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## LEPIDACTYLUS TRIARTICULATUS N. SP., A NEW HAUSTORIID AMPHIPOD FROM THE NORTHERN GULF OF MEXICO

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**ABSTRACT** A new haustoriid amphipod, *Lepidactylus triarticulatus* n. sp., from the northern Gulf of Mexico is described and illustrated. The known range is from northern Padre Island, Texas, to Grand Isle, Louisiana. The species is ecologically plastic. On surf-exposed sandy beaches it is most abundant at the highest intertidal levels, but in fine-grained sands of wave-sheltered localities it occurs throughout the intertidal region into shallow subtidal depths. In central Texas bays it has been collected subtidally at salinities as low as 10 ppt. There are differences in morphological details of peraeopod 7 between the intertidal and subtidal populations which we regard as an ecotypic variation. A provisional generic characterization is given for the genus *Lepidactylus* Say.

### INTRODUCTION

During investigations of the community structure of intertidal macrofauna on Texas sandy beaches, we found an undescribed species of *Lepidactylus* (Order Amphipoda, Family Haustoriidae) to be one of the quantitatively dominant organisms at Malaquite Beach in Padre Island National Seashore. In a recent report of those studies we designated that species *Lepidactylus* sp. 2 (Shelton and Robertson, in press). In the present paper we describe the species. Correct identification of Texas beach fauna has recently assumed increased importance as efforts continue to assess environmental effects of the IXTOC I oil spill.

### Genus *Lepidactylus* Say, 1818

The generic characters of *Lepidactylus* have not been clearly established, as for other haustoriid genera (Bousfield 1973). Probably the type species, *L. dytiscus* Say, was not described in sufficient detail, and therefore, it requires redescription. *Lepidactylus dytiscus* occurs on the Atlantic coast from the York estuary, Chesapeake Bay (Bousfield, personal communication) to northern Florida (Dexter 1967). There are no published descriptions of any other species. Bousfield (1973) noted that *Lepidactylus* resembles *Haustorius* but lacks the projecting abdominal shelf, and mentioned some other diagnostic features in a key to the genera. The following provisional generic characterization is based on Bousfield (1973), and on our own observations of *L. dytiscus* (specimens from Town Creek, South Carolina) and an undescribed Texas species, in addition to the species herein described.

Body broad-fusiform, small to medium size. Head broadest medially; rostrum moderate. Pleosome narrowing behind peraeon 7; hind margin of pleosome segment 3 not projecting as a lobe or shelf overhanging the urosome; side plate 3 rounded behind. Urosome reduced; urosome 2 short.

Antenna 1, accessory flagellum 2-3 segmented. Antenna 2, peduncular segment 5 deep, not lobate behind.

Mandibular palp long, segment 3 with several marginal comb spines. Maxilla 1, coxal baler lobe well developed. Maxilla 2, outer plate large, broad, not narrowly lunate. Maxilliped plates broad; palp segment 3 stout, geniculate.

Gnathopod 1 simple, segment 5 expanded. Gnathopod 2 minutely chelate. Peraeopods 3 and 4 similar, 3 somewhat larger. Peraeopod 3, segment 5 posterior lobe short, rounded distally.

Uropods all biramous. Uropod 1, rami subequal or inner slightly longer, inner ramus with marginal setae and terminal spines. Uropod 2, rami and peduncle strong, outer ramus somewhat longer than inner. Uropod 3, outer ramus with 2 subequal segments. Telson deeply incised; lobes apically and laterally spinose or spinose and setose.

**Remarks:** Although it may be difficult to separate juvenile *Haustorius* spp. from *Lepidactylus*, we are convinced that *Lepidactylus* is a valid genus distinct from *Haustorius*. Western Atlantic adult *Haustorius* and *Lepidactylus* appear to differ generically in the following characteristics:

1. The hind margin of pleosome segment 3 projects as a lobe or shelf overhanging the urosome in *Haustorius*, but not in *Lepidactylus*.

2. The outer plate of maxilla 2 is elongated and narrowly lunate in *Haustorius*; in *Lepidactylus* it is relatively broader, not narrowly lunate.

3. The maxilliped plates are relatively narrower in *Haustorius*.

4. The posterior lobe of peraeopod 3, segment 5 is ovals elongated in *Haustorius*; in *Lepidactylus* this lobe is short and rounded.

5. The accessory flagellum of antenna 1 of *Haustorius* is 3-5 segmented. In a key to genera of Haustoriidae, Bousfield (1973) gave 3-4 segments for the accessory flagellum of *Lepidactylus*; however, in the *Lepidactylus* spp. we examined, it was 2-3 segmented.

### *Lepidactylus triarticulatus* New Species

Holotype and paratype material. Malaquite Beach, Padre Island National Seashore, Texas, fine intertidal sand, July

1976 to June 1977: several thousand males, females, immatures.

**Other Study Material:** Copano Bay, Texas, behind Sea Gun Motel, fine muddy sand, shallow subtidal, April 20, 1975, Hugh Goodrich: several males, females; Copano Bay, Texas, near base of bridge behind Sea Gun Motel, fine muddy sand, depth 0.3 to 0.6 m, salinity 9.5 ppt, May 24, 1976: several males, females; Matagorda Bay at Port O'Connor, Texas, fine muddy sand of sheltered subtidal flat, November 26, 1976, Scott T Clark: 2 females, 3 immatures; Port Bolivar, Texas, wave-sheltered fine sand 1 km north of jetty, shallow subtidal depths, October 17, 1975: several males, females; Grand Isle, Louisiana, east end of island, fine wave-sheltered sand behind a breakwater, at various intertidal levels, and outside the breakwater subtidally to 0.2 m depth, April 6, 1977: numerous males, females; same locality and date, surf-exposed Gulf beach at Grand Isle State Park, only at high intertidal levels: numerous males, females.

**Holotype:** Ovigerous female, 4.0 mm, deposited in the U.S. National Museum (USNM 181369).

**Paratypes:** Two females (ovig.), two males, deposited in the U.S. National Museum (USNM 181370); two females (ovig.), two males, deposited in the National Museum of Natural Sciences (Canada).

**Etymology:** The specific epithet *trarticulatus* refers to the three-segmented accessory flagellum of antenna 1.

#### Diagnosis

Antenna 1, accessory flagellum 3-segmented. Antenna 2, flagellum 6-segmented. Peraeopod 4, coxal plate longer than broad. Peraeopod 7, segment 2 posterior border naked; segment 4 tapering distally to subacute apex; segment 5 posterior border lacking setae above lower angle; segment 6 stout, broadest medially, length about twice the width. Uropod 1, peduncle with 1–2 small spines proximally, naked between these and interramal spines.

#### Description

Female (ovig.), 4.0 mm Head (Figure 1) broader than long; rostrum broadly subacute. Pigmented eyes not evident in preserved material.

Antenna 1 (Figure 2): accessory flagellum 3-segmented; flagellum 6-segmented.

Antenna 2 (Figure 3): flagellum 6-segmented.

Upper lip (Figure 6): broad; apical margin shallowly indented.

Lower lip (Figure 7): outer lobes large; inner lobes broad at apex.

Mandible (Figure 5): incisor bi- or minutely tri-dentate; lacinia acute; 6 blades; palp segment 3 with 9 proximal marginal comb spines.

Maxilla 1 (Figure 8): outer plate apical margin with 4 blunt spines and 10 acute teeth spines; inner plate with 8 setae.

Maxilla 2 (Figure 9): outer plate with 21 setae distal to

comb teeth.

Maxilliped (Figure 4): plates and palp broad; terminal segment of palp stout, distal margin short.

Gnathopod 1 (Figure 15): coxa, posterior angle with numerous short setae and 4 plumes; segment 5 stout, heavily setose posteriorly.

Gnathopod 2 (Figure 16): coxa narrow, posterior angle with 1 naked seta and 5 plumes; segments 2, 5, and 6 slender; female brood plate with 2–4 setae distally.

Peraeopod 3 (Figure 17): coxa broad, semilunate; posterior angle with 2 naked setae distally and 6 plumes; segment 2, length about 2.3 times width; segment 4 stout, broadening distally; segment 5, posterior lobe short, rounded, armed with circlet of 11 blunt spines and 4 plumes; segment 6 with 1 seta and 12 blunt or minutely bifid spines; female brood plate with 19–23 setae.

Peraeopod 4 (Figure 18): coxal plate distinctly longer than broad; posterior lobe broadly and obtusely triangular; segment 2, length 2.25 times width; segment 4 stout, expanding distally; segment 5 posterior lobe rounded, with 6 plumes and circlet of 6 spines; segment 6 with 4 plumes and 9 spines; female brood plate with 18 long setae.

Peraeopod 5 (Figure 19): posterior coxal lobe marginally setose, deeper than anterior lobe; segment 2 broader than long; segments 4 and 5 broader than long; segment 6 linear, anterior margin with 2 spine groups.

Peraeopod 6 (Figure 20): coxal margin rounded posteriorly, with numerous short plumes; segment 2 nearly as broad as long; segment 4 broadest distally, with few lateral facial spines; segment 5 subquadrate, with few lateral facial spines, with a shallow U-shaped indentation near lower anterior border; segment 6 stout, shorter than 5, with 3 posterior spine clusters proximal to distal cluster.

Peraeopod 7 (Figure 21): posterior coxal lobe oval, with short plumes along lower border; segment 2 orbicular, posterior border naked; segment 4 tapering posteriorly to narrow, subacute apex, lacking a well defined posterior border; one plume and two smaller setae distally before apex; spines at apex and along lower distal border; segment 5 longer than broad, posterior distal border relatively straight; no spines or setae above lower posterior angle; segment 6 stout, broadest medially, about twice as long as broad.

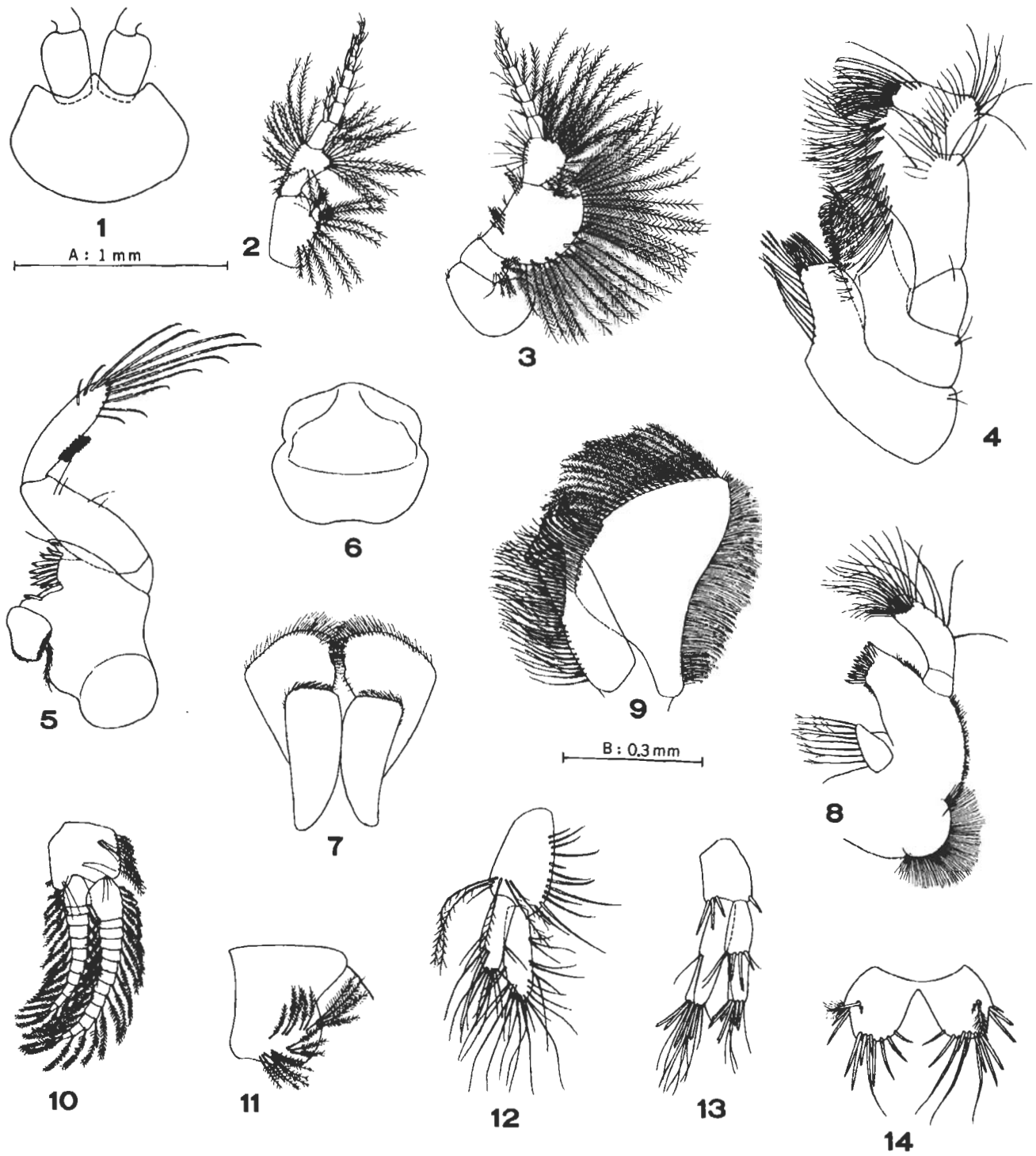
Pleosome side plate 3 (Figure 11): lower border straight, evenly rounding posteriorly; 3 groups of plumes near lower border, about 4 groups of facial plumes, and a large plume at upper posterior border.

Pleopods (Figure 10): peduncle broader than long, with outer marginal plumes; rami slender; inner 11-segmented, outer longer and 14-segmented.

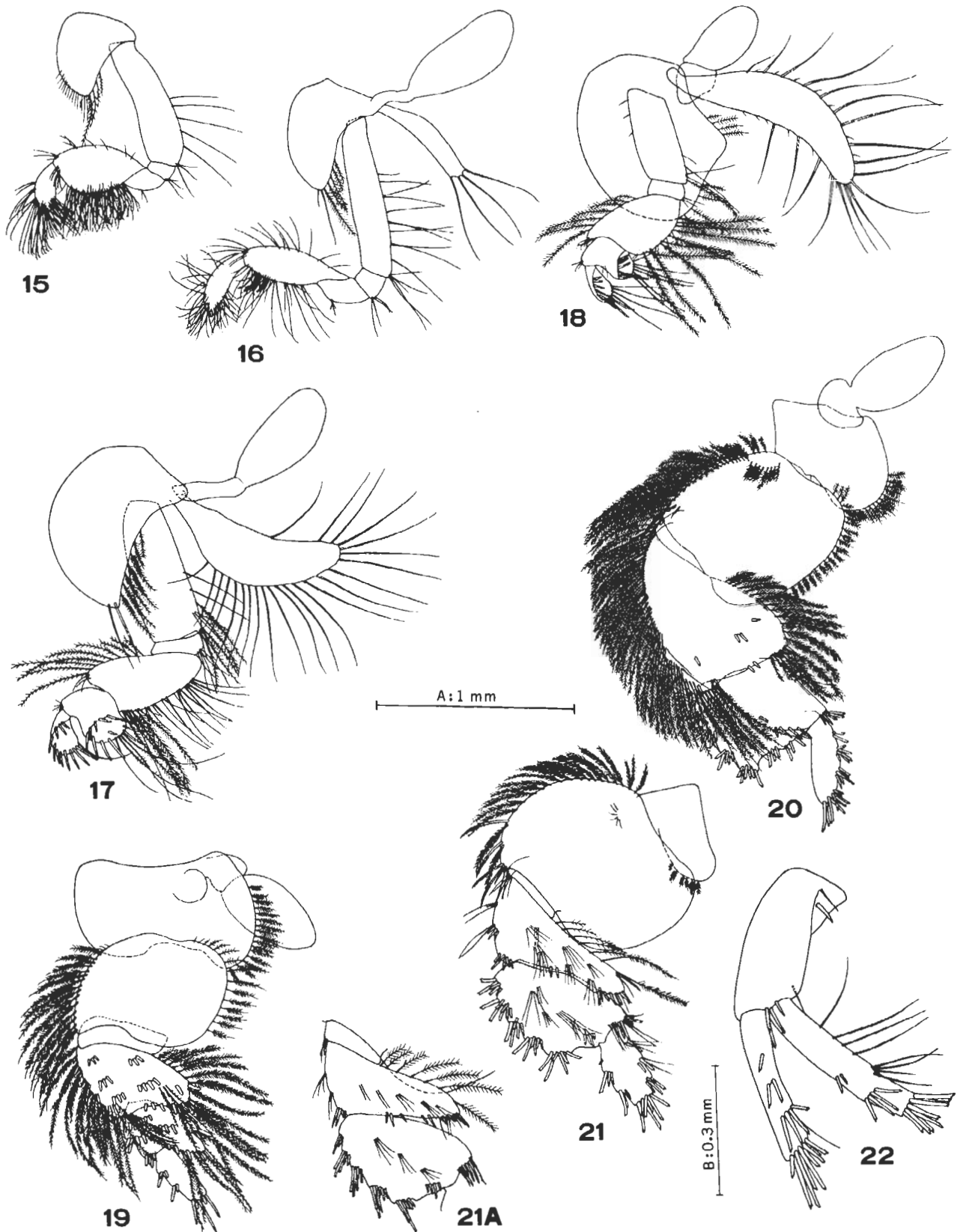
Uropod 1 (Figure 22): peduncle stout, with 1 small seta and 1–2 small spines proximally, naked between these and the interramal spines; inner ramus slightly longer than outer.

Uropod 2 (Figure 12): peduncle slightly longer than outer ramus, the latter somewhat longer than inner ramus.

Uropod 3 (Figure 13): peduncle short; rami subequal;



Figures 1-14. *Lepidactylus triarticulatus* n. sp., female (ovig.), 4.0 mm. (1) Head. (2) Antenna 1. (3) Antenna 2. (4) Maxilliped. (5) Mandible. (6) Upper lip. (7) Lower lip. (8) Maxilla 1. (9) Maxilla 2. (10) Pleopod 1. (11) Pleosome side plate 3. (12) Uropod 2. (13) Uropod 3. (14) Telson. Scale A: 1-3, 10-11; Scale B: 4-9, 12-14.



Figures 15–22. *Lepidactylus triarticulatus* n. sp., female (ovig.), 4.0 mm. (15) Gnathopod 1. (16) Gnathopod 2. (17) Peraeopod 3. (18) Peraeopod 4. (19) Peraeopod 5. (20) Peraeopod 6. (21) Peraeopod 7. (21A) Peraeopod 7, segments 4 and 5 of subtidal form (female, 3.9 mm, from Copano Bay). (22) Uropod 1. Scale A: 15–21; Scale B: 22.

the two segments of outer ramus subequal.

Telson (Figure 14): broadly and deeply cleft nearly to base; each lobe with one lateral group of 2–3 spines; apically with 9–10 spines (some more elongated and setiform).

Male, 4.2 mm. Peraeopod 3, segment 2 length about 2.0 times width. Peraeopod 4, segment 2 length about 1.7 times width. Peraeopod 5, segments 4 and 5, respectively, with 22 and 15 blunt lateral facial spines. Peraeopod 6, segments 4 and 5 each with about 9 blunt lateral facial spines. Peraeopod 7, segment 4 with one plume and one smaller seta distally before apex.

**Remarks:** There is sexual dimorphism in the greater stoutness of segment 2 of peraeopods 4 and 5 in males, and in their somewhat larger number of lateral facial spines on the above mentioned segments of peraeopods 5 and 6. However, dimorphic differences are not as significant in *L. triarticulatus* n. sp. as they are in other *Lepidactylus* spp. that we have examined.

We find apparently consistent morphological differences between the intertidal and subtidal populations of both sexes in details of peraeopod 7. The specimens collected above the waterline at Grand Isle agree with the Malaquite Beach material in that segment 4 has one or two shorter setae in addition to a plume distally before the apex, and the posterior distal border of segment 5 is relatively straight, with little arch at the distal angle (Figure 21). The subtidal specimens from Grand Isle, Bolivar, Copano Bay, and Port O'Connor differ in that segment 4 has only a plume distally before the apex and the posterior border of segment 5 is more convexly arched toward the distal angle (Figure 21a). In other respects the intertidal and subtidal forms are quite similar. For the present, at least until the variation throughout the range and habitats occupied by the species can be more fully evaluated, we regard these differences as ecotypic variation in an ecologically and morphologically plastic species.

**Ecology:** At the type locality, a surf-exposed, fine-grained sand beach, *L. triarticulatus* n. sp. was most abundant at the highest intertidal levels. During warm months it was rather sharply zoned, with only a narrow region of overlap with populations of an undescribed *Haustorius* sp. which dominated lower high- and mid-tide levels (for quantitative data see Shelton and Robertson, in press). On surf-exposed Gulf beaches *L. triarticulatus* is most abundant at, or restricted to, the highest intertidal levels, possibly due to competition with the co-occurring *Haustorius* sp. In wave-sheltered fine sands it occurs throughout the intertidal region into shallow subtidal depths. The species is euryhaline, inhabiting salinities as low as 10 ppt in central Texas bays.

**Range:** We have not found this species in collections at South Padre Island, or on wave-exposed mainland beaches of the northeastern Texas coast at Sea Rim State Park and near High Island, where it is replaced by a different, undescribed species of *Lepidactylus*. Thus the known range of *L. triarticulatus* n. sp. to date is from northern Padre Island, Texas, to Grand Isle, Louisiana, with an apparent discontinuous distribution along the northeastern Texas coast.

#### KEY TO THE SPECIES

Of the material we have examined, *L. triarticulatus* n. sp. is most similar to a northeastern Gulf form being described by Dr. E. L. Bousfield (personal communication). The northeastern Gulf form appears to be somewhat larger (length 5.1 to 6.9 mm for six males and four females provided to us by Dr. Bousfield from Little Deer Island, Mississippi), and there are minor differences in numbers of certain setae, spines, and segments. We include this form in the key below to assist eastern Gulf workers, with the stipulation that our observations are preliminary and incomplete. Determination of the specific status of this *Lepidactylus* must await detailed analysis of populations east of the Mississippi River.

#### PRELIMINARY KEY TO THE ATLANTIC AND GULF COAST SPECIES OF *LEPIDACTYLUS*

1. Peraeopod 7, segment 2 posterior border setose; segment 5 posterior border with 1 setae group above lower angle; antenna 1, accessory flagellum 2-segmented . . . . . *L. dytiscus* Say  
 Peraeopod 7, segment 2 posterior border naked; segment 5 posterior border without setae above lower angle; antenna 1, accessory flagellum 2- or 3-segmented . . . . . 2
2. Antenna 1, accessory flagellum 2-segmented; peraeopod 7, segment 4 posterior border obtusely truncated in males, shallowly oblique in females; segment 6 slender, linear, length 2.3 to 2.5 times width . . . . .  
*L. undescribed species* (reported as *Lepidactylus* sp. 1 by Shelton and Robertson, in press)  
 Antenna 1, accessory flagellum usually 3-segmented (may be 2-segmented in immatures); peraeopod 7, segment 4 tapering distally to subacute apex; segment 6 stout, broadest medially, length about 2.0 times width . . . . . 3
3. Antenna 2, flagellum 6-segmented; length to 4.8 mm . . . . . *L. triarticulatus* n. sp.  
 Antenna 2, flagellum 7-segmented; length to 6.9 mm . . . . .  
*L. undescribed form* (description in preparation by Dr. E. L. Bousfield)

## ACKNOWLEDGMENTS

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