A REVISION OF THE SHORE-FLY GENERA HOSTIS CRESSON AND PARATISSA COQUILLETT (DIPTERA: EPHYDRIDAE)

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Abstract.—The shore-fly genera Hostis Cresson and Paratissa Coquillet are revised. These genera, now placed in the tribe Psilopini, are sister groups to each other. Hostis, which is monotypic, occurs on maritime beaches of the Pacific and Indian oceans. Acanthonotiphila Scotti Séguy is a junior synonym of Hostis guamensis Cresson. Paratissa, comprising four species, includes P. neotropica, which is newly described (type locality: Belize. Stann Creek District: Carrie Bow Cay); also, P. coriacea (Lamb), P. semilutea (Loew), and P. pollinosa (Williston). The latter three species had been considered to be conspecific but are here shown to be valid species.

Key Words: Diptera, Ephyridae, shore flies, Hostis, Paratissa, phylogeny

With three notable exceptions (Hydrellia Robineau-Desvoidy with 206 species, Notiphila Fallén with 147 species, and Scatella Robineau-Desvoidy with 141 species), no genera of shore flies presently include more than 100 species. Far more genera, to the contrary, are monotypic or have just a few species (nearly 45 genera, representing over one-third of all known shore-fly genera, have three or fewer species). Two genera in the latter category are Hostis Cresson and Paratissa Coquillet, the subjects of this revision. These two genera are also linked in more significant ways of which the most important from a phylogenetic standpoint is their relationship as sister groups in the tribe Psilopini (see discussion of character evidence below). They also occur exclusively on maritime beaches, usually associated with the strand line, throughout much of the tropical and subtropical regions of the world. An exception is the west coast of the Western Hemisphere where no species of these genera are known to occur.

The purpose of this paper is to present a revision of these two genera. Species of both genera are being treated in faunal studies that I am conducting on shore flies of the Caribbean and the Republic of Seychelles. These faunal studies prompted this study, which is needed to ensure accurate determinations of the included species. Other objectives of this study are to further unravel the phylogenetic relationships of these taxa and to utilize characters from the male terminalia, which have never been described or illustrated previously.

Little is known about the natural history of either genus, especially their immature stages. Adults, and probably the eggs, larvae, and puparia, occur on maritime beaches, nearly always in association with debris at the strand line. Accumulated seaweed and other organic material at the high tide mark seem to be the preferred habitat, and at times the adults occur there in great abundance, frequently in association with members of the family Tethinidae.

The paucity of information and research on these genera makes their published his-
tory relatively simple. Thus, previous work on their systematics, especially phylogenetic studies, is relatively brief, straightforward, and is summarized in the following paragraphs.

Coquillett (1900) described Paratissa in the twilight of the 19th century and selected Drosophila pollinosa Williston as the type species. Until then, this species had been treated in the genus Drosophila, although in the original description, Williston (1896: 414) noted that this species was probably an ephydrid. Williston preferred describing pollinosa in Drosophila, however, because some of its characters would “... lead one to search for the species in this genus.” Coquillett’s precedent of considering this species as an ephydrid was followed by virtually all subsequent workers, although neither Coquillett nor any predecessor verified the identity of Williston’s species by actual study of Williston’s primary types. The specimens Williston studied were collected on St. Vincent by H. H. Smith while the latter was in the employ of the West Indian Committee, which was established in part to investigate the “Flora and Fauna of the West Indies” (Williston 1896: 253). In 1923, Sturtevant reported that the primary types of this species were apparently lost. With the exception of Sturtevant and Wheeler (1954), who reviewed Paratissa as part of a synoptic study of North American Ephydridae, no substantive paper was published on this genus between 1923 and 1965. Wirth (1965: 740), in the most recent catalog of North American shore flies, listed D. pollinosa as a junior synonym of Cacoxenus semiluteus Loew, a species first described in the family Drosophilidae and also based on specimens from the Caribbean (Cuba). Wirth studied many of Loew’s primary types at the Museum of Comparative Zoology (Cambridge, Massachusetts) and noted, evidently, that Loew’s species is an ephydrid and further, that it is very similar externally to, and is probably conspecific with, D. pollinosa. Some years later, Mathis (1977) suggested that Paratissa is related to a few genera in the tribe Psilopini, and Cogan (1980: 658) listed one additional junior synonym of P. semilutea, Acanthonotiphila coriacea Lamb (1912: 316), the first species of this group to be recognized as an ephydrid when it was initially described. Lamb described a separate genus for his species, however. Cogan, who had ready access to Lamb’s primary types, was correct in listing Acanthonotiphila as a junior synonym of Paratissa, even though the former was described from specimens collected on the Seychelles, several thousands of kilometers from the Caribbean. In the same paper, Cogan also listed Acanthonotiphila scotti Séguy (1955), which was described from specimens collected on Tromelin, as a congener but with status as a valid species. These are the primary workers and papers that have dealt with the systematics of Paratissa. A few papers reported the occurrence of P. pollinosa on the Hawaiian Islands, although in each case the species was misidentified (Adachi 1952, Hardy 1952, as Hostis guamensis Cresson; Tenorio 1980, as P. semilutea) and of P. pollinosa from islands of the Pitcairn Group and Hawaii (Mathis 1989a, b).

Hostis has a more abbreviated history than Paratissa. Cresson (1945) described Hostis as a monotypic genus with H. guamensis as its type species. Cogan and Wirth (1977) listed the genus and species in their catalog of Oriental shore flies, Mathis (1977) suggested that Hostis is closely related to Paratissa, and more recently Mathis (1989a) reported the occurrence of the genus on several islands of Oceania and on beaches of Australia and the Seychelles (Mahé). Aside from these listings, the genus and species have not appeared in the literature except as a misidentified species of Paratissa (Adachi 1952, Hardy 1952).

Methods.—The descriptive terminology, with the exceptions noted in Mathis (1986), follows that published in the Manual of Nearctic Diptera (McAlpine 1981). The descriptions of species are composite,
based solely on the holotypes. Two venational ratios are used commonly in the des-
scriptions and are defined here (all ratios are averages of three specimens):

1. Costal Vein Ratio: the straight line dis-
tance between the apices of R$_{2+3}$ and
R$_{4+5}$/distance between the apices of R$_1$
and R$_{2+3}$.

2. M Vein Ratio: the straight line distance
along M between crossvein dm-cu and
r-m/distance apicad of crossvein dm-cu.

The phylogenetic analysis was performed
with the assistance of Hennig86 (copyright-
ed), a computerized algorithm that produc-
es cladograms on the basis of parsimony.
Before performing the analysis, the char-
acter data were arranged in transformation
series and then polarized primarily using
outgroup procedures.

Terminology for structures of the male
terminalia is provided directly on the first
illustration of these structures (Figs. 14-18,
Hostis guamensis). It is not repeated for
comparable illustrations of the remaining
species.

Most specimens for this study are in the
National Museum of Natural History, and
deposition for these, unless part of divided
series, is not indicated in the text. Numer-
ous others were borrowed, particularly type
specimens of species described previously.
The institutions from which these were bor-
rowed and the acronyms used in the text
are as follows:

<table>
<thead>
<tr>
<th>Acronym</th>
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<tbody>
<tr>
<td>BMNH</td>
<td>The Natural History Museum, formerly the British Museum (Natural History), London, England (Brian Pitkin)</td>
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<tr>
<td>BBM</td>
<td>Bernice P. Bishop Museum, Honolulu, Hawaii (N. L. Evenhuis)</td>
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<tr>
<td>CNC</td>
<td>Canadian National Collection, Ottawa, Canada (J. R. Vockeroth)</td>
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<tr>
<td>MCZ</td>
<td>Museum of Comparative Zoology, Harvard, University, Cambridge, Massachusetts (David Furth)</td>
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<td>MNHN</td>
<td>Muséum National d'Histoire Naturelle, Paris, France (Loïc Matile)</td>
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<tr>
<td>TAU</td>
<td>Tel Aviv University, Tel Aviv, Israel (Amnon Freidberg)</td>
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**Systematics**

Before proceeding with the descriptive
treatment of Paratissa and Hostis, a few re-
marks are needed to explain the tribal as-
signment and phylogenetic relationships of
these two genera and their included species
within the tribe Psilopini. Most authors
(Cresson 1945, Sturtevant and Wheeler
1954, Wirth 1965, 1968, Cogan 1980, Co-
gan and Wirth 1977) assigned Paratissa and
Hostis to the tribe Discocerinini Cresson.
With recharacterization of that tribe on the
basis of synapomorphies and its establish-
ment as a monophyletic lineage (Mathis
1977, Mathis and Zuyin 1989), Paratissa
and related genera were excluded and placed
was recently divided (Zatwamicki 1992) into
two tribes, with Paratissa and related genera
being placed in the tribe Discomyzini.
Within Discomyzini, Paratissa and Hostis
are apparently related to genera that (1) have
one to five setulae (usually 3–4) inserted on
vein R$_{2+3}$ basad of crossvein r-m and (2)
have well-developed pseudopostocular set-
ea (sometimes inserted within the ocellar
triangle but usually behind and with ori-
entation variable). Frequently there is also
a moderately to well-developed supra-alar
seta, a character that is probably a symple-
siomorphy, however. Other genera, in ad-
dition to Paratissa and Hostis, that are in-
cluded in this group are: Actocetor Becker,
Clanoneurum Becker, Clasiopella Hendel,
Discomyza Meigen, Eremomusca Mathis,
Mimapsilopa Cresson, an ancestor apomorphies for son, morphic condition condition(s) apomorphic (weakly the vertex and relationship 2): or tissa tae: 0) in most parallel and only occasionally or 6-10 Wirth, Guttipsilopa phylogenetic with spond 11211112111211 Steps Fig. 1. Cladogram depicting hypothetical phylogenetic relationships among species of the genera Hostis and Paratissa (an analysis of the cladogram and characters is also provided).

Guttipsilopa Wirth, Helacomyia Cresson, Mimapsilopa Cresson, Rhysophora Cresson, and Trypetomima de Meijere.

Within this assemblage of genera, Paratissa and Hostis are sister taxa (Fig. 1; numbers for characters correspond with those used in the text) based on the following synapomorphies (Table 1) that establish this relationship and their monophyly (plesiomorphic condition indicated by 0, relative apomorphic condition(s) indicated by 1 or 2):

1. Number of dorsal aristal branches: 0) 6-10 or more; 1) few, usually 3-4, occasionally with a much reduced 5th.
2. Orientation of pseudopostocellar setae: 0) laterocline, in the same plane of the vertex (weakly developed); 1) procline and only slightly divergent, sometimes almost parallel (strongly developed).
3. Number and orientation of fronto-orbital setae: 0) usually 2, a procline seta and larger reclinate seta. Occasionally there is a second procline seta that is smaller than the first and which is inserted in front of or behind the first. 1) 3 setae (anterior seta procline, 2nd reclinate, 3rd procline: Hostis); or 2) 4 (anterior 2 setae procline, 3rd laterocline, 4th laterocline: Paratissa).
4. Placement of 2 large facial setae: 0) frequently 1 to several setae, usually 2, but at least one of these setae is usually inserted near the mid-height of the face; 1) inserted toward lateroventral margin of face and relatively close together (distance between them subequal to that between posterior ocelli).
5. Strength of supra-alar seta: 0) the supra-alar seta well developed, subequal to length of postalar seta; 1) evident but not strongly developed. This seta is only slightly larger than the surrounding setulae and considerably less developed than the postalar, posterior dorsocentral, and prescutellar acrostichal setae.
6. Presence or absence of setulae on vein R2+3 basad of crossvein r-m: 0) vein usually bare of setulae; 1) bearing 3-4 black setulae on dorsal surface. This character, as noted previously, is shared by Hostis and Paratissa and a few other genera of Psilopini.
7. Shape and arrangement of setulae on middle femur of male: 0) as in female, lacking a ridge that bears distinctive setulae; 1) bearing a row of closely set, peg-like setae,

<table>
<thead>
<tr>
<th>Character</th>
<th>1</th>
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</table>

Fig. 1. Cladogram depicting hypothetical phylogenetic relationships among species of the genera Hostis and Paratissa (an analysis of the cladogram and characters is also provided).

Table 1. Matrix of characters and taxa used in the phylogenetic analysis (numbers for characters correspond with those used in the text).
sometimes curved toward apex, that are inserted on a distinct ridge along the apical \( \frac{1}{4} \) to \( \frac{1}{2} \) of posteroventral surface.

8. Coloration of legs: 0) dark colored, blackish brown to black, essentially concolorous with pleural areas or abdomen; 1) legs pale, much lighter than coloration of pleural area or abdomen.

9. Presence of intrafrontal setae: 0) usually lacking, as in Hostis; 1) present, as in species of Paratissa; 1 pair, inserted anterior of ocellar setae.

10. Coloration of maxillary palpus: 0) yellow, as in Paratissa; 1) brown, as in Hostis.

11. Shape of postgonite: 0) short, only slightly longer than wide, as in Hostis; 1) a single long process, as in Paratissa coriacea; 2) postgonite with 2 processes, an anterior one that is long, slender, and curved medioposteriorly, and a posterior one that is short and finger-like.

12. Shape of the surstylus: 0) roughly rectangular; 1) roughly triangular and with short prongs or processes.

13. Shape of aedeagus: 0) gradually tapered on apical half, relatively bluntly rounded from a dorsal view; 1) apical half a very narrow, parallel sided process from a dorsal view.

Paratissa and Hostis may be distinguished from each other by differences in characters 3, 9, 10, and 11. These characters are also synapomorphies that establish the monophyly of Paratissa (characters 3, 9, and 11) and Hostis (character 10).

Although the relationships among the four species of Paratissa are not fully resolved (there is one trichotomy), the characters considered in this study, all morphological and primarily from the male terminalia, indicate the following relationships (Fig. 1). The basal lineage and sister group to the remaining species of the genus comprise a single species, \( P. \) coriacea. This species is most similar to the outgroup, \( H. \) guamensis, especially the dark colored legs (character 8) and shape of the surstylus (character 12) and aedeagus (character 13).

The surstylus is roughly rectangular, as in \( H. \) guamensis. Furthermore, the postgonite (character 11) of \( P. \) coriacea, although long and slender, does not bear a posterior, shorter prong, as in the other three species (\( P. \) neotropica, \( P. \) pollinosa, and \( P. \) semilutea). The other three species, all from the Western Hemisphere and a few islands in the Pacific, have a surstylus (character 12) that is more or less triangular with distinct prongs, and the gonite is two pronged, with the anterior prong much longer (its basal portion setulose and the apical portion nearly parallel sided and curved medially and then posteriorly). The posterior gonal process is shorter, straight, and finger-like. In addition, the aedeagus (character 13) from a dorsal view has the apical half very narrow and essentially parallel sided.

Genus Hostis Cresson


Diagnosis.—Specimens of Hostis are similar to those of Paratissa and related genera but are distinguished by the following combination of characters: Head. Fronto-orbital setae 3 (anterior seta procline, 2nd reclinate, 3rd procline); intrafrontal setae lacking; dorsal aristal hairs 3–5 (if a 5th is present it is greatly reduced), usually 4; pseudostocellar setae procline and only slightly divergent; facial setae 2, both well developed, ventral seta slightly smaller, both inserted toward ventrolateral corner of face and relatively close together, distance between about equal to that between posterior ocelli. Palpus brown. Thorax. Supra-alar seta 1, only moderately well developed, shorter than postalar seta; prescutellar acrostichal setae well separated; wing uniformly hyaline or very lightly infumate; vein \( R_{2+3} \) basad of crossvein r-m bearing 3–4 black setulae on dorsal surface; alula normally developed. Abdomen. 5th tergite bearing 4–6 erect setae.

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along posterior margin on each side; 2nd sternite of male with a membranous circular area on anterior 1/2. Male terminalia as follows: surstylus more or less rectangular; gonite divided, pregonite small, situated between base of hypandrium and postgonite; postgonite only slightly longer than wide, length about equal to that of cercus and not with a second, more posterior process.

*Hostis guamensis* Cresson
Figs. 2–19

*Hostis guamensis* Cresson, 1945: 64.—Cogan and Wirth, 1977: 327 [Oriental cat-
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_Acanthonotiphila scotti_ Séguy, 1955: 11.

**NEW SYNONYM.**

_Paratissa scotti._—Cogan, 1980: 658 [generic combination].

**Description.**—Small to moderately small shore flies, body length 1.75 to 2.80 mm.

_Head_ (Figs. 2–8): Frons (Figs. 3–4) mostly gray, with some brownish coloration laterad of lateral ocelli near vertex, and lower fronto-orbits silvery gray; 2 procline fronto-orbital setae, posterior seta smaller; reclinate seta well developed, inserted medial to procline setae and at level between procline setae; ocellar setae inserted laterad and in front of anterior ocellus; pseudopostocellar setae procline, at most very slightly divergent. Antenna (Fig. 6) with scape and pedicel yellow; flagellomere 1 mostly yellow but darkened apically; arista with 4, occasionally 5 dorsal rays. Face (Figs. 3, 5) gray, slightly lighter than frons; facial shape nearly flat, with very shallow, rounded vertical carina, ventral margin emarginate; facial setae 2, these inserted on ventral ½ of face and close together, distance between about equal to that between posterior ocelli, ventral seta slightly smaller; clypeus black with moderately densely microtomentose; palpus brown.

_Thorax_ (Figs. 9–12): Bicolored, mesonotum (Figs. 9–10) densely microtomentose, gray, pleural area blackish brown. Wing mostly hyaline or very slightly infumate; costal vein ratio 0.75; M vein ratio 0.78. Legs generally dark colored, blackish brown to black, concolorous with pleural coloration, tarsi of middle and hind legs extensively yellowish; middle femur with row of 6–8 closely set setae on a raised, arched ridge along posteroventral surface.

_Abdomen_ (Figs. 13–18): First sternite bare, wider than long; 2nd sternite with an unsclerotized circular area on anterior ½; 3rd and 4th sternites very slightly and gradually enlarged posteriorly, posterior margin rounded, setulae larger laterally and on posterior ½; 5th sternite distinctly but gradually becoming wider posteriorly, posterior margin truncate to slightly concave. Male terminalia (Figs. 14–18) as follows: epandrium (Figs. 14–15), in lateral view, enlarged ventrally, broadly rounded, in posterior view, widest at level of dorsal margin of cercus; cercus (Figs. 14–15) well sclerotized, roughly bacilliform, pointed dorsomedially; surstylus (Figs. 14–17), in posterior view, with median margin slightly concave, setulose, laterally rounded and bare, connected with opposite surstylus by partially sclerotized ventral margin of cercal area that has a narrow and short gap at middle, in lateral view as a subrectangular process, ventral margin rounded; gonite divided, pregonite much smaller, between base of hypandrium and postgonite, with a ventrally directed short process that bears 1–2 setulae; postgonite (Figs. 15–16) as long as cercus, wider basally, bearing numerous small setulae, especially on anterior half, joined with postgonite on opposite side with an arched bridge above aedeagus; aedeagus (Figs. 16, 18), in lateral view, boot shaped, in posteroordinal view, narrowly triangular; aedeagal apodeme (Fig. 16) triangular in lateral view, with a short process anterodorsally; hypandrium (Figs. 15–16) a broad, concave plate.

_Type material._—The holotype female of _Hostis guamensis_ is labeled “Guam Sumay RGOakley IX-26-1938 [date handwritten]/China Clipper Ports AlamedaCal.Hon. Midway [handwritten]/Guam No 1327 [number handwritten]/Lot No3818297/1265 ICM/Hostis guamensis Cresson HO-LOTYPY [handwritten, black submargin] /recovered from ANSP by CWS [Curtis W. Sabrosky] Dec 1951 [handwritten]/TypeNo 70453 USNM [red, number handwritten].” The holotype is double mounted (pointed), is in good condition, and is deposited in the USNM (70453).

The holotype female of _Acanthonotiphila scotti_ is labeled “Ile Tromélin xi[Nov.],[19]53 (R.P.) [handwritten]/INSTITUT SCIEN-
FIQUE MADAGASCAR [light blue]/TYPE [red]/Acanthonotiphila Scotti ♂ TYPE n.sp. 54 E.Séguy vid [handwritten except for “E.Séguy vid”]. The holotype is double mounted (pin in a rectangular block of plastic foam), is in good condition, and is deposited in the MNHN.

Figs. 6–9. Scanning electron micrographs of Hostis guamensis (scale length in parenthesis; bar scale for all photographs = Fig. 6). 6, Antenna, lateral view (150 μm). 7, Eye, ommatidia with occasional setulae, lateral view (30 μm). 8, Same, enlargement of setula, lateral view (3.0 μm). 9, Scutum, dorsal view (0.27 mm).

Other specimens examined.—Afrotropical. MADAGASCAR. Antseranana: Nosy Tanikely, 6 Apr 1991, A. Freidberg, F. Kaplan (8 ♂, 4 ♀; TAU, USNM). COSMOLEDANDO. Manai Island: Station, 26 Mar 1986, W. N. Mathis (1 ♀). Australasian. AUSTRALIA. Queensland: Cairns, Ellis Beach,
Figs. 10-13. Scanning electron micrographs of *Hostis guamensis* (scale length in parenthesis; bar scale for all photographs = Fig. 13). 10. Scutellum, dorsal view (176 µm). 11. Pleural area, lateral view (250 µm). 12. Notopleuron, lateral view (120 µm). 13. Abdomen, dorsal view (0.38 mm).


Figs. 14–18. Male terminalia of *Hostis guamensis*. 14, Epandrium, cerci, and surstylus, posterior view. 15, Epandrium, cerci, surstylus, postgonite, and hypandrium, lateral view. 16, Surstylus, postgonite, aedeagal apodeme, aedeagus, and hypandrium, lateral view. 17, Surstylus, posterior view. 18, Aedeagus, dorsal view. Scales equal 0.1 mm.
Distribution map for Hostis guamensis.


Remarks.—This species ranges widely throughout the western Pacific and Indian oceans. Because of its widespread distribution, I was initially skeptical that all specimens were conspecific. Careful examination of external characters and those of the male terminalia indicates a single species that is distinguished by the characters noted in the generic diagnosis and illustrations.

Genus Paratissa Coquillett


Acanthonotiphila Lamb, 1912: 316. Type species: Acanthonotiphila coriacea Lamb, 1912, by original designation.—Cogan, 1980: 658 [synonymy with Paratissa].

Diagnosis.—Species of Paratissa are similar to those of Hostis and related genera but are distinguished by the following combination of characters: Head. Fronto-orbital setae (Fig. 30) 4 (anterior 2 proclinate, 3rd lateroclinate, 4th lateroreclinate); intrafrontal setae 1 pair, inserted anterior of ocellar setae; dorsal aristal hairs 3–4; pseudopos-terocellar setae procline and only slightly divergent; facial setae 2, both inserted ventrally toward lateral corner and relatively close together. Thorax. Supraalar setae 1, moderately well developed, but not as long as postalar seta; prescutellar acrostichal setae well separated; wing uniformly hyaline or lightly infumate; vein R2+3 basad of crossvein r-m bearing 3–4 black setulae on dorsal surface; alula normally developed; middle femur of male with a row of closely set setae on a ridge along the apical portion
of the posteroventral surface. Abdomen. 2nd sternite of male subdivided, anterior portion a narrow, transverse band, ventral portion more or less rectangular, longer than wide, and with anterior margin deeply concave; male terminalia as follows: postgonite long and slender and apical portion curved medioposteriorally; aedeagal apodeme slender, more lunate than distinctly angulate at a right angle; hypandrium longer than wide.

Discussion.—The species of Paratissa are very similar externally, and so far as I can determine, those from the Western Hemisphere lack any distinguishing characters except for structures of the male terminalia. Probably for this reason most previous workers confused these species, which were usually thought to comprise just one very widespread species, P. semilutea. Characters of the male terminalia indicate otherwise, however, and these characters are the primary bases for recognition of the various species. Only characters of the male terminalia have been found to distinguish the few known species. Thus, I have not included a key but refer readers to the figures of these structures and to the remarks sections that accompany each species’ description.

Paratissa coriacea (Lamb)  
Figs. 20–26
Acanthonotiphila coriacea Lamb, 1912: 316. Paratissa semilutea of authors [misidentification in part].—Cogan, 1980: 658 [afrotropical catalog; synonymy of coriacea with semilutea].

Description.—Small to moderately small shore flies, body length 1.95 to 2.85 mm. As in P. neotropica except as follows:

Thorax: Legs dark colored, mostly blackish, concolorous with pleuron; middle femur of male with row of 8–10 closely set short, peg-like setae along apical ½ of posteroventral surface on a slight ridge. Wing: Costal vein ratio averaging 0.80; M vein ratio averaging 0.65.

Abdomen: Male terminalia (Figs. 20–25) as follows: epandrium (Figs. 20–21), in lateral view, more or less parallel sided, shallowly curved, in posterior view broadly rounded, widest at midlevel of cercus; cercus (Fig. 20) well sclerotized, roughly lunate, pointed dorsomedially; surstylus (Figs. 20–23), in posterior view, roughly rectangular with median margin slightly concave, setulose, laterally rounded and bare, connected with opposite surstylus by partially sclerotized ventral margin of cercal area that has a narrow, short gap at middle, in lateral view as a subrectangular process, posteroventral angle slightly produced; gonite divided, pregonite much smaller, between base of hypandrium and postgonite, with a ventrally directed short process that bears 1 setula; postgonite (Figs. 20–22) a single, long, and slender process, length greater than cercus, oriented medially from posterior view, slightly curved anteriorly subapically and pointed apically, bearing small setulac, joined with postgonite on opposite side with an arched bridge above aedeagus; aedeagus (Figs. 24–25), in lateral view, slipper shaped, in posterior view, narrowly oval; aedeagal apodeme (Fig. 24) narrowly and shallowly triangular to lunate in lateral view; hypandrium (Figs. 21–22) a broad, concave plate that is more deeply produced anteroventrally.

Type material.—The lectotype female, here designated, is labeled “Type H.T. [round label with a red border]/Mahe, ’08–9: Seychelles Exp./Seychelles Is. Prof. J. S. Gardiner. 1914-537/TYPE [blue label glued to a larger one] Acanthonotiphila coriacea. det C.G.L. [except for the “TYPE” label, handwritten].” The lectotype is double mounted (pin mounted in a paper-covered, rectangular block of cork with the number “140” handwritten on top), is in fair condition (much of the mesonotum is partially cracked because of the large pin), and is in the BMNH. In addition to the lectotype, there are four additional females (2 with “201,” 2 with “140”) in the BMNH with
Figs. 20–25. Male terminalia of *Parattissa coriacea*. 20, Epandrium, cerci, surstylus, and postgonite, posterior view. 21, Epandrium, surstylus, posgonite, and hypandrium, lateral view. 22, Surstylus, postgonite, aedeagus, and hypandrium, lateral view. 23, Surstylus, posterior view. 24, Aedeagus, lateral view. 25, Aedeagus, dorsal view. Scales equal 0.1 mm (larger scale is for Fig. 23 only).
the same locality label data. The latter four specimens, as former syntypes, become paralectotypes automatically. Lamb (1912: 317) reported this species from Mahé: Anonyme Island (seaweed on beach), Jan 1909.


Distribution (Fig. 26).—Old World. Indian Ocean basin: Islands of the Seychelles (Mahé) and Aldabra Group, Kenya, and Madagascar.

Natural history.—On Aldabra, this species is associated with mangrove swamps that are in protected areas, primarily along the shore of the inner lagoon and away from the direct impact of wave action.

Remarks.—This is the only species of this genus that I can distinguish without examination of the structures of the male terminalia. The legs are dark colored, usually blackish brown to black, and are concolorous with the pleural area. The structures of the male terminalia (Figs. 20–25) also distinguish it, especially the shape of the surstylus, which is similar in shape to that of *H. guamensis*, being roughly rectangular in posterior view but with the lateral margin rounded and the median margin slightly concave; and the postgonite has one long process.

**Paratissa neotropica** Mathis, New Species

Figs. 27–46

*Paratissa pollinosa* of authors [misidentification in part].—Wirth, 1956: 9 [list, distribution].

*Paratissa semilutea* of authors [misidentification in part].—Wirth, 1965: 740 [nearctic catalog]; 1968: 9 [neotropical catalog].

Description.—Small to moderately small shore flies, length 1.70 to 2.20 mm.

**Head** (Figs. 27–33): Frons (Figs. 28, 30); antenna (Figs. 27–29, 31); face (Figs. 28–29).

**Thorax** (Figs. 34–38): Scutum (Fig. 34).
Wing hyaline; costal vein ratio 0.75; M vein ratio 0.65. Legs pale colored, yellowish to slightly brownish; middle femur of male with a short row of 5–7 short, peg-like setae along apical ¼ of posteroventral surface on a slightly raised ridge.

Abdomen (Figs. 39–45): Male terminalia (Figs. 41–45) as follows: epandrium (Figs. 41–42), in lateral view, more or less parallel sided, gently and shallowly curved, in posterior view broadly rounded, widest at mid-level of cercus; cercus (Figs. 41–42) moderately well sclerotized, roughly lunate, pointed dorsomedially; surstylus (Figs. 41–43), in posterior view, with ventromedial projection narrowly developed, shallowly
sinuous, apex rounded; ventral spur with oblique, ventromedial orientation, forming a distinct V-shaped (angle acute) pocket between spur and posteroventral projection, surstylar spur moderately long and narrowly tapered to bluntly rounded apex; gonite divided, pregonite much smaller, between base of hypandrium and postgonite, with a ventrally directed short process that bears 1 setula; postgonite (Fig. 42) with 2 processes, anterior process long, slender, and curved medially then posteriorly after basal

Figs. 31–34. Scanning electron micrographs of *Paratissa neotropica* (scale length in parenthesis; bar scale for all photographs = Fig. 31). 31, Antenna, medial view (120 μm). 32, Eye, ommatidia and occasional setulae, lateral view (23.1 μm). 33, Same, enlargement (10 μm). 34, Mesonotum, dorsal view (0.33 mm).
1/2, basal portion thickened, bearing setulae, apical portion nearly parallel sided, lacking setulae, posterior process short, not more than twice as long as wide and bearing 2 apical setulae; aedeagus (Figs. 44-45), in lateral view, enlarged basally, tapered abruptly to form a slender apex, in dorsal view, rectangular on basal 1/2-1/3, apical corners of basal portion pointed and with concave shoulders at juncture with narrow apex, apical portion abruptly narrowed, forming a slender median, parallel-sided process; aedeagal apodeme (Figs. 42, 44) slender, narrowly triangular to lunate in lateral view; hypandrium (Fig. 42) longer than wide, roughly rectangular, evenly and shallowly concave.
Type material.—The holotype male is labeled "BELIZE. Stann Creek District: CarrieBow Cay 21–30 Jul 1989 Wayne N. Mathis/HOLOTYPE Paratissa neotropica δ W.N.Mathis USNM [specific name and gender symbol handwritten, red]." The allotype female and 21 paratypes (8 δ, 13 2) bear the same locality label data as the holotype. Other paratypes (90 δ, 37 2) are from the type locality but with differing dates (15 Jan–30 Jul 1984–1990) and in some cases different collectors (R. Faitoute, C. Feller, D. Mathis, P. J. Spangler, H. B. Williams). The holotype is double mounted (minuten in a plastic block), is in excellent condition, and is deposited in the USNM.


Distribution (Fig. 46).—New World. Neotropical: Circumcaribbean: Bahamas, Belize, British Virgin Islands, Mexico (Quintana Roo), Panama, and West Indies (Anguilla, Antigua, St. Martin).

Natural history.—This is one of the most abundant shore flies occurring on the Belizean cays. The species is found in the littoral zone, especially where organic debris, usually algae and sea grass, has accumulated,
and I found specimens to be most abundant on *Turbinaria* that had washed ashore on the west and north shores of Carrie Bow Cay.

Remarks.—I can distinguish this species from congeners only by reference to the characters of the male genitalia, especially the shape of the surstylus: surstylus (Fig. 43), in posteroventral view, with ventromedial angle acutely pointed; ventral spur moderately long and narrow and with oblique, ventromedial orientation.

*Paratissa pollinosa* (Williston)
Figs. 47-50


Description. — As in P. neotropica except as follows: Small to moderately small shore flies, body length 1.80 to 2.60 mm.

Thorax: Legs generally pale colored, yellowish to brownish yellow. Costal vein ratio 0.65; M vein ratio 0.60.

Abdomen: Male terminalia (Figs. 47–49) as follows: epandrium, in lateral view, more or less parallel sided, gently and shallowly curved, in posterior view broadly rounded, widest at midlevel of cercus; cercus moderately well sclerotized, roughly lunate, pointed dorsomedially; surstylus (Fig. 47), in posterior view, with ventromedial angle acutely pointed, narrowly rounded in posteroventral view, surstylar spur with oblique,
ventromedial orientation, forming a distinct V-shaped (angle acute) pocket between spur and posteroventral projection; spur moderately short and gradually tapered to bluntly rounded apex; gonite divided, pregonite much smaller, between base of hypandrium and postgonite, with a ventrally directed short process that bears 1 setula; postgonite with 2 processes, anterior process long, slender, and curved medially then posteriorly after basal 1/2, basal portion thickened, bearing setulae, apical portion nearly parallel sided, lacking setulae, posterior process short, not more than twice as long as wide and bearing 2 apical setulae; aedeagus (Figs. 48–49), in lateral view, enlarged basally, tapered abruptly to form a slender apex, in dorsal view, rectangular on basal 1/2–3/4 with margins angled medially to mostly rounded shoulders at juncture with narrow apex, apical portion abruptly narrowed, forming a slender, parallel-sided, median process; aedeagal apodeme slender, narrowly triangular to lunate in lateral view; hypandrium longer than wide, roughly rectangular, evenly and shallowly concave.

Type material.—Williston, in the original description, noted “Two specimens. St. Vincent.” Sturtevant (1923) was unable to locate either after searching through collections in the BMNH, KU, and AMNH. I was likewise unsuccessful in finding any syntypes and have had to base the characterization of this species on the neotype (designated by Mathis and Edmiston, 1991: 828) that was recently collected on St. Vincent. The neotype is labeled “W.I. St.Vincent. Cumberland Bay[,] (13°16'N, 61°16'W)[,] 8–10 June 1991[,] W. N. & D. Mathis/NEOTYPE δ Drosophila pollinosa Williston designated by W.N.Mathis & J. Edmiston [handwritten, red].” Twenty-one neoparatypes (3 δ, 18 η), which bear identical locality label data, were also designated. The neotype is double mounted (minuten in a block of plastic), is in excellent condition (some Laboubeniales on mesonotum), and is deposited in the USNM.

Fig. 50. Distribution map for Paratissa pollinosa.


Distribution (Fig. 50).—Neotropical: Dominica to St. Vincent, Panama, and the Galápagos Islands. Australasian/oceania: Hawaii (Oahu and Maui) and Pitcairn Island.

Remarks.—This species and P. semilutea have been confused with each other almost since they were first described (see synonymy), and externally they are virtually identical. I have been able to reliably distinguish between them only by reference to characters of the male genitalia, especially the shape of the surstylus and aedeagus. These are as follows (Fig. 26): surstylus, in posterior view, with the ventromedial edge acutely pointed, narrowly rounded in posteroventral view; the ventral spur has an oblique, ventromedial orientation, forming a distinct, U-shaped pocket (angle between spur and posteroventral projection acute) between the spur and posteroventral projection; spur gradually tapered to bluntly rounded apex; and base of aedeagus, at juncture with narrow, parallel-sided apex, with sides angulate, forming a distinct shoulder on each side.

Although previously confused with P. semilutea, this species is most similar to P. neotropica, based on characters of the male terminalia, and careful comparison of these characters, the surstylus and aedeagus in particular, is needed to distinguish between them.

The occurrence of this species on Pitcairn and Hawaiian Islands is undoubtedly adventive, probably through commerce. The species has been reared from “seaweed,” a product, perhaps as packing, that could easily have been introduced to these islands along with the immatures of this species.

Paratissa semilutea (Loew)
Figs. 51–54

Cacoxenus semiluteus Loew, 1869: 51.
Paratissa semilutea.—Wirth, 1965: 740 [generic combination]; 1968: 9 [neotropical catalog].
Paratissa pollinosa of authors [misidentification in part].—Coquillett, 1900: 36 [list].—Sturtevant and Wheeler, 1954: 251 [review].—Wirth, 1956: 9 [list, distribution].

Description.—As in P. neotropica except as follows: Small to moderately small shore flies, body length 1.60 to 2.70 mm.

Thorax: Legs with femora sometimes dark colored but usually pale, yellowish; tibiae and tarsomeres mostly light reddish orange
to yellowish. Costal vein ratio 0.77; M vein ratio 0.61.

**Abdomen:** Male terminalia (Figs. 51–53) as follows: epandrium, in lateral view, more or less parallel sided, gently and shalllowly curved, in posterior view broadly rounded, widest at midlevel of cercus; cercus moderately well sclerotized, roughly lunate, pointed dorsomedially; surstylus (Fig. 51), in posterior view, with ventromedial angle relatively broad, bluntly rounded, sursty lar spur with oblique, ventromedial orientation, forming nearly a right angle with plane of ventromedial angle, conspicuously narrower than the latter, appearing digitiform and more or less parallel sided; gonite divided, pregonite much smaller, between base of hypandrium and postgonite, with a ventrally directed short process that bears 1 setula; postgonite with 2 processes, anterior process long, slender, and curved medially then posteriorly after basal 1/3, basal portion thickened, bearing setulae, apical portion nearly parallel sided, lacking setulae, posterior process short, not more than twice as long as wide and bearing 2 apical setulae; aedeagus (Figs. 52–53), in lateral view, enlarged basally, tapered gradually to form a slender apex, in dorsal view rectangular on basal 1/2–2/3 with margins gradually tapered medially to juncture with narrow apex, apical portion abruptly narrowed, forming a slender, parallel-sided, median process; aedeagal apodeme slender, narrowly triangular to lunate in lateral view; hypandrium longer than wide, roughly rectangular, evenly and shallowly concave.

**Type material.—** The lectotype female, here designated, is labeled “Cuba [Felipe] Poey [green on upper surface, handwritten]/Loew Coll./semiluteus [handwritten]/Type 13453 [red, number handwritten]/LECTOTYPE 9 Cacoxenus semiluteus Loew by W.N.Mathis [all except “LECTOTYPE” and “By” handwritten, black sub margin].” The lectotype is double mounted (glued to a paper rectangle), is in poor condition (several setae of the head and the right antenna are missing), and is deposited in the Museum of Comparative Zoology (MCZ, 13453).

\( \delta \). St. John: Francis Bay (at light), 25 Mar 1958, J. F. G. Clarke (4 \( \delta \)). St. Thomas: Charlotte Amalie (3 mi from, on grass), 31 May 1917, H. Morrison (1 \( \delta \)). Pueblo del Rio (at light), 1 Aug 1963, P. J. Spangler (1 \( \delta \)).

Distribution (Fig. 54).—New World. United States (Florida) to Mexico (Quintana Roo), east to Bermuda and south to the Bahamas and West Indies (Anguilla, Antigua, Cuba, Jamaica, Puerto Rico, St. Martin, and Virgin Islands), and Belize.

Remarks.—My concept of this species is based primarily on the series, especially the males, that I collected in the province of Havana, Cuba (see specimens examined). So far as I am aware, there is only one species of Paratissa on Cuba, and I am assuming that the lectotype and specimens of this series are conspecific. The lectotype, which I have examined, was collected by Professor Felipe Poey, undoubtedly in or near Havana, and was probably given to Baron R. Osten Sacken during the winter of 1857–58 when the latter spent five weeks in Cuba and became acquainted with Professor Poey.

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