Six New Host Records and an Updated List of Wild Hosts for
Neobenedenia melleni (MacCallum) (Monogenea: Capsalidae)

STEPHEN A. BULLARD,1,5 GEORGE W. BENZ,2 ROBIN M. OVERSTREET,1
ERNEST H. WILLIAMS, JR.,3 AND JAY HEMDAL4

1 Gulf Coast Research Laboratory, Department of Coastal Sciences, University of Southern Mississippi, 703
East Beach Drive, Ocean Springs, Mississippi 39564, U.S.A. (e-mail: ash.bullard@usm.edu;
Robin.Overstreet@usm.edu),
2 Tennessee Aquarium and Southeast Aquatic Research Institute, 1 Broad Street, P.O. Box 11048,
Chattanooga, Tennessee 37401, U.S.A. (e-mail: gwb@sari.org),
3 Department of Marine Sciences, University of Puerto Rico, P.O. Box 908, Lajas, Puerto Rico 00667-0908,
U.S.A. (e-mail: bert@rmocsis.uprm.edu), and
4 Toledo Zoo, 2700 Broadway, Toledo, Ohio 43609, U.S.A. (e-mail: jay.hemdal@toledozoo.org)

ABSTRACT: Six new host records and an updated list of wild hosts for Neobenedenia melleni (MacCallum)
(Monogenea: Capsalidae) are provided. We report specimens of N. melleni from the skin of a whitefin shank
sucker (Echeineis neucratoideus Zueuw [Echeneidae]) caught off Mayagüez, Puerto Rico; from the skin of a
mosquitofish (Gambusia xanthesoma Greenfield [Poeciliidae]) caught in Little Salt Creek, Grand Cayman
Island; British West Indies; from a freshwater immersion bath of red grouper (Epinephelus morio Valenciennes)
[Serranidae]) in the Gulf of Mexico off Sarasota, Florida, U.S.A.; from the skin of a garden eel (Heteroconger
hassi) (Klausewitz and Eibl-Eibesfeldt) [Congridae]) in the Toledo Zoo, Toledo, Ohio, U.S.A.; from the skin of a
raccoon butterlyfish (Chaetodon lunula (Cuvier) [Chaetodontidae]) in the Fort Wayne Children’s Zoo, Fort
Wayne, Indiana, U.S.A.; and from the gill cavity of a red snapper (Lutjanus campechanus (Poey) [Lutjanidae])
in holding facilities at the Gulf Coast Research Laboratory, Ocean Springs, Mississippi, U.S.A. Neobenedenia
melleni had not been previously reported from a suspected wild host in the Gulf of Mexico (i.e., E. morio) or
from a member of Echeneidae, Atheriniformes, or Anguilliformes. Published host records indicate that N.
melleni exhibits a relatively low degree of host specificity among captive and wild hosts; in nature, N. melleni infests
predominantly shallow-water or reef teleosts.

KEY WORDS: Neobenedenia melleni, Echeneis neucratoideus, Gambusia xanthesoma, Epinephelus morio, Heteroconger
hassi, Chaetodon lunula, Lutjanus campechanus, Monogenea, Capsalidae, host specificity, zoogeography, pubic
aquaria, aquaculture, U.S.A., Puerto Rico, British West Indies, Florida, Mississippi, Gulf of Mexico.

The capsalid Neobenedenia melleni (MacCallum, 1927) is relatively unusual among
members of Monogenea in that it has been re
ported from a wide range of hosts. This capsalid infests the eyes, fins, gill cavity, nasal cavity,
and skin of over 100 species of marine teleosts
(Whittington and Horton, 1996). Most of these records are from fishes in aquaria and aquacul
ture systems where the parasite is identified as a
lethal pathogen (e.g., MacCallum, 1927; Jahn
and Kuhn, 1932; Nigrelli and Breder, 1934;
Mueller et al., 1994). However, there is no report
of disease associated with infestations of N. mel
leni among wild fishes. Neobenedenia melleni
had been reported previously from wild hosts in the
Caribbean Sea, Gulf of California, and eastern
Pacific Ocean off the coasts of Chile, Mexico,
and the United States (Table 1). Published
accounts of N. melleni infesting wild hosts (see
references in Table 1) are relatively scarce, and
little is known about the breadth of host specifici
ty exhibited by this parasite in nature. There
fore, reports of N. melleni from wild hosts are
significant because they offer insight into the
natural geographic distribution and host range of
this parasite. We report 6 new host records for
N. melleni: 3 from wild fishes and 3 from cap
tive fishes.

Materials and Methods
Worms were fixed in 10% neutral buffered formalin,
70% ethanol, or Bouin’s fixative. Eight worms were
stained in Van Cleave’s hematoxylin containing sev
eral additional drops of Ehrlich’s hematoxylin and
were then dehydrated to 70% ethanol. Several drops
of aqueous saturated lithium carbonate were then ad
ded, followed by several drops of 6% butylamine so
lution. Stained worms were dehydrated in an ethanol
series, cleared in clove oil, and mounted permanently
on glass slides using neutral Canada balsam. Five

5 Corresponding author.
Table 1. Wild hosts for *Neobenedenia melleni* (MacCallum, 1927).

<table>
<thead>
<tr>
<th>Atheriniformes</th>
<th>Host</th>
<th>Site</th>
<th>Locality</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poeciliidae</td>
<td>Gambusia xanthosoma Greenfield, 1983</td>
<td>Skin</td>
<td>Little Salt Creek, Grand Cayman Island, British West Indies</td>
<td>Present study (USNPC No. 89159)</td>
</tr>
<tr>
<td>Scorpaeiniformes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scorpaeidae</td>
<td>Sebastes capensis (Gmelin, 1789)</td>
<td>Skin</td>
<td>Southeast Pacific Ocean off northern Chile</td>
<td>Gonzalez and Acuna, 1998</td>
</tr>
<tr>
<td></td>
<td>Sebastes melanops Girard, 1856 (as Sebastes melanops)</td>
<td>Gills</td>
<td>Northeast Pacific Ocean off San Juan County, Washington, U.S.A.</td>
<td>Whittington and Horton, 1996</td>
</tr>
<tr>
<td></td>
<td>Sebastes serranoides (Eigenmann and Eigenmann, 1890)</td>
<td>Mouth and skin</td>
<td>Northeast Pacific Ocean off Diablo Cove, California, U.S.A.</td>
<td>Love et al., 1984 (as Neobenedenia girellae)</td>
</tr>
<tr>
<td>Hexagrammidae</td>
<td>Hexagrammos decagrammus (Pallas, 1810)</td>
<td>Gills</td>
<td>Northeast Pacific Ocean off San Juan County, Washington, U.S.A.</td>
<td>Whittington and Horton, 1996</td>
</tr>
<tr>
<td>Cottidae</td>
<td>Leptocottus armatus Girard, 1854</td>
<td>Not indicated</td>
<td>Northeast Pacific Ocean off La Jolla, California, U.S.A.</td>
<td>Gaida and Frost, 1991 (as Neobenedenia girellae)*</td>
</tr>
<tr>
<td>Perciformes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serranidae</td>
<td>Epinephelus guttatus (Linnaeus, 1758)</td>
<td>Gills</td>
<td>Caribbean Sea off La Pargüera, Puerto Rico</td>
<td>Dyer et al., 1992 (as Neobenedenia paraguaensis)</td>
</tr>
<tr>
<td></td>
<td>Epinephelus morio (Valenciennes, 1828)</td>
<td>Not indicated</td>
<td>Gulf of Mexico off Sarasota, Florida, U.S.A.</td>
<td>Present study (HWML Coll. No. 15064; USNPC No. 89162)</td>
</tr>
<tr>
<td></td>
<td>Epinephelus striatus (Bloch, 1792)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as Benedenia melleni)</td>
</tr>
<tr>
<td></td>
<td>Mycteroperca rosacea (Gilbert, 1892) (as Mycteroperca pardalis)</td>
<td>Gills</td>
<td>Gulf of California off La Paz, Mexico</td>
<td>Bravo-Hollis, 1957 (as Benedenia girellae)</td>
</tr>
<tr>
<td>Echeneidae</td>
<td>Echenetis neocratoides Zuiew, 1789</td>
<td>Skin</td>
<td>Caribbean Sea off Mayaguez, Puerto Rico</td>
<td>Present study (HWML Coll. No. 15063; USNPC No. 89161)</td>
</tr>
<tr>
<td>Lutjanidae</td>
<td>Lutjanus apodus (Walbaum, 1892) (as Lutjanus apodus)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as Benedenia melleni)</td>
</tr>
<tr>
<td>Host</td>
<td>Site</td>
<td>Locality</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------</td>
<td>------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Sparidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Archosargus probatocephalus</em> (Walbaum 1792)†</td>
<td>Eyes and skin</td>
<td>Northeast Pacific Ocean off La Jolla, California, U.S.A.</td>
<td>Whittington and Horton, 1996</td>
<td></td>
</tr>
<tr>
<td>Chaetodontidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Chaetodon capistratus</em> Linnaeus, 1758</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Chaetodon ocellatus</em> Bloch, 1787</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Chaetodon striatus</em> Linnaeus, 1758</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td>Pomacanthidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Holocanthus ciliaris</em> (Linnaeus, 1758)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Holocanthus tricolor</em> (Bloch, 1795)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Pomacanthus arcuatus</em> (Linnaeus, 1758)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Pomacanthus paru</em> (Bloch, 1787)</td>
<td>Not indicated</td>
<td>Caribbean Sea off Bimini, British West Indies</td>
<td>Nigrelli, 1947 (as <em>Benedenia mellici</em>)</td>
<td></td>
</tr>
<tr>
<td>Kyphosidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Girella nigricans</em> (Ayres, 1860)</td>
<td>Skin</td>
<td>Northeast Pacific Ocean off La Jolla, California, U.S.A.</td>
<td>Hargis, 1955 (as <em>Benedenia girella</em>)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fins and skin</td>
<td>Northeast Pacific Ocean off Santa Catalina Island, California, U.S.A.</td>
<td>Goldberg et al., 1991 (as <em>Neobenedenia girella</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Medialuna californiensis</em> (Steindachner, 1876)</td>
<td>Skin</td>
<td>Northeast Pacific Ocean off Santa Catalina Island, California, U.S.A.</td>
<td>Gaida and Frost, 1991 (as <em>Neobenedenia girella</em>)</td>
<td></td>
</tr>
<tr>
<td>Embiotocidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Embiotoca jacksoni</em> Agassiz, 1853</td>
<td>Exterior</td>
<td>Northeast Pacific Ocean, Naples Reef off Santa Barbara, California, U.S.A.</td>
<td>Whittington and Horton, 1996</td>
<td></td>
</tr>
<tr>
<td><em>Embiotoca lateralis</em> Agassiz, 1854</td>
<td>Exterior of head</td>
<td>Northeast Pacific Ocean, San Francisco Bay, California, U.S.A.</td>
<td>Whittington and Horton, 1996</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exterior</td>
<td>Northeast Pacific Ocean near San Fransisco, California, U.S.A.</td>
<td>Moser and Haldorson, 1982 (as <em>Neobenedenia girella</em>)</td>
<td></td>
</tr>
<tr>
<td><em>Rhacochilus vacca</em> (Girard, 1855) (as <em>Damalichthys vacca</em>)</td>
<td>Exterior</td>
<td>Northeast Pacific Ocean near San Fransisco, California, U.S.A.</td>
<td>Moser and Haldorson, 1982 (as <em>Neobenedenia girella</em>)</td>
<td></td>
</tr>
</tbody>
</table>
wells intended for study using Nomarski illumination were dehydrated, cleared in clove oil, and mounted unstained in neutral Canada balsam. Worms were identified using the original description of *N. melleni* (as *Epibdella melleni* MacCallum, 1927), the redescription of *N. melleni* contained in a recent revision of *Neobenedenia* Yamaguti, 1963, and the key to the species of *Neobenedenia* (see Whittington and Horton, 1996). We primarily used 1) anterior attachment organs circular and not bipartite; 2) anterior hamuli recurved, nonserrated (i.e., smooth), and robust (i.e., width usually greater than that of both accessory sclerites and posterior hamuli and with root of consistent width along total length [i.e., root not tapered, constricted, or pinched]); 3) glands of Goto not evident, and 4) other specific features indicated by Whittington and Horton (1996). Nomenclature used herein for members of *Neobenedenia* follows that of Whittington and Horton (1996). Specimens of *N. melleni* from *Gambusta xanthosoma* (Poeciliidae) and *Lujanus cambpechanus* (Poey, 1860) (Lujanidae) were deposited in the United States National Parasite Collection (USNPC) at Beltsville, Maryland, U.S.A. (USNPC Nos. 089159 and 089160), and specimens from *Echeneis neucratoideis* (Echeneidae), *Epinephelus morio* (Serranidae), *Heteroconger hassi* (Klausewitz and Eibl-Eibesfeldt, 1959) (Congridae), and *Chaetodon lunula* (Cuvier, 1831) (Chaetodontidae) were deposited there (USNPC Nos. 089161, 089162, 089163, and 089164) and in the helmhing collections of the H. W. Manter Laboratory (HWML) of the University of Nebraska State Museum at Lincoln, Nebraska, U.S.A. (HWML Nos. 15063, 15064, 15065, and 15066).

### Results and Discussion

Regarding our new host records, 2 specimens of *N. melleni* were collected from the skin of a whitefin sharksucker (*E. neucratoideis*), a remora that was attached to a West Indian manatee (*Trichechus manatus* Linnaeus, 1758 [Trichechidae]) off Mayagüez, Puerto Rico. This is the first report of *N. melleni* from a remora and may help to explain in part the wide geographic distribution of *N. melleni*. Although carriers of infested remoras may not travel between oceans, infested remoras may transfer infestations of *N. melleni* among fish, mammalian, and turtle species and individuals with which they associate. In addition, remoras can attached to or mingle with their carriers for prolonged periods of time. This habit may provide *N. melleni* opportunity to infest the remora’s carrier host or other fishes in close proximity to the infested remora. Various cleaner fishes (e.g., bluehead wrasse, *Thalassoma bifasciatum* [Bloch, 1791] [Labridae]; neon goby, *Gobiosoma oceanops* [Jordan, 1904] [Gobiidae]; and cleaning goby, *Gobiosoma genie* Böhlke and Robins, 1968) were effective in controlling infestations of *N. melleni* among aquar-
ium-kept fish (see Cowell et al., 1993). Some species of remora feed on ectoparasites (Cressey and Lachner, 1970), and, because of this, aquaculturists eventually may use remoras to control infestations of *N. melleni* on large hosts. However, as previously suggested, remoras may transport worms to adjacent groups of fishes.

A specimen of *N. melleni* was collected from the skin of a mosquitofish (*G. xanthosoma*) from Little Salt Creek (western shore of North Sound, Grand Cayman, British West Indies). *Neobenedenia melleni* had not been reported previously from a member of Atheriniformes or from the western Caribbean Sea. The specimen of *N. melleni* was conspicuous, 3 mm in total length, and attached to the dorsal surface of the head at the level of the eyes of a mosquitofish that was 33 mm in total length. *Gambusia xanthosoma* is apparently endemic to the high salinity mangrove habitats throughout North Sound (Abney and Heard, personal communication); therefore, it is of ecological interest to report on the occurrence of nonendemic parasites, such as *N. melleni*, that infest a wide range of hosts and that are identified as lethal pathogens among confined fishes. Nigrelli (1947) reported several wild hosts for *N. melleni* in the Caribbean Sea off Bimini (see Table 1). Robinson et al. (1992) and Hall (1992) reported heavy infestations of *N. melleni* among cultured, seawater-acclimated red hybrid tilapia in floating cages off southern Jamaica. Cowell et al. (1993) reported infestations of *N. melleni* on Florida red tilapia (descendants of an original cross between *Oreochromis urolepis hornorum* (Norman, 1922) [Cichlidae] and *Oreochromis mossambicus* (Peters, 1852)) in aquaria at the Caribbean Marine Research Center (CMRC), Lee Stocking Island, Exuma Cays, Bahamas. However, because *N. melleni* has a broad host range and wide geographic distribution and heavily infests some hosts in aquaculture, we cannot determine if, when, or how it was introduced to the endemic population of *G. xanthosoma*.

At least 3 specimens of *N. melleni* infested the red grouper (*E. morio*); they were caught off Sarasota, Florida, U.S.A., in January 1993. Material of *N. melleni* was collected from a freshwater immersion bath at the Mote Marine Laboratory (MML), Sarasota, Florida, when the fish were initially treated after being captured from the Gulf of Mexico. Nevertheless, *N. melleni* later became established in culture facilities at the MML. *Neobenedenia melleni* was previously reported from *E. morio* and *Mycteroperca microlepis* (Goode and Bean, 1879) (Serranidae) in recirculating-seawater tanks in northwestern Florida (Florida State University Marine Laboratory, Turkey Point, Florida, U.S.A.) by Mueller et al. (1994) and from other members of the sea bass family in the Caribbean Sea and the Gulf of California (see Table 1); however, this is the first report of *N. melleni* from a suspected wild host in the Gulf of Mexico.

We also report numerous adult and juvenile specimens of *N. melleni* from the skin of a garden eel (*H. hassi*) from the Toledo Zoo, Toledo, Ohio, U.S.A. This is the first report of *N. melleni* from any member of Anguilliformes, and to the best of our knowledge, it is also the first report of *N. melleni* from a host that lacks scales. Whereas the exact geographic origin of the eel was not known, we suspect that it became infested while confined in a compartmentalized quarantine system at the Toledo Zoo. One of us (J.H.) observed a cream angelfish (*Apolemichthys xanthurus* (Bennett, 1832) [Pomacanthidae]) in the same water system that harbored numerous specimens of a platyhelminth on its skin that were probably *N. melleni*. Nigrelli and Breder (1934) reported that some angelfishes were foci for epidemics of *N. melleni* in the New York Aquarium. Specimens of *N. melleni* have yet to be reported from *A. xanthurus*. However, because the aforementioned worms from this host were not available for identification, we did not report this fish as a host for *N. melleni*.

Numerous specimens of *N. melleni* were also collected from a raccoon butterflyfish (*C. lunula*) that died while in quarantine at the Fort Wayne Children's Zoo, Fort Wayne, Indiana, U.S.A. We are not certain of the exact geographic origin of that wild-caught fish or whether it was infested in the wild. However, *C. lunula* is a reef species that ranges from East Africa to Polynesia (Randall et al., 1990), and that raccoon butterflyfish most likely came from there (i.e., Indo-Pacific Region). *Neobenedenia melleni* has been reported from 3 members of *Chaetodon* in the Caribbean Sea (Nigrelli, 1947; Table 1).

A single specimen of *N. melleni* was collected from the gill cavity of a red snapper (*L. campechanus*) caught in the northern Gulf of Mexico and maintained in an aquaculture tank with other red snapper at the Gulf Coast Research
Laboratory (GCRL), Ocean Springs, Mississippi, U.S.A. The tank and filtration system that supported this host had been sanitized before adding any fish, and no other fishes shared the water of this system. There was no history of infestation by this monogenean in culture facilities at GCRL. Therefore, it is likely that this red snapper was infested with _N. melleni_ in the wild. In addition, 3 juvenile red snapper (each approximately 120 mm in total length) that were spawned and reared at the GCRL aquaculture facility and then transferred to the GCRL Marine Education Center (MEC), Biloxi, Mississippi, U.S.A., became heavily infested with _N. melleni_. These red snapper were maintained in a 7,700-liter aquarium with a spadefish (_Chaetodipterus faber_ (Broussonet, 1782) [Ephippidae]) that was also heavily infested with the monogenean. Nigrelli (1947) reported _Lutjanus apodus_ (as _Lutianus apodus_) as a wild host for _N. melleni_ (as _Benedenia melleni_) in the West Indies. We suspect that _L. campechanus_ also may be a wild host of _N. melleni_ in the northern Gulf of Mexico. However, it does not seem to be a common host, because we have yet to observe a specimen of _N. melleni_ on a red snapper directly from the wild, in spite of examinations of at least 276 such fish.

The most recent list of captive and wild hosts for _N. melleni_ was presented by Lawler (1981). Whittington and Horton (1996) subsequently provided a list of hosts for _N. melleni_; however, that list did not distinguish between captive and wild hosts. Because a list identifying wild hosts for _N. melleni_ has not been presented in 18 years, we consider Table 1 a useful update.

Rarely does a monogenean species, let alone a capsulesid, occur in more than 1 ocean and infest more than 1 host species, and if so, those hosts are usually closely related species (e.g., Byrnes and Rohde, 1992; Whittington, 1998). _Neoebenedenia melleni_ has now been reported from 27 species comprising 18 genera, 14 families, and 3 orders of wild hosts (Table 1). These records suggest that _N. melleni_ is a parasite of predominantly shallow-water or reef-dwelling marine teleosts. _Neoebenedenia melleni_ exhibits a relatively low degree of host specificity among both captive and wild hosts. Nigrelli and Breder (1934) studied the host-parasite relationship between _N. melleni_ and several fishes held at the New York Aquarium. However, the factors that allowed it to infest a broad array of hosts in captivity and in the wild were not clearly understood. In some cases, horizontal transfer and levels of infestation may be limited initially only by the physical distance between parasite and potential host. This could, in part, explain the apparent abundance of _N. melleni_ among reef fishes that live in close proximity to one another in the wild and among those and other fishes held in public aquaria and aquaculture systems. Further study of this unique monogenean utilizing molecular techniques could possibly reveal population differences.

**Acknowledgments**

We thank Reg Blaylock for commenting on the manuscript; Nate Jordan, Jason Steckler, Jody Peterson, and Casey Nicholson (all of GCRL) for providing red snapper for examination; Joyce Shaw (GCRL) for requesting some of the pertinent literature via interlibrary loan; Alex Schesny (MEC) for providing juvenile specimens of _L. campechanus_ infested with _N. melleni_; Michael Abney (University of Kentucky) and Richard Heard (GCRL) for providing the specimens of _G. xanthosoma_ infested with _N. melleni_; Pamela Phelps (MML) for providing specimens of _N. melleni_ from _E. morio_; David Miller (Fort Wayne Children’s Zoo) for providing specimens of _N. melleni_ from _C. lunula_; and the Cayman Islands National Trust and the Cayman Islands Department of the Environment for allowing and facilitating collection of _G. xanthosoma_ on Grand Cayman. This study was supported in part from National Oceanic and Atmospheric Administration, National Marine Fisheries Service, award No. NA86FL0476 and NA96FL0358.

**Literature Cited**


