

# ERRATA

Taxonomy of Deep-Sea  
Trachyleberidid,  
Thaerocytherid, and  
Hemicytherid Genera  
(Ostracoda)

*Moriaki Yasuhara, Gene Hunt,  
Hisayo Okahashi, and Simone N. Brandão*



Smithsonian Institution  
Scholarly Press

# Errata

---

The following corrections are announced by the authors of Smithsonian Contributions to Paleobiology, No. 96, *Taxonomy of Deep-Sea Trachyleberidid, Thaerocytherid, and Hemicytherid Genera (Ostracoda)*.

1. The catalog numbers of USNM 607200, USNM 607202, and USNM 607203 are erroneous and should be replaced by ZMH K-42870. These three specimens were deposited with the single catalog number of ZMH K-42870 in the Crustacean collection of the Zoologisches Museum Hamburg, University of Hamburg, Germany.
2. The size of USNM 607223 *Protocythere sulcatoperforata* (Brady, 1880) noted in Figure 9M, N, Figure 10N, P, and in Table 1 is erroneous. The images in Figures 9M, N and 10N, P and the dimension given in Table 1 are erroneously 125% larger than actual size. In addition, this specimen is probably an A-1 juvenile instead of adult.

Following this page are seven corrected pages that replace the corresponding incorrect pages in the originally published online version of record (VoR) for Smithsonian Contributions to Paleobiology, No. 96, found here:  
<http://opensi.si.edu/index.php/smithsonian/catalog/book/83>

*Moriaki Yasuhara, Gene Hunt, Hisayo Okahashi, and Simone N. Brandão*

*Poseidonamicus*, *Bradleya*). Because of the seeming ease with which many features of ornament can change, we have placed greater weight on muscle scar features for delimiting genera. This emphasis has been traditional in the taxonomy of trachyleberidids and allied groups, although opinions have differed somewhat about its merit (Pokorný, 1964a; Hazel, 1967). Nevertheless, it is clear that no single character or suite of characters will suffice for reliable taxonomy, and even with our emphasis on muscle scars, we still employ features from all aspects of the carapace form.

We present here a taxonomic framework for deep-sea Trachyleberididae, Thaerocytheridae, and Hemicytheridae. Soft anatomy has been useful in resolving taxonomic difficulties in ostracods (e.g., Jellinek and Swanson, 2003 and Brandão, 2008, 2010 for deep-sea ostracods), and molecular approaches have helped resolve relationships among cytheroid families (Yamaguchi, 2003; Yamaguchi and Endo, 2003). Although we would not be able to incorporate molecular or anatomic information directly for many of the species that we consider here because they are extinct, integrating these species into a broader phylogenetic framework would provide a firmer basis for the taxonomy of even fossil members of this group. Such an integrated phylogenetic analysis, although clearly desirable, is not yet feasible given the state of the knowledge of this group. Accordingly, we

emphasize here the documentation of morphological features so that they may be fruitfully incorporated into future efforts. We also present numerous high-resolution images; for some taxa, these images represent the first published documentation of internal, hinge, and muscle scar features.

#### SAMPLE DETAILS AND ABBREVIATIONS

Core samples are specified by standard Ocean Drilling Program (ODP) notation (core/section/interval) or depth interval in centimeters. All specimens with a USNM number were digitally imaged uncoated in low-vacuum mode with a Philips XL-30 environmental scanning electron microscope (SEM) with LaB6 electron source. Additional SEM images were provided by ostracod experts, including M. A. Ayress, E. K. Kempf, and I. Mazzini. Figured specimens were deposited in the National Museum of Natural History (Washington, D.C., catalog numbers USNM 607201, USNM 607204–USNM 607866, and USNM 608273) unless they were already deposited elsewhere. Both formal catalog numbers and Yasuhara's personal catalog numbers are shown. Localities of specimens used for the current study are shown in Figures 1–4. Figure 5 summarizes the morphological characters and their terminology. Detailed information about the specimens

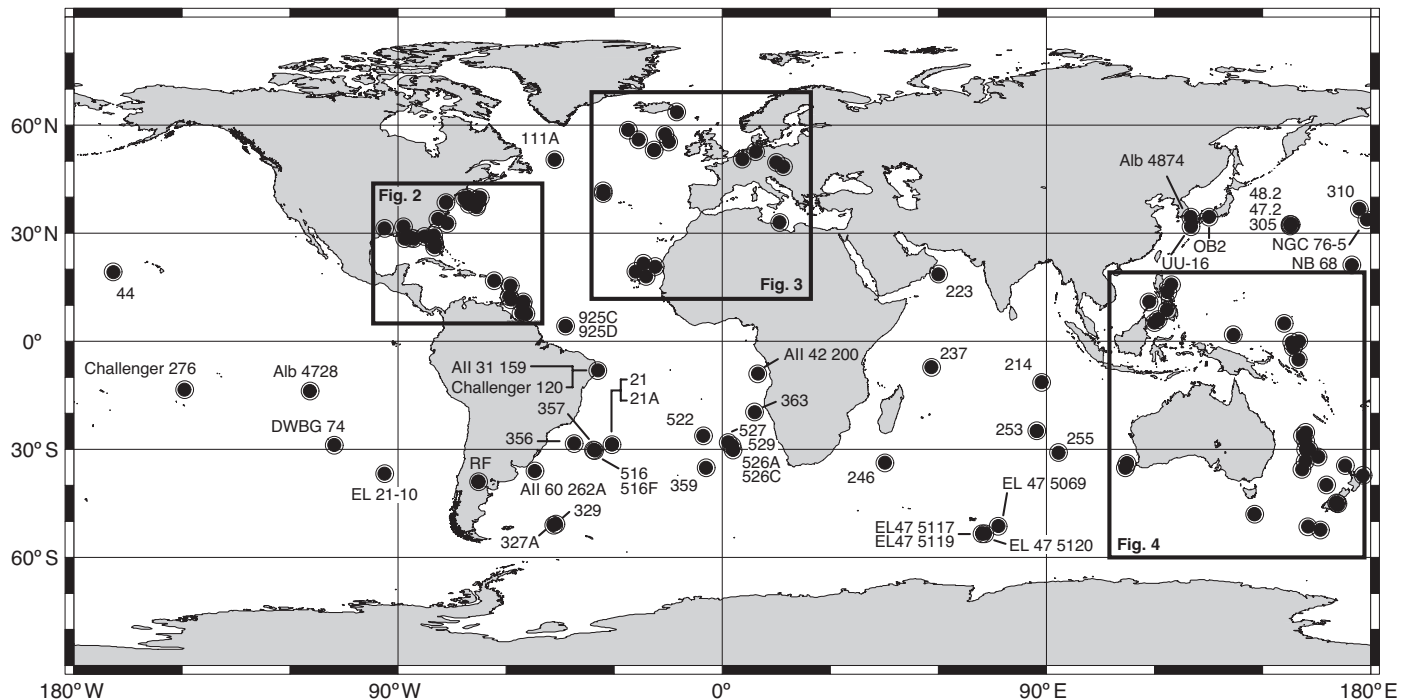


FIGURE 1. Map showing locations of samples included in the present study. For Ocean Drilling Program and Deep Sea Drilling Project sites, only numeric station codes are shown. Some locality names are sampling stations of the following oceanographic research vessels: *Albatross* (Alb), *Atlantis II* (All), *Eltanin* (EL), and *Knorr* (KN). Woods Hole Oceanographic Institution (WHOI) samples were collected as a part of the U.S. Geological Survey/WHOI Continental Margin (CONMAR) Program. RF, Rocca Formation. See Appendix (Table A1) for detailed locality information. The map was created using Ocean Data View (<http://odv.awi.de/>).

TABLE 1. List of specimens used for the present study, with dimensions provided for selected specimens.

| Catalog No. | MY No. <sup>a</sup> | Species                              | Length <sup>b</sup><br>(mm) | Height <sup>b</sup><br>(mm) | T <sup>a</sup> | V <sup>a</sup> | Instar <sup>a</sup> | Sex <sup>a</sup> | Region <sup>c</sup> | Age             | WD <sup>a</sup> |      | Figure    |
|-------------|---------------------|--------------------------------------|-----------------------------|-----------------------------|----------------|----------------|---------------------|------------------|---------------------|-----------------|-----------------|------|-----------|
|             |                     |                                      |                             |                             |                |                |                     |                  |                     |                 | (m)             | Part |           |
| ZMH K-42870 | TRA1109             | <i>Trachyleberis scabrocuneata</i>   | 0.905                       | 0.469                       | R              | R              | A                   | F                | JP                  | Holocene        | 21.91           | 6    | A         |
| USNM 607201 | TRA1113             | <i>Trachyleberis scabrocuneata</i>   | —                           | —                           | R              | R              | A                   | F                | JP                  | Holocene        | 21.91           | 6    | B, E-F, I |
| ZMH K-42870 | TRA1110             | <i>Trachyleberis scabrocuneata</i>   | 0.981                       | 0.472                       | L              | L              | A                   | M                | JP                  | Holocene        | 21.91           | 6    | C         |
| ZMH K-42870 | TRA1112             | <i>Trachyleberis scabrocuneata</i>   | —                           | —                           | L              | L              | A                   | F                | JP                  | Holocene        | 21.91           | 6    | D, G-H    |
| USNM 607204 | TRA219              | <i>Abrocycthereis malaysiana</i>     | 0.883                       | 0.524                       | L              | L              | A                   | ?                | NWP                 | Modern          | 900             | 7    | A-B       |
| USNM 607205 | TRA220              | <i>Abrocycthereis malaysiana</i>     | 0.872                       | 0.513                       | R              | R              | A                   | ?                | NWP                 | Modern          | 900             | 7    | C-D       |
| USNM 607206 | RB314               | <i>Abyssocythere atlantica</i>       | 1.043                       | 0.652                       | L              | L              | A                   | ?                | NWA                 | Modern          | 3865            | 7    | E         |
| USNM 607207 | RB315               | <i>Abyssocythere atlantica</i>       | 1.056                       | 0.569                       | R              | R              | A                   | ?                | NWA                 | Modern          | 3865            | 7    | F-G       |
| USNM 607208 | RB317               | <i>Abyssocythere atlantica</i>       | 1.020                       | 0.589                       | R              | R              | A                   | ?                | NWA                 | Modern          | 3865            | 7    | H-I       |
| USNM 607209 | RB316               | <i>Abyssocythere atlantica</i>       | 1.070                       | 0.695                       | L              | L              | A                   | ?                | NWA                 | Modern          | 3865            | 7    | J         |
| USNM 607210 | RB330               | <i>Abyssocythere atlantica</i>       | —                           | —                           | L              | L              | A                   | ?                | NWA                 | Modern          | 4425            | 7    | K         |
| USNM 607211 | RB331               | <i>Abyssocythere atlantica</i>       | —                           | —                           | R              | R              | A                   | ?                | NWA                 | Modern          | 4425            | 7    | L         |
| USNM 607212 | TRA121              | <i>Abyssocythere diagenona</i>       | 0.971                       | 0.573                       | L              | L              | A                   | ?                | SEA                 | Late Eocene     | 1054            | 7    | M-N       |
| USNM 607213 | TRA122              | <i>Abyssocythere diagenona</i>       | 0.903                       | 0.551                       | L              | L              | A                   | ?                | SEA                 | Late Eocene     | 1054            | 7    | O         |
| USNM 607214 | TRA123              | <i>Abyssocythere diagenona</i>       | 0.948                       | 0.521                       | R              | R              | A                   | ?                | SEA                 | Late Eocene     | 1054            | 7    | P-Q       |
| USNM 607215 | TRA236              | <i>Abyssocythere diagenona</i>       | 1.047                       | 0.551                       | R              | R              | A                   | ?                | SEA                 | Early Oligocene | 4441            | 7    | R-S       |
| USNM 607216 | TRA762              | <i>Abyssocythere scotti</i>          | 0.919                       | 0.533                       | P              | L              | A                   | ?                | SWA                 | Late Campanian  | 2400            | 7    | T-U       |
| USNM 607217 | TRA309              | <i>Abyssocythere scotti</i>          | 0.872                       | 0.457                       | P              | R              | A                   | ?                | SWA                 | Late Miocene    | 1519            | 9    | A-B       |
| USNM 607218 | TRA312              | <i>Abyssocythere scotti</i>          | 0.938                       | 0.579                       | P              | L              | A                   | ?                | SWA                 | Late Miocene    | 1519            | 9    | C-D       |
| USNM 607219 | TRA747              | <i>Abyssocythere scotti</i>          | 0.846                       | 0.457                       | H              | R              | A                   | ?                | SWA                 | Maastrichtian   | 2400            | 9    | E-F       |
| USNM 607220 | RB186               | <i>Protocythere vitjasi</i>          | 1.463                       | 0.928                       | L              | L              | A                   | ?                | NWP                 | Pliocene        | 2903            | 9    | G-H       |
| USNM 607221 | RB187               | <i>Protocythere vitjasi</i>          | 1.386                       | 0.819                       | R              | R              | A                   | ?                | NWP                 | Pliocene        | 2903            | 9    | I-J       |
| USNM 607222 | GSM244              | <i>Protocythere sulcatoperforata</i> | 1.363                       | 0.774                       | R              | R              | A                   | ?                | NWA                 | Pliocene        | 4940            | 9    | K-L       |
| USNM 607223 | USGSD149            | <i>Protocythere sulcatoperforata</i> | 1.118                       | 0.777                       | L              | L              | A-1?                | ?                | NA                  | Late Pliocene   | 3427            | 9    | M-N       |
| USNM 607224 | TRA854              | <i>Acanthocythereis araneosa</i>     | 0.799                       | 0.405                       | L              | L              | A                   | M                | NAM                 | Eocene          | OC              | 12   | A-B       |
| USNM 607225 | TRA856              | <i>Acanthocythereis araneosa</i>     | 0.767                       | 0.391                       | R              | R              | A                   | M                | NAM                 | Eocene          | OC              | 12   | C-D       |
| USNM 607226 | TRA861              | <i>Acanthocythereis araneosa</i>     | 0.763                       | 0.455                       | L              | L              | A                   | F                | NAM                 | Eocene          | OC              | 12   | E         |
| USNM 607227 | TRA862              | <i>Acanthocythereis araneosa</i>     | 0.718                       | 0.394                       | R              | R              | A                   | F                | NAM                 | Eocene          | OC              | 12   | F-G       |
| USNM 607228 | TRA858              | <i>Acanthocythereis cf. araneosa</i> | 0.633                       | 0.337                       | L              | L              | A                   | ?                | NAM                 | Eocene          | OC              | 12   | H         |
| USNM 607229 | TRA859              | <i>Acanthocythereis cf. araneosa</i> | 0.612                       | 0.335                       | R              | R              | A                   | ?                | NAM                 | Eocene          | OC              | 12   | I         |
| USNM 607230 | TRA860              | <i>Acanthocythereis cf. araneosa</i> | —                           | —                           | R              | R              | A                   | ?                | NAM                 | Eocene          | OC              | 12   | J         |
| USNM 607231 | TRA855              | <i>Acanthocythereis stenzeli</i>     | 0.692                       | 0.405                       | L              | L              | A                   | ?                | NAM                 | Eocene          | OC              | 12   | K         |
| USNM 607232 | TRA857              | <i>Acanthocythereis stenzeli</i>     | 0.708                       | 0.390                       | R              | R              | A                   | ?                | NAM                 | Eocene          | OC              | 12   | L-M       |
| USNM 607233 | TRA842              | <i>Actinocythereis exanthemata</i>   | 0.875                       | 0.464                       | L              | L              | A                   | F                | NAM                 | Miocene         | OC              | 12   | N-O       |
| USNM 607234 | TRA841              | <i>Actinocythereis exanthemata</i>   | 0.904                       | 0.432                       | L              | L              | A                   | M                | NAM                 | Miocene         | OC              | 12   | P         |
| USNM 607235 | TRA843              | <i>Actinocythereis exanthemata</i>   | 0.892                       | 0.472                       | L              | L              | A                   | F                | NAM                 | Miocene         | OC              | 12   | Q         |
| USNM 607236 | TRA844              | <i>Actinocythereis exanthemata</i>   | 0.881                       | 0.449                       | R              | R              | A                   | F                | NAM                 | Miocene         | OC              | 12   | R-S       |
| USNM 607237 | TRA845              | <i>Actinocythereis exanthemata</i>   | 0.845                       | 0.432                       | R              | R              | A                   | F                | NAM                 | Miocene         | OC              | 12   | T         |

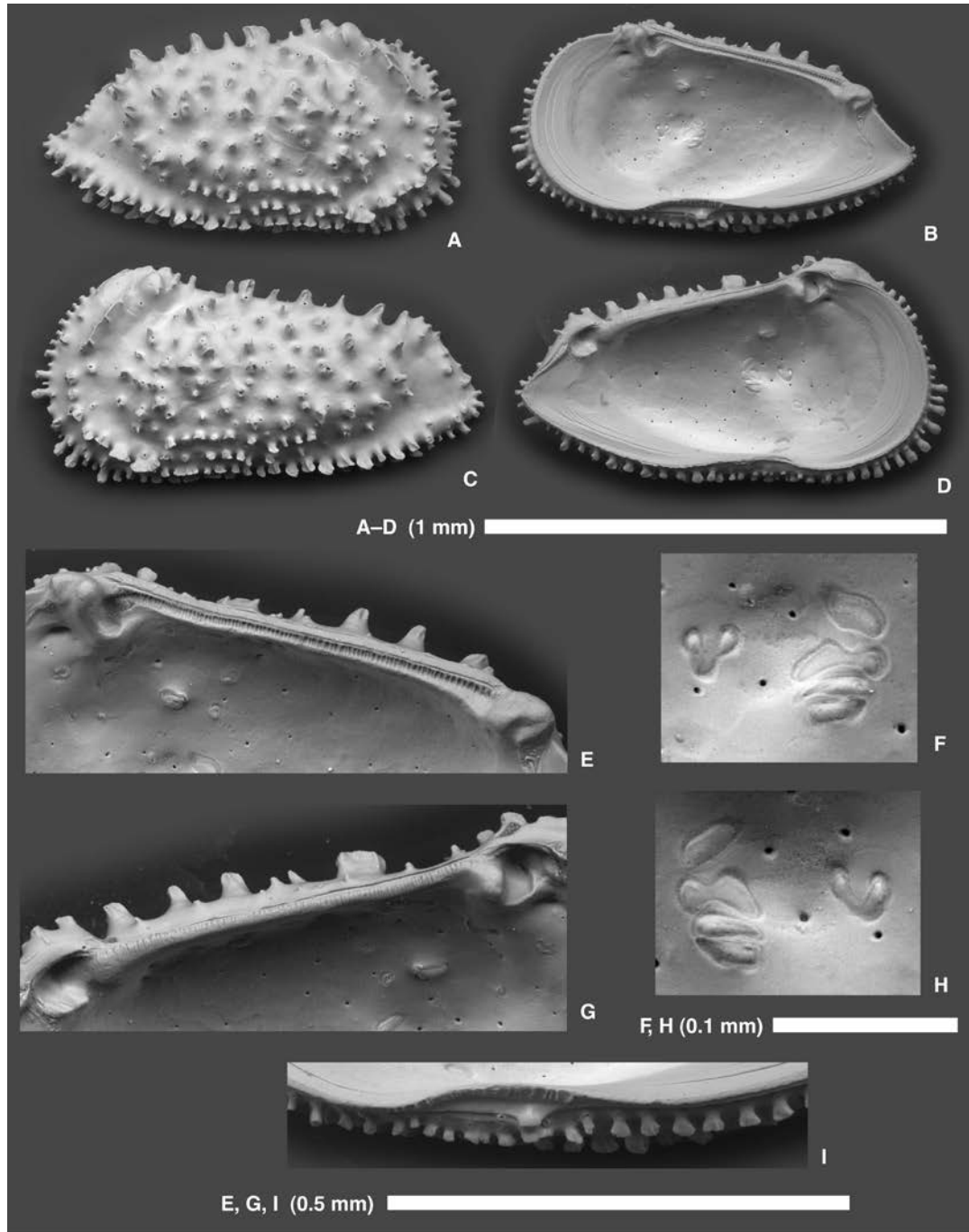


FIGURE 6. Scanning electron microscope images of *Trachyleberis scabrocuneata* (Brady, 1880). All specimens are from OB2, Holocene, Osaka Bay (Japan). A, C, lateral views; B, D–I, internal views. A, TRA1109 (ZMH K-42870), adult RV. B, TRA1113 (USNM 607201), adult RV. C, TRA1110 (ZMH K-42870), adult LV. D, TRA1112 (ZMH K-42870), adult LV. E–I, internal details. E, TRA1113 (USNM 607201), adult RV, hingement. F, TRA1113 (USNM 607201), adult RV, subcentral muscle scars. G, TRA1112 (ZMH K-42870), adult LV, hingement. H, TRA1112 (ZMH K-42870), adult LV, subcentral muscle scars. I, TRA1113 (USNM 607201), adult RV, ventromarginal area showing snap-knob structure. Scale bars represent 1 mm for A–D, 0.1 mm for F and H, and 0.5 mm for E, G, and I.

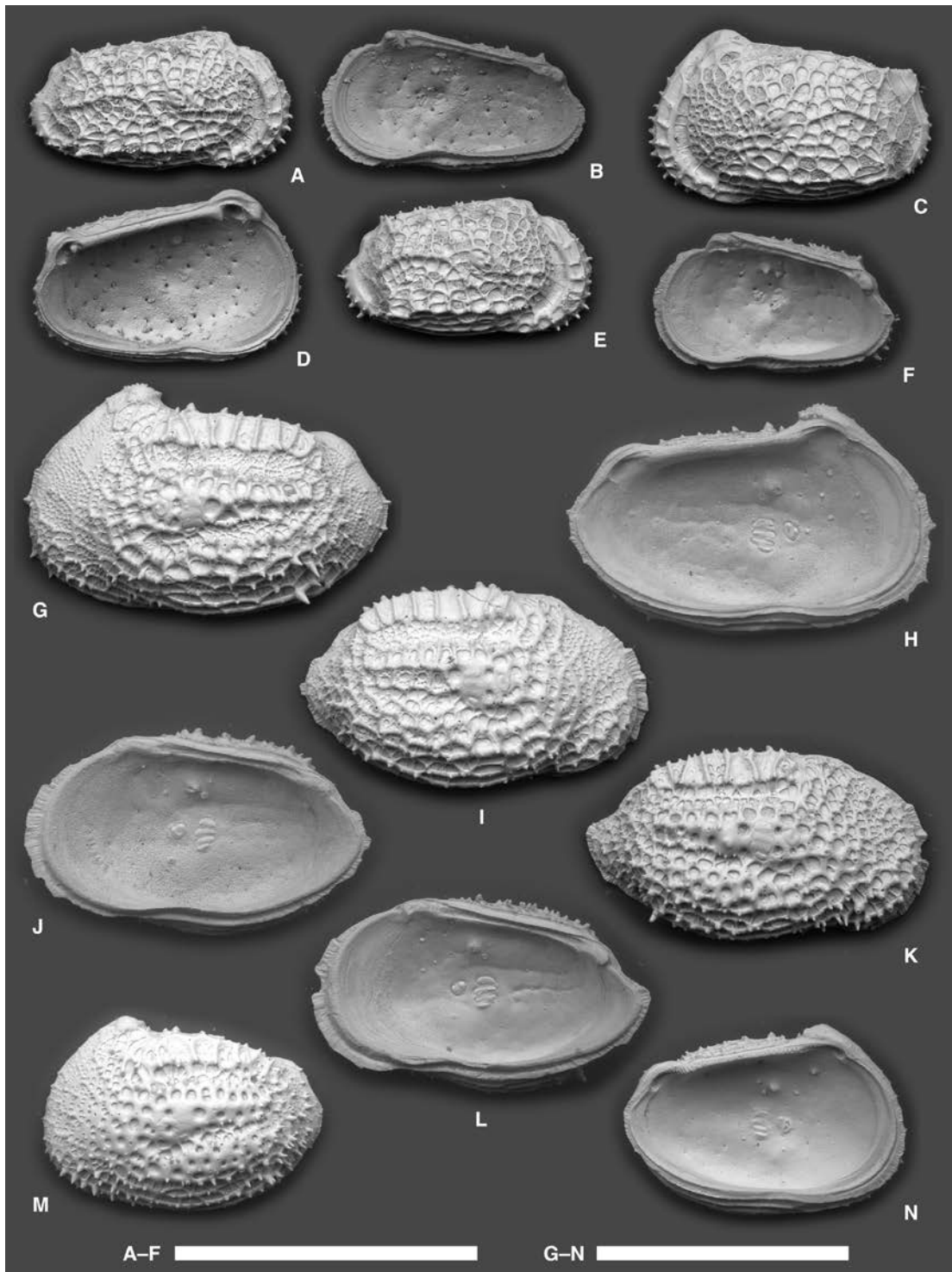


FIGURE 9. Scanning electron microscope images of *Abyssocythere scotti* sp. nov., *Protocythere vitjasi* (Schornikov, 1975), and *Protocythere sulcatoperforata* (Brady, 1880). A, C, E, G, I, K, M, lateral views; B, D, F, H, J, L, N, internal views. A–F, *Abyssocythere scotti* sp. nov. A–B, TRA309 (USNM 607217), adult RV from DSDP 329, 5/6/80–88, late Miocene, southwestern Atlantic. C–D, TRA312 (USNM 607218), adult LV from DSDP 329, 5/6/80–88, late Miocene, southwestern Atlantic. E–F, TRA747 (USNM 607219), adult RV from DSDP 327A, 12/3/50–55, Maastrichtian, southwestern Atlantic. G–J, *Protocythere vitjasi* (Schornikov, 1975). G–H, RB186 (USNM 607220), adult LV from DSDP 305, 3/2/50–56, Pliocene, northwestern Pacific. I–J, RB187 (USNM 607221), adult RV from DSDP 305, 3/2/50–56, Pliocene, northwestern Pacific. K–N, *Protocythere sulcatoperforata* (Brady, 1880). K–L, GSM244 (USNM 607222), adult RV from DSDP 541, 14/4/36, Pliocene, northwestern Atlantic. M–N, USGSD149 (USNM 607223), A-1? LV from DSDP 607, 14/5/17–19, late Pliocene, North Atlantic. Scale bars represent 1 mm.

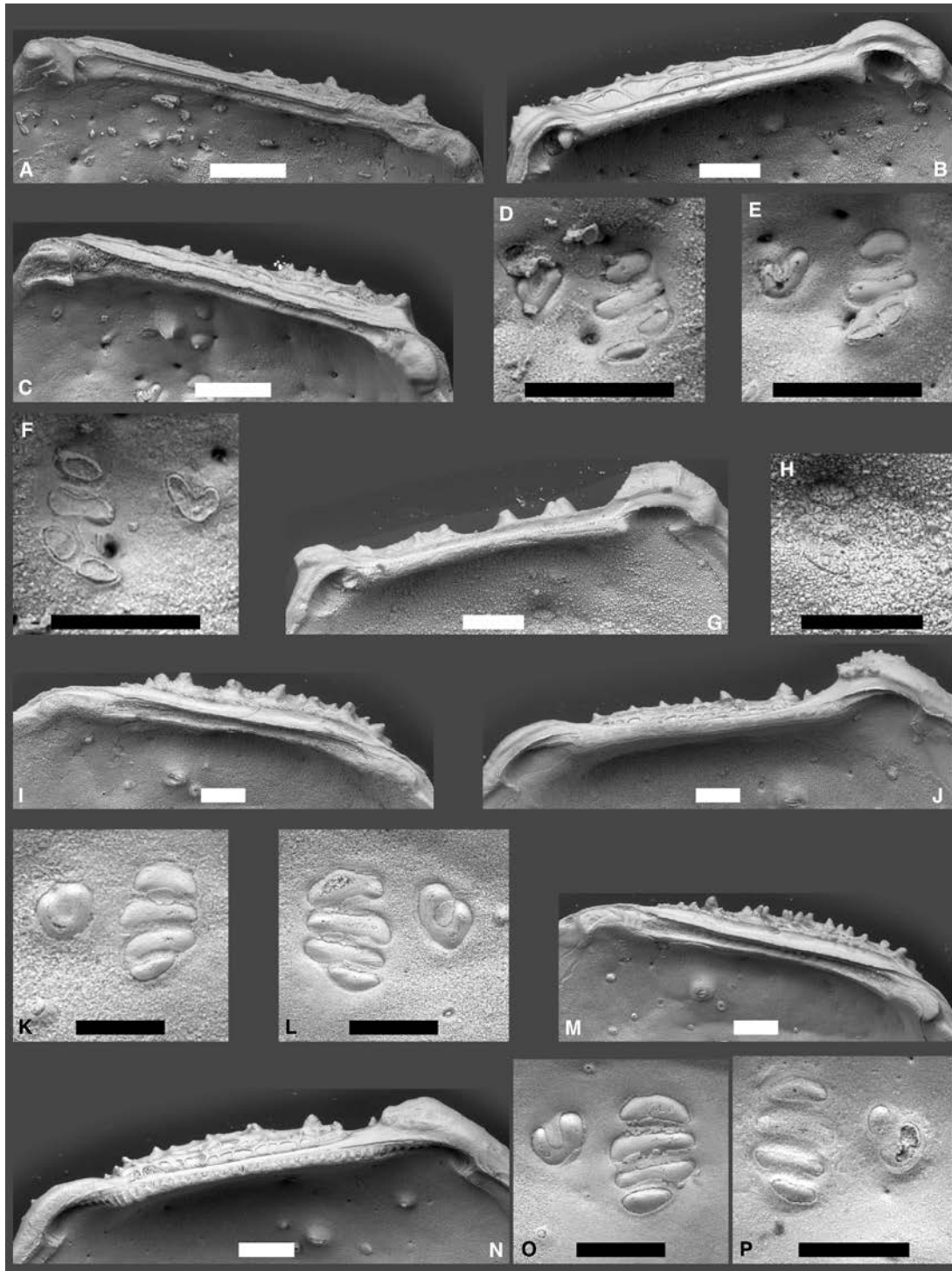


FIGURE 10. Internal details of *Abyssocythere scotti* sp. nov., *Abyssocythere* sp. 1, *Protocythere vitjasi* (Schornikov, 1975), and *Protocythere sulcatoperforata* (Brady, 1880). A–F, *Abyssocythere scotti* sp. nov. A, TRA309 (USNM 607217), adult RV, hingement. B, TRA312 (USNM 607218), adult LV, hingement. C, TRA747 (USNM 607219), adult RV, hingement. D, TRA309 (USNM 607217), adult RV, subcentral muscle scars. E, TRA747 (USNM 607219), adult RV, subcentral muscle scars. F, TRA312 (USNM 607218), adult LV, subcentral muscle scars. G–H, *Abyssocythere* sp. 1, TRA651 (USNM 607723), adult LV. G, hingement. H, subcentral muscle scars. I–L, *Protocythere vitjasi* (Schornikov, 1975). I, RB187 (USNM 607221), adult RV, hingement. J, RB186 (USNM 607220), adult LV, hingement. K, RB187 (USNM 607221), adult RV, subcentral muscle scars. L, RB186 (USNM 607220), adult LV, subcentral muscle scars. M–P, *Protocythere sulcatoperforata* (Brady, 1880). M, GSM244 (USNM 607222), adult RV, hingement. N, USGSD149 (USNM 607223), A-1? LV, hingement. O, GSM244 (USNM 607222), adult RV, subcentral muscle scars. P, USGSD149 (USNM 607223), A-1? LV, subcentral muscle scars. Scale bars represent 0.1 mm.

TABLE A1. Detailed information for the specimens used in the present study.

| Catalog No. | MY No. <sup>a</sup> | Species                            | T <sup>a</sup> | V <sup>a</sup> | Instar <sup>a</sup> | Sex <sup>a</sup> | Region <sup>b</sup> | Locality code <sup>c</sup> | Section <sup>a,d</sup> | Age <sup>a</sup> | Lat <sup>a</sup> (deg) | Long <sup>a</sup> (deg) | WD <sup>a</sup> (m) | Figure No. | Part     |
|-------------|---------------------|------------------------------------|----------------|----------------|---------------------|------------------|---------------------|----------------------------|------------------------|------------------|------------------------|-------------------------|---------------------|------------|----------|
| ZMH K-42870 | TRA1109             | <i>Trachyleberis scabrocostata</i> | R              |                | A                   | F                | JP                  | OB2                        | 106                    | Holocene         | 34.597                 | 135.158                 | 21.91               | 6          | A        |
| USNM 607201 | TRA1113             | <i>Trachyleberis scabrocostata</i> | R              |                | A                   | F                | JP                  | OB2                        | 106                    | Holocene         | 34.597                 | 135.158                 | 21.91               | 6          | B, E-E,I |
| ZMH K-42870 | TRA1110             | <i>Trachyleberis scabrocostata</i> | L              |                | A                   | M                | JP                  | OB2                        | 106                    | Holocene         | 34.597                 | 135.158                 | 21.91               | 6          | C        |
| ZMH K-42870 | TRA1112             | <i>Trachyleberis scabrocostata</i> | L              |                | A                   | F                | JP                  | OB2                        | 106                    | Holocene         | 34.597                 | 135.158                 | 21.91               | 6          | D, G-H   |
| USNM 607204 | TRA219              | <i>Abrocyclythere malaysiana</i>   | L              |                | A                   | ?                | NWP                 | Alb 5469                   | Modern                 | Modern           | 13.733                 | 123.700                 | 900                 | 7          | A-B      |
| USNM 607205 | TRA220              | <i>Abrocyclythere malaysiana</i>   | R              |                | A                   | ?                | NWP                 | Alb 5469                   | Modern                 | Modern           | 13.733                 | 123.700                 | 900                 | 8          | B, E     |
| USNM 607206 | RB314               | <i>Abyssocythere atlantica</i>     | L              |                | A                   | ?                | NWA                 | KN 25 sta 291              | Modern                 | Modern           | 10.102                 | -55.233                 | 3865                | 7          | E        |
| USNM 607207 | RB315               | <i>Abyssocythere atlantica</i>     | R              |                | A                   | ?                | NWA                 | KN 25 sta 291              | Modern                 | Modern           | 10.102                 | -55.233                 | 3865                | 7          | F-G      |
| USNM 607208 | RB317               | <i>Abyssocythere atlantica</i>     | R              |                | A                   | ?                | NWA                 | KN 25 sta 291              | Modern                 | Modern           | 10.102                 | -55.233                 | 3865                | 8          | F, I     |
| USNM 607209 | RB316               | <i>Abyssocythere atlantica</i>     | L              |                | A                   | ?                | NWA                 | KN 25 sta 291              | Modern                 | Modern           | 10.102                 | -55.233                 | 3865                | 7          | H-I      |
| USNM 607210 | RB330               | <i>Abyssocythere atlantica</i>     | L              |                | A                   | ?                | NWA                 | KN 25 sta 288              | Modern                 | Modern           | 11.037                 | -55.092                 | 4425                | 8          | H, J     |
| USNM 607211 | RB331               | <i>Abyssocythere atlantica</i>     | R              |                | A                   | ?                | NWA                 | KN 25 sta 288              | Modern                 | Modern           | 11.037                 | -55.092                 | 4425                | 7          | J        |
| USNM 607212 | TRA121              | <i>Abyssocythere diagenona</i>     | L              |                | A                   | ?                | SEA                 | DSDP 526C                  | 7/1/79-86              | Late Eocene      | -30.123                | 3.138                   | 1054                | 7          | K        |
| USNM 607213 | TRA122              | <i>Abyssocythere diagenona</i>     | L              |                | A                   | ?                | SEA                 | DSDP 526C                  | 7/1/79-86              | Late Eocene      | -30.123                | 3.138                   | 1054                | 8          | G, K     |
| USNM 607214 | TRA123              | <i>Abyssocythere diagenona</i>     | R              |                | A                   | ?                | SEA                 | DSDP 526C                  | 7/1/79-86              | Late Eocene      | -30.123                | 3.138                   | 1054                | 7          | L        |
| USNM 607215 | TRA236              | <i>Abyssocythere diagenona</i>     | R              |                | A                   | ?                | SEA                 | DSDP 522                   | 34/1/                  | Early            | -26.114                | -5.130                  | 4441                | 8          | M-N      |
| USNM 607216 | TRA762              | <i>Abyssocythere scotti</i>        | P              | L              | A                   | ?                | SWA                 | DSDP 327A                  | 113-120                | Oligocene        | -50.871                | -46.784                 | 2400                | 7          | O        |
| USNM 607217 | TRA309              | <i>Abyssocythere scotti</i>        | P              | R              | A                   | ?                | SWA                 | DSDP 329                   | 5/6/80-88              | Late             | -50.655                | -46.096                 | 1519                | 9          | A-B      |
| USNM 607218 | TRA312              | <i>Abyssocythere scotti</i>        | P              | L              | A                   | ?                | SWA                 | DSDP 329                   | 5/6/80-88              | Late             | -50.655                | -46.096                 | 1519                | 10         | A, D     |
| USNM 607219 | TRA747              | <i>Abyssocythere scotti</i>        | H              | R              | A                   | ?                | SWA                 | DSDP 327A                  | 12/3/                  | Maastrichtian    | -50.871                | -46.784                 | 2400                | 9          | C-D      |
| USNM 607220 | RB186               | <i>Protocythere vitjasi</i>        | L              |                | A                   | ?                | NWP                 | DSDP 305                   | 3/2/50-56              | Pliocene         | 32.002                 | 157.850                 | 2903                | 10         | B, F     |
| USNM 607221 | RB187               | <i>Protocythere vitjasi</i>        | R              |                | A                   | ?                | NWP                 | DSDP 305                   | 3/2/50-56              | Pliocene         | 32.002                 | 157.850                 | 2903                | 9          | E-F      |
|             |                     |                                    |                |                |                     |                  |                     |                            | 50-55                  |                  |                        |                         |                     | 10         | C, E     |
|             |                     |                                    |                |                |                     |                  |                     |                            |                        |                  |                        |                         |                     | 9          | G-H      |
|             |                     |                                    |                |                |                     |                  |                     |                            |                        |                  |                        |                         |                     | 10         | J, L     |
|             |                     |                                    |                |                |                     |                  |                     |                            |                        |                  |                        |                         |                     | 9          | I-J      |
|             |                     |                                    |                |                |                     |                  |                     |                            |                        |                  |                        |                         |                     | 10         | I, K     |



|             |          |                                      |   |      |    |     |                            |                |                  |        |         |      |    |            |
|-------------|----------|--------------------------------------|---|------|----|-----|----------------------------|----------------|------------------|--------|---------|------|----|------------|
| USNM 607222 | GSM244   | <i>Protocythere sulcatoperforata</i> | R | A    | ?  | NWA | DSDP 541                   | 14/4/36        | Pliocene         | 15,520 | -58,728 | 4940 | 9  | K-L        |
| USNM 607223 | USGSD149 | <i>Protocythere sulcatoperforata</i> | L | A-1? | ?  | NA  | DSDP 607                   | 14/5/<br>17-19 | Late<br>Pliocene | 41,001 | -32,957 | 3427 | 10 | M, O       |
| USNM 607224 | TRA854   | <i>Acanthocythereis araneosa</i>     | L | A    | M  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | M-N        |
| USNM 607225 | TRA856   | <i>Acanthocythereis araneosa</i>     | R | A    | M  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | N, P       |
| USNM 607226 | TRA861   | <i>Acanthocythereis araneosa</i>     | L | A    | F  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | A-B        |
| USNM 607227 | TRA862   | <i>Acanthocythereis araneosa</i>     | R | A    | F  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | B, F       |
| USNM 607228 | TRA858   | <i>Acanthocythereis cf. araneosa</i> | L | A    | ?  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | C-D        |
| USNM 607229 | TRA859   | <i>Acanthocythereis cf. araneosa</i> | R | A    | ?  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | A, D,<br>G |
| USNM 607230 | TRA860   | <i>Acanthocythereis cf. araneosa</i> | R | A    | ?  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | E          |
| USNM 607231 | TRA855   | <i>Acanthocythereis stenzeli</i>     | L | A    | ?  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | F-G        |
| USNM 607232 | TRA857   | <i>Acanthocythereis stenzeli</i>     | R | A    | ?  | NAM | Cook Mountain<br>Formation | Outcrop        | Eocene           | 31,450 | -93,750 | OC   | 12 | C, E,<br>H |
| USNM 607233 | TRA842   | <i>Actinocythereis exanthemata</i>   | L | A    | F  | NAM | Calvert<br>Formation       | Outcrop        | Miocene          | 38,600 | -76,517 | OC   | 12 | I          |
| USNM 607234 | TRA841   | <i>Actinocythereis exanthemata</i>   | L | A    | M  | NAM | Calvert<br>Formation       | Outcrop        | Miocene          | 38,600 | -76,517 | OC   | 12 | J          |
| USNM 607235 | TRA843   | <i>Actinocythereis exanthemata</i>   | L | A    | F  | NAM | Calvert<br>Formation       | Outcrop        | Miocene          | 38,600 | -76,517 | OC   | 12 | L-M        |
| USNM 607236 | TRA844   | <i>Actinocythereis exanthemata</i>   | R | A    | F  | NAM | Calvert<br>Formation       | Outcrop        | Miocene          | 38,600 | -76,517 | OC   | 12 | L-N        |
| USNM 607237 | TRA845   | <i>Actinocythereis exanthemata</i>   | R | A    | F  | NAM | Calvert<br>Formation       | Outcrop        | Miocene          | 38,600 | -76,517 | OC   | 12 | N-O        |
| USNM 607238 | TRA221   | <i>Actinocythereis vincyardensis</i> | L | A    | M  | NWA | Alb 2555                   | Modern         | Modern           | 39,883 | -71,533 | 244  | 14 | O, S       |
| USNM 607239 | TRA222   | <i>Actinocythereis vincyardensis</i> | R | A    | M  | NWA | Alb 2555                   | Modern         | Modern           | 39,883 | -71,533 | 244  | 14 | P          |
| USNM 607240 | TRA223   | <i>Actinocythereis vincyardensis</i> | L | A    | F  | NWA | Alb 2544                   | Modern         | Modern           | 40,029 | -70,400 | 235  | 14 | Q          |
| USNM 607241 | TRA224   | <i>Actinocythereis vincyardensis</i> | R | A    | F  | NWA | Alb 2544                   | Modern         | Modern           | 40,029 | -70,400 | 235  | 14 | R-S        |
| USNM 607242 | TRA903   | <i>Actinocythereis purii</i>         | R | A    | M? | NAM | Cocoa Sand<br>Member       | Outcrop        | Late Eocene      | 31,900 | -88,400 | OC   | 14 | P-R        |

(continued)