

AN ACCOUNT OF THE NORTH AMERICAN SPECIES OF *EUPHORIELLA* ASHMEAD WITH DESCRIPTIONS OF SEVEN NEW SPECIES (HYMENOPTERA: BRACONIDAE, EUPHORINAE)

C. C. LOAN¹ AND T. R. NEW²

Abstract

Three Nearctic species of the braconid genus *Euphoriella* Ashmead are re-described. Seven other species are described and the 10 known species are keyed. Generic relationships and structural characters of use for separating species of *Euphoriella* are briefly discussed.

* * * * *

Introduction

The genus *Euphoriella* was raised by Ashmead (1900) to contain a braconid then known as *Labeo incertus* Ashmead. Two other Nearctic species have since been described, *pacifica* Muesebeck (1936) and *sommermanae* Muesebeck (1956), but otherwise the genus has remained one of the least known of the Euphorinae.

Species of *Euphoriella* were reared or field-collected at Belleville during work on the biosystematics of euphorine Braconidae. Attempts to identify this material led to a study of types and other specimens in the Canadian National Collection, Ottawa, the United States National Museum, Washington, and the British Museum (Natural History), London, and some of the results of this study are reported in this paper. A subsequent paper will give the results of a survey of *Euphoriella* host associations in the Belleville district and also descriptions of some Ottawa, Washington and Belleville material not included here.

Little is known of the biology of *Euphoriella*. Its host range appears similar to that of *Leiophron* Nees, which attacks Heteroptera: Miridae (Bilewicz-Pawinska 1964, 1968, 1969; Brindley 1939; Clancy and Pierce 1966; Lean 1926; Loan 1965, 1966, 1970; Machalova 1954; Menzel 1924, 1926; New 1970; Richards 1967; Streams *et al.* 1968; Waloff 1967; Wilkinson 1926) and Psocoptera (New 1970; Richards 1967). So far, however, North American species have been bred only from psocids (Muesebeck 1963; Sommerman 1956). The associations given here and our unpublished data indicate a preference for psocids, and similarly, a preference of *Leiophron* for mirids. A possible exception may be *E. marica* Nixon, which was reared by Taylor (1945) from a *Sthenarus* mirid in Uganda, and described by Nixon (1946). Because of its closed radial cell, 13-segmented antennal flagellum, and host association this species may be more accurately placed with *Leiophron*.³

¹ Research Institute, Canada Department of Agriculture, Belleville, Ontario; new address: Entomology Research Institute, Central Experimental Farm, Ottawa K1A 0C6.

² Department of Zoology, La Trobe University, Bundoora, Victoria, Australia 3083. Part of work conducted at the Research Institute, Belleville, during tenure of a National Research Council of Canada Postdoctorate Fellowship

³The tergite 1 of *E. marica* is fused beneath indicating that it is correctly placed in *Euphoriella*.

Structurally, *Euphoriella* appears closely related to *Leiophron apicalis* Haliday, the type species of *Leiophron*: the mesonotum is smooth, venation is reduced, and male genitalia are similar. Its species, however, are more homogeneous than those of the *apicalis* species group e.g. all known species have a 12-segmented flagellum and remarkably uniform wing venation. Such characters and the apparent restriction of *Euphoriella* to the Nearctic region and to psocids are enough to establish its generic entity. The important morphological characters of *Euphoriella* and *Leiophron* are listed in the following key.

1. Prescutal sutures impressed, mesonotum at least partly punctate; parameters of genitalia not prolonged beyond aedeagus and not longer on ventral than dorsal side
.....*Leiophron* Nees (*pallipes* Curtis species group)⁴
Mesonotum smooth, prescutal sutures effaced or only lightly impressed anteriorly; parameres of aedeagus extended beyond aedeagus and longer on ventral than dorsal side 2
2. Flagellum exceeds 12 segments; radial cell complete, typically very narrow at wing margin; tergite 1 not fused beneath
.....*Leiophron* Nees (*apicalis* Haliday species group)
Flagellum 12-segmented; radial cell absent, second abscissa of radius spur-like at wing margin; tergite 1 fused beneath
..... *Euphoriella* Ashmead

Most of the species reviewed or described in this paper are remarkably similar. Useful specific separation characters are the length of the longest marginal cilia of the hind wing (noted by Muesebeck 1936), the color of the flagellum and legs, the length and width of the eye, the width of the face, the length of the hind tibia, and the lengths, widths and lengths to width ratios of the basal five antennal segments. Variation of these characters in the species examined is low (Tables I-III); but the ranges of values for some species overlap and sometimes render the identification of isolated specimens uncertain.

The eye dimensions, face width, and lengths of the basal five antennal segments were measured as shown (Figures 1-3). Definition of some other terms used in the species key and descriptions are as follows: malar space, the length of the malar suture; flagellum length, the total length of the antenna beyond the pedicel including intersegmental regions; head width, the distance from the lateral margin of the eye to that of the other across the frons; head length, the distance from the antennal sockets to the occipital carina; stigma length, the length from the apex of the parastigma to the apical costal junction; tergite I length, the length of the dorsal face from the propodeum to the apical margin. Measurements of antennal segments and wing characters were made from permanent slide mounts by removing the dry antenna or wing and mounting directly in Diaphane.

The sex of *Euphoriella* individuals is not easy to determine from genitalia without dissection, as the genital structures are often retracted into the gaster.

⁴This species group may warrant generic status.

Useful secondary characters that render such dissection unnecessary are found in the flagellum, face, eye and (in some species) color. In general, the flagellum of the male is longer and its apex not as wide as that of the female; the eyes of the female are larger and their convergence on the face is more pronounced than in the male. This results in the face of the female being usually very narrow, often less than the width of an eye, whereas the face width of the male usually exceeds the eye width. In two new species described here, the legs of the female are yellowish and those of the male infuscated.

Types of new species are in the Canadian National collection, Ottawa (CNC), U.S. National Museum, Washington, D.C. (USNM) and Br. Mus. (Nat. Hist.), London (BM) as noted.

Key to Described Species of *Euphoriella* from North America

1. Hind wing narrow or straplike, longest marginal cilia 0.4 to 0.6 times wing width 2
 Hind wing broad, longest marginal cilia about 0.3 times wing width10
2. Tergite I slender, more than 4.0 times as long as apical width; distinctly bicolorous, head pale reddish; large species, hind tibia 0.61 mm long; length to width ratio of flagellar segment I 3.3:1.0 (♂)....*Euphoriella nixoni* new species
 Tergite I less than 4.0 times as long as apical width; body not distinctly bicolored; smaller species; flagellar segment I not as long 3
3. Males 4
 Females 8
4. Hind femur and tibia infuscated 5
 Hind femur and tibia yellowish 6
5. Scape 1.9 to 2.5 times as long as wide; pedicel much shorter than flagellar segment II, about equal to I or III; flagellum yellowish
 *Euphoriella kaladarensis* new species
 Scape 1.5 to 2.0 times as long as wide; pedicel about as long as flagellar segment II or III, longer than I; flagellum chiefly dusky.....
 *Euphoriella solidaginis* new species
6. Flagellum cinerous or dusky, lighter basally; legs clearly yellow; body dark reddish brown
 *Euphoriella sommermanae* Muesebeck
 Flagellum stramineous or light reddish yellow; body light reddish brown..... 7
7. Lateral ocellus distinctly behind posterior eye margin; head subquadrate, eye unusually small, face nearly as wide as eye length.....
 *Euphoriella foutsii* new species
 Lateral ocellus in line with posterior eye margin; head rectangular, much wider than long; face not nearly as wide as eye length
 *Euphoriella incerta* Ashmead

8. Flagellum reddish yellow; hind wing marginal cilia 0.5 to 0.6 times wing width; hind wing straplike; lateral ocellus behind posterior eye margin *Euphoriella foutsii* new species
 Flagellum dusky, sometimes lighter basally; otherwise not as described..... 9
9. Legs light yellow; flagellar segment I less than 2.0 times as long as wide, II and III about equal in length *Euphoriella sommermanae* Muesebeck
 Legs reddish yellow; flagellar segment I about 2.0 times as long as wide, II longer than III *Euphoriella solidaginis* new species
10. Tergite I entirely, finely, distinctly rugulose; body and appendages light chocolate brown *Euphoriella pacifica* Muesebeck
 Tergite I and color not as described 11
11. Flagellum and legs light yellow, face usually not as dark as frons or genae; hind tibia average length 0.54 mm *Euphoriella pallidifacia* new species
 Flagellum and legs testaceous or infuscated; face not paler than frons or genae; hind tibia not as long 12
12. Hind tibia average length 0.36 mm; mid and hind legs testaceous..... *Euphoriella hyalopsocidis* new species
 Hind tibia average length 0.31 mm; mid and hind legs deeply infuscated *Euphoriella criddlei* new species

Descriptions of Nearctic *Euphoriella* Species

Euphoriella nixoni, New Species (Figures 4 and 17)

HOLOTYPE MALE. Length 2.2mm. Bicolorous. Head, basal 4 antennal segments and legs reddish yellow; flagellar segments III-XII dusky; thorax, propodeum, gaster reddish brown. Head rectangular, 1.5 times as wide as long; face between eyes slightly rounded, sparsely hairy, its width to length of scape + pedicel 1:1.0, to eye length 1:1.2, to eye width 1:0.9; temple as wide as eye; malar space about 0.3 times as wide as base of mandible, equal to pedicel width; flagellum 2.2 times as long as head width; length to width ratios of scape, pedicel, flagellar segments I-III 2.0, 1.7, 3.3, 2.6, 2.5:1.0; OOL 2.0 times as long as POL, OOL about as long as scape.

Mesonotum smooth, polished, few scattered hairs; prescutellar groove divided by 4 carinae; mesepisternum mat-like or finely granulose, depressed medially and finely sculptured; propodeum areolated though carinae obscured by dark color and reticulae, posterior face flat, vertical; stigma 2.1 times as long as wide; longest marginal cilia of hind wing about 0.5 times wing width. Tergite I almost 4.3 times as long as apical width, 0.7 times as long as hind tibia, quite smooth, somewhat broadened at spiracles.

TYPES: Holotype: ♂ UNITED STATES. *Maine*, Gilead, VII. 7, 1965 (L. J. Lipovsky). Type deposited in the U.S. National Museum, Washington (USNM No. 72152).

This species is recognized by color, large size, and the unusually long flagellar segment I. The female is unknown. It is named for G. E. J. Nixon of the Commonwealth Institute of Entomology, London in appreciation of his work on African Euphorinae.

Euphoriella kaladarensis, New Species (Figures 1-3, 12, 14, 18, 21)

HOLOTYPE MALE. Length 1.7 mm. Dark reddish brown. Scape, pedicel and flagellar segment I pale testaceous, remainder of flagellum dusky; mid and hind femur, tibia infuscated; tergite I and apex of gaster behind light reddish brown. Head 1.5 times as wide as long; face smooth, almost glabrous from above; face width to length of scape + pedicel 1:0.9, to length of eye 1:1.3; to width of eye 1:1.0; temple: eye 1:1.2; malar space = pedicel width, 0.5 times basal width of

TABLE I. Dimensions of *Euphoriella kaladarensis* n.sp. and *E. solidaginis* n. sp., and their separation. (Dimensions given in microscope ocular units, for antennal segments 1 unit = 0.0038 mm, for all others 1 unit = 0.0135 mm. Significance of differences between species by student's t-test shown as $P < 0.01 = **$, $P < 0.05 = *$, difference not significant = N.S., L = greatest length, W = greatest width)

Sex	Structure	<i>E. kaladarensis</i>			<i>E. solidaginis</i>			t	P
		No.	Mean	S.E.	No.	Mean	S.E.		
♂	Scape L	21	24.76	.293	9	22.11	.540	16.66	**
	Scape W	21	11.05	.563	9	11.71	.154	3.27	**
	Pedicel L	21	17.27	.207	9	16.00	.290	12.99	**
	Pedicel W	21	9.41	.093	9	9.25	.134	4.85	**
	Flagellar I L	21	16.75	.416	9	14.44	.503	12.48	**
	Flagellar I W	21	7.35	.154	9	6.67	.222	9.23	**
	Flagellar II L	21	19.70	.316	9	16.89	.351	20.58	**
	Flagellar II W	21	8.20	.145	9	7.33	.167	13.72	**
	Flagellar III L	21	16.85	.286	9	15.42	.236	12.54	**
	Flagellar III W	21	8.20	.145	9	7.67	.167	8.36	**
♀	Scape L				7	20.86	.886		
	Scape W				7	12.17	.408		
	Pedicel L				7	15.60	.216		
	Pedicel W				7	9.67	.314		
	Flagellar I L				7	12.57	.434		
	Flagellar I W				7	6.71	.247		
	Flagellar II L				7	14.14	.343		
	Flagellar II W				7	7.71	.154		
	Flagellar III L				7	13.43	.309		
	Flagellar III W				7	8.57	.453		
♂	Eye L	21	13.38	.146	9	12.56	.377	8.30	**
	Eye W	21	10.33	.129	9	10.22	.222	1.63	N.S.
	Face W	21	10.91	.145	9	10.89	.200	.24	N.S.
♀	Eye L				7	15.43	.369		
	Eye W				7	12.00	.218		
	Face W				7	9.14	.261		
♀, ♂	Stigma L	21	22.13	.408	16	21.56	.408	.409	**
	Stigma W	21	8.65	.160	16	8.94	.192	4.87	**
	Hind tibia L	21	29.38	.496	16	27.88	.378	9.78	**
	Tergite I L				16	14.95	.258		
	Hind wing W	21	13.91	.244	16	14.40	.388	4.57	**
	Cilia of hind wing	21	6.48	.125	16	6.13	.133	7.97	

mandible; flagellum 2.0 times as long as head width; length to width ratios of scape, pedicel, flagellar segments I-III 2.1, 1.8, 2.1, 2.3, 1.9:1.0; OOL:POL = 7:5, OOL not quite as long as scape; frons with a few scattered hairs otherwise glabrous, smooth, polished like genae and vertex. Mesonotum smooth, polished, prescutellar sulcus shallow, divided by a single median carina; mesepisternum glossy, rounded medially, smooth except finely sculptured for entire length below; hind wing rather narrow, longest marginal cilia 0.4 times wing width; stigma 2.4 times as long as wide; propodeum with pronounced declivity behind, sides finely reticulate, areolae of dorsal face distinct; hind tibia 0.41 mm long, spines at apex about as long as width of hind femur. Lenth of tergite I slightly more than 3.0 times apical width, about 0.7 times length of hind tibia, apex equal to hind femur width, widened distinctly at spiracles, dorsal face rugulo-striate.

TYPES: Holotype: ♂ CANADA. *Ontario*, Hastings Co. 8 miles west of Kaladar just south of highway no. 7, VII.1, 1969 beaten from *Diervilla Lonicera* Mill. (C. C. Loan). Type deposited in the Canadian National Collection, Ottawa (CNC No. 12676).

Paratypes: 3 ♀ ♀, 56 ♂ ♂. Of these, 3 ♀ ♀, 21 ♂ ♂ data as for holotype except collection dates VII.1-2, 1969; 18 ♂ ♂ data as for holotype except collec-

TABLE II. Dimensions of some characters of *Euphoriella sommermanae* Muesebeck and of *E. foutsii* n.sp. (Dimensions given in microscope ocular units, for antennal segments 1 unit = 0.0038 mm, for all others 1 unit = 0.0135 mm); L = greatest length, W = greatest width.

Sex	Structure	<i>E. sommermanae</i>			<i>E. foutsii</i>		
		No.	Mean	S.E.	No.	Mean	S.E.
♂	Scape L	5	20.80	1.78	8	24.50	.682
	Scape W	5	11.00	.629	8	11.63	.208
	Pedicel L	5	15.20	.973	8	15.63	.270
	Pedicel W	5	9.00	.446	8	9.00	.208
	Flagellar I L	5	13.00	1.23	8	14.25	.742
	Flagellar I W	5	6.60	.223	8	6.50	.332
	Flagellar II L	5	16.00	1.0	8	17.13	.516
	Flagellar II W	5	7.20	.388	8	7.38	.332
	Flagellar III L	5	15.20	.773	8	15.25	.403
	Flagellar III W	5	8.00	.317	8	7.63	.332
♀	Scape L	15	19.93	.016			
	Scape W	15	11.20	.168			
	Pedicel L	15	14.67	.207			
	Pedicel W	15	9.27	.176			
	Flagellar I L	15	10.93	.359			
	Flagellar I W	15	7.33	.120			
	Flagellar II L	15	12.80	.315			
	Flagellar II W	15	7.87	.195			
	Flagellar III L	15	12.93	.266			
	Flagellar III W	15	8.60	.195			
♂	Eye L	5	13.40	.589	8	12.10	.316
	Eye W	5	10.40	.589	8	9.40	.278
	Face W	5	11.00	.317	8	10.60	.278
♀	Eye L	15	15.79	.199			
	Eye W	15	11.61	.467			
	Face W	15	9.22	.890			
	Hind Tibia L	20	25.59	.369	8	27.30	.870
	Tergite I L	20	18.50	.184	8	19.28	.596

tion dates VII.6-7, 1970 and also beat from *Myrica Gale* L.; Dundas and Hamilton, Ontario, 17 ♂♂ VI.29, 1955 (O. Peck). 5 ♂♂ USNM, 5 ♂♂ BM, balance CNC.

Males. Variation of a number of important characters is given in Table I.

Females. As male except the legs are yellowish and except for sexual characters.

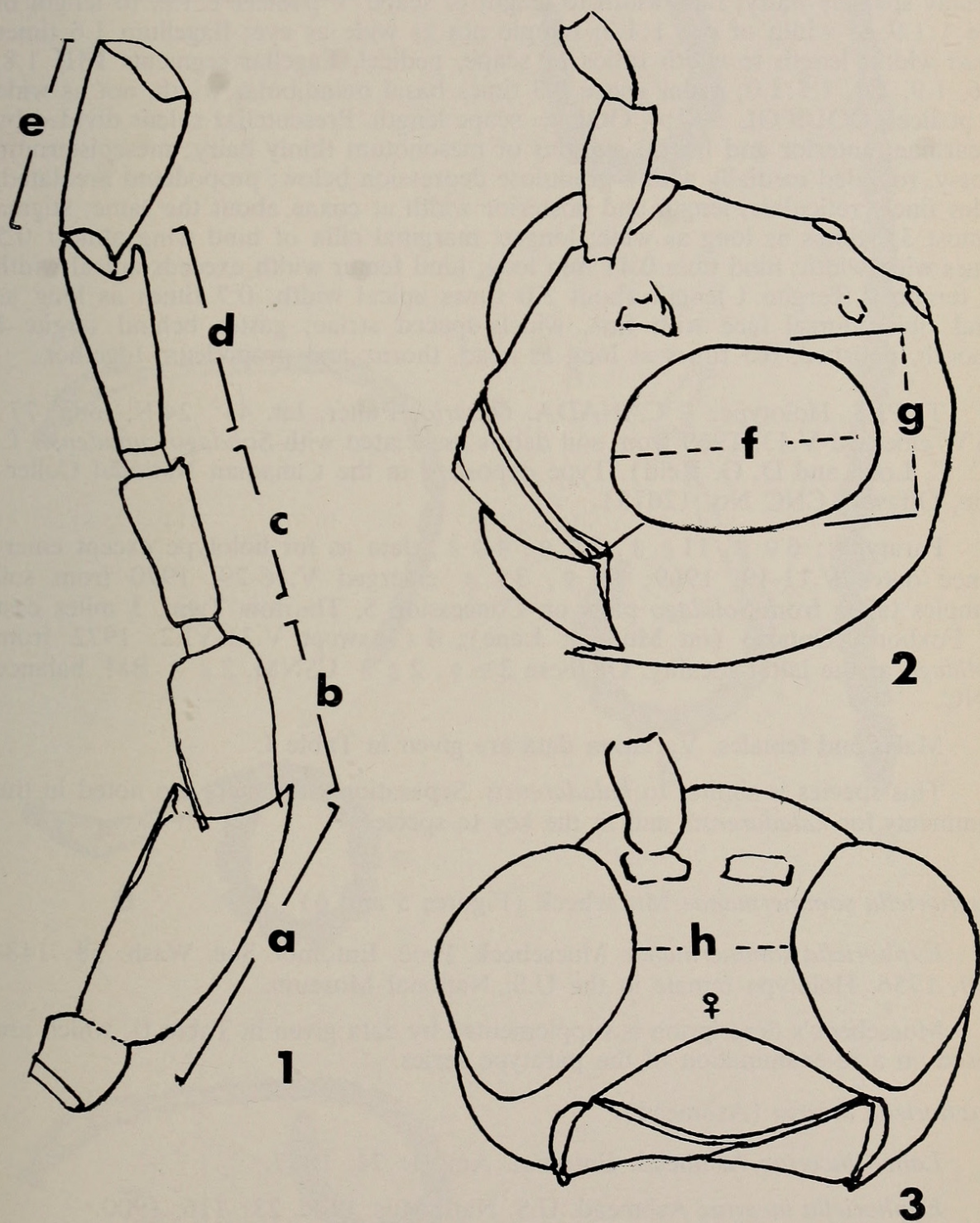
Superficially, *E. kaladarensis* closely resembles *solidaginis* new species but differs in numerous characters (Table I). Only a series of males were available to compare with *solidaginis* but the difference between means of measurements of antennal segments are significant at the $P < 0.01$ level (t-test). *E. kaladarensis* is larger than *solidaginis* but its scape, stigma and hind wing are not as wide. There is also a temporal difference as *kaladarensis* is a mid-summer species whereas *solidaginis* flies in late spring and early summer. Specimens from the Hamilton-

TABLE III. Dimensions of *Euphoriella hyalopsocidis* n.sp. and *E. criddlei* n.sp., and their separation. Legend as in Table I.

Sex	Structure	<i>E. hyalopsocidis</i>			<i>E. criddlei</i>			t	P
		No.	Mean	S.E.	No.	Mean	S.E.		
♂	Scape L	10	29.20	1.19	6	25.17	1.33	5.81	**
	Scape W	10	13.90	.380	6	13.17	.706	2.51	*
	Pedicel L	10	17.20	.396	6	17.50	.707	1.02	N.S.
	Pedicel W	10	9.90	.182	6	10.67	.314	5.81	**
	Flagellar I L	10	18.80	.720	6	15.67	.147	9.61	**
	Flagellar I W	10	8.30	.047	6	7.83	.314	4.40	**
	Flagellar II L	10	21.70	.633	6	19.83	.122	6.54	**
	Flagellar II W	10	8.80	.047	6	8.50	.408	2.18	*
	Flagellar III L	10	18.80	.058	6	17.00	.078	49.14	**
	Flagellar III W	10	8.90	.180	6	8.83	.408	.44	N.S.
♀	Scape L	6	25.00	.816	6	23.83	.914	2.80	*
	Scape W	6	14.00	.633	6	13.33	.408	1.99	N.S.
	Pedicel L	6	17.33	.547	6	16.50	.058	3.37	**
	Pedicel W	6	10.50	.184	6	10.33	.257	1.20	N.S.
	Flagellar I L	6	14.33	.796	6	14.67	.796	.67	N.S.
	Flagellar I W	6	8.83	.408	6	8.00	0.0	4.55	**
	Flagellar II L	6	18.00	.776	6	16.67	.316	3.55	**
	Flagellar II W	6	9.50	.314	6	9.17	.184	2.03	N.S.
	Flagellar III L	6	15.33	.408	6	15.67	.316	1.47	N.S.
	Flagellar III W	6	10.50	.314	6	10.00	0.0	3.56	**
♂	Eye L	10	17.30	.236	6	14.67	.605	11.55	**
	Eye W	10	13.00	.298	6	11.50	.316	8.83	**
	Face W	10	13.80	.422	6	12.83	.703	6.42	**
♀	Eye I	6	19.98	.589	6	17.67	.547	6.74	**
	Eye W	6	14.00	.545	6	13.33	.408	2.20	N.S.
	Face W	6	12.00	.499	6	10.66	.483	4.31	**
♂, ♀	Stigma L	16	26.80	.527	12	24.82	.633	8.69	**
	Stigma W	16	11.00	.218	12	10.64	.316	3.44	**
	Hind tibia L	16	35.60	.448	12	31.36	1.23	12.29	**
	Tergite I L	16	24.07	.530	12	20.83	.523	15.49	**
	Hind wing W	16	18.87	.542	12	17.80	.930	3.68	**
	Cilia of Hind wing L	16	6.00	.138	12	6.40	.316	4.37	**

Dundas population are somewhat larger than those from Kaladar but color and size-ratios of body structures appeared to be the same. The time of field captures is also similar.

E. sommermanae Muesebeck resembles these species but is separable in females by leg color which is paler, and by the means of the body structures given in Table II.



FIGURES 1-3. Points of reference for measurement of some structures of *Euphoriella*, species illustrated *E. kaladarensis* new species. 1. Basal five antennal segments: a, scape; b, pedicel; c-e, flagellar segments I-III, respectively (female illustrated). 2. Eye: f, length; g, width (male illustrated). 3. Face: h, width (female illustrated).

Euphoriella solidaginis, New Species (Figures 7 and 8)

HOLOTYPE FEMALE. Length 1.6 mm. Dark reddish brown. Scape and pedicel light yellow, basal flagellar segments slightly darker and remainder of flagellum dusky; legs pale reddish yellow, hind femur and tibia very slightly darker; anterior half of gaster behind tergite I testaceous. Head 1.5 times as wide as long; face hairy, clypeal setae barely longer than scape; frons, lower genae, mandibles basally sparsely hairy; face width to length of scape + pedicel 1:1.2, to length of eye 1:1.9, to width of eye 1:1.3; temple not as wide as eye; flagellum 1.6 times head width; length to width ratios of scape, pedicel, flagellar segments I-III 1.8, 1.6, 1.9, 1.8, 1.5:1.0; malar space 0.3 times basal mandibular width, not as wide as pedicel; OOL:POL = 7:4, OOL = scape length. Prescutellar sulcus divided by 3 carinae; anterior and lateral margins of mesonotum thinly hairy; mesepisternum glossy, rounded medially with a granulose depression below; propodeum areolated, sides finely reticulate, length and posterior width at coxae about the same; stigma almost 3.0 times as long as wide; longest marginal cilia of hind wing almost 0.5 times wing width; hind tibia 0.41 mm long; hind femur width exceeds apical width of tergite I. Tergite I length about 3.0 times apical width, 0.7 times as long as hind tibia, dorsal face with fine, widely-spaced striae; gaster behind tergite I smooth, polished, 0.5 times as long as head, thorax and propodeum together.

TYPES. Holotype: ♀ CANADA. Ontario, Fuller, lat. 44° 24'N, long. 77° 25'W emerged V.13, 1969 from soil debris associated with *Solidago canadensis* L. (C. C. Loan and D. G. Reid). Type deposited in the Canadian National Collection, Ottawa (CNC No. 12675).

Paratypes: 6 ♀ ♀, 11 ♂ ♂, 3 ♀ ♀, 4 ♂ ♂, data as for holotype except emergence dates V.11-19, 1969; 3 ♀ ♀, 3 ♂ ♂ emerged V.16-29, 1970 from soil samples taken from *Solidago* plots on Concession 5, Thurlow Twp., 3 miles east of Foxboro, Ontario (on Mud-cat Lane); 4 ♂ ♂ swept V.31-VI.2, 1972 from *Solidago* at the latter locality. Of these 2 ♀ ♀, 2 ♂ ♂ USNM, 2 ♂ ♂ BM, balance CNC.

Males and females. Variation data are given in Table I.

This species is similar to *kaladarensis*. Separation characters are noted in the comments for *kaladarensis* and in the key to species.

Euphoriella sommermanae Muesebeck (Figures 5 and 6)

Euphoriella sommermanae Muesebeck. Proc. Entomol. Soc. Wash. 58: 148-149, 1956. Holotype female in the U.S. National Museum.

Muesebeck's description is supplemented by data given in Table II, which are based on a re-examination of the paratype series.

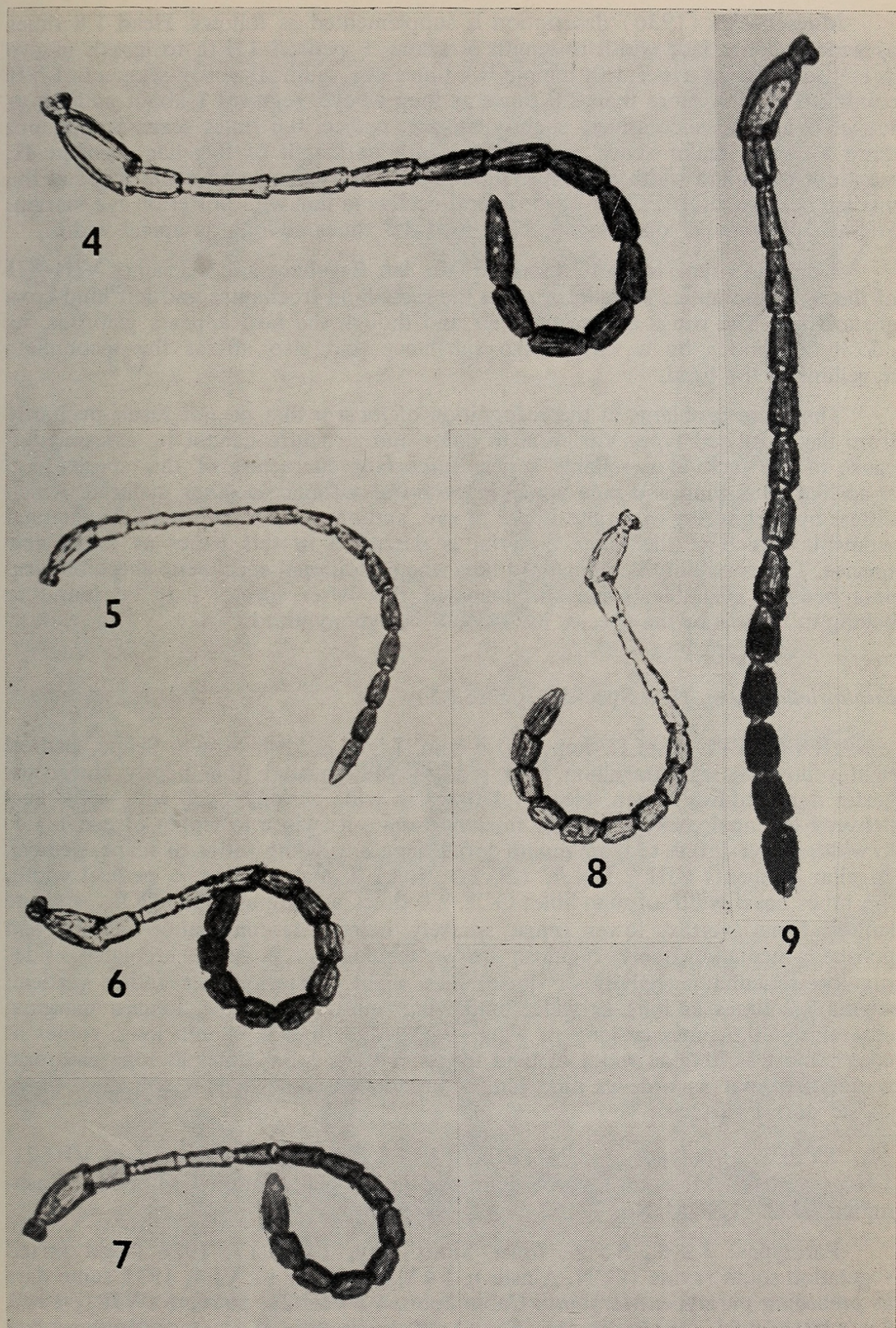
Euphoriella incerta (Ashmead)

Labeo incertus Ashmead. Entomol. Am. 3: 74, 1887.

Euphoriella incertus Ashmead. U.S. Natl. Mus. Proc. 23: 116, 1900.

Euphoriella incerta (Ashmead): Muesebeck, U.S. Dept. Agric. Misc. Publ. 241, 1936.

Holotype male in the U.S. National Museum.



FIGURES 4-9. Antennae of *Euphoriella* species. 4. *nixonii* n. sp. ♂. 5. *sommermanae* Muesebeck ♂. 6. *sommermanae* ♀. 7. *solidaginis* n. sp. ♂. 8. *solidaginis* ♀. 9. *pallidifacia* n. sp. ♀.

Muesebeck's (1936) description is supplemented as follows. Head 1.8 times as wide as long; face width to length of scape + pedicel 1:1.0, to length of eye 1:1.3, to width of eye 1:1.0; temple 0.7 times eye width; flagellar segments I-VII combined slightly more than 2.0 times as long as eye, segment I about as long as scape, II and III successively slightly shorter; pedicel 0.6 times scape length, not quite as wide; malar space = pedicel length or length of flagellar segment II; length of frons and width of temple subequal; ocellar triangle an acute angle at the median ocellus; OOL:POL = 8:5; lateral ocellus in line with posterior eye margin. Stigma 2.4 times as long as wide. Tergite I 3.3 times as long as apical width.

Ashmead's type is badly damaged: the left flagellum and segments VIII-XII of the right and all leg segments except the right hind trochanter and left hind coxa are missing. The wings adhere together and though the face appears glabrous, its pilosity is hidden by a varnish-like substance that also affixes the incomplete flagellum to the head.

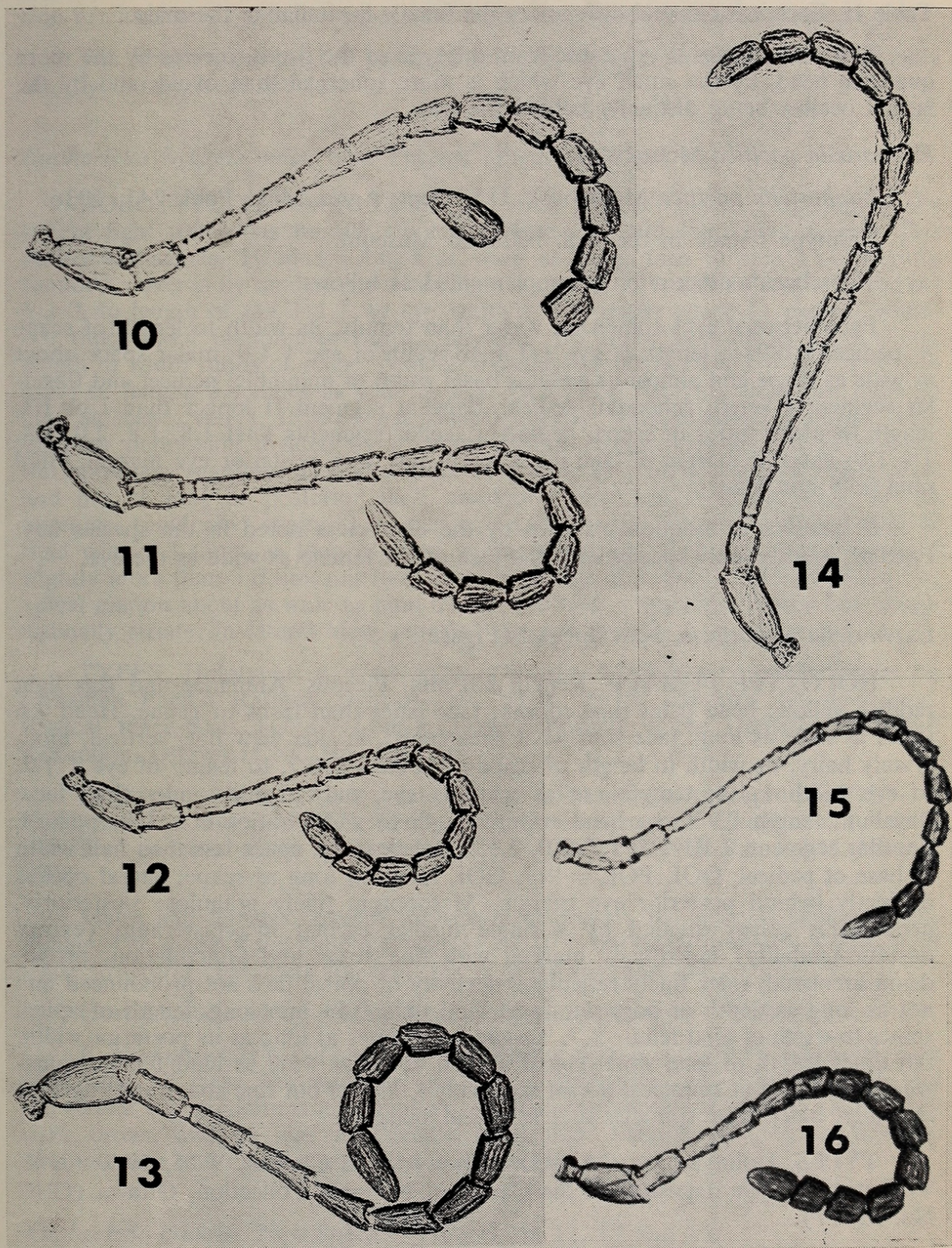
There are problems in the recognition of *incerta* that do not result primarily from the mutilated type. Variation in color and structure cannot be assessed because of the lack of a reliable series. Important characters of this species e.g. strap-like hind wing and pale appendages are also found in other material, which differs by sculpturing of tergite I, size of eye, and proportions of the basal antennal segments. Much of the latter material is described in this paper as *foutsii* new species. The possibility is recognized that when additional specimens and biological data become available, some specimens of this latter species may be found to belong to *incerta* or the species itself could be synonymized.

Euphoriella foutsii, New Species (Figure 15)

HOLOTYPE MALE. Length 1.4 mm. Light reddish brown. Scape, pedicel light yellowish; legs, flagellum light reddish yellow; hind tibia barely cinereous; gaster dark reddish brown. Head 1.4 times as wide as long; face with slight keel between antennal sockets, pilosity fine, punctulate, its width to length of eye 1:1.1, to width of eye 1:0.9, to temple with 1:0.9; length to width ratios of scape, pedicel, flagellar segments I-III 2.1, 1.7, 1.9, 2.3, 1.9:1.0; malar space = pedicel width, 0.5 times basal width of mandible; OOL 2.0 times as long as POL, OOL = scape length; frons, vertex, lower genae sparsely hairy. Mesepisternum smooth and polished medially, finely rugulose below tegulae; propodeum areolated, sides rugulose-reticulate, declivity of dorsal face slight, posterior face rather vertical; stigma 2.2 times as long as wide; hind wing unusually narrow, longest marginal cilia almost 0.6 times as long as wing width; hind tibia 0.34 mm long, spines at apex almost as long as width of hind femur. Tergite I 3.4 times as long as apical width, apex not as wide as hind femur, broadened somewhat at spiracles, finely striate dorsal surface.

TYPES. Holotype: ♂ UNITED STATES, *Maryland*, Cabin John, VIII.21, 1916 swept (R. M. Fouts). Type deposited in the U.S. National Museum, Washington, D.C. (USNM No. 72153).

Paratypes: 3 ♀ ♀, 8 ♂ ♂. *Iowa*, Sioux City, 1 ♀ VI.17, 1926 swept mixed vegetation south ravine (C. N. Ainslie); 1 ♀ V.22, 1935, 1 ♂ VI.4, 1935 same data as preceding paratype. *Maryland*, Cabin John, 1 ♂ VIII.21, 1916, 1 ♀ VII.1, 1917, 2 ♂ ♂ VIII.20-21, 1917 (R. M. Fouts); Takoma Pk., 1 ♂ no collection data (C. N. Ainslie); Glen Echo, 1 ♂ V.23, 1918, 2 ♂ ♂ VI.20, 1919 (R. M. Fouts). 1 ♀, 3 ♂ ♂ CNC, balance USNM.



FIGURES 10-16. Antennae of *Euphoriella* species. 10. *criddlei* n. sp. ♂. 11. *criddlei* ♀. 12. *kaladarensis* n. sp. ♀. 13. *hyalopsocidis* n. sp. ♂. 14. *kaladarensis* ♂. 15. *foutsi* n. sp. ♂. 16. *hyalopsocidis* ♀.

Males and females. Variation of some characters of male *foutsii* is listed in Table II. Except for sexual differences the female is similar to the male.

This new species is separable from the type of the genus, *incerta* by the more quadrate head, by the small eye which is more spherical than ovoid, and by the lateral ocellus being distinctly behind the eye.

Euphoriella pacifica Muesebeck

Euphoriella pacifica Muesebeck. U.S. Dept. Agric. Misc. Publ. 241, 1936.

Holotype female in the U.S. National Museum.

Muesebeck's description is supplemented as follows.

Face between eyes somewhat wider than temple, its width to length of scape + pedicel 1:0.9, to length of eye 1:1.4, to width of eye 1:1.0; malar space about as wide as scape and almost as wide as basal width of mandible; pedicel and flagellar segment I length subequal; pedicel, flagellar segment II longer than I or III; length to width ratios of scape, pedicel, flagellar segments I-III 1.8, 1.8, 2.0, 1.8, 1.4:1.0; anterior margin of lateral ocellus in line with posterior eye margin. Hind tibia 0.28 mm long.

E. pacifica is unique as shown by the characters noted in the species key. Further, it is the only species with the face of the female as wide as the eye.

Euphoriella pallidifacia, New Species (Figure 9)

HOLOTYPE FEMALE. Length 2.0 mm. Piceous. Antennae and legs light reddish yellow; head paler than thorax; face paler than frons or genae. Head 1.6 times as wide as long; face somewhat shagreened, in side view flat, vertical, moderately hairy, its width to length of scape + pedicel 1:0.7, to length of eye 1:1.7, to eye width 1:1.4; temple not as wide as eye, only slightly wider than face; flagellum length 1.9 times head width; length to width ratios of scape, pedicel, flagellar segments I-III 1.5, 1.7, 2.0, 2.1, 1.8:1.0; malar space less than half width of base of pedicel; OOL:POL = 9:7, OOL about as long as scape; lateral ocellus distinctly behind posterior eye margin. Mesonotum finely granulose posteriorly; prescutellar sulcus divided by a single medial carina; mesepisternum (except postero-medially) indistinctly marked with fine striae and punctulation; propodeum areolated, sides finely reticulate, declivity of dorsal face not pronounced and not as long as depth of posterior face; hind tibia 0.54 mm long, length of apical spines to width of hind femur 5:7. Tergite I 3.4 times as long as its posterior width, 0.6 times length of hind tibia, apical margin about as wide as hind femur, somewhat broadened at spiracles, dorsal face with 4 distinct but fine striae and rugulose medially, hairy near spiracles and at apical margin.

TYPES. Holotype: ♀ CANADA. *Quebec*, Old Chelsea, V.25, 1960 (J. R. Vockeroth). Type deposited in the Canadian National Collection, Ottawa (CNC No. 12677).

Paratypes: 2 ♀ ♀, 1 ♂. *Quebec*, Meach Lake, 1 ♀ VI.8, 1962 (S. M. Clark); 1 ♀ V.27, 1960, data as for holotype but captured summit King Mt., 1150'; Gatineau Pk. at Champlain Look-out, 1 ♂ VI.1, 1965 (J. R. Vockeroth). All CNC.

E. pallidifacia is distinguished by a relatively wide hind wing and by the pale antennae and yellowish legs. The face, frons and genae are not as dark as the

thorax, and the lateral ocellus is behind the posterior eye margin. This combination of characters facilitates separation from other species seen to date.

The head of one of the paratype females is light reddish brown and only slightly darker than the face.

Euphoriella hyalopsocidis, New Species (Figures 13 and 16)

HOLOTYPE FEMALE. Length 2.1 mm. Reddish black. Flagellum dusky except light testaceous basally similar to fore and mid legs; hind femur, tibia darker testaceous. Head 1.3 times as wide as long; face in side view slightly rounded, covered by moderately dense hair, its width to length of scape + pedicel 1:1.0, to length of eye 1:1.7, to eye width 1:1.4; malar space = pedicel width, 0.6 times basal mandibular width; flagellum 1.6 times as long as head width; length to width ratios of scape, pedicel, flagellar segments I-III 2.1, 1.5, 1.9, 1.9, 1.5:1.0; temple 0.8 times as wide as eye; OOL:POL = 7:5, OOL not quite as long as scape; vertex, frons, genae smooth, glossy, predominantly glabrous. Pre-scutellar depression divided by a single medial carina; ventral half of mesepisternum finely rugulose; propodeum about as wide as long, dorsal face rather short and not as long as posterior face, areolation obscured by dark color, lateral reticulæ, rugulosity; stigma 2.5 times as long as wide; longest marginal cilia of hind wing 0.3 times as long as wing width; hind tibia 0.46 mm long. Tergite I slightly more than 3.0 times as long as apical width, 0.7 times length of hind tibia, apical margin about as wide as hind femur, widened at spiracles, dorsal face longitudinally striate, in lateral view rounded but not arched.

TYPES. Holotype: ♀ CANADA. Ontario, 3 miles west of Belleville on Canadian Pacific Railway right-of-way, VII.8, 1970, captured on weathered, vertical fence-posts (C. C. Loan). Type deposited in the Canadian National Collection, Ottawa (CNC No. 12673).

Paratypes: 4 ♀ ♀, 10 ♂ ♂, data as for holotype except captured VII.8-10, 1970, and 1 ♀ emerged IX.2, 1964, reared from nymph of *Hyalopsocus striatus* (Walker) collected at the type locality. 2 ♀ ♀, 2 ♂ ♂. USNM, 2 ♂ ♂ BM, balance CNC.

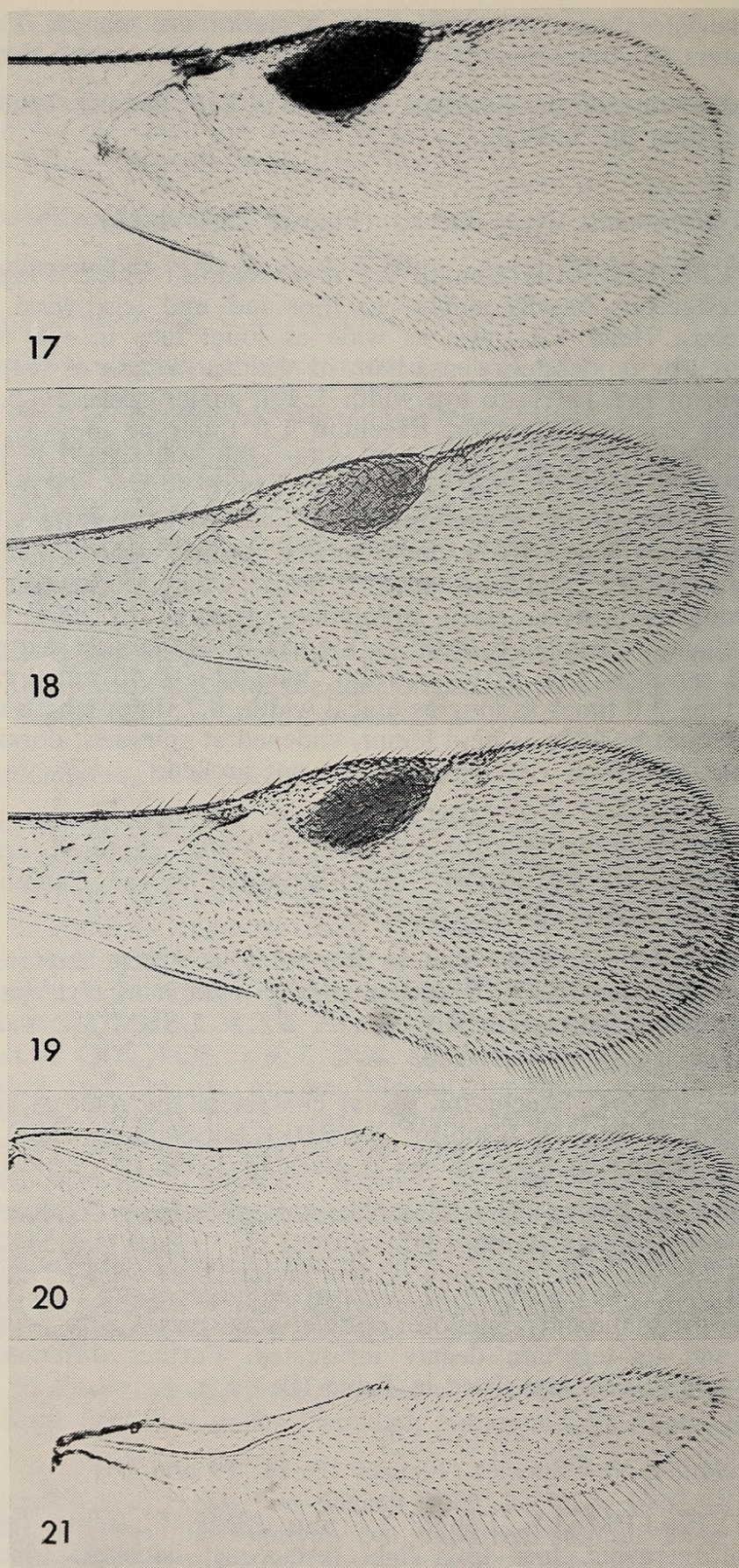
Males and females. Except for sexual characters the male is similar to the female. The scape of the male is longer ($P < 0.01$), but equal in width. Variation of some structural characters for each sex is given in Table III.

Host: Associated by rearing from *Hyalopsocus striatus* (Walker).

E. hyalopsocidis is the largest of the species characterized by a relatively wide hind wing. Of these, the antennae and legs of *pallidifacia* are light yellowish and the tergite 1 is predominantly rugulose; *criddlei* new species is piceous rather than dark brown and its legs are deeply infuscated. Further differences, between *hyalopsocidis* and *criddlei* are listed in Table III.

Euphoriella criddlei, New Species (Figures 10, 11, 19 and 20)

HOLOTYPE FEMALE. Length 1.6 mm. Black. Flagellum basally, scape, pedicel, tarsal segments, fore tibia light testaceous; flagellum apically reddish brown; fore femur, mid and hind femur, tibia infuscated. Head subquadrata, 1.3 times as wide as long; face in side view evenly rounded, sparsely hairy, in dorsal view quite glabrous with very fine, indefinite sculpture; face width to length of



FIGURES 17-21. Wings of *Euphoriella* species. 17. Front wing *nixonii*. 18. Front wing *kaladarensis*. 19. Front wing *criddlei*. 20. Hind wing *criddlei*. 21. Hind wing *kaladarensis*.

scape + pedicel 1:1.0, to length of eye 1:1.8, to eye width 1:1.3; temple as wide as face; basal width of mandible 2.0 times pedicel width, somewhat less than 2.0 times malar space; flagellum 1.7 times as long as head width; length to width ratios of scape, pedicel, flagellar segments I-III 1.9, 1.6, 1.6, 1.9, 1.5:1.0; temple = eye width; OOL:POL = 8.6, OOL about = scape length; vertex, frons and genae, polished, smooth and relatively glabrous. Mesonotum glossy, few hairs on lateral margins; prescutellar groove narrow, shallow divided by a single medial carina; mesepisternum slightly foveolate near tegulae, fine striae and pitting below raised medial area; propodeum indistinctly areolated, moderately declivous behind; stigma 2.5 times as long as wing width; hind tibia 0.34 mm long. Tergite I 3.3 times as long as apical margin. 0.8 times length of hind tibia, apical width about equal to width of hind femur, in side view broadly convex, dorsal face rugulose-striate, somewhat widened at spiracles.

TYPES. Holotype: ♀ CANADA. *Ontario*, 3 miles west of Belleville in an abandoned apple orchard a short distance south of the Canadian National Railways right-of-way, VI.3, 1970, beat from foliage of mature apple trees (C. C. Loan). Type deposited in the Canadian National Collection, Ottawa (CNC No. 12674).

Paratypes: 5 ♀ ♀, 6 ♂ ♂, data as for holotype except collection dates VI.3-5, 1970. E ♀, 1 ♂ USNM, balance CNC.

Males and females. Except for sexual characters the male is similar to the female. The length of the scape is not significantly different between the sexes. Variation of some taxonomic characters is summarized in Table III.

This species is named for the Canadian naturalist Norman Criddle (1875-1933).

Acknowledgements

For the generous loan of types and other material we thank C. F. W. Muesebeck, Department of Entomology, Smithsonian Institution, Washington, D.C., Paul Marsh, Systematic Entomology Laboratory, U.S. Department of Agriculture, Washington, D.C., and W. R. M. Mason, Entomology Research Institute, Canada Department of Agriculture, Ottawa. We also appreciate criticisms of the typescript by these systematists. The permission of J. F. Perkins, British Museum (Nat. Hist.), London, to examine type material is gratefully acknowledged. We thank Sherwood Miller, Research Station, Canada Department of Agriculture, Smithfield, Ontario for computer assistance.

References

- ASHMEAD, W. H. 1900. Classification of the Ichneumon Flies, or the Superfamily Ichneumonidae. *Proc. U.S. Natl. Mus.* 23: 116.
- BILEWICZ-PAWINSKA, T. 1964. Udział meczelkowatych (Hym. Braconidae) w redukcji polnych pluswiaków roznoskrydlowych (Heteroptera). *Polskie Pismo Entomol.* (B) 29: 261-264. (In Polish.)
- BILEWICZ-PAWINSKA, T. 1968. Laboratoryjne metody hodowli i Euphorinae pasożytów *Lygus* sp. *Ekol. Pol.* (B) 14: 231-236. (In Polish.)
- BILEWICZ-PAWINSKA, T. 1969. Natural limitation of *Lygus rugulipennis* Popp. by a group of *Leiophron pallipes* Curtis on the rye crop fields. *Ekol. Pol.* (A) 17: 811-825.
- BRINDLEY, M. D. H. 1939. Observations on the life-history of *Euphorus pallipes* (Curtis) Hym. Braconidae, a parasite of Hemiptera-Heteroptera. *Proc. R. Entomol. Soc. Lond.* A 14: 51-56.

- CLANCY, D. W. AND H. D. PIERCE. 1966. Natural enemies of some *Lygus* bugs. J. Econ. Entomol. 59: 853-858.
- LEAN, O. B. 1926. Observations on the life-history of *Helopeltis* on cotton in southern Nigeria. Bull. Entomol. Res. 16: 319-324.
- LOAN, C. C. 1965. Life cycle and development of *Leiophron pallipes* (Curtis) (Hymenoptera: Braconidae, Euphorinae) in five mirid hosts in the Belleville district. Proc. Entomol. Soc. Ont. 95: 115-121.
- LOAN, C. C. 1966. A new species of *Leiophron* Nees (Hymenoptera: Braconidae, Euphorinae) with observations of its biology and that of its host, *Plagiognathus* sp. (Heteroptera: Miridae). Ohio J. Sci. 66: 89-94.
- LOAN, C. C. 1970. Two new parasites of the tarnished plant bug in Ontario; *Leiophron pseudopallipes* and *Euphoriana lygivora* (Hymenoptera: Braconidae, Euphorinae). Proc. Entomol. Soc. Ont. 100: 188-195.
- MACHALOVA, M. J. 1954. L biologii najezdnikov *Euphorus pallipes* Curt. i *Perilitus secalis* Hal., parazitirujusich na sveklovicnych klopach v Altajskom Kraje. II ekol. Konf. 160-163. (In Roumanian.)
- MENZEL, R. 1924. De in *Helopeltis* parasitierende sluipwesp Thee 5: 24. (In Dutch.)
- MENZEL, R. 1926. Uber Teesschadlinge in Niederlandischen-Indien ind ihre Bekamfung. III. *Euphorus helopeltidis*. Z. Agnew. Entomol. 12: 340-356.
- MUESEBECK, C. F. W. 1936. The genera of parasitic wasps of the braconid subfamily Euphorinae with a review of the Nearctic species. U.S. Dept. Agric. Misc. Publ. 241, 37 pp.
- MUESEBECK, C. F. W. 1956. A braconid parasite of a psocid (Hymenoptera). Proc. Entomol. Soc. Wash. 58: 148-149.
- MUESEBECK, C. F. W. 1963. Host relationships of the Euphorini (Hymenoptera: Braconidae). Proc. Entomol. Soc. Wash. 65: 306.
- NEW, T. R. 1970. The life histories of two species of *Leiophron* Nees (Hymenoptera, Braconidae) parasitic on Psocoptera in southern England. Entomol. Gaz. 21: 39-48.
- NIXON, G. E. J. 1946. Euphorine parasites of capsid and lygaeid bugs in Uganda (Hymenoptera: Braconidae). Bull. Entomol. Res. 36: 121-148.
- RICHARDS, O. W. 1967. Some British species of *Leiophron* Nees (Hymenoptera: Braconidae, Euphorinae), with the description of two new species. Trans. R. Entomol. Soc. Lond. 119: 171-186.
- SOMMERMAN, K. M. 1956. Parasitization of nymphal and adult psocids. (Psocoptera). Proc. Entomol. Soc. Wash. 58: 149-152.
- STREAMS, F. A., M. SHAHJAKAN, AND H. G. LAMASURIER. 1968. Influence of plants on the parasitization of the tarnished plant bug by *Leiophron pallipes*. J. Econ. Entomol. 61: 996-999.
- TAYLOR, T. H. C. 1945. *Lygus simonyi* Reut., as a cotton pest in Uganda. Bull. Entomol. Res. 36: 121-148.
- WALOFF, N. 1967. Biology of three species of *Leiophron* (Hymenoptera: Braconidae, Euphorinae) parasitic on Miridae on broom. Trans. R. Entomol. Soc. Lond. 119: 187-213.
- WILKINSON, D. S. 1926. On two new parasites from West Africa bred from the cacao bark-sapper (*Sahlbergella*). Bull. Entomol. Res. 17: 309-311.



Loan, C C and New, T R. 1971. "An account of the North American species of Euphoriella Ashmead with descriptions of seven new species (Hymenoptera: Braconidae, Euphorinae)." *Proceedings of the Entomological Society of Ontario* 102, 92–108.

View This Item Online: <https://www.biodiversitylibrary.org/item/139982>

Permalink: <https://www.biodiversitylibrary.org/partpdf/203217>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In Copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.