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Original Article

Reappraisal of the status of two recently described western Atlantic species of sand crabs (Anomura: Albuneidae)

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ABSTRACT

Evidence is provided to support the synonymy of two species of sand crabs (Anomura: Albuneidae). *Zygopa lalanai* Ortiz, 2015 is a synonym of *Zygopa michaelis* Holthuis, 1961 and *Lepidopa boykoi* Ortiz, Tello-Musi and Morales-Moreno, 2018 is a synonym of *Lepidopa benedicti* Schmitt, 1935. Each of the recently described species was based on a single specimen collected well within the range of their respective senior synonyms.

KEYWORDS

Caribbean, Cuba, Gulf of Mexico, *Lepidopa*, synonymy, *Zygopa*

INTRODUCTION

Two species of sand crabs from the Caribbean and the Gulf of Mexico were recently described by Manuel Ortiz and colleagues (Ortiz, 2015; Ortiz et al., 2018). A review of these publications shows that both species are synonyms of previously described species known from these regions. *Zygopa lalani* Ortiz, 2015 is a synonym of *Zygopa michaelis* Holthuis, 1961 and *Lepidopa boykoi* Ortiz, Tello-Musi and Morales-Moreno, 2018 is a synonym of *Lepidopa benedicti* Schmitt, 1935. Evidence is presented herein to support these synonymies.

MATERIAL AND METHODS

Material from the American Museum of Natural History, New York (AMNH), Rijksmuseum van Natuurlijke Historie (RMNH, now Naturalis), Leiden, The Netherlands, and University of Louisiana at Lafayette (USLZ) was previously examined (Boyko, 2002). As the photographs and line drawings from Ortiz (2015) and Ortiz et al. (2018) provided sufficient information for required comparative analysis, it was not necessary to

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borrow the type material from the Colección Nacional de Crustáceos, Instituto de Biología, Universidad Nacional Autónoma de México (CNCR). Images were constructed in Adobe Photoshop.

SYSTEMATICS

Order Decapoda Latreille, 1802

Infraorder Anomura MacLeay, 1838

Superfamily Hippoidea Latreille, 1825

Family Albuneidae Stimpson, 1858

Subfamily *incertae sedis*

Genus *Zygopa* Holthuis, 1961

***Zygopa michaelis* Holthuis, 1961**
(Figs. 1, 2)

Zygopa michaelis Holthuis, 1961: 22–26, figs. 1, 2. — Boyko, 2002: 204–210, figs. 66, 67 (and references therein).

Zygopa cf. *michaelis* Ortiz et al., 2013: 33, figs. 1e, 1l, 5a, 5b. — Lalana et al., 2014: 127.

Zygopa lalanai Ortiz, 2015: 84-91, figs. 1b, 2–7 (new synonym). — Diez and Espinosa, 2018: 140.

Remarks. *Zygopa lalanai* was purportedly distinguished from *Z. michaelis* by the shape of the ocular peduncles (tapered vs. rounded distally; Fig. 1B vs. 1D), but this is the only character that appears to differ between the holotype (and only specimen) of *Z. lalanai* and the numerous known specimens of *Z. michaelis* (see Boyko, 2002). The carapace groove (CG) pattern is the same in both species, as evidenced by a comparison of the photographic fig. 7a in Ortiz (2015; Fig. 1A) and fig. 66a in Boyko (2002; Fig. 1C herein); note that the CGs are depicted inaccurately in the line drawing of Ortiz (2015: fig. 2a)

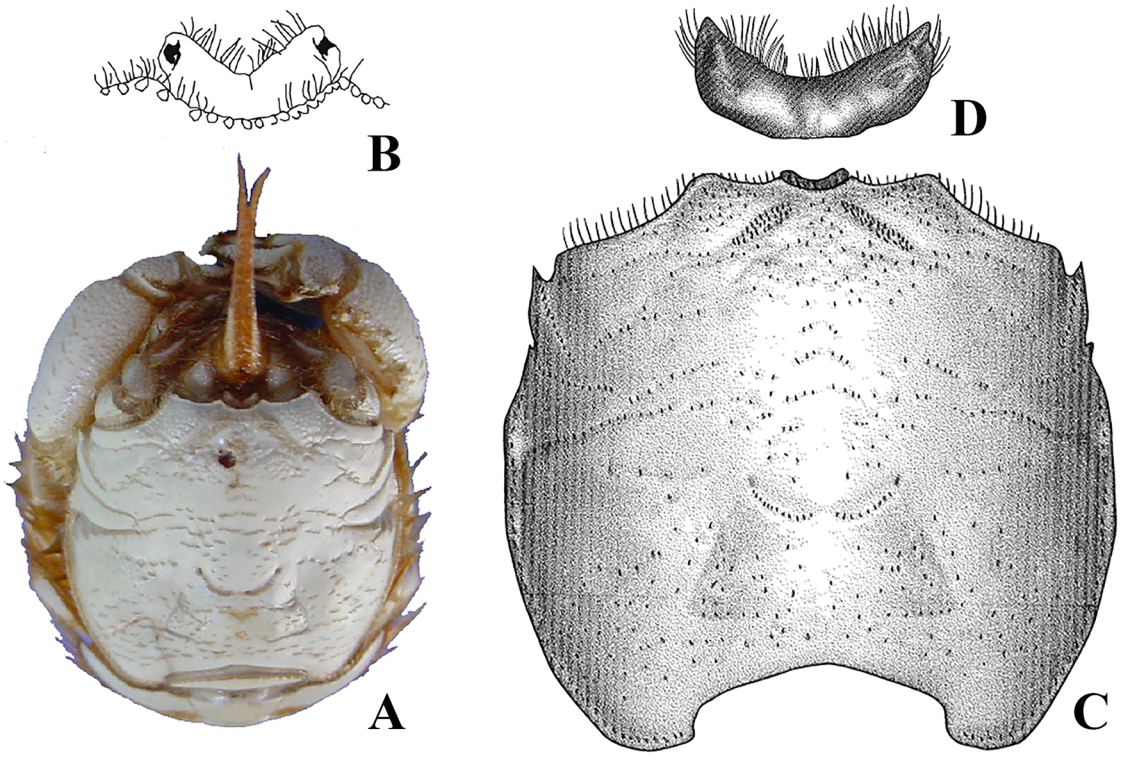

Figure 1. *Zygopa lalanai* Ortiz, 2015, holotype male (CNCR 27818) (**A**, **B**) and *Zygopa michaelis* Holthuis, 1961, lectotype female (RMNH 14501) (**C**, **D**). **A**) Dorsal view. **B**) Close-up of ocular peduncles. **C**) Carapace, dorsal view. **D**) Close-up of ocular peduncles. Not to scale. **A**, **B** modified from Ortiz (2015); **C**, **D** modified from Boyko, 2002.

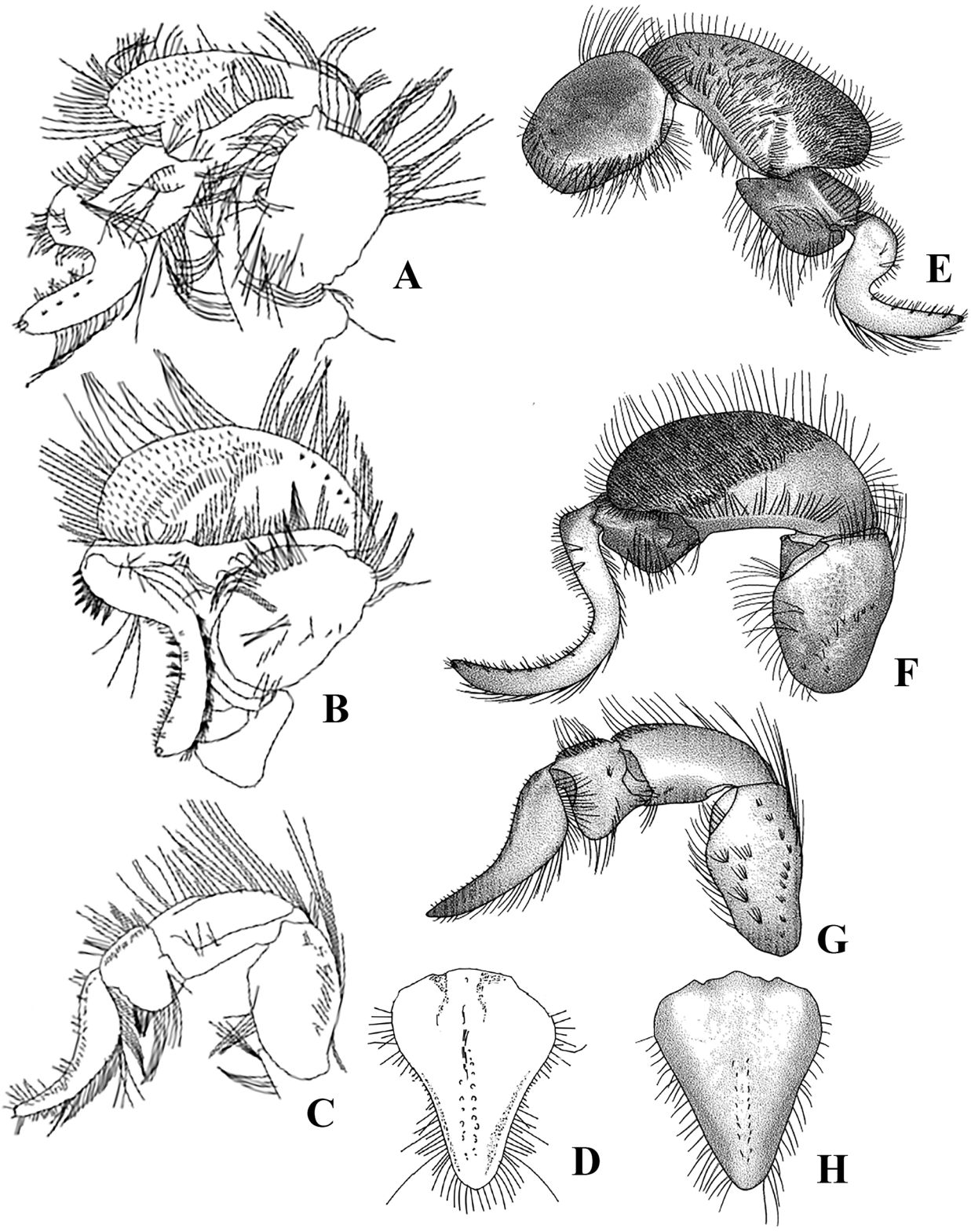

Figure 2. *Zygopa lalanai* Ortiz, 2015, holotype male (CNCR 27818) (**A**–**D**) and *Zygopa michaelis* Holthuis, 1961, paralectotype male (RMNH 14502) (**E**-**H**). **A**) Left pereopod II, lateral view. **B**) Left pereopod III, lateral view. **C**) Left pereopod IV, lateral view. **D**) Telson, dorsal view. **E**) Right pereopod II, lateral view. **F**) Left pereopod III, lateral view. **G**) Left pereopod IV, lateral view. **H**) Telson, dorsal view. Not to scale. **A**–**D** modified from Ortiz (2015); **E**–**F** modified from Boyko, 2002.

when compared to the photograph (Ortiz, 2015: fig. 7a; Fig. 1A). The dactyli of pereopods II and IV are identical in the two species (compare Ortiz, 2015: fig. 4b, d with Boyko, 2002: fig. 67b, d; Fig. 2A, C vs. 2E, G) as is the dactylus of pereopod III (see Boyko, 2002: fig. 67c; Fig. 2F herein), although in that case the photograph of the ventral view of the holotype of *Z. lalanai* (see Ortiz, 2015: fig. 7b) has to be used because the line drawing (fig. 4c; Fig. 2B) is not accurate. The shape of the telson is also the same in the two species (compare Ortiz, 2015: fig. 5d and Boyko, 2002: fig. 67f; Fig. 2D vs. 2H). The line drawings of the dactyli of pereopods II-IV as given fig. 6 of Ortiz (2015) are not useful and appear to have been drawn freehand; they are highly inaccurate as evidenced by comparison with the other figures and photographs.

Zygopa michaelis is known from both coasts of Florida, USA, to Brazil, in 4.0–73.2 m depth; the holotype of *Z. lalanai* was collected off Cuba in 6–8 m depth, a locality well within the known range of *Z. michaelis*.

As the only apparent difference between *Z. lalanai* and *Z. michaelis* is in the degree of the tapering of the ocular peduncles, this must be considered intraspecific variation, possibly age, size, or even preservation related, and the two species are synonymous. *Zygopa* at present contains only two valid species: *Z. michaelis* and *Zygopa nortoni* Serène and Umali, 1965 (known from the Philippines and New Caledonia, ranging to 60 m depth) (Boyko, 2002).

Subfamily Lepidopinae Boyko, 2002

Genus *Lepidopa* Stimpson, 1858

Lepidopa benedicti Schmitt, 1935

(Figs. 3, 4)

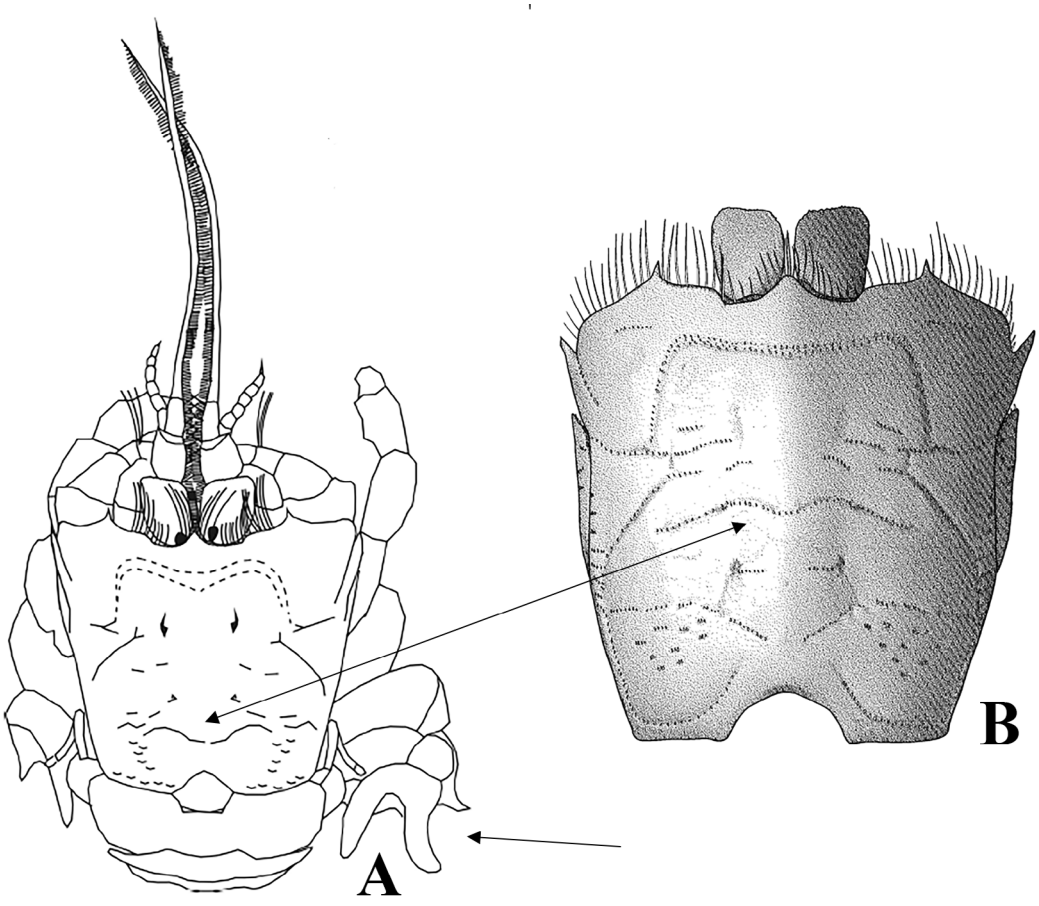

Figure 3. *Lepidopa boykoi* Ortiz, Tello-Musi and Morales-Moreno, 2018, holotype female (CNCR 34795) (**A**) and *Lepidopa benedicti* Schmitt, 1935, ovigerous female (AMNH 14425) (**B**). **A**) Dorsal view. **B**) Carapace, dorsal view. Double headed arrow indicates misplaced CG 6 and 7 in A; single headed arrow indicates incorrectly drawn dactylus of pereopod III. Not to scale. **A** modified from Ortiz et al. (2018); **B** modified from Boyko (2002).

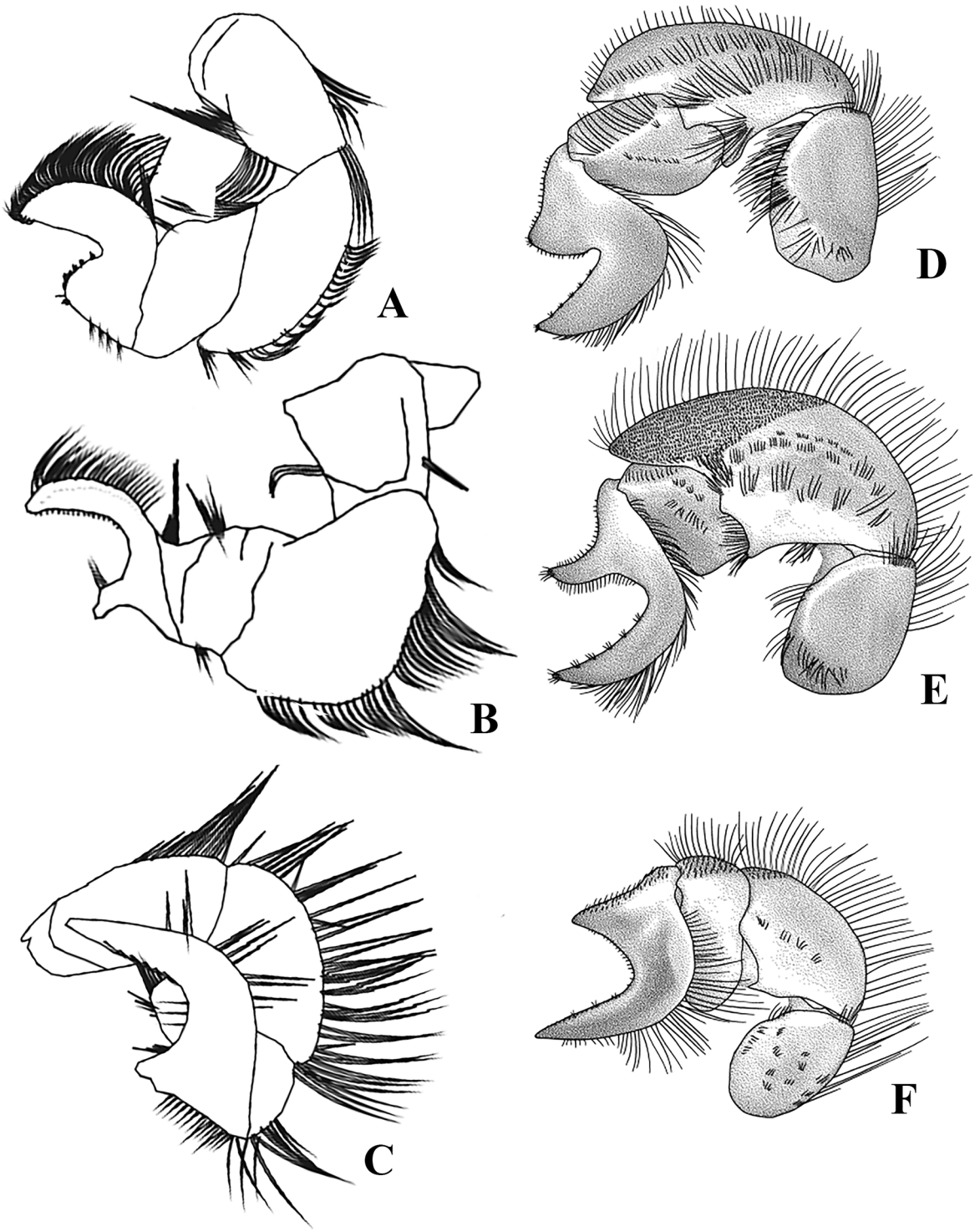

Figure 4. *Lepidopa boykoi* Ortiz, Tello-Musi and Morales-Moreno, 2018, holotype female (CNCR 34795) (**A**–**C**) and *Lepidopa benedicti* Schmitt, 1935, female (UNLZ 2122) (**D**–**F**). **A**) Left pereopod II, lateral view. **B**) Left pereopod III, lateral view. **C**) Left pereopod IV, lateral view. **D**) Left pereopod II, lateral view. **E**) Left pereopod III, lateral view. **F**) Left pereopod IV, lateral view. Not to scale. **A**–**C** modified from Ortiz et al. (2018); **D**, **F** modified from Boyko (2002).

Lepidopa benedicti Schmitt, 1935: 210. — Boyko, 2002: 172–179, fig. 56, 57 (and references therein).

Lepidopa boykoi Ortiz, Tello-Musi and Morales-Moreno, 2018: 50–58, figs. 2–5 (new synonym).

Remarks**.** Ortiz et al. (2018) distinguished the holotype and only specimen of *L. boykoi* from other species in the genus found in the Gulf of Mexico and Caribbean in their key to species using the following set of characters: "pedúnculos oculares rectangulares; con corneas presentes en sus ángulos basales internos; tacón del dactilo del pereópodo I redondeado; borde ventral distal del dactilo cubierto de setas largas cuvadas." However, none of these are unique to this specimen.

Rectangular ocular peduncles are found on several species in the genus, including *L. benedicti* and the pigmentation found in the proximomesial corner of the ocular peduncles (e.g., Fig. 3A) is only an artifact of preservation (see Remarks under various species in Boyko, 2002 where dispersal of pigments is noted). It is unclear what "tacón del dactilo del pereópodo I redondeado" (heel of pereopod dactyl I rounded) means as there is no heel present on pereopod I; it is possible the original description meant to refer to pereopod II, which does have a rounded heel as also seen in *L. benedicti* and several other species of *Lepidopa*. The notation of long curved setae on the ventral edge of the dactylus (which dactylus the descriptions refer to is not clear, perhaps all of them) is not diagnostic, as this feature is found in all species in the genus. The drawings of the whole animal (e.g., Ortiz et al., 2018: fig. 1b and inset) are of limited utility and comparison of the photo of the dorsal view (Ortiz et al., 2018: fig. 5a, c), despite its suboptimal angle and small size, clearly shows that at least some of the carapace grooves (CG) are inaccurately placed or excluded from the line drawings. The most glaring error is that CGs 6 and 7 are placed much too posteriorly on the carapace in the line drawing (Fig. 2A vs. 2B herein). The line drawing shows an incomplete submarginal groove which is also seen in *L. benedicti*; this is not visible in the photograph of Ortiz et al. (2018). The drawings of the individual parts of the holotype appear more accurate renderings, although fig. 4e of pereopod III clearly shows that the dactyl of this same appendage is drawn inaccurately in fig. 1b and the tip of the heel in fig. 4f appears broken (Fig. 3B). Overall, the shape of the dactyli of pereopods I–IV matches those of *L. benedicti* (Fig. 4A–C vs. 4D, E).

Lepidopa benedicti is known from the central Atlantic coast of Florida, USA, and Gulf of Mexico south to Veracruz, Mexico, in up to 3 m depth (Boyko, 2002). The holotype of *L. boykoi* was also collected from the littoral zone of Veracruz, Mexico, at the southernmost known edge of the species' range.

When all the above similarities, both morphological and distributional, are considered, *L. boykoi* is clearly a synonym of *L. benedicti*. The author of the present note profoundly regrets to synonymize this species (for obvious reasons), but it seems unavoidable.

DISCUSSION

Although it is regrettable that these two recently described species must enter into synonymy, this highlights an important recommendation when it comes to describing new species of albuneids and, indeed all species: it is inadvisable to describe a new species from a single specimen, especially when the specimen occurs within the range of known congeners unless the specimen exhibits multiple distinctive characters that clearly distinguish it from all previously described species in the genus (e.g., Boyko, 2020).

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