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Authors: Hennemann, Frank H., and Conle, Oskar V.

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Studies on neotropical Phasmatodea XIII: the genus *Paracalynda* Zompro, 2001 with notes on *Eusermyleformia* Bradler, 2009 (Insecta: Phasmatodea: Diapheromerinae: Diapheromerini)

Frank H. Hennemann and Oskar V. Conle

(FHH) Reiboldstrasse 11, 67251 Freinsheim, Germany. E-mail: hennemann@phasmatodea.de
(OVC) Goldbachweg 24, 87538 Bolsterlang, Germany. E-mail: conle@phasmatodea.de; www.Phasmatodea.com

Abstract

A detailed redescription and review of the north Central American genus *Paracalynda* Zompro, 2001 is presented, which presently contains only two known species. A re-description is provided for the type-species *P. picta* (Brunner v. Wattenwyl, 1907), which is only known from the unique male holotype. *P. utilaensis* (Zompro, 1998) was originally described as a subspecies of *P. picta* (Brunner v. Wattenwyl, 1907) but obviously represents a distinct species, hence it is here raised to species rank (n. stat.). Both species are illustrated and detailed figures show the significant genital morphology of *Paracalynda*. A detailed study of genital features has proven *Paracalynda* was previously misplaced in the "*Bacteria* group" (tribe Diapheromerini) and as a result the genus is transferred to Eusermyleformia Bradler, 2009. A discussion on Sermyleformia: Eusermyleformia is provided, which includes a list of the seven genera now contained in Eusermyleformia as well as an extended and more comprehensive diagnosis of this supposedly monophyletic rank-free taxon.

Key words

Phasmatodea, Central America, Eusermyleformia, *Paracalynda*, keys, descriptions, illustrations, eggs

Introduction

The large New World subfamily Diapheromerinae Kirby, 1904 was reviewed by Zompro (2001) on a generic basis, but the arrangement and subdivision into species groups proposed for the genera of the tribe Diapheromerini in particular is unsatisfactory in several aspects. Some of the inaccuracies were clarified by Bradler (2009) who detected a supposedly monophyletic taxon within Diapheromerini *sensu* Zompro, 2001, for which he introduced the rank-free name Eusermyleformia. According to Bradler (2009) the Eusermyleformia are the sister-taxon of the *Sermyleformia* Bradler, 2009 and here shown to comprise genera of three of the seven species groups that were proposed by Zompro (2001).

This is the thirteenth part of an on-going study of the neotropical Phasmatodea and clarifies the systematic position of the north Central American genus *Paracalynda* Zompro, 2001. This distinctive genus was previously placed in the "*Bacteria*-group" of the tribe Diapheromerini by Zompro (2001) and has proven to belong in Eusermyleformia. *Paracalynda* is therefore removed from the "*Bacteria*-group" sensu Zompro (2001) and here transferred to Eusermyleformia. In addition to a detailed redescription of the genus and brief treatments of the two species presently contained, we offer a survey and more comprehensive diagnosis of Eusermyleformia.

Material and methods

The present study is based on examination of the necessary type material as well as additional material in the collections of the authors. The material at hand for this study is invariably dried and pinned. Examinations of insects and eggs were carried out using a Russian MBC-10 binocular microscope and a magnifying glass with 4× magnification. Measurements were taken using a ruler or a digital calliper and are given to 0.1 mm. Eggs examined were fully developed and already laid. The terminology used for the description of egg structures follows that of Clark-Sellick (1997), the terminology for the description of genital features follows Bradler (2009). All data of cabinet specimens are reproduced exactly as on the original labels.

Depositories of specimens and type status are abbreviated as follows:

BMNH: The Natural History Museum, London / England.
NHMW: Naturhistorisches Museum, Vienna / Austria.
SMNS: Staatliches Museum für Naturkunde, Stuttgart / Germany.
FH: Private collection of Frank H. Hennemann, Kaiserslautern / Germany.
OC: Private collection of Oskar V. Conle, Bolsterlang / Germany.
OZ: Private collection of Oliver Zompro, Kiel / Germany.
HT: Holotype ; PT: Paratype; LT: Lectotype ; PLT: Paralectotype.

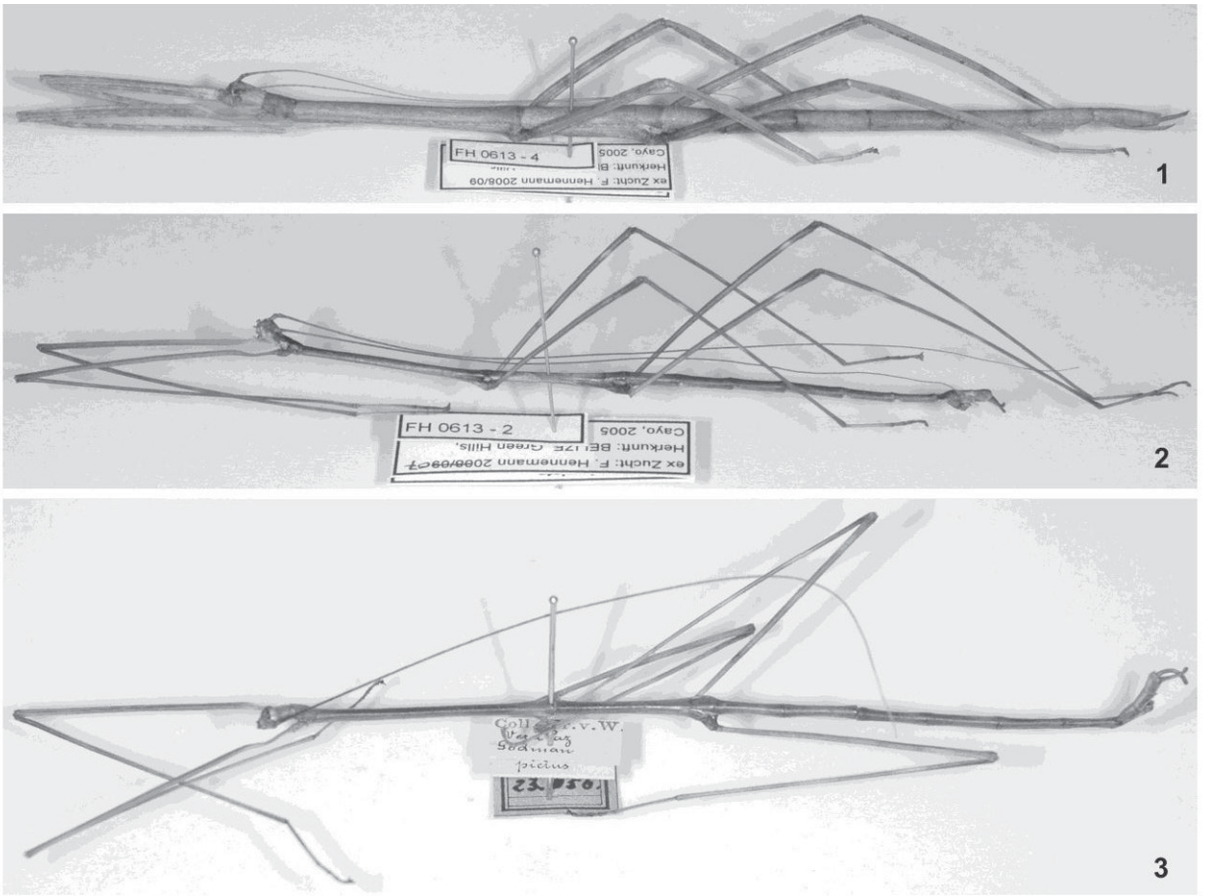
Results

Sermyleformia: Eusermyleformia

Bradler (2009) established the rank-free taxon *Sermyleformia* to comprise the genus *Parabacillus* Caudell, 1903 and its adelphotaxon, the Eusermyleformia. Common apomorphic features mentioned by Bradler (2009) are the strongly shortened subgenital plate of females, which merely covers the bases of the gonapophyses, reduced vomer, lack of paired ventral thorn pads on the posterior margin of the anal segment and enlarged cerci of males, which are incurving and have an interobasal protuberance. The specialized cerci serve for grasping the abdomen of females during copulation and hence functionally replace the vomer present in many other Phasmatodeans. A further possible synapomorphy not mentioned by Bradler might be the lack of a praeopercular organ in females, this being no longer necessary as an anchorage for the specialized genitalia of males.

Parabacillus is characterized by the strongly shortened antennae of both sexes, which consist of only six or seven segments, by the lack of a galea lobulus and complete reduction of gonapophysis VIII and gonoplacs (Bradler 2009). Zompro (2004) established the

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Figs 1-3. *Paracalynda* spp. **1.** *P. utilaensis* (Zompro, 1998) ♀ [coll. FH, No. 0613-4]. **2.** *P. utilaensis* (Zompro, 1998) ♂ [coll. FH, No. 0613-4]. **3.** *P. picta* (Brunner v. Wattenwyl, 1907) ♂ LT [NHMW].

tribe Paraleptyniini as a subordinate taxon of Heteronemiinae (*sensu* Zompro 2001, 2004) to comprise the Nearctic *Parabacillus* and some exceptionally southern Neotropical genera, and stated that this tribe was characterized by short antennae. However, a close relationship between *Parabacillus* and *Heteronemia* Gray, 1835, the type-genus of Heteronemiinae, can be excluded, due to fundamental differences in the genital morphology of both genera (Bradler 2009). Nor can the close relation between *Parabacillus* and the tribe Paraleptyniini, as postulated by Zompro (2004), be supported, since the genitalia of *Paraleptynia* Caudell, 1904 also differ from those of *Parabacillus* to a great extent.

In *Paraleptynia* females have a very long and lanceolate subgenital plate, a praeopercular organ as well as developed gonapophyses IX and gonoplacs, while males have a well-developed and sclerotised vomer, paired thorn pads on the lower posterior margin of the anal segment and small, unspecialised cerci. The "strongly elongate egg" erroneously described for *Paraleptynia* by Zompro (2004) does not belong to a species of *Paraleptynia*, but to another supposedly closely related genus. Zompro (2004) erroneously stated the male of *Parabacillus* was unknown, but Caudell (1903) had already described the male of *P. coloradus* (Scudder, 1893) and recognized that the morphology of the cerci was identical to that of *Diapheromera*. Furthermore, Hebard (1934, pl. 20, figs 5-9) presented a study of the variability of the males' genitalia of *Parabacillus* species in the United States, which included several illustrations.

The Eusermyleformia are characterized by the conspicuous position of the stigmata of the abdominal tergum VIII, these being noticeably displaced and shifted towards the middle of the segment (Bradler 2009). Since no further characterizing features for Eusermyleformia were mentioned by Bradler (2009), a more comprehensive diagnosis of this distinctive group appears warranted and is presented below.

Eusermyleformia Bradler, 2009

Eusermyleformia Bradler, 2009: 101, figs 26c-d, 27d-e, 28a-d.
Diapheromerini, Otte & Brock, 2005: 29 (in part).
Diapheromerini: "*Diapheromera* group", Zompro, 2001: 208.
Diapheromerini: "*Sermyle* group", Zompro, 2001: 215.
Diapheromerini: "*Bacteria* group", Zompro, 2001: 202 (in part).

Description.—Small to fairly large (body length *ca* 30-150 mm), slender to moderately robust, cylindrical and typically stick-like Diapheromerinae. Both sexes apterous. No ocelli. Gula present. Antennae filiform, longer than complete thorax and consisting of > 30 antennomeres. Pronotum without distinct defensive glands. Mesothorax elongate and > 2× longer than head and pronotum combined. Median segment very short, < ¼ the length of metanotum. No praeopercular organ on sternum VII of females. Stigmata of abdominal tergum VIII shifted towards the median portion of corresponding segment. Epiproct small. In females cerci ± (more or less) straight and mostly shorter than anal segment, rarely lanceolate and somewhat longer than anal segment; round to oval in transverse-section. Gonapophyses VIII considerably longer than

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gonapophyses IX and longer than gonoplacs. Gonoplacs longer than gonapophyses IX. Gonangulum present or absent. Subgenital plate mostly short, scoop-shaped and merely covering bases of gonapophyses, rarely projecting somewhat over apex on anal segment. In males anal segment ventrally closed by sternum X, no paired ventral thorn-pads at posterior margin. Vomer reduced (a rudimentary vomer is present in only one genus). Epiproct very small. Cerci ± prominently enlarged, longer than anal segment, in-curving and specialized in various ways; mostly round to cylindrical in cross-section with an internobasal protuberance and occasionally with the apex laterally flattened and spatulate, bifid, trifid or deeply furcate; in certain genera asymmetrical cerci occur with the dextral cercus smaller than the sinistral one. Poculum small and rarely somewhat larger than basal portion of sternum IX, often specialised. Basal portion of sternum IX occasionally with one finger-like dextrolateral appendix or two lateral appendices, one on the right and one on the left (phalanges). Legs long and slender, the mesofemora (and metafemora) sometimes ± thickened and with single sub-basal lobes on two outer ventral carinae or a subapical spine on medioventral carina. Profemora compressed and curved basally with the anterodorsal carina ± raised, medioventral carina slightly displaced towards anteroventral carina. Four posterior femora and all tibiae trapezoidal in cross-section. No area apicalis on tibiae. Basitarsi longer than following tarsomeres.

Comments.—Bradler (2009) listed the genera *Diapheromera* Gray, 1835, *Megaphasma* Caudell, 1903, *Manomera* Rehn & Hebard, 1907, *Pseudosermyle* Caudell, 1903, *Litosermyle* Hebard, 1919 and *Sermyle* Stål, 1875 (= *Hoplolibethra* Caudell, 1904) as belonging to Eusermyleformia. Research in the course of an extensive study on the species groups of Diapheromerini suggested by Zompro (2001) has revealed one further genus exhibiting the characteristics of Eusermyleformia: this is *Paracalynda* Zompro, 2001. Consequently, *Paracalynda* is here removed from the "*Bacteria*-group", where it was originally placed by Zompro (2001), and transferred to Eusermyleformia.

Within Eusermyleformia *Paracalynda* is characteristic for having the subgenital plate of females slightly longer than in the other genera, reaching as far as to the apex of the anal segment, and for males having a small, hook-like rudimentary vomer at the base of the abdominal sternum X (Figs 10-11). Both features can certainly be interpreted as plesiomorphic and would place *Paracalynda* as the adelphotaxon of the remaining Eusermyleformia except Litosermyle Hebard, 1919 [rather than *Megaphasma* as suggested by Bradler (2009)]. This is also supported by females of *Paracalynda* having the stigmata of tergum VIII just slightly shifted off the anterior margin (Fig. 8), a character state interpreted as apomorphic for the Eusermyleformia by Bradler (2009). The only other Eusermyleformia, in which males have a small rudimentary vomer, is the Colombian *Litosermyle* Hebard, 1919. However, the large poculum of males, which is noticeably larger than the basal portion of sternum IX, the conspicuous shape of the subgenital plate of females as well as the basal position of the stigmata of abdominal tergum VIII in both sexes distinguish *Litosermyle* from all other genera of Eusermyleformia (Conle, Hennemann & Gutiérrez 2011). This would suggest *Litosermyle* as the adelphotaxon of the entire Eusermyleformia including *Paracalynda*, but the exact systematic position of *Litosermyle* deserves further evaluation.

Eusermyleformia now comprises genera of three species-groups of Diapheromerini suggested by Zompro (2001), the "*Diapheromera*-group", the "*Sermyle*-group" and one genus of the "*Bacteria*-group". Since Eusermyleformia contains *Diapheromera* Gray, 1835, the type-genus of Diapheromerini Kirby, 1904, Bradler's rank-free taxon represents what should in fact be regarded as the tribe Diapheromerini (*sensu stricto*).

Distribution.—Members of the Eusermyleformia are present in the whole of Central America as far south as the northern portions of Colombia and have northwards inhabited almost the complete United States and dispersed as far as north as SE Canada. The center of its radiation with by far the highest diversity of species and genera is Mexico, which harbors four of the seven genera currently contained.

Genera included.—

1. *Diapheromera* Gray, 1835: 18. Type species: *Spectrum femoratum* Say, 1824: 297.
   = *Spectrum* Say, 1824: 297.
   [Distribution: Mexico, United States and SE Canada]
2. *Litosermyle* Hebard, 1919: 171. Type species: *Litosermyle ocanae* Hebard, 1919: 172, pl. 23: 9.
   [Distribution: N Colombia]
3. *Manomera* Rehn & Hebard, 1907: 283. Type species: *Bacunculus tenuescens* Scudder, 1899 : 95, pl. 1: 1-2.
   [Distribution: Eastern United States]
4. *Megaphasma* Caudell, 1903: 878. Type species: *Diapheromera dentricus* Stål, 1875: 76.
   [Distribution: Mexico and United States]
5. *Paracalynda* Zompro, 2001: 207. Type species: *Bacunculus pictus* Brunner v. Wattenwyl, 1907: 333. (Here transferred from the "*Bacteria*-group" sensu Zompro, 2001: 202)
   [Distribution: Belize, Honduras and Guatemala]
6. *Pseudosermyle* Caudell, 1903: 867. Type species: *Pseudosermyle banksii* Caudell, 1903: 871.
   [Distribution: Mexico, SW-United States and Central America]
7. *Sermyle* Stål, 1875: 23. Type species: *Acanthoderus mexicanus* Saussure, 1859: 62.
   = *Hoplolibethra* Caudell, 1904: 108. Type species: *Hoplolibethra tuberculata* Caudell, 1904: 108, pl. 6: 1-2.
   [Distribution: Mexico, Belize and Guatemala]

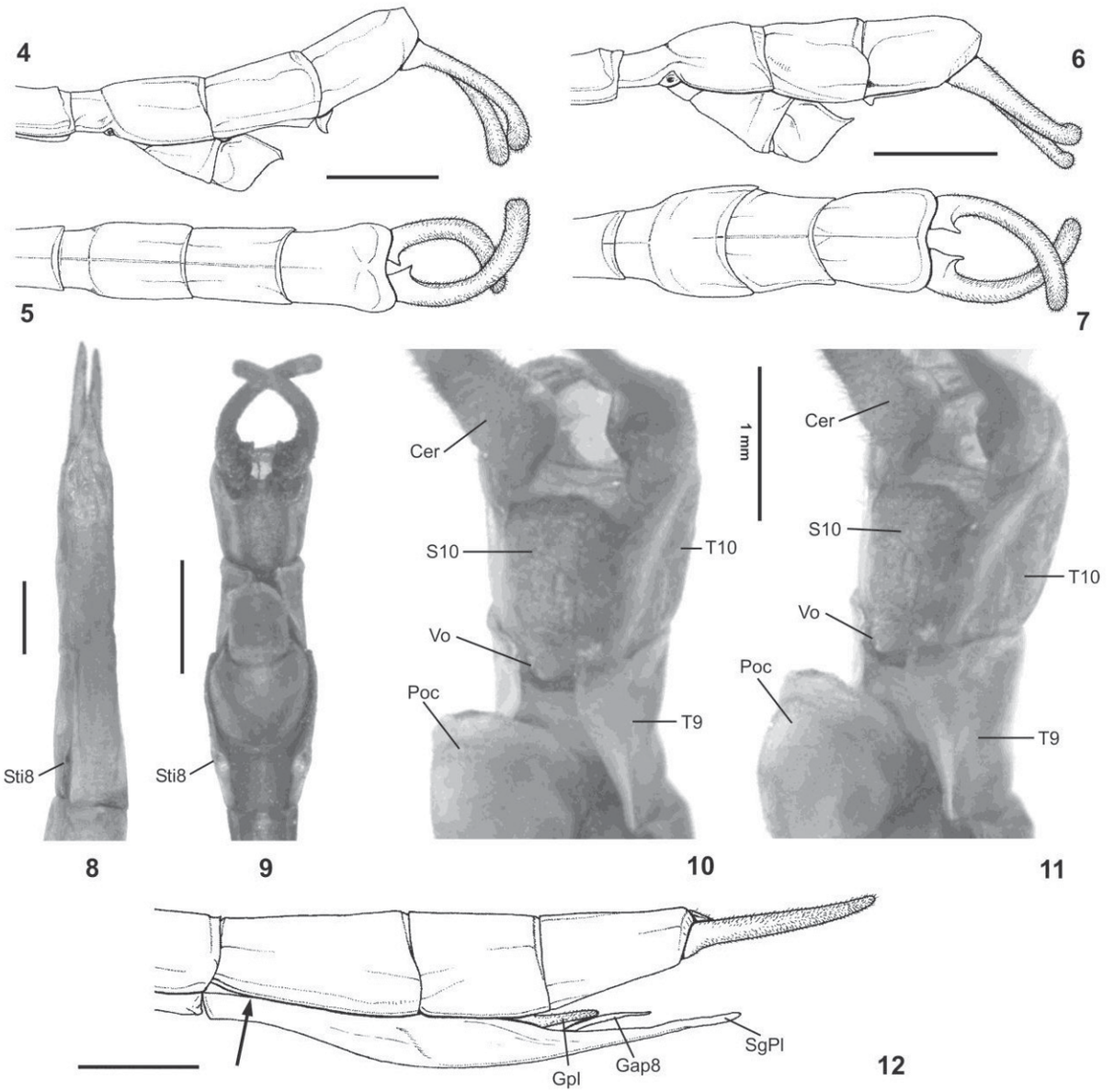
Genus ***Paracalynda*** Zompro, 2001

Type species.—*Bacunculus pictus* Brunner v. Wattenwyl, 1907: 333, by original designation.

Paracalynda Zompro, 2001: 207, figs. 19-20, 88-89, 130-131.
Bacunculus, Brunner v. Wattenwyl, 1907: 331 (in part – only species no. 3); Shelford, 1909: 351 (in part).
Heteronemia, Brock, 1993: 19; Brock, 1998: 50.
Pseudobacteria, Zompro, 1998: 215.

Description.—Medium sized to large (body length ♂♂ 70.0-86.0 mm, ♀♀ 111.0-124.0 mm) and very slender members of the *Eusermyleformia* with slender and entirely unarmed legs. Color of female mostly plain green, more rarely straw; often to a variable degree furnished with small brown and grey speckles. Males multicolorous, generally green or brown, the head often with conspicuous markings on frons and the legs annulated. Body surface of both sexes entirely smooth and very slightly glabrous. Head ovoid (♂♂) or roundly rectangular (♀♀) in dorsal aspect, longer than wide and broadest at the eyes; vertex flattened to very gently rounded and entirely smooth. Eyes of moderate size and projecting hemispherically. Antennae very long and filiform, reaching to abdominal segment III in females and

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Figs 4-12. Genitalia of *Paracalynda* spp. Cer = cerci; Poc = poculum; Sti8 = stigmata VIII; T9 = tergum IX; T10 = tergum X; S10 = sternum X; Vo = rudimentary vomer; Gpl = gonoplac; Gap8 = gonapophysis VIII; SgPl = subgenital plate [scale = 2 mm except as otherwise labelled]. **4.** *P. picta* (Brunner v. Wattenwyl, 1907) ♂ LT: apex of abdomen in lateral aspect. **5.** *P. picta* (Brunner v. Wattenwyl, 1907) ♂ LT: apex of abdomen in dorsal aspect. **6.** *P. utilaensis* (Zompro, 1998) ♂: apex of abdomen in lateral aspect. **7.** *P. utilaensis* (Zompro, 1998) ♂: apex of abdomen in dorsal aspect. **8.** *P. utilaensis* (Zompro, 1998) ♀: ventral view of apex of abdomen. **9.** *P. utilaensis* (Zompro, 1998) ♂: ventral view of apex of abdomen. **10.** *P. utilaensis* (Zompro, 1998) ♂: ventral view of abdominal segments IX and X. **11.** *P. utilaensis* (Zompro, 1998) ♂: ventro-lateral view of abdominal segments IX and X. **12.** *P. utilaensis* (Zompro, 1998) ♂: apex of abdomen in lateral aspect [arrow indicates the position of stigmata VIII].

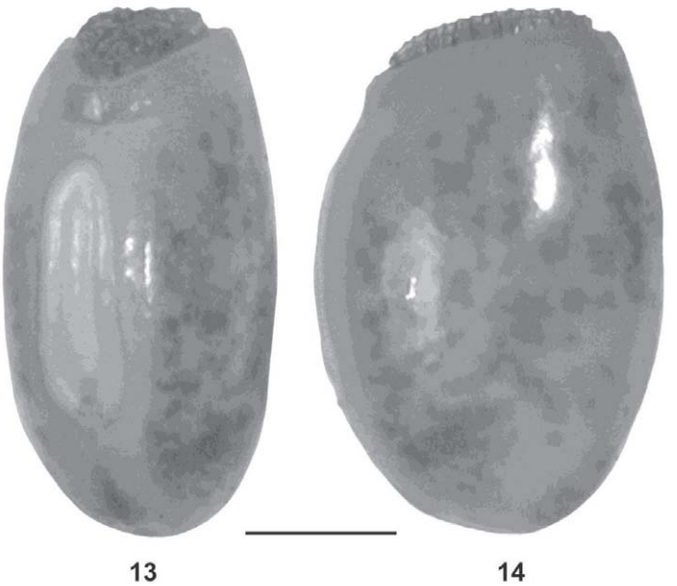
longer than body in males. Scapus dorsoventrally compressed (♀♀ in particular), roundly rectangular in dorsal aspect, and 1.3-1.5× longer than wide. Pedicellus subcylindrical to slightly club shaped and a little shorter than scapus. III slightly longer than pedicellus. Pronotum a little shorter and narrower than head, considerably longer than wide and rectangular. Mesothorax very elongate and >3× longer than head and pronotum combined; in males narrower than prothorax. Metathorax about 2/3 length of mesothorax. Meso- and metasternum simple. Abdomen excluding median segment slightly longer (♀♀) or about equal in length (♂♂) to combined length of head and complete thorax. Median segment very short, scarcely longer than wide in males and slightly transverse in females; less than ¼ the length of metanotum. Abdominal segment II more than 2× longer than median segment. Segments II-VI at least 2.5× longer than wide (relatively more slender and elongate in males) and roughly parallel sided; in males roughly of equal width and length, in females very scarcely increasing in length with VI the longest segment. VII in both sexes shorter than VI. Abdominal sternites II-VII smooth, no praeopercular organ on VII in females. Stigmata of tergum VIII slightly (♀♀) to noticeably (♂♂) displaced and shifted towards the middle of segment (Figs 8-9). Tergites VIII-X in females considerably shorter and just slightly narrower than previous, roughly of uniform width; VIII roughly 1.3× the length of IX or X. Anal segment about as long as IX, longitudinally carinate

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and narrowed towards the apex, the posterior margin with a shallow median indention. Epiproct very small, rounded and indistinctly projecting over posterior margin of anal segment. Cerci longer than anal segment, slender, lanceolate and gradually narrowed towards a pointed apex; very faintly carinate dorsally (Fig. 12). Gonapophyses VIII slender, elongate and gently up-curving but not reaching to apex of anal segment. Gonoplacs thickened, finger-like and considerably longer than gonapophyses IX, but shorter than gonapophyses VIII (Fig. 12). Subgenital plate slender, longitudinally carinate with the apex strongly narrowed, pointed and ± reaching apex of anal segment (Figs 8, 12). In males tergites VIII-X much shorter than previous and of unequal width. VIII constricted basally but strongly swollen and broadened in posterior 2/3; wider than II-VII. IX shorter and narrower than VIII or X. Anal segment broader than IX and widened toward posterior, the posterior margin with a wide but shallow median indentation; ventrally closed by sternum X; a very small, tooth or hook-like rudimentary vomer present (Figs 10, 11). Epiproct very small and completely hidden under anal segment. Poculum smaller than basal portion of sternum IX, cup-shaped and not reaching to posterior margin of tergum IX. Cerci large, longer than anal segment, distinctly incurving with the basal portion broadened and interobasally bearing a spiniform protuberance (Figs 5, 7). Legs all long, slender and entirely unarmed, the meso- and metafemora ± decidedly thickened. Profemora slightly longer than mesothorax, mesofemora longer than metathorax, and metatibiae almost reaching (♀♀) or prominently projecting over apex of abdomen (♂♂); tibiae slightly longer than corresponding femora. Profemora with anterodorsal carina noticeably raised, the medioventral carina distinct and noticeably displaced towards the anteroventral carina (females in particular). Meso- and metafemora and all tibiae trapezoidal in cross-section with the medioventral carina midways. Two outer ventral carinae of mid and hind legs in females very slightly expanded. Basitarsi slender and roughly equal (♀♀) or longer (♂♂) than remaining tarsomeres combined.

Eggs.— (Figs 13-14) Moderately sized (capsule length < 4.0 mm), capsule ovoid, laterally compressed, distinctly oval in cross-section and slightly bullet-like; >1.8× longer than wide. Capsule surface entirely smooth and strongly shiny. Micropylar plate very slightly displaced towards anterior and roughly ½ the length of capsule and 3× longer than wide; the posterior portion gently widened and rounded. Interior surface smooth and outer margin roundly swollen. Micropylar cup represented by a rounded median swelling at polar end of plate. Median line distinct, almost reaching to polar-area. Operculum oval with the anterior portion gently down-curving; opercular angle roughly 10°. Capitulum an irregular, dorsally flattened swelling deeply pitted throughout, which covers most of the surface of the operculum. Color of capsule pale amber or straw with lateral surfaces irregularly furnished with brown speckles and markings. The micropylar plate surrounded by a broad whitish or pale cream colored area. Micropylar plate very pale cream to ivory. Capitulum dull orange.

Differentiation.—Within Eusermyleformia, females of *Paracalynda* are characterized by an elongate and apically narrowed subgenital plate, which ± reaches to the apex of the abdomen, and by having the stigmata of abdominal tergum VIII just slightly displaced off the anterolateral angles of the segment (Figs 8, 9). Males are characterized by the presence of a small, rudimentary vomer. The latter is of particular interest and, since represented by a small tooth or hook-like protuberance at the base of sternum X (Figs 10, 11), is here interpreted as the remains of a vomer. A similar structure, which



Figs 13-14. Eggs of *P. utilaensis* (Zompro, 1998) [scale = 1 mm] **13.** Dorsal view. **14.** Lateral view.

may be regarded a rudimentary vomer, is seen amongst the Eusermyleformia only in *Litosermyle* Hebard, 1919 (Conle, Hennemann & Guttiérrez, 2011) and certain species of *Pseudosermyle* Caudell, 1903 (Conle, Hennemann & Fontana 2007). The small poculum of males, which is smaller than the basal portion of abdominal sternum IX (Figs 4, 6, 9) is shared with *Pseudosermyle*, but while it is typically cup-shaped in *Paracalynda*, conspicuous specializations of the poculum are seen in the latter genus.

In general *Paracalynda* resembles *Manomera* Rehn & Hebard, 1907 from the eastern United States; but it differs by the noticeably less elongate and oval head (> 2× longer than wide in *Manomera*)by the entirely unarmed legs of both sexes, by the much longer subgenital plate of females, which roughly reaches to the apex of the abdomen (Fig. 12), as well as by the presence of a rudimentary vomer and slender mesofemora of males; the last lacking the conspicuous sub-apical spine on the medioventral carina seen in *Manomera*. The eggs differ from those of *Manomera* mainly in the pale, smooth and strongly shiny capsule surface (Figs 13, 14).

Males also resemble some of the larger and more slender representatives of *Pseudosermyle*, but frequently differ by the typically incurving cerci (specialized in *Pseudosermyle*), which bear a interobasal spine, and larger unspecialized poculum.

Comments.—Although this genus is very close to *Pseudosermyle* and the nearctic *Manomera* Rehn & Hebard, 1907 and, based on striking genital features, apparently belongs in the Eusermyleformia, Zompro (2001) placed this genus in the "*Bacteria*-group"; then in contrast to this placement, he postulated close relation to the Central American *Calynda* Stål, 1875, a member of the "*Phanocles*-group". The genital morphology of *Paracalynda* however differs fundamentally from that of both those species-groups. Males lack a well-developed vomer and paired ventral thorn pads on the posterior margin of the anal segment, have the anal segment ventrally closed by sternum X and the long incurving cerci have an interobasal spine. Both sexes have the stigmata of tergum VIII displaced and shifted towards the middle of the segment and females lack a praeopercular organ. Consequently, the generic name *Paracalynda*, which errorneously postulates relation to *Calynda*, is an unfortunate choice.

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The Brazilian *Pseudobacteria longipes* Toledo Piza, 1938 was erroneously placed in *Paracalynda* by Zompro & Domenico (2005), although this species has a much longer median segment, dorsally raised basitarsi, a well-developed vomer, paired ventral thornpads on the posterior margin of the anal segment, short and simple cerci and the stigmata of tergum VIII positioned in the anterolateral angles of the corresponding segment. Hence, this species was removed from *Paracalynda* and provisionally transferred to *Bacteria* Latreille *et al.*, 1825 by Otte & Brock (2005). The exact generic position of this species will be clarified by Hennemann & Conle (in press). Research on the type-series of *P. picta* (Brunner v. Wattenwyl, 1907), the only species that has previously been included in the genus, has revealed inaccuracies concerning its recognition as presented by Zompro (2001).

Distribution.—Northern Central America (Belize, Honduras and Guatemala). Although not yet recorded from Mexico the genus is also likely to be found in the southeastern provinces, Chiapas, Tabasco and Campeche. Principally *Paracalynda* is a neotropical taxon which is restricted to the Mesoamerican Dominion and three biogeographical provinces termed Mexican Gulf, Chiapas and Eastern Central America (Morrone 2006).

Species included.—
1. *Paracalynda picta* (Brunner v. Wattenwyl, 1907)
2. *Paracalynda utilaensis* (Zompro, 1998) n. stat.

Paracalynda picta (Brunner v. Wattenwyl, 1907)
(Figs 3-5)

Bacunculus pictus Brunner v. Wattenwyl, 1907: 333. **LT** [by present designation], ♂: Coll. Br. v. W., Vera Paz, Godman; det. Br. v. W., *Bacunculus pictus*; 23.856 [NHMW, No. 684]. (**Not:** PLT's in NHMW and BMNH. These are *P. utilaensis* (Zompro, 1998), see below); Shelford, 1909: 351.
Heteronemia picta, Brock, 1993: 19; Brock, 1998: 50.
Pseudobacteria picta, Zompro, 1998: 215.
Paracalynda picta, Zompro, 2001: 207.
Paracalynda picta picta, Otte & Brock, 2005: 245.

Diagnosis.—Males (the only sex known) differ from those of *P. utilaensis* (Zompro, 1998) by: the larger size; more slender body; green general coloration (Fig. 3); considerably more elongate and slender head; relatively more slender and elongate abdominal tergites VIII-X (Fig. 4); somewhat smaller poculum; more prominent basal protuberance of sternum X and relatively longer and more slender cerci, the cerci having the interobasal spine slightly shorter but broader than in *utilaensis* (Fig. 5).

Description.— Male (Fig. 3): Fairly large (body length 86.0 mm) and slender for the genus. General color dull yellowish to brownish green, meso- and metanotum in the HT with a dark greyish wash dorsally. Head with a bold, oval ivory-colored spot between the eyes and in front with a black transverse line. Eyes and cerci reddish mid brown. Meso- and metafemora and all tibiae with three faint yellow annulations; all femora with a brown wash apically. Antennae dark brown with the ventral surface black, scapus and pedicellus greenish middle brown.
Head: Elongate oval, about 2× longer than wide, vertex flattened. Eyes prominent and contained almost 3× in length of cheeks. Scapus roughly 2× longer than wide, pedicellus only ½ the length of scapus. Segment III considerably longer than pedicellus.
Thorax: pronotum slightly shorter but as broad as head, rectangular. Transverse median sulcus faint, gently curved and very slightly displaced towards the posterior. Mesothorax 4.3× longer than head and pronotum combined. Metanotum a little more than half as long as mesonotum.
Abdomen: median segment about 1.7× longer than wide and gently widened towards the posterior; < 1/6 the length of metanotum. Segment II about 3× longer than median segment. II-VI about equal in length and width, all gently constricted medially; on average 5.3× longer than wide. VII noticeably shorter than previous. VIII hardly more than half the length of VII, constricted in the basal 1/4, the posterior portion widened, roughly parallel-sided and somewhat broader than II-VII (Fig. 5). Stigmata of tergum VIII small and considerably displaced, being positioned some 1/3 off the anterior angle (Fig. 4). IX shorter and slightly narrower than VII, rectangular. Anal segment scarcely longer than IX and gently widened in posterior portion, the posterior margin with a shallow median indentation. Rudimentary vomer is an acute back-curving, hook-like protuberance (Fig. 4). Cerci about 1.3× longer than anal segment, slender, incurving and with the apex slightly club-like; intero-basal spine short but acute (Fig. 5). Poculum strongly convex, cup-shaped and reaching roughly half way along tergum IX.
Legs: all very long and slender. Profemora almost equal in length to head, pro- and mesonotum combined, mesofemora reaching 2/3 the way along abdominal segment II and metafemora reaching to posterior margin of V. Basitarsi very elongate and almost 1.3x longer than remaining tarsomeres combined.

Comments.—The here designated and redescribed LT of *Bacunculus pictus* Brunner v. Wattenwyl, 1907 in NHMW is the only specimen of the type-series that fully matches the original description and key features used by Brunner v. Wattenwyl (1907). The PLT's in NHMW and BMNH are not conspecific and both represent *P. utilaensis* (Zompro, 1998 n. stat.). Hence, *P. picta* is so far known only from a unique type specimen.

Distribution.—Only known from the type-locality Vera Paz in northern Central Guatemala.

Paracalynda utilaensis (Zompro, 1998) n. stat.
(Figs 1, 2, 6-14)

Pseudobacteria picta utilaensis Zompro, 1998: 215, figs. 6-8. **HT**, ♂: Honduras, Isl. Utila, III.1997, T. Kujawski leg. [coll. OZ]; **PT**, 1 ♂, 1 ♀, 1 ♀ (nymph n5): Honduras, Isl. Utila, III.1997, T. Kujawski leg. [coll. OZ]; **PT**, 2 ♂♂, 1 ♀: Captive reared by O. Zompro, F1-generation [coll. OZ]. n. stat.
Paracalynda picta utilaensis, Zompro, 2001: 207, figs. 19-20, 88-89, 130-131; Otte & Brock, 2005: 245.
Bacunculus pictus Brunner v. Wattenwyl, 1907: 333 (in part – only PLT's). **PLT**, ♂: Coll. Br. v. W., Guatemala, Mus. Stuttgart; det. Br. v. W., *Bacunculus pictus*; 23.376 [NHMW, No. 684; specimen retained from SMNS]; **PLT**, ♂: Syntype; Senahu, Vera Paz, Champion; 32.; Godman-Salvin Coll. 1908.-168.; B.C.A. Orth. II, *Bacunculus pictus* Redt.; *Bacunculus pictus* Brunner, 1907, det. John Huxley, 1964, BMNH(E) #844537 [BMNH]. (**Not: PLT**, ♂: Syntype; Atoyac, Vera Cruz, Schumann; 29.; Godman-Salvin Coll. 1908.-168.; B.C.A. Orth. II, *Bacunculus pictus* Redt.; *Bacunculus pictus* Brunner, 1907, det. John Huxley, 1964, BMNH(E) #844536 [BMNH]. à This is notcongeneric and belongs in the genus *Pseudosermyle* Caudell, 1903).

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Table 1. Measurements of *Paracalynda* spp.

	♂, LT *picta*(NHMW)	♂, PLT *picta (= utilaensis)* (NHMW)	♂♂ *utilaensis* (coll. FH)	♀♀ *utilaensis* (coll. FH)
Body:	86.0	70.0	73.8-79.0	111.0-124.0
Pronotum:	2.6	2.0	2.2-2.3	3.2-3.8
Mesonotum:	22.4	19.0	19.5-20.0	25.2-28.5
Metanotum:	12.5	11.9	11.0-11.4	13.7-14.9
Median segment:	2.0	2.2	2.1-2.2	2.9-3.0
Profemora:	28.4	23.3	25.0-26.2	26.0-30.0
Mesofemora:	22.0	16.2	19.6-20.9	20.0-21.3
Metafemora:	26.2	22.1	22.7-24.5	23.8-28.2
Protibiae:	31.8	32.9	35.2-36.0	30.7-34.5
Mesotibiae:	24.1	24.4	24.6-27.2	21.6-25.2
Metatibiae:	30.8	30.0	31.5-24.8	28.0-33.5
Antennae:	> 70.0	> 73.0	81.0-85.0	60.0-72.0

Further material.— (16 ♂♂, 10 ♀♀, eggs): BELIZE: 1 ♀, 2 ♂♂, eggs: ex Zucht: F. Hennemann, 2007, Herkunft: Belize, Green Hills, Cayo, 2005, leg. J. Meerman [coll. FH, No's 0613-1 to 3 & E]; 3 ♀♀: ex Zucht: F. Hennemann, 2008/09, Herkunft: Belize, Green Hills, Cayo, 2005, leg. J. Meerman [coll. FH, No's 0613-4 to 6]; 6 ♀♀, 14 ♂♂: ex Zucht B. Kneubühler 2006, F1 gen., Zuchtstamm ex Belize, Green Hills, Cayo, leg. J. Meerman, 2005 [coll. OC].

Diagnosis.— Males differ from those of *P. picta* (Brunner v. Wattenwyl, 1907) by: the smaller size; less slender body; brown general coloration (Fig. 2); shorter and more ovate head; relatively shorter and broader abdominal tergites VIII-X (Fig. 5); somewhat larger poculum; less prominent and acute rudimentary vomer (Figs 10-11) as well as by the relatively shorter and more robust cerci, which have the interobasal spine longer and narrower than in *picta* (Fig. 6).

Comments.—Zompro (1998) originally described *Pseudobacteria picta utilaensis* based on material originating from Utila Island (Honduras) some kilometres off the south coast of Belize and regarded this as a subspecies of *P. picta* (Brunner v. Wattenwyl, 1907), a species described from Guatemala. Subsequently, Zompro (2001) placed both the nominate form and subspecies in the newly described genus *Paracalynda*. However, Zompro was apparently not aware that *P. picta* was described from as many as four syntypes, two each in NHMW and BMNH, since the author only quoted a holotype in NHMW and provided the very unprecise data "Coll. Br. v. W., Guatemala, Godman" (Zompro 2001). Examination has proven these four syntypes to represent as many as three distinct species, one of which is not even congeneric and belongs in *Pseudosermyle* Caudell, 1903. Only the male from Vera Paz in NHMW fully matches with the original description and is here designated as the LT of *P. picta* (see above). The remaining two PLT's, one each in NHMW and BMNH, are conspecific and represent *P. picta utilaensis*. Since these two specimens clearly represent a separate species, Zompro's subspecies is here raised to species level (n. stat.).

One adult pair of *P. utilaensis* was collected by Jan Meerman in Central Belize near Green Hills in the Cayo District during 2005. The collector stated *Piper amalgo* (Piperaceae) to be the preferred host plant and *Paulina* sp. (Sapindaceae) to have been accepted as an alternative food-plant in captivity in Belize (Jan Meerman personal communication). Eggs laid by this couple were sent to Bruno Kneubühler (Switzlerland), who first reared this species in captivity in Europe, mostly using ferns as an alternative food plant. Eggs of the F1-generation were kindly passed on to the authors, who were able to culture from these on *Prunus laureocerasus* (Rosaceae) and ferns in fairly dry and well-ventilated conditions. Unfortunately, the F3-generation has become parthenogenetic, but further breeding has shown this species to be capable of parthenogenetic reproduction. Some variation is seen in the coloration of females which range from pale over mid-green to straw, have the body, to a variable degree, furnished with small pale brown to grey speckles, and may sometimes have the bases of all femora mid to dark brown. Males show slight variation concerning the coloration, with specimens from Utila Island having the pale bands of the legs more distinct than from other localities. Zompro (1998) cited a body length of 83.2 mm for the male HT, which is slightly larger than the captive reared specimens at hand.

Distribution.—Utila Island (politically a part of Honduras), Belize (Cayo District: Green Hills) and Guatemala (Vera Paz: Senahu).

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