

*This contribution is published
to honor Dr. Amnon Freidberg,
a scientist, a colleague and a friend,
on the occasion of his 75th birthday.*

New discoveries in New World Atissini as revealed in revision of *Pelignellus* Sturtevant & Wheeler (Diptera: Ephydriidae)

TADEUSZ ZATWARNICKI¹ & WAYNE N. MATHIS²

¹*Institute of Biology, Opole University, ul. Oleska 22, 45-052 Opole, Poland.*

E-mail: zatwar@uni.opole.pl

²*Department of Entomology, National Museum of Natural History, MRC 169, Smithsonian Institution, Washington, DC 20013-7012, USA.*

E-mail: mathisw@si.edu

ABSTRACT

Pelignellus is resurrected from synonymy with *Atissa* and is revised. The genus and both included species—*P. subnudus* Sturtevant & Wheeler from the USA (California) and *P. freidbergi* n. sp. from Central America (Costa Rica, El Salvador, Panama)—are described with an emphasis on structures of the male terminalia, which are fully illustrated. The species are keyed and their distribution data are provided. For perspective and to facilitate recognition of genera and species, the tribe Atissini is diagnosed and a key to genera is provided.

KEYWORDS: Ephydriidae, Atissini, *Pelignellus*, shore flies, New World, Central America, identification key, new species.

RESUMEN

Pelignellus es recuperado de la sinonimia con *Atissa* y se revisa. El género y sus dos especies, *P. subnudus* Sturtevant & Wheeler de los Estados Unidos (California) y *P. freidbergi* n. sp. de América Central (Costa Rica, El Salvador y Panamá), se describen con un énfasis en las estructuras de los genitales masculinos, que están completamente ilustradas. Las especies se distinguen en la clave de identificación y se proporcionan sus datos de distribución. Para facilitar el reconocimiento de géneros y especies, se diagnostica la tribu Atissini y se proporciona una clave de identificación para los géneros.

PALABRAS CLAVE: Efidridas, Atissini, *Pelignellus*, moscas de los playones, Nuevo Mundo, América Central, clave de identificación, nuevas especies.

INTRODUCTION

Taxa of the shore-fly tribe Atissini Cresson are generally poorly known despite being abundant and diverse at both the generic and specific levels and being widespread throughout much of the world (Mathis & Zatwarnicki 1995, and updates). This is attributable at least in part to their minute size with body lengths of adults being less than two millimeters. Specimens of a few species are less than

one millimeter. Although some species frequent freshwater environments, the vast majority occur in inhospitable saline or alkaline habitats both inland and along maritime coasts. Unless specifically sought by collectors, specimens are usually overlooked, as reflected by their absence or sparse numbers in most collections. Herein, we offer this revision of the little-known genus *Pelignellus* Sturtevant & Wheeler as a contribution toward furthering our understanding about this enigmatic tribe of tiny shore flies.

Sturtevant and Wheeler (1954) first described the genus *Pelignellus* in a review paper on Nearctic shore flies. *Pelignellus* is based on *P. subnudus*, a new species from southern California that Sturtevant and Wheeler also described in the same paper. They published their article to complete a series of faunistic works that E.T. Cresson, Jr. had begun on the Nearctic shore flies (Cresson 1942, 1944, 1946, 1949) and that was not completed due to Cresson's untimely death (Roback 1969).

Being a tiny and little-known genus, the literature treating *Pelignellus* is both sparse and mostly limited to brief listings. Wirth and Stone (1956) mentioned it in their review of aquatic insects of California, and Wirth (1965) included the genus and species in his chapter on Ephydridae in the Nearctic catalog of Diptera. Mathis and Zatwarnicki (1990b) then reassessed the status of *Pelignellus*, concluding that this genus was better placed within the genus *Atissa* and formally made the synonymy. Their conclusion was based on the position of the interfrontal setae, being anterior in *Pelignellus* and posterior in *Atissa*, and suggested that this was a trivial character for generic recognition. They further noted that structures of the male terminalia of *Pelignellus* were like those of *Atissa*. Re-evaluating these characters plus recognition of a new species that is closely related to *P. subnudus* prompted the research reported in this paper.

MATERIALS AND METHODS

The descriptive terminology, with the exceptions noted in Mathis (1986) and Mathis & Zatwarnicki (1990a) and below, generally follows that published by Merz and Haenni (2000). Specimens of *Pelignellus* are very small, and study and illustration of the male genitalia required use of a compound microscope. We have followed the terminology for most structures of the male genitalia as applied to the genus *Pelignellus* (Figs 3–6) that other workers in Ephydridae have used (see references in Mathis 1986; Mathis & Zatwarnicki 1990a, b; Zatwarnicki 1996), except the term aedeagal apodeme has been replaced with the synonymous term phallapodeme. The species descriptions are composite and based on all available specimens. The species descriptions emphasize structures of the male terminalia, as these seem to be reliable for distinguishing species. Externally, specimens are very similar.

Label data from each specimen were recorded and listed alphabetically according to country, island, district, and city. As available, date of collection, collector, sex, and specimen location were listed. Label data from holotype specimens were

recorded verbatim, and clarifying information, such as script style and label color, is enclosed within brackets.

External morphological structures were observed and recorded using a dissecting microscope. Continuous characters were measured using a calibrated ocular micrometer attached to either a compound or dissecting microscope.

Dissections of male and female genitalia and descriptions were performed using the method of Clausen & Cook (1971) and Grimaldi (1987). Microforceps were used to remove abdomens, which were macerated in a 10 % potassium hydroxide solution at room temperature for 20–30 hours. Cleared genitalia were rinsed in distilled water and 70 % ethanol and then transferred to glycerin for observation. If necessary, for proper orientation, the specimen was transferred from glycerin to glycerin jelly. The glycerin jelly was heated, and the specimen appropriately oriented. After cooling, the embedded specimen in glycerin jelly became immobilized. Abdomens were placed in a plastic microvial filled with glycerin and attached to the pin supporting the remainder of the insect from which it was removed.

External morphological characters were drawn using an ocular grid attached to a stereoscopic dissecting microscope. Internal genitalia features were drawn using a camera lucida with a Nikon Labophot2 and were rendered using the graphic software Micrografx Designer 7.0. Photographs of habituses were taken with a Canon EOS 7D (18 Mp) camera with a zoom objective 70–200/f4 and a Nikon L Plan 20×/0.35 SLWD microscopic objective. The images were then combined, using licensed stacking software, Zerene Stacker.

Measurements of quantitative characters were made using a calibrated ocular reticule with a Leica MZ8 stereomicroscope for 2 male and 2 female specimens that were determined by eyeball to be the largest and smallest specimens. The measurements were recorded as a range for each sex. Quantitative characters used commonly in the descriptions are defined as follows:

1. Body length: maximum distance in lateral view from anterior margin of head to posterior abdominal apex.
2. Gena-to-eye ratio: genal height (immediately below the eye)/eye height.
3. Wing ratio: width (greatest distance)/length (from base of cell cua to apex).
4. Costal vein ratio: straight line distance between the apices of veins R_{2+3} and R_{4+5} (Costal Section III)/distance between the apices of veins R_1 and R_{2+3} (Costal Section II).
5. M vein ratio: straight line distance along vein M between crossvein $dm-cu$ and $r-m$ /distance apicad of crossvein $dm-cu$.

Although most specimens are in the collection of the National Museum of Natural History (USNM), Smithsonian Institution, Washington, DC, USA, we also studied numerous specimens from the Academy of Natural Sciences of Philadelphia, Pennsylvania (ANSP; Jon K. Gelhaus and Jason D. Weintraub). Some paratypes of the new species are deposited to the Steinhardt Museum of the Natural History, Tel Aviv University, Israel (SMNH-TAU).

TAXONOMY

Subfamily Hydrelliinae Robineau-Desvoidy, 1830

Tribe Atissini Cresson, 1942

Atissini: Cresson 1942: 103. Type genus: *Atissa* Haliday in Curtis 1837; Wirth 1965: 735–737 [Nearctic catalog]; 1968: 77.4–77.6 [Neotropical catalog]; Cogan & Wirth 1977: 324–325 [Oriental catalog]; Cogan 1980: 657–658 [Afrotropical catalog]; 1984: 129–134 [Palearctic catalog]; Mathis 1989: 641 [Australasian/Oceanian catalog]; Mathis and Zatwarnicki 1995: 54–60 [world catalog].

Diagnosis: Atissini are distinguished from other tribes of the subfamily Hydrelliinae by the following combination of characters: Body length small to moderately small, 0.60–2.10 mm; generally densely microtomentose, silvery gray to brown. Head: Antenna with 4–6 dorsal rays (secondarily, as in *Asmeringa*, the arista is barely developed, just a stub without any aristal rays). Eye bearing numerous, short, interfacetal, fluted setulae. Thorax: Dorsocentral setae usually 0+1, rarely 1+1 (anterior seta sutural); posterior notopleural seta either at about same level as anterior seta or distinctly dorsad of anterior seta. Wing slightly pointed at apex of vein R_{4+5} ; vein R_{2+3} short; costal section III long, at least $\frac{2}{3}$ length of section II, sometimes longer; costa extended to vein M; frequently area around and over crossvein dm–cu distinctly darkened. Midtibiae lacking dorsal, spine-like setae. Abdomen: Male terminalia: Epandrium in posterior view as an inverted U, sometimes discontinuous medially across dorsum; cercus separated from epandrium, rarely fused anteriorly with epandrium, from oval to clavate; surstylus (= gonostylus) present or reduced, if present, its shape and connection with epandrium variable: separated or fused with epandrium, small and narrow to robust and elongate or broad, or forming a genital plate; postgonite elongate, bearing some setulae, rarely connected with surstylus; pregonite small, short, more or less triangular or lobate, bearing 1–3 apical setulae; fused aedeagus/phallapodeme elongate, basal third (phallapodemal section) V-, or T-shaped or rod-like in ventral view, medial section more robust and wide, apical third tapered to acutely pointed apex; hypandrium as simple sclerite with rounded anterior margin, in lateral view flattened.

Discussion: The characters used to distinguish Atissini from other tribes in Hydrelliinae include both symplesiomorphies and synapomorphies. The synapomorphies that establish the monophyly of the tribe are: (1) Wing slightly pointed at apex of vein R_{4+5} ; (2) Vein R_{2+3} short, with costal section III long, at least $\frac{2}{3}$ the length of section II, sometimes longer; and (3) Phallapodeme and aedeagus fused.

In addition to these synapomorphies, most specimens are densely microtomentose and are dull whitish or silvery gray to tan; often the posterior notopleural seta is inserted at an elevated position relative to the anterior seta; and specimens are frequently found in saline or alkaline aquatic habitats along maritime coasts or inland.

Although the tribe Atissini is a monophyletic clade, we have not definitively identified its sister group. Perhaps the tribe Hydrelliini Robineau-Desvoidy is a likely candidate, as both Hydrelliini and Atissini have eyes that bear conspicuous and numerous interfacetal setulae that are fluted.

Key to genera of Atissini Cresson

- 1 Antenna in moderately to very deep cavities 2
 - Antenna at most in rather shallow depressions 3
- 2 Foretibia bearing a large, black, blunt, peg-like seta at apex; antennae somewhat approximate, face between antennae a prominent triangle bearing numerous stout, black, setulae; scape greatly enlarged, height twice length; arista reduced to basal, slightly thickened portion..... *Isgamera* Giordani Soika
 - Foretibia normal, not bearing a large, blunt, black seta at apex; antennae somewhat separate with face between bases a wide, blunt ridge lacking stout, black setulae; scape about as long as length; arista short but bearing dorsal branches.....
..... *Asmeringa* Becker
- 3 Posterior notopleural seta at level distinctly dorsad of anterior seta; face in lateral view concave or protrudent 4
 - Posterior notopleural seta at nearly same level as anterior seta, only slightly dorsad; face in lateral view mostly vertical, straight..... 6
- 4 Gena moderately high to high, height greater than height of basal flagellomere; 1–2 pairs of interfrontal setae anterior of anterior ocellus
..... *Pelignellus* Sturtevant & Wheeler
 - Gena shorter, height always less than height of basal flagellomere; frontal setae, when present, posterior to anterior ocellus..... 5
- 5 Face in lateral view concave, most prominent at ventral facial margin, lacking dorsally curved setae *Atissa* Haliday
 - Face convex in lateral view, protrudent, prominent just ventrad of antennal bases, bearing large, dorsally curved setae near facial prominence.....
..... *Ptilomyia* Coquillett
- 6 Intrafrontal setae absent; ocellar setae moderately well developed, in ocellar triangle, sometimes just laterad of anterior ocellus; pseudopostocellar setae greatly reduced, hair-like..... *Subpelignus* Papp
 - Intrafrontal setae well developed, proclinate; ocellar setae reduced, in ocellar triangle; pseudopostocellar setae moderately well developed, usually slightly divergent..... 7
- 7 Gena comparatively low, less than ½ eye height. Acrostichal setulae in 2 rows *Schema* Becker
 - Gena high, over ½ eye height. Acrostichals in 4 rows *Cerobothrium* Frey

Pelignellus Sturtevant & Wheeler, 1954 (revised status)

Pelignellus: Sturtevant & Wheeler 1954: 252 (type species: *Pelignellus subnudus* Sturtevant & Wheeler, 1954: 252, orig. des.); Wirth & Stone 1956: 464 [key], 467 [list]; Wirth 1965: 737 [Nearctic catalog], 1968: 77.6 [Neotropical catalog]; Wirth *et al.* 1987: 1038–1039 [key]; Mathis & Zatwarnicki 1990b: 896 [synonymy with *Atissa*, figures of male terminalia].

Diagnosis: Minute to small shore flies, body length 1.05–1.65 mm; generally densely microtomentose species, especially dorsum of head, thorax, and abdomen.

Head: Frons wider than high; mesofrons weakly to not distinguished from parafrons; 1–2 pairs of interfrontal setae inserted well anterior of anterior ocellus; fronto-orbital setae 3, 2 anterior setae proclinate, inserted anterior of longer, reclinate to lateroreclinate seta; ocellar setae weakly developed, proclinate, shorter than lateral vertical seta; pseudopostocellar setae reduced, mostly laterocline but slightly proclinate; lateral vertical seta slightly shorter than medial vertical seta; ocelli arranged in equilateral triangle. Antenna rather short, basal flagellomere as high or higher than long, rounded apically; arista short, not longer than basal flagellomere, bearing 4–5 dorsal rays, these short, length less than width of basal flagellomere. Eye elliptical, bearing numerous interfacetal, fluted setulae, orientation obliquely horizontal. Face in lateral view distinctly concave, excavated, epistomal margin robust, bluntly projected; 2–4 short, pale setae in oblique row ventrolaterally; row of pale, tiny setulae near parafacial. Gena moderately high to high, height greater than height of basal flagellomere. Palpus well developed, yellow.

Thorax: Acrostichal setulae in 2 rows, a prescutellar acrostichal seta well developed; dorsocentral setulae more or less in a single row, only posteriormost seta well developed; 1 prescutellar seta; no postsutural supra-alar setae; scutellar disc with few setulae; 1 lateral and 1 apical seta; notopleural setae 2–3, posterior seta inserted at elevated level from anterior seta, with 1–3 short, pale setulae anterodorsad of anterior seta. Wing generally faintly infusate, milky gray to faintly tannish; pointed apically near apex of vein R_{4+5} ; crossveins generally infusate, brown. *Abdomen:* Tergites uniformly invested with gray to silvery gray microtomentum. Male terminalia (Figs 3–6, 13–16): Epandrium in posterior view as an inverted U, varying from being parallel sided to being widest at midheight, diamond-like, in lateral view with ventral portion projected anteriorly as a triangle; cercus in posterior view broadly ovate, in lateral view narrowly semihemispherical; surstylus short and robust to elongate and narrow, postgonite in lateral view variable, longer than wide, at last apical half mostly parallel sided, in ventral view elongate, narrow; pregonite small, short, more or less triangular, bearing 2 apical setulae; fused aedeagus/phallapodeme in lateral view elongate, apical half digitiform, basal half more robust and with narrow U-shaped notch or relatively wide concavity sub-basally, in ventral view narrow, moderately elongate, apical third tapered to acutely pointed apex; hypandrium in lateral view very slender, elongate, shallowly sinuous. Female ventral receptacle (Fig. 10): Operculum bowl-like, with ventral margin flat, extended process J-shaped.

Discussion: According to Sturtevant and Wheeler (1954: 252), Wirth wrote that he had identified two species from Panama. We have carefully studied all specimens available in the USNM, including examination of structures of the male terminalia, and have found that these specimens represent a single species, not two. In addition to the specimens that Wirth collected and observed from Panama, we have since collected large series of the same species from **Costa Rica**.

In their discussion, Sturtevant and Wheeler further commented about generic assignment, recognizing that although their new species was similar to congeners

of *Atissa* Haliday and *Pelignus* Cresson (= *Schema* Becker), it is also structurally different, which was the main criterion then used for recognition of genera. To broaden their deliberations, they consulted with a noted shore-fly specialist from England, Mr. J. E. Collin, who proffered his opinion, which, according to Sturtevant and Wheeler, suggested that their new species should be treated as an aberrant *Atissa*, i.e., Collin would expand the generic characterization of *Atissa* to accommodate this new species. Ultimately, however, Sturtevant and Wheeler (1954: 252) decided otherwise, writing that “While we dislike the multiplication of genera, we cannot agree that this form can reasonably be put in that genus [*Atissa*], nor in any other known to us.”

We have likewise re-examined the question of generic placement, especially as we now have a second species that is closely related and has similar morphologically to *P. subnudus*. In addition to external characters, we have also studied structures of the male terminalia, and our interpretation is that these structures represent an ancestral state to those found in *Atissa*. These observations and conclusions are our basis for resurrecting *Pelignellus* from synonymy with *Atissa* and placement of these two species in *Pelignellus*. We hasten to add, however, that our phylogenetic understanding of taxa and lineages within the Atissini is rudimentary, and more comprehensive research and phylogenetic analysis are needed.

Key to species of *Pelignellus*

- 1 One pair of interfrontal setae anterior of anterior ocellus; frons multicolored, dark gray posteriorly to yellowish orange on anterior portion of frontal triangle. Antenna mostly yellow, especially pedicle, only small, dorsal areas silvery gray. Scutellar disc mostly brown (United States: California).....*P. subnudus*
- Two pairs of interfrontal setae; frons dark gray to gray, including frontal triangle. Antenna with small ventral area yellow, otherwise gray to dark gray. Scutellar disc mostly gray with narrow, medial portion brownish (Costa Rica, El Salvador, Panama) *P. freidbergi* n. sp.

Pelignellus freidbergi n. sp.

(Figs 2–10)

Pelignellus subnudus sensu Wirth 1968: 77.6 [misidentification; Neotropical catalog].

LSID: urn:lsid:zoobank.org:act:C7D5204C-E92E-4F6A-B85E-7055081842E1.

Etymology: The species is named to honor Amnon Freidberg. Amnon accompanied us to Costa Rica where we conducted field work. Although he focused on tephritoid Diptera, he collected several other flies, including numerous specimens of shore flies. Amnon is exceptional in the field and is a “born” naturalist. His skills and success as a collector are legendary. It is our pleasure to name this species after him.

Diagnosis: Small shore flies, body length 1.10–1.65 mm. Body mostly gray with central portion of scutum brown.

Head (Figs 2, 7, 8): Frons dark gray, varying slightly depending on angle of view; mesofrons forming isosceles triangle, greater distance across vertex, uniformly colored; 2 pairs of small interfrontal setae, posterior seta inserted at level with anterior ocellus or slightly posterior, anterior seta inserted about midway between anterior ocellus and anterior margin of frons; 4 short fronto-orbital setulae, anterior 3 proclinate and aligned along lateral margin of frons, posterior setula larger than anterior 3, lateroclininate to lateroreclinate, inserted medially from alignment of anterior 3; pseudopostocellar and ocellar setae reduced, similar in size to anterior fronto-orbital setulae. Antenna mostly gray to dark gray, only ventral portion of basal flagellomere yellow to yellowish orange; basal half of arista swollen, bearing 5 dorsal rays, these relatively short, none greater in length than height of basal flagellomere, apical half of arista style-like. Face in lateral view concave, with silvery microtomentum, epistomal margin robustly produced. Facial and genal setae and setulae silvery white. Eye elliptical, obliquely oriented. Gena relatively high; gena-to-eye ratio 0.58–0.64.

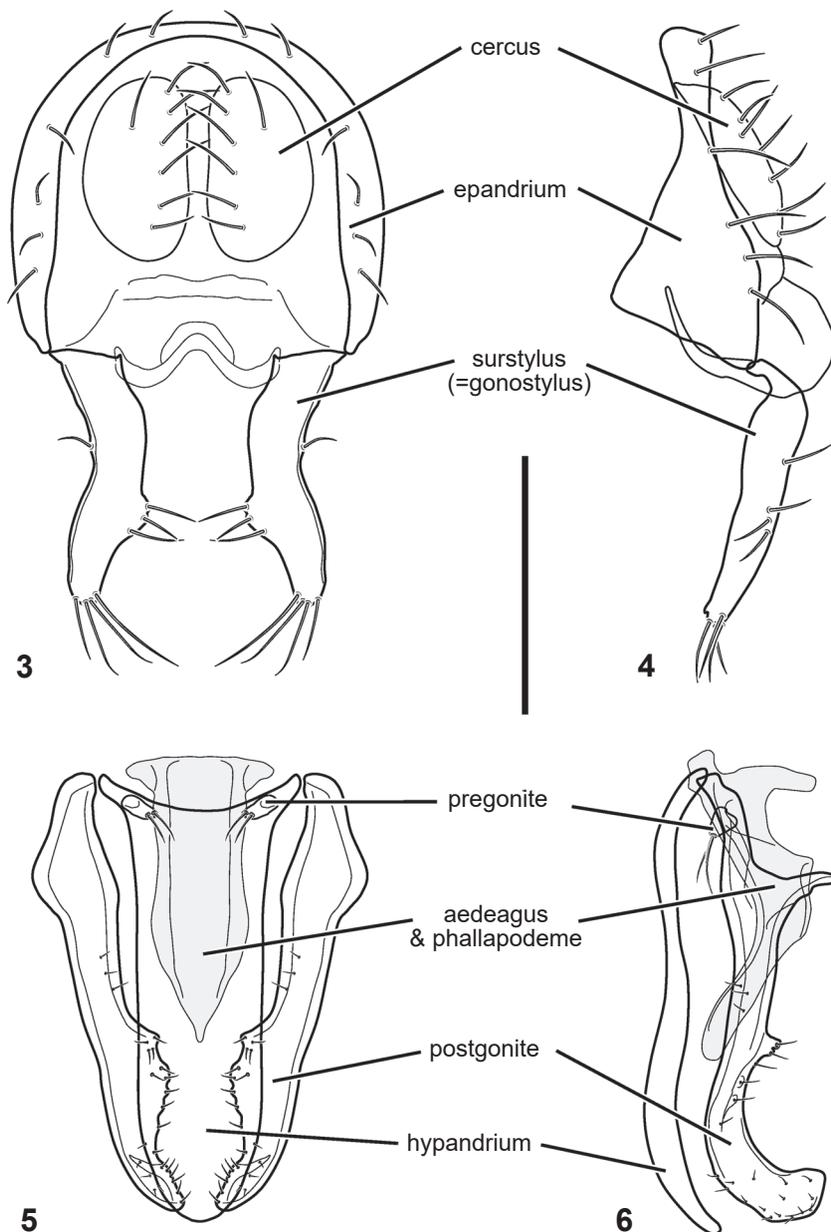
Thorax (Figs 7–9): Scutum with much of midportion brown, anterior and lateral areas gray; scutellar disc with small, medial area tan; 1 pair of presutural acrostichal setae and only posterior dorsocentral seta better developed; other acrostichal and dorsocentral setulae short; notopleuron with 1–2 faint, short setulae anterodorsad of anterior seta. Pleural area generally gray, pleural setae reduced, pale colored. Wing (Fig. 9) faintly tan, somewhat hyaline; wing ratio 0.42–0.44; costal vein ratio 0.68–0.71; M vein ratio 0.58–0.63. Legs generally gray to blackish gray; only basal 3 tarsomeres yellowish.

Abdomen: Tergites uniformly gray, similar to pleural areas. Male terminalia (Figs 3–6): Epandrium in posterior view (Fig. 3) as an inverted U, in lateral view (Fig. 4) with ventral portion projected anteriorly as a triangle; cercus in posterior view (Fig. 3) broadly ovate, in lateral view (Fig. 4) narrowly semihemispherical; surstylus elongate, narrow, in posterior view (Fig. 5) irregularly curved, bearing setulae medially at midlength and apically, in lateral view (Fig. 6) elongate, narrow, straight, slightly tapered; postgonite in lateral view (Fig. 6) narrow, elongate, mostly parallel sided but with narrow, relatively short, acutely pointed projection sub-basally and at midlength, in ventral view (Fig. 5) elongate, narrow, medial surface irregularly sinuous; pregonite in lateral view (Fig. 6) tiny, more or less triangular, bearing 2 apical setulae, in ventral view (Fig. 5) oriented obliquely medially; fused aedeagus/phallopodeme in lateral view (Fig. 6) elongate, apical half digitiform, basal half more robust and with U-shaped notch sub-basally, in ventral view (Fig. 5) narrow, moderately elongate, apical third tapered to acutely pointed apex; hypandrium in lateral view (Fig. 6) very slender, elongate, shallowly sinuous. Female terminalia (Fig. 10): Female ventral receptacle (Fig. 10): Operculum as inverted U or thimble, as high as wide, dorsal curvature moderately narrow, ventral margin flat, extended process J-shaped, with narrows, upturned feet at apex.

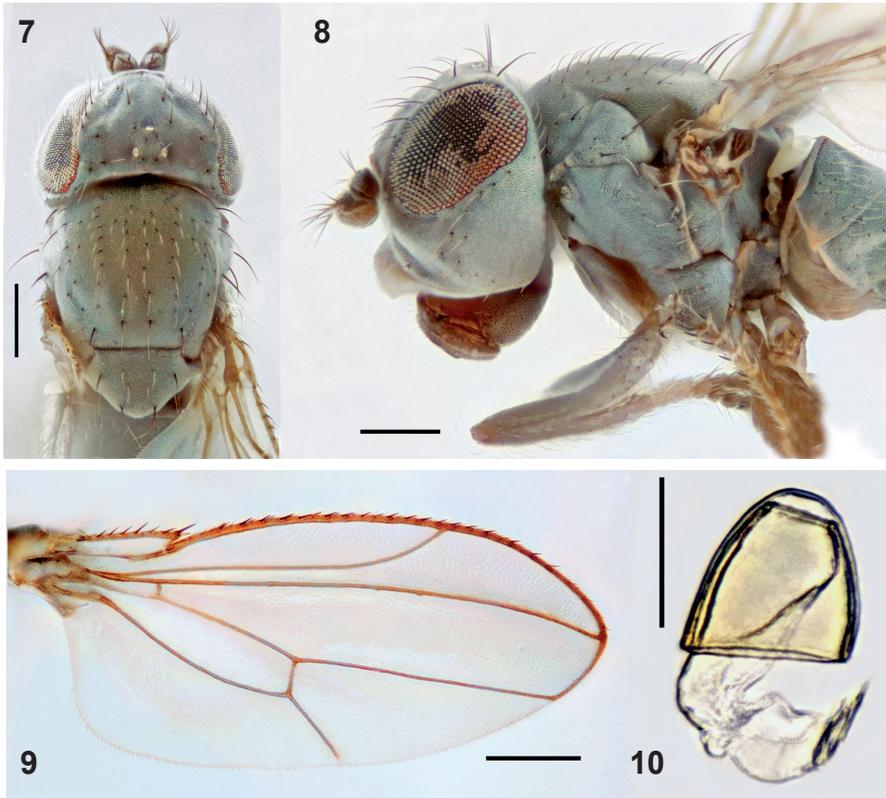
Holotype: ♂ “COSTA RICA. Guana[caste]: Playa Puerto Soley (11°02.5'N 85°40.1'W), 16 June 2003, D. & W. N. Mathis/ ENT 00198835 [plastic bar code label]/HOLOTYPE ♂ *Pelignellus freidbergi*



Figs 1, 2: Antero-oblique photo of head and thorax: (1) *Pelignellus subnudus*, male, United States, California, Orange, Corona del Mar; (2) *Pelignellus freidbergi* n. sp., male, Costa Rica, Guanacaste, Playa Puerto Soley, beach. Scale bar = 0.2 mm.



Figs 3–6: Male terminalia of *Pelignellus freidbergi* n. sp., Costa Rica, Guanacaste, Playa Puerto Soley: (3) epandrium, cerci, and surstyli, posterior view; (4) same, lateral view; (5) internal structures of male terminalia, ventral view; (6) same, lateral view. Scale bar = 0.1 mm.



Figs 7–10: *Pelignellus freidbergi* n. sp.: (7, 8) head and thorax of male, Costa Rica, Guanacaste, Playa Puerto Soley, dorsal (7) and lateral (8) views, scale bar = 0.2 mm; (9, 10) female, Costa Rica, Guanacaste, Playa Puerto Soley: (9) wing, dorsal view, scale bar = 0.2 mm; (10) ventral receptacle, lateral view, scale bar = 0.05 mm.

Zatwarnicki & Mathis USNM [red].” The holotype is double mounted (minuten in block of plastic elastomer), is in excellent condition, and is deposited in USNM.

Paratypes: 33♂ 4♀ bear the same label data as the holotype (USNM); **Costa Rica:** 17♂ 8♀ Guanacaste: Playa de Cuajiniquil (10°56.1'N 85°42.2'W), beach, 16.vi.2003, D. & W.N. Mathis (USNM); 6♂ 7♀ Puntarenas: Bahía Gigante (Río Lajas; 9°53.8'N 84°56'W), beach, 22.vi.2001, D. & W.N. Mathis (SMNHTAU, USNM); 1♀ Malpaís (09°37.6'N 85°09.1'W), beach, 21.vi.2001, D. & W.N. Mathis (USNM).

Other material examined: **El Salvador:** 1♂ Sonsonate: Acajutla [13°35.7'N 89°49.6'W], 29.xii.1964, M.E. Irwin (USNM). **Panama:** 1♀ Cocle: Playa Santa Clara (08°22.4'N 80°06.4'W), 2.vii.1967, W.W. Wirth (USNM); 6♂ 48♀ Darien: Jaqué (07°31'N 78°09.6'W), 24–28.vii.1952, W.W. Wirth (USNM); Panama: 1♂ 1♀ Fort Kobbe (08°55.1'N 79°35.7'W), vii.1957, W.W. Wirth (USNM); 16♂ 39♀ Porto Chorrera (08°52.8'N 79°47'W), 9.vii.1952, W.W. Wirth (USNM).

Type locality: Costa Rica, Guanacaste, Playa Puerto Soley (11°02.5'N 85°40.1'W).

Distribution: Neotropical: Costa Rica (Guanacaste, Puntarenas), El Salvador (Sonsonate), Panama (Cocle, Darien, Panama).

Remarks: Although similar to *P. subnudus* in having a high gena, this species differs in having two pairs of interfrontal setae and in characters from structures of the male terminalia, especially the shape of the elongated surstyli.

Pelignellus subnudus Sturtevant & Wheeler, 1954

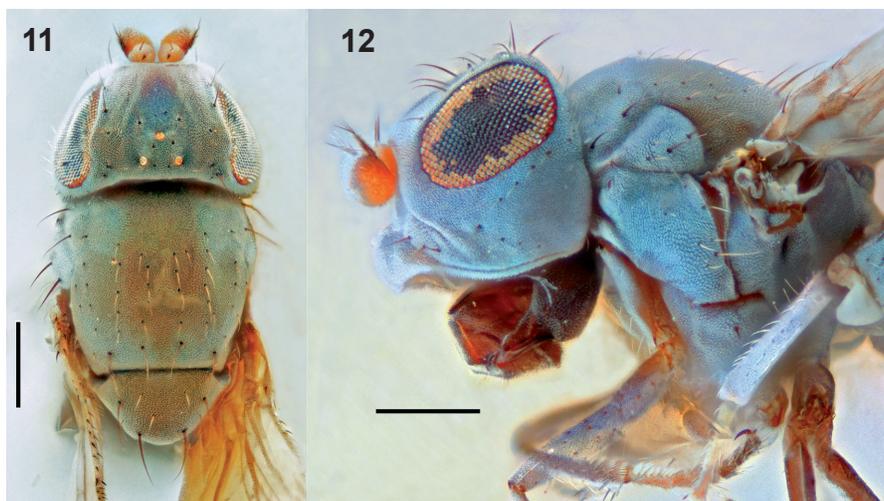
(Figs 1, 11–16)

Pelignellus subnudus: Sturtevant & Wheeler 1954: 252 [United States, California, Orange, Corona del Mar; HT ♂, ANSP (6700)]; Wirth & Stone 1956: 464 [key], 467 [list]; Wirth 1965: 737 [Nearctic catalog]; Wirth *et al.* 1987: 1024, fig. 21 [head].

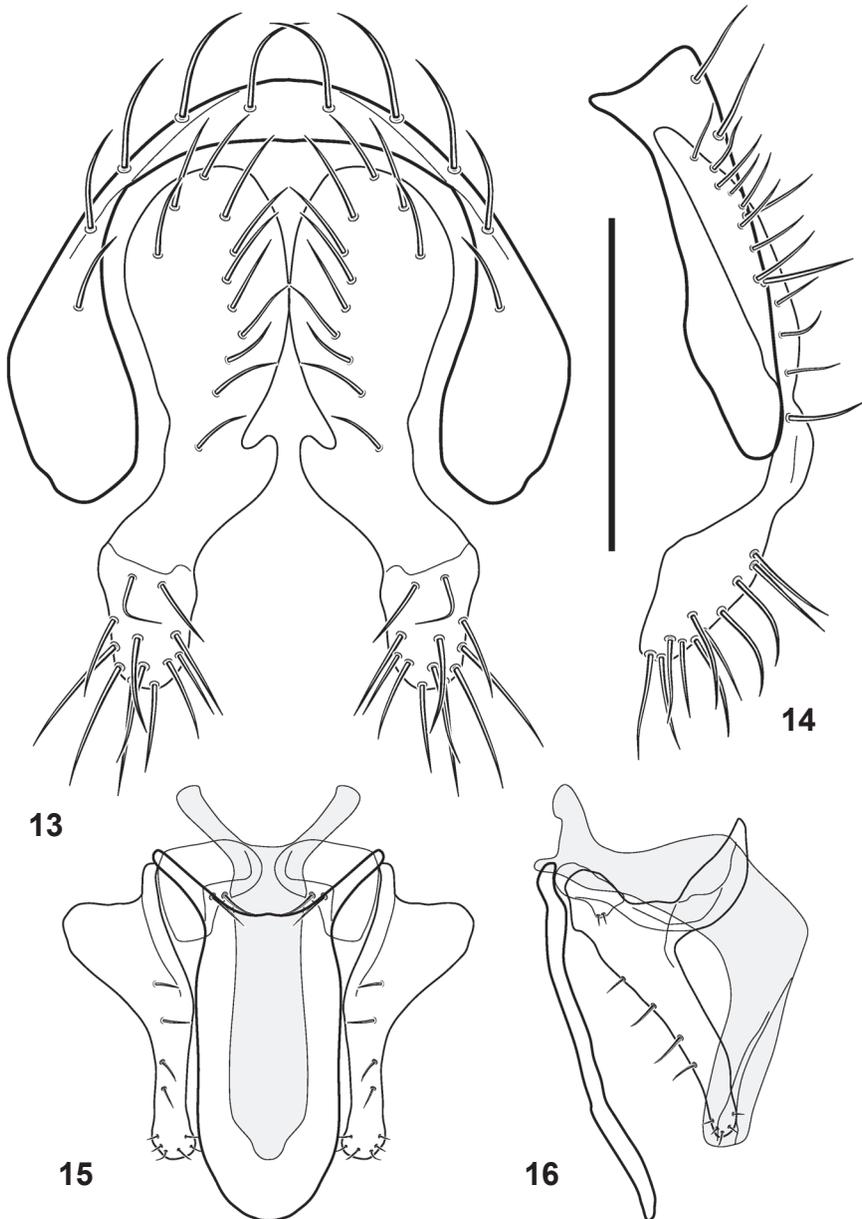
Atissa subnuda: Mathis & Zatwarnicki 1990b: 896 [generic combination]; 1995: 56–57 [world catalog].

Diagnosis: Small shore flies, body length 1.05–1.55 mm. Body mostly gray with central portion of scutum brown.

Head (Figs 1, 11, 12): Frons multicolored, posterior portion at level of ocellar triangle brownish gray to blackish gray, parafrons gray, becoming lighter, whitish gray anteriorly, mesofrons forming irregular triangle, wide, posterior portion robust, becoming abruptly narrowed just anterior to anterior ocellus, coloration of narrowed portion purplish blue posteriorly, gradually becoming reddish orange at vertex; 1 pair of interfrontal setae anterior of anterior ocellus; 3 short fronto-orbital setulae in parafrons, anterior 2 proclinate, aligned, posterior setula larger than anterior 2, laterocline to laterorecline, inserted medially from alignment of anterior 2. Antenna mostly yellowish orange to orange, dorsum sparsely invested with whitish gray microtomentum; basal half of arista swollen, bearing 3–4 dorsal rays, these relatively short, none greater in length than height of basal flagellomere, apical



Figs 11, 12: Head and thorax of *Pelignellus subnudus*, male, United States, California, Orange, Corona del Mar, dorsal (11) and lateral (12) views. Scale bar = 0.2 mm.



Figs 13–16: Male terminalia of *Pelignellus subnudus*, United States, California, Orange, Corona del Mar: (13) epandrium, cerci, and surstyli, posterior view; (14) same, lateral view; (15) internal structures of male terminalia, ventral view; (16) same, lateral view. Scale bar = 0.1 mm.

half of arista style-like. Face in lateral view concave, with silvery microtomentum, epistomal margin robustly produced. Facial and genal setae and setulae gray to silvery white. Eye elliptical, obliquely oriented. Gena-to-eye ratio 0.81–0.82.

Thorax: Scutum with much of midportion brown, anterior, lateral, and usually posterior margins gray; scutellar disc variable from mostly gray to mostly brown; 1 pair of presutural acrostichal setae and only posterior dorsocentral seta better developed; other acrostichal and dorsocentral setulae short. Pleural area generally gray, pleural setae reduced, pale colored. Wing uniformly faintly tan, partially hyaline; wing ratio 0.45–0.49; costal vein ratio 0.75–1.00; M vein ratio 0.52–0.56. Legs generally gray to blackish gray, posterior surfaces darker and subshiny; only basal 3 tarsomeres yellowish.

Abdomen: Tergites uniformly gray, similar to pleural areas. Male terminalia (Figs 13–16): Epanthrium in posterior view (Fig. 13) as an inverted diamond-shaped U, wider than high, in lateral view (Fig. 14) almost parallel sided, narrowed on ventral $\frac{1}{4}$; cercus in posterior view (Fig. 13) broadly ovate on dorsal $\frac{2}{3}$, ventral $\frac{1}{3}$ narrowed, in lateral view (Fig. 14) narrowly semihemispherical; surstylus in posterior view (Fig. 15) relatively short, wide, thumb-like, length less than half length of cerci, bearing several evenly scattered setulae, in lateral view (Fig. 16) wide basally, tapered gradually to relatively broadly rounded apex; postgonite in lateral view (Fig. 16) elongate, irregularly funnel shaped, broad on basal $\frac{1}{3}$, thereafter gradually tapered apical half almost parallel sided; in ventral view (Fig. 15) elongate, narrow, irregularly triangular, medial surface shallowly angulate, lateral surface shallowly concave, apex slightly expanded; pregonite in lateral view (Fig. 16) tiny, more or less triangular, bearing 2 small, apical setulae, in ventral view (Fig. 15) oriented obliquely medially; fused aedeagus/phallapodeme in lateral view (Fig. 16) elongate, apical half digitiform, rod-like, basal half more robust and with shallow concavity sub-basally, in ventral view (Fig. 15) moderately narrow, moderately elongate, apical $\frac{3}{4}$ thumb-like, almost parallel sided, apex truncate; hypandrium in lateral view (Fig. 16) very slender, elongate, almost straight to very shallowly concave.

Type material examined: holotype ♂ labeled “Corona del Mar[,] (33°35.9'N 117°52.4'W) Cal. M[a]r[ch] 19 [handwritten; yellow white]/TYPE 6700 [number handwritten; red]/HOLOTYPE *Pelignellus subnudus* St[urte]v[an]t & Wh[ee]l[e]r [red].” The holotype is glued to a large paper triangle, is in very good condition, and is deposited in the ANSP (6700). Twenty-six paratypes (4♂ 22♀; ANSP, USNM) bear the same locality data as the holotype with dates of collection from 3–19.iii.1950.

Type locality: United States, California, Orange, Corona del Mar.

Distribution: Nearctic: United States (California).

Remarks: Thus far, this species is only known from the type locality, which is along the maritime coast in southern California. We suspect that this species is more widespread than is indicated by current collection records.

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