–38 m, off Boynton Beach, Palm Beach Co.; EFG 9553 (2), 38–43 m, off Boynton Beach, Palm Beach Co.; HGL (1), Boysont Beach, Palm Beach Co.; UF 352841 (1), 18 m, off Boynton Beach, Palm Beach Co.; Florida; UF 122778 (7), 107 m, off Boynton Inlet, Palm Beach Co.; UF 126244 (1), 26 m, off Boynton Inlet, Palm Beach Co.; UF 225793 (6), 73 m, off Palm Beach, Palm Beach Co.; UF 127142 (1), off Palm Beach, Palm Beach Co.; UF 229058 (1), 55–73 m, off Palm Beach, Palm Beach Co.; UF 262537 (2), 91–152 m, off Palm Beach, Palm Beach Co.; UF 126241 (7), 37 m, off Palm Beach, Palm Beach Co.; UF 229890 (2), 37–46 m, off Palm Beach Inlet, Palm Beach Co.; UF 250037 (2), 37–55 m, Dodge Estate to inlet, Palm Beach Co.; EFG 13995 (1), 30 m, off West Palm Beach, Palm Beach Co.; UF (3), 183–213 m, off Looe Key, Monroe Co. West Florida: EFG 28347 (1), 61 m, off Egmont Key, Hillsborough Co.; MW (1), HGL (5), 27 m, off Panama City, Bay Co.; MW (2), 6.4 km off

Table 1. Shell characteristics of Engina and Hesperisternia. Numbers in ( ) are modes except for length, which are averages; * - no mode.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Number of Radial Lirae</th>
<th>Number of Columellar Folds</th>
<th>Number of Outer Lip Denticles</th>
<th>Number of Outer Lip Lirae</th>
<th>Number of Axial Ribs Last Whorl</th>
<th>Number of Axial Ribs Pen. Whorl</th>
<th>Primary Spiral Cords Last Whorl</th>
<th>Length</th>
</tr>
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<tbody>
<tr>
<td>anae</td>
<td>5</td>
<td>6–8</td>
<td>5–7</td>
<td>weak</td>
<td>10</td>
<td>10</td>
<td>9–10</td>
<td>12.9–15.6</td>
</tr>
<tr>
<td>corinnae</td>
<td>2–5 (5)</td>
<td>4–7 (6)</td>
<td>6–8 (6)</td>
<td>weak</td>
<td>6–13 (10)</td>
<td>7–10 (9)</td>
<td>9–12 (11)</td>
<td>9.2–14.8 (12.4)</td>
</tr>
<tr>
<td>demani</td>
<td>2–4 (3)</td>
<td>4–8 (6)</td>
<td>5–6 (5)</td>
<td>N</td>
<td>6–8 (7)</td>
<td>6–8 (7)</td>
<td>10–12 (12)</td>
<td>11.7–15.5 (13.8)</td>
</tr>
<tr>
<td>goncalvesi</td>
<td>1</td>
<td>3–5 (*)</td>
<td>6–7 (*)</td>
<td>N</td>
<td>obsolete</td>
<td>8–11 (10)</td>
<td>12–15 (12)</td>
<td>9.5–14.2 (11.5)</td>
</tr>
<tr>
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<td>N</td>
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<td>7–10 (9)</td>
<td>9–11 (9)</td>
<td>17.9–25.0 (20.1)</td>
</tr>
<tr>
<td>lignea</td>
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<td>5</td>
<td>5</td>
<td>Y</td>
<td>7</td>
<td>7</td>
<td>9–10</td>
<td>14.3</td>
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<tr>
<td>pennixa</td>
<td>3–5 (4)</td>
<td>4–7 (5)</td>
<td>3–6 (5)</td>
<td>Y</td>
<td>7–10 (9)</td>
<td>8–10 (8)</td>
<td>7–10 (9)</td>
<td>9.4–16.1 (12.5)</td>
</tr>
<tr>
<td>itzamna</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td>N</td>
<td>8–10 (*)</td>
<td>8–10 (*)</td>
<td>11–13 (*)</td>
<td>17.4–17.8 (17.6)</td>
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<tr>
<td>turbinella</td>
<td>3–7 (4)</td>
<td>4–8 (6)</td>
<td>3–7 (6)</td>
<td>Y</td>
<td>8–13 (10)</td>
<td>9–14 (10)</td>
<td>6–10 (8)</td>
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<tr>
<td>williamsae</td>
<td>2–5 (4)</td>
<td>2–6 (*)</td>
<td>5–6 (5)</td>
<td>weak</td>
<td>8–10 (9)</td>
<td>9–10 (9)</td>
<td>9–11 (9)</td>
<td>11.5–15.0 (13.4)</td>
</tr>
</tbody>
</table>
Figures 14-33. Engina corinnae Crovo, 1974. 14-15. Holotype, MCZ 277496, photo courtesy of Jennifer W. Lenihan, © Museum of Comparative Zoology, Harvard Univ., 13.0 mm. 16. UF 128074, 27 m, off Boynton Beach, Palm Beach Co., Florida, 12.4 mm. 17. EFG 9553, 38-43 m, off Boynton Beach, Palm Beach Co., Florida, 9.9 mm. 18. UF 226793, 73 m, off Palm Beach, Palm Beach Co., Florida, 9.5 mm. 19. UF 122778, 107 m, off Boynton Inlet, Palm Beach Co., Florida, 9.3 mm. 20. UF 122778, 107 m, off Boynton Inlet, Palm Beach Co., Florida, 9.3 mm. 21. UF 126241, 36.6 m, off Palm Beach, Palm Beach Co., Florida, 11.0 mm. 22. MW, 30-46 m, off St. Augustine, St Johns Co., Florida, 12.7 mm. 23. HGL, 183-213 m, off Looe Key, Monroe Co., Florida, 11.5 mm. 24. HGL, 30-46 m, off St. Augustine, St Johns Co., Florida, 12.2 mm. 25. MW, 6.4 km off Panama City, Bay Co., Florida, 13.2 mm. 26. HGL, 30-46 m, off St. Augustine, St Johns Co., Florida, 10.5 mm. 27. EFG 13895, 30 m, off West Palm Beach, Palm Beach Co., Florida, 14.2 mm. 28. EFG 27567, 39 m, 54 km SSW of Panama City, Bay Co., Florida, 14.7 mm. 29. MW, 27 m, off Panama City, Bay Co., Florida, 10.5 mm. 30. MW, 31 m, off NE Yucatan, Mexico, 14.8 mm. 31. EFG 28347, 61 m, off Egmont Key, Hillsborough Co., Florida, 12.6 mm. 32. MW, 34 m, off Mayport, St. Johns Co., Florida, 12.7 mm. 33. ?Engina corinnae. UF 352841, 18 m, off Boynton Beach, Palm Beach Co., Florida, 12.4 mm.
Figure 34. Distribution of *Engina corinnae* Crovo, 1974 (©) and *Engina demani* de Jong and Coomans, 1988 (●).

Panama City, Bay Co.; EFG 27567 (1), 39 m, 54 km SSW of Panama City, Bay Co., 29° 43.32' N, −85° 54.85' W. Louisiana: EFG 23426 (1), 57-65 m, Ewing Bank, 105 km off Louisiana coast, 28° 06.07' N, −91° 02.42' W. Mexico: MW (3), 31 m, off NE Yucatan.

Lee (2009) also lists Xalvis Island, St. Johns Co., Florida.

**Distribution:** Western Atlantic Ocean, offshore, eastern Florida from St. Johns County to the Florida Keys. Gulf of Mexico from Hillsborough County, Florida, west to Louisiana, and off Yucatan Peninsula. The *E. corinnae* recorded from the East Flower Garden banks by Ode (1983) may be this species but we have not seen the specimen. This species co-occurs with the equally rare *E. williamsae* at Egmont Key off Tampa Bay, western Florida.

**Habitat:** Empty shells have been found from 18–122 m on rubble bottom. Live specimens have been recorded from 30–73 m. Specimens are locally common and are occasionally found on *Spondylus*. Most specimens are taken as by-catch by shrimp and scallop trawlers. A single label reads “rock, sand reef,” the only report of a habitat. Specimens are frequently covered by calcareous algae.

**Variation in Specimens:** Specimens vary in degree of coloration, from nearly all white (holotype) to having prominent brown patches. The intervacular brown banding varies from diffuse patches to distinctly pigmented spiral cords, but is always present. Specimens also vary in the degree of elongation, ranging from compact to rather fusiform.

**Etymology:** Named for Corinne E. Edwards (1905–1989), an “ardent collector of marine life as well as an educator in popular subjects on natural history” (Crovo, 1974: 30).

**Comparison with Other Species:** *Engina corinnae* superficially resembles *E. williamsae* new species. *Engina corinnae* has more prominent spiral sculpture over the entire shell, including the sub-sutural band, which is nearly smooth in *E. williamsae*. *Engina corinnae* is also less solid, has a shorter spire, and averages a slightly smaller size. The widespread *E. turbinella* differs in its (usually) much darker coloration with white spots as contrasted to the lighter coloration with dark spots seen in *E. corinnae*, as well as its dark aperture with white teeth. See Table 1 for a comparison with other species.

**Discussion:** *Engina corinnae* is an offshore species that varies greatly in the degree of elongation and coloration. The holotype is not typical of the specimens usually seen. It is small, compact, nearly uniformly white, and has fewer axial ribs than average specimens.

**Engina demani de Jong and Coomans, 1988** (Figures 34–49)


*Engina janowskyi* Coltro, 2005: 1, pl. A, figs. 1–5; Faber, 2007: 74, figs. 6, 7; Dornellas and Simone, 2011: 20; Landau and Vermeij, 2012: 123, 125, 126.


**Description (based on 20 adult specimens):** Largest adult specimen, 15.5 mm in length; smallest specimen, 10.7 mm in length. Shell biconic to fusiform; spire ca. 50% total length. Protoconch small, conical, of 1.5–1.75 smooth, white or brown banded whorls. Teleoconchs of 5.5 whorls, weakly demarcated from protoconch. Teleoconch sculpture of 10–12 (mode=12) evenly spaced, rounded, spiral cords between the suture and the anterior limit of the siphonal canal. Subsutural slope wide; flat, with single primary thread, well-developed in some specimens, very weak in others. Between these cords are ca. 10 fine, regular threads. Axial sculpture of widely spaced, wide, primary angular ribs; 7 (rarely 6 or 8) on the final whorl, 7 (rarely 6 or 8) on penultimate whorl, most prominent on periphery, with numerous secondary fine, axial threads in between primary ribs; in well-preserved specimens these threads are developed into oblique lamella, giving a scalloped appearance to the sculpture. Terminal varix well-developed, angular. Aperture oval. Parietal wall erect on anterior half. Anal canal bounded by single parietal denticle on columella and single anal denticle on outer lip. Outer lip with 5 (rarely 6) small denticles. The thin rib that projects deep...
Figures 35–49. *Engina demani* de Jong and Coomans, 1988. 35. Holotype, *Engina demani* de Jong and Coomans, 1988, 11.0 mm, photo courtesy of Marien Faber. 36. Holotype, *Engina janowskyi* Coltro, 2005, 13.2 mm, reproduced from Coltro (2005). 37. HGL, 183 m, 3.2 km W of Sandy Lane Bay, Barbados, 11.2 mm. 38. GTW 13795e, 4 m, Ilha Escalvada, Espírito Santo State, Brazil, 15.2 mm. 39. GTW 13795e, 4 m, Ilha Escalvada, Espírito Santo State, Brazil, 13.8 mm. 40. HGL, 40–45 m, off Búzios, São Paulo State, Brazil, 10.7 mm. 41. HGL, shallow water, Cartagena, Colombia, 13.6 mm. 42. GTW 13795a, 40–45 m, Ilha de Calbo Frío, Rio de Janeiro State, Brazil, 13.5 mm. 43. GTW 12026d, 3 m, off Guarapari, Espírito Santo State, Brazil, 15.0 mm. 44. GTW 15579a, French Guiana, 13.1 mm. 45. GTW 13795b, 4 m, Ilha Escalvada, Espírito Santo State, Brazil, 15.3 mm. 46. GTW 11645a, 15–25 m, off Guarapari, Espírito Santo State, Brazil, 12.3 mm. 47. GTW 13795b, 4 m, Ilha Escalvada, Espírito Santo State, Brazil, 11.4 mm. 48. GTW 13795b, 4 m, Ilha Escalvada, Espírito Santo State, Brazil, 14.9 mm.
into the aperture and delimits the siphonal canal found in other species is absent or nearly so. Radial lirae 1–4 (mode=3) (may be bi- or trifurcate) at posterior end, weak and irregular, not very distinct from columellar folds. Anterior to these are columellar folds (4–8, mode=6) weak, irregular, often limited to edge of parietal wall. Swelling on interior ledge of columella not pronounced. Siphonal canal moderately short, open. Base color variable: dark brown, tan, or yellow, axial ribs usually darker, always with a continuous pale band just anterior to the periphery. The abapertural side of the axial ribs is usually dark-colored and the adaperture side is usually pale. Aperture white to tan, the siphonal canal rimmed in brown. Operculum oval, yellow-brown, with a subterminal nucleus. Radula and anatomy unknown.

**Holotype:** *Engina demani* de Jong and Coomans, 1988: ZMA 3.87.084; *Engina janowskyi* Coltro, 2005: Museu de Zoologia da Universidade de São Paulo 37178, but apparently lost (fide D. Cavallari, Jan. 2015).

**Type Locality:** *Engina demani* de Jong and Coomans, 1988, Aruba, harbour [Netherlands Antilles]. *Engina janowskyi* Coltro, 2005, off Guarapari, Espírito Santo State, Brazil.

**Paratype(s):** *Engina demani* de Jong and Coomans, 1988. Faber (2007) illustrated a “paratype” from the Frère Fredericus Verberne collection. Although de Jong and Coomans (1988) mentioned additional examples in the Verberne and de Man collections, they are not explicitly referred to as types and it is not certain whether these specimens are valid paratypes. *Engina janowskyi* Coltro, 2005, off Guarapari, Espírito Santo State, Brazil.

**Other Material Examined (28 specimens):** Barbados: HGL (1), 183 m, 3.2 km W of Sandy Lane Bay, Colombia: HGL (1), shallow water, Cartagena. French Guiana: GTW 153579a (1), Brazil: GTW 116455a (3), HGL (1), 15–25 m, off Guarapari, Espírito Santo State; GTW 13795c (1), 25 m, off Guarapari, Espírito Santo State; GTW 12026c (2), 12026d (4), 3 m, off Guarapari, Espírito Santo State; HGL (1), 18 m, off Anchieta, Espírito Santo State; GTW 13795b (3), 13795c (5), 4 m, Ilha Escalvada, Espírito Santo State; GTW 13795a (1), 40–45 m, Ilha de Cabo Frio, Rio de Janeiro State; HGL (1), 34–45 m, off Búzios, São Paulo State; HGL (3), 40–45 m, off Búzios, São Paulo State.

**Distribution:** Apparently widely distributed across the southern Caribbean and down the Brazilian coast to São Paulo State, but this is based on few records with large gaps.

**Habitat:** Empty shells are found at depths between 3–183 m; some live specimens have been collected in caves at 40–45 m, but the majority of specimens examined were found on rubble or under rocks from 4 m.

**Variation in Specimens:** Shell base color varies from nearly pure white to nearly all dark brown. Elongation varies from compact, solid shells (typically from Brazil, Figures 38, 43) to relatively high-spired, narrow shells (French Guiana, Figure 44). Despite this great variation in color and elongation of the shell, the sculpture is remarkably uniform in the number of axial and spiral elements.

**Etymology:** *Engina demani* de Jong and Coomans, 1988, named for Ad and Gon de Man, shell collectors in Aruba. Thus the correct orthography should be *de manorum*. However, a name change reflecting this would be an unjustified emendation. *Engina janowskyi* Coltro, 2005, named for Robert H. Janowsky, owner of MdM Shell Books in Wellington, Florida, USA.

**Comparison with Other Species:** Some color forms of *E. permixta* are similar to *E. demani*, with which it may be sympatric. *Engina permixta* has more axial ribs on both the final whorl (7–10) and the penultimate whorl (8–10) than does *E. demani* (6–8 for both) and has fewer spiral cords on the final whorl (7–10 vs. 10–12). Additionally, the deep ridge bounding the siphonal canal on the inside of the outer lip is present in *E. permixta* but absent or very weak in *E. demani*. See Table 1 for a comparison with other species.

**Discussion:** This is a very variable species in coloration, in degree of elongation, and in the strength of the sculpture. *Engina demani* is based on short, compact specimens. *Engina janowskyi* is based on elongate forms. Without seeing intermediates, the two forms would clearly seem to represent two taxa. However, there is no clear cut delineation between the two forms in either color or elongation and the two taxa are synonymous. This possible synonymy was first suggested by Faber (2007), who remarked that *E. demani* may be the shallow water form and *E. janowskyi* the deeper water form. However, our records indicate that there is great variation within each population regardless of depth and both “forms” and intergrades co-occur together.

**Engina goncalvesi Coltro, 2005**

(Figures 5–9, 13)


**Description (based on 4 adult specimens):** Largest adult specimen, 14.2 mm in length; smallest specimen, 9.5 mm in length. Shell fusiform; spire ca. 50% total length. Protoconch small, of 1.5 smooth, brown whorls
with pale peripheral band. Teleoconch of 5 whorls, abruptly arising from protoconch. Teleoconch sculpture of 12–15 (mode=12) primary flattened, spiral threads on final whorl between the suture and the anterior limit of the siphonal canal, with numerous intercalated secondary and tertiary threads. Spiral cords on siphonal canal slightly stronger. Axial sculpture of broad, low ribs; ca. 20 primary ribs on penultimate whorl, obsolete on most specimens by last whorl. Intersections of axial and spiral sculpture with weak, elongated nodules. Terminal varix well-developed, flaring, moderately narrow. Aperture oval. Anal canal bounded by single parietal denticle on columella and single anal denticle on outer lip. Outer lip with 6–7 weak, irregular denticles. The thin rib that projects deep into the aperture and delimits the siphonal canal found in other species is absent. Single (or bifurcating) radial lira at posterior end, very weak and irregular, not very distinct from columellar folds. Anterior to this lira are columellar folds (3–5), usually indistinct, irregular, often limited to edge of parietal wall. Swelling on interior ledge of columella distinct, white. Parietal lip erect for most of its length. Siphonal canal short, open. Color brown with wide, pale tan spiral band at suberect for most of its length. Siphonal canal slightly stronger. Axial sculpture of widely spaced, flat, with single primary thread. Spiral cords on siphonal canal slightly stronger. Axial sculpture of narrowly spaced, rounded primary ribs; 8–10 on penultimate whorl, 8–10 on final whorl, with numerous secondary axial threads. Intersections of axial and spiral sculpture with strong, elongated nodules; strongest at periphery. Terminal varix weakly developed, somewhat constricted, narrow. Aperture oval, outer lip with 4 medial teeth. Anal canal deeply indented between two teeth; columellar tooth bifid. Parietal wall erect with 7 weak, lirate teeth. Siphonal canal moderately long, open. Color white with orangish-tan interaxial spaces cut by a white subperipheral narrow band; the spaces form broken flammulations below this band. Aperture white. Operculum, radula, and anatomy unknown.

Holotype: Stated to be in Museu de Zoologia da Universidade de São Paulo, 37179, and listed as such in Domellas and Simone (2011), but not found. (fide L. R. L. Simone, pers. comm., 2008).

Type Locality: Off Cabo Frio, Rio de Janeiro State, Brazil. Depth unknown.

Paratype(s): Museu Oceanográfico Eliézer Rios da Fundação Universidade de Rio Grande 43854 (1); Museu Nacional da Universidade Federal do Rio de Janeiro, unnumbered (2); P.M. Santos Costa coll. (1). The localities of the paratypes were not given but are presumed to be from the type locality.

Other Material Examined (4 specimens): Brazil. GTW 10479a (1), 12477a (1), 40–50 m, in cave, off Arraial do Cabo, Rio de Janeiro State; HGL (1), 40–44 m, in cave, off Arraial do Cabo, Rio de Janeiro State; GTW 12477b (1), 150–160 m, off Cabo Frio, Rio de Janeiro State.

Distribution: Brazil, between Cabo Frio, Rio de Janeiro State, and Ilhabela, São Paulo State.

Habitat: Empty shells are found between depths of 25–160 m; live individuals from 25–45 m under rocks, sometimes in caves.

Variation in Specimens: The few specimens we have seen are very uniform in all characteristics.

Etymology: Named for Paulo Cesar Pinto Gonçalves, who first collected the species.

Comparison with Other Species: The near lack of axial sculpture on the final whorl and reduced columellar dentition set this species apart from all other western Atlantic Engina. See Table 1 for a comparison with other species.

Discussion: This species is placed in Engina with some reservation. The parietal shield lirae and columellar folds are nearly absent in some specimens and only barely expressed in the remainder.

Engina itzamnai (Watters, 2009) (Figures 50–57, 68)


Engina dicksoni Petuch, 2013: 72, 192, 202, fig. 5.6E.

Description (based on 4 specimens): Largest adult specimen, 17.8 mm in length (holotype); smallest adult specimen, 17.4 mm in length. Shell fusiform, spire ca. 50% total length. Shell relatively thin. Protoconch small, conical, of 1.5 smooth, white whorls with tan blotches. Teleoconch of 5.5 whorls, strongly demarcated from protoconch. Teleoconch sculpture of 11–13 rounded, widely separated primary spiral cords between the suture and the anterior limit of the siphonal canal, with numerous intercalated secondary threads. Subsutural slope wide, flat, with single primary thread. Spiral cords on siphonal canal slightly stronger. Axial sculpture of widely spaced, rounded primary ribs; 8–10 on penultimate whorl, 8–10 on final whorl, with numerous secondary axial threads. Intersections of axial and spiral sculpture with strong, elongated nodules; strongest at periphery. Terminal varix weakly developed, somewhat constricted, narrow. Aperture oval, outer lip with 4 medial teeth. Anal canal deeply indented between two teeth; columellar tooth bifid. Parietal wall erect with 7 weak, lirate teeth. Siphonal canal moderately long, open. Color white with orangish-tan interaxial spaces cut by a white subperipheral narrow band; the spaces form broken flammulations below this band. Aperture white. Operculum, radula, and anatomy unknown.


Type Locality: Hesperisterinia itzamnai Watters, 2009: 100 fms. [91 m], NE of Contoy Light, Isla Contoy, Quintana Roo State, Mexico: Engina dicksoni Petuch, 2013: 35 m depth on Campeche Bank, off Puerto Progresso, Yucatán State, Mexico.

Paratype(s): Hesperisterinia itzamnai Watters, 2009, UF 425517 (1), from type locality. Engina dicksoni Petuch, 2013, Petuch coll. (1), from type locality.

Other Material Examined (2 specimens): Mexico: EFG 25800 (1), 52–53 m, 64 km NNW of Cayos...
Figures 50-67. *Engina* species. 50-57. *Engina itzamnai* (Watters, 2009). 50-51. Holotype, UF 170226, 17.9 mm. 52-53. Paratype, UF 425517, 91 m, NE of Contoy Light, Isla Contoy, Quintana Roo State, Mexico, 16.2 mm. 54-55. MW, 31 m, off NE Yucatan, Campeche State, Mexico, 17.4 mm. 56-57. EFG 25800, 52-53 m, 64 km NNW of Cayos Areas, Campeche Bank, Campeche State, Mexico, 17.4 mm. 58-67. *Engina permixta* new species. 58-59. Holotype, UF 479326, 16.1 mm. 60. Paratype, UF 479324, from type locality, 14.5 mm. 61. Paratype, OSUM 39958, 21 m, off Piúma, Espírito Santo State, Brazil, 12.7 mm. 62. GTW 4265f, 20-25 m, off Guarapari, Espírito Santo State, Brazil, 11.4 mm. 63. GTW 4265b, 21 m, off Piúma, Espírito Santo State, Brazil, 13.0 mm. 64. GTW 13807a, 40-50 m, off Conceição da Barra, Espírito Santo State, Brazil, 12.0 mm. 65. GTW 4265r, from type locality, 12.1 mm. 66. GTW 12026a, 40-45 m, off Búzios, Rio de Janeiro State, Brazil, 11.2 mm. 67. GTW 4265ah, 10-15 m, Porto da Barra, Salvador, Bahia State, Brazil, 12.4 mm.
Arrecife Alaeran and Cayos Areas.

Habitat: Dead specimens were dredged in 46-180 m on rubble bottom. No live collected specimens are known to us.

Variation in Specimens: The few known specimens vary slightly in the number of axial (8-10) and spiral (11-13) sculptural elements.

Etymology: Hesperistemia itzamnai Watters, 2009: Mayan, itzamná, the creator deity in Mayan mythology. This species is only known from off the Yucatán Peninsula, ancestral home of the Mayans. A masculine name. Engina dicksoni Petuch, 2013: Named for Andrew Dickson, collector of the type.

Comparison with Other Species: This is the largest western Atlantic Engina and the most fusiform. See comparison with E. lignea new species, below. See Table 1 for a comparison with other species.

Discussion: This is apparently a very rare species in collections. Petuch (2013) renamed this taxon Engina dicksoni.

Engina lignea new species
(Figures 10–13)

Description (based on 2 specimens): Only adult specimen seen, holotype 14.3 mm in length × 7.4 mm in width. Fusiform, spire ca. 50% total length. Shell thick, solid. Protoconch small, conical, of 1.5 smooth, tan whors. Teleoconch of 5 whors, strongly demarcated from protoconch. Teleoconch sculpture of 9-10 rounded, widely separated primary spiral cords between the suture and the anterior limit of the siphonal canal, with 3-6 intercalated secondary threads. Subsutural slope wide, flat, with single primary thread. Axial sculpture of widely spaced, rounded primary ribs; 7 on penultimate whorl, 7 on final whorl, with numerous secondary very fine, axial threads. Intersections of axial and spiral sculpture with strong, elongated nodules, strongest at periphery. Terminal varix weakly developed, low and wide. Aperture oval, outer lip with 5 lirate denticles extending seep into aperture. Anal canal shallowly indented between two weak teeth. Parietal wall erect anteriorly with 5 lirate columellar folds. Siphonal canal moderately long, open. Color uniformly light tan to brown, with a vague darker band on sub-sutural plane, with or without lighter-colored peripheral axial nodes. Aperture light tan. Operculum, radula, and anatomy unknown.

Holotype: UF 479325 (ex EFG 26687).

Type Locality: 46-48 m, 145 km WSW of Arrecife Alaeran, Campeche Bank, Campeche State, México, 22° 10.80' N, -91° 09.00' W.

Paratype(s): BMSM 76001(1), 50-55 m, 146 km WSW of Arrecife Alaeran, Campeche Bank, Campeche State, México, 22° 11.46' N, -91° 08.71' W (ex EFG 25522).

Distribution: Known only from off northern Yucatán Peninsula.

Habitat: Only empty shells have been found between 46-55 m.

Variation in Specimens: The two known specimens differ in color from light tan to dark brown.

Etymology: Latin lignea, made of wood, in reference to the texture and colors of the shells.

Comparison with Other Species: This species is most similar to the sympatric E. itzamnai. It is a smaller species that differs in having fewer primary axial ribs on both the final whorl (8–10 in E. itzamnai, 7 in E. lignea) and on the penultimate whorl (8–10 in E. itzamnai, 7 in E. lignea), as well as fewer primary spiral cords (11–13 in E. itzamnai, 9–10 in E. lignea). See Table 1 for a comparison with other species.

Discussion: This is the second new Engina described from the Yucatán Peninsula. Both are deeper water species that are rare in collections. Both have some characteristics of Hesperistemia but based on the analysis of Landau and Vermeij (2012) we have placed them in Engina.

Engina permixta new species
(Figures 58–67, 103)
non *Engina turbinella* (Kiener, 1836). — Rios, 1975: 93, pl. 27, fig. 385; Coltro, 2005: 1, pl. A, figs. 8–10 [misidentifications].


**Description** (based on 31 adult specimens): Largest adult specimen, 16.1 mm in length (holotype); smallest specimen, 9.4 mm in length; holotype 16.1 in length × 8.3 mm in width. Shell biconic; spire ca. 50% total length. Protoconch small, conical, of 1.5 smooth, white or brown banded whorls; last yellow-brown, with a subterminal nucleus. Radula and colunellar folds. Anterior to these are 3–7 (mode=5) on outer lip. Outer lip with 3–6 (mode=5) weak, irregular. Aperture oval. Anal canal bounded by single only slightly more prominent than preceding axial ribs, axial threads in between primary ribs. Terminal varix sculpture of widely spaced, angular primary ribs; 7–10 secondary threads between these remaining cords. Axial gathered at periphery, remaining cords very widely cated from protoconch. Teleoconch sculpture of 5.5 whorls, strongly demar-

**Variation in Specimens:** Shell coloration varies from nearly all dark brown to nearly all pale yellow to white, with some intergrades. There is no clinal variation in shell color and all colors may occur together. The dark brown morph characterized by the holotype appears to be the most common.

**Etymology:** Latin *pernix*, mixed, confused, in relation to the disarray of color forms.

**Comparison with Other Species:** Although often misidentified as *E. corninae*, it is not similar to that Florida-Gulf of Mexico species. It is most similar to some color forms of *E. demani*, with which it may co-occur. See the comparison under that species for details. See Table 1 for a comparison with other species.

**Discussion:** The somewhat weathered leetotype of *Engina zonata* Gray, 1839, is very close to some specimens of this species. However, the paralectotype clearly shows the presence of sub-peripheral white nodules, which do not occur in *E. pernixita*.

*Engina turbinella* (Kiener, 1836) (Figures 69–100, 102)

**Distribution:** Brazil, from Rio Grande do Norte State to São Paulo State; Fernando de Noronha. If the specimens referred to *E. turbinella* by Leal (1991) are this species, then it is also present at Abrolhos, Atol das Rocas, Jaseur, and Davis and Dogaressa seamounts.

**Habitat:** Empty shells have been found from low tide to 50 m; live individuals have been found from 1–45 m under rocks and on rubble.

**Holotype:** UF 479326 (ex GTW 4265r).

**Type Locality:** 1 m, Cajuiero, Rio Grande do Norte State, Brazil.

**Paratype(s):** BSMX 76000 (1), from type locality (ex GTW 4265r); OSUM 399358 (1), 21 m, off Piúma, Espírito Santo State, Brazil (ex GTW 13807b); UF 479324 (1), from type locality (ex GTW 4265r). Other Material Exam-
Figures 69–101. *Engina* species. **69–100.** *Engina turbinella* (Kiener, 1836). **69.** Purpura turbinella Kiener, 1836: 29, pi. 9, fig. 25. **70–71.** UF 281377, Scarborough, Tobago. 12.1 mm. **72.** KF 4735, Punto San Juan, Venezuela. 12.3 mm. **73.** UF 281378, Friendship Beach, Tobago. 11.1 mm. **74.** EFG, 60 ft., Montezuma Shoals, Mustique Island. 12.7 mm. **75.** HGL, drift, Playa de Carenera, Venezuela. 9.6 mm. **76.** EFG 25590, 3 km N of Colón Island, Panamá, 8.8 mm. **77.** GTW 4265af, 1–2 m, Buraco da Rachel, Fernando de Noronha, 9.3 mm. **78.** UF 70393, Bruja Point, Canal Zone, 15.0 mm. **79.** GTW 4265e, 0.3–1.5 m, Punta Robles, Ambergris Caye, Belize, 13.2 mm. **80–81.** NHMUK 1982122, syntype of *Engina elegans* Gray, 1839, ca. 7.5 mm, photo courtesy of Phil Hurst, NHMUK. **82.** HGL, Isla de Utila, Honduras, 11.3 mm. **83.** GTW 4265ag, 2–5 m, Isla la Tortuga, Venezuela, 13.3. **84.** GTW 4265b, 7.3 m, Isla Morro Pelotas, Venezuela, 14.2 mm. **85.** UF 146654, Miami, Miami-Dade Co., Florida, 14.0 mm. **86.** GTW 4265h, 0.3–1.5 m, Long Reef, Isla Roatán, Honduras, 8.6 mm. **87.** GTW 4265c, 1 m, Sandbur Reel, Ambergris Caye, Belize, 9.3 mm. **88.** EFG 19507, Isla de Providencia, Colombia, 13.9 mm. **89.** EFG 25673, Bocas del Toro, Panamá, 10.4 mm. **90.** MW, 1.0–1.5 m, Sand Key, off Key West, Monroe Co., Florida, 11.0 mm. **91.** KF 2503, 12 m, St. Vincent, S end of Baliceaux Island, Grenadines, 12.3 mm. **92.** MW, Pompano Beach, Broward Co., Florida, 13.5 mm. **93.** KF 2551, 8–9 m, Canoum Island, Grenadines, 13.7 mm. **94.** HGL, Current, Eleuthera, 12.1 mm. **95.** GTW 4265w, 0.6–1.8 m, Coral Cove, Mt. Hartman Bay, Grenada, 10.5 mm. **96.** GTW 4265am, 0.3–1 m, Enriquillo La Parguera, Puerto Rico, 9.7 mm. **97–98.** UF 126216, paratype of *Engina turbinella cruzana* (Nowell-Usticke, 1959), 9.2 mm. **99–100.** NHMUK 1982122, lectotype of *Engina zonata* Gray, 1839, 11.5 mm. **101.** *Engina cf. turbinella*. KF 5262, 12 m, Savan Island, Grenadines, 12.2 mm.

**Description (based on 26 adult specimens):** Largest adult specimen, 14.9 mm in length; smallest specimen, 6.6 mm in length. Spire occupies 30-50% of total length. Protoconch minute, of 1.5 smooth whorls, tan with or without a darker band. Protoconch almost always eroded away, very rarely remaining in adult specimens. Teleoconch of 5-6 whorls. Spiral sculpture consists of 6-10 (mode=8) primary spiral cords; the wide subsutural slope has secondary threads and usually a single primary (rarely two, rarely absent) cord somewhere between the suture and the mid-point of the subsutural slope; this cord may abruptly turn posteriorly at the edge of the varix. The periphery has 2-3 primary cords grouped over the axial nodes and microscopic threads; anteriorly there are 3-7 wide, rounded ribs widely separated by 3-5 secondary threads. Axial sculpture 8-13 (mode=10) elongated, undulating peripheral nodes on the final whorl, 9-14 (mode=10) on the penultimate whorl; usually prominent but less so on small specimens. Terminal varix slightly more developed than previous axial sculpture. Aperture small, constricted. Anal canal bounded by single parietal denticle on columella and single denticle on outer lip. Outer lip with 3-7 (mode=5) denticles; the denticles are elongate but not lirate and do not project far into the aperture. The posterior-most two denticles are usually the most prominent and are fused; the anterior-most denticle forming a strong, long, thin rib that projects deep into the aperture and delimits the siphonal canal. Radial lirae (3-7, mode=4) at posterior of the columella. In some specimens, particularly small ones, the posterior half of the columella may be deeply excavated. Background color usually dark brown to black, rare in orange in some southeastern populations. Axial ribs at periphery always colored white, either as distinct spots or merged into a single spiral band; these white spots may be limited to the adapertural side of the ribs. Elsewhere, intersections of axial and spiral sculpture may or may not be present as white spots. Axial ribs at periphery always colored white, either as distinct spots or merged into a single spiral band; these white spots may be limited to the adapertural side of the ribs. Elsewhere, intersections of axial and spiral sculpture may or may not be present as white spots. Axial ribs at periphery always colored white, either as distinct spots or merged into a single spiral band; these white spots may be limited to the adapertural side of the ribs. Elsewhere, intersections of axial and spiral sculpture may or may not be present as white spots.

**Types:** *Purpura turbinella* Kiener, 1836: Types not located at the Muséum d'histoire naturelle de la Ville de Genève (Y. Finet, pers. comm., 2011), the Muséum national d'Histoire naturelle, Paris (online database, 2011), nor the Natural History Museum UK (K. Way,
pers. comm., 2011), and are presumed lost. *Engina elegans* Gray, 1839: Syntypes, NHMUK 1982122 (5). The specimens are heavily worn and/or immature. *Engina zonata* Gray, 1839: Lectotype and paratypotype, NHMUK 1967592; the lectotype is the larger of the two, designated by Orr (1962). *Engina turbinella cruzana* Nowell-Usticke, 1959: Lectotype, AMNH 195494, designated by Boyko and Cordeiro (2001) [although listed as a variety on page 68 of Nowell-Usticke, 1959, the name was immediately used as a subspecies on the same page as well as earlier on page vi], additional specimens implied but their disposition is unknown except for UF 126216, Judith’s Fancy, St. Croix, 7 paratypes.

**Type Locality:** *Purpura turbinella* Kiener, 1836: “Unknown.” *Engina elegans* Gray, 1839, Atlantic Ocean. Lectotype label reads “West Indies.” *Engina turbinella cruzana* Nowell-Usticke, 1959: West Coast [place name], Judith’s Fancy, Christiansted Harbor [all St. Croix]. Restricted by Boyko and Cordeiro (2001) to West Coast but paratypes at UF are from Judith’s Fancy.

**Other Material Examined (951 specimens):** Florida: UF 12718 (1), S of Lake Worth Inlet, Palm Beach Co.; UF 126238 (1), Boynton Beach, Palm Beach Co.; MW (3), 18 m, Boynton Beach, Palm Beach Co.; UF 394034 (2), Hillsborough Light, Broward Co.; MW (2), 18 m, Pompano Beach, Broward Co.; UF 146654 (1), Miami, Miami-Dade Co.; UF 185179 (1), Bear Cut, Key Biscayne, Miami, Miami-Dade Co.; UF 126219 (4), Miami County Causeway, Miami-Dade Co.; UF 126227 (11), Biscayne Bay, Miami, Miami-Dade Co.; UF 238288 (3), Miami Beach, Miami-Dade Co.; UF 80978 (1), Key Largo, Monroe Co.; UF 239825 (1), Marathon, Key Largo, Monroe Co.; HGL (9), 3-4.5 m, Pickles Reef, Key Largo, Monroe Co.; UF 126223 (11), Little Molasses Reef, Key Largo, Monroe Co.; UF 80975 (2), Molasses Reef, Key Largo, Monroe Co.; UF 126228 (1), 4.0 km WSW of Carysfort Reef Light, Key Largo, Monroe Co.; UF 37855 (1), Dry Rocks, Key Largo, Monroe Co.; UF 123130 (51), UF 352066 (7), Looe Key, Big Pine Key, Monroe Co.; UF 352065 (6), UF 123056 (2), Little Torch Key, Monroe Co.; UF 61023 (4), UF 70936 (11), 192067 (3), Key West, Monroe Co.; UF 126218 (44), UF 126243 (92), UF 153382 (9), Middle Sambo Shoals, Key West, Monroe Co.; UF 80974 (41), Sambo Shoals, Key West, Monroe Co.; UF 126236 (3), Sand Key Light, Key West, Monroe Co.; UF 126214 (12), UF 126223 (20), UF 192158 (2), MW (1), Pelican Shoals, Key West, Monroe Co.; UF 126222 (3), Washerswoman’s Shoals, Key West, Monroe Co.; UF 126216 (20), UF 70335 (3), UF 126231 (15), UF 192158 (2), MW (1), Pelican Shoals, Key West, Monroe Co.; UF 126222 (3), Washerswoman’s Shoals, Key West, Monroe Co.; UF 12715 (1), Bush Key Reef, Dry Tortugas, Monroe Co.; UF 12716 (1), Garden Key, Dry Tortugas, Monroe Co.; Bahamas: UF 126240 (5), North Bimini; GTW 4265a (1), tide pool, South Bimini; UF 126246 (10), Gun Cay, off Bimini; UF 80985 (1), Grand Bahama Island; UF 37853 (2), West End, Grand Bahama Island; UF 70391 (2), New Providence; UF 126224 (3), North Cay, Nassau, New Providence; UF 126226 (9), Delaport Point, New Providence; UF 126221 (2), Morgan’s Bluff, Andros; UF 126234 (2), Frazier Hog Cay, Berry Islands; GTW 4265n (1), 1.0-2.5 m, Beachside, Chub Cay, Berry Islands; MW (2), Periwinkle Beach, Chub Cay, Berry Islands; HGL (1), Cat Island; HGL (2), Current, Eleuthera; MW (2), 18.0 m, Cay Sal. Cuba: UF 80982 (12), 80995 (5), Santiago; UF 80993 (5), Jauco; UF 80983 (7), Varadero; UF 80994 (1), Baracoa; UF 54955 (1), Guantánamo; UF 80992 (4), Gibara; UF 17997 (6), La Habana. Dominican Republic: UF 239824 (2), Barahona. Cayman Islands: UF 283935 (4), Preston Bay, Little Cayman; UF 239823 (1), Cayman Turtle Farm, Grand Cayman; UF 126230 (1), Red Bay, Grand Cayman. Jamaica: UF 61025 (4), UF 80973 (10), Flag Point. Puerto Rico: UF 80988 (1), Fajardo; GTW 4265z (1), 0.3-1 m, Escambron, San Juan; GTW 4265aa (3), 0.3-1 m, Enrique, La Parguera; GTW 4265ab (3), 0.3-1 m, Collao, La Parguera; GTW 4265ac (3), 0.3-1 m, Playa Buey, La Parguera; GTW 4265ad (7), 0.3-1 m, Medio la Luna, La Parguera; GTW 4265ae (4), 1-3 m, El Corral, La Parguera; MW (3), Piñones Beach, HGL (7), Playa de Sardineria. U.S. Virgin Islands: UF 37856 (2), UF 80979 (43), Water Island; MW (3), 1 m, St. Croix; MW (1), 1 m, Han Bay, St. Croix; UF 126216, St. Croix [7 paratypes of *Engina turbinella cruzana* (Nowell-Usticke, 1959)]. British Virgin Islands: UF 163643 (9), Tortola; UF 3929 (1), HGL (2), beached, Reef Island; HGL (3), 0.6 m, Buck Island; UF 163644 (4), Guana Island. Antigua: UF 80977 (3), UF 126235 (7), UF 120766 (2), Curtin Bluff; GTW 4265a (5), 0.3-1 m, Long Bay; GTW 4265aj (2), 0.3-1 m, Deep Bay; GTW 4265ak (8), 0.3-1 m, Morris Bay; GTW 4265al (1), 0.3-1 m, Valley Church Bay; GTW 4265am (2), 0.3-1 m, Half Moon Bay; GTW 4265an (2), 0.3-1 m, Valley Church Bay; GTW 4265ao (1), 0.3-1 m, Cades Bay. Grenadines: EFG (1), 18 m, Montexuma Shoals, Mustique Island; KF 2503 (3), 12 m, St. Vincent, S end of Baliceaux Island; KF 5262 (3), 12 m, Savan Island; KF 2551 (1), 8-9 m, Cannoun Island. Grenada: GTW 4265l (12), GTW 4265n (4), GTW 4265v (8), GTW 4265w (4), GTW 4265x (7), GTW 4265y (2), 0.6-1.8 m, Coral Cove, Mt. Hartman Bay. Barbados: UF 80976 (2), UF 126220 (23), Hasting’s Rock. Tobago: UF 70391 (3), UF 80980 (25), UF 126225 (6), UF 126237 (6), Buccoo Reef; UF 281378 (6), Friendship Beach; UF 281377 (7), UF 352067 (2), Scarborough; MW (2), Lambeau; MW (3), Irvine Bay. Mexico: EFG 26687 (1), 46-48 m, Campeche State, 22° 10.00’ N. – 91° 09.00’ W; UF 383287 (4), Punta Hogna, Quintana Roo State; UF 264023 (1), Cayos Lobos, Quintana Roo State; UF 38338 (3), Cozumel, Quintana Roo State. Belize: GTW 4265c (4), 1 m, Sandbar Reef, Ambergris Caye; GTW 4265d (1), 1.5 m, Tres Cocos, Ambergris Caye; GTW 4265e (2), 0.3-1.5 m, Punta Robles, Ambergris Caye. Honduras: EFG 7365 (9), MW (2), Caribe Point, Isla Roatán; HGL (1), 0.5-1.3 m, Isla Roatán; GTW 4265g (1), 0.3-1.5 m, West Lime Key, SE Isla Roatán; GTW 4265h (1), GTW 4265i (2), GTW 4265j (1), 0.3-1.5 m,
Long Reef, Isla Roatán; GTW 4265k (6), SE Isla Roatán; GTW 4265l (1), 1–1.5 m, Old Port Royal, Isla Roatán; GTW 4265m (2), 1–1.5 m, Horseshoe Reef, Isla Roatán; HGL (5), Oak Ridge, Isla Roatán; KF 2173 (1), shallow water, Cayos Cochinos; KF 4141 (2), 2 m, Isla de Utría; MW (3), intertidal, Isla de Utría; HGL (19), Isla de Utría; UF 380423 (2), Guanaja; MW (2), 1 m, Guanaja. Costa Rica: UF 163876 (1), Punta Cahuita. Panama: UF 126217 (10), Colón; UF 50981 (9), UF 50989 (7), UF 160525 (2), Galeta Point; UF 50990 (2), Bocas del Toro; UF 160524 (3), Careening Cay, Bocas del Toro; UF 50991 (3), Devil’s Beach; KF 3593 (2), Tiger Island; EFG 25590 (2), Isla Colón; UF 70393 (4), Bruja Point. Colombia: KF 3590 (3), Santa Marta; EFG 19507 (5), EFG 19508 (1), Isla de Providencia; EFG 25673 (1), Bocas del Toro. Venezuela: GTW 4265b (1), 7.3 m, Isla Morro Pelotas; GTW 4265ag (3), 2–5 m, Isla la Tortuga; HGL (5), Playa de Carenero; MW (1), Piedras Negras, Paraguana Peninsula; MW (2), Isla de Margarita; MW (3), El Tunal, Isla de Margarita; EFG 19264 (1), Isla Borracha; KF 4735 (1), Punta San Juan. Netherlands Antilles: UF 50984 (2), UF 163642 (7), Bonaire; MW (6), 1.2 m, Kralendijk, Bonaire; UF 50986 (2), Aruba; UF 126245 (2), Palm Beach, Aruba. Brazil: GTW 4265af (1), 1–2 m, Buraco da Rachel, Fernando de Noronha; KF 78 (12), low tide, Fernando de Noronha.

Distribution: Widely distributed in southern Florida, rarely in the northern Gulf of Mexico, throughout the Bahamas, the Greater and Lesser Antilles, and along the Central American and northern South American coasts. Massemin et al. (2009) recorded this species from Îles du Salut, French Guiana. Daccarett and Bossio (2011) recorded it from most of the Colombian Caribbean coast. Perhaps the strangest aspect of this species’ distribution is its occurrence on Fernando de Noronha, 2,400 km away from the next known site in French Guiana, where it co-occurs with E. demani. Tryon (1881) recorded E. elegans from Sierra Leone but it is not listed by Ardovini and Cossignani (2004) and this record is probably in error.

Habitat: A shallow water species found from the intertidal zone to ca. 20 m. It seems to occur in deeper water off Florida and the northern Gulf of Mexico than elsewhere in the Caribbean. It is most commonly found under slabs of coral rubble, often in pairs, often almost completely covered in a thick, coralline algal deposit.

Variation in Specimens: Specimens vary greatly in size and degree of "fusiformity," but are relatively uniform in sculpture and, with few exceptions, coloration. All specimens have a peripheral band of white spots on the axial cords that may merge into a single unbroken band. In some populations the single spiral cord on the sub-sutural plane and/or the spiral cords anterior to the periphery may have white nodes as well. The two posterior-most outer lip denticles are almost always fused into a single large tooth. In the southeastern populations some specimens are an orange color (see discussion below) with numerous white spots. Specimens from the Bahamas and the Lesser Antilles tend to be smaller than elsewhere, but there are numerous exceptions.


Comparison with Other Species: The combination of a uniformly dark background color with white spots or bands, fused outer lip teeth, and dark aperture with white teeth characterize this species. Some specimens are similar to the Brazilian E. permixta— that is a relatively larger species with fewer axial ribs on both the final whorl (8–13 in E. turbinella, 7–10 in E. permixta) and the penultimate whorl (9–14 in E. turbinella, 8–10 in E. permixta). Engina turbinella never shows the wide range of colors seen in E. permixta. See Table 1 for a comparison with other species.

Discussion: Engina turbinella (Kiener, 1836) is a widespread and usually shallow water species occurring throughout much of the tropical western Atlantic Ocean. It is a baffling species varying greatly in size, shape, and coloration. Three color forms are apparent, all named, that appear rather distinct unless a large number of specimens is studied. These are discussed below.

Purpura turbinella Kiener, 1836. Louis Charles Kiener curated the vast (150,000 specimens) collection of Baron Jules Paul Benjamin Delessert, describing and illustrating many species in his Spécies Général (Dance, 1866). This included the “jolie petite espèce” Purpura turbinella from an unknown habitat, originally from the Prince Masséna collection, which Delessert had acquired in 1840. Subsequently this name has been almost universally applied to all western Atlantic Ocean Engina taxa as "Engina turbinella." Although the type is apparently lost, the illustrations (Figure 69) clearly show an orange shell with small white nodules above and below the usual peripheral row of nodules. This is not the widely distributed typical form illustrated in most accounts as Engina turbinella. Kiener’s illustrations match our specimens from Scarborough, Tobago (Figures 70, 71). Although the size of the figured type specimen - "7 ligines" [= 13.5 mm] is larger than the largest specimen we have seen from there (12.5 mm), given the great variation in size among other Caribbean Engina species we do not feel this is significant. These specimens represent a morph that appears to have a rather limited distribution from Barbados and Tobago to adjacent western Venezuela, including the Netherlands Antilles. It should be noted that orange shells occasionally are seen throughout the remainder of the western Atlantic Ocean and that shells may fade to an orange or tan color as well.

Engina zonata Gray, 1839. Tomlin (1928) mentioned a tablet at NIHUK labeled “Enzina [sic] zonata Gray. B.V. 113” with two examples. He misidentified them as Engina leucozona (Philippi, 1844) from the Mediterranean Sea.
Orr (1962) quoted Tomlin as saying the specimens represent “a possible type lot” but this phrase does not appear in his 1928 paper. Bartsch (1931) did not pick a lectotype of \textit{zonata}, but simply illustrated one of the two specimens as the genotype of \textit{Engina} without further comment. Orr (1962) selected and illustrated a lectotype from the same lot that Tomlin saw. Gray (1839) greatly misrepresented the size of the specimen as 1.5 inches long, a fact apparently overlooked by Bartsch (1931) but noted by Orr (1962). Tryon (1883: 196) also commented on \textit{Engina zonata}: “This is also a lost species.” But types exist and prove to be \textit{E. turbinella}. This is the morph most commonly found throughout the western Atlantic, where it insensibly grades into the other \textit{E. turbinella} morphs described here. It is often quite large, particularly in populations off Miami and Panamá. Like the \textit{E. turbinella} morph described above it usually has small, white nodules below the periphery (not apparent on the lectotype but visible on the paratype of \textit{E. zonata}) but lacks the white sub-sutural nodules.

\textit{Engina elegans} Gray, 1839 (and \textit{Engina turbinella cruzana} Nowell-Usticke, 1959). This is the morph usually associated with the Greater Antilles and the Bahamas. It is often quite small in comparison to the \textit{E. zonata} morph and usually lacks the sub-peripheral white nodules.

Examination of over 900 specimens indicates that these three morphs seem to blend from one to the other without clear-cut distinctions. Thus we prefer to recognize only the single species, \textit{E. turbinella}. However, phylogenetic work may yet separate this “species” into two or more potentially cryptic species. The southeastern Caribbean form, the basis of the name \textit{Purpurea turbinella} Kiener, 1836, in particular seems the most morphologically and zoogeographically distinct of the three morphs. A peculiar form from the Grenadines (Figure 101) may represent a distinct species as well.

This is the only extant \textit{Engina} species from the western Atlantic with a fossil record. It was recognized from the middle Miocene of Panamá by Woodring (1973) and the late Pleistocene of the Dominican Republic by Landau and Vermeij (2012).

\textit{Engina williamsae} new species
(Figures 13, 103–107)

\textbf{Description (based on 11 adult specimens): } Largest specimen, 15.0 mm in length; smallest specimen, 11.5 mm in length; holotype 12.6 mm length × 7.4 mm in width. Spire occupies 60% of total length. Protoconch minute, of 1.5 smooth whorls, white with tan patches or bands. Teleoconch of ca. 5 whorls. Spiral sculpture consists of a wide subsutural slope with a narrow primary thread with microscopic secondary threads; the periphery has 4 indistinct primary cords over the axial nodes and microscopic threads; anteriorly there are 5 wide, flat primary cords separated by deeply incised channels. Axial sculpture of numerous microscopic threads on sub-sutural band and 8–10 (mode=9) elongated primary peripheral nodes on the final whorl, 9–10 (mode=9) on penultimate whorl. Terminal varix only slightly more developed than previous axial sculpture. Aperture small, constricted. Anal canal bounded by single parietal denticle on columella and single anal denticle on outer lip. Outer lip with 5–6 (mode=5) semi-lirate denticles, the anterior-most forming a weak, long, thin rib that projects deep into the aperture and delimits the siphonal canal, barely perceptible in some specimens. Radial lirae (2–5, mode=5) at posterior end, weak and irregular. Anterior to these are columellar folds (2–6, mode=6), weak or absent from center of columella, often limited to edge of parietal wall, anterior-most two best-developed and forming a ridge on the interior of the columella. Background color white, subsutural slope gray, wide brown blotches on the subsutural slope and between the axial ribs on the posterior half, leaving a white sub-peripheral band, anteriorly colored with brown spots, more or less aligned axially. Aperture pale tan. Operculum rounded, leaf-shaped, yellow with brown central radius. Radula and anatomy unknown.

\textbf{Holotype: } UF 478947 (ex MW).

\textbf{Type Locality: } 15 m, off Egmont Key, Hillsborough Co., Florida, USA.

\textbf{Paratype(s): } UF 478946 (1), 15 m, off Egmont Key, Hillsborough Co., Florida, USA (ex MW); BMSM 75995 (1), off Egmont Key, Hillsborough Co., Florida, USA (ex MW).

\textbf{Other Material Examined (9 specimens): } Western Florida: UF 239509 (1), 220 m, off Egmont Key, Hillsborough Co.; HGL (2), MW (4), 15 m, off Egmont Key, Hillsborough Co.; MW (1), 14 m, off Egmont Key, Hillsborough Co.; MW (1), 14 m, off Anna Maria Island, Manatee Co.

\textbf{Distribution: } Known only from off Egmont Key and adjacent Anna Maria Island, Hillsborough and Manatee counties, Florida, Gulf of Mexico.

\textbf{Habitat: } Live and dead specimens collected on rock reef in 15 m. Other specimens known to 220 m.

\textbf{Variation in Specimens: } The few known specimens are remarkably uniform in coloration and sculpture.

\textbf{Etymology: } Named for Margaret “Peggy” Williams of Tallavast, Florida, who collected most of the known examples.

\textbf{Comparison with Other Species: } This species is similar to \textit{E. cortinnae}. That species has more prominent spiral sculpture over the entire shell, including the subsutural band, which is nearly smooth in \textit{E. williamsae}. See Table 1 for a comparison with other species.

\textbf{Discussion: } \textit{Engina williamsae} is only known from Egmont Key and Anna Maria Island off the Gulf coast of Florida. These sites are at the mouth of Tampa Bay, a large open-water estuary. It has not yet been found on
Figures 103–120. Engina species. 103–107. Engina williamsae new species. 103–104. Holotype, UF 478947, 14.5 mm. 105. Paratype, BMSM 75998, 13.0 mm. 106. Paratype, UF 479946, 15.0 mm. 107. MW, 13.6 mm. All specimens from 15 m, off Egmont Key, Hillsborough Co., Florida. 108–119. Hesperipismia karinae (Nowell-Usticke, 1959). 108–109. Holotype, AMNH 193771, 23 mm. 110. KF 2505, 5–7 m, Ronde Island, Grenada, 18.5 mm. 111. HCL, 9.1 m, Pickles Reef, Monroe Co., Florida, 19.9 mm. 112. HCL, 201 m, St. Anne, Guadeloupe, 19.8 mm. 113. GTW 6613c, 20–25 m, off Guarapari, Espírito Santo State, Brazil, 21.0 mm. 114. GTW 6613a, 6.1 m, Tambor Cay, Panamá, 18.5 mm. 115. GTW 6613e, French Guiana, 17.1 mm. 116. GTW 6613b, 12 m, off Guarapari, Espírito Santo State, Brazil, 21.9 mm. 117. KF 4533, Isla Los Aves, Venezuela, 19.3 mm. 118. HCL, Playa de Ponce, Puerto Rico, 21.1 mm. 119. KF 2947, Port Louis, Guadeloupe, 20.8 mm. 120. Hesperipismia sp., GTW 6613d, Amuay, Venezuela, 18.8 mm.
adjacent Mullet and Sister keys. Given the amount of recreational shelling that takes place in the area it is surprising that more examples have not been found. Most specimens are worn and crabbed.

**Hesperisterinia** Gardner, 1944

**Type Species:** *Hesperisterinia waltonia* Gardner, 1944, by original designation.

**Discussion:** In *Hesperisterinia* the lirae extend much further back within the aperture than in *Engina*. Vermeij (2006) reviewed the fossils and Recent species. Additional notes are given here for *Hesperisterinia karinae* (Nowell-Usticke, 1959) because it occupies a much larger range than is usually thought and is often misidentified in collections. It is redescribed and its distribution is given so that its proper place in the western Atlantic fauna may become more clear.

In addition to *H. karinae*, other western Atlantic Ocean Recent taxa include *Hesperisterinia multangula* (Philippi, 1848) and *Hesperisterinia haraseucychi* (Petuch, 1987). Abbott (1986) named a subspecies, *H. multangula grandana*, which Vermeij (2006) considered a minor variant, but which Petuch (2013) raised to a full species. *Hesperisterinia itzomnoi* Watters, 2009, and *Engina janoweskyi*, placed in *Hesperisterinia* by Watters (2009), are reallocated to *Engina* based on the study of Landau and Vermeij (2012). An additional undescribed *Hesperisterinia* occurs at Anuay, Venezuela, but it is only known to us from a single specimen (Figure 120).

**Hesperisterinia karinae** (Nowell-Usticke, 1959)

(Figures 68, 108–119)

*Tritonidea orbignyi* Payraudeau, 1826. Dall and Simpson, 1901: 400 [misidentification].


Non *Cantharus lautus* Reeve, 1846. — Warmke and Abbott, 1961: 118, pl. 21, fig. c [misidentification].


**Description (based on 19 adult specimens):** Largest adult specimen, 25.0 mm in length; smallest specimen, 17.0 mm in length. Spire occupies 50% of total length. Protoconch minute, of 1.5 smooth whorls, tan with a brown band. Telecomch of ca. 6.25 whorls. Spiral sculpture of 10–13 (mode =12) primary ribs, usually absent from the sub-sutural ramp, between which are single secondary threads flanked by a few tertiary threads. Axial sculpture of large primary ribs, absent or greatly reduced on the spire. Long, thin rib that projects deep into the aperture and delimits the siphonal canal in some *Engina* is not present. Radial rib at posterior end composed of combinations of 4–10 pustules and irregular lirae, often mixed together. Anterior to these are columnal folds (8–10, mode=10) posteriorly composed of irregular pustules, anterior 2–3 folds of long lirae. Interior ledge of columnal well-developed. Background color yellow or tan with a prominent, wide, undulating, white peripheral band. This band is often bordered on each side by a thin dark brown line and may have dark brown flecks embedded within it. A diffuse, broad, dark band occurs above and below the white peripheral band. Subsutural slope and pustules lighter in color — yellow or tan. Aperture white, columnal showing through to brown below. Operculum rounded, leaf-shaped, yellow with brown central radius. Radula and anatomy unknown. Leal (1991) figured the protoconch.

**Holotype:** AMNH 193771.

**Type Locality:** N of Frederiksted, [St. Croix, US Virgin Islands].

**Paratype(s):** AMNH 294356 (1); UF 154704 (1); both from the type locality.

**Other Material Examined (35 specimens):** Florida: UF 352842 (1), UF 352843 (1), dredged off Delray Beach, Palm Beach Co.; UF 126511 (1), 27 m, off Palm Beach Inlet, Palm Beach Co.; UF 126510 (1), 37 m, off Palm Beach, Palm Beach Co.; UF 157523 (4), 18 m, Pompano Beach, Broward Co.; UF 399301 (1), 365.8 m, off Hillsboro, Broward Co.; HGL (1), 9 m, off Pickles Reef, Key Largo, Monroe Co. Bahamas: UF 168507 (1), Cat Cay, Bimini, Puerto Rico: UF 162626 (1), Córcega Beach, Rincón; UF 162629 (1), Rincón; HGL (3), Playa de Ponce. U.S. Virgin Islands: UF 154704 (1), N of Frederiksted, St. Croix [paratype]. Guadeloupe: HGL (3), 201 m, St. Anne; KF 2947 (4), Port Louis. Grenada: KF 2505 (1), 5–7 m, Ronde Island. Panama: GTW 6613a (1), 6 m, Tambor Cay. Venezuela: KF 4535 (1), Isla Los Aves. French Guiana: GTW 6613c (1); Brazil: HGL (1), 6 m, Salvador, Bahia State; HGL (1), 10–12 m, Salvador, Bahia State; HGL (1), off Guarapari, Espírito Santo State; GTW 6613c (2), 20–25 m, off Guarapari, Espírito Santo State; GTW 6613b (2), 12 m, off Guarapari, Espírito Santo State.
Distribution: This is a rare but widely distributed species: southeastern Florida, sporadically throughout the eastern Caribbean to Espírito Santo State, Brazil, but with considerable gaps in this distribution. It has not been recorded from Central America beyond Panamá, or from Cuba or Hispaniola, although it probably occurs there. It was not included as part of the North American fauna by Abbott (1974). Recorded by Dall and Simpson (1901) from Ponce and Culebra, Puerto Rico, as Tritonides orabilus Payraudeau, 1826. Nowell-Usticke (1971) added Antigua, Barbados, Grenada, Curaçao, and Aruba to his original description. Leal (1991) recorded it from Trindade and Vitória seamounts.

Habitat: Live and dead individuals have been found from 6-366 m. It appears to live in shallower water in the southern Caribbean than in the northern part of its range. It has been found on calcareous rubble.

Variation in Specimens: The degree of development of the axial sculpture varies considerably. The overall coloration varies from yellowish to a mahogany color but the wide, white peripheral band is always present.

Etymology: Named after Nowell-Usticke’s wife, Karin.

Comparison with Other Species: This relatively large and brightly colored species should not be confused with any other species from the western Atlantic. No species of Engina from there has a similar color pattern, or the elongate, lirate outer lip denticles, or the pustulose radial lilae. See Table 1 for a comparison with other species.

Discussion: This species has been identified in many collections as Buccinum lautum Reeve, 1846, described from an unknown locality. That species is the eastern Pacific taxon Gemphos lautus (Reeve, 1846).

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LITERATURE CITED


Gray, J.E. 1839. Molluscan animals, and their shells. In: The zoology of Captain Beechey’s voyage, comp. from the collections and notes made by Captain Beechey, the officers and naturalist of the expedition, during a voyage to the Pacific and Behring’s Straits performed in His Majesty’s ship Blossom, under the command of Captain F. W. Beechey ... in the years 1825, 26, 27 and 28, by J. Richardson ... N. A. Vigers ... G. T. Lay ... E. T. Bennett ... Richard Owen ... John E. Gray ... Rev. W. Buckland ... and C. B. Sowerby ... Illustrated with upwards of fifty finely coloured plates by Sowerby. Pub. under the authority of the lords commissioners of the Admiralty. H.G. Bohn, London, pp. 101-143.


Wood, W. 1828. Index Testaceologicus; or, a Catalogue of Shells, British and Foreign, arranged according to the Linnean System; with the Latin and English Names, References to Authors, and Places where found. Illustrated with 2300 figures. Second edition, corrected and revised. Supplement. Wood, London, 2 + 59 pp, 38 pls.
