

## ***Saltipedis navassensis*, a new species of apseudomorph tanaidacean (Crustacea: Peracarida: Parapseudidae) from the tropical north- western Atlantic**

TOM HANSKNECHT<sup>1</sup>, RICHARD W. HEARD<sup>2</sup>, & JOEL W. MARTIN<sup>3</sup>

*1 Barry A. Vittor and Associates, 8060 Cottage Hill Road, Mobile, Alabama 36695, USA (e-mail:  
bvataxa@bvaenviro.com)*

*2 Department of Coastal Sciences, College of Marine Sciences, The University of Southern Mississippi, P.O.  
Box 7000, Ocean Springs, MS 39566-7000, USA (e-mail: richard.heard@usm.edu)*

*3 Natural History Museum of Los Angeles County, 900 Exposition Boulevard, Los Angeles, CA 90007, USA  
(e-mail: jmartin@nhm.org)*

### **Abstract**

*Saltipedis navassensis* n. sp. is reported and described from a sand bottom at a depth of 24 m off Navassa Island in the northern Caribbean. The description of the new species includes the first known male for the genus along with the first record of *Saltipedis* from the northern Atlantic. *Saltipedis navassensis* can be distinguished from other females of the genus by having an antennule with a serrated inner peduncular margin and pereopod 2 with plumose setae on the basis and no spiniform seta on the merus. A key to the known species of *Saltipedis* is presented.

**Key words:** Tanaidacea, Parapseudidae, *Saltipedis*, taxonomy, Tropical N.W. Atlantic

### **Introduction**

*Saltipedis* Guçu, 1995 was erected to accommodate a Brazilian species formerly designated as *Apseudes paulensis* Brum, 1971. Material of *A. paulensis* was scarce not only for the original description of the species (Brum 1971), but also for the subsequent redescriptions by Sieg (1986) and by Guçu (1996), the latter of whom examined specimens from Cabo Frio, Rio de Janeiro State, Brazil. Guçu (1995, 1996) suggested that the species referred to by Sieg (1986) as "Apseudes indet." was probably referable to *Saltipedis*. A second species, *S. robustispinosus*, also from Cabo Frio, Brazil, was described by Guçu (1996). Later, Guçu (1998) described two additional new species, *S. bacescui* and *S. müelleri*, both from the coast of Tanzania, and provided a key to the four known species. No males for the genus were known.

As part of an ongoing survey of the cryptic marine invertebrates of certain islands in the Caribbean (specifically Guana Island, British Virgin Islands, and other nearby islands) led by T. L. Zimmerman and J. W. Martin, we obtained specimens, including a male, of an apseudomorph tanaidacean referable to the genus *Saltipedis* from waters surrounding Navassa Island, a United States Territory just off the southeastern coast of Cuba. The description of the new species of *Saltipedis* from Navassa Island is the subject of this report.

Type material has been deposited in the collections of the Natural History Museum of Los Angeles County (LACM) and the National Museum of Natural History (USNM), Smithsonian Institution. All measurements are in millimeters (mm). Body length is measured from the tip of the rostrum to the end of the telson as total length (TL).

### *Saltipedis* Guçu, 1995

**Diagnosis.** (Modified from Guçu 1995, 1996). Apseudomorpha, Parapseudidae. Eyes and carapace without spinous processes. Coxa of pereopod 2 lacking spine or spinose process. 1<sup>st</sup> hyposphenial spine laterally flattened, curved and directed anteriorly over mouthpart bundle. Oostegites, 5 pairs. Pereopods 5-7 with basis greatly enlarged. Anterior (= tergal) margin of basis of pereopod 7 lined with plumose setae. Pleonite 1 with dorsal margin bearing transverse row of small setae. Pleopods, 5 pairs.

### *Saltipedis navassensis* n. sp

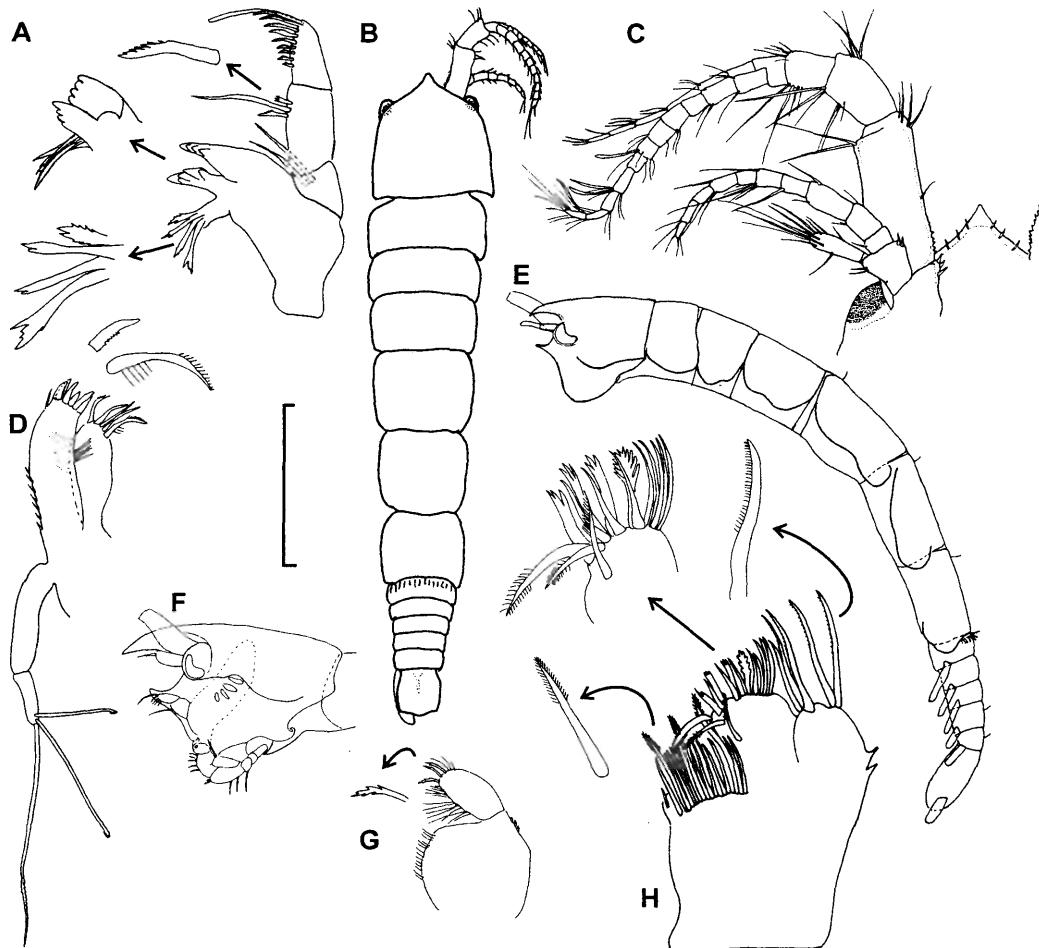
**Type material** Holotype-female, 3.0 mm (LACM CR 20000091), Navassa Island, N E Caribbean Sea, southeast coast of Cuba (Sta. RW-025), Northwest Point, 18°24.820'N, 75°01.820'W, SCUBA, sand flat, depth 24 m, R/V Coral Reef II, 16 March 2000, coll. R. Wetzer and G. Hessler. Preserved in 95% ethanol. Paratypes: 1 male (3.4 mm, dissected), 1 ovig female, 2 adult females LACM, 20000092 and 2 ovig. females, 2 subadult males, 1 female dissected and 5 unsexed juveniles USNM 1000885, same collection data as holotype.

**Diagnosis.** Female with pereopod 2 merus lacking robust spiniform seta; basis of pereopod 2 in both sexes bearing plumose setae. Inner margin of antennule in both sexes bearing serrations.

**Male paratype.** Body (Fig. 1B) elongate, TL 3.4 mm, approximately 5.0 times width of carapace (measured across posterior carapace border), dorsoventrally flattened.

Carapace length (tip of rostrum to posterior medial border of carapace) equal to greatest width (across posterior carapace border). Ocular lobes present, lacking spines, and with some diffuse visual pigment. Rostrum short, slightly down turned, broadly tapering toward acute tip; outer margins of rostrum with minute spines.

Pereon (Fig. 1B) with width of pereonites decreasing slightly from anterior to posterior; length of first two pereonites nearly equal with third longer than first and second; length of pereonite 4 and 5 more or less equal, and greater than length of any of first three pereonites; length of 6th pereonite less than that of 5<sup>th</sup>. First free pereonite with small hyposphenia, flattened and upturned over mouthpart bundle.



**FIGURE 1.** *Saltipedis navassensis* n. sp. A, ovigerous female left and right mandible with enlargement of lacinia mobilis. B, male dorsal view. C, Right antennule and antenna of male, ventral aspect. D, maxillule inner and outer endite plus palp. E, female lateral view. F, lateral closeup of female head. G, labium, with serrated terminal spine, female. H, maxilla with enlargement of inner endite. Scale bar: A,H = 0.025 mm; B,D,E = .1 mm; C,F,G = .5 mm

Pleon (Fig. 1B) composed of 5 short somites, decreasing slightly in width from anterior to posterior, as shown, and with pleotelson approximately 3 times longer than any pleonal somite; weak setal band on dorsal margin of 1<sup>st</sup> pleonite.

Antennule (Fig. 1C) with peduncle of 4 visible articles; inner proximal 1/3 of article 1 finely serrate; outer flagellum of 12 articles; inner margin of articles 6,8 and 10 with respectively 1,2 and 1 flattened aesthetascs; outer flagellum with 3 terminal setae; inner flagellum of 6 articles terminating with 3 setae.

Antenna (Fig. 1C) peduncle of 5 articles; distal two peduncular articles with cluster of spines on medial border; squama well developed, longer than any flagellar article and setose in distal half; flagellum with 10 articles and 4 terminal setae.

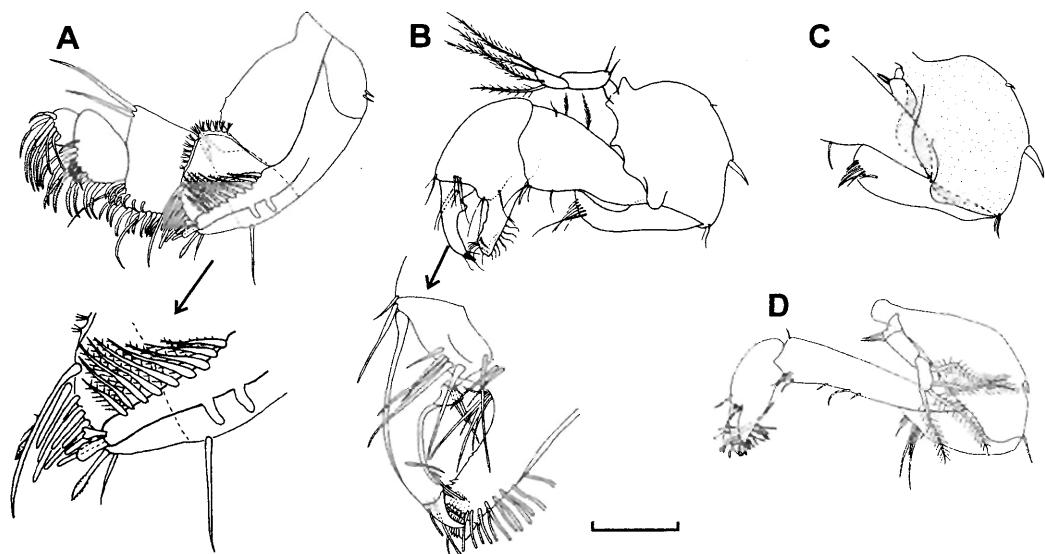
Mandible (Fig. 1A) palp with 3 articles; basal article slightly less than half length of second article, which in turn is slightly shorter than distal article; incisor process (pars incisiva) of left mandible with 5 blunt teeth; setiferous lobe with 5 large apically cleft dentate spiniform setae; right mandible not illustrated.

Labium (Fig. 1G) gently curving, more or less oval and fringed with short setae; distal margin of palp with 3 setiform setae and many setules.

Maxillule (Fig. 1D) palp with 2 articles; outer endite terminating with approximately 10 stout setiform setae; inner endite with 5 setiform setae.

Maxilla (Fig. 1H) distal endite with 5 sinuous, setiform seta; middle lobe with 3 trifid setae and a single branched seta along with 3 setiform setae; inner endite with comb-like row of curved setae and 3-4 guard setae, setiform at their tips.

Epignath not examined.



**FIGURE 2.** *Saltipedis navassensis* n. sp. A, female maxilliped, with enlargement of inner endite showing coupling hooks. B, male cheliped with enlargement of propodus and dactylus. C, articulation of male cheliped (diagrammatic showing groove in basis to accommodate carpus). D, female cheliped. Scale bar: B,C = 0.25 mm; A,D = 0.1 mm

Maxilliped (Fig. 2A) coxa short with 2 small setae on inner margin; basis quadrate with concave expansion on outer  $\frac{1}{2}$  of segment; article 1 of palp wider than long; outer margin bearing truncate lobe with single subterminal seta; inner margin with single long seta on distal 1/3. Article 2 longer than the combined lengths of articles 3 and 4 with inner margin and distal inner corner bearing row of serrate setae; article 3 with row of long serrate setae on inner margin extending distally to 4<sup>th</sup> article; article 4 with long serrate setae on inner and distal  $\frac{1}{2}$  of segment; endite (Figure 2A, enlargement) with inner margin bearing 2 coupling hooks and outer margin with 9-10 inflated plumose setae; inner corner of distal lobe with apically bilobed setae and multiform setae; outer margin drawn into thin veil with several clusters of setules.

Cheliped (Fig. 2B,C) coxa with 3 segmented exopodite; article 2 with 2 setae on proximal corner; article 3 with 4 plumose setae. Basis inflated with lobed processes on anterior and ventral margins; posterior margin with 1 spiniform seta on distal 2/3 and 2 small setae on posterior distal corner; ischium greatly narrowed with several setae on distal ventral margin; carpus triangular with several setae on the distal ventral corner along with plumose setae on the dorsal margin; posterior margin of carpus partially obscured by lobed processes on basis when contracted; propodus stout with tip of fixed finger receiving dactylus on inner margin; fixed finger with row of several thick setae distally on ventral margin along with 5-6 comblike setae on distal apical margin; dactylus meeting fixed finger of propodus and forming a "gap" in which are one proximal posteriorly directed tooth and several distal propodal setae; tip of propodal finger bearing dense field of blunt ventral setae and 2 spines in area where it receives tip of closing dactylus.

Pereopod 2 (Fig. 3A) coxa with 3 articulated exopod; second article with 1 plumose seta, third article with 4 plumose setae; basis quadrate, longer than wide with anterior margin lined with multiple plumose setae; postero-distal corner with large spiniform setae; ischium short without important characters; merus long with distal dorsal lobe bearing 1 spiniform seta and ventral margin with numerous attenuated setae and a single conical spiniform seta; carpus shorter than merus with distal dorsal lobe with 1 stout seta, ventral margin with 3 conical spiniform setae; outer lateral margin of carpus with stout setae on disto-medial margin and transverse row of 5 long setae; propodus without broom seta on dorsal margin, with 2 large spiniform setae near dactylus and ventral margin with 6 large conical spiniform setae; external lateral margin of propodus bearing transverse row of 4 setae; internal lateral margin with single small feathered seta at base of dactylus; dactylus curved, compound; proximal portion with 3 ventral teeth and 2 dorsal setae.

Pereopod 3 (Figs. 3B,C) sexually dimorphic with unusual form; basis longer than wide with anterior margin bearing 2 small setae and distal posterior corner with 2 setae; ischium with 3 long setae on distal posterior margin; merus with distal ventral spiniform seta along with several attenuated singly inserted setae; carpus rectangular, with dorsal margin bearing distal lobe overlapping base of propodus and armed with 2 spiniform setae, ventral lateral margin with curved and straight spiniform setae on internal face; medial internal face

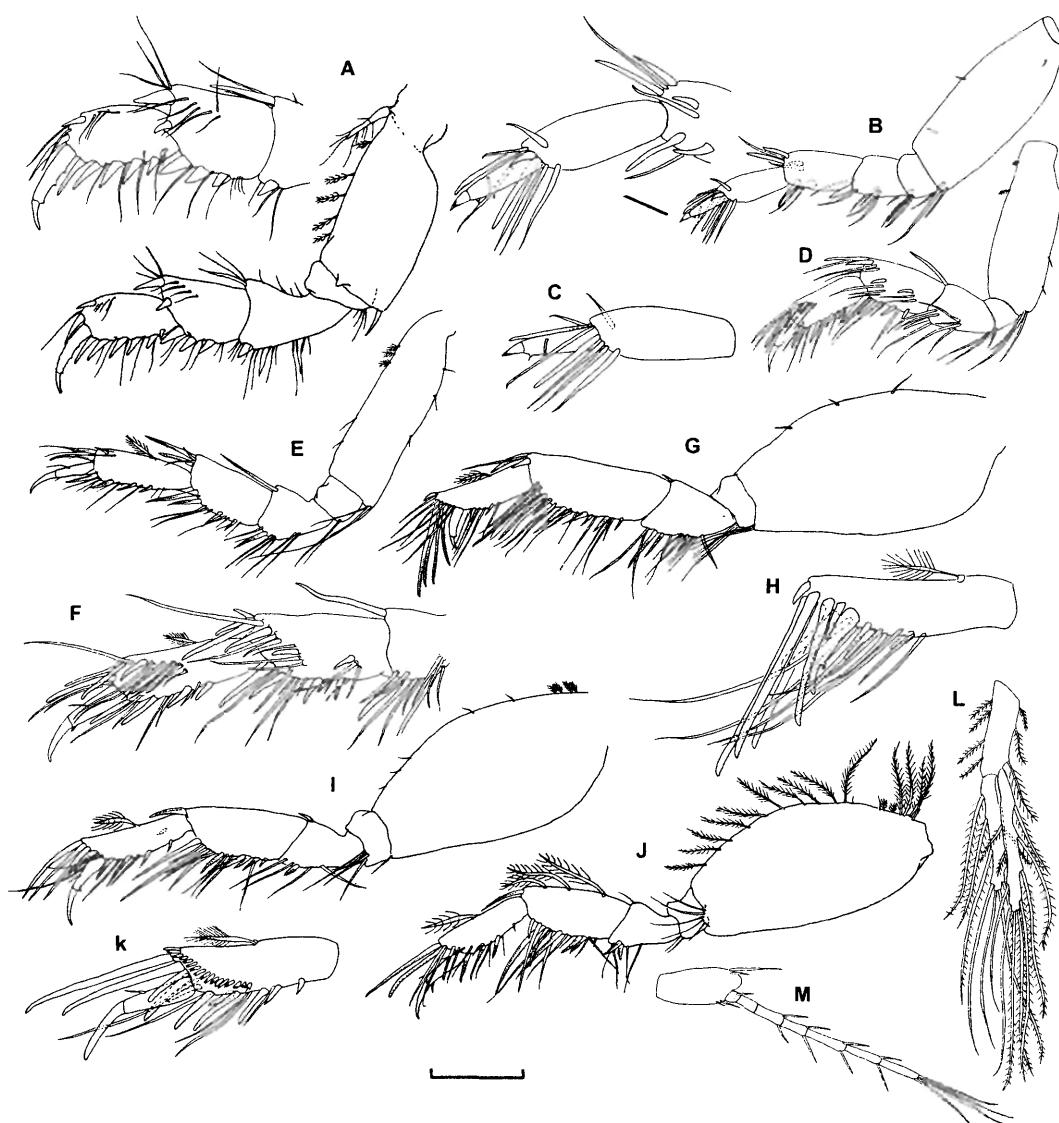
with 2 spiniform setae, 1 short and 1 long, near juncture with propodus; distal dorsal margin with 2 spiniform setae; propodus without broom setae and without dorsal or ventral spiniform setae with 2 attenuate setae and single spiniform setae on distal-ventral margin of external face; dorsal-distal margin above dactyl with single stout, serrated spiniform seta and hook-like seta; internal lateral face of propodus near dactyl with 2 stout curved spiniform setae; dactylus divided, having weakly chitonized anterior portion with single lateral seta on external margin and single ventral seta near distal part of dactylus.

Pereopod 4 (Figs. 3E,F) basis with group of 3 broom setae on anterior margin followed by 2 small simple setae; posterior distal margin with 2 long attenuate setae; ischium unremarkable; merus dorsally with single distal spiniform seta and ventrally with numerous attenuate setae and distal spiniform seta; carpus dorsally with distal lobe bearing 3 spiniform setae joining row of setae on external face; setae in transverse row with 2 stout serrate setae and 6 simple setae; ventro-lateral margin of external surface with transverse row of single serrate setae and 2 attenuate setae; ventral margin of carpus with 4 spiniform setae and numerous long setae singly inserted; propodus dorsal margin with large broom setae on anterior 1/3 of segment; with 2 spiniform setae on dorsal margin of carpus dorsal to dactylus and joining transverse row of setae on external face; transverse setal row with 2 serrate spiniform setae and about 6 long attenuate setae; ventral margin of propodus with 4 spiniform setae on distal 2/3; dactylus compound with 1 dorsal and 2 ventral setae.

Pereopod 5 (Figs. 3G,H) basis inflated with single long seta on ventral distal margin; ischium typical; merus with 3 spiniform setae on ventral margin; carpus dorsally with 3 curved serrated setae on distal margin and with 10 spiniform setae on ventral margin; propodus with broom setae on anterior 1/3 of dorsal margin and with single curved spiniform seta distally; ventral margin with numerous setae as figured including 4 long serrate setae truncate at tips, situated dorsal to dactylus; dactylus compound, shorter than truncated setae and less than half length of propodus, with ventral tooth as illustrated.

Pereopod 6 (Fig. 3I) basis inflated as in P5; anterior margin with 4 broom setae and 4 small simple setae; ischium with 3 long attenuate setae on ventro-distal margin; merus dorsal margin with single long seta and ventral margin with single small serrate spine-seta; carpus dorsal margin with long distal serrate spine-seta and ventral margin with 9 curved serrate spine-setae (not all figured); propodus with broom seta on midpoint of article with 5 distal setae; dactylus compound, nearly as long as distal setae on propodus, anterior portion with single dorsal and ventral seta.

Pereopod 7 (Figs. 3J,K) basis inflated, posteriorly lined with 16 plumose setae and 2 broom setae; ischium normal; merus with dorsal seta and 2 spiniform setae on ventral margin; carpus dorsally with 3-4 plumose setae and distal serrated spiniform setae; ventral margin with 9 spiniform setae; propodus with dorsal broom seta located near midpoint of article and with transverse row of 17 comblike spines (some trifid) on outer lateral distal margin; dactylus nearly as long as propodus with 1 dorsal and 1 ventral seta on anterior portion of compound dactylus.



**FIGURE 3.** *Saltipedis navassensis* n. sp. A, male left pereopod 2 with enlargement of carpus, propodus and dactylus. B, male pereopod 3 with detail of setation on propodus and dactylus. C, male pereopod 3 male with detail of outer surface of propod and dactylus. D, female left pereopod 3 showing lateral setal distribution. E, male right P4, inner aspect. F, male right P4, outer aspect showing lateral setae. G, male right P5. H, same, closeup of propodus and dactylus. I, male pereopod 6. J, male pereopod 7 left inner aspect. K, same, outer aspect. L, female pleopod 2. M, female uropod. Scale bar: ABDEGIJ = 0.1 mm; CFHK = 0.5 mm

Antennular peduncle as in male, article 1 with basal 1/3 of inner margin with serrations and cluster of 3 broom setae on outer margin; outer flagellum with 10 articles, inner flagellum with 5 -6; terminus of outer flagellum with 3 setae, articles 6 and 8 with flattened sensory setae on inner margins; inner antennular flagellum terminating in 1 broom and 3 simple setae.

Antenna with squama bearing 7 setae; peduncle with 5 articles and flagellum with 8.

Labium with 1-articulated palp with 3 terminal setulate setae.

Mandible stout, with 3-articulated palp; right mandible with pars molaris bearing 4 serrated setae with bifid tips; lacina mobilis resembling molar with 4-5 cusps; mandibular palp with first article bearing 2 setae on dorsal margin and second article with 3 setae on inner margin, with first falcate and serrated; third article with 9 serrate and single distal seta; left mandibular molar smaller than right with 2-3 cusps and pars molaris bearing 5 setae.

Cheliped (Fig. 2D) with exopod of 3 articles; second article exopodite with 2-3 setae on anterior proximal margin; third article with 4 plumose setae; basis of cheliped with 3 small spines on anterior margin.

Maxillule with 2-articulated palp; outer endite terminating with 7-8 curved setae, basally setulate and with single small seta on outer margin; inner endite terminating with 5 flagellated setae; palp with 3 terminal setae including 2 comb setae and third seta with sub-terminal serrations.

Maxilla outer endite with serrations and 5 terminal combed setae; inner endite outer margin with 5 curved setae and inner margin with single subterminal flagellated seta and 2 terminal flagellated setae; distal margin with 3 trifid setae and single branch-like seta; inner endite with filter basket of about 20 curved setae with bifid tips.

Maxilliped, as described for male, with inner endite bearing 2 coupling hooks on outer margin and plumose setae on inner margin; distal margin of inner endite bearing large bone-shaped setae; palp of maxilliped of 5 articles, article 3 bearing 2 long setae on outer margin.

Cheliped (Fig. 2D) coxa provided with large 3-articulated exopod; first article of exopod with 2 anteriorly directed setae; third article with 4 plumose setae; basis elongated with posterior spiniform seta on distal 2/3 of article and single seta near junction with merus; merus with several setae on ventral margin; carpus, elongate with several setae on ventral margin; propodus with several blunt setae on fixed finger near distal sclerotized tooth of cheliped; distal tooth on fixed finger projecting inwardly and overlapped on outer margin by tooth on dactylus.

Pereopod 2 resembling that of male, but not as robust; large seta on dorsal lobe of merus not serrate (as in male).

Pereopod 3 (Fig. 3D) basis quadrate, not enlarged, with 2 broom setae on proximal anterior margin and 3 long attenuated setae on postero-distal margin at junction with ischium; ischium with similar setae; merus with 1 dorsal spine-seta and 3 ventral spine-setae,

outer lateral margin with transverse row of setae near midpoint and near ventro-distal margin; carpus with dorsal lobe with 2 serrate spine-setae, ventral margin with 4 spine-setae; outer lateral margins with 3 rows of transverse setae characterized by serrated dorsal spine-setae and several long attenuate setae; propodus with or without broom setae on anterior 1/3 of article and with 3 long distal setae; ventral margin with 4 spine-setae; antero-distal outer lateral margin with row of long attenuate setae mixed with 2 serrate-spiniform setae; dactylus divided, lacking setae.

Pereopods 4-7 as described for male.

Uropod (Fig 3M) peduncle short with paired lateral setae; endopod missing in all specimens; exopod with 7 articles and 4 terminal setae; first article of exopod with ventral lobe; all articles except second with paired lateral setae on distal margin.

Pleopods (Fig. 3 l) typical, with several plumose setae on peduncle and many plumose setae on each ramus.

Oostegites: 5 pairs on cheliped and P2-P5

Type locality: Navassa Island,  $18^{\circ}24.820' N$ ,  $75^{\circ}01.820' W$ , U.S. Territory, Caribbean Sea, off the southeastern coast of Cuba.

Etymology: Named for the type locality.

## Remarks

*Saltipedis navassensis* is the fifth member of the genus and the first known member from the northwestern Atlantic. It also is the first species for which a male has been described.

Like other members of the genus, *S. navassensis* has an enlarged basis on pereopods 5-7 (Figs. 3G,IJ), a well developed epistomal spine, a curved laterally flattened first hyposphenial spine (Fig. 1F), ocular lobes that lack spines (Figs. 1B,C,E,F), a dorsal row of transverse setae on pleonite one, and plumose setae on the basis and carpus of pereopod 7 (Guçu, 1995, 1996). It differs from all four previously described species in having a minutely denticulate medial border on the antennular peduncle (Fig 1C) and plumose setae on the anterior margin of the basis of pereopod 2 (Fig. 3A). The serrated inner margin of the antennule is reminiscent of that of the *Apseudes bermudeus* complex (see Băcescu 1980). In reference to the pereopods, the location of the plumose setae is different from those figured for other species. In addition to their normal location on the basis and carpus of pereopod 7, plumose setae are also found on the basis of pereopod 2 as in the unrelated metapseudid genus *Calozodian* Gardiner, 1973.

The male cheliped described and illustrated here for the first time has several interesting characteristics. First, the basis contains a furrow on the anterior margin that allows for the partial concealment of the carpus when retracted. Here it strongly resembles that of the unrelated apseudid species *Bunakenia (Extensibasella) sudvestatlantica* Guçu, 1996 . The dactylus of the male cheliped also has a large backwardly directed ventral tooth that is similar to what is found in its sister genus *Longiflagrum* Guçu, 1996.

Differences also exist in the chaetotaxy of the merus, carpus, propodus and form of the dactyl of pereopod 3 in the mature sexes (Figs 3B,D), which is not described for other parapseudids. We note that the pereopod 3 of the mature male does not resemble that of any of the female pereopods. Of interest here is the discovery that the female third pereopod strongly resembles that of the male fourth pereopod, with the number, kind and placement of the outer lateral setae on the carpus and propodus (Figures 3D,F). Juvenile males of *S. navassensis* also share the chaetotaxy characteristics of the female pereopods.

Since there was only a single mature male available for study with a single third pereopod, there remains the possibility that its pereopod was anomalous. The discovery of males for the other species of *Saltipedis* and additional males of *S. navassensis* will be needed to establish the status of the male third pereopod.

The setae of the pereopods are unusual in that the large conical spiniform setae present on the ventral margin of the carpus and propodus of the pereopod, especially evident on pereopod 2, have large circular fossae on their outer margins and appear rugose. With regard to the mouthparts, the "flagellated spine" of the middle endite of the maxilla, which was described by Guçu (1995, 1996, 1998) for other species in the genus, is present. The endite of the maxilliped bears a large setulate seta on the distal inner corner that does not appear to be flattened and serrate as described for the genus by Guçu (1996). The exopodal setae on the cheliped and the second pereopod are similar to those described for other species.

The following key to the species of *Saltipedis* includes two undescribed species from the Gulf of Mexico, USA (Heard & Hansknecht, personal observations).

#### **Key to females of the tanaidacean genus *Saltipedis* Guçu, 1995**

(Based entirely on pereopod 2)

- 1A- Dorsal margin of merus of pereopod 2 without robust spiniform setae; basis with or without anterior row of plumose setae ..... 6
- 1B- Dorsal margin of merus of pereopod 2 provided distally with 1 or more robust spiniform setae; basis without anterior row of plumose setae ..... 2
- 2A- Dorsal margin of merus with 1 spiniform seta ..... 3
- 2B- Dorsal margin of merus with 2 large curved spiniform setae .....  
..... *Saltipedis* sp. A [US Atlantic]
- 3A- Propodus of pereopod 2 with 3 or more robust spiniform setae on ventral margin . 4
- 3B- Propodus of pereopod 2 with 2 ventral spiniform setae .....  
..... *S. muelleri* Guçu, 1998 [Tanzania]
- 4A- Propodus of pereopod 2 with 6 ventral spiniform setae ..... 5
- 4B- Propodus of peropod 2 with 5 spiniform setae on ventral margin .....  
..... *S. bacescui* Guçu, 1998 [Tanzania]

- 5A- Carpus of pereopod 2 with 4 spiniform setae on ventral margin .....  
..... *Saltipedis robustispinosus* Guçu, 1996 [Brazil]
- 5B- Carpus of pereopod 2 with 1 spiniform setae on ventral margin .....  
..... *Saltipedis* sp.B [US Atlantic]
- 6A- Basis of pereopod 2 with plumose setae ..... *S. navassensis* n. sp. [Caribbean]
- 6B- Basis of pereopod 2 without plumose setae ..... *S. paulensis* (Brum, 1971) [Brazil]

## Acknowledgments

We thank Regina Wetzer, who collected the specimens of *S. navassensis*. Roger McManus and Tom DiBenedetto of the Center for Marine Conservation coordinated and arranged for the expedition to Navassa Island. Tom DiBenedetto, the expedition leader, was instrumental in accommodating the diving and on board activities to facilitate the collection of material. This work was funded in part by the Biotic Surveys and Inventories program of the U.S. National Science Foundation (NSF) via grant DEB 9972100 to T. L. Zimmerman and J. W. Martin, and in part by the PEET initiative of the NSF Systematic Biology Program via grant DEB 9978193 to J. W. Martin and D. K. Jacobs. We thank NSF and especially Dr. Douglas Causey for support and encouragement. TJH thanks Barry A. Vittor and Associates, Inc and his laboratory manager Linda Sierke for providing support for the study. We also thank Dawne Hard of GCRL for assisting with the presentation and layout of the illustrations.

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