

## A new species of *Synidotea* (Crustacea: Isopoda: Valvifera) from the northern Gulf of Mexico

Marilyn Schotte and Richard Heard

(MS) Department of Systematic Biology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20013-7012, U.S.A.;

(RH) Department of Coastal Sciences, Gulf Coast Laboratory, P.O. Box 7000, Ocean Springs, Mississippi 39566, U.S.A.

**Abstract.**—*Synidotea fosteri*, n. sp., the sixth known member of the genus *Synidotea* from the western Atlantic Ocean, is described from shallow waters (1–2 m) adjacent to open beaches in the northern Gulf of Mexico. Its current range extends from western Florida westward to Texas. The new species is distinguished from other related species by small size, fairly straight lateral margins of first pereonite, having the posterior margin of pleotelson straight to very slightly emarginate and by details of the appendix masculina. A key to the known western Atlantic species of the genus *Synidotea* is also given.

### Introduction

The presence of an undescribed species belonging to the valviferan genus *Synidotea* has been known from the Gulf of Mexico for over 20 years. Although there are only two published records listed as "*Synidotea* sp." and "*Synidotea* sp. A" from Texas and Florida, respectively (Clark & Robertson 1982, Rakocinski et al. 1996), it has also been observed in beach habitats at Grand Island, Louisiana and Gulf Shores, Alabama (R. Heard, pers. obs.). More recent collections of *Synidotea* made near Panama City, Florida, have made possible the determination of a new species, which is the subject of this report. In the most recent discussion of the 56 nominal world species of *Synidotea*, Poore (1996) lists the relevant characters used to differentiate several species in this genus which closely resemble *S. laevidorsalis* (Miers, 1881), as does the present new species.

Family Idoteidae Samouelle, 1819

Genus *Synidotea* Harger, 1878

*Synidotea* Harger, 1878:374; Richardson, 1905:376; Rafi and Laubitz, 1990:2672; Poore and Lew Ton, 1993:261–262.

**Diagnosis.**—Body about twice as long as wide, integument sometimes setose or with sculpturing; cephalon narrower than pereonite 1; body width greatest at pereonite 4. Pleon lacking articulating pleonites, pleonite 1 indicated by single, small ventrolateral suture; apex acute, rounded or excavate. Antenna 2 multiarticulate. Mandible with secondary tooth on lacinia mobilis. Maxillipedal palp, with articles 2 and 3 fused, 4 and 5 also fused. Coxae 2–4 without dorsal coxal plates; coxae 5–7 with expanded dorsal plates. Penes fused completely and swollen distally, attached to posterior margin of pleonite 1. Oostegites forming brood-pouch on pereonites 1–4.

### Key to the Species of *Synidotea* from the Western Atlantic Region

- 1a. Pleotelson tapers to narrowly rounded, produced apex ..... *S. nodulosa*
- 1b. Pleotelson faintly to deeply emarginate at apex, not produced ..... 2
- 2a. Cephalon bearing two convexities separated by narrow groove and 2 small, medial tubercles anteriorly; lateral margins of pereonites 1–4 angular ....  
..... *S. littoralis*

- 2b. Cephalon smooth, lacking sculpturing; lateral margins of pereonites not angular ..... 3
- 3a. Lateral margins of pleotelson almost parallel for first 2/3 of length; angled medially in distal one-third with broad, shallow emargination on distal margin ..... *S. brunnea*
- 3b. Lateral and distal margins of pleotelson not as above ..... 4
- 4a. Cephalon with deep medial notch; pleotelson tapering to very narrow, emarginate apex ..... *S. marmorata*
- 4b. Cephalon without deep medial notch, faintly emarginate at most; pleotelson not tapering to narrow apex ..... 5
- 5a. Antennal flagellum with 13–20 articles; body length of mature male ca. 12.5 mm; appendix masculina of male not extending beyond apex of endopod of pleopod 2 ..... *S. marplatensis*
- 5b. Antennal flagellum with 7–8 articles; body length of mature male ca. 4.2 mm; appendix masculina extending beyond apex of endopod of pleopod 2 ..... *S. fosteri* n.sp.

*Synidotea fosteri*, n. sp.

Figs. 1, 2

*Synidotea* sp. Clark & Robertson, 1982:46 (key), 49–50 (Table & Text), 57 (Fig. 5); Rakocinski, et al. 1996:351 (Table).

*Material examined*.—Holotype male USNM 1022910, TL 6.5 mm, from sea grass clumps (origin unknown) in surf/swash zone, “Bid-a-wee” Beach, Panama City Beach, Florida, 30°12.2’N, 085°52.5’W, sal. 34 ppt., coll. R. Heard and J. Foster, 23 Nov 1996; Allotype female USNM 1022911, TL 6.0 mm, same data. Paratypes: 7 males, 6 ovig. females, 53 females, 1 juv., USNM 1022912, same locality data.

Other material: 1 male, 7 ovig. females, 2 females, 2 juvs., open gulf off Santa Rosa Beach, northwest Florida, 1–1.5 m, coarse sand with detritus, *Sargassum* and algae, coll. R. Heard, 15 July 1991.

*Description*.—Male: body length 2.7

times greatest width (at pereonite 3) with minutely spinulose integument (Figs. 3C, D) and faint dorsolateral sculpturing on all tergites. Cephalon with faint curved anterior groove above slight dome and faint lateral grooves, transverse posterior groove deeper; anterior margin of cephalon straight, sometimes with minute medial emargination. Width of head to width of pereonite 4 ratio 0.79. Eyes prominent. Lateral angles of first pereonite nearly straight; lateral angles of pereonites 2–4 convex and 5–7 nearly straight, making continuous margin. Lunette on pereonites 2–4 with broadly rounded posterior margin. Coxal plates not discernible dorsally. Sutures separating tergites from coxae faintly visible on tergites 2–4. Pleotelson length to width ratio 1.29; length of pleotelson 0.32 times body length, lateral margins tapering slightly to broad apex with straight or very slightly emarginate posterior margin. Uropodal peduncle with single, oblique ridge; length to width ratio of exopod 0.94, with curve between lateral margin and truncate apex.

Antenna 1 with 4 articles, terminal article bearing aesthetascs; antenna 2, single distal plumose seta on 5th peduncle article; flagellum with 8 articles. Mouthparts typical of genus, with secondary tooth noted on lacinia mobilis of mandible.

Pereopod 1, palmate propodus bearing many pectinate spine-like setae; end of dactyl reaching carpus-merus suture. Pereopods 2–4 similar with posterior margins of propodi, carpi, and meri bearing several long and short simple setae. Pereopod 7 with spine-like setae, some pectinate on anterodistal margins of propodus, carpus and merus. Pereopods lacking dense pads of setae.

Pleopod 1, peduncle with 5 coupling hooks, 23 and 25 plumose marginal setae on endopod and exopod, respectively. Pleopod 2, appendix masculina parallel-sided through 90% of its length, tapering to nearly acute apex, curving laterad, extending slightly beyond apex of endopod; endopod

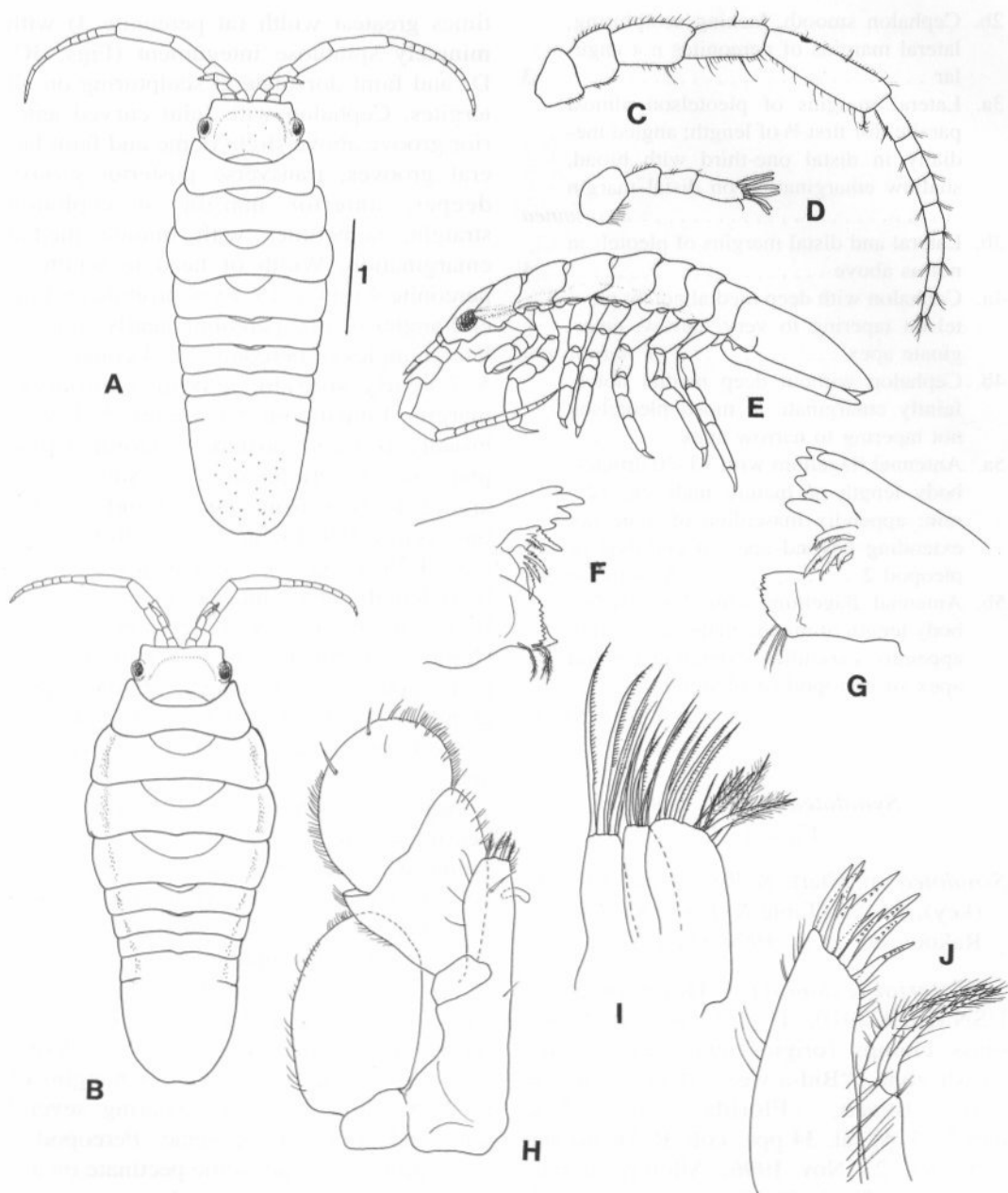


Fig. 1. A, male habitus; B, female habitus; C, antenna; D, antennule; E, lateral aspect of male; F, right mandible; G, left mandible; H, maxilliped; I, second maxilla; J, first maxilla. Scale = 1 mm.

bearing 9 plumose marginal setae, exopod bearing 22. Pleopods 3–5 with partial suture on exterior margin of exopod; exopods bearing few setae, endopods none. Fused penial plate weakly waisted, widening

somewhat distally with apex evenly, broadly rounded.

*Ovigerous female.*—As in male except for sexual characters and length/width proportions. Length of body 2.3 times width.

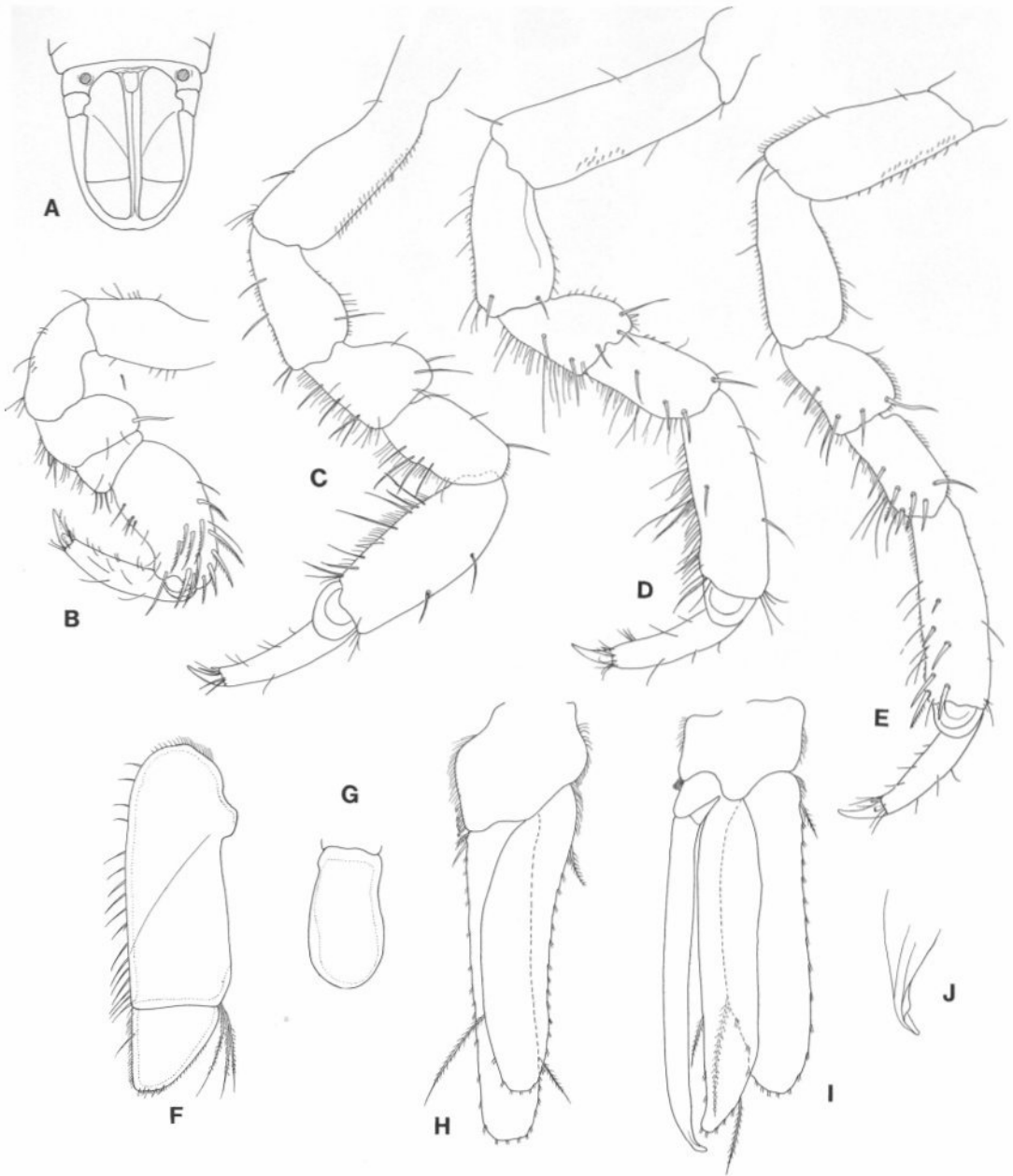


Fig. 2. A, ventral pleon; B, pereopod 1; C, pereopod 2; D, pereopod 4; E, pereopod 7; F, uropod; G, penial papilla; H, pleopod 1; I, pleopod 2 of male; J, apex of appendix masculina.

Length of pleotelson 0.29 times body length. Length to width ratio of pleotelson 1.32.

*Color*.—Specimens in preservation a light red-brown color, pigmentation subtly reticulated overall.

*Etymology*.—The species is named for Mr. John M. Foster of Gulf Coast Laboratory, who collected the new species in the company of the second author.

*Remarks*.—The *Synidotea* species *S. hirtipes* H. Milne Edwards, 1940, *S. brunnea*

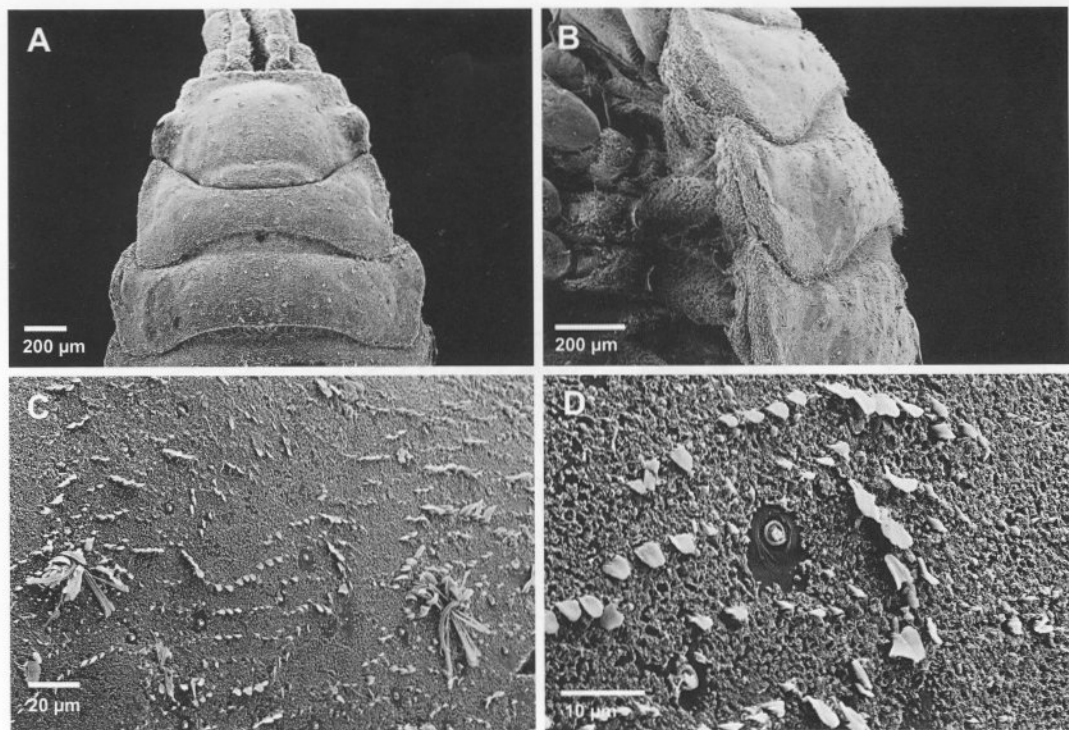


Fig. 3. Scanning Electron Micrographs: A, dorsal view of cephalon, pereonites 1 and 2; B, lateral margins of pereonites 1-3; C, integument of dorsal pereon; D, close-up of integument.

Pires & Moreira, 1975, *S. marplatensis* Giambiagi, 1922, *S. laticauda* Benedict, 1897, *S. harfordi* Benedict, 1897, *S. laeviodorsalis* Miers, 1881, *S. keablei* Poore and Lew Ton 1993, and *S. fosteri* n. sp. resemble each other closely. Based on morphological differences, Poore, 1996 concluded that *S. hirtipes*, *S. laticauda* and *S. laeviodorsalis*, all from Indo-Pacific coasts, are valid and separate species, not synonyms of the earliest described member of the group (*S. laeviodorsalis*), and do not represent a global invasion thereof, as suggested by Chapman and Carlton, 1991. Poore and Lew Ton, 1993 described *S. keablei* from Australia, which also superficially resembles *S. laeviodorsalis*. But consistently different character states again allowed these authors to call into question the conclusion of Chapman and Carlton and their resulting synonymies.

Of the western Atlantic species, *S. fosteri*

most resembles *S. marplatensis* and *S. brunnea*, neither of which were available for direct observation. *S. marplatensis* and *S. fosteri* can be separated by the number of articles in the antennal flagellum (7-8 in *S. fosteri*, 13-20 in *S. marplatensis*); relative length of the appendix masculina (extending beyond apex of pleopodal endopod in *S. fosteri*, shorter than the apex in *S. marplatensis*); and the larger size of mature male specimens, e.g., 12.5 mm in the latter vs. 6.5 mm in the new species. Chief differences separating *S. brunnea* from *S. fosteri* include 13 articles in the antennal flagellum (7-8 in *S. fosteri*), convex margin of pereonite 1 lateral margin (nearly straight in the new species) and distinct difference in shape of the pleotelson. In *S. brunnea* these lateral margins are nearly straight then angled medially in the distal third, joined by a broad but shallowly emarginate apex on the distal margin. In *S. fosteri* the pleo-

Table 1.—Comparison of two additional *Synidotea* species from North America, as addendum to Poore, 1996. Data from our own observations.

	<i>S. fosteri</i>	<i>S. harfordi</i>
Maximum length of ovigerous female	6.0 mm	—
Maximum length of adult male	6.5 mm	17.0 mm
Color in alcohol	red-brown, reticulated	blotchy yellow-brown; darker medial stripe on pereon
Pleotelson length: width in males (number of specimens)	1.29 (6)	1.21 (1)
Pereon margin	pereonite 1 nearly straight; 2 and 3 convex, 4–7 straight	pereonite 1 with subtle curved angle; 2–7 making continuous line
Frontal margin of cephalon; dorsal sculpture	straight; weak depression in front of eyes	straight; obvious depression in front of eyes
Head width: pereonite 4 width	0.79	0.62
Pereopod 1 of male	palm of propodus concave; dactyl reaching carpus-merus suture	palm of propodus concave; dactyl reaching carpus-merus suture
Setation of ischium-propodus of pereopods of female	long and short setae along lower margins	—
Setation of ischium-propodus of pereopods of male	long and short setae along lower margins	dense pads of short setae
Fused penial plate	weakly waisted; length: width 1.85; broadly rounded apically	not waisted; length: width 2.14; rounded apically
Uropodal peduncle	1 oblique ridge	no oblique ridge
Uropodal exopod: length/width	curve between lateral margin lateral and truncate apex; 0.94	curve between lateral margin and truncate apex; 0.88

telson is broadly rounded apically with little or no emargination. The male of *S. brunnea* is as yet unknown.

*S. fosteri* can be distinguished from all others in this group by the combination of the nearly rectilinear lateral margins of the first pereonite, which are rounded or convex in most of the others. It is readily separated from *S. laevidorsalis* by the shape of the fused penial plate, and the longer, narrower pleon in the latter. Mature males of the new species measure 4.2 to 6.5 mm in length, whereas Miers' type specimens of *S. laevidorsalis* (also male) are longer than 25 mm. Table 1, patterned after Poore's 1996 comparison of five *Synidotea* species Indo-Pacific coasts, lists the same morphological data for *S. fosteri* and *S. harfordi* to help distinguish this group of similar animals.

*Ecological notes.*—*Synidotea fosteri* was collected on sand substrata at depths of 1–2 m. All of our records came from sites adjacent to high energy beaches facing the

open Gulf of Mexico. Specimens collected and observed during our study occurred between the beach and first or second seaward sand bar. The specimens were always found associated with unattached macro-plant detritus or algae. Other peracarids commonly found associated with *S. fosteri* included the amphipods *Micropotopus raneyi* Wigely and *Atylus urocarinatus* Mc Kinney.

#### Acknowledgments

We wish to thank John Foster, Sara LeCroy, and Jerry McClelland for making material available for study. Our sincere appreciation goes to Scott D. Whittaker, SEM Lab Manager in the Laboratories of Analytical Biology, National Museum of Natural History for technical assistance with the Scanning Electron Micrographs. We also thank Dr. Brian Kensley of the National Museum of Natural History and two anonymous reviewers for helpful comments on the manuscript.

## Literature Cited

- Benedict, J. E. 1897. A revision of the genus *Synidotea*.—Proceedings of the Academy of Sciences of Philadelphia 1897:387–404.
- Chapman, J. W., & J. T. Carlton. 1991. A test of criteria for introduced species: the global invasion by the isopod *Synidotea laevidorsalis*.—Journal of Crustacean Biology 11(3):386–400.
- Clark, S. T., & R. B. Robertson. 1982. Shallow water marine isopods of Texas.—Contributions in Marine Science 25:45–59.
- Giambiagi, D. 1922. Cuatro nuevos isopodos de la Argentina.—Physis 5:230–244.
- Harger, O. 1878. Descriptions of new genera and species of Isopoda, from New England and adjacent regions.—American Journal of Sciences and Arts (series 3) 15:373–379.
- Miers, E. J. 1881. Revision of the Idoteidae, a family of sessile-eyed Crustacea.—Journal of the Linnean Society 16(89):1–87.
- Milne Edwards, H. 1840. Histoire Naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux, vol. 3. Paris.
- Pires, A. M. S., & P. S. Moreira. 1975. Two new species of *Synidotea* (Crustacea, Isopoda, Valvifera) from Brazil.—Boletim Instituto Oceanográfico da Universidade de São Paulo 24:45–67.
- Poore, G. C. B. 1996. Species differentiation in *Synidotea* (Isopoda: Idoteidae) and recognition of introduced marine species: a reply to Chapman and Carlton.—Journal of Crustacean Biology 16:384–394.
- Poore, G. C. B., & H. Lew Ton. 1993. Idoteidae of Australia and New Zealand (Crustacea: Isopoda: Valvifera).—Invertebrate Taxonomy 7:197–278.
- Rafi, F., & D. R. Laubitz. 1990. The Idoteidae (Crustacea, Isopoda, Valvifera) of the shallow waters of the northeastern Pacific Ocean.—Canadian Journal of Zoology 68:2649–2689.
- Rakocinski, C., R. W. Heard, S. E. LeCroy, J. A. McClelland, & T. Simmons. 1996. Responses by macrobenthic assemblages to extensive beach restoration at Perdidi Key, Florida, U.S.A.—Journal of Coastal Research 12:326–353.
- Richardson, H. 1905. A monograph on the isopods of North America.—Bulletin of the United States Museum 54:1–727.