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TANAIDACEA (CRUSTACEA: PERACARIDA) OF THE GULF OF MEXICO. II. THE OCCURRENCE OF *HALMYRAPSEUDES BAHAMENSIS* BĂCESCU AND GUȚU, 1974 (APSEUDIDAE) IN THE EASTERN GULF WITH REDESCRIPTION AND ECOLOGICAL NOTES.

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ABSTRACT *Halmyrapseudes bahamensis* Băcescu and Guțu, 1974 is reported from two localities in the northeastern Gulf of Mexico. A redescription is presented based on examination of type material and a large collection of Gulf specimens. Ecological notes are presented on the occurrence, seasonality and distribution of *H. bahamensis* in two tidal marsh systems near St. Marks, Florida. The taxonomic status of *H. bahamensis* in relation to the two other described species of *Halmyrapseudes* is discussed.

INTRODUCTION

Subrahmanyam, Kruczynski and Drake (1976) reported "*Aapseudes* sp." from tidal marshes near St. Marks, Florida. They suggested that their specimens might be "*Aapseudes alicii* King." However Ogle (1977) examined the specimens of "*A. alicii*" deposited in the National Museum of Natural History (USNM) and found them to belong to the genus *Kalliapseudes* Stebbing, 1910 noting that "*A. alicii*" is a *nomum nudum* having no published description. The senior author has examined the specimens of Subrahmanyam et al. (1976) and found them to be *Halmyrapseudes bahamensis* Băcescu and Guțu, 1974, a species originally described from Andros Island, Bahamas. Tanaidacean specimens collected at Naples, Florida, which are now in the collection of the National Museum of Natural History (USNM), Washington, D.C., have also proved to be this species. Based on the St. Marks and Naples specimens and type material, this report presents a supplemental and partial redescription of *H. bahamensis* and information on its ecology in two north-eastern Gulf tidal marsh systems.

MATERIALS AND METHODS

With the exception of the Naples, Florida, material, specimens were collected during random monthly sampling at low tide from 1972 to 1974 in both zones "high" and "low" of marshes at St. Marks and Wakulla Beach, Florida, (see Coultas 1969, 1970). Emergent vegetation was cut to ground level and a 0.0625 m² sample of marsh substrata 10 cm deep was taken. Salinity, water temperature and depth were measured at the time samples were collected. Samples were taken to the laboratory and washed through a series of sieves, 1 mm being the smallest. The organisms obtained were preserved in 10% formalin, stained with rose

bengal and sorted under a dissecting microscope. Methods used for the collection of the Naples, Florida specimens are at present unavailable. Type material from the USNM and Muséum d'Histoire Naturelle "Grigore Antipa" was examined by the senior author.

Halmyrapseudes bahamensis Băcescu and Guțu, 1974

Halmyrapseudes bahamensis: Băcescu and Guțu, 1974: 96–100; Băcescu and Guțu, 1975:111; Heard, 1982: 30.

Aapseudes sp.: Subrahmanyam, Kruczynski and Drake, 1976: 174, 179, 181, 184, 185, 190–192.

Material Examined – Andros Island, Bahamas, 1970, 2 ♂♂, 1 ♀ (2 ♂♂ USNM 171401), 1 ♀ Muséum d'Histoire Naturelle "Grigore Antipa" No. 249, Bucarest, Romania; St. Marks, Florida, 1972–1974, 94 ♀♀ + 95 ♂♂ (3 ♂♂ + 4 ♀♀ in Coll. J. Sieg; 4 ♀♀ + 3 ♂♂ in Coll. J. Ogle, 4 ♂♂ in Coll. R. Heard, remaining material in Coll. W. Kruczynski); Naples, Florida, 4 ♂♂, 6 ♀♀ (USNM 181929).

Description of female (Figs. 1–4).

Body – Length of the females about 4.2–4.5 mm; subadults and manca stages proportionately smaller; somewhat less than 6.3 times longer than broad (Fig. 1).

Cephalothorax – Gently rounded and with an indentation in the middle of each side; excluding rostrum as long as broad; rostrum triangulated and relatively well developed.

Peraeonites – All peraeonites with 1 or 2 setae at the anterior and posterior corner; first peraeonite three times broader than long, anterior and posterior border smoothly concave, also rounded laterally in dorsal view; second 2.5 times broader than long, rounded laterally in dorsal view; third about 1.9 times broader than long, becoming somewhat broader posteriorly; fourth and fifth of same size, equal to the third but 1.5 times broader than long; sixth

peraeonite of same dimensions as the first, but straightened anteriorly (Fig. 1).

Pleonites – Five tergites dorsally visible, all of same size, four times broader than long; with a row of plumose setae at the lateral margins, these rows on the first 3 segments also curved inwards to the middle of the tergite (Fig. 1).

Antenna 1 (Fig. 1) – Consisting of a four-jointed peduncle, a two-jointed inner flagellum and a six-jointed outer flagellum; first joint of peduncle 2.7 times longer than broad, outer margin with 3 setae at the middle and 3 distally, inner margin with 4 feathered hair setae proximally and 6 hair setae distally; second joint about 1.6 times longer than broad, outer margin with 2 setae proximally and 3 setae distally, inner margin with 1 seta at the middle and 3 setae as well as 2 feathered hair setae distally; third joint only somewhat longer than broad, with single distal seta at the inner and outer margin; fourth with a projection and 2 setae; first and second joint of inner flagellum 2.9 times longer than broad, first with 1 distal seta and second with 4 setae distally; first and second joint of inner flagellum as long as broad and inner margin with 1 or 2 setae distally; third to sixth joint 2.3 times longer than broad, third and fifth only with single seta distally and fourth with 3 setae distally; sixth with 1 aesthetasc, 3 short and 3 long setae.

Antenna 2 (Fig. 1) – Consisting of a two-jointed peduncle, a squama, and an eight-jointed flagellum; first joint of peduncle with a strong and broad projection bearing 4 setae, second only somewhat longer than broad, outer margin with 1 seta distally, inner margin with a seta near the articulation of squama, this three times longer than broad with 3 setae distally; first joint of flagellum only little longer than broad and outer margin with 5 setae distally; second 1.5 times longer than broad, outer margin with 1 feathered hair seta and 1 seta in the middle and inner margin with a row of 4 setae; third 1.7 times longer than broad, outer margin with a row of 4 setae and a feathered hair seta, inner margin with 2 setae and 1 feathered hair seta; fourth to eighth joint small, only somewhat more than two times longer than broad, fourth, sixth and seventh joint each with 1 seta at the inner and outer margin distally, fifth joint at the inner margin with 2 setae and at the outer margin with 1 seta distally, eighth with 1 short and 4 longer setae.

Labrum (Fig. 2) – Hood-like, nearly completely covered with fine hair setae.

Mandibles (Fig. 2) – Well developed, with a three-jointed palpus; first joint only somewhat longer than broad, inner margin with 3 setae; second 2.7 times longer than broad, inner margin with 2 rows of 6 or 7 setae and outer margin with 1 seta at the middle; third joint 1.6 times longer than broad with 9 setae distally; corpus of mandibles strong, left mandible with lacina mobilis and right without, spiniferous lobe with 8 small spines, pars molaris also strong.

Labium (Fig. 2) – Consists of only 1 lobe which is deeply divided in the middle, with a large terminal lobe which

bears 2 two-pointed spines and is completely covered with fine hair setae.

Maxilla 1 (Fig. 2) – Consists of an inner and outer endite as well as a two-jointed (?) palpus bearing 2 long and 3 short setae; inner endite with a projection at the outer margin and with 4 distal spines; outer endite with 10 strong spines.

Maxilla 2 (Fig. 2) – Outer margin with some serrations and set with fine hair setae; inner margin set with fine hair setae along the distal half; rostral row of the outer end consists of about 14 setae and caudal row of fixed endite with 1 caudal subterminal spine, distally with 5 normal spines, 1 plumose setae and 4 forked spines; outer lobe of the movable endite bears 3 long setae with single row of hair setae along the distal part and 1 normal seta.

Maxilliped (Fig. 2) – Coxa short, without setae; caudal surface of basis with 6 long setae distally near the articulation of palpus; palpus four-jointed; first joint as long as broad, with 1 distal spine at the outer margin; second nearly 1.2 times longer than broad, inner margin with a rostral and caudal row of 11 setae, outer margin with 1 spine distally; third only somewhat longer than broad, inner margin with a caudal and rostral row of 6 setae; fourth joint 1.8 times longer than broad, with 8 setae; each endite with 3 couplers and 1 long and 1 shorter caudal seta, inner margin with a row of 11 setae with double row of hair setae; distal margin with 11 normal setae.

Epignath (Fig. 3) – Set with fine hairs and in front furnished with two melted oval lobes; terminal membranous spine covered with some fine hairs.

Cheliped (Fig. 4) – Coxa very small, bare; basis 1.6 times longer than carpus, with a broad projection distally, with 5 setae mid-rostrally, 2 sternal setae more proximally, a group of 5 setae mid-sternally and also 4 distal setae sternally; exopodite slender, three-jointed, last joint with 4 plumose setae; merus with 5 setae proximally and 6 setae distally; carpus slender, three times longer than broad, with a rostral and caudal row of setae tergally and at the sternal margin with 6 setae; propodus and fixed finger two times longer than broad, with some tergal setae rostrally and caudally, with 1 seta rostrally and 5 setae and 1 feathered hair caudally near the articulation of dactylus, fixed finger with 4 setae sternally, a spine at its tip and there 3 small setae, tergal margin with 9 small plumose setae; dactylus with spine and 3 setae tergally.

Peraeopod 1 (Fig. 3) – Fossorial; coxa without any projection; basis two times longer than broad, exopodite three-jointed and last joint with 5 plumose setae, with 2 rostral setae sternally and a row of 8 setae tergally, also 2 spines and a group of 5 setae distally; ischium small and with a group of 4 distal setae tergally; merus strong and flattened, mid-tergally with a row of 6 rostral setae, sternal margin with 4 setae and a distal spine, distal end of tergal margin with a strong spine and 6 setae; carpus somewhat shorter than merus, sternal margin with a row of about 16 rostral

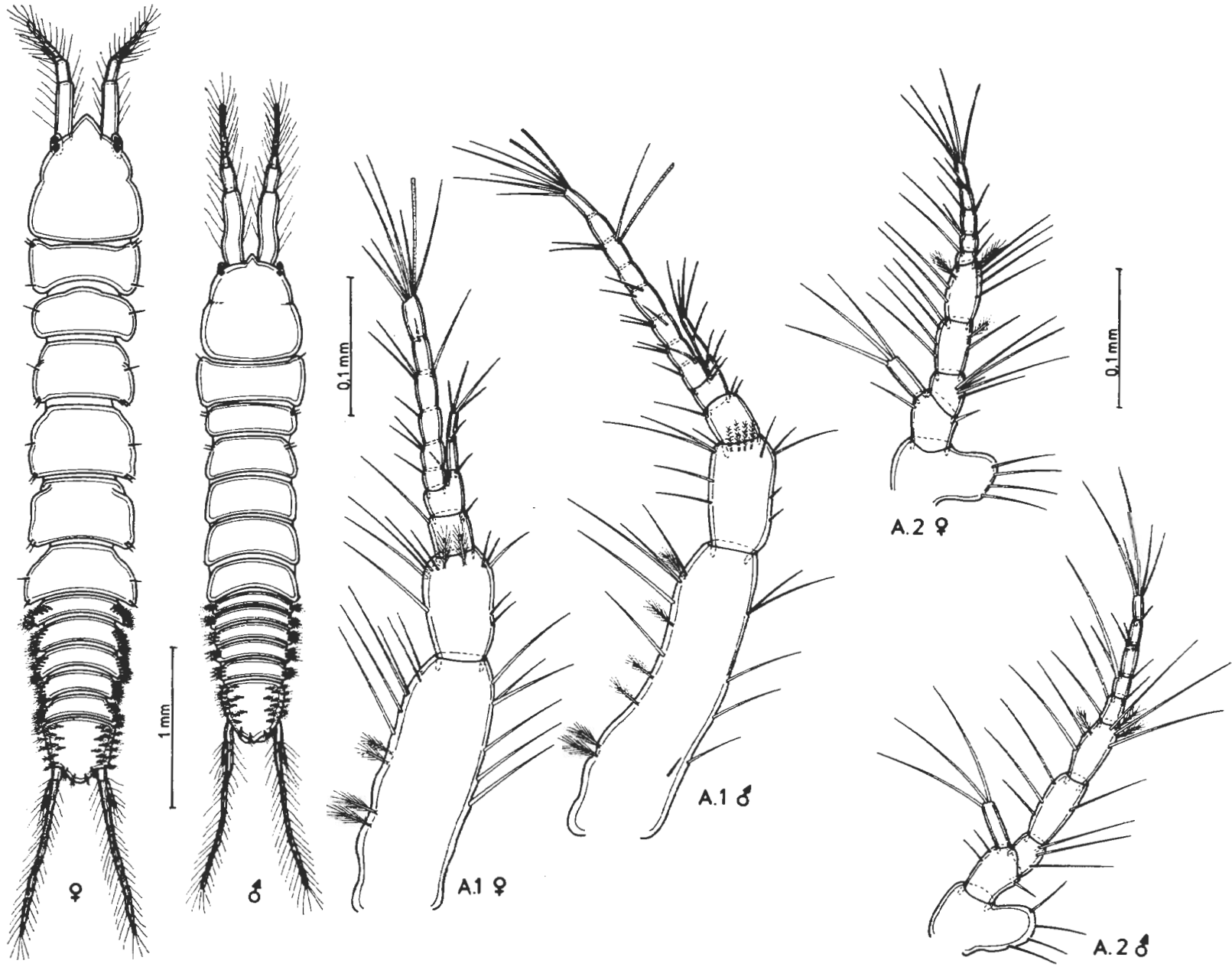


Figure 1. *H. bahamensis*; male and female, dorsal; A1 = Antenna 1; A2 = Antenna 2.

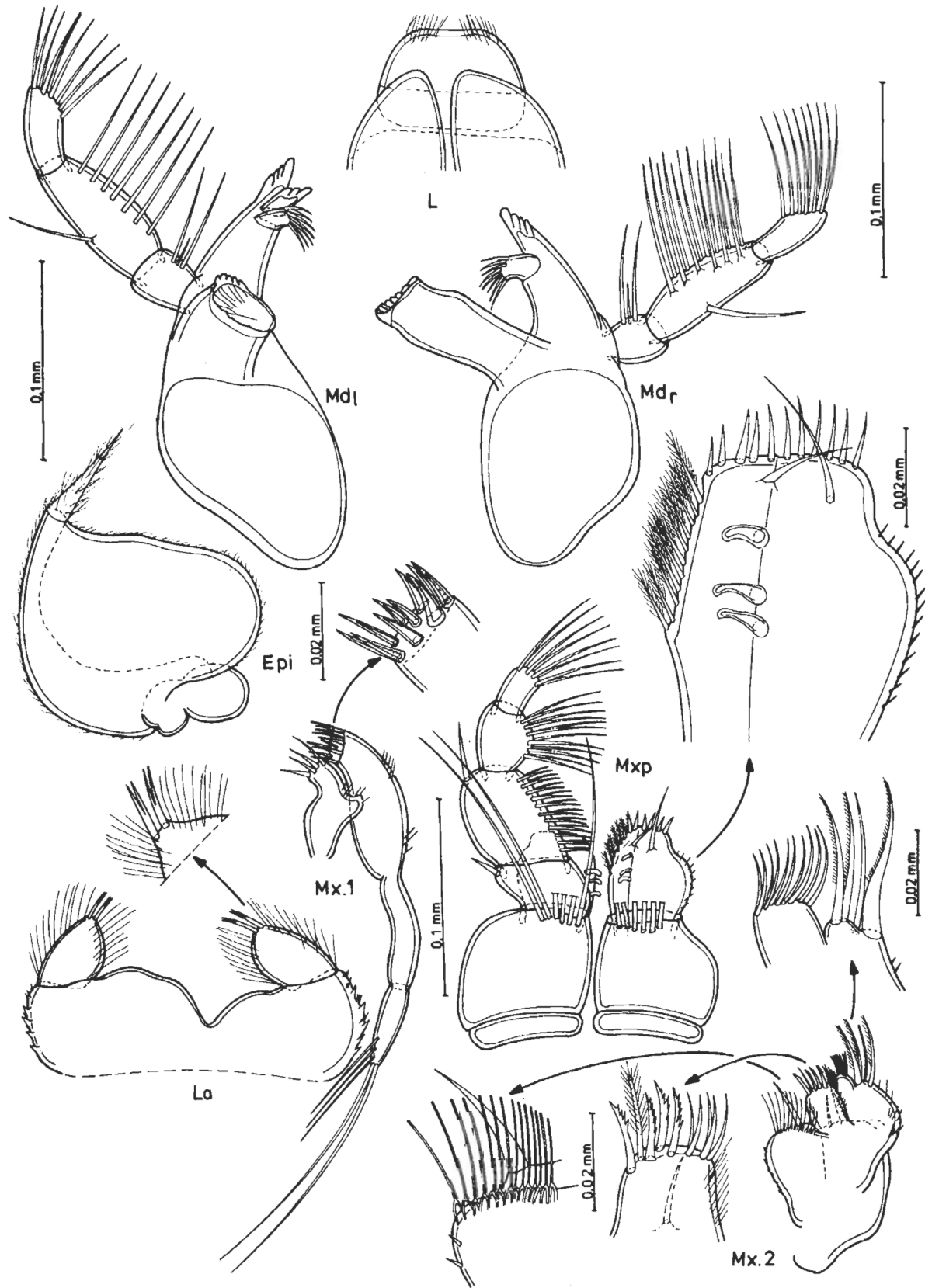


Figure 2. *H. bahamensis*; female; L = labrum; Md_l = left mandible; Md_r = right mandible; La = labium; Mx.1 = Maxilla 1; Mx.2 = Maxilla 2; Mxp = Maxilliped; Epi = Epignath.

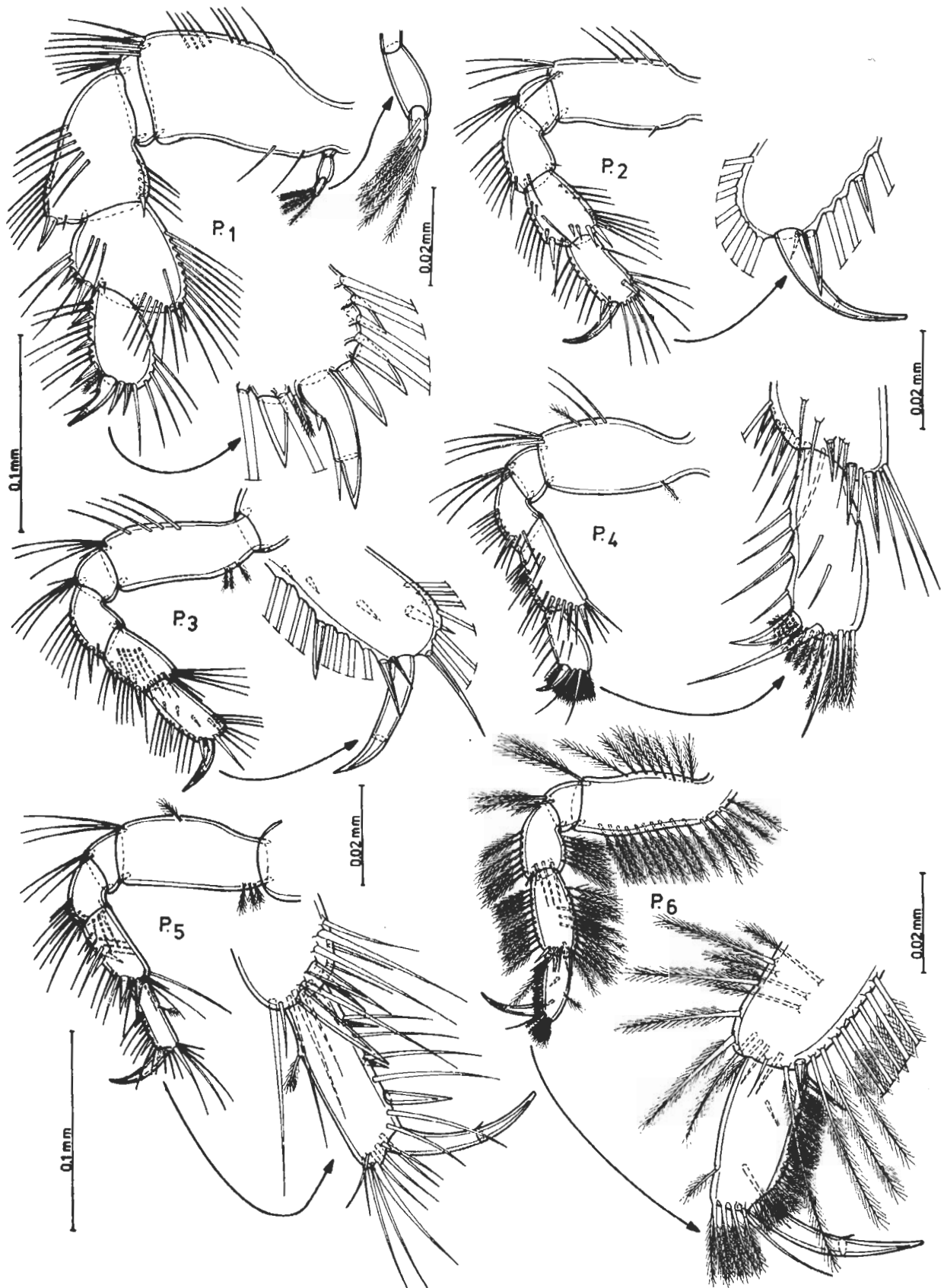


Figure 3. *H. bahamensis*; female; P 1-6 = peraeopod 1-6.

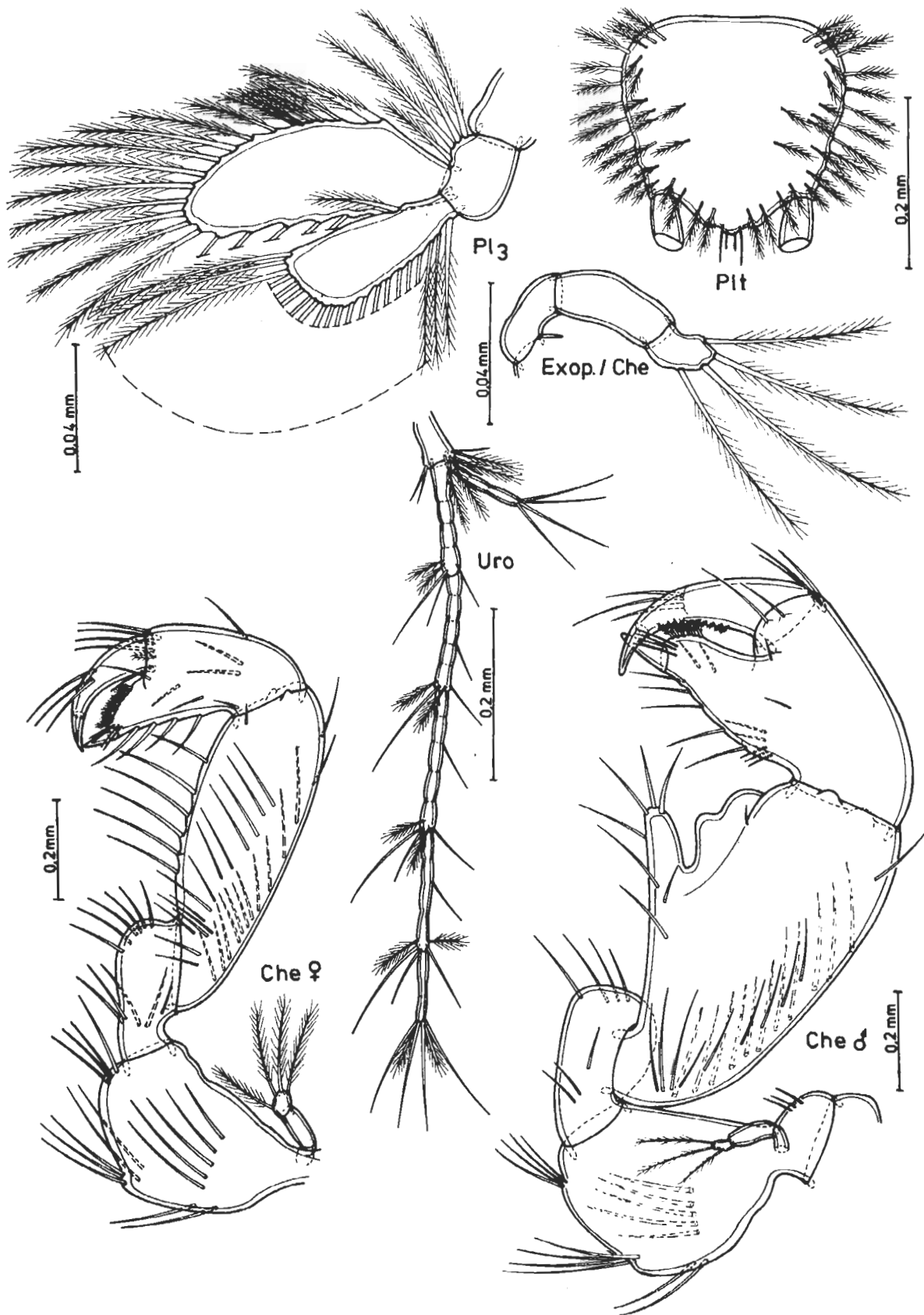


Figure 4. *H. bahamensis*; male and female; Che = cheliped; Pl_3 = third pleopod (female); Plt = pleotelson (female); Uro = uropod (female); Exop/Che = exopodite of cheliped.

setae, a caudal spine distally, mid-rostrally with 3 setae, tergal margin with 2 spines, 4 longer setae and 1 short seta; propodus smaller, as long as carpus, sternal margin with 5 rostral setae and with 2 rostral spines distally, tergal margin with alternating 2 setae and a strong spine, with a feathered hair distally; dactylus with a short spine and 2 spiniform projections.

Peraeopod 2 (Fig. 3) — Smaller than *P. 1*; basis 2.5 times longer than broad, with 1 seta sternally, with 4 rostral setae mid-tergally, and 4 distal setae; ischium as long as broad, with 3 long and 2 short distal setae; merus 1.4 times longer than broad, with 1 small distal seta sternally, with a row of 7 tergal setae, 2 small and 1 long spine; carpus 1.5 times longer than broad, sternal row consists of 8 caudal setae, also 4 distal spines sternally, tergal row consisting of 7 setae, also 2 small proximal spines and 1 small and 1 large spine distally; propodus 2 times longer than broad, tergal with 1 proximal seta and 7 setae as well as 1 spine distally, tergal margin with 6 setae and 2 spines; dactylus with spine, together nearly as long as propodus.

Peraeopod 3 (Fig. 3) — Similar in proportions and armament to *P. 2*; only propodus bears 3 distal spines instead of two.

Peraeopod 4 (Fig. 3) — Basis 2.2 times longer than broad, sternal with 1 proximal hair rostrally, tergal with 2 setae and 1 feathered hair mid-rostrally and 4 setae distally; ischium as long as broad with a group of 4 distal setae; merus 1.5 times longer than broad, slanted sternally, with a caudal row of 4 setae and 1 small spine as well as a rostral row of 6 setae and a long spine; carpus nearly 2 times longer than broad, rostral row beginning proximally and ending at the distal part of sternal margin consists of 11 setae and 3 spines, caudal row consists of 8 setae and 2 small spines; propodus 2 times longer than broad, tergal margin with 4 setae, distal part with a row of 14 two-sidedly ciliate setae and 2 long rostral setae; dactylus and spine seem to be coalesced to a claw.

Peraeopod 5 (Fig. 3) — Proportions as in *P. 4*; armament of basis, ischium, merus, and carpus as in *P. 4* only spines are somewhat stronger; propodus with a rostral feathered hair mid-sternally, tergal margin with 6 setae and 1 spine rostrally and 2 small setae, 1 spiniform; dactylus and spine not coalesced to a claw, together shorter than propodus.

Peraeopod 6 (Fig. 3) — Proportions as in *P. 4/P. 5* but armament different, all setae bear double rows of fine setae; tergal margin of basis with a row of 15 setae and sternal with 8 setae and additionally with 2 distal setae; ischium with 3 distal setae; merus with 6 sternal, 7 tergal, and 3 distal setae and a small distal spine; carpus with 13 sternal, 11 tergal, 2 distal setae as well as 4 short spines; propodus two times longer than broad, with a rostral feathered hair mid-sternally, with 7 short and 1 long setae distally, tergal margin with a proximal spine and a row of

about 22 small plumose setae, with a caudal spine proximally and distally.

Pleopods (Fig. 4) — All five pairs of pleopods are very similar; coxa fused with the sternite; basis about 1.5 times longer than broad only inner margin with 4 plumose setae; exopodite one-jointed, broad, margins covered totally with plumose setae, additional inner margin with 1 strong plumose setae proximally; endopodite also one-jointed and broad, only outer margin covered with plumose setae of which the most distal one is different—stronger and irregular ciliate—inner margin only with a proximal plumose seta.

Pleotelson (Fig. 4) — As long as broad, trapeziform; lateral and caudal margins covered with many plumose setae; caudal margin slightly alternated with 2 longer tergal and 2 smaller sternal setae.

Uropods (Fig. 4) — Consisting of basis, four-jointed endopodite and exopodite of about 20 "joints" forming five functional "segments"; inner margin of basis with 2 normal and 4 plumose setae distally, outer margin only with 2 normal setae distally; first to third joint of endopodite small, without setae, fourth joint about 2.5 times longer than broad with 4 distal setae; first "segment" of exopodite consists most times of 4 "joints," only the last one bears 2 feathered hairs and 3 setae distally; second "segment" consisting of 5 "joints," third bearing 1 distal seta and fifth with 2 feathered hairs and 2 setae distally; third "segment" consists also of 5 "joints," 3 setae distally; fourth "segment" with 4 "joints," second with 1 seta and fourth with 3 setae and 2 feathered hairs distally; fifth "segment" two-"jointed" with 2 feathered hairs and 4 setae distally.

Description of male (Figs. 1 & 4)

Body — Smaller than the female, about 3.5–3.6 mm, 5 times longer than broad (Fig. 1).

Cephalothorax — As in the female, only rostrum somewhat smaller.

Peraeonites — First and second similar to that of the females, but proportionately smaller; third to fifth peraeonite 2.5 times longer than broad, rounded laterally in dorsal view; sixth of same dimensions as second.

Pleon — Proportionately smaller as those in the females; about 5.4 times broader than long.

Antenna 1 (Fig. 1) — Consisting of a four-jointed peduncle, two-jointed inner flagellum and eight-jointed outer flagellum; armament of joints of peduncle very similar to those in the females; first joint about 4.1 times; second 1.6 times; third 1.3 times longer than broad; and fourth as long as broad; inner flagellum as in the females; first to seventh joint about 1.3 times longer than broad; first and second with 2; third with 3; and fourth again with 2 setae distally; fifth and seventh without seta; sixth with 1 aesthetasc and 3 setae distally; last joint about three times longer than broad with 2 aesthetascs and 5 setae distally.

Antenna 2 (Fig. 1) — Armament very similar to that of females but all joints somewhat longer.

Mouthparts — As in the females.

Cheliped (Fig. 4) — Much stronger than in the females; basis about 1.2 times larger than in the female sex, armament similar, exopodite also three-jointed, but last joint with 3 plumose setae; merus similar in armament and proportion to that of females; sternal margin of carpus at the middle with a strong small and flattened projection, this with 3 proximal and 4 distal setae, with 2 broad but shorter projections more distal and these without setae; propodus with fixed finger and dactylus with spine about 1.5 times larger than in the females, but armament very similar.

Peraeopods, pleopods, pleotelson and uropods — Very similar to those of the female sex.

Remarks — We observed minor variations in the small setae and spines on the peraeopods; the number of "joints" of "segments" in uropods seem to be variable but not the number of "segments." Sexual dimorphism is pronounced. The sexes have different body shapes (Fig. 1) with the males having a greater number of joints in the outer flagellum of antenna 1 and a much stronger cheliped with a carpus bearing large projections at the sternal margin.

Distribution (Fig. 5)

This species is known from its type locality, Bahama Islands, Andros Island muddy tidal flats on northwest side in tubes (male type USNM 153850, paratype USNM 153940). From Naples, Florida, 4 ♂♂, 6 ♀♀ (USNM 18129) and in extensive collections of Kruczynski from St. Mark and Wakulla Beach, Florida.

Taxonomy

This detailed redescription of *H. bahamensis* should aid in further distinguishing it from the other two named species of *Halmyrapseudes* Băcescu and Guțu, 1974, especially if only female specimens are available for study. Distinctive characters may occur in the mouth parts and in the armament of the peraeopods, particularly in their spination. *Halmyrapseudes bahamensis* is similar to the other two described species of the genus, *H. cubanensis* Băcescu and Guțu, 1974 and *H. spaansi* Băcescu and Guțu, 1975. *Halmyrapseudes cubanensis* and *H. spaansi* are both presently known only from their type localities in Cuba and Surinam, respectively. At present the three species can only be reliably separated from each other by the described morphological differences in the chelae of the adult males; therefore, a revision of the species of *Halmyrapseudes* with a detailed comparison of the females is needed to further clarify their systematic and taxonomic status.

Ecological Notes

The ecology of two tidal marshes, St. Marks and Wakulla Beach, from which most specimens of *H. bahamensis* were

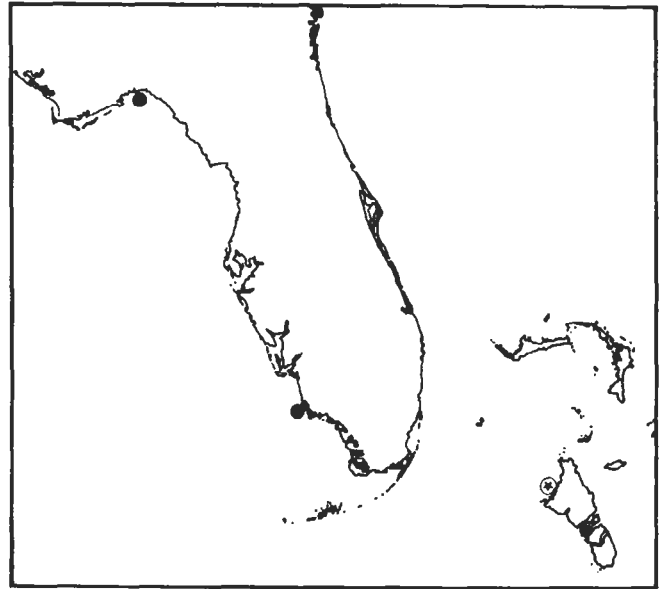


Figure 5. Known distribution of *H. bahamensis*.
Circled star represents type locality;
black dots represent the new
Gulf of Mexico localities.

collected, has been described in detail by Subrahmanyam and Drake (1975); Subrahmanyam, Kruczynski and Drake (1976); and Kruczynski, Subrahmanyam and Drake (1978). Both areas are undisturbed marshes with almost pure stands of *Juncus roemerianus* from the waters edge to approximately 500 m inland. Coultas (1969, 1970) studied soil characteristics of these marshes and divided them into low and upper areas based on sediment characteristics.

Temperature at the St. Marks-Wakulla Beach tidal marsh sites varied from 11° to 35°C and salinity varied from 10 to 30 ‰ during the sampling period. Mean water depth at high tide was 19.5 cm for low marsh and 9.5 cm for upper marsh areas at both marshes. Abundance of *H. bahamensis* and another tanaid, the paratanaid *Hargeria rapax* (Harger 1879) is summarized in Table 1. *Halmyrapseudes* was more numerous than *H. rapax* (Harger 1879) in the low marsh zone of both marshes. *Hargeria* was more numerous than *Halmyrapseudes* in the upper zone at St. Marks, whereas, *Halmyrapseudes* was more abundant than *Hargeria* in the upper zone at Wakulla Beach. Both species of tanaidaceans were most abundant between January 1973 and April 1973 and December 1973 and May 1974. During these colder periods of the year, the marsh substrata is damper and generally more oxygenated than during the hotter late spring, summer and early fall periods. These conditions probably have a major effect on the seasonal fluctuations in the two tanaid populations.

ACKNOWLEDGMENTS

The authors wish to express their gratitude to Dr. William Kruczynski, formerly with Florida A&M University's saline

TABLE 1.

Abundance of tanaidaceans in .0625 m samples taken monthly in two *Juncus roemerianus* marshes in northwestern Florida, U.S.A.

St. Marks Marsh					Wakulla Beach Marsh				
Date	Low Marsh		Upper Marsh		Date	Low Marsh		Upper Marsh	
	Halmyrapseudes	Hargeria	Halmyrapseudes	Hargeria		Halmyrapseudes	Hargeria	Halmyrapseudes	Hargeria
10 Aug 72	0	0	0	1	15 Aug 72	0	0	0	0
14 Aug 72	0	0	0	0	16 Aug 72	0	10	0	3
21 Aug 72	0	0	0	0	30 Aug 72	0	0	0	0
30 Sep 72	0	0	0	0	2 Sep 72	0	0	0	0
19 Oct 72	0	0	0	0	5 Oct 72	0	0	0	0
16 Nov 72	0	0	0	0	2 Nov 72	0	0	0	0
					18 Nov 72	0	0	0	0
27 Jan 73	1	2	0	10	1 Feb 73	6	1	0	0
1 Mar 73	89	45	1	4	4 Mar 73	5	0	33	0
15 Mar 73	22	1	0	1	18 Mar 73	10	4	0	0
21 Apr 73	10	3	1	5	22 Apr 73	25	6	1	0
20 May 73	0	0	0	0	24 May 73	1	0	0	0
15 Jun 73	0	0	1	6	14 Jun 73	0	0	0	0
7 Jul 73	0	0	0	1	9 Jul 73	1	0	0	0
6 Aug 73	0	0	0	0	7 Aug 73	1	1	0	0
4 Sep 73	3	0	0	2	5 Sep 73	0	0	0	0
2 Oct 73	0	2	0	9	4 Oct 73	0	0	7	0
5 Nov 73	0	0	0	0	6 Nov 73	7	0	0	0
4 Dec 73	28	0	1	7	6 Dec 73	0	5	0	0
14 Jan 74	1	0	0	0	12 Jan 74	1	0	0	0
24 Feb 74	3	0	0	2	27 Feb 74	6	0	0	19
23 Mar 74	11	0	0	1	25 Mar 74	0	1	0	0
25 Apr 74	7	1	0	0	28 Apr 74	3	1	1	2
30 May 74	13	1	0	0	25 May 74	0	0	0	0
20 Jun 74	0	9	0	4	21 Jun 74	0	0	0	0
23 Jul 74	21	1	0	0	26 Jul 74	0	0	0	0
12 Aug 74	0	0	0	0	13 Aug 74	0	0	0	0
TOTALS	209	65	4	53		66	29	42	24

marsh project, for providing ecological data and specimens from the St. Marks-Wakulla Beach salt marshes. Charles

Messing made available the specimens from Naples, Florida, and Sharon Wilson typed the manuscript.

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