

A TAXONOMIC REVISION OF THE NEARCTIC SPECIES  
OF THE GENUS BEZZIA (DIPTERA: CERATOPOGONIDAE)

by

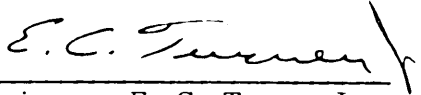
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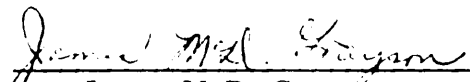
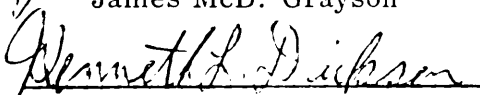
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Virginia Polytechnic Institute and State University  
in partial fulfillment of the requirements for the degree of  
DOCTOR OF PHILOSOPHY

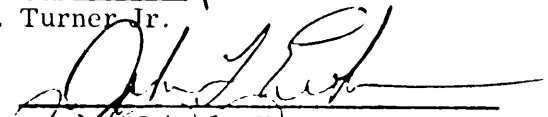
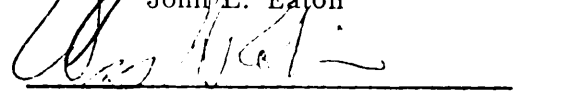
in

Entomology

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## INTRODUCTION

The nearctic species of the ceratopogonid genus Bezzia are in need of study for a variety of reasons. No comprehensive study for the entire region exists. Wirth's (1952) review of the California species is the only modern presentation of illustrations, keys, and descriptions for a substantial number of species. Many specimens exist in the U.S. National Collection and the Canadian National Collection which heretofore were unidentified.

Little is known of their respective biologies and life cycles. This aspect is not included, however, a brief synopsis of biological information is presented in a later portion of this paper.

The objectives of this study are to provide detailed descriptions, illustrations, and keys to the adults of the species known to exist in the Nearctic Region (the northern continent in the Western Hemisphere including Mexico). The taxonomic status of each subgeneric group as well as individual species is reviewed and substantiated or otherwise clarified.

Type and, or allotype specimens were examined for each species except Bezzia punctipennis Williston which according to Wirth (1952) is "presumably in the British Museum". It is easily separated being the only nearctic species with spotted wings. Forty-three species are reviewed, 14 of which are new. Two species are thought to be junior synonyms after careful examination of specimens and literature. One new subgeneric name is proposed.

## LITERATURE REVIEW

Early students of the biting midges grouped most species in the family Chironomidae, in the large genus Ceratopogon. Malloch (1917) first suggested family rank for the Ceratopogonidae and was substantiated by Edwards (1926). Kieffer (1919, 1925) and Edwards are credited with the modern delineation of genera, most of which still exist in the modern concepts of the family.

The genus Bezzia was described by Kieffer (1899) with Ceratopogon ornatus Meigen as the type. It was named in honor of Mario Bezzi, a renowned dipterist. Stone et al. (1965) list 29 nearctic species. Loew (1861) described Bezzia opaca and Bezzia setulosa. Williston (1896) added B. punctipennis. Coquillett was the first major contributing student of the group. From 1901-1905 he described B. exopolita, B. barberi, B. pulverea, B. glabra, B. varicolor, B. media, B. media, B. bivittata, B. gibbera, and B. pruinosa. Johannsen (1905) described an adult female but did not name it. The specimen is not available for study. Malloch (1914-1915) described B. apicata, B. dentata, B. flavitarsus, B. albisorsata, B. cockerelli, B. incerta, and B. +obscura. Thomsen (1935) added B. copiosa. Johannsen (1943) compiled a generic synopsis and a list of North American species. Wirth (1951) described B. pseudobscura and B. mallochi. In his classic review of the Heleidae of California, Wirth (1952) produced the only modern presentation of a large number of nearctic species. He described B. biannulata, B. coloradensis, B. granulosa, B. modocensis

B. sordida, B. bilineata, and with Williams (1957) added B. atlantica. Prior to this paper, the afore mentioned served as the taxonomic basis for the nearctic species in the genus Bezzia.

## MATERIALS AND METHODS

Approximately 4,500 specimens used in this study, including types, were borrowed from the following places: the Canadian National Collection (CNC) at Ottawa, Ontario, Canada; Cornell University (CU) at Ithaca, New York; Illinois Natural History Survey Museum (INH) at Urbana, Illinois; U.S. National Museum (USNM) at Washington, D.C.

The mounting technique is that of Wirth and Marston (1968). Measurements and other data are recorded in the manner of Chan and LeRoux (1965). When possible, ten adults of each sex were measured. The measurements of the wing and the female spermathecae are expressed in millimeters. All other data are expressed simply as units of a Zeiss, one centimeter, 10x, ocular micrometer. The data are presented two ways. A table of averages of measurements is presented for the appropriate species with each subgenus group. The range of each measurement is presented within the body of each species description. The number of measurements per item is shown simultaneously. An example: (111-333 = range, n-10 or number measured).

At this point, a brief review of these measurements is in order. Except for the female spermathecae, all measurements are similar for both sexes. The antennal proportions (AP) are the longitudinal proportions of individual antennal flagellomeres (hereafter referred to as antennal segments) stated as a proportion to each other. The antennal ratio (AR) is the sum of the distal four antennal segments divided by the sum of the remaining basal segments for the male.

For the female, the distal five segments are summed and the process repeated. The palpal proportions (PP) are measured in the same manner as the AP i.e. the longitudinal proportions. Due to difficulty of measurement, the basal palpal segment and the scape and pedicel of the antenna were not measured. Thus, palpal segments 2-5 and antennal segments 3-15 are figured in the plates. The palpal ratio (PR) is the length of the third palpal segment divided by its greatest width. The wing length is measured from the basal arculus vein to the wing tip. The costal ratio (CR) is the length of the costa from the basal arculus to its apex, divided by the wing length. The  $R_1$  vein is measured from the proximal side of the radial cell the length of the vein to its intercept at the costa. The last costal segment (LCS) is measured from the proximal side of the  $R_1$ -costa intercept to the tip of the costa. The tarsal ratio (TR) is the length of the basitarsus divided by the length of the second tarsomere. The female spermathecae are measured to their greatest length, including the duct, by the greatest width. The measurements stated in proportions, and the female spermathecae, are from an individual whose ratio for that measurement is at or near the average. Measurements were made at 160x for the wing and tarsi, 250x for the antenna, and 400x for the palp and spermathecae. Figures were made with a Zeiss drawing tube and a Leitz microscope slide projector.

When possible, the thoracic mesonotal pattern is figured (labeled T) and may be included with the male or female plate. Variance of this pattern occurs with different lighting. It is necessary to establish a norm of observation to eliminate

this variance. The mesonotum was viewed dorsally such that the plane of the notum was perpendicular to the optical plane of the stereo microscope. The posterior depression of the mesonotum, known as the "disc", is in a shadow and not plainly visible. A light source was directed toward the notum at approximately a 45 degree angle. Variance from this procedure leads to differences of observation on a single specimen.

The pattern of leg banding is presented (labeled L) with the plate of either sex. The leg banding and the mesonotal patterns are both subject to specific variation. Both are intended as a guide to the reader and not as a representation of invariable color scheme.

The bibliographic section at the head of each description is not complete. It does not include all species check lists and citations of that sort. The author included all references important to the taxonomy and when possible, the biology of the species.



BEZZIA KIEFFER

Body slender, with sparse bristles on thoracic notum. Eyes bare. Female antenna with basal segments ovoid or very short, usually five distal segments cylindrically elongate; male usually with plumose hairs on segments 2-10 or 2-11 and usually four distal segments cylindrically elongate, differing from preceding flagellar segments. Maxillary palp slender. Mesonotum without anterior spine or tubercle; scutum with several strong prealare and postalare setae; scutellum usually with strong bristles and various number of small setae. Femora may be armed ventrally with short, stout spines; fore femur may be slightly swollen; tarsal segment five cylindrical and with or without sharply-pointed, ventral plantar setae (not stout batonetts); claws moderate, equal, usually with a basomedian tooth; empodium absent. Wing narrow, with fine microtrichiae, usually without macrotrichiae of membrane. Veination: one anterior radial cell,  $R_1$  and  $R_5$  quite separated, costa usually extending at least two-thirds of wing, no intercalary fork, median fork usually sessile or with a short petiole, r-m cross vein vertical or nearly so, anal vein bent at middle and with fold arising from bend; anal lobe not well developed. Female abdomen nearly always with paired eversible glands which are internally manifest by slender, sclerotized, rod-like projections directed basad (gland rods). Male hypopygium inverted; tergite nine rather small, with lateral lobes well developed; basimere and telomere simple; aedeagus more or less triangular or conical; parameres fused, usually forming an elongate rod-like structure. (Taken from Tokunaga and Murachi 1959 with slight modification).

Key to the Adults of the Genus Bezzia

- 1 Venter of fore femora armed with one or more short, stout setae . . . . . 2
- 1' Venter of fore femora unarmed . . . . . 3
- 2 Mesovertex of head with one or more very large, stout setae in addition to secondary setae. (Subgenus Pseudobezzia). . . . . 4
- 2' Mesovertex lacking large, stout setae. (Subgenus Bezzia s. str.). . . . . 21
- 3 Telomeres of male genitalia reduced, short, or lacking. (Subgenus Phaenobezzia Plate 69, fig. B). . . . . B. opaca
- 3' Telomeres of male normal, not reduced. (Subgenus Aspinabezzia n. subgen.) . . . . . 30
- 4 Wing with 2 large dark spots and 2-3 fainter spots. (Plate 29, fig. C; Plate 30, fig. D) . . . . . B. punctipennis
- 4' Wing without spots. . . . . 5
- 5 At least apical knob of halter dark; brown-black. . . . . 6
- 5' Halter light colored; white-tan-yellow. . . . . 16
- 6 Legs with fore and mid femora broadly yellow . . . . . 17
- 6' Legs dark, if any broadly yellow, only fore femur, hind femur, mid femur dark. (except B. atlantica with brown fore and mid femora, hind femur with broad yellow mesal band). . . . . 13
- 7 Hind leg with much yellow. . . . . 8
- 7' Hind leg dark. . . . . 10
- 8 Fore femur yellow with broad brown apex. Base of fore tibia broadly brown.

Mid femur yellow with faint subapical brown band; tibia yellow with broad sub-basal and narrow brown apex. Hind femur yellow, gradually darkening to apex; tibia yellow with broad brown subbasal and narrow brown apical bands. Mesonotum grey pollinose with darker median longitudinal vitta and humeral spots. A very dark species. (Plate 24) . . . . . B. pruinosa

8' Fore femur yellow with narrow brown subapical band . . . . . 9

9 Mid femur yellow, broadly brown apically. Fore tibia yellow with broad brown mesal and narrow brown apical bands. Mid tibia brown basal half, broadly yellow subapically with narrow brown apex. Hind femur with narrow brown basal band, yellow gradually darkening to apical third; tibia dark brown with yellow subapical band. Thorax brown with silver pollen; a wide brown median vitta splits at midlength, humerus with brown patches. (Plates 25-26) . . . . . B. pulverea

9' Mid femur yellow with broad brown basal and narrow brown subapical bands. Fore femur yellow with broad brown basal and narrow brown subapical bands; tibia yellow with lighter yellow subapical and narrow brown apical bands. Mid tibia yellow with lighter yellow subapical and narrow brown apical bands. Hind femur broadly yellow mesad, broadly brown apically and basally; tibia brown with broad yellow subapical band. (Plates 33-34) . . . . .

. . . . . B. spicata n. sp.

10 Fore femur yellow with narrow brown basal and broad brown subapical bands. . . . . 11

10' Fore femur otherwise . . . . . 12

- 11 Fore tibia brown with broad yellow subapical band. Mid femur brownish yellow basad, gradually darker apically; tibia with basal half brown, gradually lighter apically (Plates 13-14) . . . . . B. imbifida n. sp.
- 11' Fore tibia yellow with broad brown mesal and narrow brown apical bands. Fore femur yellow with faint, narrow, brown basal and broad brown subapical bands. Mid femur yellow with faint, narrow, brown basal and broad brown apical bands; tibia brown with narrow yellow subapical bands. (Plates 15-16 and 35-36) . . . . . B. laciniastyla n. sp. and B. uncistyla n. sp.
- 12 Fore femur with broad, brown basodorsal area; tibia with basal half darker. Mid femur with dark basal and apical bands; tibia dark basal half and narrow dark apical band. Thorax brown with white polinose spots on humerus. (Plate 9). . . . . B. dentata
- 12' Fore femur brownish yellow with subapical yellow band; tibia brownish yellow with wide brown band mesad and narrow brown band apically. Mid femur brownish-yellow with apical third dark; tibia dark brown with narrow yellow subapical band. Thorax shiny dark with two thin, silvery submedian vittae; humerus with irregular silvery spots (Plate 8). . . . B. bilineata
- 13 Hind femur and tibia brown with broad yellow mesal bands. Fore femur brown with narrow yellow apical band; tibia yellow with broad brown basal and narrow brown apical bands. Mid femur brown with yellow dorsal patch apicomesad; tibia yellow with basal third brown and narrow brown apex. (Plates 5-6). . . . . B. atlantica

- 13' Hind femur dark, not like above. . . . . 14
- 14 Fore femur yellow with slightly darkened dorsomedian area; tibia dark with narrow subbasal and broad subapical brownish-yellow bands. Mid femur brown; tibia brown with narrow subapical yellow bands. Thorax shining black. (Plate 10). . . . . B. expolita
- 14' Fore femur brown with only narrow yellow subapical band. . . . . 15
- 15 Legs very spiny; hind femur with coarse ventral spines. Fore femur brown with slightly lighter subapical band; tibia brown with lighter bands subbasally and subapically. Mid and hind legs brown with mid tibia having a lighter subapical band. Mesonotum of B. mallochi shiny blackish brown; pattern of B. perplexa unknown. (Plates 19-20 and 22-23). . . . .  
. . . . . B. mallochi and B. perplexa n. sp.
- 15' Legs not unusually spiny; hind femur lacking ventral spines. Legs with coloration as above. (Plates 11-12). . . . . B. flavitarsus
- 16 Legs broadly yellow or with broad yellow median bands on most femora and tibiae. . . . . 17
- 16' Legs primarily dark. . . . . 20
- 17 Mid femur yellow with subapical brown band. Mid tibia yellow with apical brown band. Fore femur yellow with subapical brown band; tibia yellow with dark apical and another indistinct subapical band. Hind femur yellow with apical fifth dark; tibia yellow with dark apex. Thorax deep black; abdomen whitish yellow with apical 3 segments dark. (Plates 3-4) . . . B. apicata
- 17' Mid femur not as above. . . . . 18

- 18 Fore femur yellow with narrow brown basal band and subapical brown dorsal patch. Fore tibia yellow with faint darker median band and narrow dark apex. Mid femur yellow with dark bands apically and basally; tibia yellow with very narrow darker bands basally and apically. Hind femur and tibia with broad brown bands basally and apically, broadly yellow mesad. Thorax dark brown with grey pruinosity; a dark brown median vitta; humorous with dark spots. (Plate 7) . . . . . B. barberi
- 18' Fore femur not like above. . . . . 19
- 19 Fore femur brown basally, broadly yellow mesad with a broad brown subapical band, yellow apically. Fore tibia yellow with brown subbasal and narrow brown apical bands. Mid femur yellow with narrow brown basal and broad brown apical band; tibia yellow with broad brown band basad and narrow brown apical band. Hind femur yellow with narrow brown basal and broad brown apical bands; tibia yellow with broad brown apical and basal bands. Thorax brown with grey pollinosity; two darker vittae divide at disc; humorous with darker patches. (Plates 31-32). . . . . B. setulosa
- 19' Fore femur yellow, narrowly brown basad, broadly brown apically. Fore tibia yellow with broad brown bands apically and basally. Mid and hind femora and tibiae with wide brown bands basally and apically, broadly yellow mesad. A large species. (Plates 17-18). . . . . B. magnisetula n. sp.
- 20 Fore femur brown with faint lighter subapical band; tibia brown with light bands subbasally and subapically. Mid leg dark with faint light bands at base and apex of tibia. Hind leg similar with only lighter basal band on

- tibia. Thorax dark brown; mesonotum with very dark brown median vitta expanded to a Y-shape. (Plates 1-2) . . . . . B. albidorsata
- 20' Fore femur with basal two-thirds brown, apical third yellow; tibia yellow basally with wide brown mesal band, a yellow subapical band and narrow brown apex. Mid leg dark brown; tibia with apical third yellow with a narrow brown apex. Hind leg brown. Thorax dark brown with dense bluish-silver pollen; two densely silver pollinose submedian vittae. (Plate 21). . B. media
- 21 Halter light colored. . . . . 22
- 21' At least knob of halter dark. . . . . 24
- 22 Legs brown; only fore femur brownish-yellow. Fore femur brownish-yellow with faint broad, darker subapical band; tibia brown with narrow yellow basal band. Mid and hind legs brown with narrow bases of femora slightly lighter. Mesonotum dark brown with rusty-brown median vitta. (Plate 51) . . . . .  
. . . . . B. suffusa n. sp.
- 22' Legs with much yellow. . . . . 23
- 23 Tibiae yellow with dark apices. Fore femur yellow with dark brown subapical band. Mid femur similar. Hind femur yellow with apical third dark. Thorax dense pearly grey pollinose with faint submedian vittae; humorous with faint spots. (Plate 46) . . . . . B. pseudobscura
- 23' Fore and mid tibiae yellow with broad brown mesal and narrow brown apical bands. Fore femur yellow with broad brown subapical band. Mid femur similar. Hind femur yellow basal half, brown apically; tibia yellow basally and subapically with broad brown subbasal and narrow brown apical bands.

- Thorax dense silvery-blue-grey with two light brown submedian vittae;  
humorous with dark brown L-shaped area. (Plates 54-55) . . . B. varicolor
- 24 Legs brown or nearly so. . . . . 25
- 24' Legs with much yellow, not dark. . . . . 27
- 25 Legs uniformly brown. (Plates 41-42 and 52-53) . . . . .  
. . . . . B. downesi n. sp. and B. unispina n. sp.
- 25' Legs with small amounts of yellow coloring. . . . . 26
- 26 Fore tibia yellow with broad brown subbasal band. Fore femur brown with  
narrow lighter areas basally and apically. Mid femur brown with very narrow  
lighter band apically; tibia brown with narrow brownish yellow basal band,  
apical third slightly lighter. Hind femur brown; tibia brown with narrow  
brownish yellow basal band. Armature of individual fore femora highly var-  
iable in length. (Plates 39-40). . . . . B. dorsasetula n. sp.
- 26' Fore tibia brown with brownish yellow subbasal band. Base of fore femur  
brownish yellow. Thorax brown with dense gold pile. (Plates 44-45). . . . .  
. . . . . B. modocensis
- 27 Legs tan. (Plates 47-48) . . . . . B. obelisca n. sp.
- 27' Legs otherwise. . . . . 28
- 28 Tibiae yellow with only apices darkened. Legs yellow with faint apical half  
of fore and mid femora and dorsal half of hind femur darker. Thorax brown  
with mesonotum with gold bordered, fiddle-shaped outline. (Plates 37-38)  
. . . . . B. cockerelli
- 28' Tibiae banded otherwise. . . . . 29



- 29 Mid and hind tibiae yellow with broad brown subbasal and narrow brown apical bands. Legs yellow; brown subapical bands on fore and mid femora; fore tibia yellow with broad brown mesal and narrow brown apical bands. Hind femur ochreous with apical third brown. A large species with a long radial cell nearly reaching wing apex. (Plate 43). . . . . B. longiradia n. sp.
- 29' Mid tibia yellow with dark apical band; hind tibia dark basal half with wide yellow subapical and dark apical bands. Fore femur brownish-yellow with narrow brown subapical band; tibia with narrow yellow subbasal band, broad brown mesal band, apical half brownish yellow with narrow brown apical band. Mid femur slightly darker apical half. Hind femur yellow basal two-thirds, dark brown apical third. Radial cell not elongated. (Plates 49-50) . . . . . B. sordida
- 30 At least knob of halter dark. . . . . 31
- 30' Halter light colored. . . . . 33
- 31 Femora entirely brown . . . . . 32
- 31' Fore and mid femora brown with lighter subapical band. Fore and mid tibiae brown with yellow subbasal and subapical bands. Hind femur dark brown; tibia with very faint subapical and subbasal bands. Mesonotum of B. bivittata shiny dark brown with two narrow silvery submedian vittae. Mesonotal pattern of B. gibbera shiny blackish-brown. (Plates 58-59 and 66) . . . . . B. bivittata and B. gibbera
- 32 Tibiae yellow. (Plate 65). . . . . B. flavitibia n. sp.

- 32' Tibiae brown; tarsi yellow; female with single spermatheca; frontoclypeal area with very coarse, short setae. (Plate 64) . . . . . B. faciespina
- 33 Fore tibia without dark bands. Legs yellow with faint darker bands at apices of femora and mid and hind tibiae. Mesonotum dark brown with silvery pollen. (Plates 60-61) . . . . . B. coloradensis
- 33' At least apex of fore tibia dark. . . . . 34
- 34 Hind leg with only tibial apex dark banded. Fore femur yellow with brown dorsal "Patch"; tibia yellow with brown mesal and apical bands. Mid leg yellow with brown tibial apex. Mesonotum with pinkish-grey pollen with broad median vitta; humorous with two darker spots. (Plates 67-68) . . . . . B. glabra
- 34' Hind leg other than above . . . . . 35
- 35 Hind femur dark with yellow subapical band. Fore femur yellow with brown mesal band; tibia yellow with brown mesal and apical bands. Mid leg yellow with dark tibial apex. Hind tibia yellow with brown basal and apical bands. Mesonotum with white pollen and broad brown median vitta; humorous with dark brown triangular area. (Plates 62-63). . . . . B. copiosa
- 35' Hind femur dark shaded basal third, remainder yellow with dark apex. Fore femur yellow, not banded, gradually darker apically. Mid femur yellow with dark apical band. All tibiae yellow with faint brown mesal and dark apical bands. Mesonotum brown with grey pollinose submedian vittae. (Plates 56-57) . . . . . B. biannulata

SUBGENUS PSEUDOBEZZIA

Table I

Averages of Measured Data

Females

SPECIES	AR	PR	Tarsal Ratio			CR	Wing			
			Fore	Mid	Hind		L	W	R <sub>1</sub>	LCS
<u>B. albidorsata</u>	0.55	4.20	1.85	2.00	2.26	0.72	1.99	0.62	0.30	0.51
<u>B. apicata</u>	1.11	2.33	2.18	2.29	2.23	0.72	1.42	0.49	0.24	0.39
<u>B. atlantica</u>	1.14	2.49	2.20	2.09	2.37	0.72	1.43	0.45	0.25	0.33
<u>B. barberi*</u>										
<u>B. bilineata</u>	0.89	3.71	1.94	2.18	2.15	0.75	1.87	0.67	0.30	0.46
<u>B. dentata</u>		3.00	1.94	2.07	2.41	0.75	1.76	0.63	0.30	0.46
<u>B. expolita*</u>										
<u>B. flavitarsus</u>	1.27	2.37	1.82	2.23	2.25	0.73	1.43	0.50	0.25	0.37
<u>B. imbifida</u>	1.32	2.28	1.91	2.06	2.11	0.74	1.70	0.59	0.28	0.45
<u>B. laciniastyla</u>	1.48	2.87	1.84	1.98	2.19	0.76	1.62	0.65	0.27	0.44
<u>B. magnisetula</u>	1.14	3.69	1.82	1.84	1.99	0.79	2.32	0.78	0.40	0.60
<u>B. mallochi*</u>										
<u>B. media</u>	1.19		1.85	1.81	2.00	0.77	2.03	0.73	0.37	0.53
<u>B. perplexa</u>	1.48	2.66	2.09	2.24	2.57	0.73	1.52	0.59	0.27	0.38
<u>B. pruinosa*</u>										
<u>B. pulverea</u>	0.87	3.20	1.82	1.99	2.14	0.75	2.28	0.73	0.41	0.59
<u>B. setulosa</u>	1.01	3.23	1.85	1.97	2.15	0.74	1.96	0.66	0.27	0.53
<u>B. spicata</u>	1.42	3.87	1.89	1.99	2.15	0.76	2.03	0.77	0.38	0.59
<u>B. uncistyla</u>	1.37	3.75	1.82	1.92	2.13	0.73	2.62	0.89	0.47	0.60

\* Measurable specimens not available.

Table II

Averages of Measured Data

Males

SPECIES	AR	PR	Tarsal Ratio			CR	Wing			
			Fore	Mid	Hind		L	W	R <sub>1</sub>	LCS
<u>B. albidorsata</u>	0.89	3.22	1.82	1.94	1.95	0.70				
<u>B. apicata</u>	0.85	2.33	2.07	2.18	2.08	0.67	1.21	0.36	0.18	0.20
<u>B. atlantica</u>	0.95	3.23	1.65	1.88	2.11	0.67	1.44	0.37	0.18	0.24
<u>B. barberi*</u>										
<u>B. bilineata*</u>										
<u>B. dentata*</u>										
<u>B. expolita</u>	0.94	2.70	2.01	1.96	1.97	0.67	1.57	0.45	0.25	0.25
<u>B. flavitarsus</u>	0.91	2.65	1.93	2.05	2.02	0.66	1.41	0.38	0.21	0.24
<u>B. imbifida</u>	0.91	3.31	1.77	1.94	1.97	0.66	1.56	0.45	0.22	0.27
<u>B. laciniastyla</u>	1.01	2.96	1.65	1.82	1.98	0.68	1.50	0.43	0.23	0.25
<u>B. magnisetula</u>	0.96	3.99	1.69	1.78	1.87	0.62	1.80	0.56	0.29	0.43
<u>B. mallochi</u>	1.09	2.95	1.60	1.89	2.06	0.69	1.31	0.46	0.24	0.26
<u>B. media*</u>										
<u>B. perplexa</u>	1.08	2.96	1.77	1.97	2.15	0.65	1.42	0.43	0.20	0.26
<u>B. pruinosa*</u>										
<u>B. pulverea</u>	0.89		1.59	1.76	1.85	0.68	1.92	0.52	0.31	0.37
<u>B. setulosa</u>	0.94	3.94	1.58	1.92	1.91	0.72	1.74	0.47	0.29	0.32
<u>B. spicata</u>	0.98	3.80	1.72	1.88	1.87	0.68	1.71	0.53	0.31	0.37
<u>B. uncistyla</u>	0.92	3.54	1.59	1.74	1.91	0.66	2.39	0.66	0.37	0.37

\* Measurable specimens not available.

Bezzia albidorsata Malloch

Female - Plate 2

Bezzia albidorsata Malloch, 1915: 346. Johannsen, 1943: 785. Johannsen, 1952: 168.

Wing length (1.99mm, n=1); width (0.62mm, n=1).

Head (Fig. A) dark brown. Vertex white pollinose with a large median seta in addition to secondary setae. Antennal (Fig. G) segments 3-10 subequal, vase-shaped, yellow basal two-thirds, brown apically; 11-15 cylindrically elongate, brown, slight basal swelling yellow. AP 20-12-11-12-13-14-14-16-35-38-38-44-51. AR (1.82, n=1). Palp (Fig. E) slightly lighter than head, segment 2 subcylindrical; 3 cylindrical with apical half narrowed, 4-5 sensilla mesad; segments 4-5 subequal, subcylindrical, 5 slightly bulboid apically. PP 20-33-17-19. PR (4.12, n=1). Mandible (Fig. D) with 12 teeth.

Thorax dark brown. Mesonotum with a very dark brown median vitta expanded at medlength forming an inverted Y-shape. Pollinose white markings on humerus, laterad of vitta and submesad at anterior margin of disc. Prealare setae 11, postalare 2. Halter white. Scutellum subshining dark brown with 8 moderate setae. Postscutellum dull, dark brown. Fore leg with 4-7 stout ventral setae on femur. Legs dark with lighter bands at subapex of fore femur; subapex and subbasad of fore tibia; basally and apically on mid tibia; basally on hind tibia. Tarsus with moderate ungues, about half the length of distal segment (Fig. F) bearing a large basomedian tooth. Tarsi whitish-yellow. TR (fore-1.85, n=1); (mid-2.00, n=1); (hind-2.26, n=1). Wing (Fig. C) with faintly yellow

anterior veins. CR (0.70, n=1).  $R_1$  (0.30mm, n=1). LCS (0.51mm, n=1).

Abdomen (Fig. B) brown, dorsum with dense white pile; pygidial segments dark, fine golden setal vestiture. One pair long, hyaline gland rods reach nearly to base of abdomen. Spermathecae: 2 unequal, subspherical. Dimensions (.066mm x .088mm and .091mm x .111mm). Genital sclerotizations talon-like, laterally opposed, slightly basally directed.

#### Male - Plate 1

Wing length (1.75mm, n=1); width (0.51mm, n=1).

Head (Fig. A) similar to female with sparser vertical pollin. Antenna (Fig. F) with segments 3-9 subequal, apically bulboid; 10-11 slightly longer, cylindrical; 12-15 cylindrically elongate. Antennal plume golden. AP 25-17-16-16-15-16-16-20-29-49-38-49-53. Palp (Fig. D) with PP 17-29-20-18. PR (3.22, n=1).

Thorax subshining dark brown without mesonotal markings. Legs spinier. Leg coloration differing slightly from female. Apex of fore femur slightly lighter as is tibia. Mid leg with tibia slightly lighter apical half. Tarsi similar (Fig. E) with ungues faintly bifid. TR fore (1.82, n=1); mid (1.94, n=1); hind (1.95, n=1). Wing (Fig. C) with CR (0.70, n=1);  $R_1$  (0.30mm, n=1); LCS (0.34 mm, n=1).

Abdomen (Fig. B) dark brown, subshining, not pollinose as female. Genitalia with tergum 9 reduced, narrow, with small lateral lobes subequal in length to basimere. Sternum 9 large, plate-like, subequal in length to basimere with

shallow caudomedian excavation. Basimere rotund, sparsely setose, subcylindrical. Telomere short, stout, knobby, setose, cone-shaped. Parameres with a long, blunt-tipped, sword-like process apically, basal process like a fleur-de-lis. Aedeagus a large, inverted Y-shaped structure, the stem apicad, fork basad.

Discussion: This is not a widely collected species. The illustrations are based on a limited number of specimens that were compared with the types and presumed to be the same species. It is probably closest to B. media, which itself is not a common species.

Type: Malloch (1915) Illinois, Algonquin, 12 July 1895, W.A. Mason, Holotype F. (INH).

Distribution: Malloch (1915) Illinois; Johanssen (1952), Connecticut; Virginia.

Material studied: (pinned) VIRGINIA, Wallops Is., paratype F., 25 May 1913, W.L. McAtee; Augusta Co., Mt. Solon, l.t., 1F., 25 June 1951, W.W. Wirth. (slides) VIRGINIA, Falls Church, stream marg., 1F., 1M., 30 June 1951, W.W. Wirth.



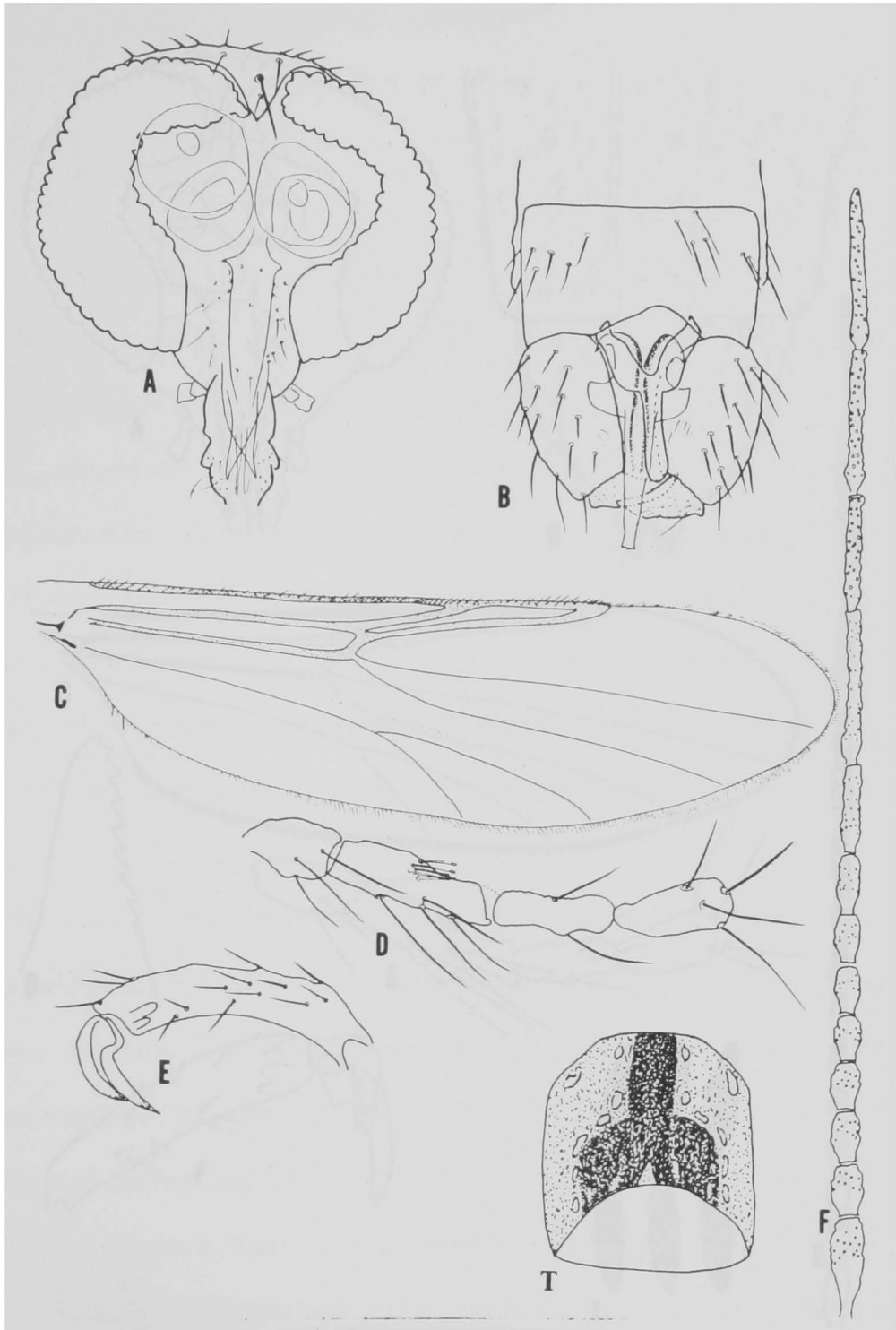


Plate I - *B. albidorsata* Malloch - M

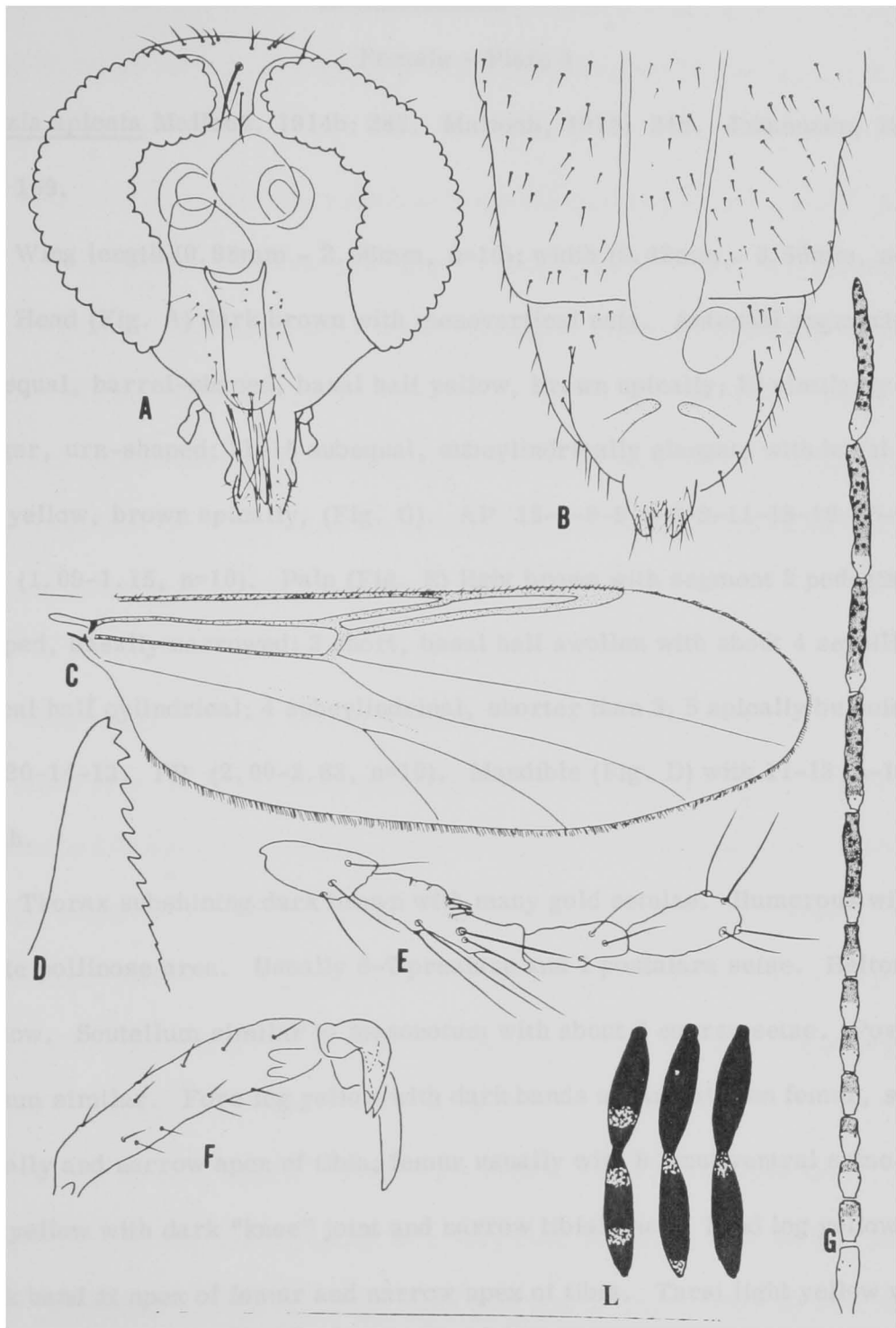


Plate 2 - *B.albidorata* Malloch-F

Bezzia apicata Malloch

Female - Plate 4

Bezzia apicata Malloch, 1914b: 282. Malloch, 1915: 348. Johannsen, 1952: 169.

Wing length (0.98mm - 2.06mm, n=10); width (0.42mm - 0.56mm, n=10).

Head (Fig. A) dark brown with mesovertical seta. Antennal segments 4-9 subequal, barrel-shaped, basal half yellow, brown apically; 10 similarly colored, longer, urn-shaped; 11-15 subequal, subcylindrically elongate with basal swelling yellow, brown apically, (Fig. G). AP 12-9-9-9-9-9-9-11-18-18-16-15-18. AR (1.09-1.15, n=10). Palp (Fig. E) light brown with segment 2 pedestal-shaped, basally narrowed; 3 short, basal half swollen with about 4 sensilla, apical half cylindrical; 4 subcylindrical, shorter than 3; 5 apically bulboid. PP 13-20-14-13. PR (2.00-2.63, n=10). Mandible (Fig. D) with 11-13 (n=10) teeth.

Thorax subshining dark brown with many gold setulae. Humerous with small white pollinose area. Usually 6-7 prealare and 1 postalare setae. Halter pale yellow. Scutellum similar to mesonotum with about 6 coarse setae. Postscutellum similar. Fore leg yellow with dark bands subapically on femur, subbasally and narrow apex of tibia; femur usually with 6 stout ventral setae. Mid leg yellow with dark "knee" joint and narrow tibial apex. Hind leg yellow with dark band at apex of femur and narrow apex of tibia. Tarsi light yellow with short ungues (Fig. F) each with small basomedian tooth. TR fore (1.87-3.72, n=10); mid (2.18-2.50, n=10); hind (2.14-2.50, n=10). Wing (Fig. C) very

translucent with anterior veins faintly yellow; costal setae sparser basad. CR (0.52-0.73, n=10).  $R_1$  (0.19mm x 0.27mm, n=10). LCS (0.34mm x 0.46mm, n=10).

Abdomen (Fig. B) light yellow with sparse covering of fine, golden setae dorsally and ventrally. One pair long, hyaline gland rods reach 3 full segments. Spermathecae: two moderately large, subequal, subovoid with short, wrinkled ducts. Dimensions: (.041mm x .086mm--.044mm x .108mm). Genital sclerotizations appear connected mesad, expanded lateroapically. (The figure is not to be regarded as totally accurate as the sclerotizations are difficult to see and are somewhat hypothetical).

#### Male - Plate 3

Wing length (1.14-1.31mm, n=8); width (0.34-0.38mm, n=8).

Head (Fig. A) dark brown with mesovertical seta. Antenna (Fig. F) with segments 4-9 subequal, subspherical; 10 longer, vase-shaped; 11-15 subcylindrical; flagellum pale yellow to apex of segment 12, 13-15 dark brown. Antennal plume light yellow. AP 20-10-10-10-10-10-10-12-18-31-16-18-28. AR (0.79-0.83, n=8). Palp (Fig. D) similar to female with smaller swelling on segment 3. PP 13-22-14-15. PR (1.75-2.86, n=8).

Thorax as with female. Five to six prealare and 2 postalare setae. Legs as with female with the exception of a very faint subapical band on mid femur. (Only one slide mounted specimen seen with this). Tarsi (Fig. E) with rather deep unguis bifurcation apically. TR fore (1.87-2.80, n=8); mid (2.00-2.33, n=8); hind (1.90-2.26, n=8). Wing (Fig. C) with CR (0.65-0.70, n=7).

R<sub>1</sub> (0.14-0.21mm, n=8). LCS (0.15-0.27mm, n=8).

Abdomen similar to female except segment 9 and genitalia distinctly dark brown. Genitalia (Fig. B) with tergum 9 apically conical with lateral lobes. sternum 9 produced apicad in an apically rounded, bifurcate, spiculate structure extending about half the length of basimere. Basimere broadly subtriangular widest basad with sparse, fine setae. Telomere subequal in length to basimere, nearly straight, tapered to sharp apex. Fused parameres apically slender, rod-like with rounded apex, basal processes broad, hat-like. Aedeagus apically very similar, subequal in length, basal processes bilaterally somewhat claw-like.

Discussion: Malloch (1914b) described this species from a single male specimen. Since that date the species has not been widely known. A series of slides prepared from material collected in emergence traps represents the only material available to the author for study. These specimens agree with Malloch's description in all aspects but one. The dark subapical band on the mid femur of the male is discernable on only one male slide mounted specimen. It is not visible on the females. However Malloch (1915) himself say " The female probably differs considerably in structure from the male, but if the general rule for the group holds good in this species, the abdomen should be entirely white and the legs should be less conspicuously blackened". The band is very faint on the pinned holotype. In view of these facts and the fact that the slides are over cleared, it seems these specimens are B. apicata Malloch .

Type: Malloch (1914b), Illinois, Muncie, 24 May 1914, J.R. Malloch,

Holotype M. (INH).

Distribution: Illinois, Malloch (1914b); Michigan, New York,

Material studied: (pinned) MICHIGAN, Cheboygan Co., Douglas L., emerg.  
t., 4F., 1M., 8-15 July; 3F., 2M., 15-23 July; 6F., 5M., 30 July-August 1959,  
R.W. Williams. NEW YORK, Thompkins, Cayuga L., Wyers Pt., Entacot, 2F.,  
May-June, 1965, F.S. Blanton

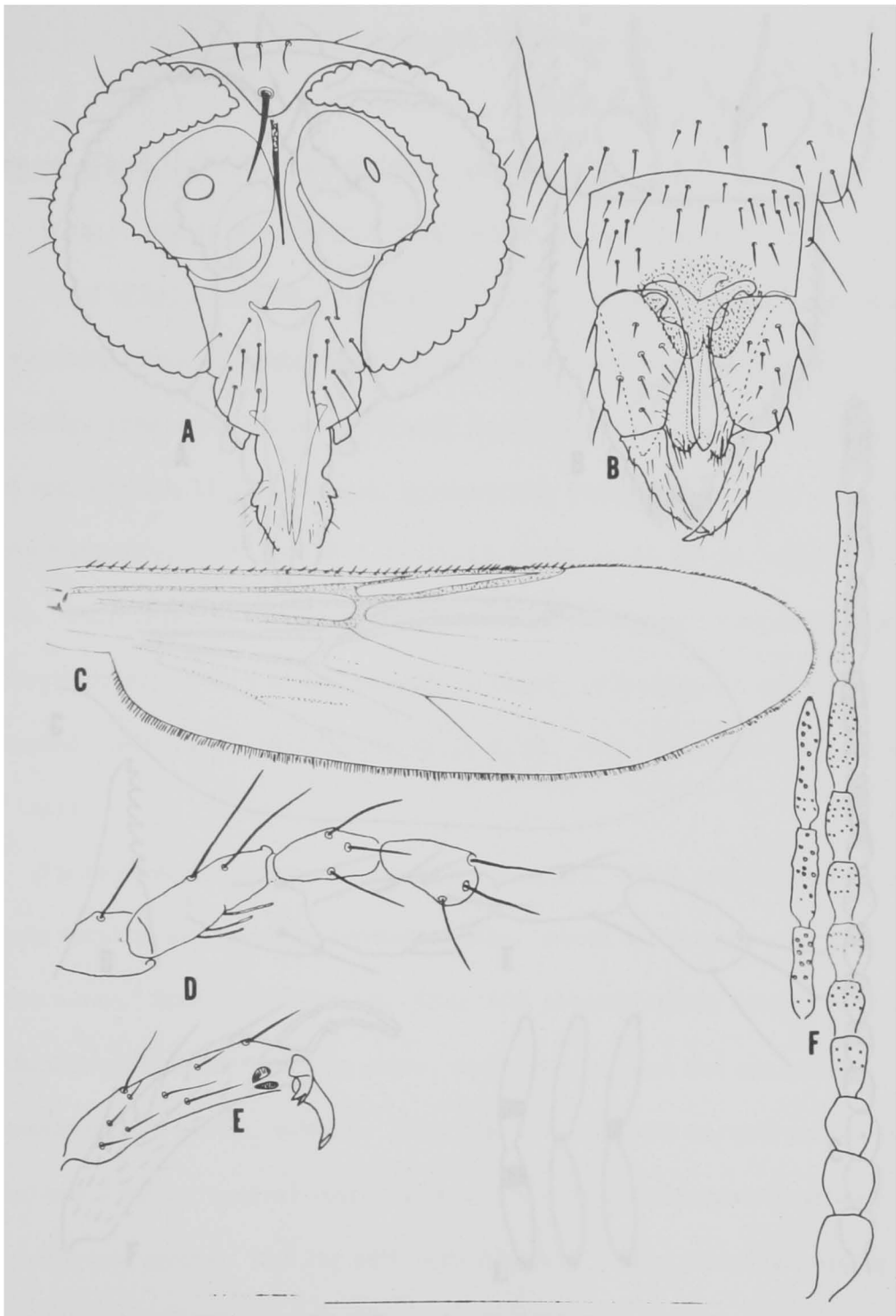


Plate 3 - *B. apicata* Malloch - M

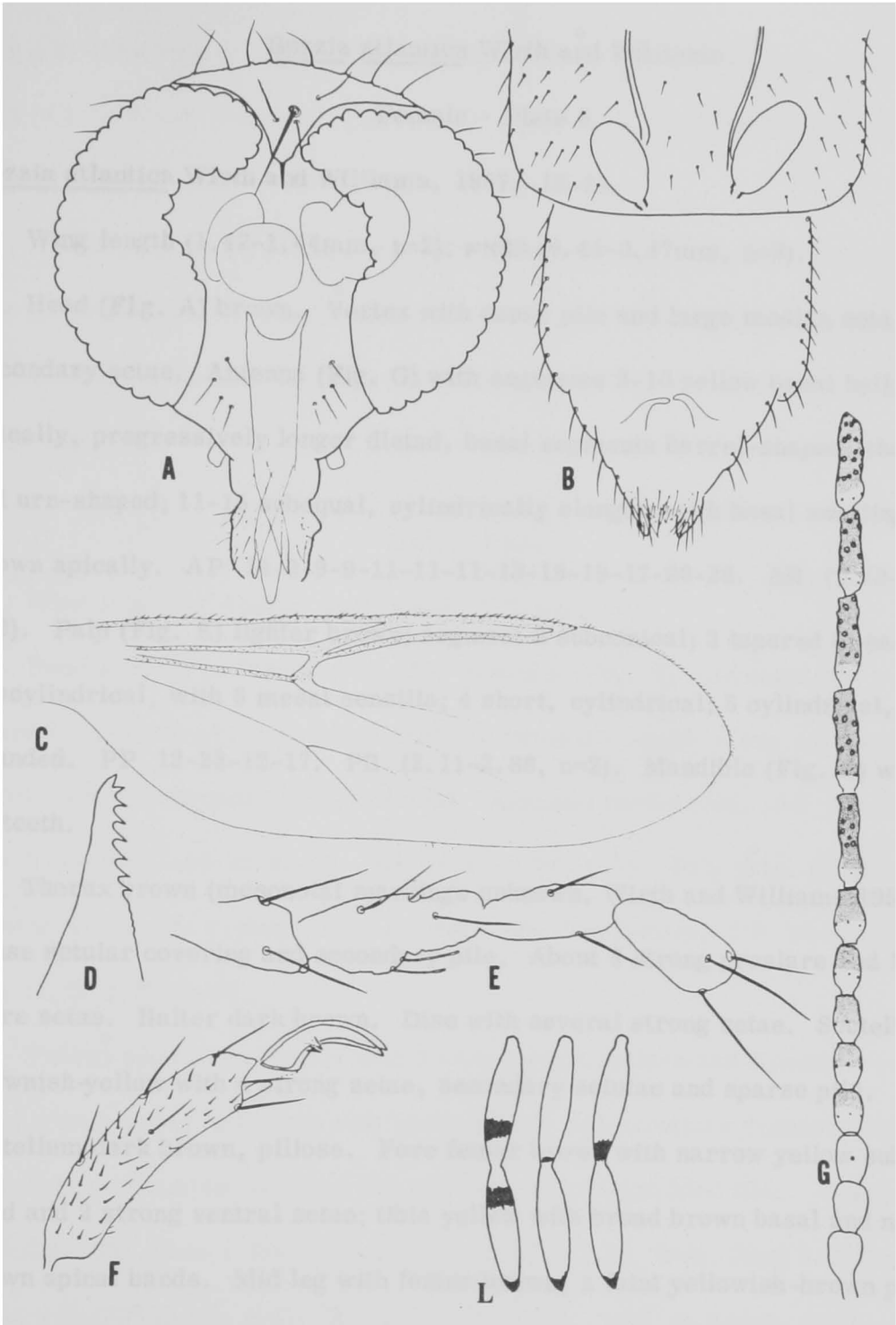


Plate 4 - *B. apicata* Malloch-F



Bezzia atlantica Wirth and Williams

Female - Plate 6

Bezzia atlantica Wirth and Williams, 1957: 13-14.

Wing length (1.42-1.44mm, n=2); width (0.44-0.47mm, n=2).

Head (Fig. A) brown. Vertex with dense pile and large median seta with secondary setae. Antenna (Fig. G) with segments 3-10 yellow basal half, brown apically, progressively longer distad, basal segments barrel-shaped, those distad urn-shaped; 11-15 subequal, cylindrically elongate with basal swelling yellow, brown apically. AP 14-9-9-9-11-11-11-13-18-19-17-20-26. AR (1.13-1.15, n=2). Palp (Fig. E) lighter brown; segment 2 subconical; 3 tapered at each end, subcylindrical, with 6 mesal sensilla; 4 short, cylindrical; 5 cylindrical, apically rounded. PP 12-23-12-17. PR (2.11-2.88, n=2). Mandible (Fig. D) with 11-12 teeth.

Thorax brown (mesonotal markings unknown, Wirth and Williams 1957) with dense setular covering and secondary pile. About 8 strong prealare and 1 postalare setae. Halter dark brown. Disc with several strong setae. Scutellum brownish-yellow with 4 strong setae, secondary setulae and sparse pile. Post-scutellum dark brown, pillose. Fore femur brown with narrow yellow subapical band and 3 strong ventral setae; tibia yellow with broad brown basal and narrow brown apical bands. Mid leg with femur brown, a faint yellowish-brown patch dorsomesad; tibia brown basally gradually becoming yellow with narrow brown apical band. Hind femur and tibia brown with broad yellow band mesad. Tarsi light yellow. TR (fore 2.20, n=2); (mid 2.09, n=2); (hind 2.37, n=2). Ungues

(Fig. F) stout with large basomedian tooth. Wing (Fig. C) with anterior veins faintly yellow with numerous fine costal setae. CR (0.71-0.72, n=2).  $R_1$  (0.20-0.21mm, n=2). LCS (0.30-0.37mm, n=2).

Abdomen (Fig. B) pale brown with moderate setal vestiture. One pair hyaline gland rods reach 4 segments. Spermathecae: 2 equal subpyriform. Genital sclerotizations with median process sharp, talon-like, the lateral extreme band-like.

#### Male - Plate 5

Wing length (1.44mm, n=1); width (0.37mm, n=1).

Head similar to female (Fig. A). Antenna (Fig. E) with segments 3-9 barrel-shaped, 10-11 longer, subcylindrical, 12 twice the length of any segment, cylindrical; 13-15 subequal, subcylindrical. Antennal plume gold. AP 20-11-11-11-11-12-12-14-21-46-20-23-28. AR (0.95-0.96, n=2). Palp (Fig. C) similar to female with distal segment longer, slenderer than female. PP 10-25-12-17. PR (2.89-3.57, n=2).

Thorax similar to female with 9 very large prealare and 2 postalare setae. Legs also similar to female with bands fainter and armature denser, notable on dorsal row of coarse setae on mid and hind femora and hind tibia. Ungues (Fig. D) bifid. TR (fore 1.60-1.68, n=2); (mid 1.81-1.96, n=2); (hind 2.03-2.19, n=2). Wing with CR (0.67, n=1).  $R_1$  (0.18mm, n=1). LCS (0.24mm, n=1).

Abdomen (Fig. B) with sternum 9 rather small, about two-thirds as long as its width with a moderate, broadly U-shaped caudomedian excavation. Tergum 9 broad, apically conical with fleshy lateral lobes subequal to length of basimere.

Basimere subequal in length to sternum 9, slightly swollen basad, median margins longitudinally parallel, moderately setose. Telomere three-quarters length of basimere, stout, setose, the flattened apices bent slightly mesad. Fused parameres form an Eiffel Tower-shaped structure, apically rod-like with sculptured basolateral processes. Aedeagus an apically rounded, subtriangular structure with basolaterally divergent processes subequal in length to parameres.

Discussion: Wirth and Williams (1957) point out the similarity of B. atlantica with B. setulosa. The species are readily separated on the basis of halter and leg color. B. atlantica has a brown halter and generally darker leg color scheme. Differences also exist in the form of male and female genitalia.

Type: Wirth and Williams (1957), Bermuda, Devonshire Marsh, recovery cage, holotype M., allotype, 21-27 June 1955, R. W. Williams. (USNM).

Distribution: Wirth and Williams (1957), Bermuda.

Material studied: 2M., 1F. paratype, allotype, same data as type.

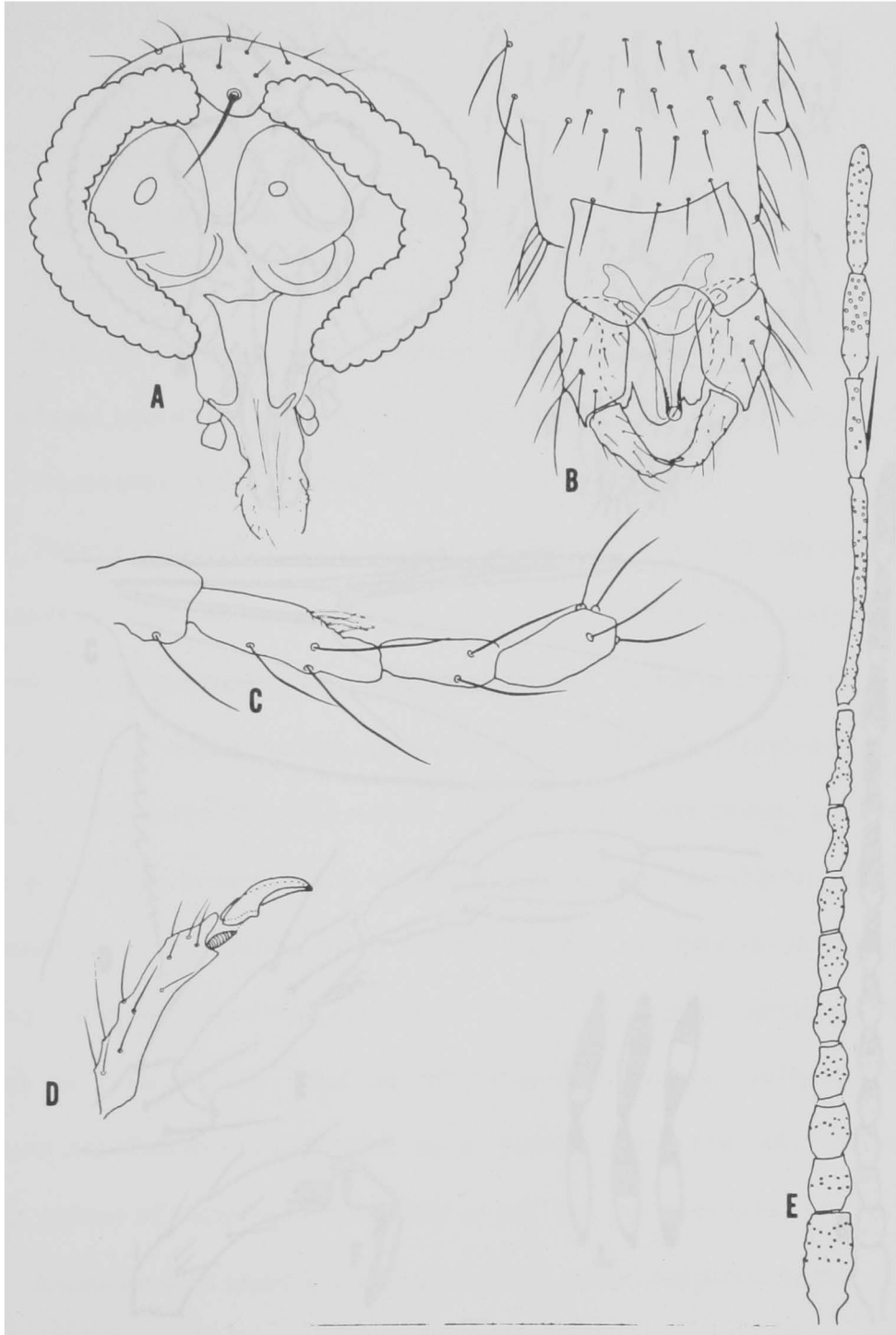


Plate 5 - *B. atlantica* Wirth & Williams - M

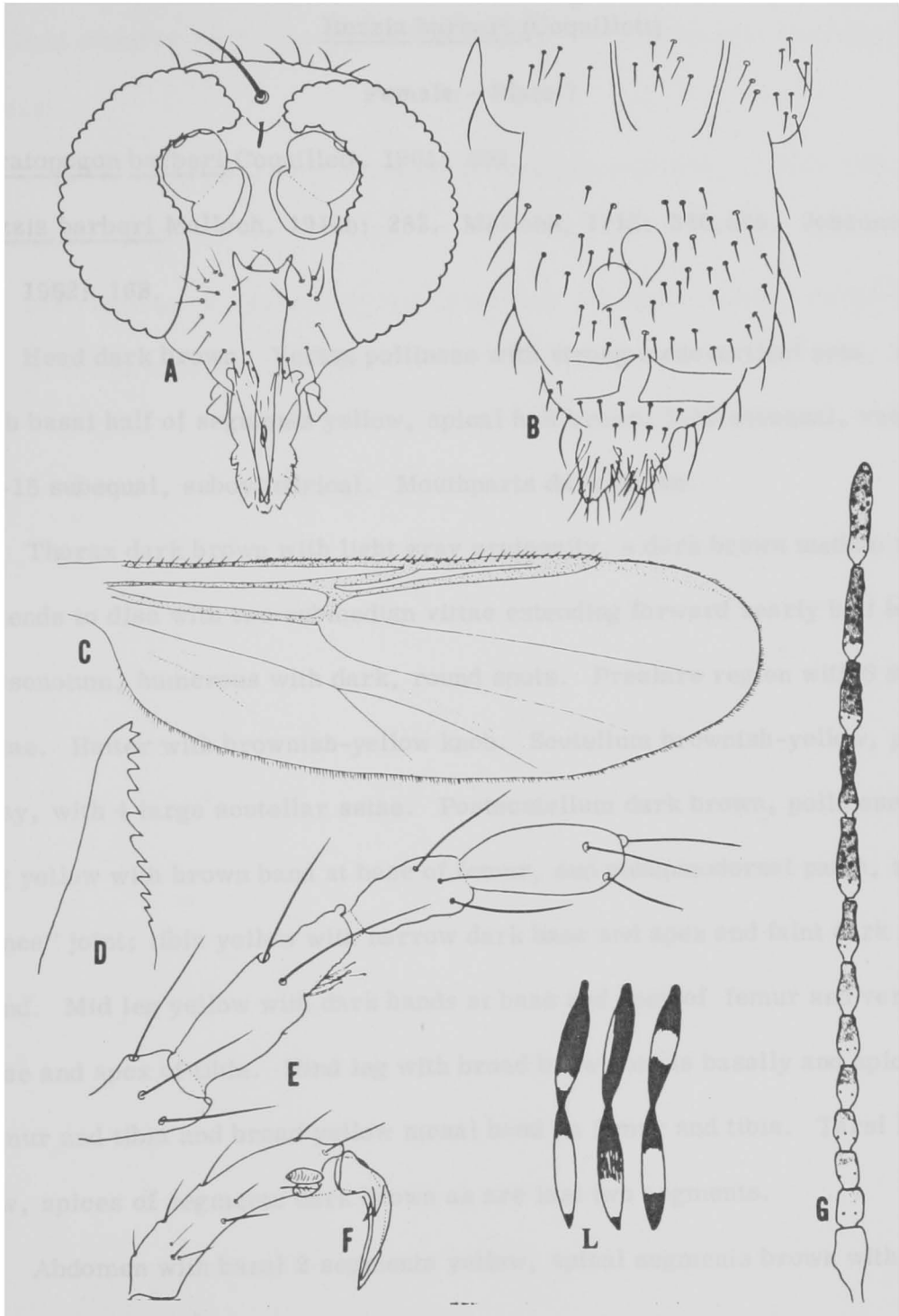


Plate 6 - *B. atlantica* Wirth & Williams - F

Bezzia barberi (Coquillett)

Female - Plate 7

Ceratopogon barberi Coquillett, 1901: 601.

Bezzia barberi Malloch, 1914b: 282. Malloch, 1915: 346, 348. Johannsen, 1952: 168.

Head dark brown. Vertex pollinose with strong mesovertical seta. Antenna with basal half of segments yellow, apical half brown; 3-10 subequal, vase-shaped; 11-15 subequal, subcylindrical. Mouthparts dark brown.

Thorax dark brown with light gray pruinosity, a dark brown median vitta extends to disc with two submedian vittae extending forward nearly half length of mesonotum, humerus with dark, round spots. Prealare region with 6 strong setae. Halter with brownish-yellow knob. Scutellum brownish-yellow, pollinose gray, with 4 large scutellar setae. Postscutellum dark brown, pollinose. Fore leg yellow with brown band at base of femur, and subapicodorsal patch, a dark "knee" joint; tibia yellow with narrow dark base and apex and faint dark mesal band. Mid leg yellow with dark bands at base and apex of femur and very narrow base and apex of tibia. Hind leg with broad brown bands basally and apically on femur and tibia and broad yellow mesal band on femur and tibia. Tarsi light yellow, apices of segments dark brown as are last two segments.

Abdomen with basal 2 segments yellow, apical segments brown with the apical margins of each segment yellow.

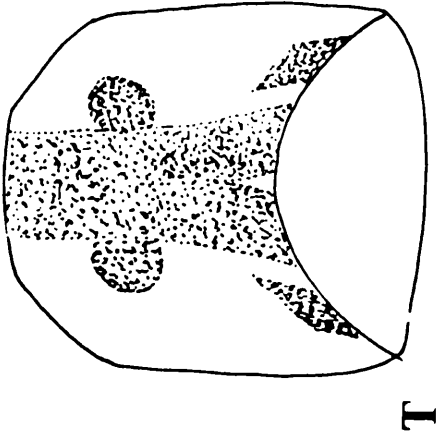
Discussion: B. barberi is a little known species. It seems to be closely related to B. setulosa but can be separated by the dark abdomen as opposed to

the light abdomen of B. setulosa. The band pattern of the fore tibia also differs.

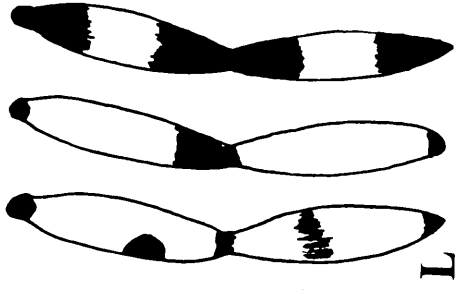
Type: Coquillett (1901), Maryland, Chesapeake Beach, 11 May 1901, H. S. Barber. Holotype F. (USNM).

Distribution: Coquillett (1901), Maryland; Johannsen (1952), Connecticut.

Material studied: See type.



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Plate 7 - *B. barberi* (Coquillett)



Bezzia bilineata Wirth

Female - Plate 8

Bezzia bilineata Wirth, 1952: 227, 230. Wirth and Stone, 1968: 437.

Wing length (1.87mm, n=1); width (0.67mm, n=1).

Head (Fig. A) dark, blackish brown with moderate covering of silvery pollin on vertex. A moderate median vertical seta present. Antenna (Fig. G) dark brown with faint lighter banding on segments; segments 4-10 subequal, somewhat vase-shaped, 11-15 subequal, subcylindrical, individually about one-third longer than individual segments 4-10. AP 14-10-9-9-10-9-10-10-14-14-14-17-18. AR (0.95, n=1). Palp (Fig. E) brown; segment 2 slightly pedestal-shaped; 3 subcylindrical with slight basal swelling, 2-3 mesal sensilla; 4 subcylindrical with apical expansion; 5 bulboid. PP 20-26-16-17. PR (3.71, n=1). Mandible (Fig. D) with 15 teeth, basal 5 teeth reduced.

Thorax subshining, blackish brown with faint silvery pollin and fine gold setulae dorsad. Mesonotum with 2 narrow, silver, submedian vittae reaching two-thirds distance to anterior margin of disc; humerus with amorphous silver pollinose areas. Usually 10 coarse prealare setae. Halter with tan stem and dark knob. Scutellum subshining blackish brown with 6 long, coarse setae and minute spiculae. Postscutellum dull, blackish brown. Fore leg brownish yellow with dark "knee", mesal and narrow and narrow tibial bands. Mid femur brownish yellow with apical third brown; tibia dark brown with narrow yellow subbasal and subapical bands. Hind leg dark brown. Tarsi light yellow with segments 4-5 and apices of basal segments dark. Ungues (Fig. F) moderate with rather large basomed-

ian tooth. TR fore (1.94, n=1); mid (2.18, n=1); hind (2.15, n=1). Wing (Fig. C) translucent with light brown anterior veins. Costal setae moderate. CR (0.75, n=1).  $R_1$  (0.30mm, n=1). LCS (0.46mm, n=1).

Abdomen (Fig. B) subshining blackish brown with faint silver pollinosity and fine golden setulae. One pair long, hyaline gland rods extend 5 full segments. Spermathecae: 2, large, unequal, ovoid with short ducts. Dimensions: (.054 x .088mm - .069 x .125mm).

Discussion: Wirth (1952) notes this species closeness to B. expolita and B. flavitarsus. It is also close to B. dentata but is separated by the pattern of leg banding as outlined above and in the key.

Type: Wirth (1952), California, Mono Co., Topaz L., 1 Aug. 1948, R. Coleman. Holotype F., (USNM).

Distribution: Wirth (1952), California, Nevada.

. Material studied: (pinned) allotype and 2F., paratypes with same data as type; 2F., same locality, July 1948; CALIFORNIA, Quincy, 4mi w. Plumas, 1F., 24 June 1949, P.D. Hurd. NEVADA, Reno, 1F., 6 July, 2F., 7 July 1916, 1F., 16 July 1915, H.G. Dyar. (slide) 1F., paratype, same data as type.

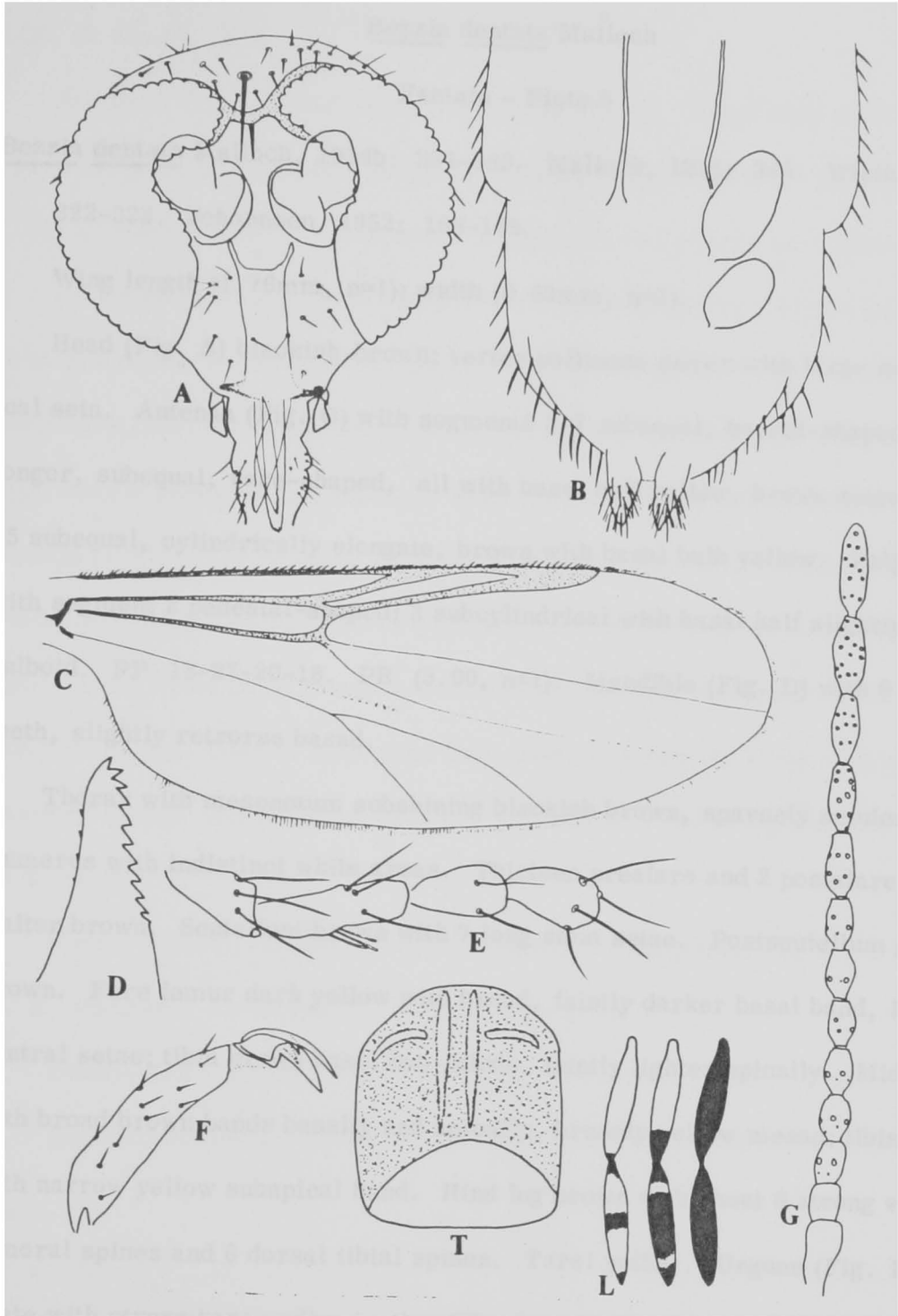


Plate 8 - *B. bilineata* Wirth-F

Bezzia dentata Malloch

Female - Plate 9

Bezzia dentata Malloch, 1914b: 284-285. Malloch, 1915: 346. Wirth, 1951: 322-323. Johannsen, 1952: 168-169.

Wing length (1.76mm, n=1); width (0.63mm, n=1).

Head (Fig. A) blackish-brown; vertex pollinose silver with large mesovertical seta. Antenna (Fig. G) with segments 3-7 subequal, barrel-shaped; 8-10 longer, subequal, vase-shaped, all with basal half yellow, brown apically; 11-15 subequal, cylindrically elongate, brown with basal bulb yellow. Palp (Fig. E) with segment 2 pedestal-shaped; 3 subcylindrical with basal half slightly apically bulboid. PP 18-27-20-18. PR (3.00, n=1). Mandible (Fig. D) with 9 (n-1) teeth, slightly retrorse basad.

Thorax with mesonotum subshining blackish brown, sparsely setulose.

Humerus with indistinct white areas. Thirteen prealare and 2 postalare setae. Halter brown. Scutellum brown with 7 long stout setae. Postscutellum pruinose brown. Fore femur dark yellow with broad, faintly darker basal band, 5-6 stout ventral setae; tibia brown basal two-thirds, faintly lighter apically. Mid femur with broad brown bands basally and apically, broadly yellow mesad; tibia brown with narrow yellow subapical band. Hind leg brown with about 6 strong ventral, femoral spines and 6 dorsal tibial spines. Tarsi yellow. Ungues (Fig. F) moderate with strong basomedian tooth. TR (fore 1.94, n=1); (mid 2.07, n=1); (hind 2.41, n=1). Wing (Fig. C) broad; anterior veins light brown; costal setae numerous, arranged in a double row. CR (0.75, n=1). R<sub>1</sub> (0.30mm, n=1).

LCS (0.46mm, n=1).

Abdomen (Fig. B) dark brown, sparsely setose. Gland rods not visible. Spermathecae: 2 apparently subequal, subspherical-subovoid. Dimensions: (.098 x .098mm - .079 x .116mm). Genital sclerotizations not visible.

Discussion: The male is similar to the female; antennal plume gold; 15 prealare setae; 8 long scutellar setae. This description is based partially on Malloch's (1914b) original description, on study of the lectotypes and on a paratype female remounted to a slide. Webb (personal communication) noted that Firson (1927) is the probable designator of the lectotypes. The genitalia of the lectoallotype is missing. Wirth (personal communication) indicated that his 1951 figure of the male genitalia is probably incorrect as the specimen has no femoral spines. Due to these circumstances, this species along with some of Malloch's other lesser known species, remains in a rather dubious and uncertain position.

Type: Malloch (1914b), Illinois, Monticello, Sangomon R., 21-28 June 1914, J. R. Malloch. Lectotype F., lectoallotype (INH).

Distribution: Malloch (1914-1915), Illinois; Wirth (1951), Virginia.

Material studied: 1 slide mounted paratype female with same data as type.

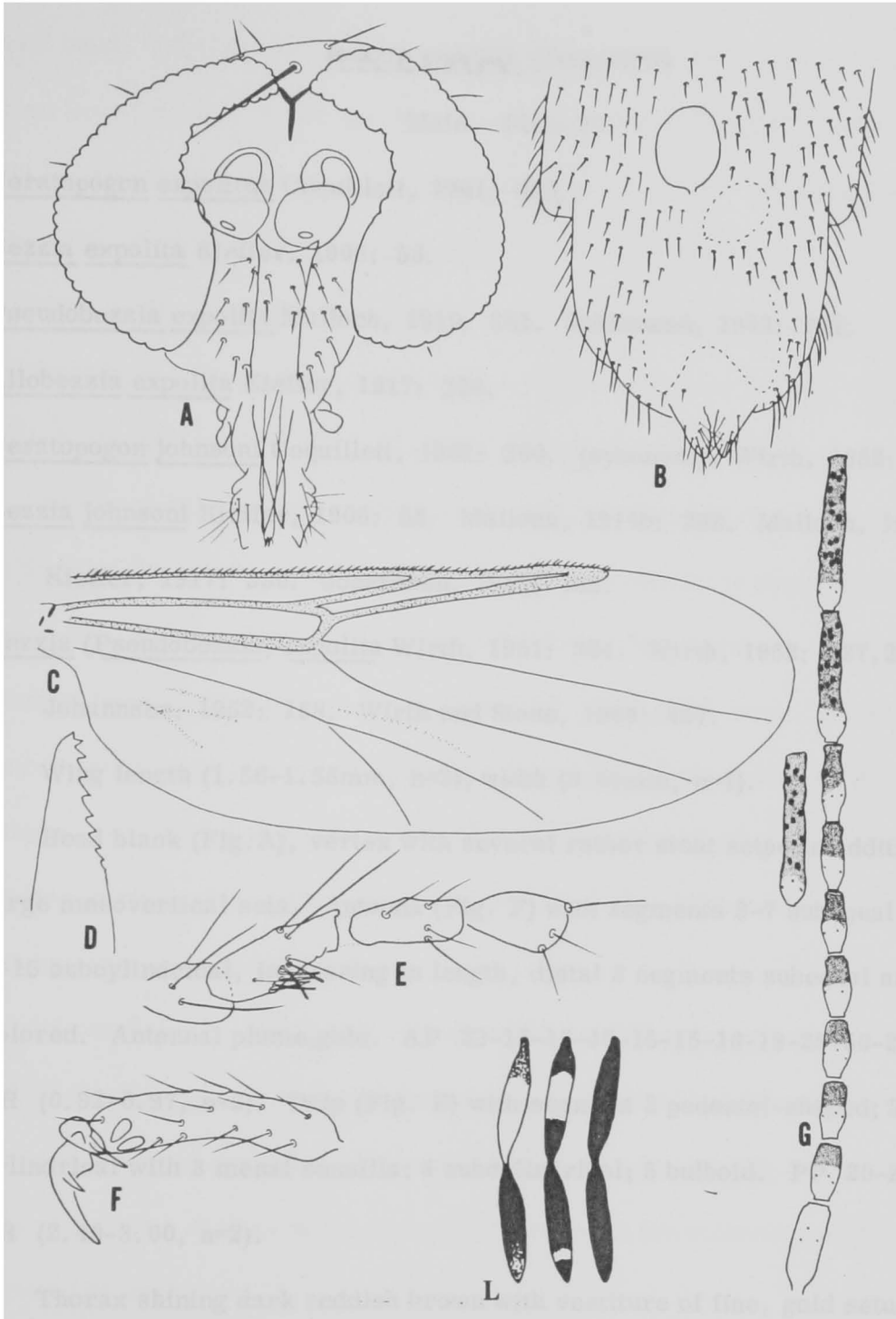


Plate 9 - *B. dentata* Malloch-F

Bezzia expolita (Coquillett)

Male - Plate 10

Ceratopogon expolitus Coquillett, 1901: 600.

Bezzia expolita Kieffer, 1906: 58.

Pseudobezzia expolita Malloch, 1915: 351. Johannsen, 1943: 782.

Allobezzia expolita Kieffer, 1917: 328.

Ceratopogon johnsoni Coquillett, 1901: 300. (synonymy, Wirth, 1952: 227).

Bezzia johnsoni Kieffer, 1906: 58. Malloch, 1914b: 282. Malloch, 1915: 349.

Kieffer, 1917: 330. Johannsen, 1943: 785.

Bezzia (Pseudobezzia) expolita Wirth, 1951: 324. Wirth, 1952: 227, 228.

Johannsen, 1952: 168. Wirth and Stone, 1968: 437.

Wing length (1.56-1.58mm, n=2); width (0.45mm, n=1).

Head black (Fig. A), vertex with several rather stout setae in addition to large mesovertical seta. Antenna (Fig. F) with segments 3-7 subequal, bulboid; 8-15 subcylindrical, increasing in length, distal 3 segments subequal and darker colored. Antennal plume gold. AP 23-15-15-15-15-15-16-18-25-50-28-25-43. AR (0.92-0.97, n=2). Palp (Fig. E) with segment 2 pedestal-shaped; 3 subcylindrical with 3 mesal sensilla; 4 subcylindrical; 5 bulboid. PP 20-27-17-14. PR (2.40-3.00, n=2).

Thorax shining dark reddish brown with vestiture of fine, gold setulae. Usually 11 stout prealare and 2 postalare setae. Scutellum reddish brown with 9 coarse setae. Postscutellum subshining with similar color. Halter with brownish yellow stem and brown knob. Fore femur yellow with narrow brown

basal band, a darker dorsal area, dark "knee"; tibia with yellow subbasal band, broad brown mesal, broad yellow subapical and narrow brown apical bands. Mid leg brown with narrow yellow subapical band on tibia. Hind leg dark brown. Wing (Fig. C) with anterior veins faintly brown. CR (0.67, n=2). R<sub>1</sub> (0.22-0.28mm, n=2). LCS (0.25-0.26mm, n=2). Ungues (Fig. D) short, stout, minutely bifid. Tarsi dark yellow with apices of segments darker. TR (fore 1.71-2.10, n=2); (mid 1.85-2.07, n=2); (hind 1.94-2.00, n=2).

Abdomen shining dark reddish brown with vestiture of fine gold setae. Genitalia (Fig. B) with tergum 9 reduced, narrow, extending to about two-thirds length of basimere, lateral lobes slightly setose, also reduced. Sternum 9 about 3 times as wide as it is long, band-like. Basimere large, somewhat barrel-shaped with a large caudomedian lobe. Telomere short, stout, apically thinner, bent mesad to a point. Fused parameres sword-shaped apically, basally ornate. Aedeagus apically a long, rounded, rod-shaped structure with basal process somewhat hat-shaped.

Discussion: B. expolita is closely related to B. perplexa n. sp., B. mallochi, and B. flavitarsus. It is easily distinguished by the yellow fore femur and the shape of the male genitalia. Females identified as B. expolita were not available at the time of illustration but are so labeled in the collection of the U. S. National Museum.

Type: Coquillett (1901), New Jersey, Riverton, 3 July, C. W. Johnson. Holotype M. (USNM).

Distribution: Coquillett (1901), New Jersey; Kieffer (1917), Hungary;



Wirth (1952). California, Delaware, Florida, Indiana, Louisiana, Montana, New York, Utah, Virginia, Washington; Johannsen (1952), Connecticut, Nebraska.

Material studied: (pinned) DELAWARE, Port Penn, 1.t., 1M., 6 June 1937, G.H. Bradley; LOUISIANA, Baton Rouge, 1F., 13 May 1947, W.W. Wirth; MONTANA, Laural, 1F., 16 July 1917, H.G. Dyar; VIRGINIA, Alexandria, stream marg., 1F., 4 July, 1M., 15 July 1951, W.W. Wirth; (slides) LOUISIANA, Baton Rouge, Tigertown, 1.t., 1F., 6 May 1947, W.W. Wirth; NEBRASKA, Valentine, 1M., 8 June 1950, Hicks, Slater, and LaFoon; UTAH, Vernal, 1.t., 1M., 23 June 1948, G.F. Knowlton; VIRGINIA, Alexandria, Dyke Swp., 1M., 11 June 1952, W.W. Wirth.

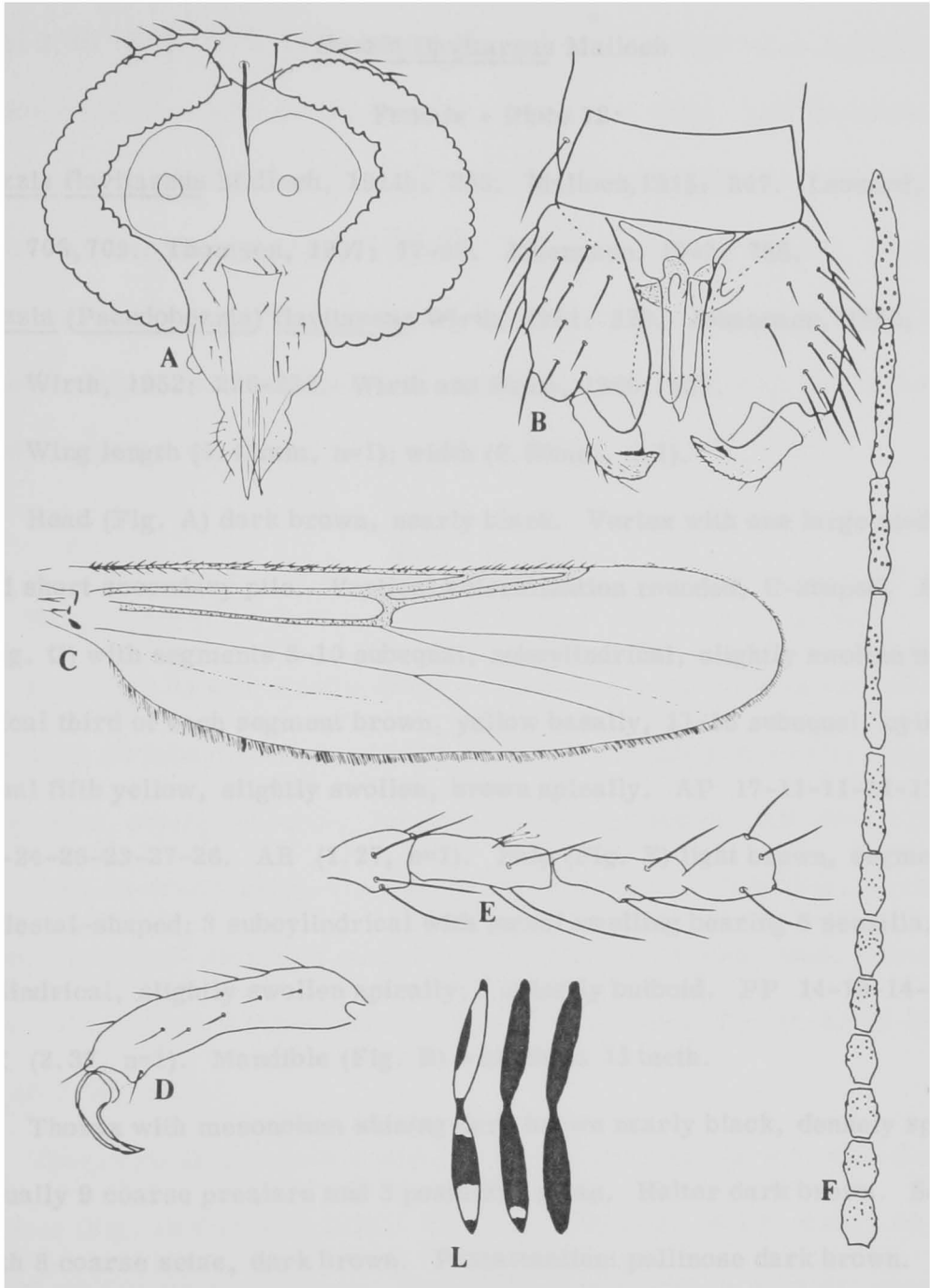


Plate 10 - *B. expolita* (Coquillett) - M

Bezzia flavitarsus Malloch

Female - Plate 12

Bezzia flavitarsus Malloch, 1914b: 283. Malloch, 1915: 347. Leonard, 1926: 708, 709. Thomsen, 1937: 77-80. Johannsen, 1943: 785.

Bezzia (Pseudobezzia) flavitarsus Wirth, 1951: 323. Johannsen, 1952: 168, 169. Wirth, 1952: 220-230. Wirth and Stone, 1968: 437.

Wing length (1.43mm, n=1); width (0.50mm, n=1).

Head (Fig. A) dark brown, nearly black. Vertex with one large median seta and short secondary pile. Vertical sclerotization rounded, U-shaped. Antenna (Fig. G) with segments 3-10 subequal, subcylindrical, slightly swollen mesally, apical third of each segment brown, yellow basally, 11-15 subequal, cylindrical, basal fifth yellow, slightly swollen, brown apically. AP 17-11-11-11-11-11-13-14-24-26-23-27-26. AR (1.27, n=1). Palp (Fig. E) light brown, segment 2 pedestal-shaped; 3 subcylindrical with mesal swelling bearing 6 sensilla; 4 subcylindrical, slightly swollen apically; 5 apically bulboid. PP 14-19-14-17. PR (2.37, n=1). Mandible (Fig. B) with about 11 teeth.

Thorax with mesonotum shining dark brown nearly black, densely spiculate. Usually 9 coarse prealare and 3 postalare setae. Halter dark brown. Scutellum with 8 coarse setae, dark brown. Postscutellum pollinose dark brown. Legs brown with faint lighter subapical band on fore femur; subbasally and subapically on fore tibia; subapically on mid tibia. Tarsi whitish yellow. Ungues (Fig. F) large with large basomedian tooth. TR (fore 1.82, n=1); (mid 2.23, n=1);

(hind 2.25, n=1). Wing (Fig. D) translucent with anterior veins faintly yellow, costal setae fine. CR (0.73, n=1).  $R_1$  (0.25mm, n=1). LCS (0.37mm, n=1).

Abdomen (Fig. C) subshining dark brown, densely spiculate. One pair gland rods reaching to second segment. Spermathecae: 2 unequal, subovoid with very short duct. Divemnsions: (.054 x .079mm - .062 x .106mm). Genital sclerotizations like opposing, comma-shaped structures, each with faint lateral band-like processes.

#### Male - Plate 11

Wing length (1.16-1.62mm, n=10); width (0.34-0.45mm, n=10).

Head (Fig A) with antenna (Fig. F) segments 3-9 somewhat vase-shaped, aubequal; 10 subcylindrical, slightly longer; 11-15 subcylindrically elongate, 12 longest, others subequal. Antennal plume dark brown. AP 20-15-15-15-14-15-15-19-26-50-29-30-31. AR (0.77-1.04, n=11). Palp (Fig. E) with segment 2 pedestal-shaped; 3 subcylindrical, slightly swollen basad, 4 sensilla in shallow mesal pit; 4 subcylindrical; 5 apically bulboid. PP 13-22-21-18. PR (2.22-3.00, n=11).

Thorax similar to female with legs armed coarser and somewhat darker. Ungues (Fig. D) distinctly bifid. TR fore (1.66-2.81, n=10); mid (1.86-2.37, n=10); hind (1.87-2.17, n=10). Wing (Fig. C) with CR (0.64-0.71, n=10).  $R_1$  (0.14-0.28mm, n=10). LCS (2.22-3.00mm, n=10).

Abdomen similar to female, shinier. Genitalia (Fig. B) with tergum 9 small, hardly evident except for large, well developed lateral lobes which are acutely

rounded, sparsely setose. Sternum 9 about as long as broad, sparsely setose, slightly spiculate. Basimere massive, with large median protuberance about two-thirds length, a broadly rounded ventroapical projection beyond base of telomere. Parameres fused to a broad, sword-shaped structure apically, basally with laterally divergent sclerotizations re-sembling ram's horns. Aedeagus a slender, sclerotized rod, reaching apex of basimere, slightly narrowed about one-third of apex, apex knobby, transverse; basal process hat-shaped.

Discussion: This species is very similar to B. mallochi and B. perplexa n. sp. It is distinguished by the male genitalia and the unarmed ventor of the hind femur of the female. The females of B. mallochi and B. perplexa n. sp. are much spinier.

Type: Malloch (1914b), Illinois, Monticello, 21 June 1914, J.R. Malloch, Holotype F., (INH).

Distribution: Malloch (1914b) Illinois, (1915), Michigan; Thomsen (1935) New York; Wirth (1951) Virginia, (1952) California; Johannsen (1952) Connecticut; Florida, Montana, Washington.

Material studied: (pinned) CALIFORNIA, San Luis Obispo Co., Alamo Cr., 1M., 22 June 1948, W.W. Wirth. FLORIDA, Everglades City, 1M., 7 Oct. 1948, G. LaFoon. ILLINOIS, Muncie, Stony Cr., 1F., (paratype) 5 July 1914, Urbana Fiarground, 1M., 23 May 1915, J.R. Malloch. MONTANA, Big Timber, 1M., 14 July 1917, H.G. Dyar. VIRGINIA, Alexandria, 3M., 11 June 1952, Falls Church, 2M., 30 June 1951, 1M., Homes Run, l.t., 25 June 1960, W.W. Wirth. WASHINGTON, Yakima Co., Naches, 1M., l.t., 17 July 1941, Brookman and

Reeves. (slides) VIRGINIA, Alexandria, Dyke Swamp, 1M., 11 June 1932;  
Falls Church, str. marg., 1M., 23 June 1951, 1M., 24 June 1960, 1F.,  
26 June 1961, 8M., l.t., 20 June 1962, W.W. Wirth.

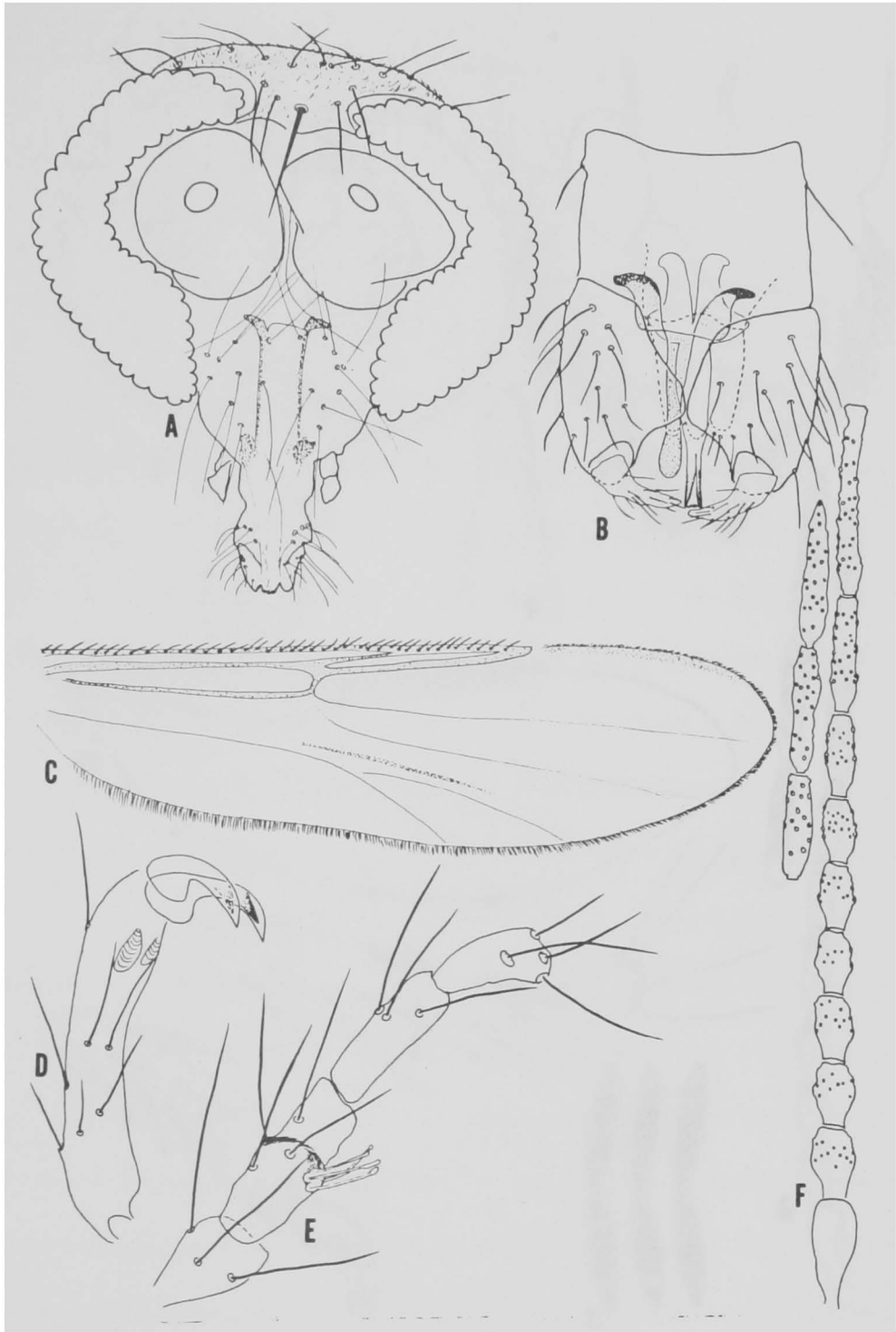


Plate II - *B. flavitarsus* Malloch - M

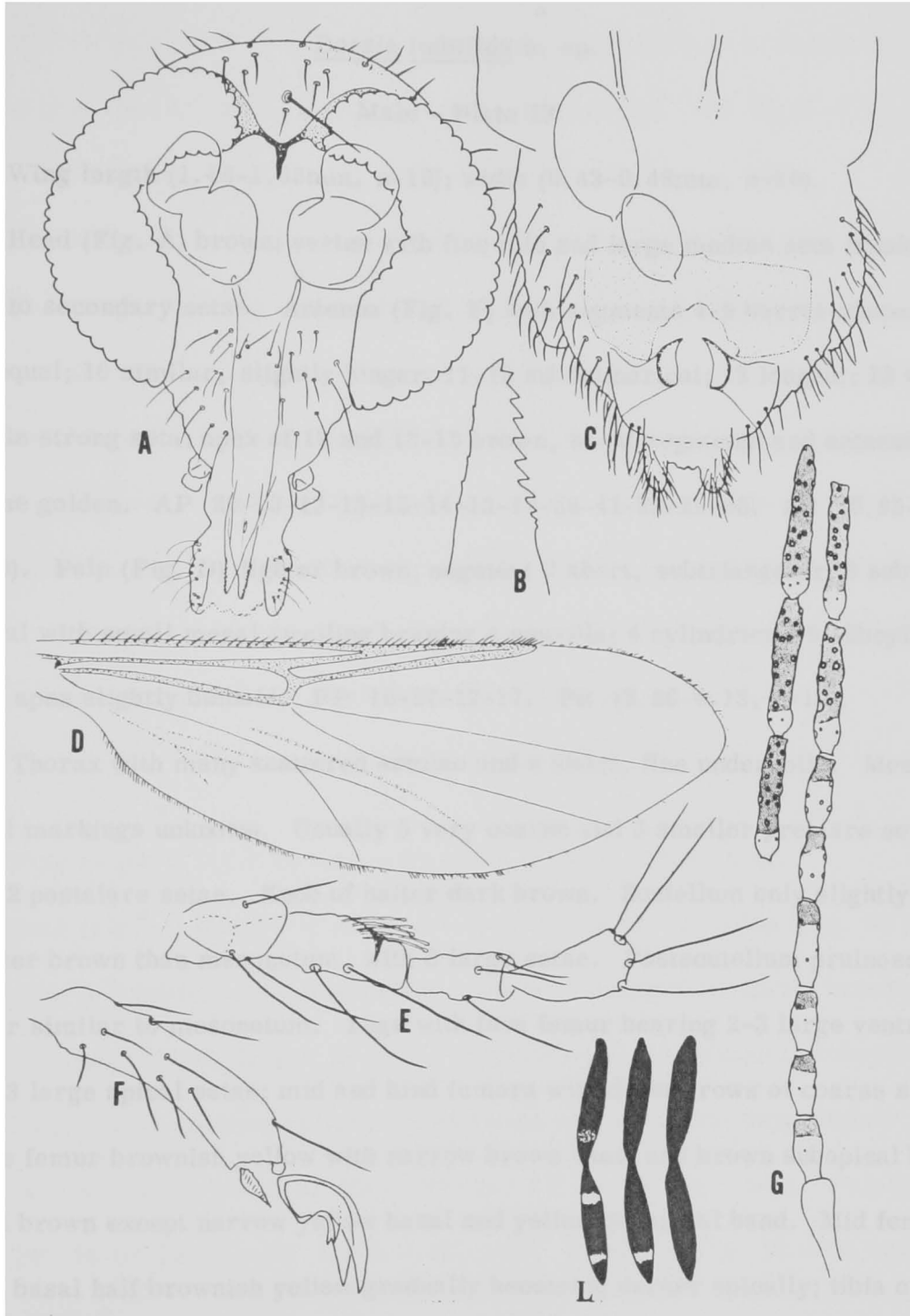


Plate 12 - *B. flavitarsus* Malloch-F



Bezzia imbifida n. sp.

Male - Plate 13

Wing length (1.48-1.65mm, n=10); width (0.43-0.48mm, n=10).

Head (Fig. A) brown; vertex with fine pile and large median seta in addition to secondary setae. Antenna (Fig. F) with segments 4-9 barrel-shaped, subequal; 10 similar, slightly longer; 11-15 subcylindrical; 12 longest; 13 with single strong seta; apex of 12 and 13-15 brown, basal segments and antennal plume golden. AP 20-13-13-13-13-14-13-17-26-41-22-29-36. AR (0.85-1.05, n=10). Palp (Fig. D) lighter brown; segment 2 short, subtriangular; 3 subcylindrical with small mesal swelling bearing 4 sensilla; 4 cylindrical; 5 subcylindrical with apex slightly bulboid. PP 16-27-17-17. PR (2.66-4.13, n=10).

Thorax with many scattered setulae and a short, fine under-pile. Mesonotal markings unknown. Usually 5 very coarse and 5 smaller prealare setae and 2 postalare setae. Knob of halter dark brown. Scutellum only slightly lighter brown than mesonotum, with 8 large setae. Postscutellum pruinose, color similar to mesonotum. Legs with fore femur bearing 2-3 large ventral and 3 large apical setae; mid and hind femora with dorsal rows of coarse setae. Fore femur brownish yellow with narrow brown basal and brown subapical bands; tibia brown except narrow yellow basal and yellow subapical band. Mid femur with basal half brownish yellow gradually becoming darker apically; tibia opposite with basal half brown gradually becoming yellow apically with narrow brown apical band. Hind leg dark brown. Tarsi yellow with 2 apical segments slightly darker; ungues (Fig. E) strongly bifid. TR (fore 1.48-2.04, n=10); (mid 1.84-

2.18, n=10); (hind 1.59-2.21, n=10). Wing (Fig. C) with coarse costal setae continuing past apex of costa. Anterior veins golden brown. CR (0.65-0.70, n=10).  $R_1$  (0.18-0.27mm, n=10). LCS (0.24-0.30mm, n=10).

Abdomen brown with vestiture of moderate setae. Genitalia (Fig. B) with tergum 9 short, about two-thirds length of telomere, apically transverse with large, rounded lateral lobes. Sternum 9 nearly as long as broad with many fine setulae, a broad, shallow excavation present. Basimere broadly cylindrical, slightly narrowed apically, with many long setae. Telomere short, setose, like an inverted comma, basal half stout, apically bent mesad and tapered to sharp tip. Parameres reach mid-length of telomere, apically flame-shaped, basal processes rounded, not produced laterally. Aedeagus as figured.

Female - Plate 14

Wing length (1.44-1.96mm, n=9); width (0.50-0.67mm, n=9).

Head (Fig. A) similar to male with eyes narrower. Antenna (Fig. G) with segments 4-8 subequal, barrel-shaped with basal half yellow apices brown; 9-10 vase-shaped, slightly longer than basal segments; 11-15 subequal, subcylindrical, 11-12 with basal swelling yellow, 13-15 brown with basal swelling slightly lighter. AP 14-9-9-9-9-10-11-11-21-25-19-20-23. AR (1.16-1.49, n=9). Palp (Fig. F) with PP 14-29-19-16. PR (1.85-3.66, n=9). Mandible (Fig. B) with 10-13 (n=9) teeth.

Thorax similar to male. Mid tibia with slightly narrower subapical yellow area than male. Ungues (Fig. E) with large basomedian tooth. TR (fore 1.72-

2.11, n=9); (mid 1.84-2.24, n=9); (hind 2.00-2.20, n=9). Mid and hind legs lacking dorsal rows of coarse setae as with male femora. Wing (Fig. D) with CR (0.72-0.76, n=9).  $R_1$  0.24-0.34mm, n=9). LCS (0.38 - 0.52mm, n=9).

Abdomen (Fig. C) with two long, hyaline gland rods reaching basal abdominal segments. Spermathecae: 2, unequal, subovoid, the smallest sometimes half the length of the larger. Dimensions: (.046 x .079mm -- .051 x .103mm). Genital sclerotizations like the dicondylid end of a bone articulation.

Discussion: This species is closely related to the B. pulverea species complex but is easily separated by the male genitalia and the differences in color pattern of the fore femora. The females are more difficult to separate but differences in the shape of the genital sclerotizations exist. B. imbibida has broader sclerotizations with the thumb-like condylid processes indicated.

Type: Maryland, Worcester Co., Snow Hill, l.t., 19 May 1968, W.H. Anderson, Holotype M.; allotype; 5F., 2M. paratypes with same data; 1M. paratype 1 May, 2 M. paratypes 24 May with other data similar. (USNM).

Distribution: • Maryland.

Material Studied: (slides) MARYLAND, Worcester Co., Snow Hill, l.t., 1 F., 7 M., 1 May; 7 F., 11 M., 19 May; 4 F., 2 M., 24 May 1968, W.H. Anderson.

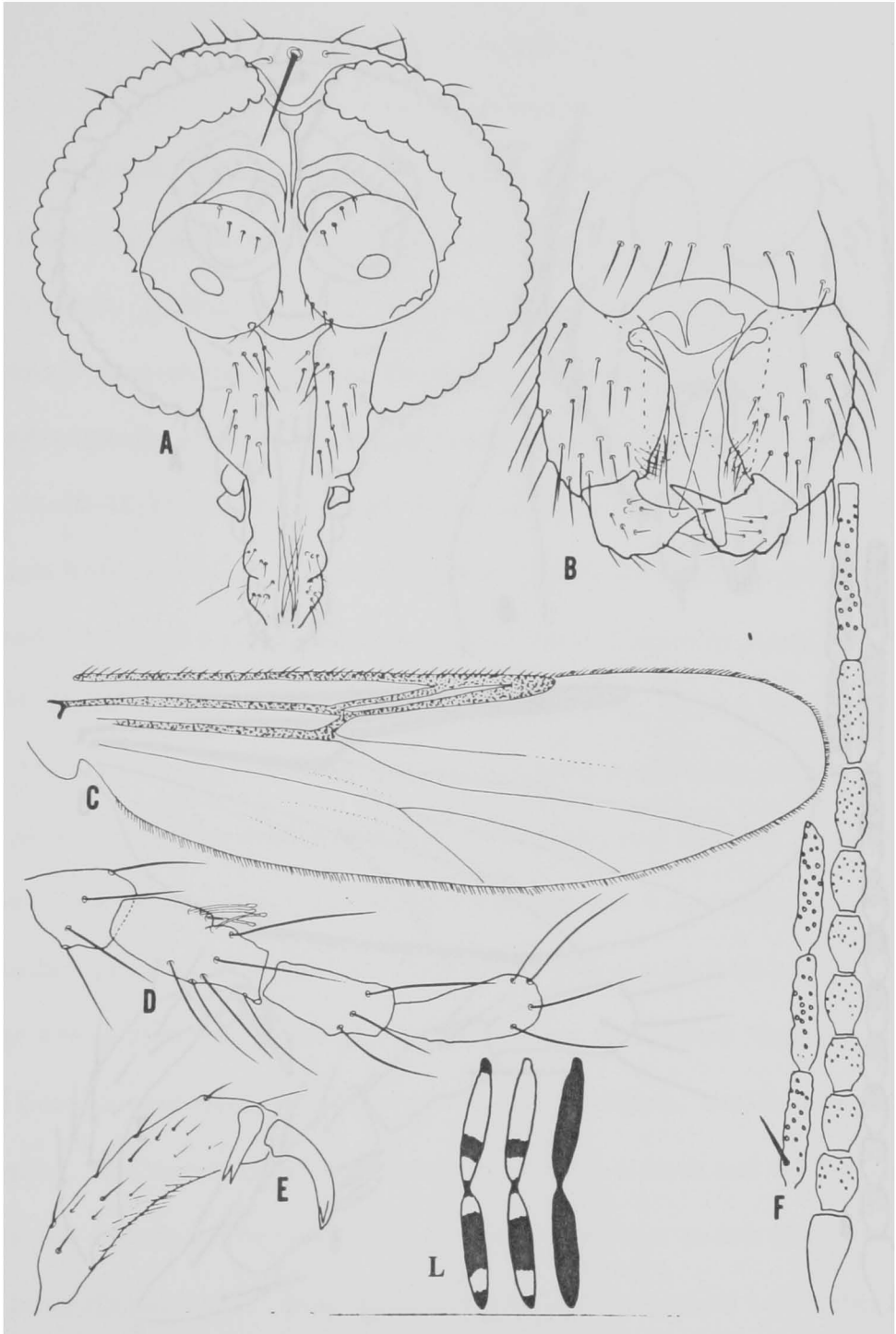


Plate 13 - *B. imbibida* n. sp. - M

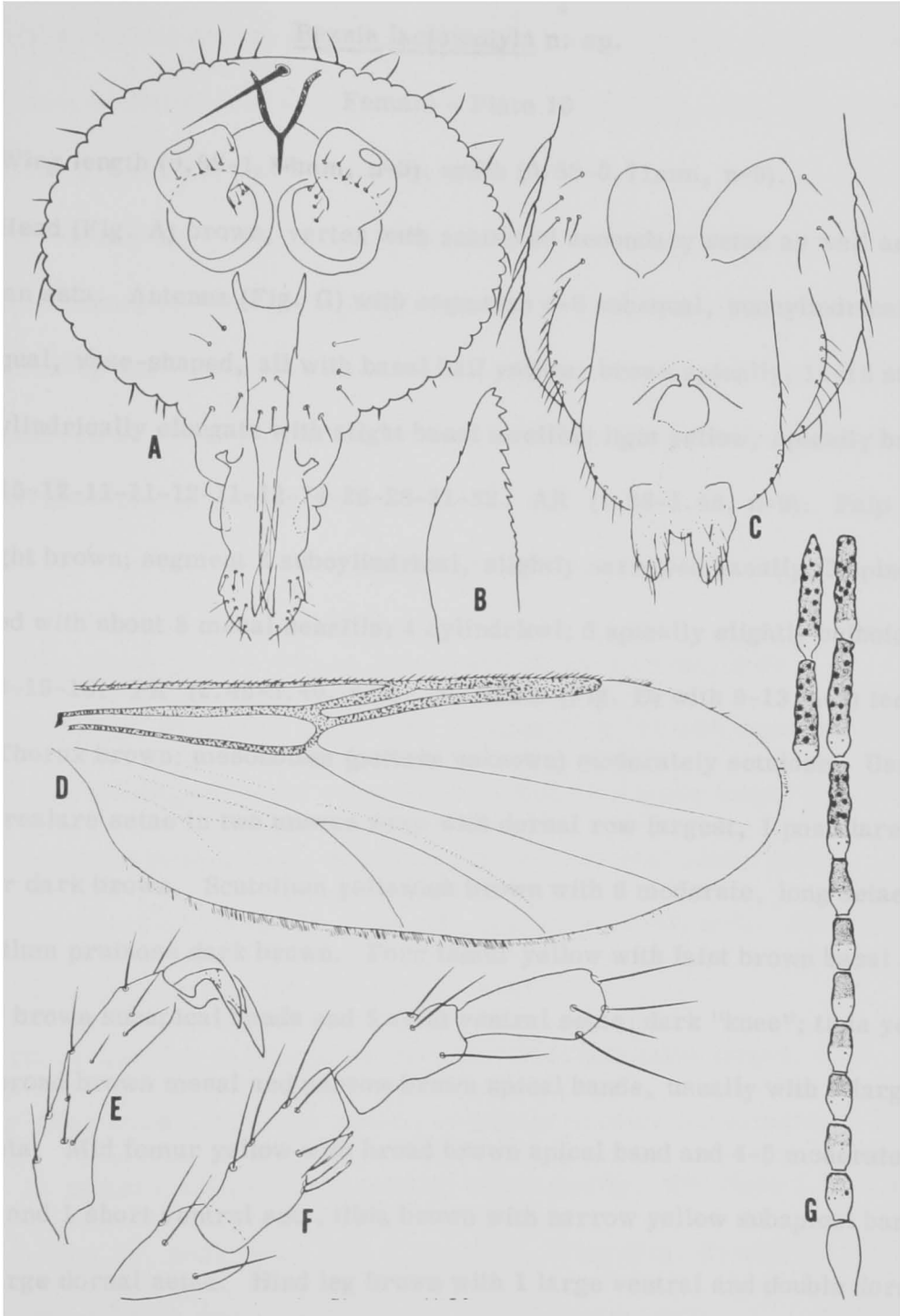


Plate 14 - *B. imbibida* n. sp. - F

Bezzia laciniastyla n. sp.

Female - Plate 16

Wing length (0.92-1.86mm, n=9); width (0.58-0.71mm, n=9).

Head (Fig. A) brown, vertex with scattered secondary setae as well as large median seta. Antenna (Fig. G) with segments 4-8 subequal, subcylindrical; 9-10 subequal, vase-shaped, all with basal half yellow, brown apically; 11-15 subequal, subcylindrically elongate with slight basal swelling light yellow, apically brown. AP 15-12-11-11-12-11-12-14-26-28-31-32. AR (1.36-1.48, n=9). Palp (Fig. E) light brown; segment 2 subcylindrical, slightly narrowed basally; 3 spindle-shaped with about 8 mesal sensilla; 4 cylindrical; 5 apically slightly bulboid. PP 18-29-19-18. PR (2.45-3.40, n=9). Mandible (Fig. D) with 9-13 (n=9) teeth.

Thorax brown; mesonotum (pattern unknown) moderately setulose. Usually 8-9 prealare setae in two uneven rows with dorsal row largest, 1 postalare seta. Halter dark brown. Scutellum yellowish brown with 6 moderate, long setae. Post-scutellum pruinose dark brown. Fore femur yellow with faint brown basal and broad brown subapical bands and 5 stout ventral setae; dark "knee"; tibia yellow with broad brown mesal and narrow brown apical bands, usually with 1 large dorsal seta. Mid femur yellow with broad brown apical band and 4-5 moderate dorsal setae and 1 short ventral seta; tibia brown with narrow yellow subapical band and 2-4 large dorsal setae. Hind leg brown with 1 large ventral and double dorsal row of setae; tibia with double dorsal row of setae. Tarsi yellow with segments 4-5 only faintly darker. Ungues (Fig. F) rather large, long, with large basomedian tooth. TR (fore 1.75-2.00, n=8); (mid 1.93-2.08, n=8); (hind 2.05-2.33, n=9).

Wing (Fig. C) translucent with anterior veins thicker, faintly yellow; costal setae dense; medial fork slightly petiolate. CR (0.74-0.78, n=9). R<sub>1</sub> (0.24-0.31mm, n=9). LCS (0.40-0.51mm, n=9).

Abdomen (Fig. B) yellowish brown, setulose. One pair long, hyaline gland rods extend 5 segments. Spermathecae: 2 well developed, unequal, oblong-ovoid with rudimentary duct. Dimensions: (.064 x .116mm -- .054 x .185mm). Genital sclerotizations broadly bifurcate medially with basal process highly sclerotized, lateral process band-like.

#### Male - Plate 15

Wing length (1.40-1.57mm, n=3); width (0.40-0.45mm, n=3).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 3-9 subequal, barrel-shaped; 10-15 subcylindrical with 12 slightly longer than 15. Distal 3 segments brown, basal segments yellow. Antennal plume golden. AP 22-13-14-15-14-15-15-18-27-46-27-36-44. AR (0.99-1.03, n=3). Palp (Fig. D) with PP 17-25-18-18. PR (2.55-3.22, n=3).

Thorax similar to female but spinier. Prealare setae larger, 8-12. Scutellar setae longer, 8. Legs similar to female in color and armature. Ungues (Fig. E) rather small, microscopically bifid apically. TR (fore 1.63-1.65, n=3); (mid 1.76-1.88, n=3); (hind 1.95-2.00, n=3). Wing (Fig. C) with CR (0.66-0.70, n=3). R<sub>1</sub> (0.21-0.24mm, n=3). LCS 0.40-0.51mm, n=3).

Abdomen light brown, moderately setose. Genitalia (Fig. B) with tergum 9 broad, short, with lateral lobes shorter than parameres. Sternum 9 broad,

length subequal to breadth, with caudomedian excavation about half its length. Basimere subglobular, with 2-3 large setae, other setae hair-like. Telomere short, about half the length of basimere, subcylindrical, apex with ventromesal flap-like process. Fused parameres form a broad, subconical structure with ventral surface appearing folded; basolateral process very blunt, broad. Aedeagus a very complex, crown-shaped structure with rather pointed basolateral processes.

Discussion: This species is named for the flap-like process at the tip of the telomere. A group of species resembling B. pulverea are found extensively in Florida and more sparsely elsewhere. In addition, B. laciniastyla is a member of a complex within the Pulverea complex. It is easily distinguished by the male genitalia and to a lesser degree by the female genitalia. Plate 27 (Pulverea Complex) illustrates this phenomenon. Illustrated are two different male forms and four different female forms all with the same color pattern of B. laciniastyla, thus the close relationship to B. laciniastyla. Even though B. laciniastyla is closely related to others of the larger pulverea group, it is different in its leg color patterns as well as genital structure. Because of the scarcity of specimens, the species evident on Plate 27 are not presented as new at this time. B. uncistyla n. sp. is the only new species presently described along with B. laciniastyla having the same leg pattern.

The male forms A and B of Plate 27 were collected in Florida. Female C from Snow Hill, Marland; female D from Alachua, Florida; female E from Wakulla, Florida; female F from Ontario. These specimens are in the U.S. National Museum.



Type: Florida, Glades Co., Palmdale, l.t., 14 July 1970, E. Irons,  
Holotype Male, allotype, 2 M., paratypes, 4 F., paratypes; South Carolina,  
Georgetown, l.t., 8 Aug. 1970, L.G. Henry, 4 F., paratypes.

Distribution: Florida, Maryland, Mississippi, South Carolina, Texas.

Material Studied: See Type.

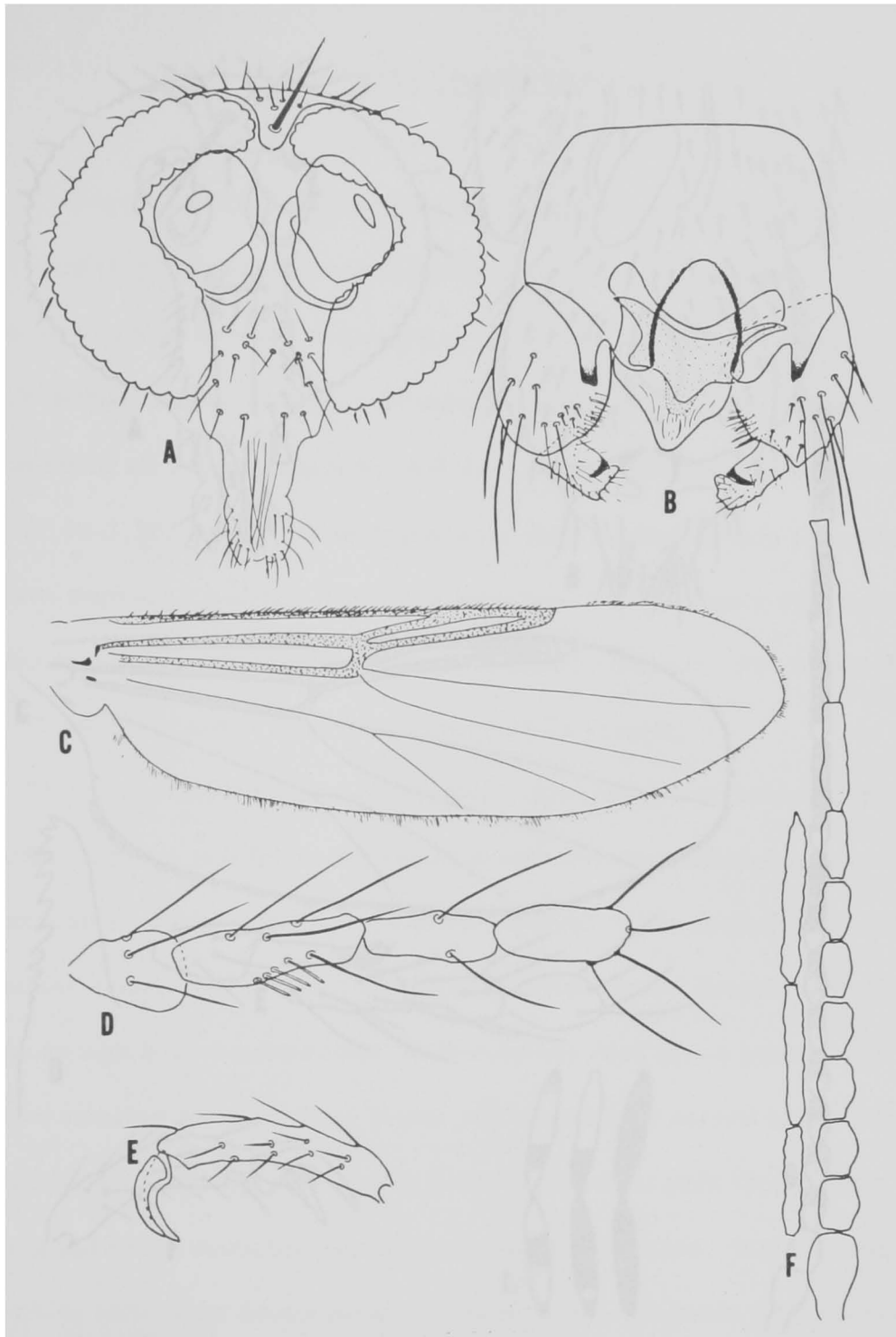


Plate 15 - *B. laciniastyla* n. sp. - M

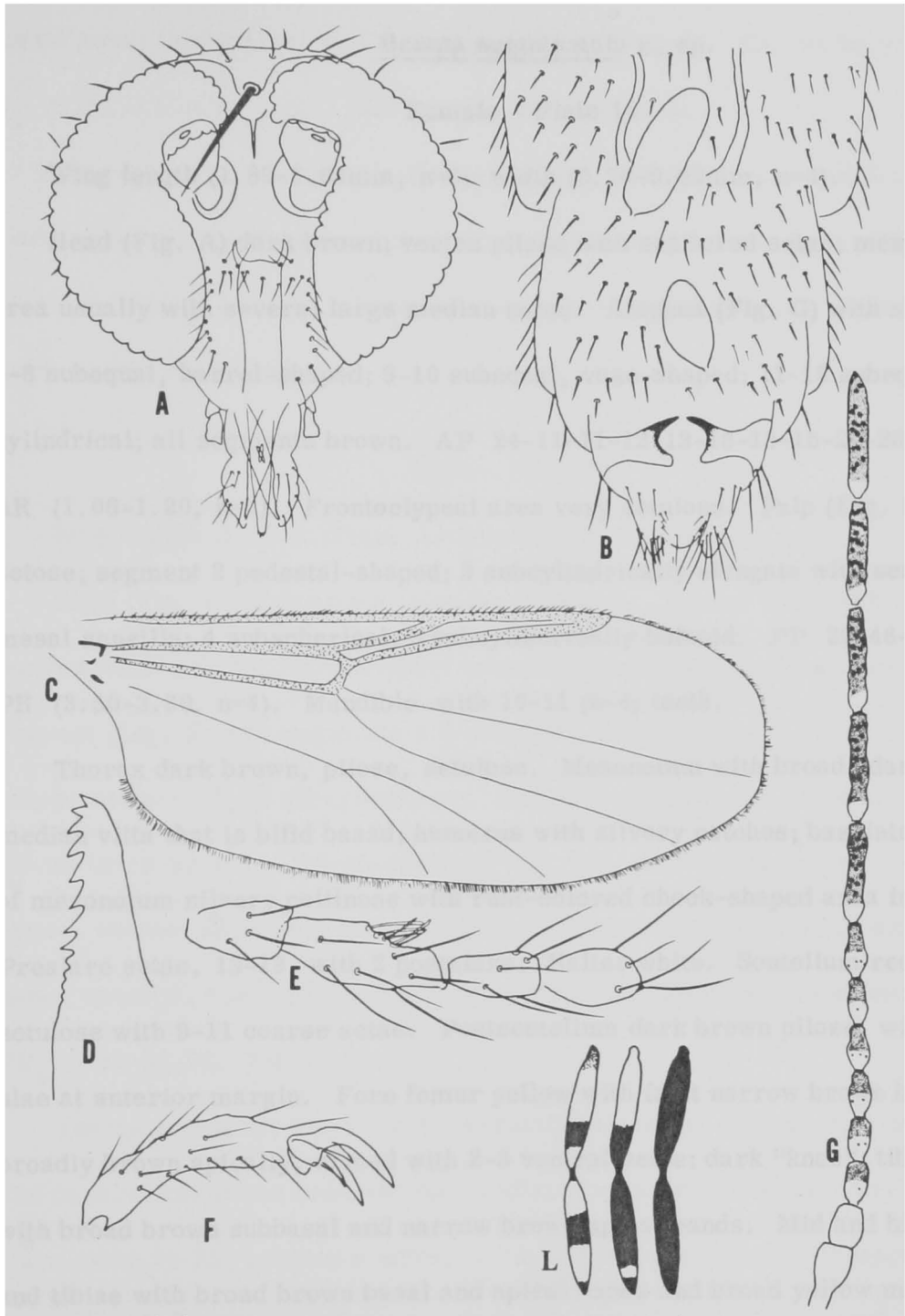


Plate 16 - *B. laciniastyla* n. sp. - F

Bezzia magnisetula n. sp.

Female - Plate 18

Wing length (1.89-2.64mm, n=4); width (0.76-0.82mm, n=4).

Head (Fig. A) dark brown; vertex pilose with scattered setae; mesovertical area usually with several large median setae. Antenna (Fig. G) with segments 4-8 subequal, barrel-shaped; 9-10 subequal, vase-shaped; 11-15 subequal, sub-cylindrical; all segments brown. AP 24-11-11-12-13-13-13-15-20-26-25-28-28. AR (1.06-1.20, n=4). Frontoclypeal area very setulose. Palp (Fig. E) brown, setose; segment 2 pedestal-shaped; 3 subcylindrically elongate with scattered mesal sensilla; 4 subspherical; 5 subcylindrically bulboid. PP 20-46-15-22. PR (3.50-3.90, n=4). Mandible with 10-11 (n=4) teeth.

Thorax dark brown, pilose, setulose. Mesonotum with broad, dark brown median vitta that is bifid basad; humerus with silvery patches; basolateral half of mesonotum silvery pollinose with rust-colored check-shaped area in center. Prealare setae, 13-18, with 2 postalare. Halter white. Scutellum reddish-brown, setulose with 9-11 coarse setae. Postscutellum dark brown pilose, with fine setulae at anterior margin. Fore femur yellow with faint narrow brown basal band, broadly brown apically, armed with 2-3 ventral setae; dark "knee"; tibia yellow with broad brown subbasal and narrow brown apical bands. Mid and hind femora and tibiae with broad brown basal and apical bands and broad yellow mesal bands. Tarsi brownish yellow with segments 2-5 darker. Ungues (Fig. F) short, broad, with moderate basomedian tooth. TR (fore 1.73-1.92, n=4); (mid 1.80-1.90, n=4); (hind 1.90-2.07, n=4). Wing (Fig. C) long, narrow; anterior veins faintly yellow;

costal setae fine sparse; medial fork just at cross-vein. CR (0.73-0.94, n=4).

R<sub>1</sub> (0.37-0.43mm, n=4). LCS (0.58-0.61mm, n=4).

Abdomen (Fig. B) subshining dark brown, setulose. One pair faint hyaline gland rods. Spermathecae: 2 subequal, pyriform with short duct. Dimensions: (.051 x .061mm - .037 x .086mm). Genital sclerotizations not visible. A faint caudomedian cleft evident.

#### Male - Plate 17

Wing length (1.20-2.00mm, n=4); width (0.52-0.58mm, n=3).

Head (Fig. A) dark brown, similar to female. Vertex often with several mesovertical setae. Frontoclypeal area with numerous, long, coarse setae. Antenna (Fig. F) with segments 4-9 subequal, barrel-shaped; 10-11 unequal subcylindrical; 12-15 subcylindrical. Antennal plume dense, dark brown. AP 28-12-13-13-13-14-14-18-25-43-33-37-32. AR (0.97-1.02, n=4). Palp (Fig. D) brown, setose; segment 2 pedestal-shaped; 3 cylindrically elongate with about 7 mesal sensilla; 4 subcylindrical; 5 subcylindrical with broadly rounded apex. PP 20-42-20-25. PR (3.58-4.30, n=4).

Thorax similar to female with mesonotal markings darker, less distinct. The basolateral silver area and the reddish-brown "check mark" very faint. Prealare setae 16-23, postalare setae, 3. Scutellum usually with 10 coarse setae. Legs slightly darker than female. Fore femur narrowly brown basad, broadly brown apically, broadly yellow mesad; tibia yellow with broad brown subbasal and narrow brown apical bands. Mid femur similar to female with yellow mesal

band darker, fainter; tibia similar, each with a dorsal row of spines. Hind femur brown, tibia like female, femur with row of spines on dorso-apical half, tibia with double dorsal row. Ungues (Fig. E) short, slender, apices bifid. TR (fore 1.60-1.89, n=4); (mid 1.74-1.82, n=4); (hind 1.79-1.93, n=4). Wing (Fig. C) with medial fork slightly sessile. CR (0.55-0.65, n=4). R<sub>1</sub> (0.27-0.31mm, n=2). LCS (0.34mm, n=3).

Abdomen subshining blackish brown, setose. Genitalia (Fig. B) with tergum 9 short with large, fleshy, setose lateral lobes reaching to apex of basimere. Sternum 9 short with broad, shallow U-shaped caudomedian excavation. Basimere moderate, setose, subcylindrical, slightly wider basad. Telomere setose, stout, slightly bent mesad, subequal in length to basimere. Parameres form a slender rod-like structure apically. Aedeagus a tripartite, star-shaped structure with subequal arms, the apical extreme appears folded at the edges.

Discussion: This very large species was named for its size and its resemblance to B. setulosa. It is easily separated by its size, the color pattern of the mesonotum and the leg banding pattern.

This species was described in part from a large series of specimens collected at Churchill, Manitoba, Canada. Another large series collected at Brooks, Alberta, Canada closely resemble this group. There is no obvious difference in the structure of the male genitalia. Slide mounts of the female genitalia did not reveal the structure of the female terminalia as with the B. magnisetula specimens. Statistical data for both groups was nearly identical. The frontoclypeal setae are as numerous with the Brooks group but are not as stout. Macro-

scopically there are some differences. The male hind femur of the Brooks group has a faint lighter mesal band and the subapical yellow band on the tibia is more extensive. The female abdomen is tan colored with large brown median patches dorsally. The mesonotal markings of the Brooks group are essentially the same as the Churchill group with the whole color scheme lighter. More extensive investigation and experimentation may show these two groups as distinct but they are here considered as the same species.

Type: Canada, Manitoba, Churchill, 14 July 1953, J.A. Downes, Holotype M., allotype, 3 paratype M, 3 paratype F, mounted on slides; 4F., and 4M., paratypes pinned, (CNC).

Distribution: Churchill, Manitoba; Brooks, Alberta, Canada.

Material Studied: See type. 70 pinned, Churchill, Manitoba; 88 pinned Brooks, Alberta.

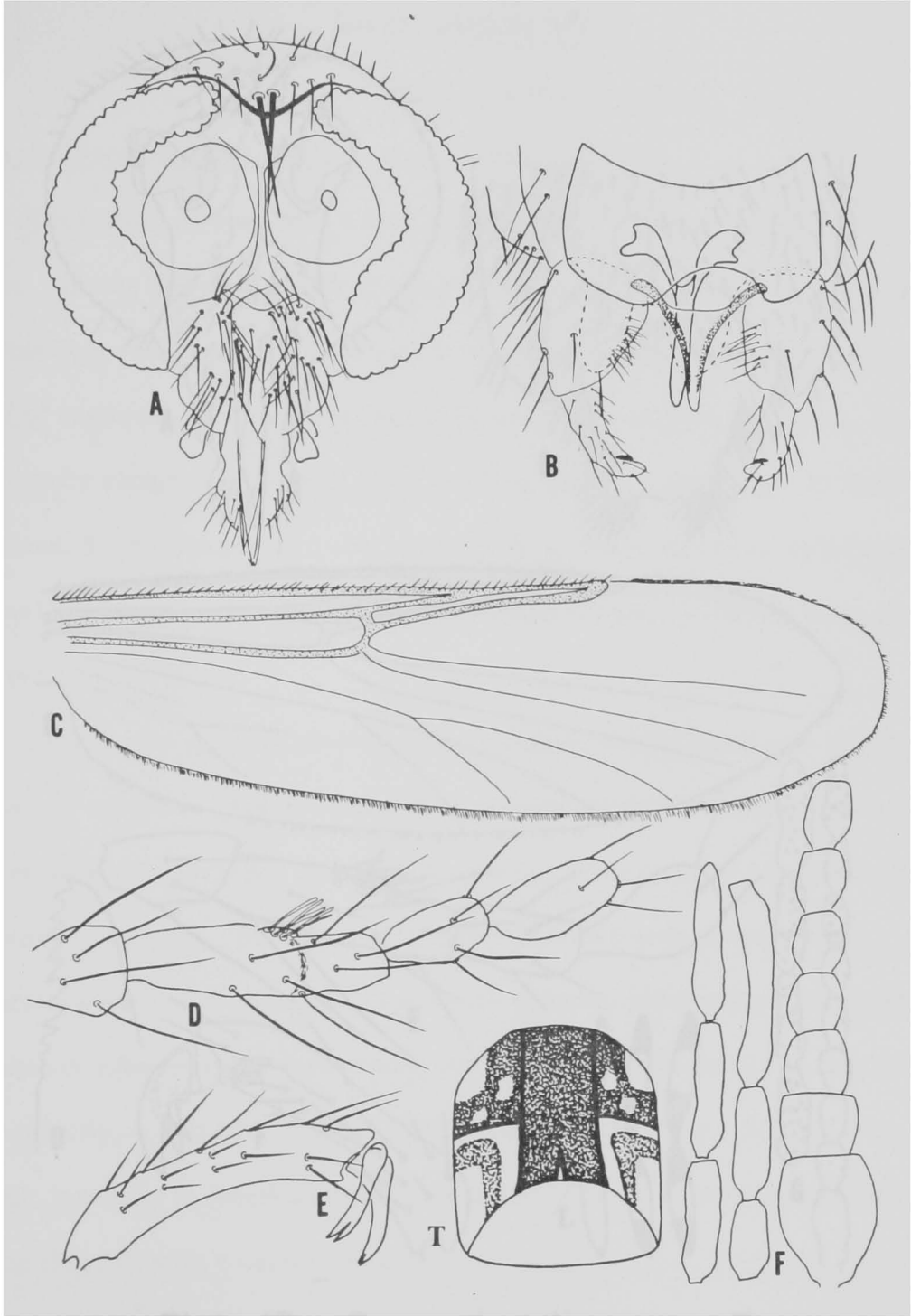


Plate 17 - *B. magnisetula* n. sp. - M



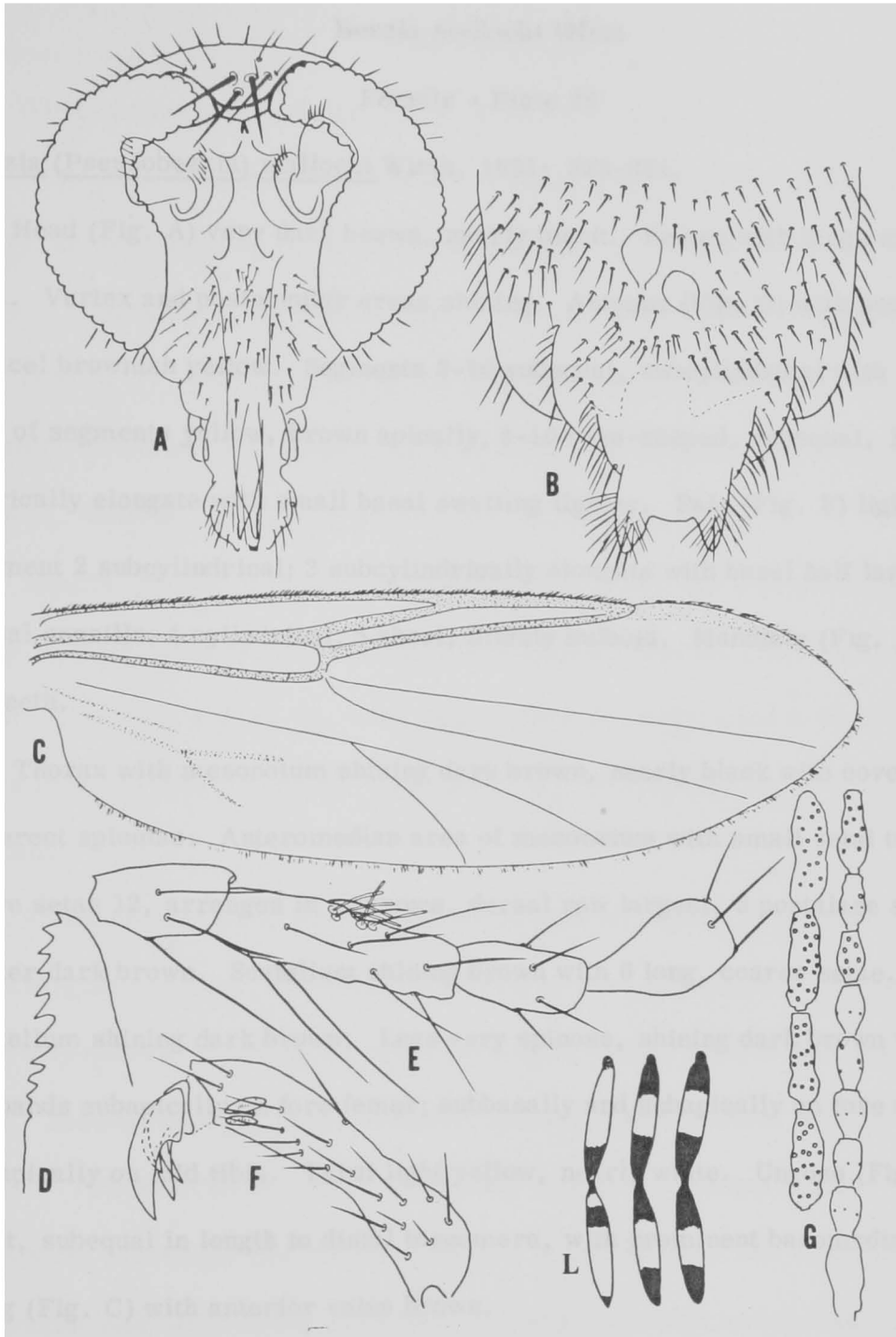


Plate 18 - *B. magnisetula* n. sp. - F

*Bezzia mallochi* Wirth

Female - Plate 20

Bezzia (Pseudobezzia) mallochi Wirth, 1951: 323-324.

Head (Fig. A) very dark brown, nearly black. Vertex with large median seta. Vertex and postocular areas shining. Antenna (Fig. G) with scape and pedicel brownish yellow. Segments 3-10 subequal, subcylindrical with basal half of segments yellow, brown apically; 9-10 vase-shaped, subequal, 11-15 cylindrically elongate with small basal swelling lighter. Palp (Fig. E) lighter brown; segment 2 subcylindrical; 3 subcylindrically elongate with basal half larger, 8 mesal sensilla; 4 cylindrical; 5 short, bluntly bulboid. Mandible (Fig. D) with 13 teeth.

Thorax with mesonotum shining dark brown, nearly black with covering of suberect spiculae. Anteromedian area of mesonotum with small setal tuft. Prealare setae 12, arranged in two rows, dorsal row largest, 3 postalare setae. Halter dark brown. Scutellum shining brown with 6 long, coarse setae. Postscutellum shining dark brown. Legs very spinose, shining dark brown with yellow bands subapically on fore femur; subbasally and subapically on fore tibia; subapically on mid tibia. Tarsi light yellow, nearly white. Ungues (Fig. F) stout, subequal in length to distal tarsomere, with prominent basomedian tooth. Wing (Fig. C) with anterior veins brown.

Abdomen (Fig. B) uniformly subshining dark brown. Abdominal setae fine, numerous. Gland rods hyaline, only partially visible. Spermathecae: 2 subequal, subovoid with very short duct. Genital sclerotizations not evident.

Male - Plate 19

Wing length (0.71-1.61mm, n=3); width (0.40-0.52mm, n=3).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 3-10 subequal, spindle-shaped; 11 cylindrically elongate; 12-15 similar to 11, subequal, longer. Antennal plume golden. AP 20-13-13-13-13-13-14-23-41-25-36-42. AR (1.04-1.17, n=3). Palp (Fig. E) with segment 2 pedestal-shaped; 3 subcylindrical with basal half larger, 6 mesal sensilla at constriction; 4 cylindrical; 5 short, bulboid. PP 20-33-25-19. PR (2.77-3.30, n=3).

Thorax similar to female, with about 16 prealare and 3 postalare setae.

Legs similar, spinier, bands fainter than female. Ungues (Fig. D) stout, deeply bifid. TR (fore 1.24-1.88, n=3); (mid 1.85-1.93, n=3); (hind 2.02-2.13, n=3).

Wing (Fig. C) with CR (0.67-0.71, n=3).  $R_1$  (0.17-0.28mm, n=3). LCS (0.22-0.29mm, n=3).

Abdomen similar to female with coarser dorsal setae. Genitalia (Fig. B) with tergum 9 narrow, flap-like, extending to apex of basimere. Sternum 9 large, sparsely setose, width nearly twice the length, caudal margin with shallow excavation. Basimere large, barrel-shaped, sparsely setose, about twice as long as broad. Telomere short, stout, triangular with blunt, conical apices. Parameres with basal processes like the fleur-de-lis, apical process like a bowling pin. Aedeagus with broad basal processes, apically somewhat sword-like.

Discussion: B. mallochi is very closely related to B. perplexa n. sp. It is distinguished by the shape of the male aedeagus and more easily by the parameres. The females are much more difficult to separate, and may need to be identified

by association with collected males. Females of B. mallochi have more palpal sensilla scattered over a larger area than B. perplexa whose sensilla number 2-3 and are confined to a small, shallow pit. B. perplexa has more mandibular teeth. The ungues of B. perplexa are longer.

B. flavitarsus is also a closely related species but can be distinguished by the male terminalia and the notably lesser degree of leg armature. B. exopolita is also closely related but is more easily distinguished by the leg color patterns as well as the form of the genitalia.

Type: Virginia, Mt. Solon, 1.t., 11 July 1950, W.W. Wirth, holotype M, allotype, (USNM).

Distribution: Wirth(1952), Virginia.

Material studied: (pinned) VIRGINIA, Augusta Co., Mt. Solon., 1.t., 1F., 2M (allotype and paratypes) 11 July 1950; Falls Church, stream marg., 1M., 30 June 1951, W.W. Wirth; (slides) VIRGINIA, Falls Church, 1M., 8 July; 1M., 29 July 1950; stream marg., 1M., 1F., 30 June 1951; Alexandria, Dyke Swamp, 1M., 11 June 1952, W.W. Wirth.

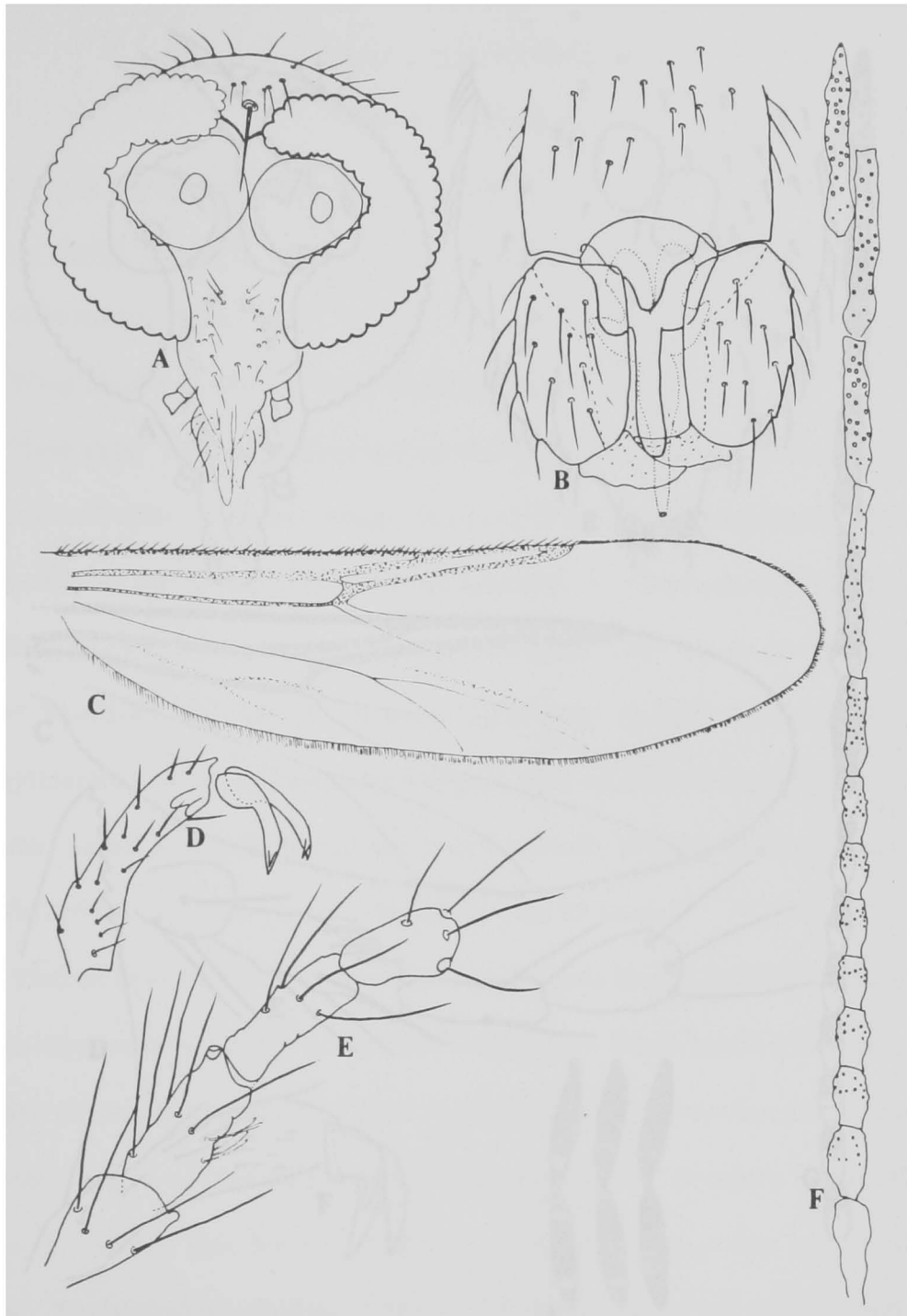


Plate 19 - *B. mallochi* Wirth - M

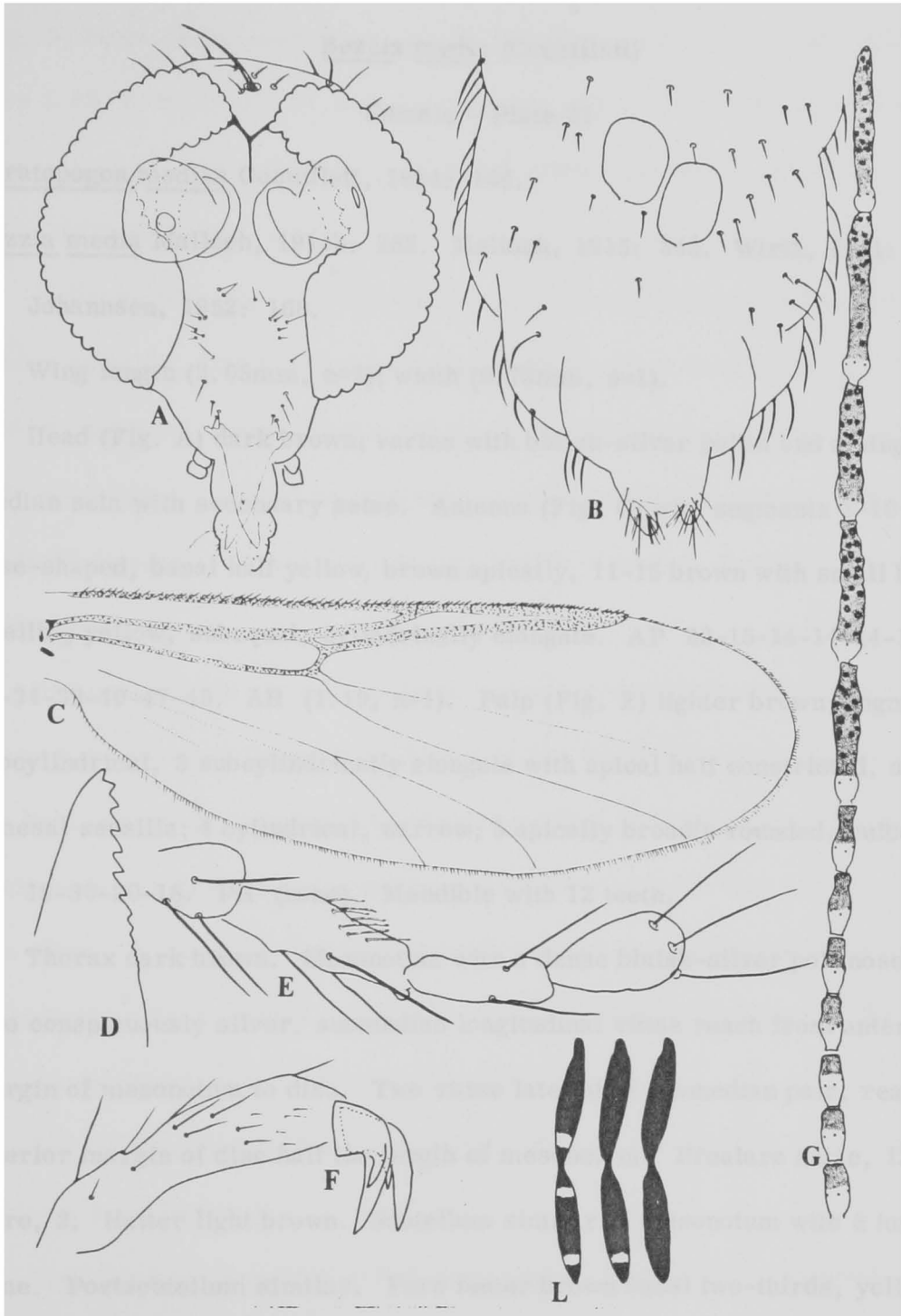


Plate 20 - *B. mallochi* Wirth-F

Bezzia media (Coquillett)

Female - Plate 21

Ceratopogon medius Coquillett, 1904: 166.

Bezzia media Malloch, 1914b: 282. Malloch, 1915: 345. Wirth, 1951: 324.

Johannsen, 1952: 168.

Wing length (2.03mm, n=1); width (0.73mm, n=1).

Head (Fig. A) dark brown; vertex with bluish-silver pollen and a single large median seta with secondary setae. Antenna (Fig. G) with segments 3-10 subequal, vase-shaped, basal half yellow, brown apically, 11-15 brown with small basal swelling yellow, subequal, cylindrically elongate. AP 22-15-14-14-14-16-17-20-34-39-40-47-45. AR (1.19, n=1). Palp (Fig. E) lighter brown; segment 2 subcylindrical, 3 subcylindrically elongate with apical half constricted, about 8 mesal sensilla; 4 cylindrical, narrow; 5 apically broadly rounded. bulboid. PP 16-30-20-18. PR (none). Mandible with 12 teeth.

Thorax dark brown. Mesonotum with a dense bluish-silver pollinose covering. Two conspicuously silver, submedian longitudinal vittae reach from anterior margin of mesonotum to disc. Two vittae laterad of submedian pair, reach from anterior margin of disc half the length of mesonotum. Prealare setae, 12, postalare, 3. Halter light brown. Scutellum similar to mesonotum with 8 long, stout setae. Postscutellum similar. Fore femur brown basal two-thirds, yellow apical third; dark "knee"; tibia yellow basally with broad, brown subbasal band gradually becoming yellow apically with narrow brown, apical band. Mid leg brown with apical third of tibia gradually becoming lighter yellow. Hind leg brown. Ungues

(Fig. F) large, stout, with prominent basomedian tooth. Tarsi light yellow. TR (fore 1.85, n=1); (mid 1.81, n=1); (hind 2.00, n=1). Wing (Fig. D) with anterior veins faintly yellow; a single row of costal setae. CR (0.77, n=1). R<sub>1</sub> (0.37mm, n=1). LCS (0.53mm, n=1).

Abdomen (Fig. C) light tan, pollinose with scattered gold setae over dorsum, denser apically. One pair hyaline gland rods extend to first segment. Spermathecae: 2, subequal, subovoid with minute ducts. Dimensions: (.061 x .096mm - .074 x .098mm). Genital sclerotizations scarcely visible, sickle-shaped, basomedially directed. Apical sternite with basally directed, V-shaped, median excavation.

Discussion: This is a little known species with few representative specimens in the U.S. National Collection. No males are known. Malloch (1914b) confirms the light colored halteres that Coquillett described as being black. The specimen illustrated was drawn from a specimen compared with the type and then remounted to a slide. B. media seems to be closely related to B. albidorsata but is easily separated by the mesonotal pattern as well as the leg band pattern. The form of the female genital sclerotizations are also different.

Type: Coquillett (1904), New Jersey, Riverton, 7 July, C.W. Johnson, holotype F., (USNM).

Distribution: Coquillett (1904), New Jersey; Wirth (1951), Virginia; Johanssen (1952), Connecticut.

Material studied: VIRGINIA, Falls Church, 1F., 4 July, 1F., 29 July 1950, W.W. Wirth; (1 F. slide mounted with same data, 4 July).



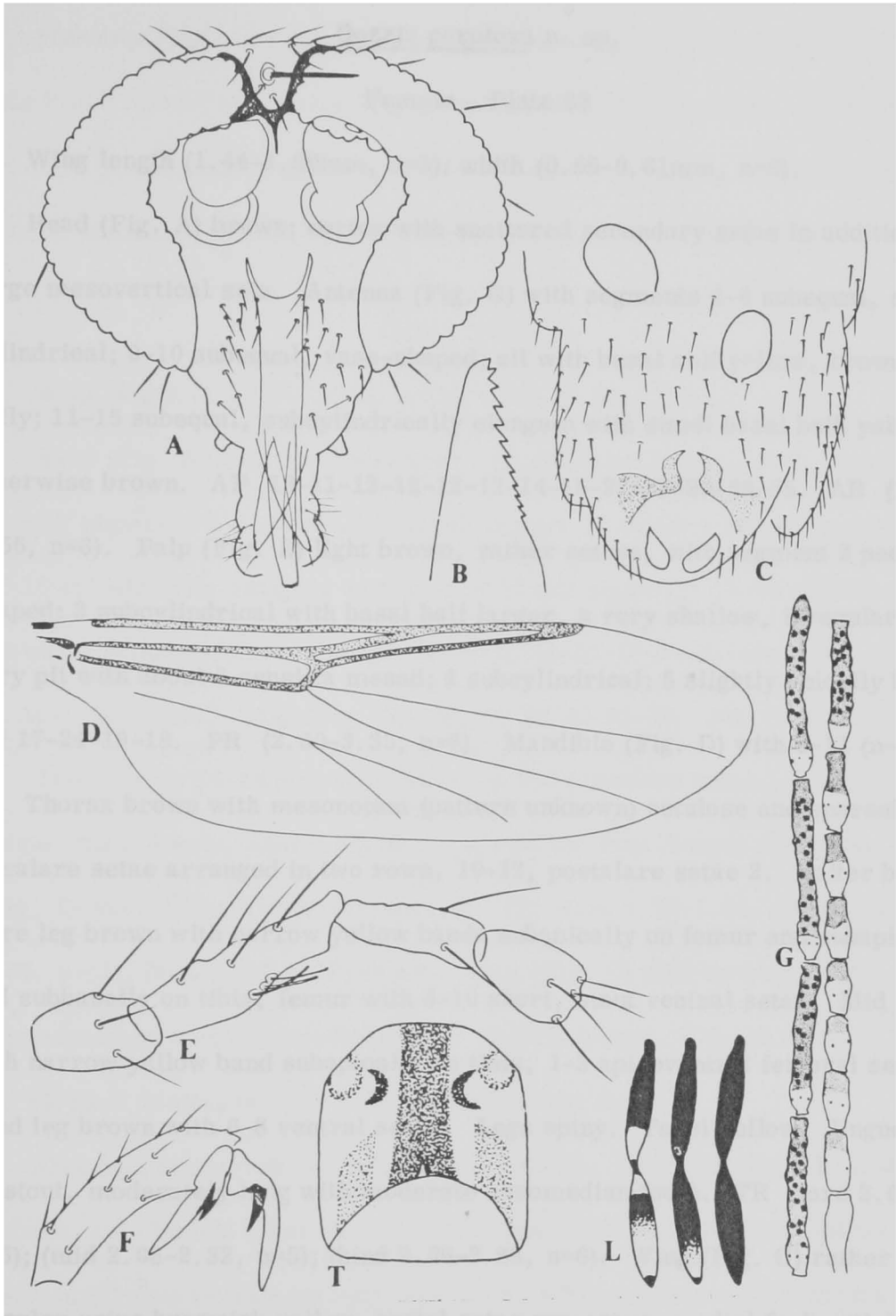


Plate 21 - *B. media* (Coquillett) - F

Bezzia perplexa n. sp.

Female - Plate 23

Wing length (1.44-1.60mm, n=5); width (0.55-0.61mm, n=6).

Head (Fig. A) brown; vertex with scattered secondary setae in addition to large mesovertical seta. Antenna (Fig. G) with segments 4-8 subequal, subcylindrical; 9-10 subequal, vase-shaped; all with basal half yellow, brown apically; 11-15 subequal, subcylindrically elongate with small basal bulb yellow, otherwise brown. AP 18-11-12-12-12-12-14-15-27-29-29-38-35. AR (1.41-1.55, n=6). Palp (Fig. E) light brown, rather setose, with segment 2 pedestal-shaped; 3 subcylindrical with basal half larger, a very shallow, irregular sensory pit with about 6 sensilla mesad; 4 subcylindrical; 5 slightly apically bulbous. PP 17-24-19-18. PR (2.50-3.33, n=6). Mandible (Fig. D) with 9-11 (n=9) teeth.

Thorax brown with mesonotum (pattern unknown) setulose and sparsely pilose. Prealare setae arranged in two rows, 10-12, postalare setae 2. Halter brown. Fore leg brown with narrow yellow bands subapically on femur and subapically and subbasally on tibia, femur with 6-10 short, stout ventral setae. Mid leg brown with narrow yellow band subapically on tibia, 1-3 apicoventral femoral setae. Hind leg brown with 6-8 ventral setae. Legs spiny. Tarsi yellow. Ungues (Fig. F) stout, moderately long with moderate basomedian tooth. TR (fore 2.06-2.26, n=6); (mid 2.08-2.32, n=5); (hind 2.06-2.83, n=6). Wing (Fig. C) rather broad; anterior veins brownish yellow; costal setae numerous; medial fork petiolate at cross-vein. CR (0.72-0.76, n=5).  $R_1$  (0.27mm, n=6). LCS (0.34-0.43mm, n=6).

Abdomen (Fig. B) brown, moderately setose. One pair long, brown gland rods reach second segment. Spermathecae: 2 slightly unequal, subovoid, without duct. Dimensions: (.051 x .074mm - .061 x .081mm). Genital sclerotizations somewhat ham-shaped with narrow portion basomesad.

#### Male - Plate 22

Wing length (1.27-1.71mm, n=10); width (0.39-0.50mm, n=10).

Head (Fig. A) with eye separation slightly wider than female. Antenna (Fig. F) with segments 3-9 subequal, barrel-shaped; 10 slightly longer, subcylindrical; 11-15 cylindrically elongate with apex of 12 and segments 13-15 slightly darker brownish yellow; plume. AP 26-16-16-16-15-17-17-21-31-52-39-50-47. AR (1.04-1.11, n=10). Palp (Fig. D) with PP 20-30-25-19. PR (2.66-3.75, n=10).

Thorax with 11-16 prealare setae and 2-4 postalare setae. Legs much spinier than female, especially dorsa of mid and hind femora and tibiae. Ungues (Fig. E) rather broad with bifid apices. TR (fore 1.59-1.95, n=10); (mid 1.86-2.05, n=10); (hind 1.94-2.32, n=10). Wing (Fig. C) with sparser costal setae, less numerous apically; medial petiole slightly longer. CR (0.64-0.70, n=10).  $R_1$  (0.18-0.24mm, n=10). LCS (0.18-0.37mm n=10).

Abdomen slightly darker with coarser setae. Genitalia (Fig. B) with tergum 9 short, only lateral lobes extend beyond base of basimere to two-thirds its length. Sternum 9 twice as wide as long, spiculate, without caudomedian excavation. Basimere large, subcylindrical, a slight apicomesal lobe projects beyond base of telomere. Telomere conical, setulose, narrowest apically, the apicomesal

extreme concave, spoon-like. Parameres with basal process like a fleur-de-lis, apical process mace-shaped. Aedeagus with sword-shaped apical process, with basally bilaterally divergent processes.

Discussion: This species derives its name from its close relationship to B. mallochi in particular and to B. flavitarsus. Macroscopically the species appear identical. Noted differences exist in the shape of the male parameres and telomeres. The female genital sclerotizations are much more difficult to separate. Both B. perplexa and B. mallochi can be separated from B. flavitarsus by virtue of much spiner appearance of the leg armature.

Type: Florida, Alachua Co., Gainesville, Chantilly Acres, 8 June (holotype M.), 2 May (allotype) 1967, F.S. Blanton; 9 paratype F., 2 paratype M. with same data collected from 1 May-August 1967, 1 paratype F., June 1968; 1 paratype M., Hillsbora Co., Harris Swamp, 13 Apr. 1967, anonym.; 1 paratype M., Liberty Co., Torreya ST. Pk. 20 May 1966, H.V. Weems; 3 paratype M., Vero Beach, Ent. Res. Center, l.t., Jan., Mar., 1960 and Apr. 1961, anonym.; 1 paratype M., 3 paratype F., Arkansas, Drew Co., Monticello, College Heights, 13 May 1969, Gary Hartley.

Distribution: Arkansas, Florida, Michigan, New York, Quebec, Virginia.

Material Studied: See type.

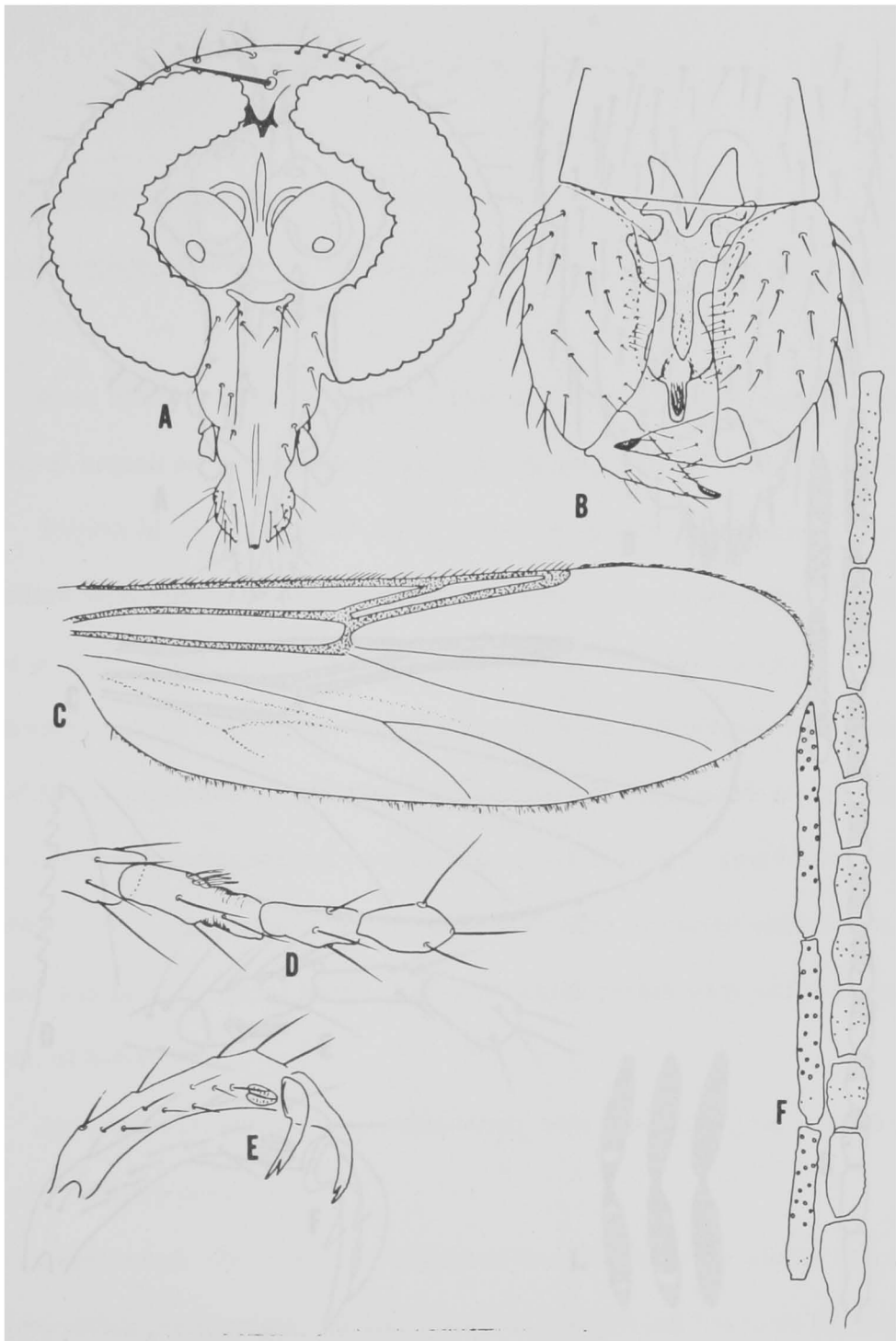


Plate 22 - *B. perplexa* n. sp. - M

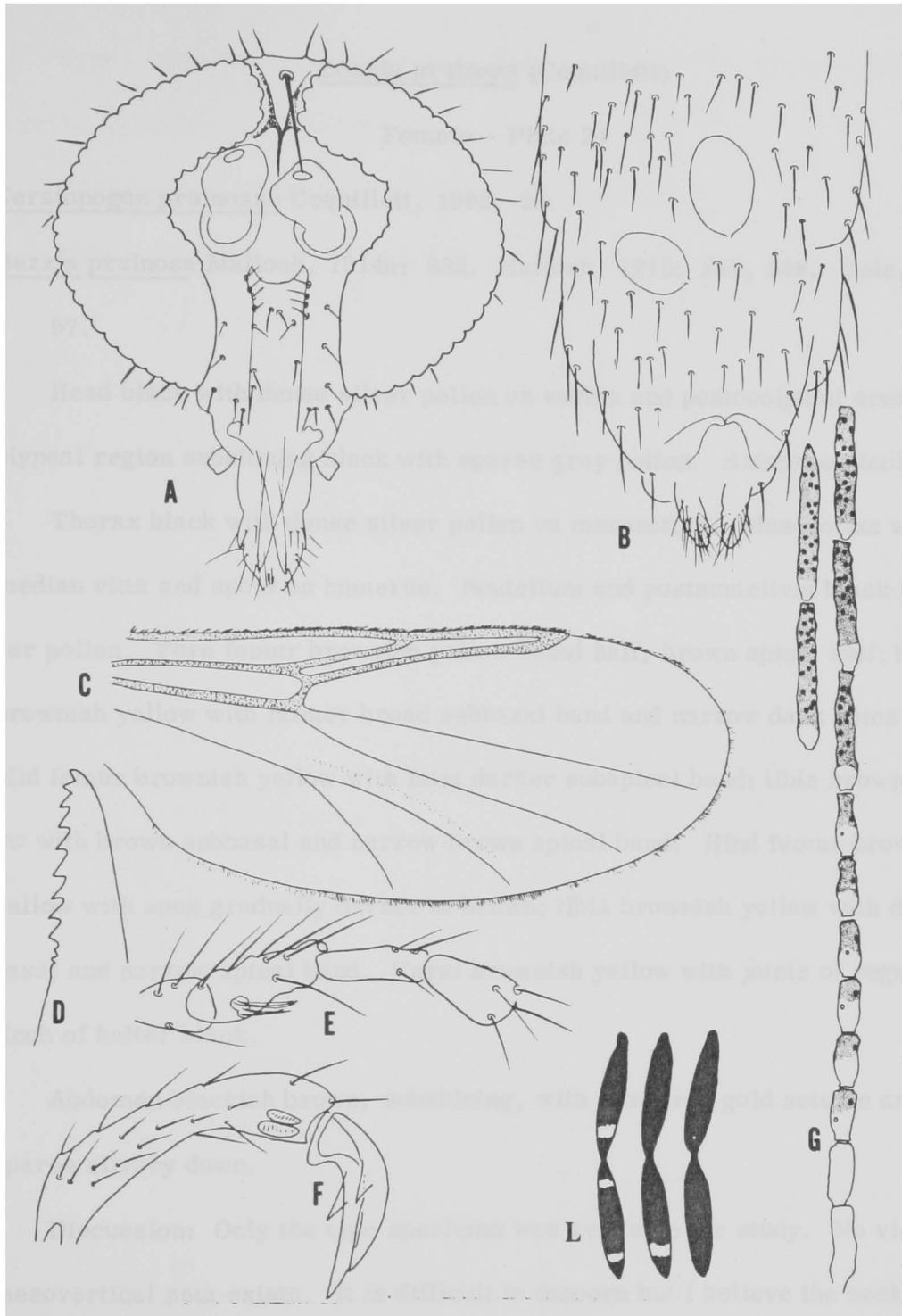


Plate 23 - *B. perplexa* n. sp. - F

Bezzia pruinosa (Coquillett)

Female - Plate 24

Ceratopogon pruinosis Coquillett, 1905: 59.

Bezzia pruinosa Malloch, 1914a: 282. Malloch, 1915: 345, 348. Cole, 1969:

97.

Head black with dense silver pollen on vertex and postoccipital area. Fronto-clypeal region subshining black with sparse gray pollen. Antennae black.

Thorax black with dense silver pollen on mesonotum. Mesonotum with broad median vitta and spots on humerus. Scutellum and postscutellum black with silver pollen. Fore femur brownish yellow basal half, brown apical half; tibia brownish yellow with fainter broad subbasal band and narrow dark apical band. Mid femur brownish yellow with faint darker subapical band; tibia brownish yellow with brown subbasal and narrow brown apical band. Hind femur brownish yellow with apex gradually darker to brown; tibia brownish yellow with dark subbasal and narrow apical band. Tarsi brownish yellow with joints of segments dark. Knob of halter black.

Abdomen blackish brown, subshining, with scattered gold setulae and fine sparse silvery down.

Discussion: Only the type specimen was available for study. No visible mesovertical seta exists. It is difficult to discern but I believe the socket of the seta is present. The species is therefore placed in the Pseudobezzia. On this assumption, the species appears to be close to B. pulverea.

Type: Coquillett, (1905), British Columbia, Bear L., 20 July 1903, R.P  
Currie, Holotype F., (USNM).

Distribution: Coquillett (1905), British Columbia.

Material Studied: See Type.



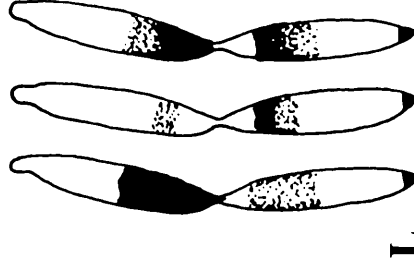
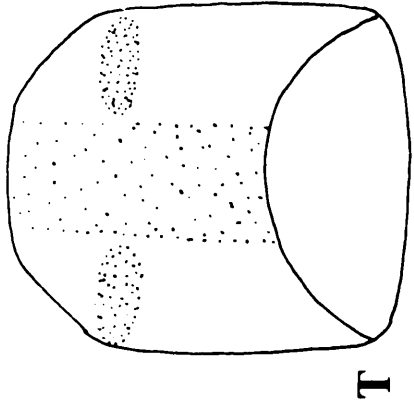


Plate 24 - *B. pruinosa* (Coquillett)

*Bezzia pulverea* (Coquillett)

Female - Plate 26

*Ceratopogon pulvereus* Coquillett, 1901: 600.

*Bezzia pulverea* Kieffer, 1906: 58. Malloch, 1914b: 283. Malloch, 1915: 348.

Kieffer, 1917: 330. Johannsen, 1943: 785. Wirth, 1952: 232. Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (2.26-2.30mm, n=4); width (0.69-0.77mm, n=4).

Head (Fig. A) brown; vertex with lighter brown median vitta with 8 decumbant setae bordering vitta, 1 large median seta. Antenna (Fig. G) with segments 4-7 barrel-shaped, 8-10 vase-shaped with longer distal neck; 11-15 cylindrically elongate with slight basal swelling; segments 3-10 yellow basal half, brown apically, 11-15 brown with basal bulb yellow. AP 22-14-15-15-15-15-15-16-31-28-30-40-43. AR (0.58-1.44, n=4). Palp (Fig. E) brown, segment 2 narrowed basad, apically bulbous; 3 cylindrical with slight mesal swelling bearing 5 sensilla; 4 cylindrical; 5 broadly bulboid. PP 15-37-20-22. PR (2.72-3.70, n=4). Mandible (Fig. D) with 11-13 (n=4) teeth.

Thorax dark brown with silver pollinosity and scattered covering of short setae; a broad, brown longitudinal median vitta reaches half the length of mesonotum, appearing bifid at disc; humerus with brown spots. A patch of prealare setae. Halter with tan stem and dark brown knob. Scutellum yellowish brown with 8 coarse setae. Postscutellum dull, dark brown. Fore femur yellow with narrow brown basal band; dark "knee"; tibia yellow with faint subapical and narrow brown apical bands. Mid femur yellow with broad brown apical band; tibia brown with

yellow subapical band. Hind femur with narrow brown basal band, apical third brown, rest yellow; tibia brown with broad yellow subapical band. Tarsi yellow with apices of segments dark brown. Ungues (Fig. F) with basal swelling and large basomedian tooth. TR (fore 1.78-1.92, n=4); (mid 1.82-2.16, n=4); (2.06-2.20, n=4). Wing hyaline with faintly yellow anterior veins. CR (0.74-0.77, n=4).  $R_1$  (0.40-0.43mm, n=4). LCS (0.57-0.61mm, n=4).

Abdomen (Fig. B) dark brown with silvery pollinosity, macrotrichia dense. One pair gland rods reach 4.5 segments. Spermathecae: 2 large, unequal, oblong, about twice as long as wide, duct short. Genital sclerotizations band-like laterally, somewhat crescent-shaped mesad.

#### Male - Plate 25

Wing length (1.87-1.96mm, n=2); width (0.52mm, n=2).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 4-8 barrel-shaped; 9-10 similar, longer; 11-12 cylindrically elongate, yellow with brown apices; 13-15 cylindrically elongate, brown with bases yellow. AP 27-16-16-15-16-16-18-22-32-52-36-50-63. AR (0.89, n=1). Palp (Fig. D).

Thorax similar to female with posterolateral and posterodorsal aspects of mesonotum more setose. Ungues (Fig. E) bifid. TR (fore 1.33-1.77, n=3); (mid 1.72-1.79, n=3); (hind 1.79-1.90, n=3). Wing (Fig. C) with CR (0.66-0.70, n=2).  $R_1$  (0.27-0.34mm, n=2). LCS (0.34-0.40mm, n=2).

Abdomen similar to female. Genitalia (Fig. B) with tergum 9 short, with large rounded lateral lobes. Sternum 9 rounded apically reaching about half the

length of basimere, a deep caudomedian excavation present with highly sclerotized margins which appear serrate and lined with fine setae. Basimere short, globular, sparsely setose. Telomere, short, expanded apically to a bipartite, spade-like structure, setose. Parameres form a large, broad, triangular structure apically, appearing "furrowed", basal processes large, bilaterally lobate. Aedeagus smaller than parameres, subtriangular with blunt apices of angles.

Discussion: B. pulverea seems to be the base from which a rather large number of species are described, all being similar yet quite distinct. The male genitalia in particular seem difficult to separate but after some study the species fall into rather obvious groups. The most obvious differences are with the shape of the telomeres and this is usually accompanied by differences in leg color patterns. Differences in the shape of sternum 9 also occur. The parameres and aedeaga are also different but are difficult to use in separation as these structures are very complex in this species group.

Plate 28 presents variations of male genitalia. Each will probably eventually be described as new but were not in this paper due to the extreme shortage of specimens. In most cases only one specimen of each form is available. Figures A-D were collected in Florida, Figure E from the Bahamas, and Figure F from Maryland. Plate 27 presents two more forms. The explanation of these forms is in the discussion of B. laciniastyla n. sp. on page 62.

Type: Coquillett (1901), New Jersey, Riverton, 3 July 1948, C.W. Johnson, Holotype F., (USNM).

Distribution: Coquillett (1901) New Jersey; Kieffer (1917) Hungary; Wirth

(1952) California, Delaware, District of Columbia, Mississippi, Louisiana, Texas.

Material Studied: (pinned) DELAWARE, Port Penn, l. t., 6 June 1937, G.H.

Bradley, 2 M.; VIRGINIA, Alexandria, 11 June 1952, 3 F., W.W. Wirth.

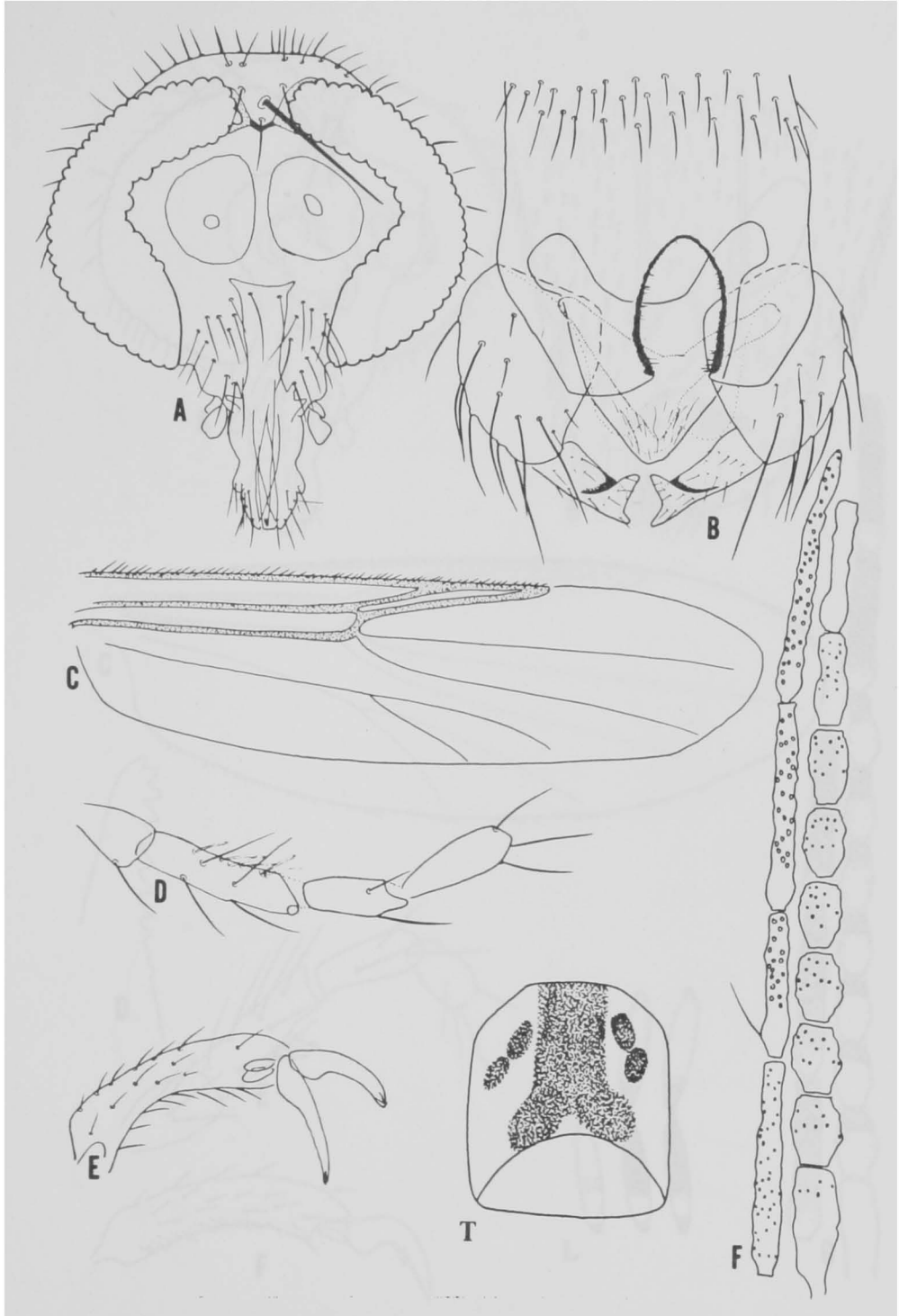


Plate 25 - *B. pulverea* (Coquillett) - M

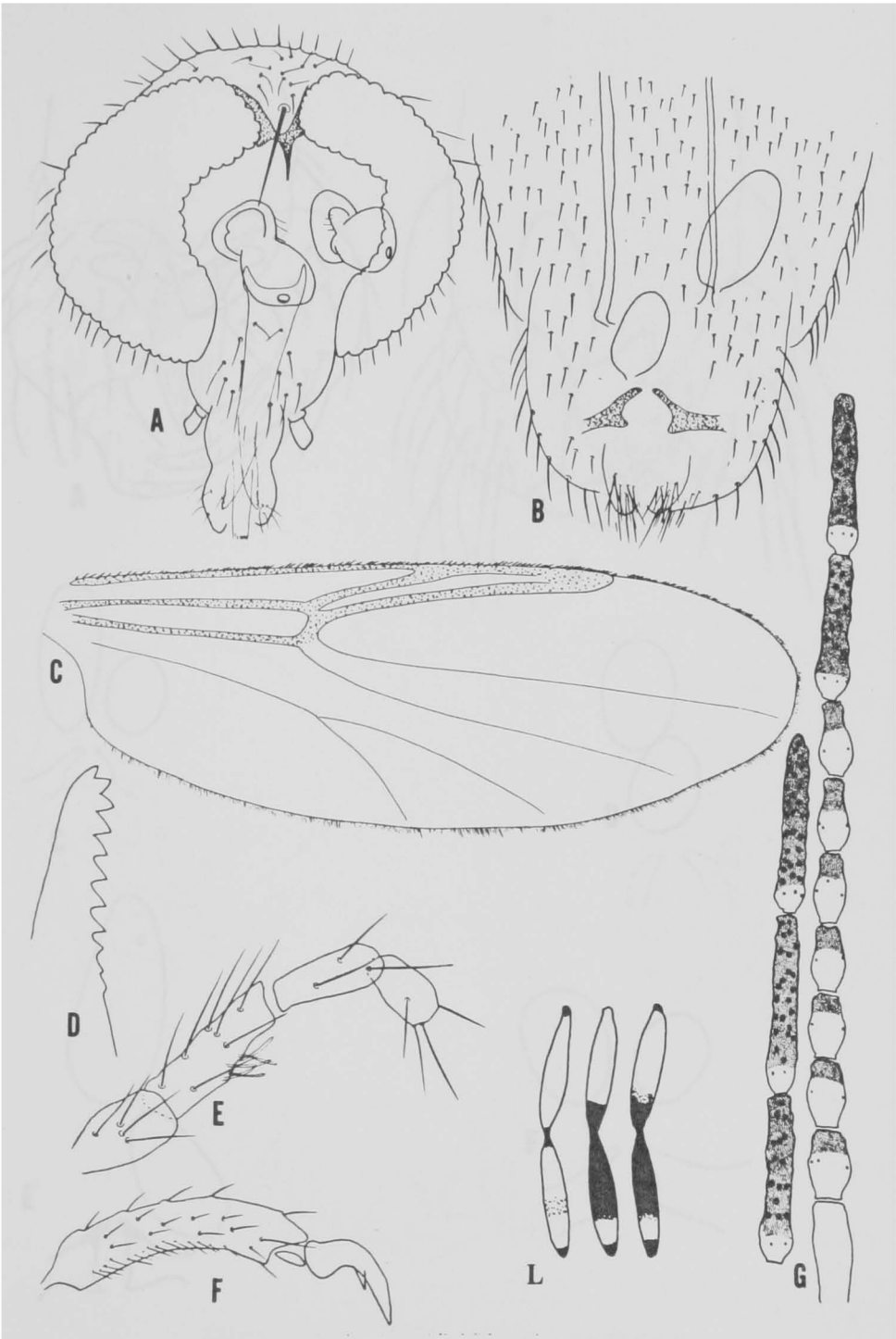


Plate 26 - *B. pulverea* (Coquillett) - F

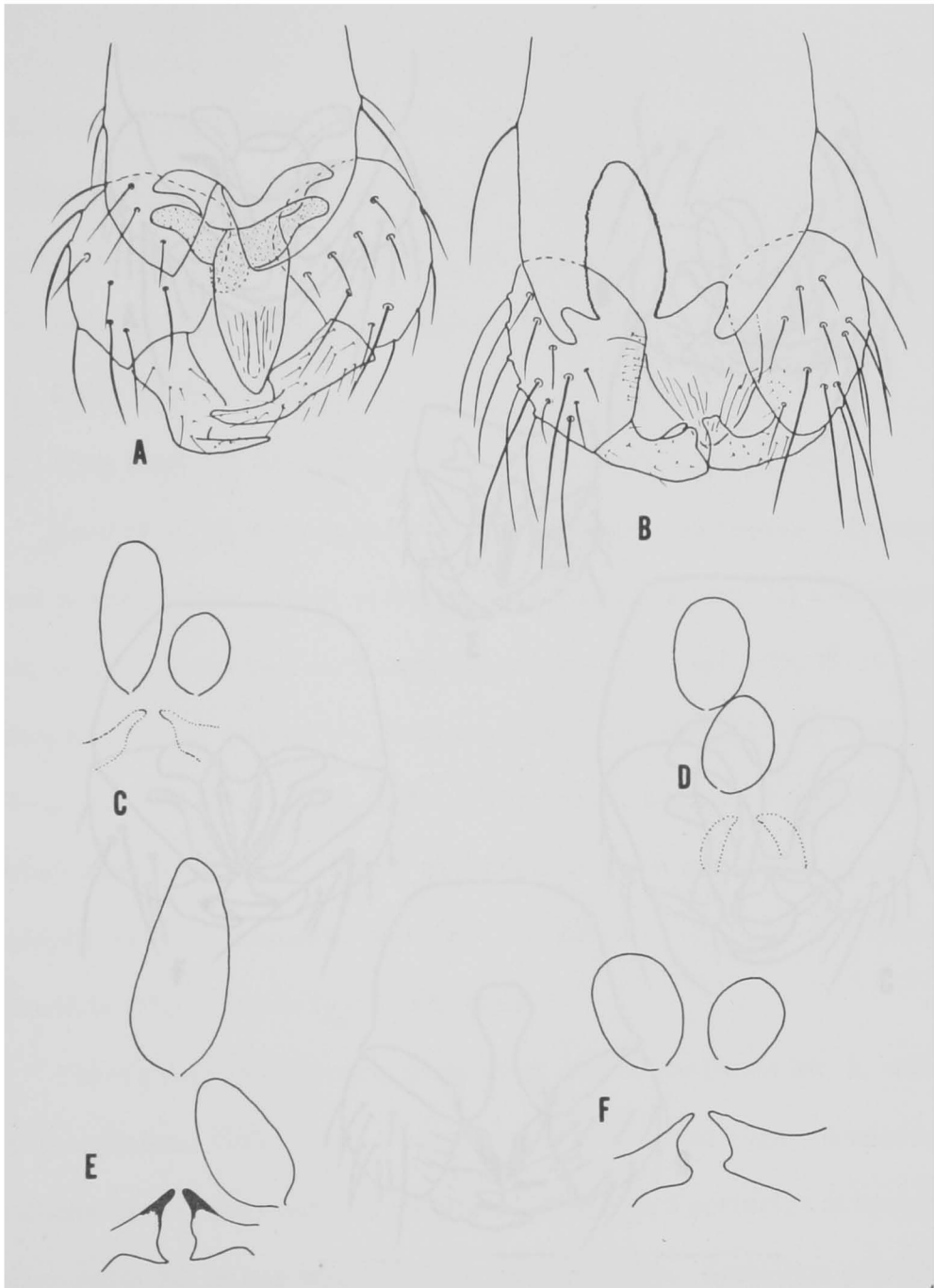


Plate 27 Pulverea complex



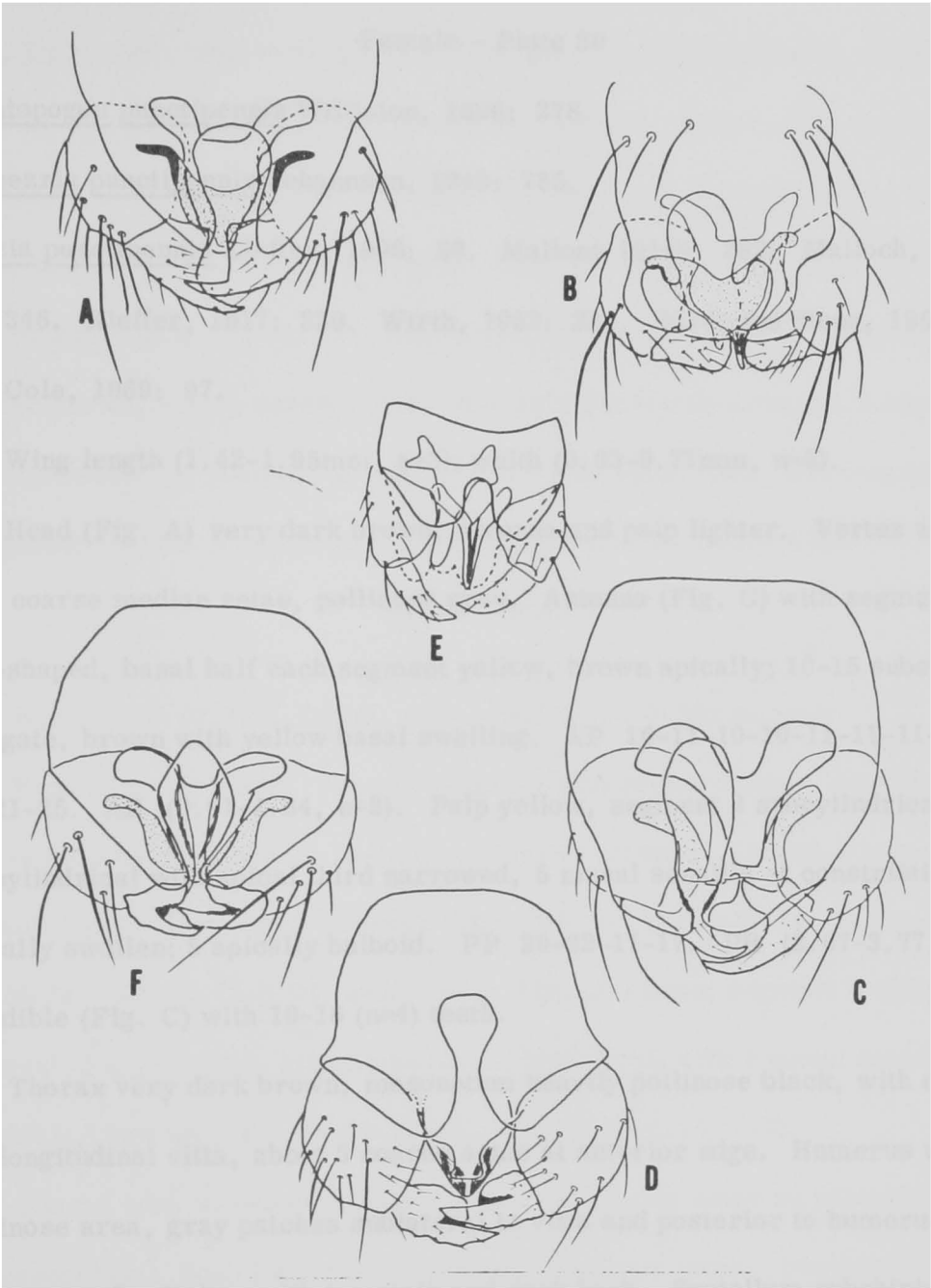


Plate 28 Pulverea complex

Bezzia punctipennis (Williston)

Female - Plate 30

Ceratopogon punctipennis Williston, 1896: 278.

Probezzia punctipennis Johannsen, 1943: 785.

Bezzia punctipennis Kieffer, 1906: 58. Malloch 1914b: 282. Malloch, 1915:

346. Kieffer, 1917: 330. Wirth, 1952: 235. Wirth and Stone, 1968: 436.

Cole, 1969: 97.

Wing length (1.42-1.95mm, n=3); width (0.63-0.71mm, n=3).

Head (Fig. A) very dark brown, antenna and palp lighter. Vertex with several coarse median setae, pollinose gray. Antenna (Fig. G) with segments 4-9 keg-shaped, basal half each segment yellow, brown apically; 10-15 subcylindrical, elongate, brown with yellow basal swelling. AP 16-11-10-10-11-11-11-12-21-20-21-25. AR (0.91-1.34, n=3). Palp yellow, segment 2 subcylindrical; 3 subcylindrical with apical third narrowed, 5 mesal sensilla at constriction; 4 apically swollen; 5 apically bulboid. PP 20-32-17-17. PR (2.07-3.77, n=3). Mandible (Fig. C) with 10-16 (n=4) teeth.

Thorax very dark brown, mesonotum heavily pollinose black, with dark median longitudinal vitta, about 5 coarse setae at anterior edge. Humerus with gray pollinose area, gray patches sublateral to vitta and posterior to humerus. Prealare setae 7. Halter with tan stalk and dark knob. Scutellum subshining brown with gray pollin, a row of coarse setae. Postscutellum dark brown, with gray pollin. Legs dark brown, heavily armed. Tarsi yellowish brown with apices of segments darker. Ungues (Fig. F) with basal swelling and basomedian tooth.

TR (fore 1.61-2.05, n=4); (mid 1.93-2.16, n=4); (hind 2.23-2.48, n=4). Wing (Fig. D) hyaline, with brownish tint, anterior veins darker brown, dark brown spots at r-m cross vein, posterior to apex of costa, mesad on  $m_1$  just ventrad of former, fainter spots on apices of cells  $R_5$ ,  $M_1$ ,  $M_2$ ,  $M_4$ , and Anal. CR (1.09-1.35, n=3).  $R_1$  (0.27-0.40mm, n=3). LCS (0.44-0.49mm, n=3).

Abdomen (Fig. B) dark brown, setose, terga with basal half each segment lighter brown, ventor nearly black. One pair gland rods extend 4.5 segments. Spermathecae: 2, unequal, elongate, ovoid with short duct. Dimensions: (.049 x .093mm -- .051 x .116mm). Genital sclerotizations claw-like.

#### Male - Plate 29

Wing length (0.80-1.75mm, n=3); width (0.38-0.53mm, n=3).

Head (Fig. A) black. Antenna (Fig. F) with golden plume. Antennal segments 3-10 barrel-shaped; 11-14 cylindrically elongate, 13 with 2 large setae, 14 with 1 seta; 15 elongate, spindle-like. AP 24-13-13-13-13-13-15-15-22-43-24-28-32. AR (0.76-0.94, n=3). Palp (Fig. D) brown; segment 2 widest, cylindrical; 3 cylindrical, slightly narrowed apical half with 3 mesal sensilla; 4 cylindrical; 5 bulboid. PP 15-29-15-15. PR (3.25-3.75, n=3).

Thorax with 8 coarse prealare setae; 4-5 coarse setae on posterior margin of mesonotum. Scutellum dark brown with 8 coarse setae. Postscutellum buff dark brown with median grayish vitta. Legs spinose, shining black. Tarsi with bifid ungues (Fig. E). TR (fore 1.52-1.83, n=3); (mid 1.73-2.12, n=3); (hind 1.94-2.16, n=3). Wing (Fig. C) with fewer spots than female; 1 large spot post-

erior to apex of costa; 1 smaller spot just basad and posterior to large spot; 1 faint spot in anal cell. CR (0.67-0.69, n=3).  $R_1$  (0.18-0.31mm, n=3). LCS (0.24-0.31mm, n=3).

Abdomen dark brown, nearly black, terga lighter on basal half of each segment. Genitalia (Fig. B) with tergum 9 rounded apically with rounded, setose sublateral lobes. Sternum 9 with bilateral, apically directed, triangular sclerotizations. Basimere setose, short, stout, broadest basad, bluntly subtriangular. Telomere setose, stout, bent mesad, apically pointed. Parameres somewhat arrow-shaped, pointed apicad. Aedeagus a tripartite, star-shaped structure with subequal arms.

Discussion: B. punctipennis is thusfar unique to the nearctic Bezzia. It is the only species with spotted wings. It is therefore easily separated from other species. Tokunaga and Murachi (1959) described and figured several species with darkened areas on the wings in their study of ceratopogonids of Micronesia.

Type: Williston (1896), St. Vincent, British West Indies, (presumably in the British Museum, Wirth 1952).

Distribution: Williston (1896), British West Indies. Wirth (1952), Florida, Costa Rica, California. Nevada.

Material Studied: (pinned) CALIFORNIA, Imperial Co., Hot Mineral Spr., 1 M., 25 April 1953, J.N. Belkin; Death Valley, Saratoga Spr., 1 M., 30 May 1953 J.N. Belkin. FLORIDA, Dade Co., Miami B., l.t., 1 F., 9 Feb. 1948, W. Buren; W. Palm B., Morrison Field, 1 F., 31 Oct. 1942. (slides) CALIFORNIA, Lassen Co., Halleujah Sct., 1 M., 18 July 1953, E.J. Sahlinger; Death Valley Saratoga Spr. & Death Valley Jct., l.t., 2 F., C.B.&R.N. Philip.

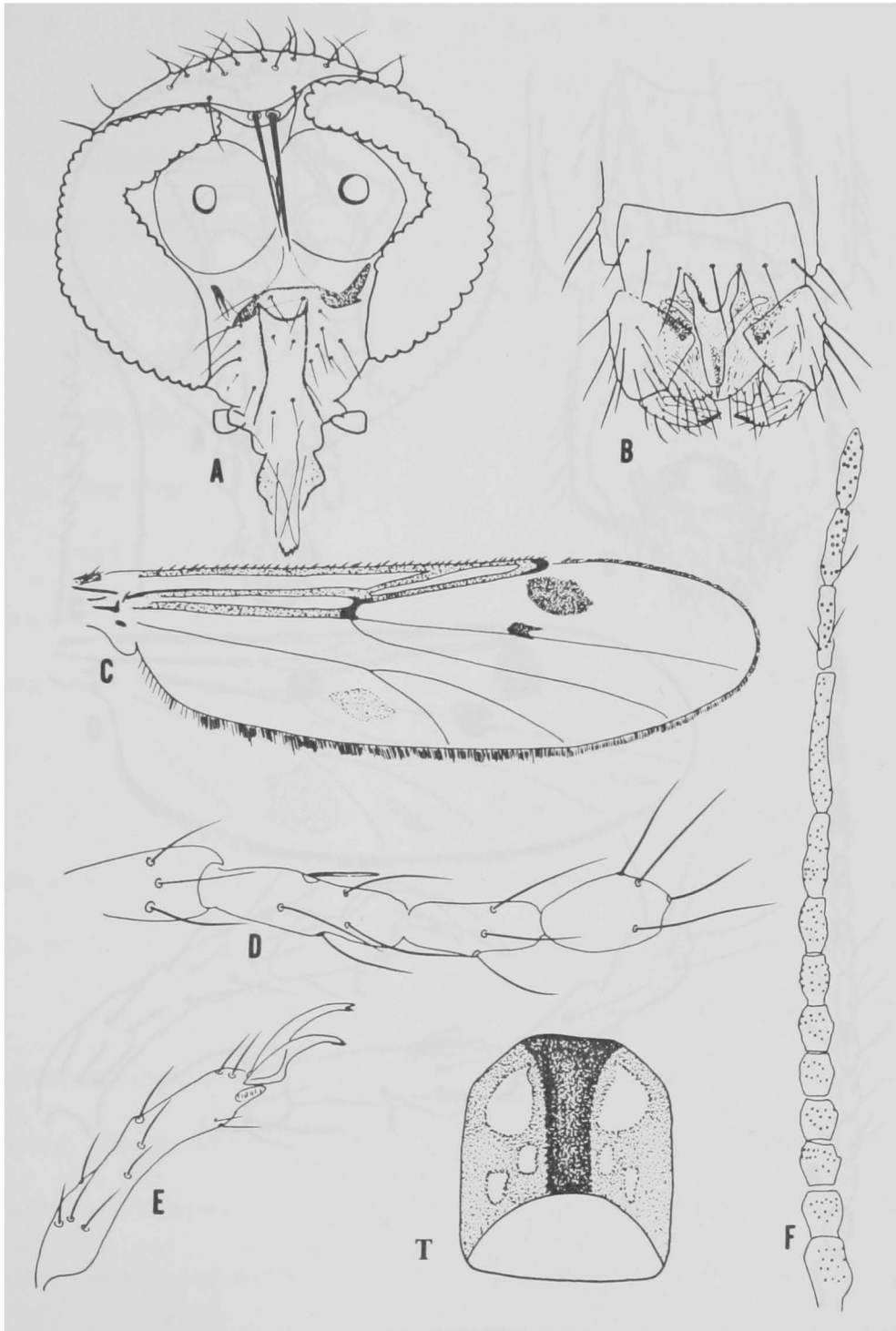


Plate 29 - *B. punctipennis* (Williston) - M

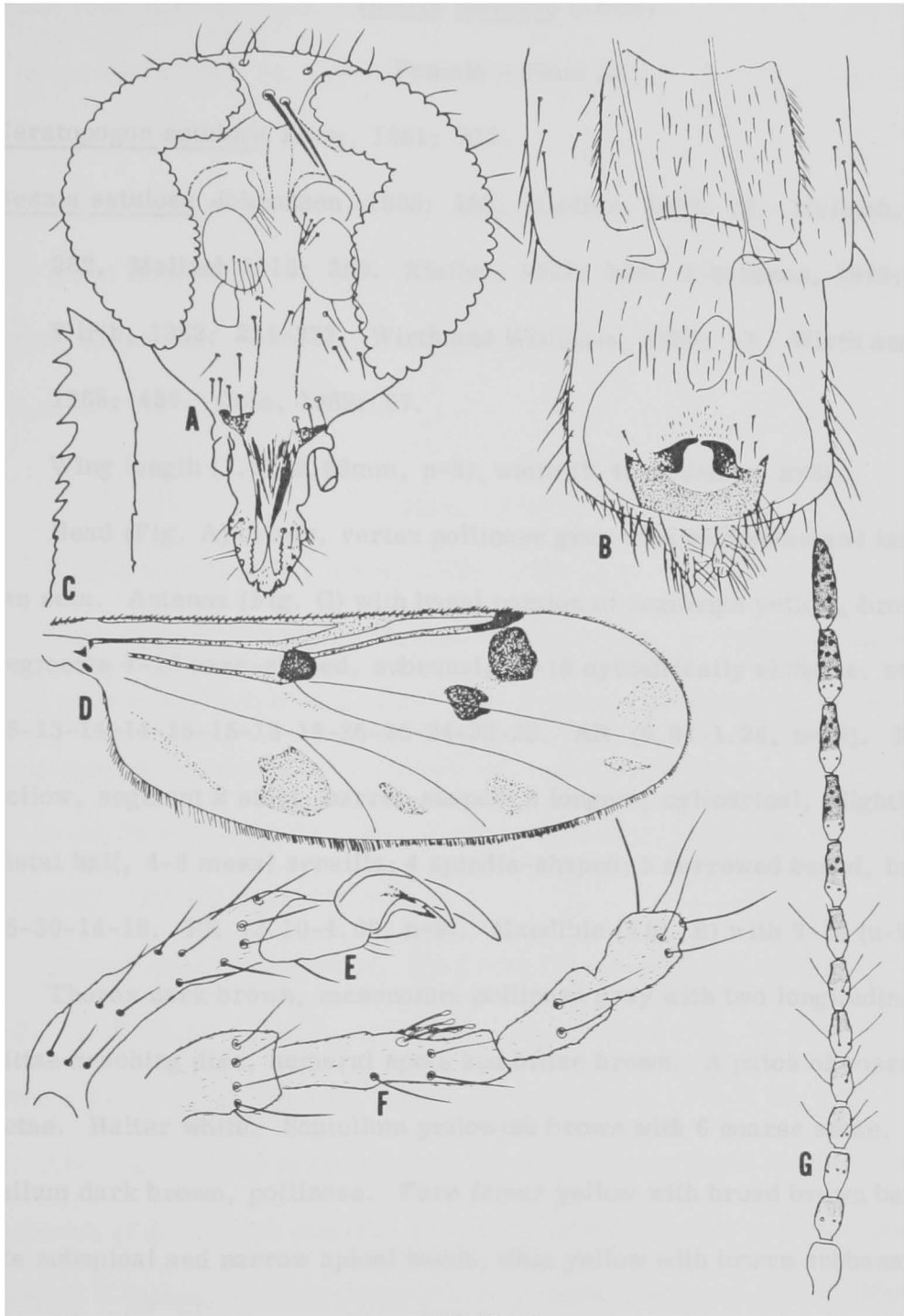


Plate 30 - *B. punctipennis* (Williston) - F

Bezzia setulosa (Loew)

Female - Plate 32

Ceratopogon setulosa Loew, 1861: 312.

Bezzia setulosa Johannsen, 1905: 102. Kieffer, 1906: 58. Malloch, 1914b:

282. Malloch 1915: 350. Kieffer, 1917: 330. Johannsen, 1943: 785.

Wirth, 1952: 231-232. Wirth and Williams, 1957: 14. Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (1.51-2.63mm, n=8); width (0.49-0.88mm, n=8).

Head (Fig. A) brown, vertex pollinose gray with gold setae and large median seta. Antenna (Fig. G) with basal portion of segments yellow, brown apically; segments 4-10 vase-shaped, subequal; 11-15 cylindrically elongate, subequal. AP 18-13-14-14-15-15-18-18-26-26-24-26-29. AR (0.91-1.24, n=10). Palp (Fig. F) yellow, segment 2 stout, barrel-shaped; 3 longest, cylindrical, slightly constricted distal half, 4-5 mesal sensilla; 4 spindle-shaped; 5 narrowed basad, bulboid. PP 15-30-14-18. PR (2.10-4.00, n=9). Mandible (Fig. B) with 9-16 (n=9) teeth.

Thorax dark brown, mesonotum pollinose gray with two longitudinal median vittae reaching disc, humeral spots and bittae brown. A patch of coarse prealar setae. Halter white. Scutellum yellowish brown with 6 coarse setae. Postscutellum dark brown, pollinose. Fore femur yellow with broad brown basal, moderate subapical and narrow apical bands; tibia yellow with brown subbasal and narrow apical bands. Mid femur yellow with brown apical and basal bands; tibia similar. Hind leg similar to mid leg. Tarsi yellow, darker apically. Ungues (Fig. E) gently curved, swollen basad with large basomedian tooth. TR (fore 1.25-2.15,

n=10); (mid 1.71-2.20, n=10); (hind 2.00-2.44, n=10). Wing hyaline, with yellow anterior veins (Fig. D). CR (0.66-0.78, n=9).  $R_1$  (0.12-0.40mm, n=8). LCS (0.49-0.71mm, n=8).

Abdomen (Fig. C) cream-colored dorsally, slightly darker ventrad. One pair gland rods reach 4.5 segments. Spermathecae: 2 subequal, ovoid, with short, sclerotized neck. Dimensions: (.037 x .046mm - .046 x .059mm). Genital sclerotizations boot-shaped.

#### Male - Plate 31

Wing length (1.33-2.07mm, n=10); width (0.37-0.56mm, n=10).

Head (Fig. A) similar to female. Antenna (Fig. F) with gold plume; segments 3-12 yellow, 12 with brown apical ring; segments 13-15 brown; segments 3-9 vase-shaped, narrowed basad; 10-15 cylindrically elongate. AP 25-14-14-14-15-15-19-26-63-26-28-31. AR (0.86-0.98, n=10). Palp (Fig. D) with PP 14-28-19-17. PR (3.22-4.37, n=9).

Thorax similar to female. Wing with CR (0.64-0.95, n=9).  $R_1$  (0.21-0.37mm, n=9). LCS (0.25-0.49mm, n=9), (Fig. C). Ungues (Fig. E) bifid apically. TR (fore 1.32-1.72, n=10); (mid 1.77-2.06, n=9); (hind 1.76-2.02, n=9).

Abdomen similar to female with darker, coarser setae scattered over dorsum. Genitalia (Fig. B) with sternum 9 having a broad, shallow caudomedian excavation. Tergum 9 setose, apically rounded with rounded sublateral lobes. Basimere setose, stout barrel-shaped, tapered apically, about twice as long as wide. Telomere setose, short, stout, apically bluntly pointed. Parameres a distally rod-



shaped structure with apex appearing bilaterally folded. Aedeagus apically rod-shaped, basal arms ornate.

Discussion: B. setulosa is a rather ubiquitous species in relation to other species of the genus. It is easily distinguished by its color patterns. It is close to B. magnisetula n. sp. but is generally lighter colored and much smaller in size. The mesonotal patterns differ markedly.

Type: Loew (1861), District of Columbia, (MCZ, Cambridge, Massachusetts).

Distribution: Loew (1861), District of Columbia; Johannsen (1905), New York; (1910), New Jersey; Malloch (1915), Illinois, Idaho; Wirth (1952), Maryland, Virginia, Indiana, Michigan, Saskatchewan, Louisiana, Texas, Nevada, Washington, Alabama, Arizona, Arkansas, British West Indies, Colorado, Connecticut, Florida, Georgia, Mississippi, Nebraska, New Mexico, Oregon, South Carolina, South Dakota, Tennessee, Utah, Wyoming.

Material studied: (pinned) ALABAMA, Florence, Cypress Cr., 1F., 21 Aug. 1955, W. E. Snow, CALIFORNIA, Imperial Co., Palo Verde, 1F., 8 Aug. 1949; Modoc Co., Alturas, 1F., July 1948, W.W. Wirth; Riverside Co., Blythe, 1F., 2 July 1948, R. Coleman; San Bernardino Co., Vidal, 1F., April 1948, R. Coleman. COLORADO, Ft. Collins, 1M., 1.t., 3 Aug., 1F., 1.t., 14 Aug. 1942, M.A. Palmer. CONNECTICUT, Storrs, 1M., reared, 24 Aug. 1953, F. B. Lewis. FLORIDA, Ft. Worth, 1F., 1.t., 1M., 1.t., 6 Aug. 1951, W.W. Wirth. INDIANA, LaFayette, 1F., 17 May; 1M., 14 July 1916, J.M. Aldrich. MARYLAND, Plummers Is., 1F., 6 July 1963, G. Steyskal; Worcester Co., Snow Hill, 1M., 19 May 1968, W.H. Anderson. MASSACHUSETTS, Bedford,

1M., 1F., 20 July 1961, W.W. Wirth. MICHIGAN, Midland Co., 1M., 15 Sept. 1945, R.R. Dreisbach. NEVADA, Reno, 1F., 1915, H.G. Dyar.

SASKATCHEWAN, Saskatoon, 2F., Aug. 1947, R. Coleman. TEXAS, Port Arthur, 1F., 16 Aug. 1947, J.L. Darnell; Valde, ex. mud, 2F., 30 Mar. 1943, H.M. Brundrett. VIRGINIA, Alexandria, 2F., 11 June 1952; Falls Church, Homes Run, 1F., 1.t., 24 June 1961; Richmond Co., Warsaw, 2M., 26 Aug. 1952, W.W. Wirth. WASHINGTON, Yakima Co., Sunnyside, 1M., 1.t. 30 July 1941, Brookman & Reeves. (slides) ALABAMA, Collinsville, Lookout Mts., 1M., 1.t., Aug. 1968, Blanton & Jones; Theodore, Aligator, Cr., 1F., 7 June 1968, F. S. Blanton & R.W. Cannon. ARIZONA, Ajo, 1.t., 1F., 1 Oct. 1962, W.F. Barr. ARKANSAS, Orew Co., Monticello, College Hts., 1F., 13 May 1969, G. Hatley. BRITISH WEST INDIES, Bimini Is., 1M., May 1959, Cazier & Gertach. CALIFORNIA, Riverside Co., Blythe, 1F., 1.t., 20 July 1947, J.W. MacSwain. FLORIDA, Alachua Co., Gainesville, Chantilly Acres, 1M., 8 May 1967, F.S. Blanton. GEORGIA, Sapelo Id., 1F., salt marsh, 16 June 1958, A.E. Smalley. LOUISIANA, Baton Rouge, Tigerstown, 1F., 1.t., 6 May 1947, W.W. Wirth. MARYLAND, Montgomery Co., Fairland, 1F., 1.t., 19 May 1969, A.A. Hubert. MISSISSIPPI, Washington Co., 1F., 1.t., 21 May; 1M., 30 May 1966, R.H. Roberts. NEBRASKA, Cedar Co., Hartington, 1M., 1.t., 18 June 1969, W.W. Wirth. NEW MEXICO, Las Cruces, 1F., 22 July 1964, unknown. OREGON, Little Valley s.w. Vale, 1M., 1.t., 1963, K. Goeden. SOUTH CAROLINA, Charleston, 1M., 1.t., Sept. 1969, W.B. Ezell. SOUTH

DAKOTA, Lawrence Co., Spearfisher Cr., 1M., 3F., creek marg., 14 June  
1969, W.W. Wirth. TENNESSEE, Alcoa, 1F., b.l.t. 21 June 1968, R.E.  
Woodruff. TEXAS, Jasper Co., Jasper, 1F., b.l.t., 2 Aug. 1968, R. E.  
Woodruff. UTAH, Milford, 1M., reared ex. sewage creek marg., 17 Apr.  
1959, L.J. Ogden. VIRGINIA, Falls Church, Homes Run, 1M., l.t., 25 May  
1961, W.W. Wirth. WYOMING, Yellowstone National Pk., Sylvan Spr., 1M.,  
1F., summer 1960, N.C. Collins; Platte Co., Brown Ranch, 1M., l.t., 1 Aug.  
1967, M. Griffith.

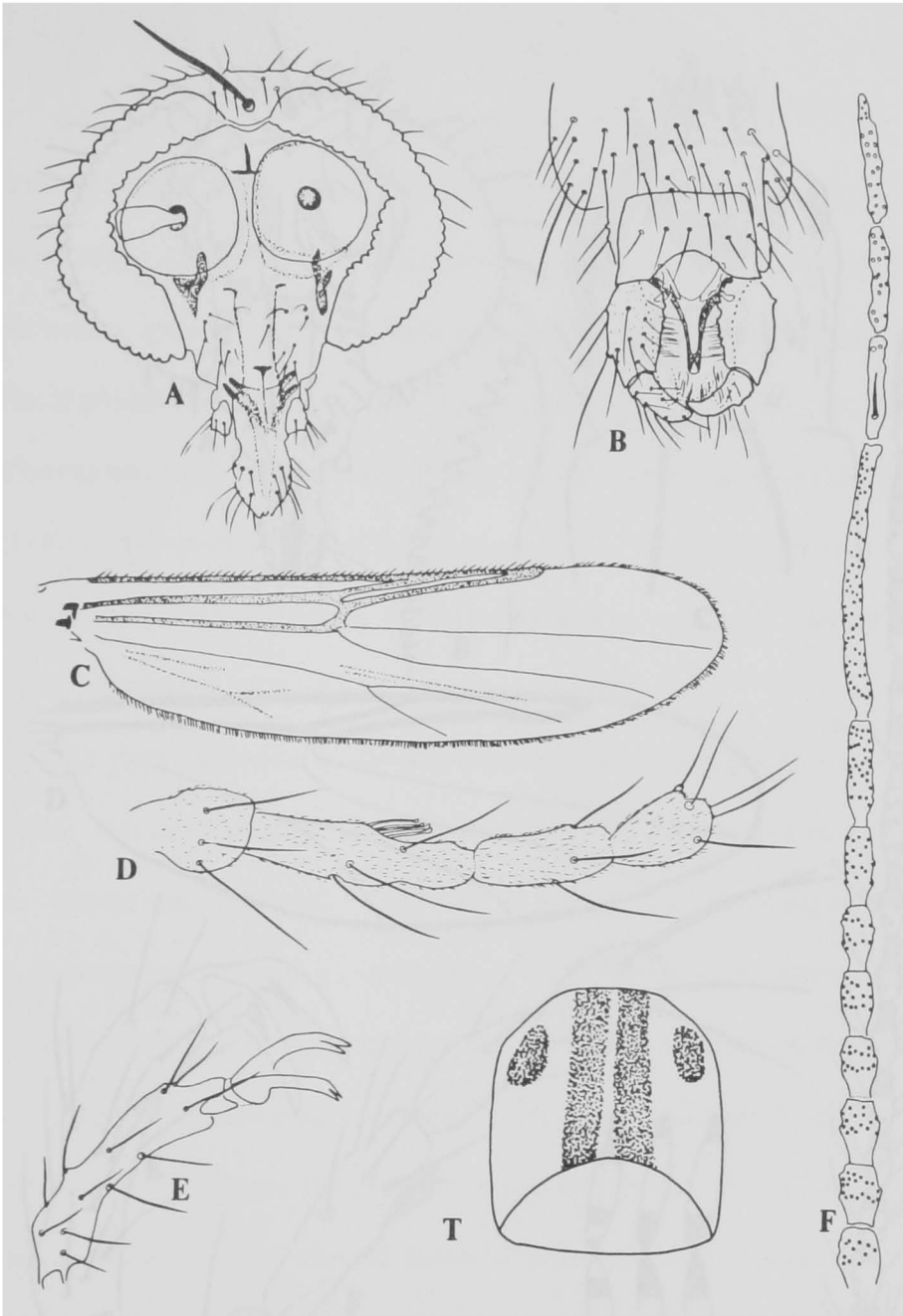


Plate 31 - *B. setulosa* (Loew) - M

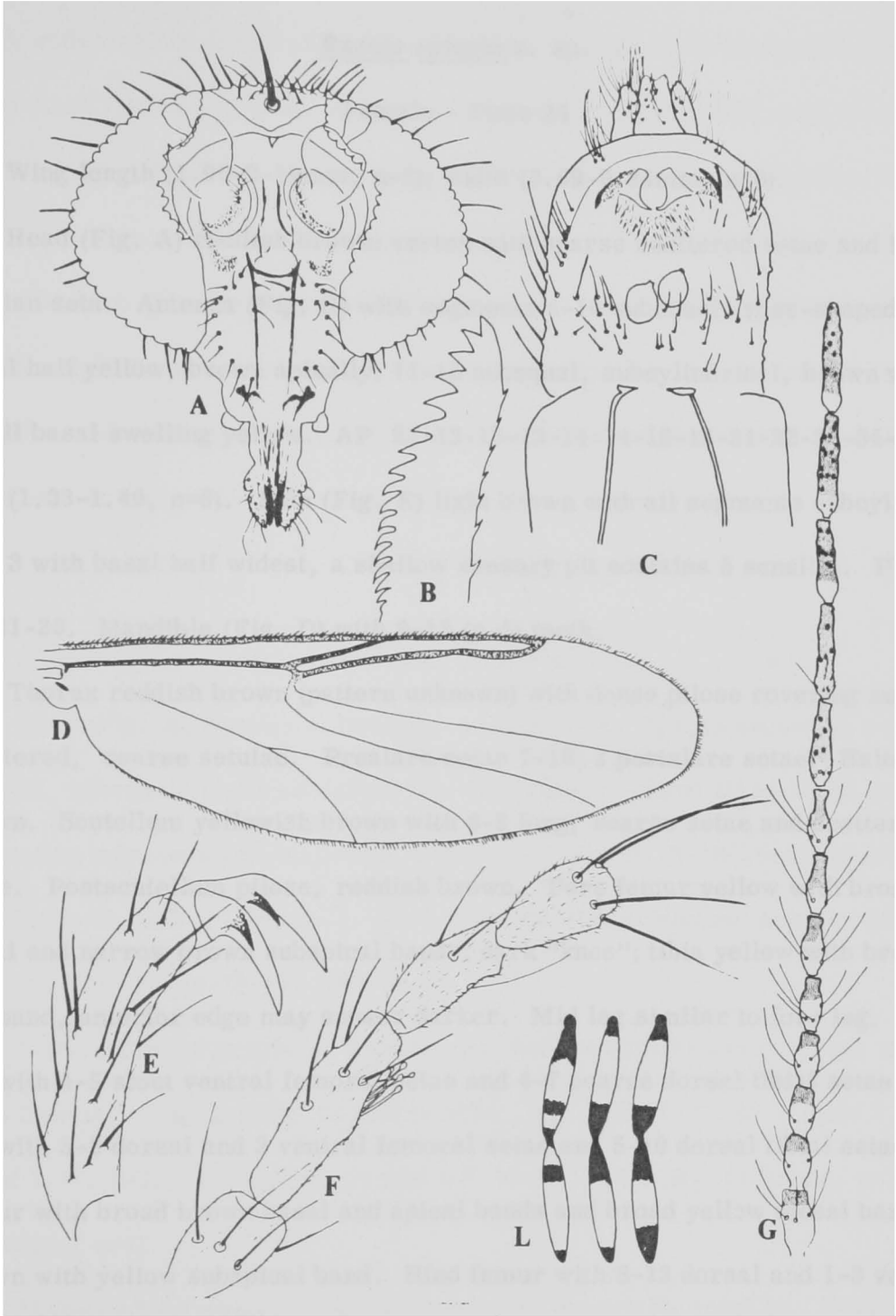


Plate 32 - *B. setulosa* (Loew) - F

Bezzia spicata n. sp.

Female - Plate 34

Wing length (1.90-2.19mm, n=6); width (0.69-0.84mm, n=6).

Head (Fig. A) reddish brown; vertex with sparse scattered setae and large median seta. Antenna (Fig. G) with segments 4-10 subequal, vase-shaped with basal half yellow, brown apically; 11-15 subequal, subcylindrical, brown with small basal swelling yellow. AP 22-13-13-13-14-14-15-15-31-32-32-34-39. AR (1.33-1.49, n=6). Palp (Fig. E) light brown with all segments subcylindrical; 3 with basal half widest, a shallow sensory pit contains 5 sensilla. PP 26-44-21-20. Mandible (Fig. D) with 9-12 (n=5) teeth.

Thorax reddish brown (pattern unknown) with dense pilose covering and scattered, coarse setulae. Prealare setae 7-10; 2 postalare setae. Halter brown. Scutellum yellowish brown with 6-8 long, coarse setae and scattered setulae. Postscutellum pilose, reddish brown. Fore femur yellow with broad brown basal and narrow brown subapical bands; dark "knee"; tibia yellow with brown apical band, anterior edge may appear darker. Mid leg similar to fore leg. Fore leg with 4-5 stout ventral femoral setae and 4-7 coarse dorsal tibial setae. Mid leg with 3-8 dorsal and 2 ventral femoral setae and 5-10 dorsal tibial setae. Hind femur with broad brown basal and apical bands and broad yellow mesal band; tibia brown with yellow subapical band. Hind femur with 8-13 dorsal and 1-3 ventral setae; tibia armed with a double row of dorsal setae. Tarsi yellow with narrow apices of segments brown; segments 4-5 darker yellow. Ungues (Fig. F) mod-

erate with large basomedian tooth. TR (fore 1.77-2.00, n=6); (mid 1.89-2.10, n=6); (hind 1.88-2.33, n=6). Wing (Fig. C) broad, translucent, with anterior veins faintly yellow; medial fork just petiolate. CR (0.75-0.78, n=6).  $R_1$  (0.31-0.43mm, n=6). LCS (0.49-0.71mm, n=6).

Abdomen (Fig. B) reddish brown, setose. One pair long, hyaline gland rods reach nearly 5 segments. Spermathecae: 2 unequal, punctate, ovoid. Dimensions: (.066 x .158 -- .091 x .241mm). Genital sclerotizations bilaterally mesally concave, the apical process like a bat's ear.

#### Male - Plate 33

Wing length (1.71mm, n=1); width (0.53mm, n=1).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 4-9 barrel-shaped, subequal; 10-15 subcylindrical with apex of -2 and all of 13-15 brown, preceding segments yellow; plume yellow. AP 25-16-15-15-15-16-18-20-30-49-32-42-43. AR (0.98, n=1). Palp (Fig. D) without distinct sensory pit of female. PP 23-38-19-17. PR (3.80, n=1).

Thorax with 10 prealare, 2 postalare, and 8 scutellar setae. Legs spinier than female. Ungues (Fig. E) faintly bifid. TR (fore 1.72, n=1); (mid 1.88, n=1); (hind 1.87, n=1). Wing (Fig. C) with CR (0.68, n=1).  $R_1$  (0.31mm, n=1). LCS (0.37mm, n=1).

Abdomen with coarser setae than female, especially apically. Genitalia (Fig. B) with tergum 9 short, reduced, only round, fleshy lateral lobes extend beyond base of basimere. Sternum 9 long, broad, with deep, narrow caudo-

median excavation. A dense patch of setae at base of excavation on segment 8. Basimere broad, short, setulose, subconical with few long, coarse, apicolateral setae. Telomere setulose, short, broad, expanded apically terminating in short, sharp apicolateral spike. Parameres a broad, somewhat pyrimidal-shaped structure apically with mesal folded or wrinkled appearance, basal arms plain, broad. Aedeagus a tent-shaped process with a membranous covering over apical extreme.

Discussion: The shape of the male genitalia and the female spermathecae indicate this species is a member of the B. pulverea-group. The broad yellow markings on the hind leg indicate a close relationship to B. pulverea. It is easily distinguished by the broad brown subapical bands on the fore and mid femora of B. spicata as opposed to the lack of the subapical band on the fore femur and the broad, apical band on the mid femur of B. pulverea. The male genitalia and the female genital sclerotizations also readily separate the species. The species is named for the apical "spike" of the telomere.

Type: Florida, Wakulla Co., Ochlockonee Riv. St. Pk., l.t., holotype F., allotype, 29 Apr. 1970, W.W. Wirth; 3 paratype F. same data; Florida, Alachua Co., West Gainesville, l.t., 1 paratype F., June 1968, Blanton and Fletcher; Florida, Vero Beach Ent. Res. Cntr., l.t., p paratype F., May 1961.

Distribution: Florida

Material studied: slides--see type.



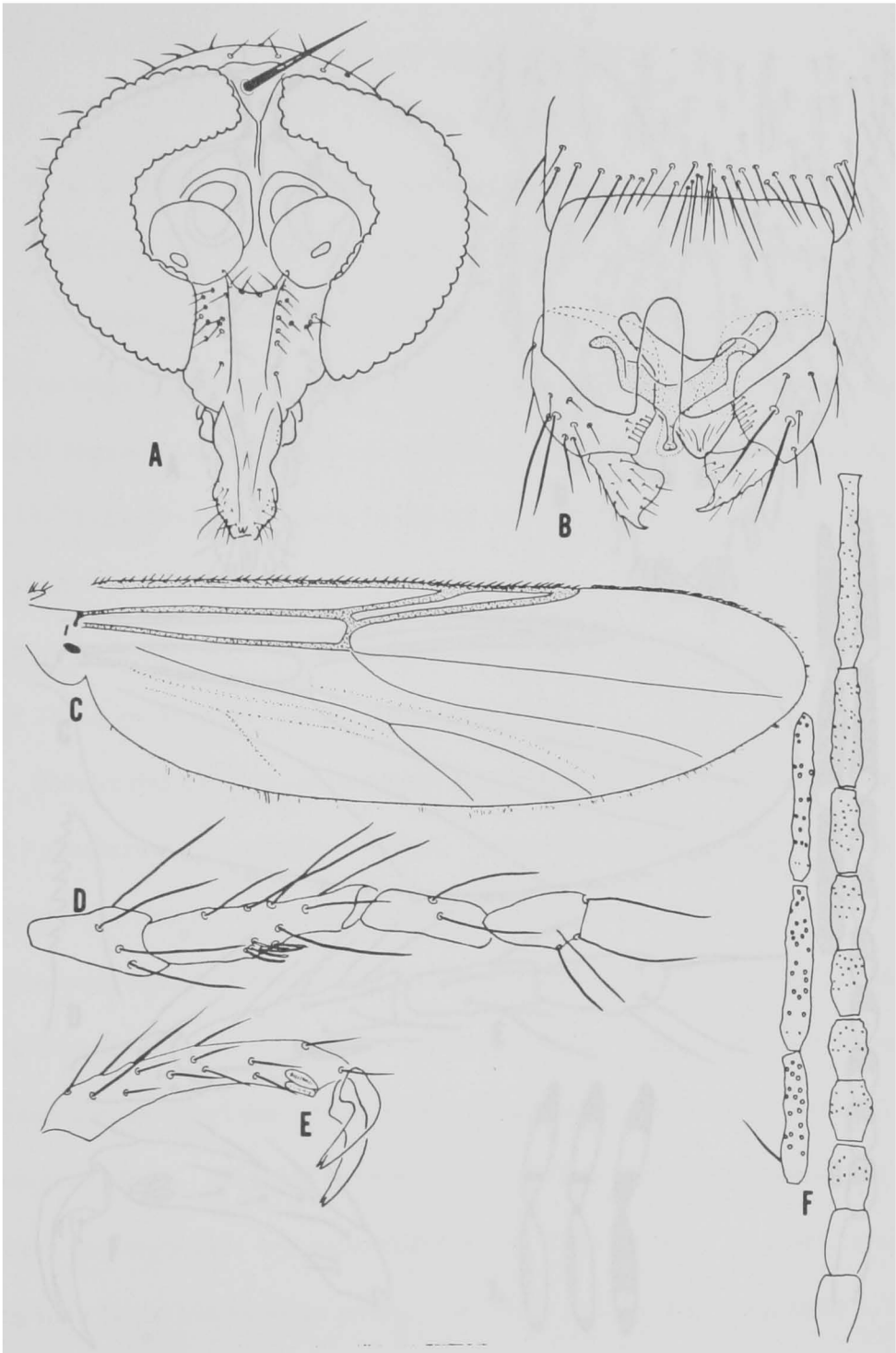


Plate 33 - *B. spicata* n. sp. - M

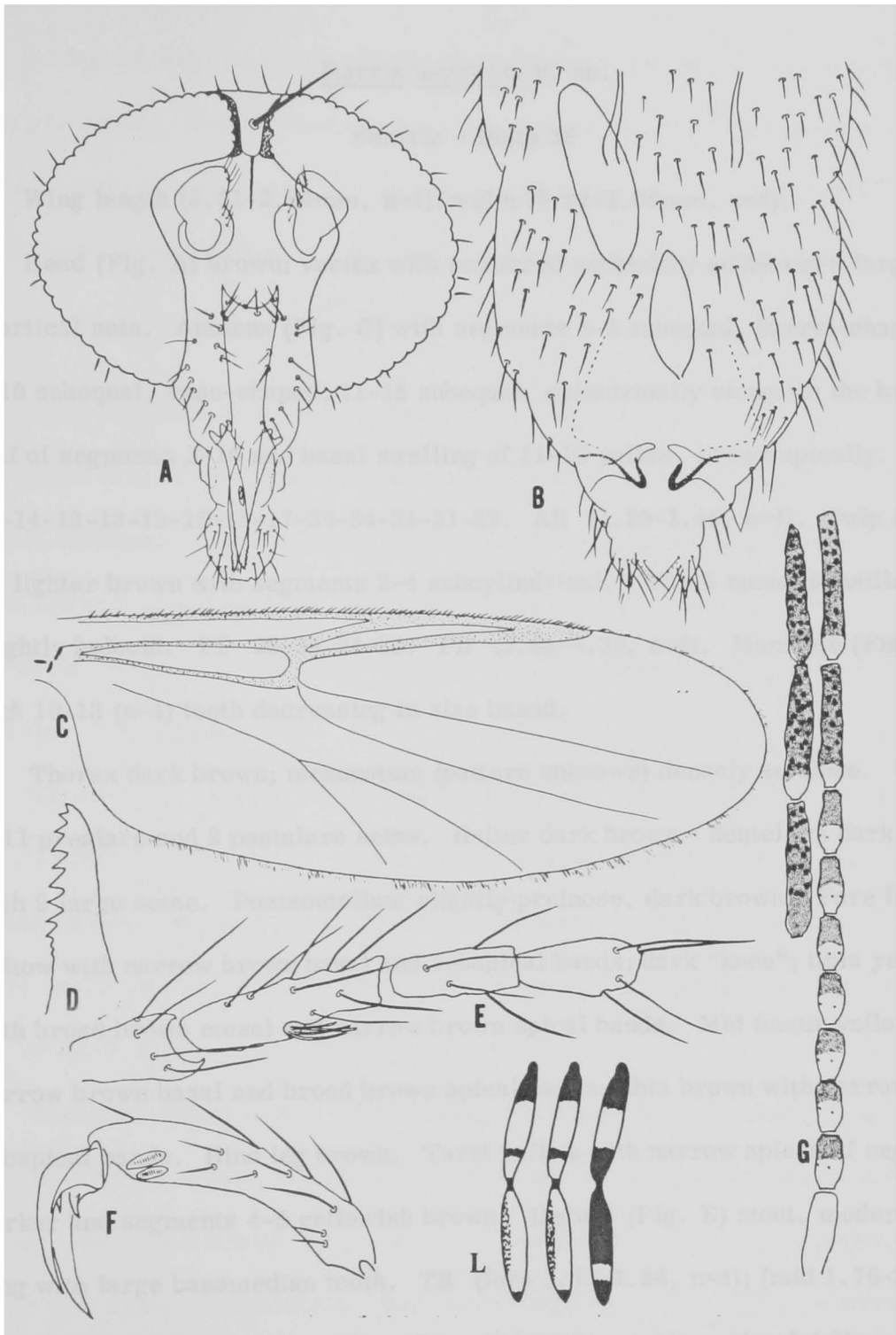


Plate 34 - *B. spicata* n. sp. - F

Bezzia uncistyla n. sp.

Female - Plate 36

Wing length (2.51-2.84mm, n=4); width (0.92-1.00mm, n=4).

Head (Fig. A) brown; vertex with scattered secondary setae and a large mesovertical seta. Antenna (Fig. G) with segments 3-8 subequal, barrel-shaped; 9-10 subequal, vase-shaped; 11-15 subequal, cylindrically elongate; the basal half of segments 3-10 and basal swelling of 11-15 yellow, brown apically. AP 23-14-13-13-13-15-15-17-30-34-34-31-32. AR (1.29-1.45, n=4). Palp (Fig. F) lighter brown with segments 2-4 subcylindrical; 3 with 5 mesal sensilla; 5 slightly bulboid. PP 23-34-24-23. PR (3.33-4.30, n=4). Mandible (Fig. D) with 10-13 (n=4) teeth decreasing in size basad.

Thorax dark brown; mesonotum (pattern unknown) densely setulose. Usually 8-11 prealare and 2 postalare setae. Halter dark brown. Scutellum dark brown with 9 large setae. Postscutellum slightly pruinose, dark brown. Fore femur yellow with narrow brown basal and subapical bands; dark "knee"; tibia yellow with broad brown mesal and narrow brown apical bands. Mid femur yellow with narrow brown basal and broad brown apical bands; tibia brown with narrow yellow subapical bands. Hind leg brown. Tarsi yellow with narrow apices of segments darker and segments 4-5 yellowish brown. Ungues (Fig. E) stout, moderately long with large basomedian tooth. TR (fore 1.73-1.96, n=4); (mid 1.76-2.05, n=4); (hind 2.04-2.21, n=4). Wing (Fig. C) broad; anterior veins faintly yellow; medial fork just sessile. CR (0.70-0.75, n=4).  $R_1$  (0.46-0.52mm, n=4). LCS (0.55-0.67mm, n=4).

Abdomen (Fig. B) dark reddish brown, densely setose. One pair long, hyaline gland rods. Spermathecae: 2 large, unequal, oblong-ovoid with very short ducts. Dimensions: (.154 x .365mm -- .235 x .495mm). Genital sclerotization with lateral processes band-like and mesal process gently hook-like.

Male - Plate 35

Wing length (2.29-2.50mm, n=7); width (0.61-0.71mm, n=7).

Head (Fig. A) with antennal segments (Fig. F) 4-9 subequal, barrel-shaped; 10-11 subequal, subcylindrical; 12-15 subcylindrically elongate; segments yellow with apex of 12 and all of 13-15 brown. Plume golden. AP 23-16-16-17-18-18-23-33-60-32-37-38. AR (0.88-0.97, n=6). Palp (Fig. D) slightly darker than female. PP 21-35-22-22-. PR (2.54-4.20, n=6).

Thorax with 11-13 prealare and 2-3 postalare setae. Scutellar setae longer, stouter than female, 9-12. Legs similar, armed heavier. Ungues (Fig. E) broad, moderately long, apically bifid. TR (fore 1.43-1.75, n=7); (mid 1.54-1.84, n=7); (hind 1.78-2.02, n=7). Wing (Fig. C) with CR (0.65-0.68, n=7).  $R_1$  (0.34-0.43mm, n=7). LCS (0.34-0.40mm, n=7).

Abdomen darker brown than female, densely setose. Genitalia (Fig. B) with tergum 9 broad, short, with lateral lobes reaching about one-half length of basimere. Sternum 9 broad, long, with deep caudomedian excavation, a patch of coarse setae just basad of excavation. Basimere subglobular with about 4 coarse caudolateral setae in addition to finer setae. Telomere stout with basal and apical ends widest, apicomesal extreme rounded, apicolateral extreme a short, hook-like

process, sharply pointed. Parameres a broad, cone-shaped structure apically with broad, blunt, bilateral processes. Aedeagus somewhat tent-shaped with apex sharply pointed and heavily sclerotized.

Discussion: This species is named for the sharp, hook-like process on the apicolateral extreme of the telomere. It is closely related to B. laciniastyla n. sp. Both species have similar leg color patterns. The females are difficult to separate. B. laciniastyla has a generally lighter scutellum with 6 setae while B. uncistyla has a dark scutellum with 9 setae. The female abdominal color is also different with B. uncistyla dark brown as opposed to the brownish yellow of B. laciniastyla. The males are easily separated on the basis of telomere structure and shape of eadeagus.

Type: New Mexico, Taos, l.t., holotype M., allotype, 3 paratype F., 6 paratype M., 27 July 1969, W.W. Wirth.

Distribution: Florida, Montana, Nebraska, New Mexico, New York, Ontario.

Material Studied: See Type.

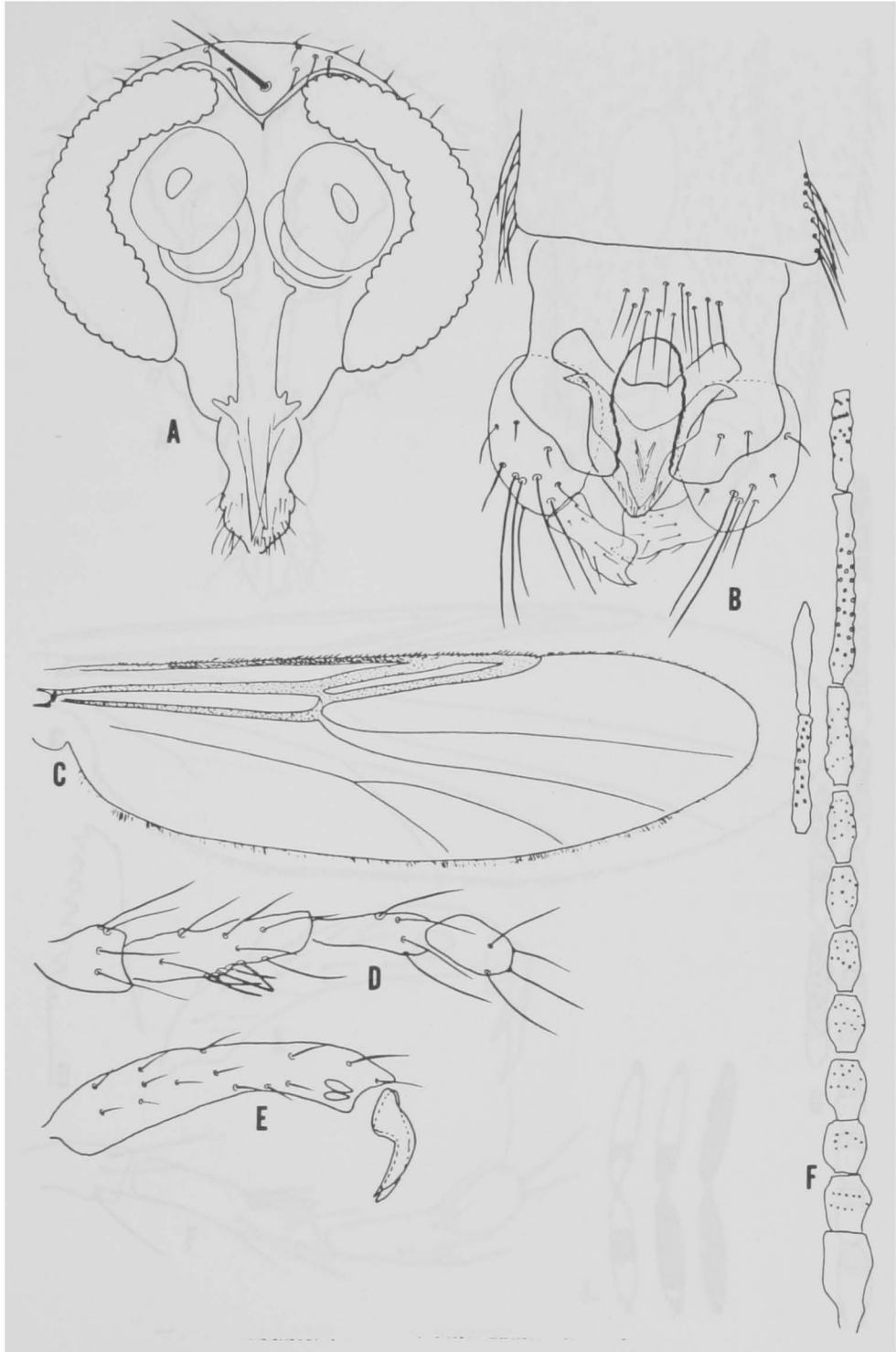


Plate 35 - *B. uncistyla* n. sp. - M

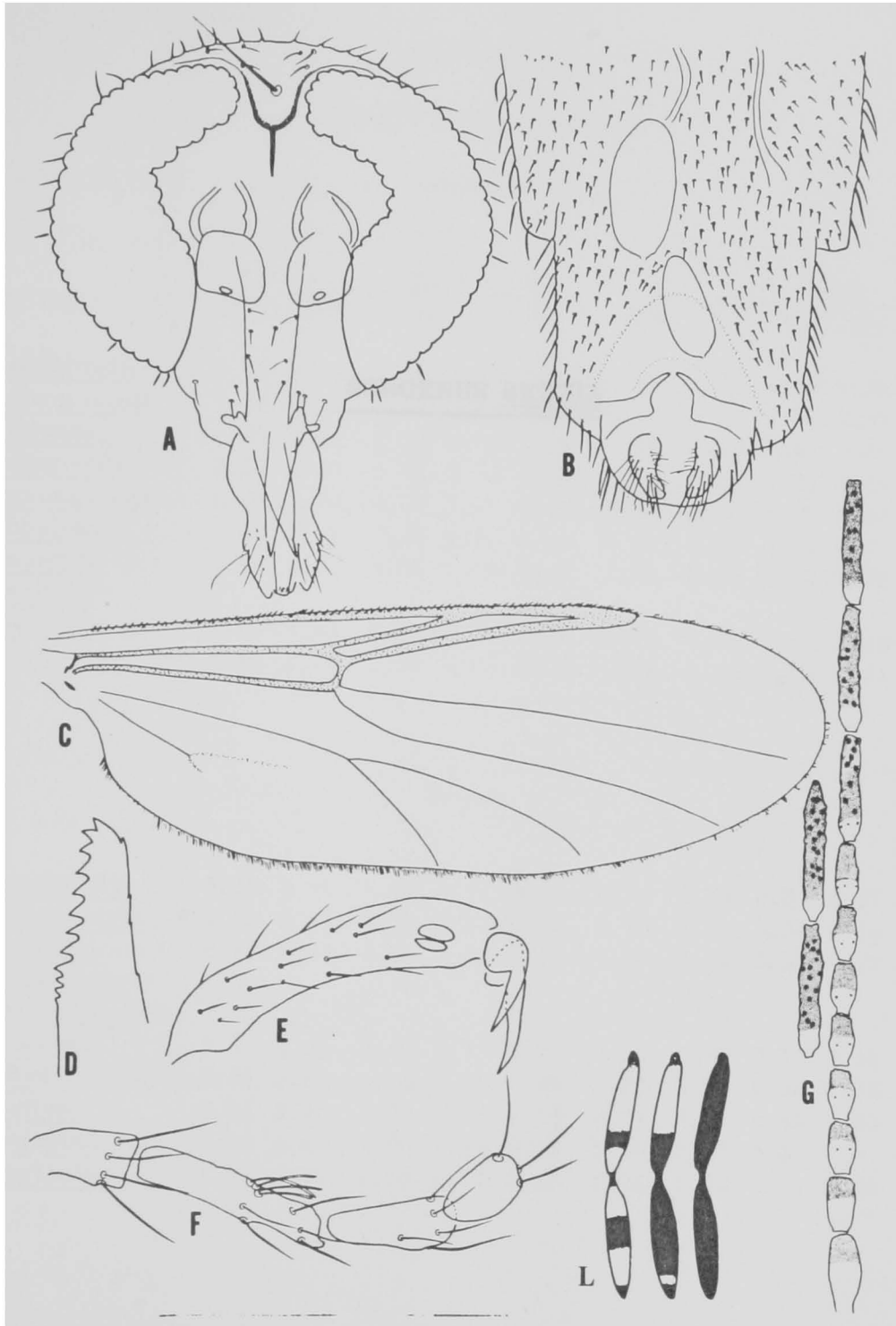


Plate 36 - *B. uncistyla* n. sp. - F

SUBGENUS BEZZIA



Table III

Averages of Measured Data

Females

SPECIES	AR	PR	Tarsal Ratio			CR	Wing			
			Fore	Mid	Hind		L	W	R <sub>1</sub>	LCS
<u>B. cockerelli</u>	0.78	2.48	1.96	2.27	2.32	0.77	2.43	0.80	0.61	0.69
<u>B. dorsasetula</u>	1.31	2.33	1.87	2.44	2.37	0.77	1.37	0.47	0.22	0.40
<u>B. downesi</u>	0.98	3.05	1.93	2.00	2.02	0.72	1.82	0.63	0.31	0.43
<u>B. longiradia</u>	2.24	2.97	2.12	2.26	2.75	0.88	2.68	1.03	0.74	1.05
<u>B. modocensis</u>	0.84	2.92	1.87	2.07	2.42	0.74	2.44	0.72	0.43	0.61
<u>B. obelisca</u>	1.23	2.27	2.33	2.70	2.50	0.72	1.23	0.42	0.17	0.36
<u>B. sordida</u>	0.95	3.03	1.66	2.28	2.57	0.76	2.35	0.76	0.48	0.66
<u>B. suffusa*</u>										
<u>B. unispina</u>	1.02	3.43	1.81	2.14	2.13	0.71	1.85	0.66	0.28	0.47
<u>B. varicolor</u>	1.86	3.15	1.94	2.34	2.47	0.80	2.20	0.78	0.44	0.70

Males

<u>B. cockerelli</u>	0.59	1.85	1.77	2.01	2.09	0.76	1.54	0.54	0.27	0.37
<u>B. dorsasetula</u>	1.03	2.61	1.71	2.34	2.23	0.70	1.21	0.38	0.14	0.29
<u>B. downesi</u>	0.78	2.71	1.84	1.93	2.07	0.64	1.67	0.52	0.27	0.28
<u>B. longiradia*</u>										
<u>B. modocensis*</u>										
<u>B. obelisca</u>	0.84	1.93	2.07	2.42	2.48	0.73	0.82	0.31	0.12	0.21
<u>B. sordida</u>	0.56	2.85	1.95	2.32	2.26	0.76	1.68	0.56	0.33	0.38
<u>B. suffusa</u>	0.91	2.45	1.76	1.88	2.06	0.74	1.63	0.56	0.26	0.34
<u>B. unispina</u>	0.76	3.40	1.89	1.91	1.89	0.65	1.67	0.38		
<u>B. varicolor</u>	1.08	2.77	1.79	2.19	2.16	0.76	1.30	0.45	0.24	0.34

\* Measureable specimens not available.

Bezzia cockerelli Malloch

Female - Plate 38

Bezzia cockerelli Malloch, 1915: 346-347. Johannsen, 1943: 785.

Wing length (1.07-2.63mm, n=4); width (0.66-0.92mm, n=4).

Head (Fig. A) brown; vertex with dense pile. Antenna (Fig. G) brown; segments 4-10 subequal, vase-shaped; 11-15 subequal, cylindrically elongate. AP 28-15-14-13-12-12-12-13-18-18-17-19-19. Palp (Fig. E) slightly lighter than antenna with each segment subcylindrical; 3 with 5 sensilla at faint mesal swelling. PP 23-32-22-29. PR (2.10-2.81, n=4). Mandible (Fig. D) with 11 teeth.

Thorax dark brown; mesonotum with gold, fiddle-shaped area bordered with bright gold; humeral and lateral areas dark brown. Prealare setae 6-11; 1 postalare seta. Halter dark brown. Scutellum brownish yellow with 8 rather fine setae, secondary setae and short pile. Postscutellum dark brown with pile. Legs yellow with coxae, trochanters, "knee" joints and narrow tibial apices brown. Fore femur with 2 short ventral setae. Ungues (Fig. F) rather large, gently curved with prominent basomedian tooth. TR (fore 1.87-2.08, n=4); (mid 2.21-2.36, n=4); (hind 2.20-2.50, n=4). Wing (Fig. C) with prominent yellow anterior veins. CR (0.75-0.79, n=4). R<sub>1</sub> (0.37-0.90mm, n=4). LCS (0.55-0.74mm, n=4).

Abdomen (Fig. B) subshining brown, sparsely setose. Usually 1 pair of short gland rods, reaching only to adjacent segment. Spermathecae: 2 slightly

unqual, subovoid with faint necks. Dimensions: (.056 x .103mm -- .079 x .128mm). Genital sclerotization appearing chelate.

Male - Plate 37

Wing length (1.48-1.57mm, n=4); width (0.50-0.58mm, n=4).

Head (Fig. A) similar to female. Mandible notably developed for the sex.

Antenna (Fig. F) with segments 3-11 subspherical to elongate at segment 11; 12-15 subequal, subcylindrical. Antennal plume sparse, dark golden brown. AP 20-11-11-11-10-10-10-11-11-14-16-17-17. AR (0.55-0.65, n=4). Palp (Fig. D) with proportions 15-22-16-17. PR (1.30-2.09, n=4).

Thorax with mesonotal markings less distinct than female. Prealare setae coarse, 5-11. Ungues (Fig. E) markedly bifid. TR (fore 1.57-1.84, n=4); (mid 2.00-2.04, n=4); (hind 1.96-2.16, n=4). Wing (Fig. C) with CR (0.75-0.78, n=3).  $R_1$  (0.27-0.30mm, n=4). LCS (0.34-0.40mm, n=4).

Abdomen similar to female. Genitalia (Fig. B) large, setose. Tergum 9 apically triangular, lateral lobes well developed, subequal to tergum, moderately setose. Sternum 9 reduced with deep, broad, U-shaped caudomedian excavation. Basimere elongate, subcylindrical with rather long, coarse setae. Telomere stout, basolaterally expanded, apically knobby and blunt, bent at nearly right angle mesad. Parameres an elongate rod apically, basal process as figured. Aedeagus somewhat tent-like, spiculate.

Discussion: The male described and figured in this paper is thought to be B. cockerelli by association. The type female was studied. Females were com-

pared with the type and males associated with them are assumed to be B. cockerelli. The species is easily distinguished by its leg coloration.

Careful comparison of Malloch's (1915) description of B. obscura with that of B. cockerelli and comparison of the type seem to indicate that these two species are indeed one. While only dissection of the terminalia and microscopic examination can positively affirm or disaffirm this hypothesis, they are treated as such in this paper. Since B. cockerelli occurs earliest in the paper, it becomes the senior synonym and takes precedence. Wirth (1951) corroborates the presence of ventral fore femoral spines on Malloch's type of B. obscura.

Type: Malloch (1915), Colorado, Modern, holotype F., 28 May, T.D.A. Cockerell, (INH).

Distribution: Malloch (1915), Colorado, Alaska, Idaho, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Washington.

Material studied: (Pinned) ALASKA, Anchorage, 1F., 19 July 1921, J.M. Aldrich; Valdez, tidal marsh, 1F., 1M., 5 July 1948, R.I. Sailer. COLORADO, Pagasa Spr., hot spr., 1F., 27 May 1969, W.W. Wirth. TENNESSEE, Pass., 1F., 23 July 1917, J.M. Aldrich. IOWA, Ames, 1F., 24 May 1951, W.L. Downes. MICHIGAN, Arenak Co., 1M., R.R. Driesbach; Roosevelt Co., Bainville, 1M., Sheridan Co., Medicine L., 1F., 9 June 1969, W.W. Wirth. MINNESOTA, New Brighton, reared, 1F., 31 May 1934, D. Denning. MONTANA, Sheridan Co., Medicine L., 1F., 9 June 1969, W.W. Wirth. NEBRASKA, Cherry Co., Big Alkali L., 2F., 2 June 1969, W.W. Wirth; Snake Falls, 1F., 5 Aug.

1948, R.R. Dreisbach. NORTH DAKOTA, Burleigh Co., Long L., 2F., 4 June 1969; McHenry Co., 4 mi N. Upham, 1M., 5 June 1969, W.W. Wirth. WASHINGTON, Bellingham, 1M., 31 May 1917, H.G. Dyar; Grant Co., O' Sullivan Dam, 1F., 27 June 1954, N.G. Davis. (slides) IDAHO, Latah Co., Trails pond, reared ex. algal mats, 1M., 22 July 1969, J. Gillespie. MONTANA, Roosevelt Co., Bainville, 1M., 9 June 1969, W.W. Wirth. NEBRASKA, Cherry Co., Hackberry L., 1F., 2 June 1969, W.W. Wirth. NORTH DAKOTA, McHenry Co., 4 mi N. Upham, 3F., 2M., 5 June 1969, W.W. Wirth.

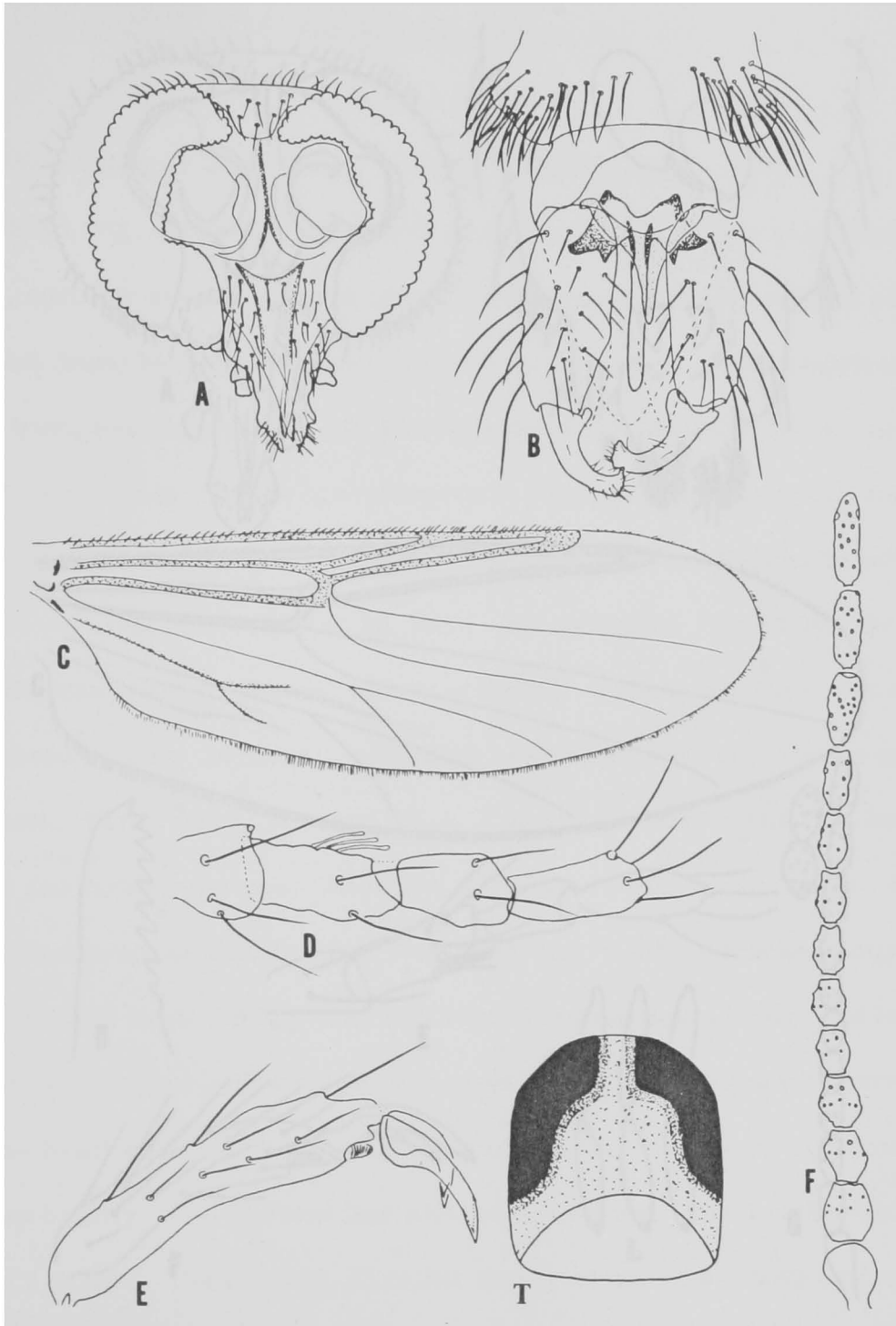


Plate 37 - *B. cockerelli* Malloch - M

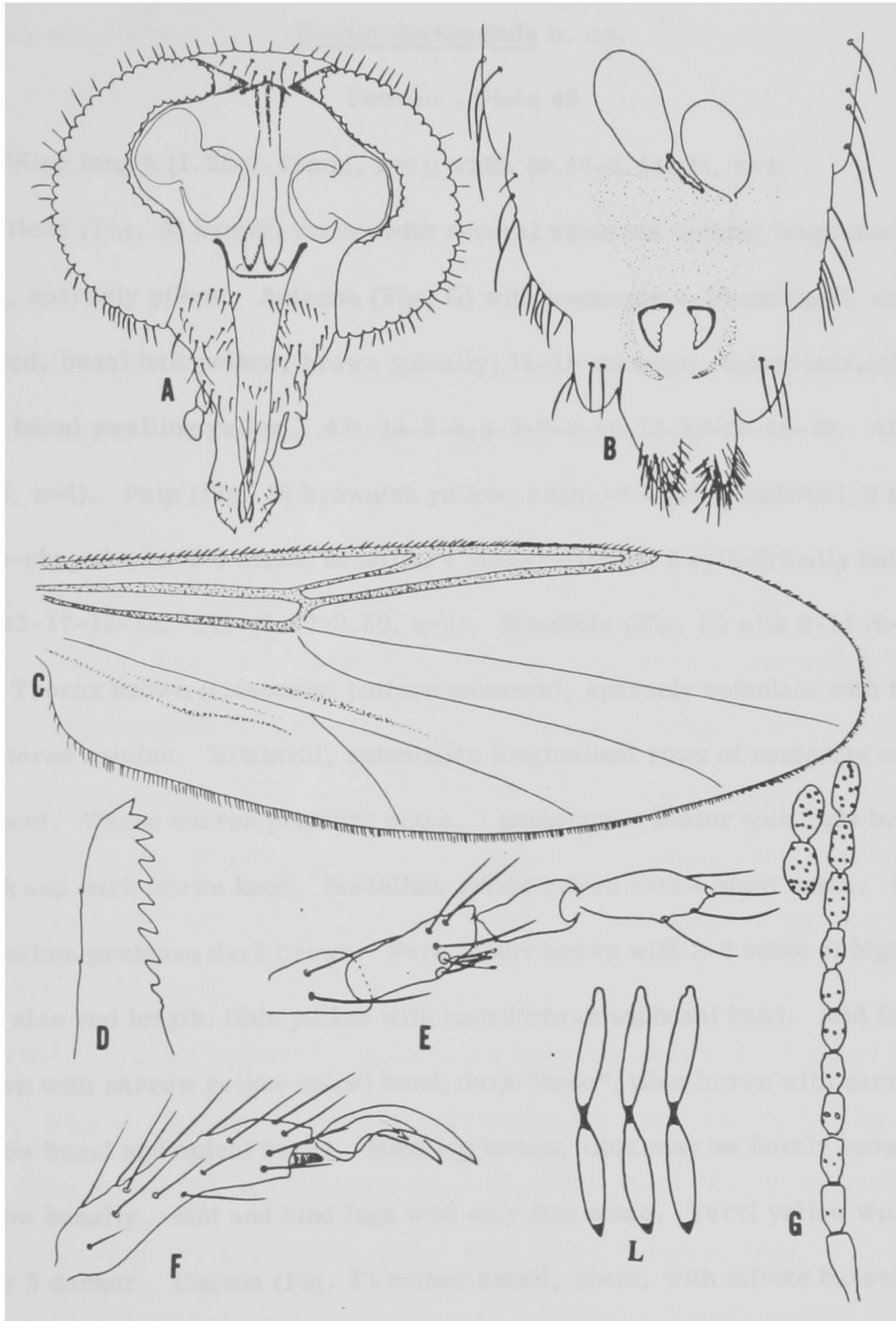


Plate 38 - *B. cockerelli* Malloch - F

Bezzia dorsasetula n. sp.

Female - Plate 40

Wing length (1.25-1.48mm, n=4); width (0.45-0.48mm, n=4).

Head (Fig. A) brown; vertex with several setae but lacking large median seta, sparsely pilose. Antenna (Fig. G) with segments 4-10 subequal, vase-shaped, basal half yellow, brown apically; 11-15 subequal, subcylindrical, brown with basal swelling yellow. AP 14-9-8-8-8-8-9-10-18-18-19-18-19. AR (1.22-1.40, n=4). Palp (Fig. E) brownish yellow; segment 2 subcylindrical; 3 elongate, vase-shaped with 4-5 mesal sensilla; 4 subcylindrical; 5 cylindrically bulboid. PP 12-17-13-15. PR (1.77-2.50, n=3). Mandible (Fig. D) with 9-11 (n=3) teeth.

Thorax brown (mesonotal pattern unknown), sparsely spiculate with few scattered setulae. Bilateral, submedian longitudinal rows of moderate setae present. Three coarse prealare setae, 1 postalare. Hlateral with light brown stalk and dark brown knob. Scutellum pilose brown with 4 short setae. Post-scutellum pruinose dark brown. Fore femur brown with 3-7 setae of highly variable size and length; tibia yellow with broad brown subbasal band. Mid femur brown with narrow yellow apical band; dark "knee"; tibia brown with narrow yellow basal and apical bands. Hind leg brown, tibia may be faintly brownish yellow basally. Mid and hind legs with only fine setae. Tarsi yellow with segment 5 darker. Ungues (Fig. F) rather small, short, with minute basomedian tooth. TR (fore 1.73-1.93, n=4); (mid 2.35-2.57, n=4); (hind 2.32-2.41, n=4). Wing (Fig. C) with anterior veins light brown. Costal setae fine, sparse. M<sub>2</sub>



broadly sessile basad. CR (0.76-0.79, n=4).  $R_1$  (0.21-0.24mm, n=4). LCS (0.34-0.44mm, n=4).

Abdomen (Fig. B) brown with moderate setal vestiture. Two pairs long, hyaline gland rods reaching 3 segments; 1 faint short pair gland rods evident. Spermathecae: 2 subequal, subspherical with short, wrinkled looking ducts; a rudimentary globular third sometimes present. Dimensions: (.041 x .054mm - .041 x .059mm). Genital sclerotizations faint, as figured.

#### Male - Plate 39

Wing length (1.11-1.26mm, n=3); width (0.32-0.41mm, n=3).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 4-10 subequal, barrel-shaped with sparse band of verticels; 11 longer than preceding segments, vase-shaped; 12-15 subequal, subcylindrical with several coarser setae subbasally on 12. Plume sparse, brownish-gold. AP 19-11-11-11-11-11-13-14-21-24-33-37. AR (1.00-1.05, n=3). Palp (Fig. D) with PP 15-21-13-13. PR (2.33-2.87, n=3).

Thorax similar to female. Fore femur more swollen with 2-3 more ventral setae. Ungues (Fig. E) with minute bifurcation apically. TR (fore 1.28-2.00, n=3); (mid 2.16-2.50, n=3); (hind 2.08-2.32, n=3). Wing (Fig. C) with CR (0.62-0.72, n=3).  $R_1$  (0.12-0.15mm, n=3). LCS (0.34-0.44mm, n=3).

Abdomen with terminalia (Fig. B) small; tergum 9 broadly conical with short, broadly rounded lateral lobes. Sternum 9 short, width more than twice the length; a broad, U-shaped, caudomedian excavation present. Basimere as long as ter-

gum 9, apical half cylindrical, basal half with mesal swelling, moderately setose. Telomere moderately setose, broad, stout, apically bent mesad and sharply pointed. Parameres with apical two-thirds rod-like, apex slightly bulbous, basal process bilaterally divergent, slightly bifurcate. Aedeagus subtriangular, the apical third less sclerotized, rounded, lateral margins highly sclerotized, basal arch broad, moderately deep.

Discussion: This species is closely related to B. modocensis but is easily separated by several characters. B. modocensis has a very deep, dense mesonotal pile which this species lacks. The prealare setae of B. modocensis are more numerous and much more coarse than those of B. dorsasetula. B. modocensis lacks the double dorsal row of mesonotal setae of this species. The distinctly varied fore femoral armature is quite unique to B. dorsasetula.

Type: New York, Lewis Co., Brantingham L., Holotype F., 22 June 1963; Enfield, Tompkins Co., allotype, 15 June 1963, W.W. Wirth. Two M., 1 F., paratypes with same data as allotype. New York, Tompkins, Co., Ringwood swamp, 1 paratype F., 16-17 June 1963; McLean Res., sphagnum bog, 1 paratype F., 18 June 1963, W.W. Wirth.

Distribution: New York.

Material Studied: See Type.

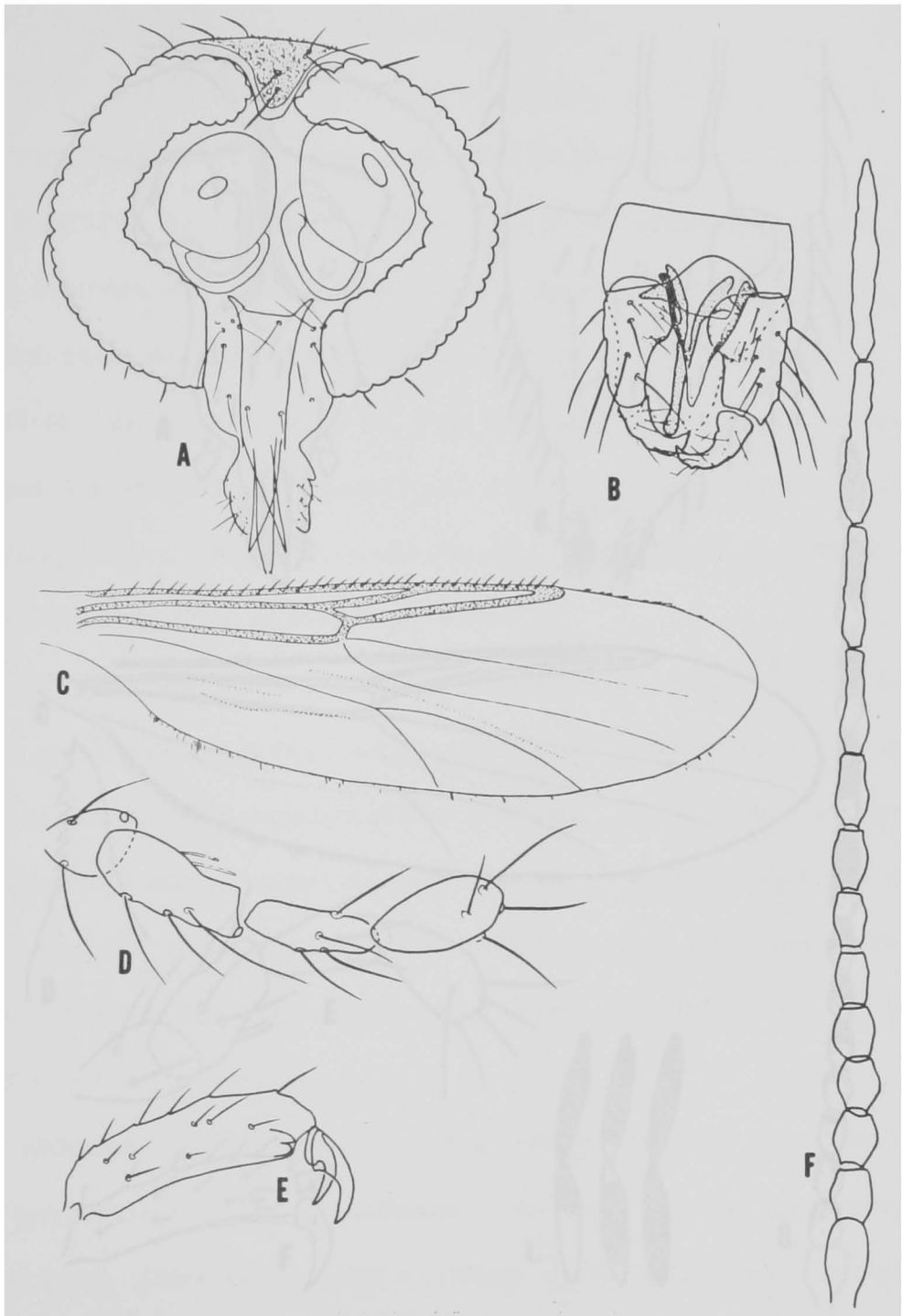


Plate 39 - *B. dorsasetula* n. sp. - M

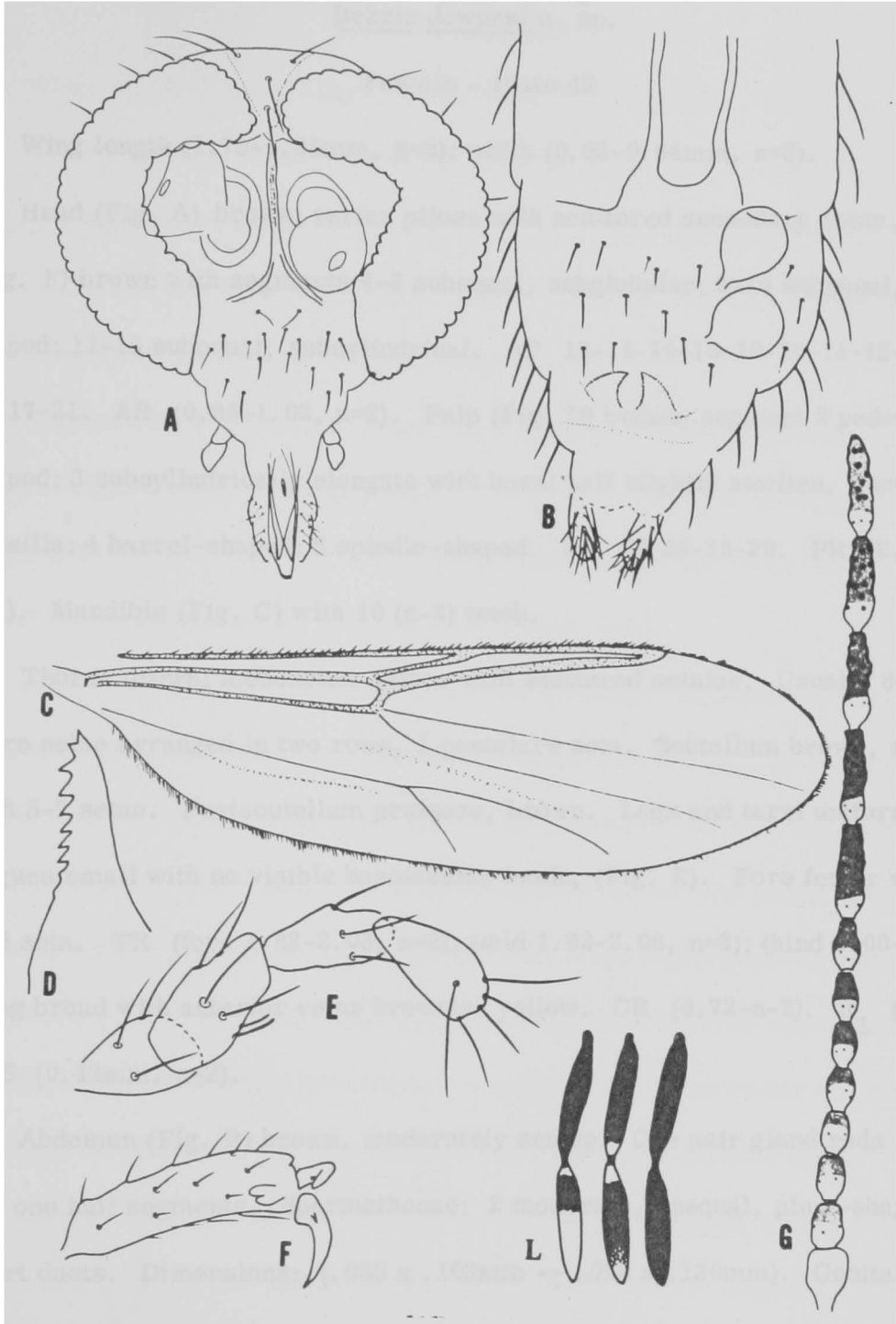


Plate 40 - *B. dorsasetula* n. sp. - F

Bezzia downesi n. sp.

Female - Plate 42

Wing length (1.79-1.85mm, n=2); width (0.63-0.64mm, n=2).

Head (Fig. A) brown; vertex pilose with scattered secondary setae. Antenna (Fig. F) brown with segments 4-8 subequal, subglobular; 9-10 subequal, barrel-shaped; 11-15 subequal, subcylindrical. AP 18-11-10-10-10-10-11-12-16-18-15-17-21. AR (0.95-1.02, n=2). Palp (Fig. D) brown; segment 2 pedestal-shaped; 3 subcylindrically elongate with basal half slightly swollen, 6 mesal sensilla; 4 barrel-shaped; 5 spindle-shaped. PP 22-29-18-20. PR (2.90-3.20, n=2). Mandible (Fig. C) with 10 (n=2) teeth.

Thorax brown; mesonotum pilose with scattered setulae. Usually 8-10 prealare setae arranged in two rows, 1 postalare seta. Scutellum brown, setulose, with 5-7 setae. Postscutellum pruinose, brown. Legs and tarsi uniformly brown. Ungues small with no visible basomedian tooth, (Fig. E). Fore femur with 1 ventral seta. TR (fore 1.82-2.05, n=2); (mid 1.92-2.08, n=2); (hind 2.00-2.03, n=2). Wing broad with anterior veins brownish yellow. CR (0.72-n=2).  $R_1$  (0.31, n=2). LCS (0.43mm, n=2).

Abdomen (Fig. B) brown, moderately setose. One pair gland rods reach 2 and one half segments. Spermathecae: 2 moderate, unequal, plum-shaped with short ducts. Dimensions: (.056 x .103mm -- .066 x .130mm). Genital sclerotizations band-like with basal finger-like projection directed mesad.

Male - Plate 41

Wing length (1.63-1.76mm, n=3); width (0.50-0.53mm, n=3).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 4-9 subequal, subglobular; 10-15 subcylindrical. AP 21-11-11-11-11-12-11-14-21-40-19-17-21. AR (0.75-0.81, n=3). Antennal plume brown. Plap (Fig. D) with PP 20-28-17-23. PR (2.42-2.90, n=3).

Thorax with 6-7 prealare setae and 1 postalare seta. Scutellum with 7-8 setae. Ungues (Fig. E) small, bifid. TR (fore 1.76-2.00, n=3); (mid 1.70-2.36, n=3); (hind 2.00-2.21, n=3). Wing (Fig. C) with CR (0.63-0.64, n=3).  $R_1$  (0.50-0.53mm, n=3). LCS (0.27-0.31mm, n=3).

Abdomen with tergum of genitalia (Fig. B) small, flap-like with rounded, sparsely setose lateral lobes. Sternum 9 broad with narrow, U-shaped caudo-median excavation reaching about mid length, spiculate at base of excavation. Basimere stout, subcylindrical, slightly tapered apicad with scattered fine setae. Telomere short, somewhat coma-shaped with large lobate process extending basolaterad. Parameres a long, stout, rod-shaped structure with lateral margins heavily sclerotized; basal processes butterfly-shaped. Aedeagus a tripartite structure with basal arms lyre-shaped; caudal process appears bifid.

Discussion: This species is very similar to B. unispina n. sp. But, it is easily separated by the shaped of the telomere of the male genitalia. The females are more difficult to separate. The Extended duct of the spermatheca should distinguish this species from females of B. unispina.

Type: Maine, Mt. Katahdin, Holotype M., allotype, 1 July 1968, D. R. Oliver; 2 M., 1 F., paratypes with same data, (CNC).

Distribution: Maine, Alaska.

Material Studied: See Type.

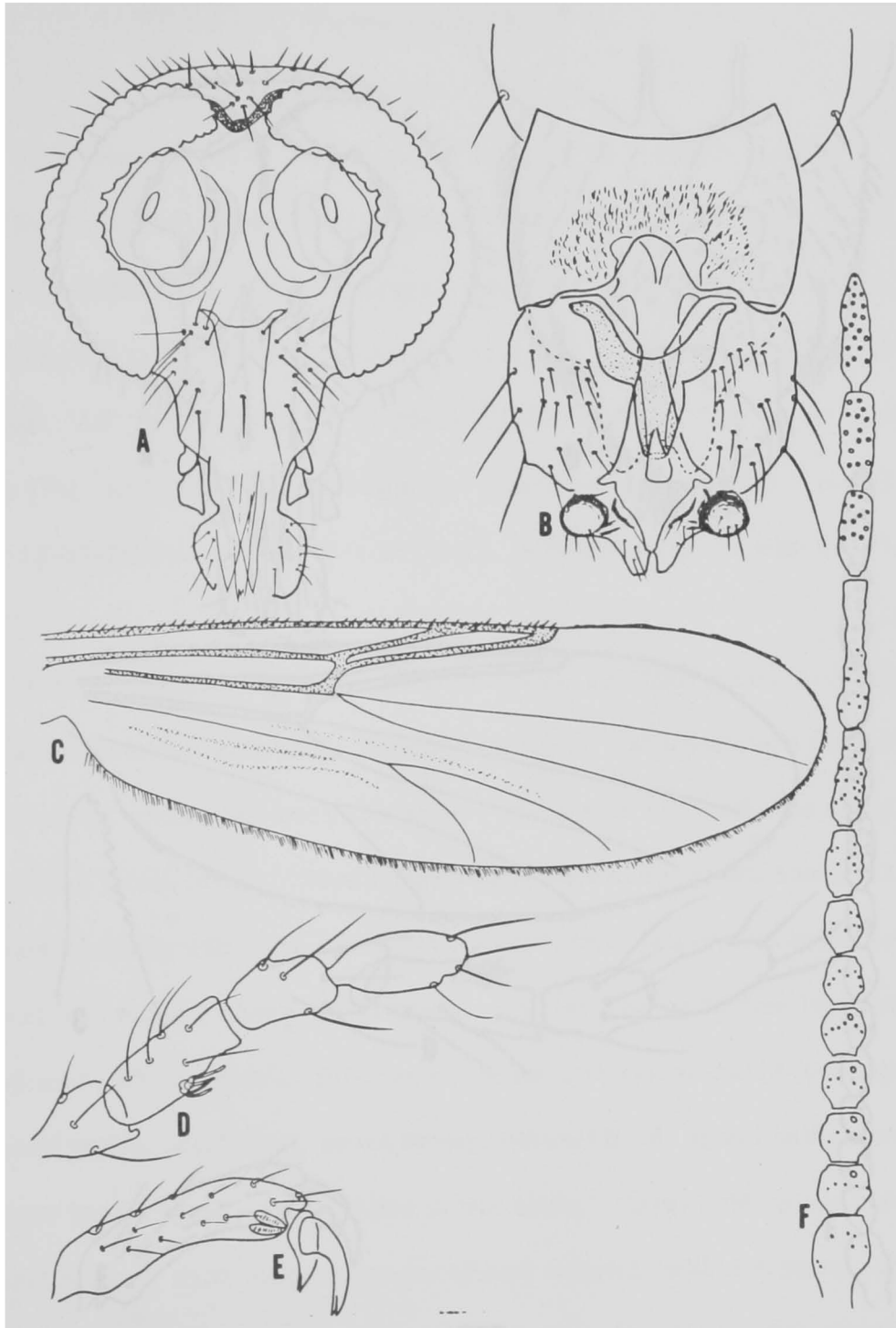


Plate 41 - *B. downesi* n. sp. - M



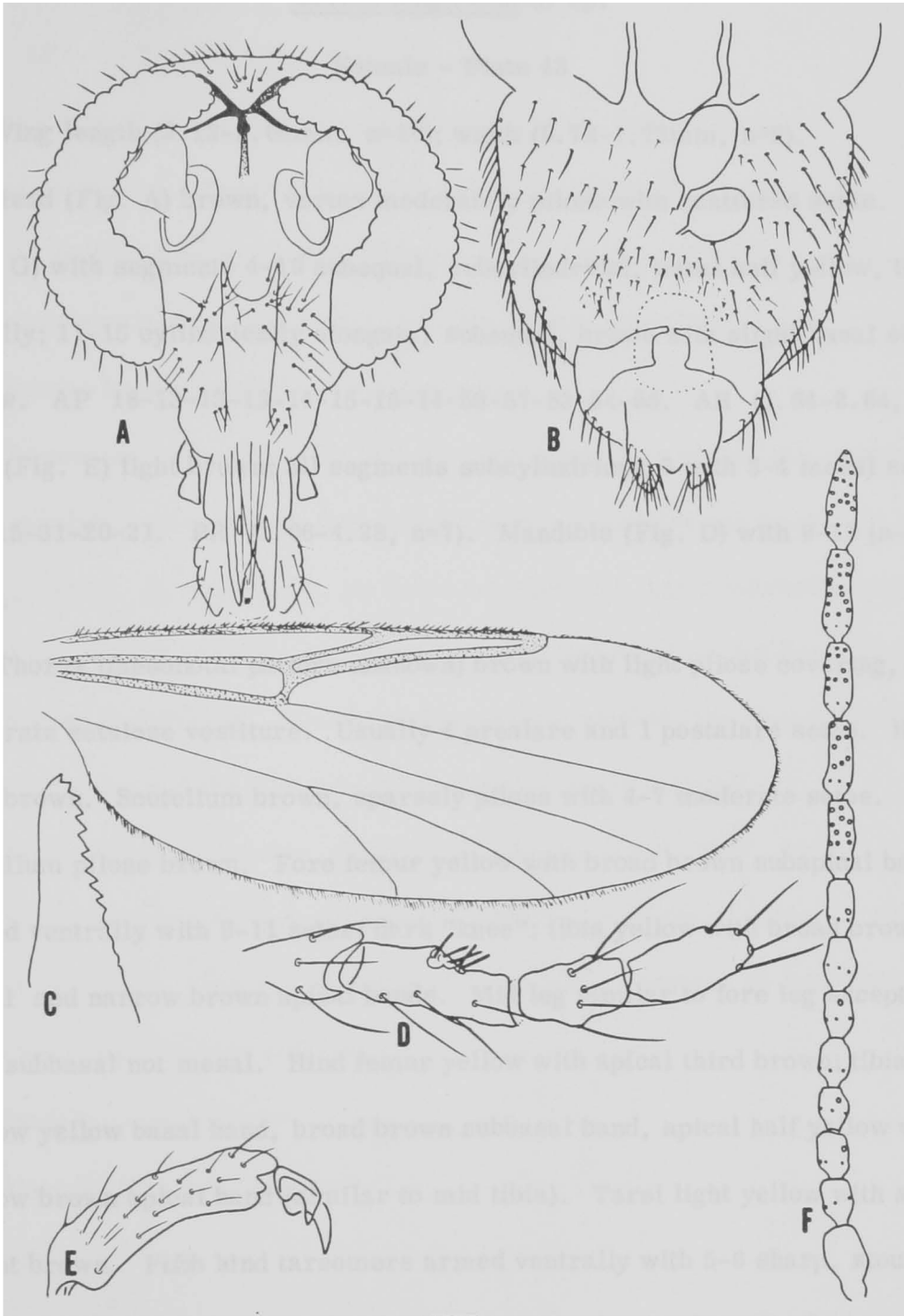


Plate 42 - *B. downesi* n. sp. - F

Bezzia longiradia n. sp.

Female - Plate 43

Wing length (2.13-3.09mm, n=10); width (0.72-1.73mm, n=9).

Head (Fig. A) brown, vertex moderately pilose with scattered setae. Antenna (Fig. G) with segments 4-10 subequal, subcylindrical, basal half yellow, brown apically; 11-15 cylindrically elongate, subequal, brown with slight basal swelling yellow. AP 18-13-13-13-14-15-15-14-53-57-53-54-55. AR (1.64-2.64, n=7). Palp (Fig. E) light brown; all segments subcylindrical; 3 with 3-4 mesal sensilla. PP 15-31-20-21. PR (2.06-4.28, n=7). Mandible (Fig. D) with 9-11 (n=10) teeth.

Thorax (mesonotal pattern unknown) brown with light pilose covering, and moderate setulose vestiture. Usually 4 prealare and 1 postalare setae. Halter light brown. Scutellum brown, sparsely pilose with 4-7 moderate setae. Post-scutellum pilose brown. Fore femur yellow with broad brown subapical band, armed ventrally with 9-11 setae; dark "knee"; tibia yellow with broad brown mesal and narrow brown apical bands. Mid leg similar to fore leg except tibial band subbasal not mesal. Hind femur yellow with apical third brown; tibia with narrow yellow basal band, broad brown subbasal band, apical half yellow with narrow brown apical band (similar to mid tibia). Tarsi light yellow with segment 5 light brown. Fifth hind tarsomere armed ventrally with 5-6 sharp, stout setae. Ungues (Fig. F) long, slender with small basomedian tooth. TR (fore 1.88-2.35, n=10); (mid 2.06-2.44, n=10); (hind 2.33-3.00, n=10). Wing (Fig. C) broad with anterior veins very light yellow; costal setae numerous, fine. Radial cell very

long, extending nearly to apex of wing. CR (0.79-0.98, n=10).  $R_1$  (0.74-0.80, n=7). LCS (0.67-1.80mm, n=8).

Abdomen (Fig. B) ochreous, sparsely setose. One pair gland rods extend to base of segment 3. Spermathecae: 2 subequal, subpyriform with ducts extended to about radius of basal portion. Dimensions: (.041 x .074mm -- .046 x .098mm). Genital sclerotizations somewhat claw-like mesad, band-like laterad. Accessory depressions basolaterad of sclerotizations.

Discussion: The extensive yellow of the leg pattern places this species close to B. sordida. Even though this species is known only for the female, it is easily distinguished. B. longiradia, as the name indicates, has a markedly longer radial cell than B. sordida and can readily be separated on that basis alone. The leg banding is different. Female genital sclerotizations, the shape and dimensions of the antennae and the fifth hind tarsomere all differ markedly.

Type: Ontario, London, Holotype F., 25 July 1958, W.W. Judd; 1 F., paratype with same data as type collected at each of the following dates; 9, 10, 12, 13, 18, 19, 21, July. One F., paratype 28 May; 1 F., paratype 26 July 1960 with other data same as type (USNM).

Distribution: Ontario

Material Studied: See Type.

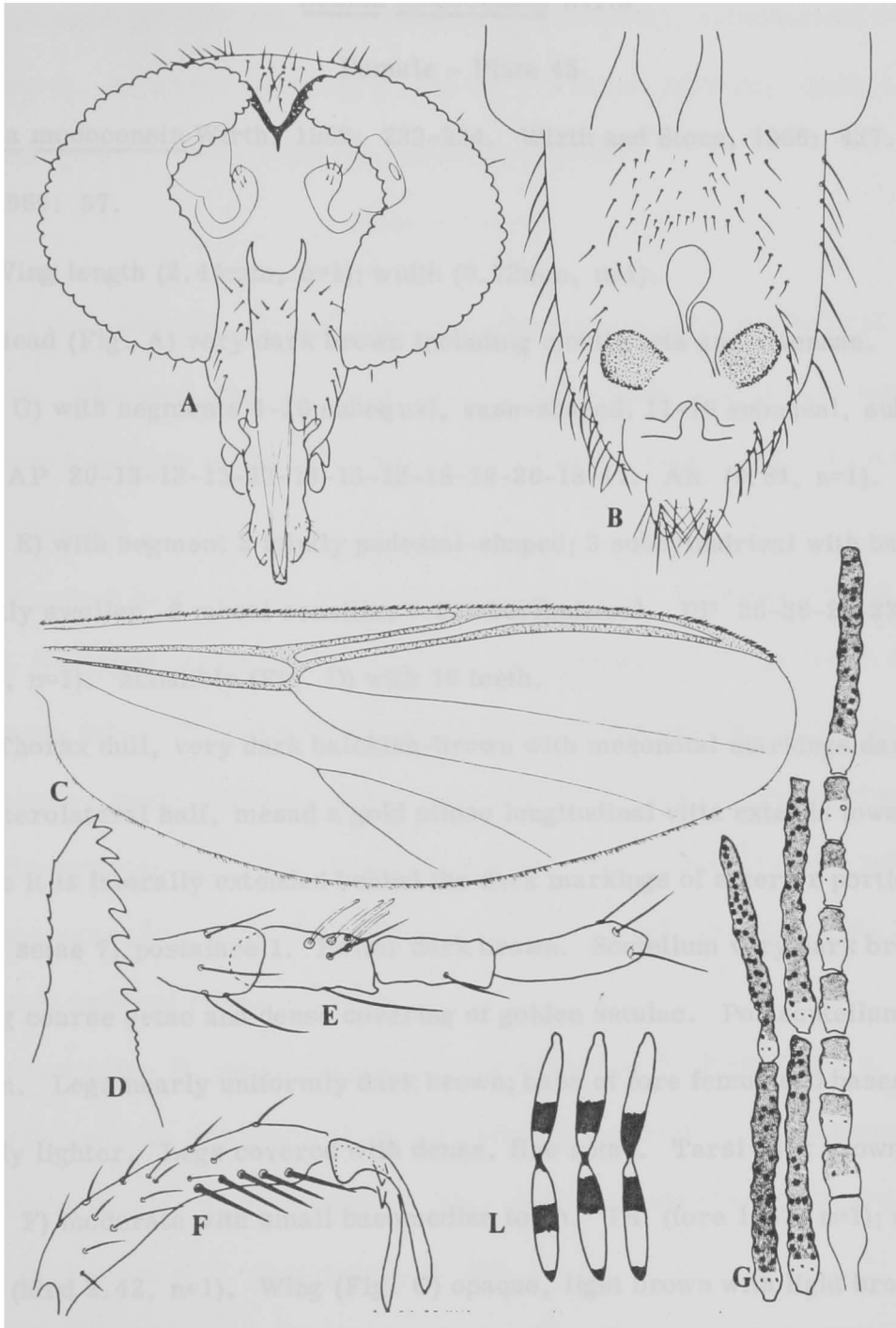


Plate 43 - *B. longiradia* n. sp. - F

Bezzia modocensis Wirth

Female - Plate 45

Bezzia modocensis Wirth, 1952: 233-234. Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (2.44mm, n=1); width (0.72mm, n=1).

Head (Fig. A) very dark brown including mouthparts and antennae. Antenna (Fig. G) with segments 4-10 subequal, vase-shaped; 11-15 subequal, subcylindrical. AP 20-13-13-13-13-13-13-12-18-19-20-18-17. AR (0.84, n=1). Palp (Fig. E) with segment 2 faintly pedestal-shaped; 3 subcylindrical with basal half slightly swollen, 6 mesal sensilla; 4-5 subcylindrical. PP 25-38-22-23. PR (2.92, n=1). Mandible (Fig. D) with 10 teeth.

Thorax dull, very dark blackish-brown with mesonotal markings dark brown on anterolateral half, mesad a gold pilose longitudinal vitta extends toward disc where it is laterally extended behind the dark markings of anterior portions. Prealare setae 7, postalare 1. Halter dark brown. Scutellum very dark brown with 4 long coarse setae and dense covering of golden setulae. Postscutellum dull, dark brown. Legs nearly uniformly dark brown; base of fore femur and bases of tibiae faintly lighter. Legs covered with dense, fine setae. Tarsi dark brown. Ungues (Fig. F) moderate with small basomedian tooth. TR (fore 1.87, n=1); (mid 2.07, n=1); (hind 2.42, n=1). Wing (Fig. C) opaque, light brown with light brown anterior veins. CR (0.74, n=1).  $R_1$  (0.43mm, n=1). LCS (0.61mm, n=1).

Abdomen (Fig. B) subshining blackish brown with minute golden setae. Two pair long gland rods extend nearly 3 segments, a third short pair extend no fur-

ther than segment of origin. Spermathecae: 2 subequal, subspherical with very short ducts. Dimensions: (.049 x .049mm -- .049 x .069mm). Genital sclerotizations rather broadly T-shaped, laterally opposed.

Male - Plate 44

The genitalia (Fig. B) are taken from the slide mounted genitalia of the pinned allotype. The head (Fig. A), wing (Fig. C) and antenna (Fig. E) are taken from a specimen found late in the study and identified as B. modocensis. No measurements are presented.

Tergum 9 long, narrow with narrow lateral lobes. Sternum 9 short, with broad, U-shaped caudomedian excavation reaching about half the length of segment. Basimere subcylindrical with pronounced basomedian swelling. Telomere moderate, setose, knobby looking, apically sharp and bent mesad. Parameres a long, rod-like structure apically. Aedeagus a broad, subconical structure with apical extreme enlarged. In all other aspects the male closely resembles the female. The male antennal plume is brown.

Discussion: B. modocensis is closely related to B. dorsasetula n. sp. The highly varied size and length of the fore femoral armature of B. dorsasetula easily distinguish it from B. modocensis. Other distinguishing characters are presented in the discussion of B. dorsasetula, p. 128.

Type: Wirth (1952), California, Modoc Co., Dismal Swamp, swept at stream marg., 8000', Holotype F., allotype, 15 July 1948, W. W. Wirth, (USNM).

Distribution: Wirth (1952), California.

Material Studied: (pinned) allotype and 2 F., paratypes with same data as type; (slide) 1 F., paratype with same data.

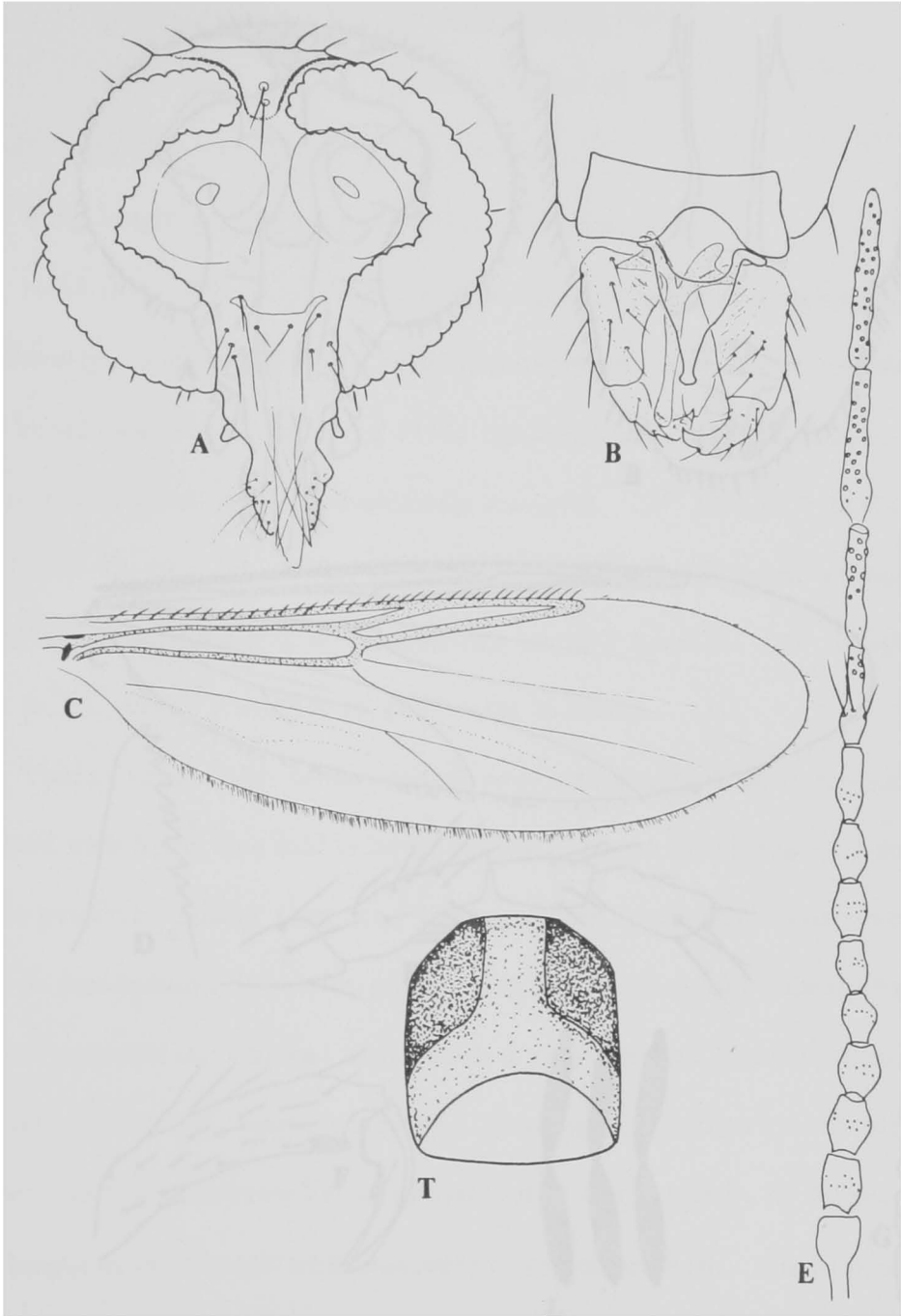


Plate 44 - *B. modocensis* Wirth - M



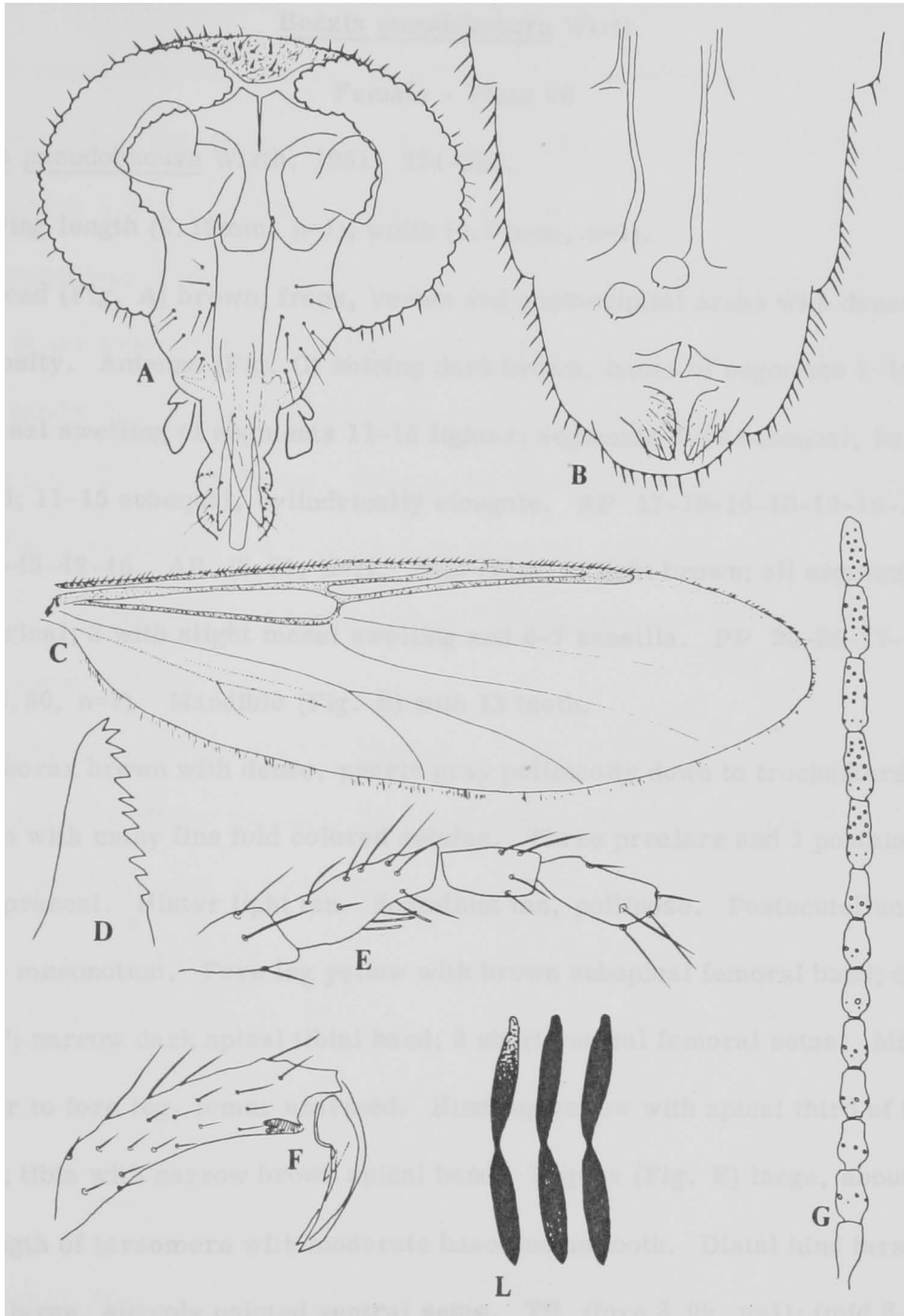


Plate 45 - *B. modocensis* Wirth - F

Bezzia pseudobscura Wirth

Female - Plate 46

Bezzia pseudobscura Wirth, 1951: 324-325.

Wing length (2.19mm, n=1); width (0.74mm, n=1).

Head (Fig. A) brown; frons, vertex and postoccipital areas with dense gray pollinosity. Antenna (Fig. G) shining dark brown, bases of segments 3-10 lighter and basal swelling of segments 11-15 lighter; segments 3-10 subequal, barrel-shaped; 11-15 subequal, cylindrically elongate. AP 17-10-10-10-10-10-11-12-50-45-43-42-46. AR (2.51, n=1). Palp (Fig. F) light brown; all segments subcylindrical; 3 with slight mesal swelling and 6-7 sensilla. PP 20-25-17-16. PR (2.50, n=1). Mandible (Fig. B) with 13 teeth.

Thorax brown with dense, pearly gray pollinosity down to trochanters. Mesonotum with many fine fold colored setulae. Three prealare and 1 postalare setae present. Hlateral light tan. Scutellum tan, pollinose. Postscutellum similar to mesonotum. Fore leg yellow with brown subapical femoral band; dark "knee"; narrow dark apical tibial band; 2 short ventral femoral setae. Mid leg similar to fore leg, femur unarmed. Hind leg yellow with apical third of femur brown; tibia with narrow brown apical band. Ungues (Fig. E) large, about half the length of tarsomere with moderate basomedian tooth. Distal hind tarsomere with 3 large, sharply pointed ventral setae. TR (fore 2.09, n=1); (mid 2.39, n=1); (hind 2.80, n=1). Wing (Fig. D) opaque with anterior veins faintly yellow. CR (1.26, n=1).  $R_1$  (0.46mm, n=1). LCS (0.62mm, n=1).

Abdomen (Fig. C) with light tan dorsum covered with fine, gold setae. Venter with apical half dark brown, basal half tan. Two pairs indistinct long, hyaline gland rods. Spermathecae: 2 subequal, subovoid with short ducts.

Dimensions: (.049 x .064mm -- .049 x .074mm).

Discussion: This species is closely related to B. varicolor due to the similarity of leg coloration. B. varicolor is easily separated by the broad brown mesal bands on fore and mid tibiae, apical half of hind femur and broad subbasal band of hind tibia being brown. Differences also exist in the shape of head sclerotizations and the shape of the female genital sclerotizations.

Type: Wirth (1951), Virginia, Falls Church, holotype F., July-Aug. 1950, W.W. Wirth, (USNM).

Distribution: Wirth (1951), Virginia.

Material Studied: (pinned) 2F. paratypes 4 Aug. 1950, same data as type; (slide) 1F. paratype, same data.

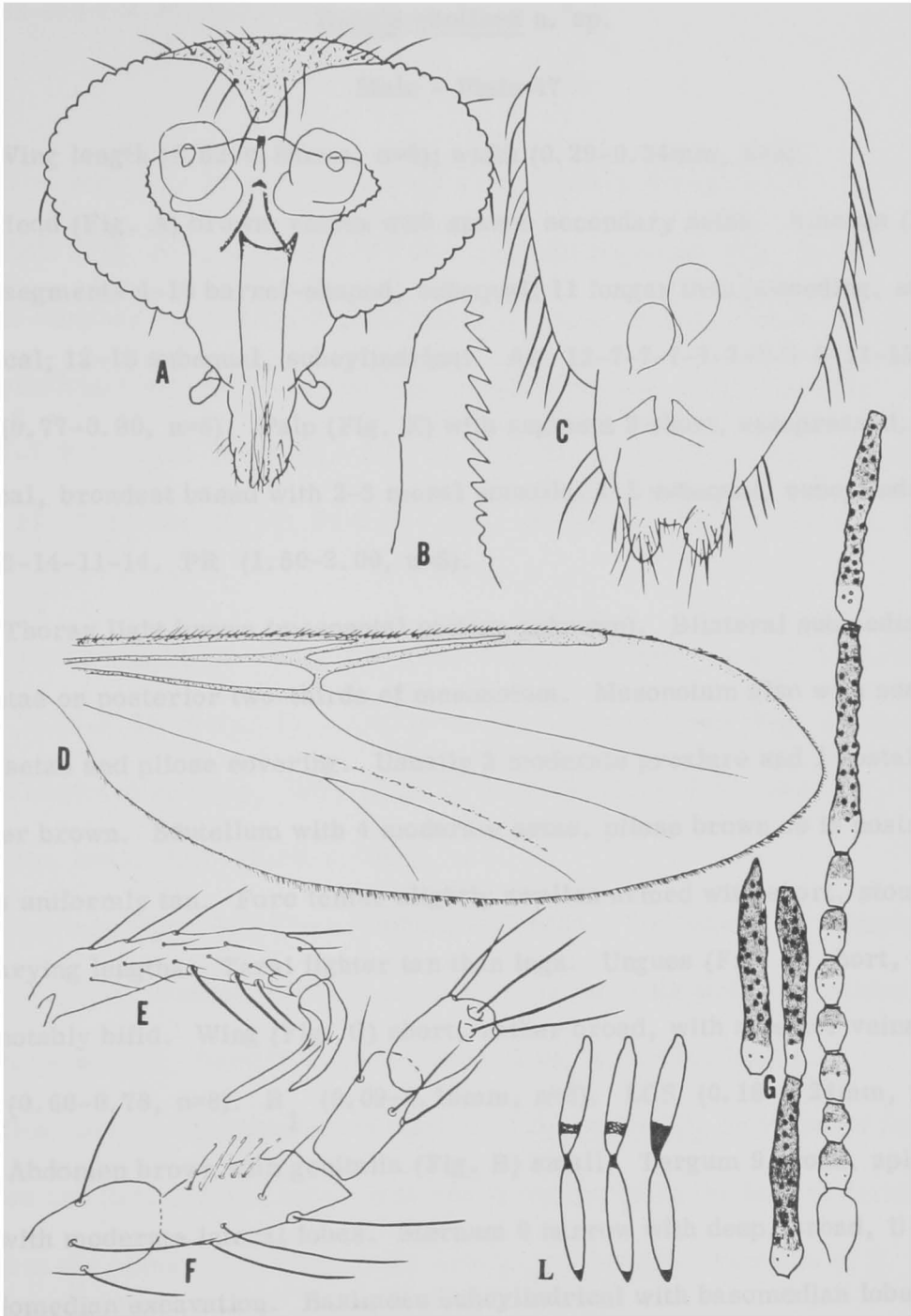


Plate 46 - *B. pseudobscura* Wirth - F

Bezzia obelisca n. sp.

Male - Plate 47

Wing length (0.62-0.89mm, n=8); width (0.29-0.34mm, n=8).

Head (Fig. A) brown; vertex with sparse secondary setae. Antenna (Fig. F) with segments 4-10 barrel-shaped, subequal; 11 longer than preceding, subcylindrical; 12-15 subequal, subcylindrical. AP 13-7-7-7-7-7-7-7-8-11-13-14-21. AR (0.77-0.90, n=8). Palp (Fig. E) with segment 2 short, compressed; 3 subconical, broadest basad with 2-3 mesal sensilla; 4-5 subequal, subcylindrical. PP 9-14-11-14. PR (1.50-2.00, n=5).

Thorax light brown (mesonotal pattern unknown). Bilateral submedian rows of setae on posterior two-thirds of mesonotum. Mesonotum also with scattered, fine setae and pilose covering. Usually 3 moderate prealare and 1 postalare setae. Halter brown. Scutellum with 4 moderate setae, pilose brown as is postscutellum. Legs uniformly tan. Fore femur slightly swollen armed with short, stout setae of varying lengths. Tarsi lighter tan than legs. Ungues (Fig. D) short, small, not notably bifid. Wing (Fig. C) short, rather broad, with anterior veins light tan. CR (0.66-0.78, n=8).  $R_1$  (0.09-0.15mm, n=8). LCS (0.18-0.24mm, n=7).

Abdomen brown with genitalia (Fig. B) small. Tergum 9 broad, apically conical with moderate lateral lobes. Sternum 9 narrow with deep, broad, U-shaped, caudomedian excavation. Basimere subcylindrical with basomedian lobe, sparsely setose. Telomere setose, basally broad, apical half bent mesad, knobby appearing with sharply pointed tip. Fused parameres form a long, baseball-bat-shaped structure apically, with simple, expanded, bilateral basal processes. Aedeagus a broad,

obelisk-shaped structure with reduced basal arms.

Female - Plate 48

Wing length (1.20-1.26mm, n=4); width (0.40-0.43mm, n=4).

Head (Fig. A) similar to male with antennal segments (Fig. G) 4-10 subequal, barrel-shaped, the basal half each segment yellow, brown apically; 11-15 subequal, subcylindrical with slight yellow basal swelling yellow, brown apically. AP 13-7-7-7-7-7-7-14-15-14-14-21. AR (1.86-2.71, n=4). Palp (Fig. E) with proportions 12-19-13-13. PR (1.86-2.71, n=4). Mandible (Fig. D) with 9-11 (n=4) teeth.

Thorax similar to male. TR (fore 2.00-2.55, n=3); (mid 2.58-2.92, n=4); (hind 2.37-2.60, n=4). Fifth hind tarsomere short; ungues (Fig. F) short with small basomedian tooth. Wing (Fig. C) with CR (0.68-0.75, n=4).  $R_1$  (0.15-0.18mm, n=4). LCS (0.32-0.40mm, n=4).

Abdomen (Fig. B) without visible gland rods. Two subequal, subspherical and a vestigial rounded third spermathecae present with wrinkled looking ducts shortly extended. Genital sclerotizations faint, somewhat lobate.

Discussion: This species is similar to B. cockerelli by virtue of its dark halteres and light colored legs. It is easily separated by the lack of darkened areas at the apices of the femora as with B. cockerelli. Females of B. cockerelli have rather large, oval spermathecae as opposed to the spherical spermathecae of this species. The male genitalia are easily separated. The aedeagus of B. cockerelli is short, narrow, spiculate while that of B. obelisca is broad, long

long, obelish-shaped. B. cockerelli lacks the basomedian swelling of the basimere.

Type: New York, Tompkins Co., McLean Res., sphagnum bog, holotype M., allotype, 7M., 3F., paratypes, 19 June 1963, W.W. Wirth, (USNM).

Distribution: New York.

Material Studied: (slides) see type.

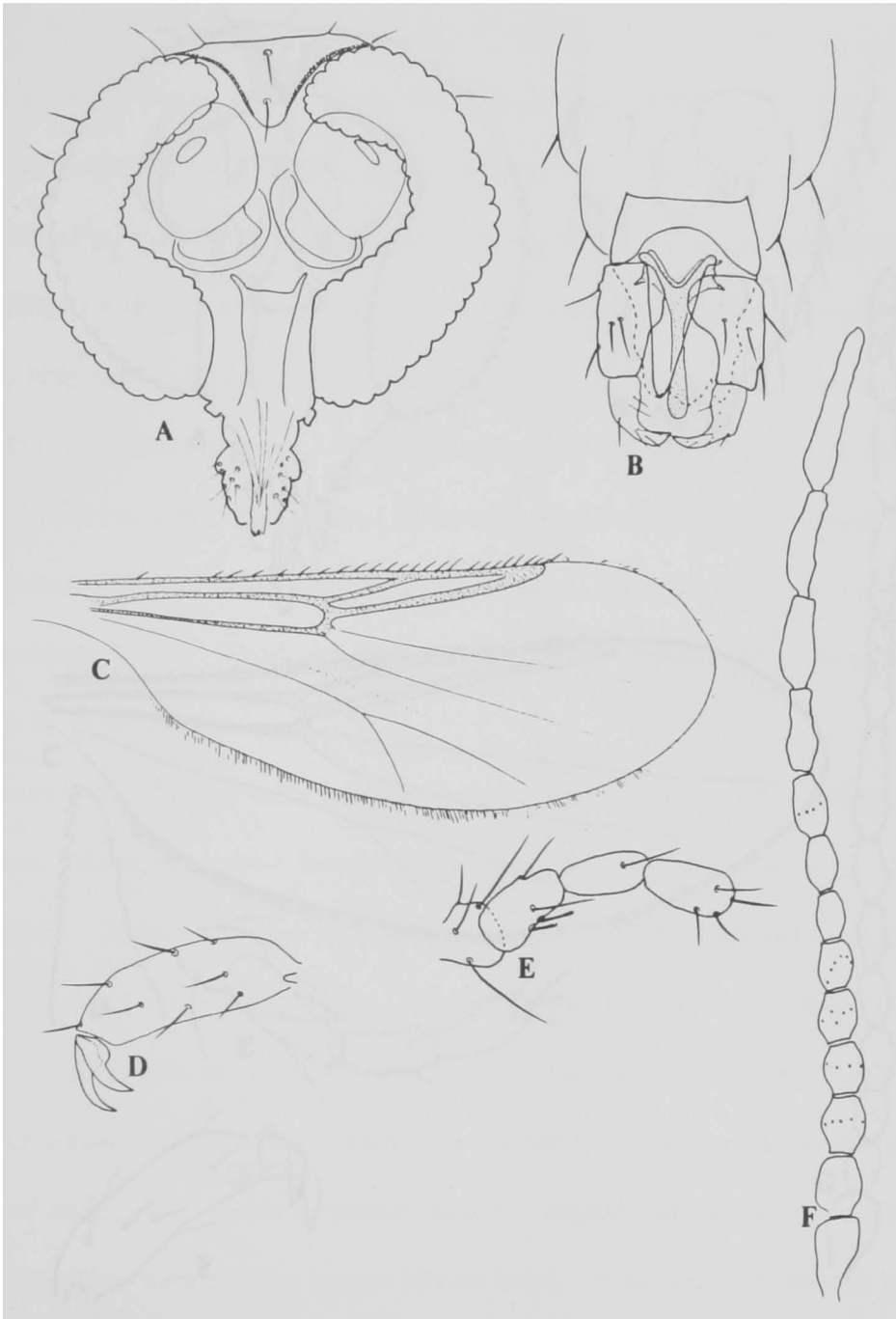


Plate 47 - *B. obelisca* n. sp. - M



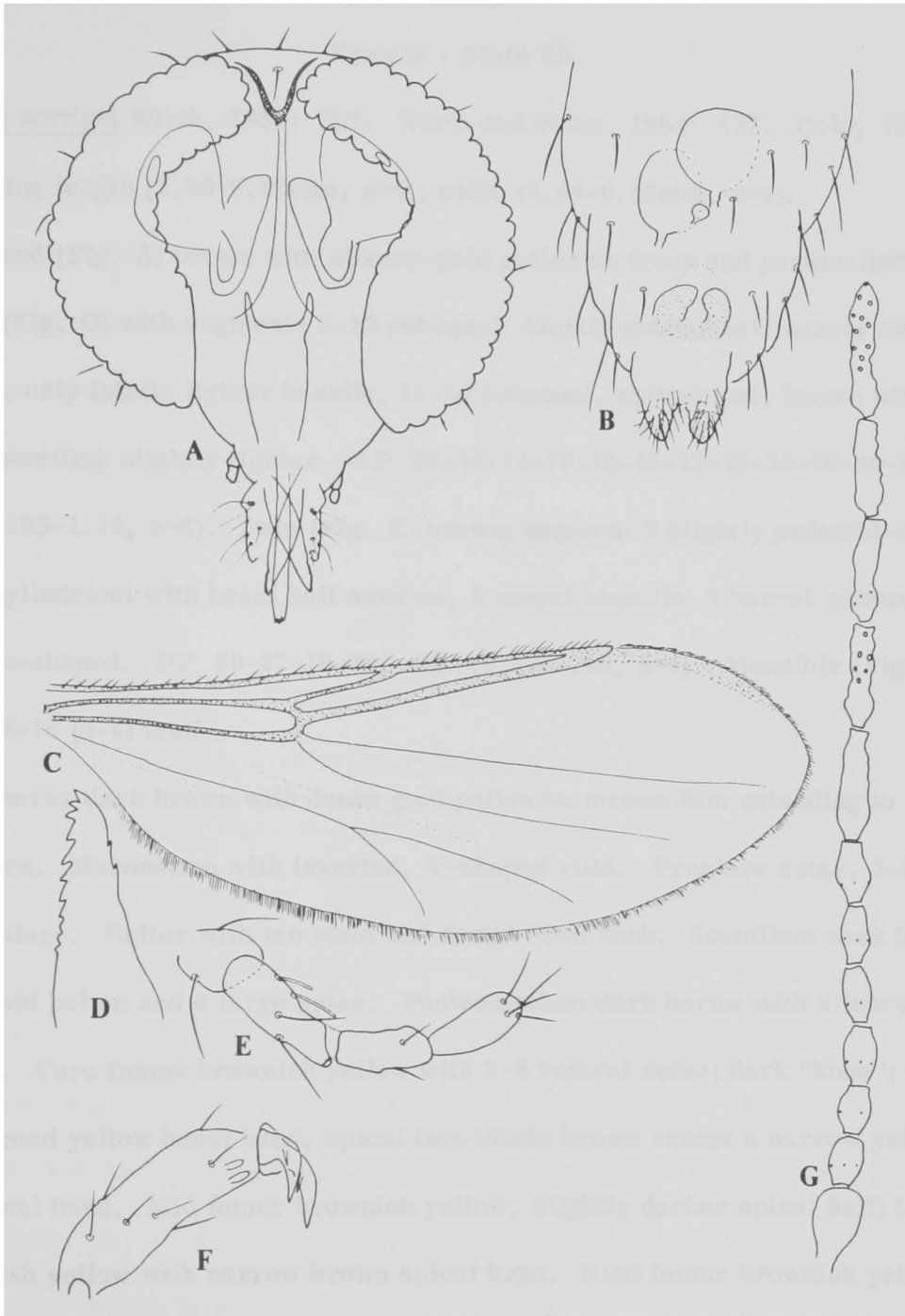


Plate 48 - *B.obelisca* n. sp. - F

Bezzia sordida Wirth

Female - Plate 50

Bezzia sordida Wirth, 1952: 227. Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (2.00-2.49mm, n=4); width (0.64-0.83mm, n=4).

Head (Fig. A) brown with silvery-gold pollen on frons and postocciptus. Antenna (Fig. G) with segments 3-10 subequal, bluntly subconical, nearly totally brown, only faintly lighter basally; 11-15 subequal, cylindrical, brown with faint basal swelling slightly lighter. AP 22-14-14-13-13-13-12-13-20-20-20-21-25. AR (0.85-1.14, n=4). Palp (Fig. E) brown; segment 2 slightly pedestal-shaped; 3 subcylindrical with basal half swollen, 5 mesal sensilla; 4 barrel-shaped; 5 spindle-shaped. PP 20-27-16-22. PR (2.30-3.80, n=4). Mandible (Fig. D) with 12-15 (n=4) teeth.

Thorax dark brown with dense gold pollen on mesonotum extending to trochanters. Mesonotum with inverted, Y-shaped vitta. Prealare setae, 3-6, and 1 postalare. Halter with tan stem and dark brown knob. Scutellum dark brown with gold pollen and 6 large setae. Postscutellum dark brown with silvery-gold pollen. Fore femur brownish yellow with 3-5 ventral setae; dark "knee"; tibia with broad yellow basal band, apical two-thirds brown except a narrow yellow subapical band. Mid femur brownish yellow, slightly darker apical half; tibia brownish yellow with narrow brown apical band. Hind femur brownish yellow with apical third brown; tibia with basal half brown, apical half yellow with narrow brown apical band. Tarsi brownish yellow, apices of basal 2 segments dark and segments 3-5 dark. Ungues (Fig. F) stout with small basomedian tooth. TR

(fore 1.48-1.82, n=4); (mid 2.04-2.46, n=4); (hind 2.40-3.03, n=4). Fifth hind tarsomere with 3 pair sharp ventral setae. Wing (Fig. C) opaque brown, anterior veins brown, costal setae dense. CR (0.75-0.78, n=4).  $R_1$  (0.43-0.49mm, n=4). LCS (0.56-0.71mm, n=4).

Abdomen (Fig. B) subshining, very dark brown, nearly black, with gold setulae and smaller spiculae. Two pair gland rods reach about two segments; a faint, vestigial third pair sometimes visible. Spermathecae: 2, subequal, subspherical with ducts extended. Dimensions: (.039 x .071mm -- .049 x .079mm). Genital sclerotizations like opposing boot-shaped structures.

#### Male - Plate 49

Wing length (1.42-2.07mm, n=3); width (0.51-0.64mm, n=3).

Head with sparse, dark brown antennal plume. Antenna (Fig. E) with segments 3-11 subequal, vase-shaped; 12-15 subequal, subcylindrical, slightly longer than basal segments. AP 23-13-13-13-11-11-11-11-11-14-19-14-21. AR (0.54-0.58, n=2). Palp with proportions 15-23-18-20. PR (2.50-3.18, n=3).

Thorax similar to female with fainter mesonotal and leg markings. Tarsi with bifid ungues (Fig. D). TR (fore 1.85-2.05, n=3); (mid 2.27-2.38, n=3); (hind 2.05-2.38, n=3). Wing (Fig. B) with sparser costal setae. CR (0.75-0.78, n=3).  $R_1$  (0.25-0.43mm, n=3). LCS (0.34-0.43mm, n=3).

Abdomen with tergum 9 of genitalia (Fig. A) short, rounded, conical; lateral lobes large, setose, apically rounded. Sternum 9 short, with shallow caudo-median excavation. Basimere short, subconical with prominent basomedian

swelling. Telomere stout, long, equal to length of basimere, apically dorso-ventrally flattened, setose. Parameres an uneven rod-like structure apically, basal process as figured. Aedeagus subtriangular, apically hyaline with lateral and basal margins heavily sclerotized.

Discussion: B. sordida seems close to B. longiradia n. sp. It is readily separated by having a much shorter radial cell than that species. Other differences are presented in the discussion of that species.

Type: Wirth (1952), California, San Luis Obispo Co., Oceano Beach, swept ex. pond margin, holotype F., 20 Aug. 1948, W. W. Wirth (USNM).

Distribution: Wirth (1952), California, Idaho.

Material Studied: Allotype, 1F. paratype, 19 Aug., 2F., paratypes, 20 Aug., other data similar. (slides) 2F., 3M., paratypes same data as type; Black Lake Canyon, swept ex. trees at lake marg., 1F., 22 Aug. 1948, W.W. Wirth. IDAHO, Latah Co., Trails Pond, 1F., 22 July 1969, J. Gillespie.

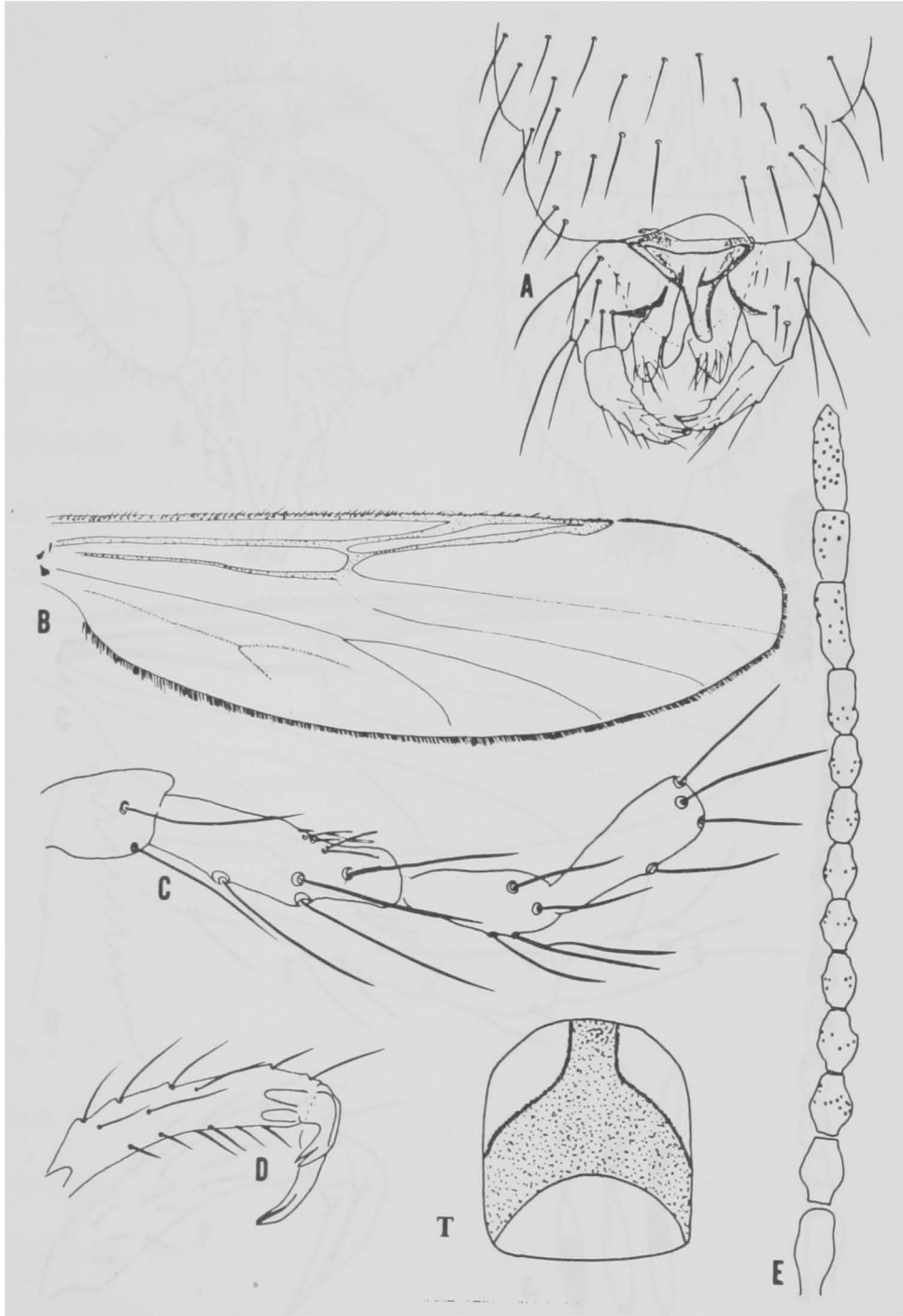


Plate 49 - *B. sordida* Wirth - M

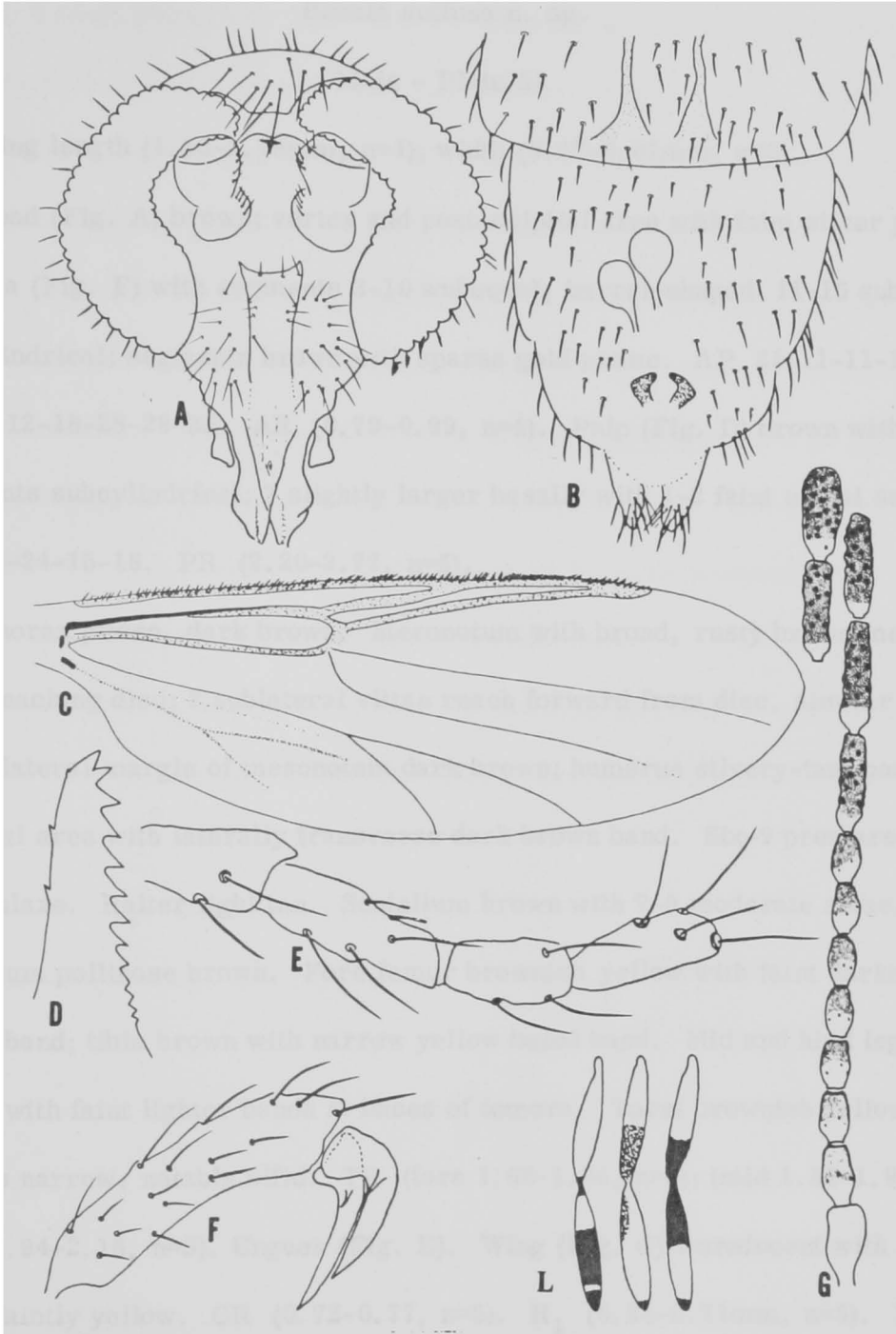


Plate 50 - *B. sordida* Wirth - F

*Bezzia suffusa* n. sp.

Male - Plate 51

Wing length (1.36-1.78mm, n=4); width (0.47-0.61mm, n=5).

Head (Fig. A) brown; vertex and postoccipital area with faint silver pile.

Antenna (Fig. F) with segments 3-10 wubequal, barrel-shaped; 11-15 subequal, subcylindrical; segments brown with sparse gold plume. AP 21-11-11-11-11-11-12-11-12-18-28-29-25. AR (0.79-0.99, n=4). Palp (Fig. D) brown with all segments subcylindrical; 3 slightly larger basally with 1-2 faint mesal sensilla. PP 15-24-15-18. PR (2.20-2.77, n=5).

Thorax pilose, dark brown. Mesonotum with broad, rusty brown median vitta reaching disc; 2 sublateral vittae reach forward from disc, similar color; anterolateral margin of mesonotum dark brown; humerus silvery-tan; post-humeral area with laterally transverse dark brown band. Six-9 prealare setae, 1 postalare. Halter light tan. Scutellum brown with 7-9 moderate setae. Post-scutellum pollinose brown. Fore femur brownish yellow with faint darker sub-apical band; tibia brown with narrow yellow basal band. Mid and hind legs dark brown with faint lighter bands at bases of femora. Tarsi brownish yellow.

Ungues narrow, notably bifid. TR (fore 1.66-1.94, n=5); (mid 1.84-1.91, n=5); (hind 1.94-2.16, n=5). Ungues (Fig. E). Wing (Fig. C) translucent with anterior veins faintly yellow. CR (0.72-0.77, n=5).  $R_1$  (0.24-0.31mm, n=5). LCS (0.24-0.40mm, n=5).

Abdomen subshining dark brown, sparsely setose. Genitalia (Fig. B) with

tergum 9 long, broad with large lateral lobes reaching midlength of telomere. Sternum 9 short, with broad, U-shaped caudomedian excavation. Basimere somewhat conical with large basomedian lobe. Telomere subequal to length of basimere, basally expanded, apically narrowed, sharply pointed. Parameres with apical process rod-like, somewhat swollen apically, basal processes wing-like. Aedeagus triangular, with basolateral extremes highly sclerotized.

Discussion: This species is closest to B. pseudobscura and B. varicolor. It is distinguished from both by its brown, unbanded legs. The telomeres are distinct. The basomedian lobe of the basimere is more prominent than B. varicolor. The mesonotal pattern is also characteristic.

Type: Canada, Manitoba, Churchill, holotype M., 4 slide mounted, 6 pinned paratype M., 12 July 1953, J.A. Downes; 1 paratype M., same locality, 1951, (CNC).

Distribution: Manitoba, Churchill.

Material Studied: See type.



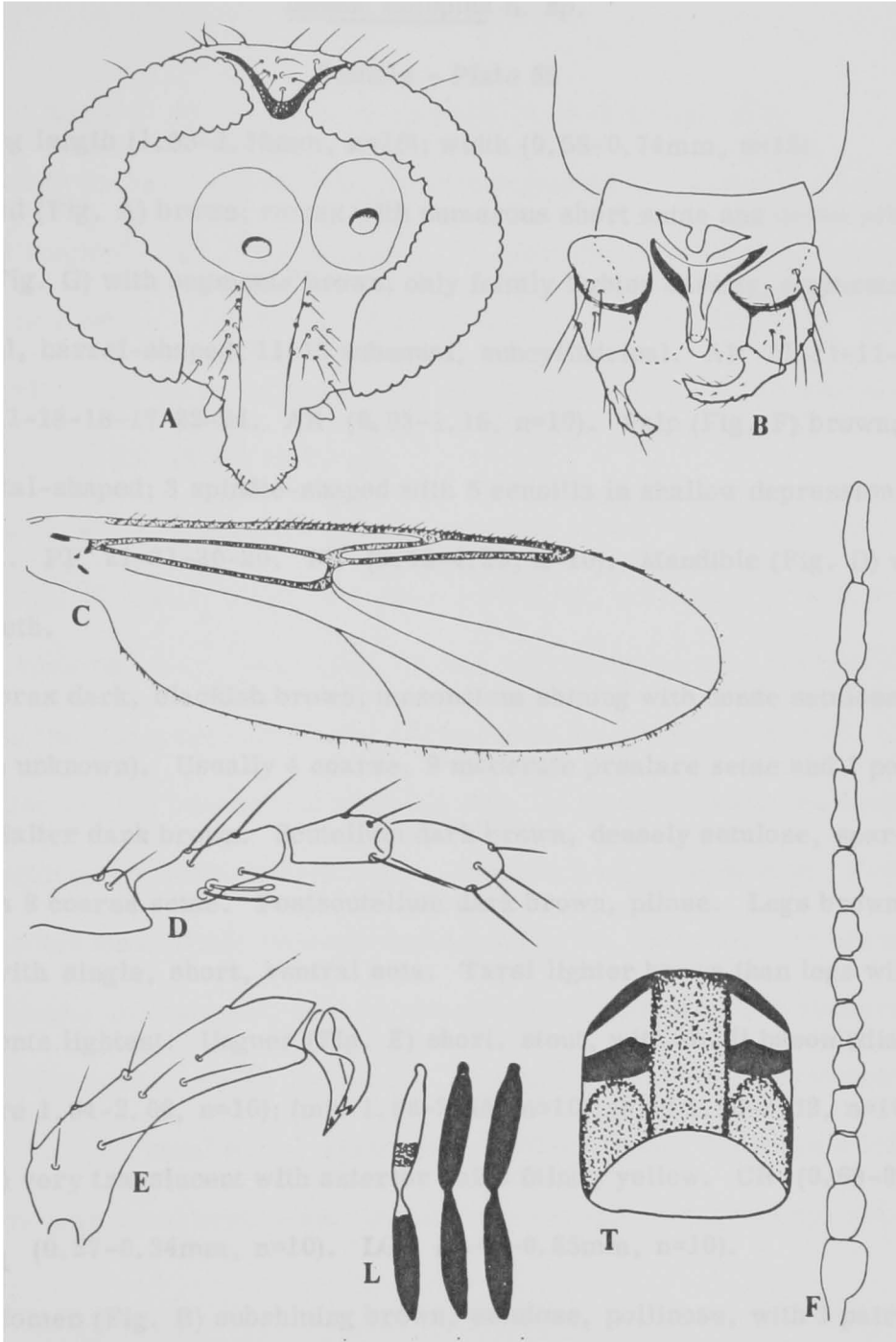


Plate 51 - *B. suffusa* n. sp. - M

Bezzia unispina n. sp.

Female - Plate 53

Wing length (1.63-2.15mm, n=10); width (0.55-0.74mm, n=10).

Head (Fig. A) brown; vertex with numerous short setae and dense pile. Antenna (Fig. G) with segments brown; only faintly lighter basally; segments 4-10 subequal, barrel-shaped; 11-15 subequal, subcylindrical. AP 17-11-11-11-11-11-11-11-18-18-17-22-24. AR (0.91-1.16, n=10). Palp (Fig. F) brown; segment 2 pedestal-shaped; 3 spindle-shaped with 5 sensilla in shallow depression; 4-5 cylindrical. PP 21-31-20-20. PR (2.72-4.22, n=10). Mandible (Fig. D) with 9-13 (n=9) teeth.

Thorax dark, blackish brown; mesonotum shining with dense setulose covering (pattern unknown). Usually 4 coarse, 2 moderate prealare setae and 1 postalare seta. Halter dark brown. Scutellum dark brown, densely setulose, sparsely pilose with 8 coarse setae. Postscutellum dark brown, pilose. Legs brown; fore femur with single, short, ventral seta. Tarsi lighter brown than legs with apical 3 segments lightest. Ungues (Fig. E) short, stout, with small basomedian tooth. TR (fore 1.64-2.06, n=10); (mid 1.86-2.46, n=10); (hind 1.96-2.32, n=10). Wing (Fig. C) very translucent with anterior veins faintly yellow. CR (0.69-0.75, n=10).  $R_1$  (0.27-0.34mm, n=10). LCS (0.40-0.55mm, n=10).

Abdomen (Fig. B) subshining brown, setulose, pollinose, with 1 pair opaque gland rods reaching 5 segments. Spermathecae: subequal, subovoid with very short duct. Dimensions: (.056 x .091 -- .074 x .111mm). Genital sclerotizations somewhat claw-like.

Male - Plate 52

Wing length (1.45-1.88mm, n=4); width (0.33-0.40mm, n=3).

Head (Fig. A). Antenna (Fig. F) with segments 4-9 subequal, slightly compressed longitudinally, subglobular; 11-15 cylindrically elongate. Antennal plume dense, dark brown. AP 30-12-12-12-13-13-14-19-29-49-22-22-26. AR (0.72-0.79, n=4). Frontoclypeal setae long, numerous. Palp (Fig. D) with proportions 18-30-15-21. PR (3.00-3.77, n=4).

Thorax with 4-5 prealare and 1-2 postalare setae. Scutellum with 5-7 setae. Claws (Fig. E) small, bifid. TR (fore 1.85-1.95, n=4); (mid 1.74-2.07, n=4); (hind 1.83-2.00, n=4). Wing (Fig. C) with anterior veins only slightly yellow; costal setae fine, sparse; medial fork slightly petiolate. CR (0.63-0.64, n=4).

Abdomen with tergum 9 of genitalia (Fig. B) rounded, about the length of basimere, with large fleshy lateral lobes. Sternum 9 with broad, deep, U-shaped caudomedian excavation; excavation covered by thin, spiculate membrane. Basimere robust, subtriangular with basomedian aspect produced. Telomere stout with swollen basal process and knobby blunt apical process. Parameres with butterfly-shaped basal arms, apical process flame-like. Aedeagus a triangular structure with basal arms highly sclerotized and apical extreme hyaline, sharply pointed.

Discussion: This species could be closely related to B. albipes or B. calceata as described by Edwards (1926). In North America it is close to B. downesi, which also possesses brown legs. The species are separated by the differences

in shape of the male genitalia, i. e. shape of the telomere primarily and differences also exist in the shape of the male antenna. The female genital sclerotizations differ as do the spermathecae, B. downesi having the ducts notably extended as compared to B. unispina.

Type: Alaska, Fairbanks, jeep t., Holotype F., July 1967, K. Sommerman; allotype Northwest Territory, Chesterfield, 15 July 1950, J.R. Vockeroth; Palmer Highway, Jeep t., 1F. paratype, 22 June, 1 F. paratype 13 July 1964; Fairbanks, jeep t., 1 F. paratype 23 June, 2 F. paratypes June 1967; 5 F. paratypes 12 June 1968; 1 F. paratype July 1968, K.M. Sommerman, (USNM).

Distribution: Alaska, Manitoba, North West Territory, Southampton Is. , Canada.

Material Studied: See Type.

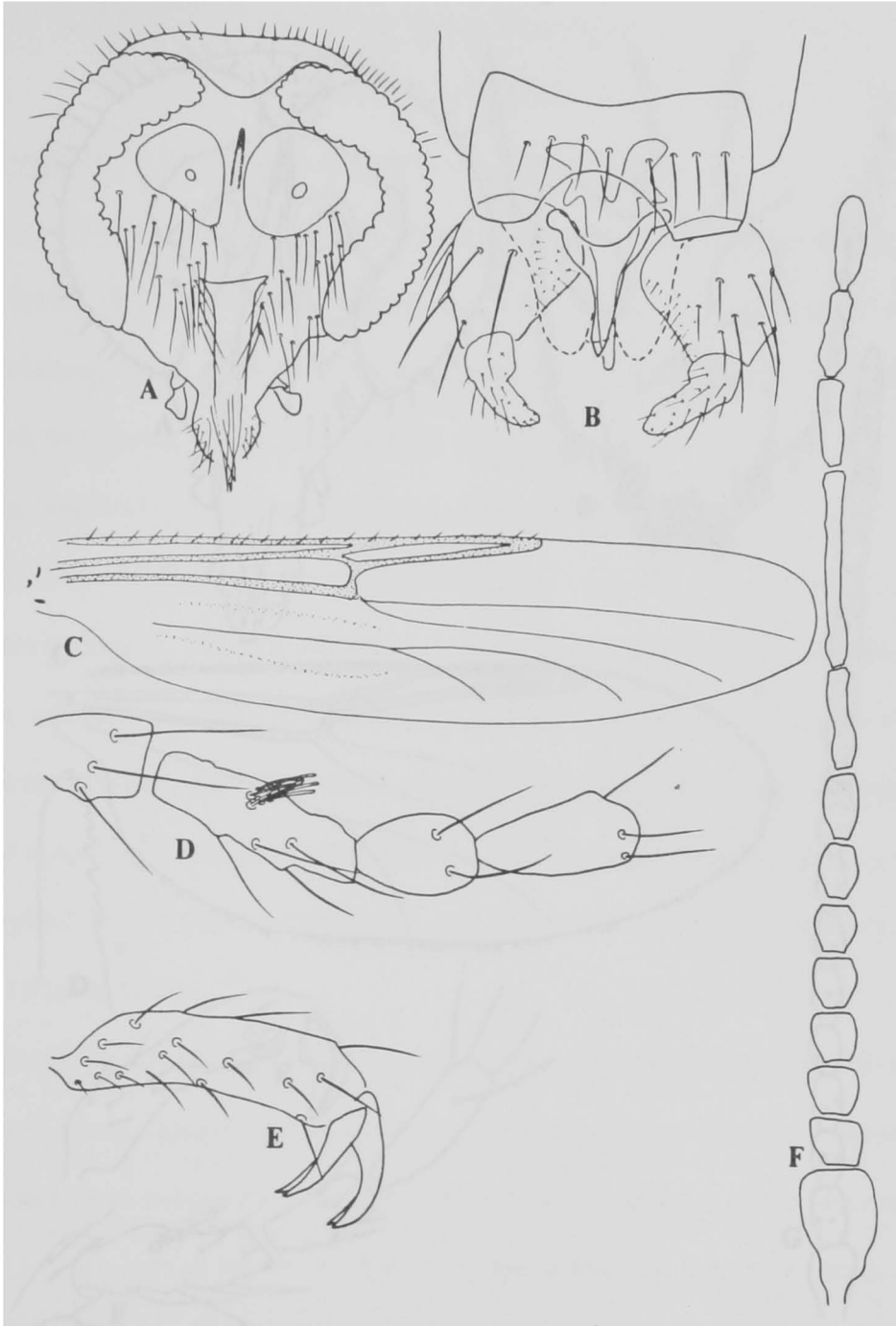


Plate 52 - *B.unispina* n. sp. - M

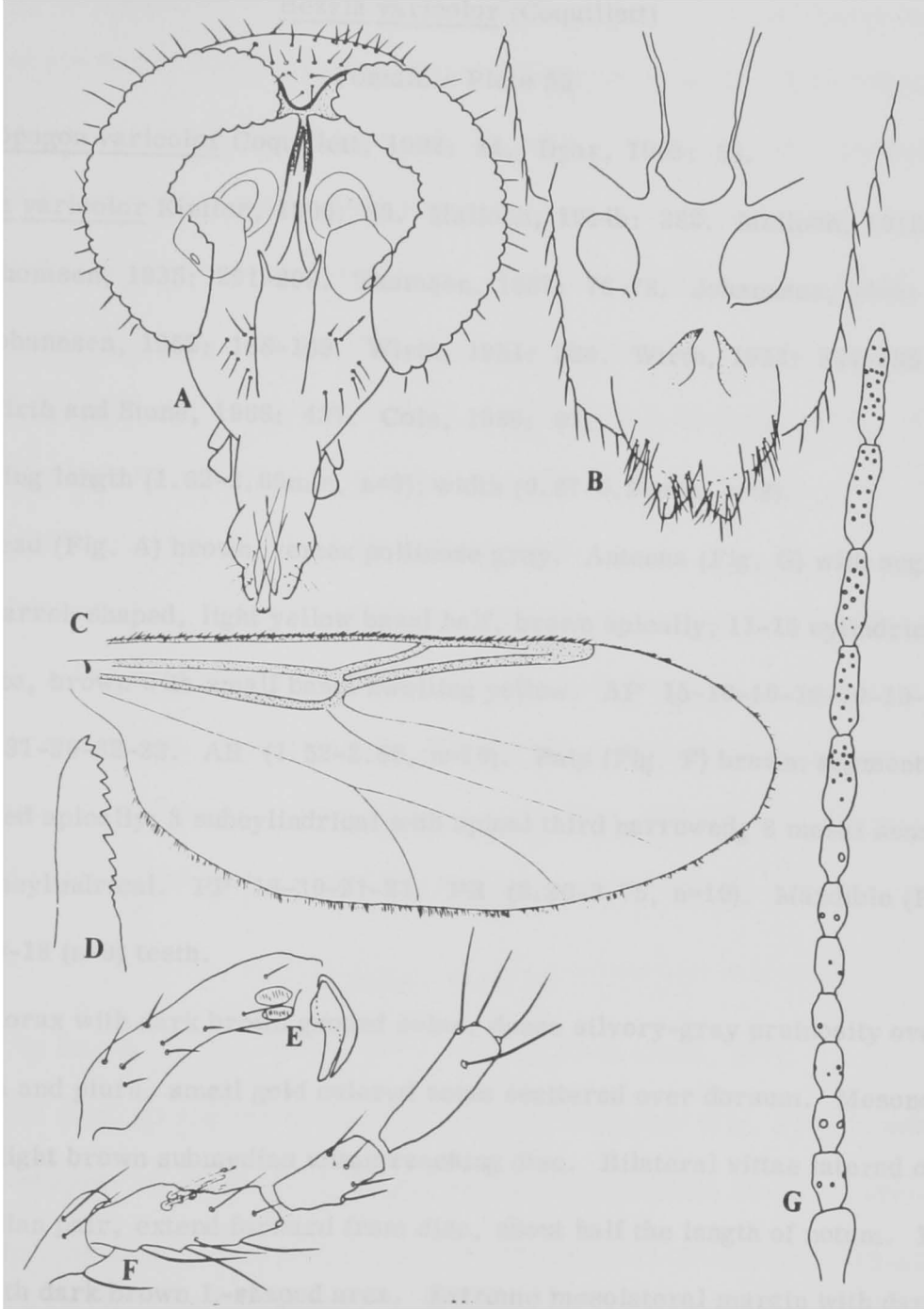


Plate 53 - *B.unispina* n. sp. - F

Bezzia varicolor (Coquillett)

Female - Plate 55

Ceratopogon varicolor Coquillett, 1902: 84. Dyar, 1903: 58.

Bezzia varicolor Kieffer, 1906: 59. Malloch, 1914b: 282. Malloch, 1915: 384.

Thomsen, 1935: 291-292. Thomsen, 1937: 76-78. Johanssen, 1943: 785.

Johanssen, 1952: 168-169. Wirth, 1951: 324. Wirth, 1952: 234-235.

Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (1.82-2.69mm, n=9); width (0.67-0.96mm, n=8).

Head (Fig. A) brown; vertex pollinose gray. Antenna (Fig. G) with segments 3-10 barrel-shaped, light yellow basal half, brown apically; 11-15 cylindrically elongate, brown with small basal swelling yellow. AP 15-10-10-10-10-10-10-11-29-31-30-32-33. AR (1.52-2.65, n=10). Palp (Fig. F) brown; segment 2 expanded apically; 3 subcylindrical with apical third narrowed, 8 mesal sensilla; 4-5 subcylindrical. PP 18-30-21-21. PR (2.20-3.75, n=10). Mandible (Fig. C) with 10-18 (n=9) teeth.

Thorax with dark brown ground color, dense silvery-gray pruinosity over dorsum and plura, small gold colored setae scattered over dorsum. Mesonotum with 2 light brown submedian vittae reaching disc. Bilateral vittae laterad of submedian pair, extend forward from disc, about half the length of notum. Hum-erus with dark brown L-shaped area. Extreme mesolateral margin with dark brown triangular area. Usually 3 stout prealare and 1 postalare setae. Halter buff white. Scutellum yellowish brown with 6 stout setae. Postscutellum dark brown with gray pruinosity. Fore leg yellow with dark brown subapical band on

femur; dark "knee"; broad brown mesal and narrow brown apical bands on tibia. Mid leg similar to fore leg except tibial band fainter mesally. Hind femur brownish yellow basal half, brown apically; tibia yellow with brown subbasal and narrow brown apical bands. Fore femur armed with 1-4 ventral setae. Tarsi light yellow with apical segment brown. Fifth hind tarsomere armed with several sharp, ventral setae. Ungues (Fig. E) long with large basomedian tooth. TR (fore 1.73-2.26, n=10); (mid 2.18-2.73, n=10); (hind 2.30-2.71, n=10). Wing (Fig. D) clear with faintly yellow anterior veins. CR (0.78-0.82, n=9). R<sub>1</sub> (0.34-0.56mm, n=9). LCS (0.53-0.93mm, n=9).

Abdomen (Fig. B) gray, pollinose, segments brown basally to lighter tan apically. Two pair gland rods reach two and a half segments, a faint third pair sometimes present. Spermathecae: 2 subequal, subspherical with ducts slightly produced. Dimensions: (.034 x .061mm -- .041 x .074mm). Genital sclerotizations appear band-like, twisted one half turn, mesal margin crescent-like.

#### Male - Plate 54

Wing length (1.12-1.45mm, n=7); width (0.43-0.49mm, n=7).

Head (Fig. A) similar to female. Antennal segments (Fig. F) 3-10 subequal, barrel-shaped; 11-12 subequal, longer than basal segments; 13-15 cylindrically elongate. Antennal plume yellow. AP 19-11-10-10-11-10-10-10-14-19-26-31-39. AR (1.00-1.27, n=8). Palp (Fig. D) with segment 2 cylindrical; 3 subcylindrical, tapered apically, 4 mesal sensilla; 4 spindle-shaped; 5 bulboid. PP 15-27-15-20. PR (2.50-3.13, n=8).



Thorax similar to female with color patterns not as distinct. Usually 3 coarse prealare and 1 postalare setae. Leg patterns also fainter. Ungues (Fig. F) all bifid. TR (fore 1.50-2.00, n=8); (mid 1.89-2.36, n=8); (hind 2.03-2.24, n=8). Wing (Fig. C) with CR (0.74-0.78, n=7). R<sub>1</sub> (0.21-0.27mm, n=7). LCS (0.27-0.37mm, n=7).

Abdomen similar to female. Genitalia (Fig. B) with tergum 9 somewhat bell-shaped with small, pointed lateral lobes. Sternum 9 short, broad, with broad, deep caudomedian excavation. Basimere faintly conical, widest basally, mesal lobe produced at midlength. Telomere stout, setose, bent mesad, apically blunt. Parameres a long rod-like structure apically, basal processes broad. Aedeagus a subtriangular, spiculate structure, the apicolateral margins appear rolled, highly sclerotized.

Discussion: B. varicolor is nearest B. pseudobscura but is separated by having broad brown mesal bands on fore and mid tibiae, and broad brown subbasal band on hind tibia. B. pseudobscura has yellow tibiae with only narrow apices brown.

Authors have noted variation in the extent of leg color banding in this species. Comparison of these forms produces no obvious differences in morphology of structure. This phenomenon probably occurs in all species. Most specimens examined, however, are identifiable by the key.

Type: Coquillett (1902), New York, Long Is., Bellport, holotype F., 4 Sept., H. G. Dyar, (USNM).

Distribution: Coquillett (1902), New York; Malloch (1914-1915), Illinois; Wirth (1951), Virginia, (1952), Alaska, California, Maryland, Montana, Ontario; Johanssen (1952), Connecticut, Colorado, Florida, Michigan, Newfoundland, Nebraska, New Hampshire.

Material Studied: (pinned) ALASKA, Nenrana, 1F., 13 June 1951, R.I. Sailor. CALIFORNIA, Berkeley, 1F., reared L. Temascal, 1 May 1948, W.W. Wirth. COLORADO, Florissant, 1F., 23 June 1907. MASSACHUSETTS, Amherst, 1M., 1F., reared, 1 June 1943, M.E.S.; Concord pond, 1F., 27 July 1961, W.W. Wirth. MONTANA, Big Timber, 1F., 14 July 1947, H.G. Dyar. NEWFOUNDLAND, Briggs Jct., Avalon, 1F., 1 July 1961, C.P. Alexander. NEW HAMPSHIRE, Stinson L., 1F., 23 July 1961, W.W. Wirth. NEW YORK, Monroe Co., Braddock Bay, 1F., 12 June 1963; St. Lawrence Co., 1F., swamp, 25 June 1963, W.W. Wirth. VIRGINIA, Augusta Co., Mt. Solon, 1F., 13 July 1950, W.W. Wirth. (slides) CALIFORNIA, Sequoia National Pk., Neather L., 1F., 9 Aug. 1947, W.W. Wirth. FLORIDA, Alachua Co., Gainesville, Chantilly Acres, 1F., 8 May 1967, F.S. Blanton; Fort Peirce, 1M., l.t. Mar. 1965, unknown. MARYLAND, Garrett Co., Cransville Swamp, 1F., reared, 6 May 1960, W.W. Wirth. MICHIGAN, Cheboygan Co., Douglas L., 1F., l.t. 3-10 Aug. 1954; 2M., emerg. t., 23-28 June 1959, R.W. Williams. NEBRASKA, Cherry Co., Pelican L., 2M., l.t., 2 June 1969, W.W. Wirth. NEW YORK, Nayack, Mill Cr., 1F., reared, 6 May 1957, J.A. Jamnback; Chautauga Co., S. Dayton, 2M., ex. marsh, 1 June 1963, W.W. Wirth. ONTARIO, Ottawa, Mer Bleu, 2F.,

27 May 1960; Algonquin Pk., 2M., reared, 7 June 1969, W.W. Wirth. LONDON,  
1M., 22 May 1958, W.W. Judd. VIRGINIA, Blacksburg, 1F., l.t. June 1960,  
D.H. Messersmith.

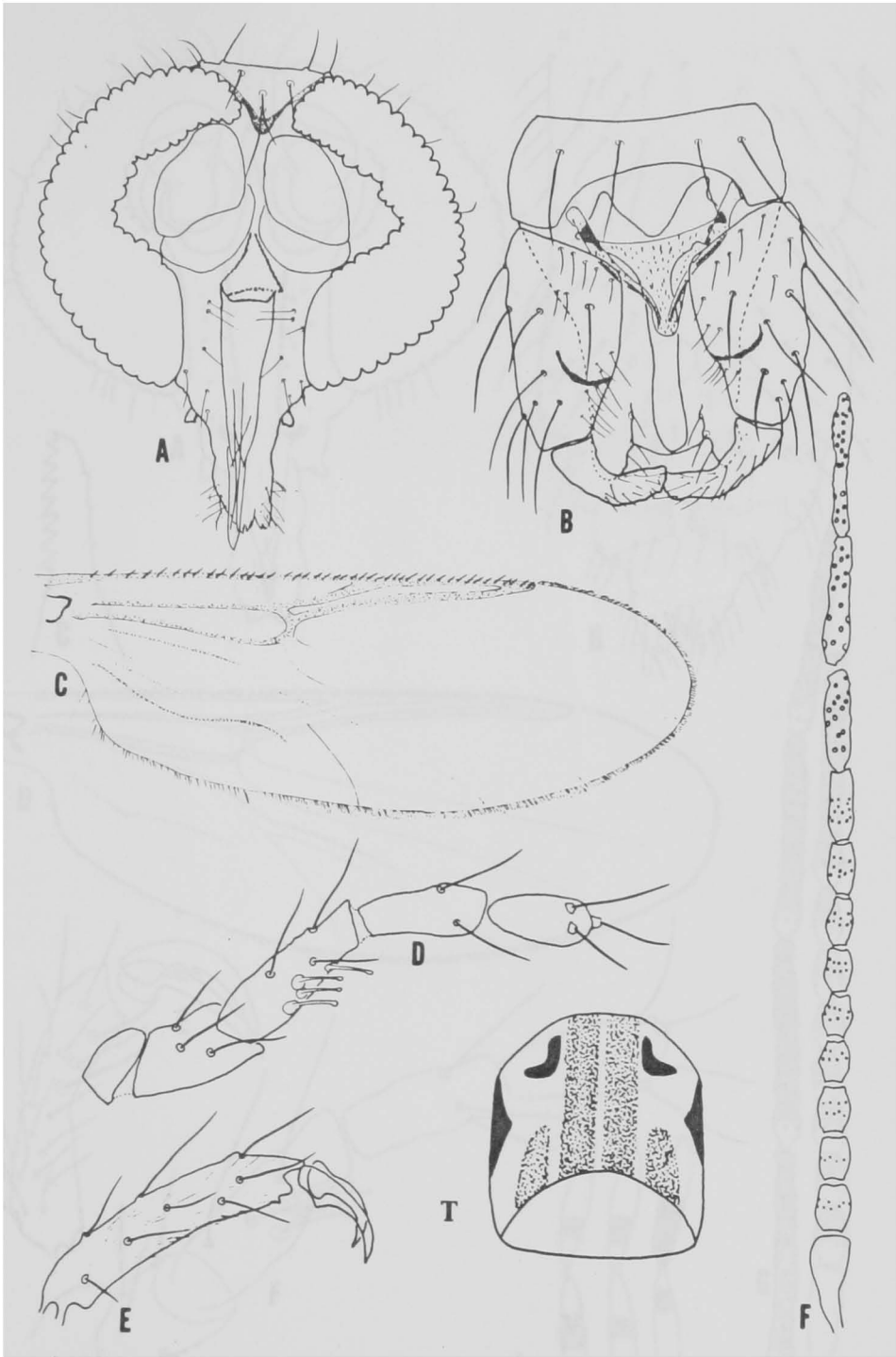


Plate 54 - *B. varicolor* (Coquillett) - M

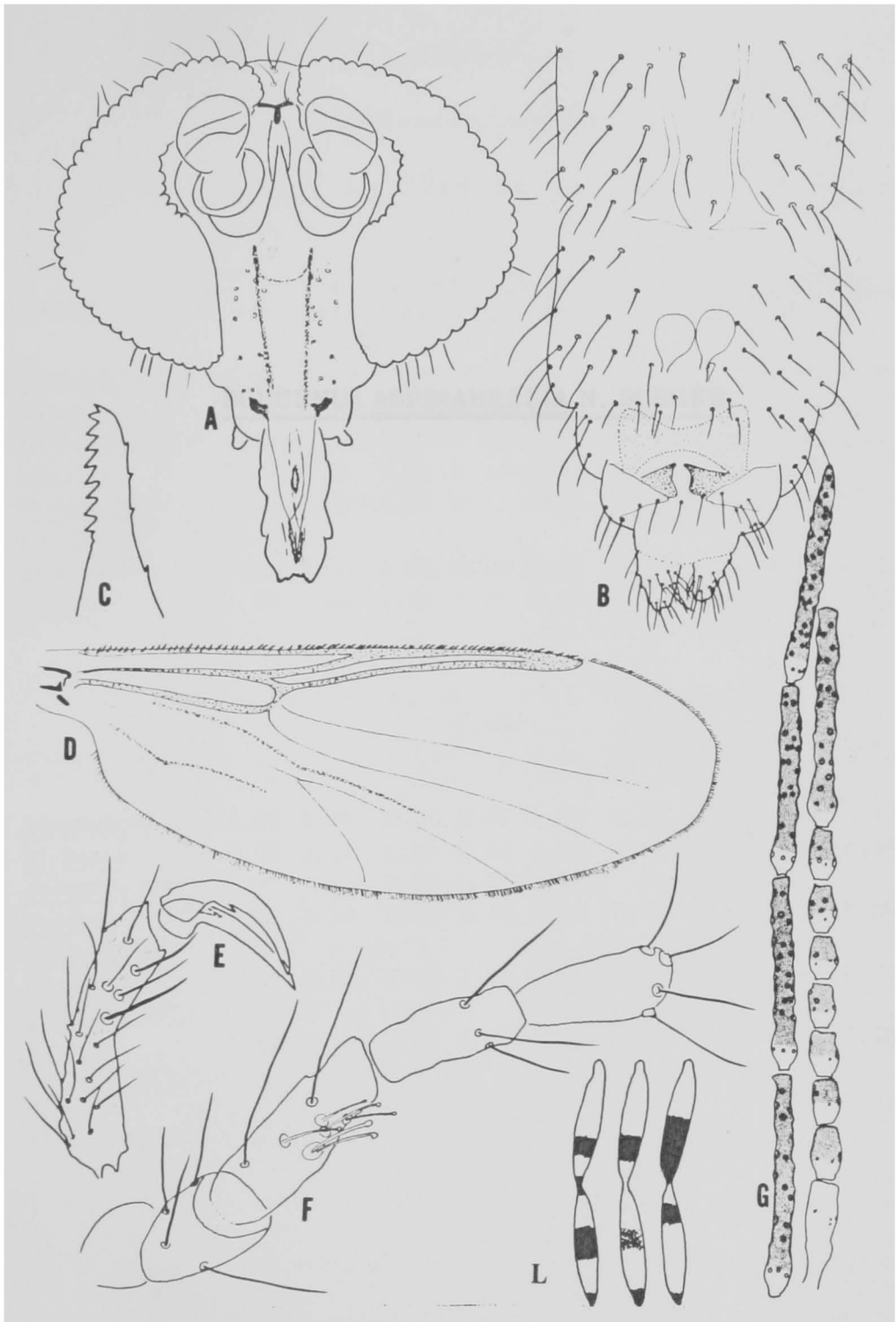


Plate 55 - *B. varicolor* (Coquillett) - F

SUBGENUS ASPINABEZZIA N. SUBGEN.

Table IV

Averages of Measured Data

Females

SPECIES	AR	PR	Tarsal Ratio			CR	Wing			
			Fore	Mid	Hind		L	W	R <sub>1</sub>	LCS
<u>B. biannulata</u>	0.80	2.51	1.98	2.22	2.41	0.78	2.14	0.72	0.47	0.57
<u>B. bivittata</u>	1.02	2.36	2.25	2.30	2.23	0.72	1.34	0.53	0.21	0.37
<u>B. coloradensis</u>	1.13	2.51	1.92	2.34	2.47	0.79	1.47	0.53	0.27	0.48
<u>B. copiosa</u>	0.88	2.13	1.76	2.10	2.27	0.78	1.87	0.66	0.38	0.53
<u>B. faciespina</u>	1.35	2.12	2.00	2.71	2.52	0.74	1.38	0.49	0.19	0.35
<u>B. flavitibia*</u>										
<u>B. gibbera</u>	0.96	2.78	1.62	2.14	2.19	0.72	1.15	0.51	0.17	0.31
<u>B. glabra</u>	1.50	3.23	1.84	2.59	2.79	0.78	1.99	0.67	0.39	0.58

Males

<u>B. biannulata</u>	0.61	2.22	2.00	2.07	2.42	0.78	1.54	0.49	0.37	0.37
<u>B. bivittata</u>	0.66	3.42	1.88	2.04	1.98	0.65	1.11	0.34	0.16	0.21
<u>B. coloradensis</u>			0.23	1.82	2.38					
<u>B. copiosa</u>	0.72	2.10	1.66	1.78	2.17	0.74	1.48	0.54	0.30	0.37
<u>B. faciespina*</u>										
<u>B. flavitibia</u>	0.78	3.27	2.05	2.15	0.92	0.67	1.39	0.41	0.21	0.25
<u>B. gibbera*</u>										
<u>B. glabra</u>	0.83	2.89	1.61	2.34	2.25	0.74	1.15	0.47	0.26	0.41

\* Measureable specimens not available.

Bezzia biannulata Wirth

Female - Plate 57

Bezzia biannulata Wirth, 1952: 237. Wirth and Stone, 1968: 437. Cole, 1969: 96.

Wing length (2.10-2.54mm, n=3); width (0.75-0.85mm, n=3).

Head (Fig. A) dark brown with dense gray pile; vertex with many fine setae. Postocular area with many fine fold setae. Antenna (Fig. G) with segments 3-10 vase-shaped, subequal, basal half yellow, brown apically; 11-12 with faint basal swelling yellow, cylindrical; 13-15 brown, cylindrical. AP 25-15-15-14-14-15-15-14-21-25-23-22-21. AR (0.84-0.88, n=3). Palp (Fig. D) light brown, all segments subcylindrical; 3 with slight mesal swelling having 6 long mesal sensilla. PP 17-25-19-21. PR (2.40-2.90, n=3). Mandible (Fig. E) with 15 (n-1) moderate teeth.

Thorax dark brown with dense, gray pollen to coxae. Mesonotum with two brown, submedian vittae reaching disc; a second pair laterad of submedian pair reach forward from disc about half length; very dark brown, thin lines border submedian vittae, at mid point extend at right angles laterad to lateral margin of notum. Prealare setae, 2-4. Halter with tan knob, dark stalk. Scutellum buff, yellowish brown, dull, with 4 moderate setae. Postscutellum dark brown with gray pollen. Legs unarmed. Fore femur yellow; dark "knee"; tibia yellow with brown mesal and apical bands. Mid leg similar to fore leg. Hind femur yellow with brown basal and apical bands; tibia similar to fore and mid tibiae.



Tarsi yellow with apices of segments 1-3 dark, segments 4-5 totally dark. Fifth hind tarsomere with 3 pairs of sharp ventral setae. Ungues (Fig. F) rather long with small basomedian tooth. TR (fore 1.60-1.83, n=3); (mid 2.14-2.41, n=3); (hind 2.26-2.65, n=3). Wing (Fig. C) with anterior veins yellow. CR (0.76-0.79, n=3).  $R_1$  (0.49-0.52mm, n=3). LCS (0.58-0.71mm, n=3).

Abdomen (Fig. B) dark brown with gray pollinose covering and light vestiture of fine, gold setae. Two pairs gland rods, one reaching 4 segments, the other 3 segments. Spermathecae: 2 subequal, spherical with ducts extended. Dimensions: (.044 x .064mm -- .046 x .071mm). Genital sclerotizations bilaterally ribbon-like.

#### Male - Plate 56

Wing length (1.54mm, n=1); width (0.49mm, n=1).

Head similar to female, Wirth (1952). Antenna (Fig. E) with segments 3-11 somewhat barrel-shaped, subequal; 12-15 slightly longer, subequal, subcylindrical. Antennal plume dark brown. AP 25-13-13-13-13-13-12-12-13-16-21-19-22. AR (0.61, n=1). Palp (Fig. C) with segment 3 basally swollen, tapered apically, with 6 mesal sensilla. PP 18-20-18-20. PR (2.22, n=1).

Thorax similar to female. Fore legs similar with markings fainter. Mid femur yellow, gradually darkening apically; tibia with broad basal band reaching midlength. Hind leg nearly all light brown with tibia subapically yellow. Ungues deeply bifid. TR (fore 2.00, n=1); (mid 2.07, n=1); (hind 2.42, n=1). Wing (Fig. B) with longer costal setae. CR (0.78, n=1).  $R_1$  (0.37mm, n=1). LCS (0.37mm, n=1).

Abdomen with tergum 9 of genitalia (Fig. A) short, conical, with large lateral lobes. Sternum 9 short, with broad, deep, U-shaped caudomedian excavation. Basimere short, stout, subcylindrical, sparsely setose, slightly tapered apically. Telomere nearly equal to length of basimere, stout, apically blunt, knobby, setose. Parameres a blunt, rod-like apically; basal processes subtriangular. Aedeagus subtriangular with broad, sclerotized anterior arch, apical portion lightly spiculate, sclerotized medially and with hyaline margins.

Discussion: B. biannulata is close to B. copiosa. It is easily distinguished by leg pattern, mesonotal pattern, male and female genitalia.

Type: Wirth (1952), California, San Luis Obispo Co., Oceano B., holotype F., allotype, 20 Aug. 1948, W.W. Wirth.

Distribution: Wirth (1952), California.

Material Studied: (pinned) CALIFORNIA, San Luis Obispo Co., Oceano B., 1F., paratype, 20 Aug. 1948; San Benito Co., Pinnacles National Mon., 1F., paratype, reared, 24 Apr. 1948, W.W. Wirth. (slides) CALIFORNIA, San Luis Obispo Co., Oceano B., 1F., paratype, 1M., allotype, reared; 1F., pond marg., 20 Aug. 1949; Black L. Canyon, swept ex. trees at lake marg., 1F., 22 Aug. 1948, W.W. Wirth.

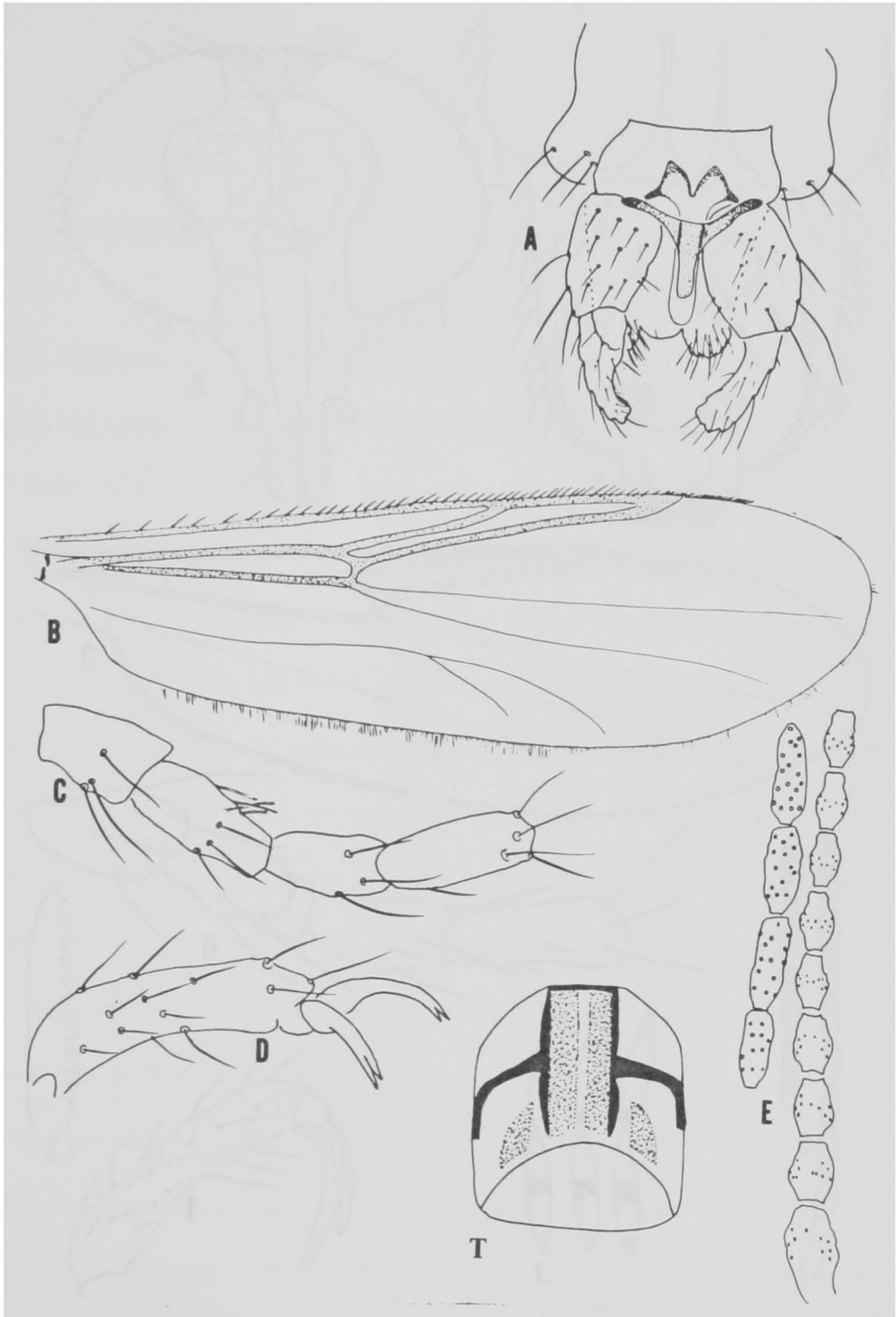


Plate 56 - *B. biannulata* Wirth-M

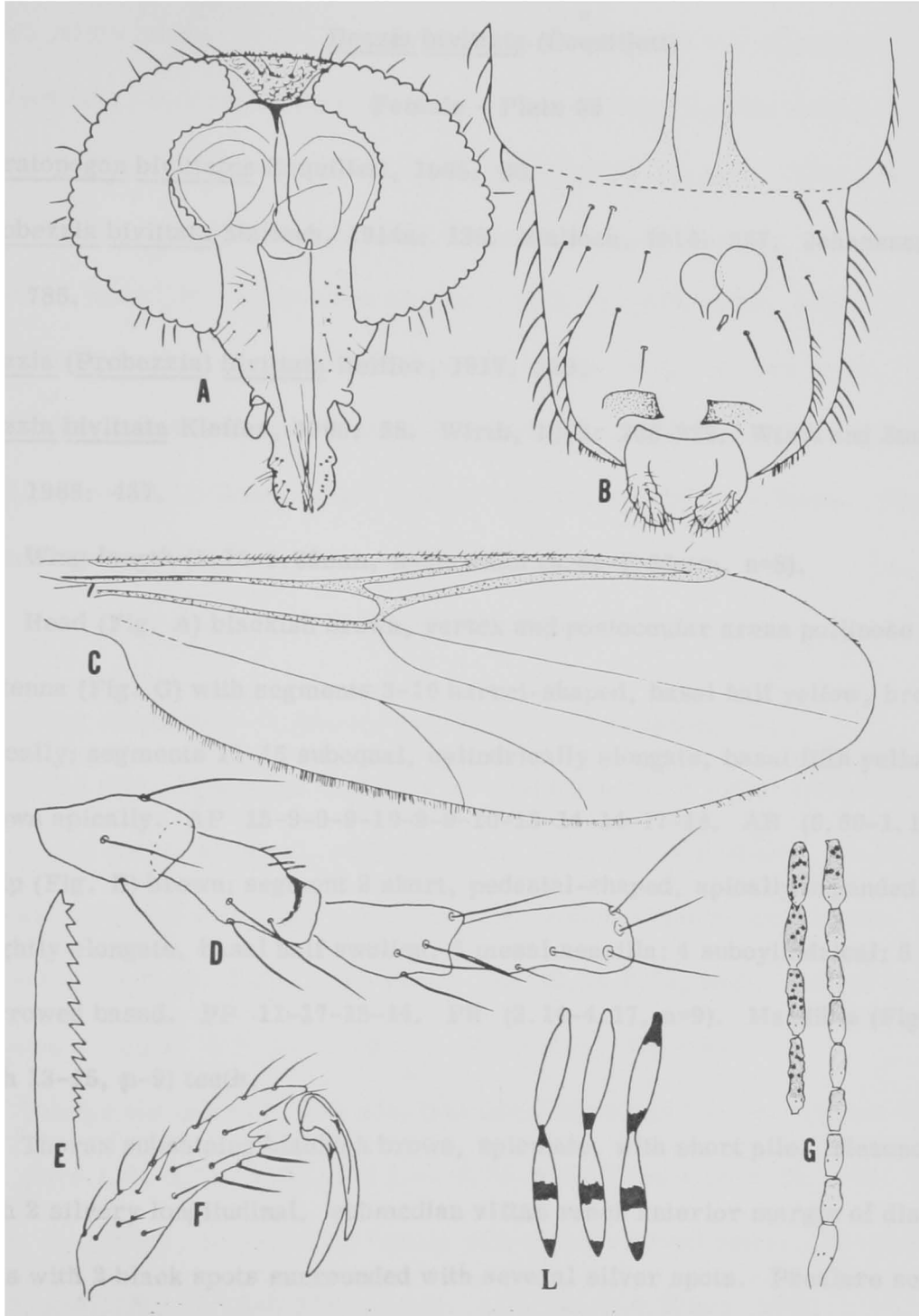


Plate 57 - *B. biannulata* Wirth-F

Bezzia bivittata (Coquillett)

Female - Plate 59

Ceratopogon bivittatus Coquillett, 1905: 60.

Probezzia bivittata Malloch, 1914a: 138. Malloch, 1915: 357. Johannsen, 1943: 785.

Bezzia (Probezzia) bivittata Keiffer, 1917: 329.

Bezzia bivittata Kieffer, 1906: 58. Wirth, 1952: 238-239. Wirth and Stone, 1968: 437.

Wing length (1.10-1.68mm, n=8); width (0.48-0.63mm, n=8).

Head (Fig. A) blackish brown, vertex and postocular areas pollinose silver.

Antenna (Fig. G) with segments 3-10 barrel-shaped, basal half yellow, brown apically; segments 11-15 subequal, cylindrically elongate, basal fifth yellow, brown apically. AP 15-9-9-9-10-9-9-10-13-14-14-17-18. AR (0.80-1.18, n=9). Palp (Fig. E) brown; segment 2 short, pedestal-shaped, apically expanded; 3 slightly elongate, basal half swollen, 5 mesal sensilla; 4 subcylindrical; 5 bulboid, narrowed basad. PP 11-17-13-14. PR (2.14-4.17, n=9). Mandible (Fig. D) with 13-15, (n=9) teeth.

Thorax subshining blackish brown, spiculate, with short pile. Mesonotum with 2 silvery longitudinal, submedian vittae reach anterior margin of disc; humerus with 2 black spots surrounded with several silver spots. Prealare setae 3-4, usually 1 postalare. Halter dark brown. Scutellum dark brown, slightly pruinose. Postscutellum pollinose, blackish brown. Legs brown. Fore and mid femora with subapical yellow bands. Fore and mid tibiae with subapical and sub-

basal yellow bands. Tarsi whitish yellow with segments 4-5 slightly darker. Ungues (Fig. F) small, slightly curved with small apicomedian tooth. TR (fore 1.75-2.67, n=8); (mid 2.08-2.46, n=9); (hind 1.88-2.53, n=9). Wing (Fig. C) opaque white, anterior veins faintly yellow, costal setae sparse, small. CR (0.66-0.74, n=8).  $R_1$  0.16-0.35mm, n=8). LCS (0.30-0.49mm, n=8).

Abdomen (Fig. B) subshining blackish brown, with fine dark setae. One pair gland rods reach antebasal segment. Spermathecae: 2 subequal, subspherical with duct just evident. Dimensions: (.032 x .034mm -- .037 x .046mm). Genital sclerotizations as figured.

#### Male - Plate 58

Wing length (0.84-1.24mm n=4); width (0.32-0.38mm, n=4).

Head (Fig. A) similar to female with eyes separated wider. Antennal segments 4-9 short, subequal, subcylindrical; 10 longer, urn-shaped; 11-15 cylindrically elongate with slight basal swelling. Antennal plume dark brown. AP 17-9-9-9-10-9-10-12-20-31-14-14-16. AR (0.54-0.76, n=6). Palp (Fig. D) with 6 mesal sensilla. PP 15-23-18-18. PR (2.50-5.33, n=6).

Thorax similar to female with mesonotal markings fainter. Ungues bifid. TR (fore 1.64-2.22, n=6); (mid 1.81-2.25, n=6); (hind 1.83-2.38, n=6). Wing (Fig. C) similar, longer, than female with sparser costal setae. CR (0.62-0.67, n=4).  $R_1$  (0.12-0.21mm, n=4). LCS (0.19-0.22mm, n=4).

Abdomen similar to female. Genitalia (Fig. B) small; tergum 9 narrowed, subtriangular, apex rounded, heavily setose with well developed lateral lobes.

Sternum 9 short, subequal to length of basimere, with broad caudomedian excavation about one-third of length. Basimere subtriangular, expanded basad with large basomedian lobe, narrowed apicad, moderately setose. Telomere stout, setose, sculptured, apical half bent mesad, sharply pointed tip. Parameres form a tripartite structure with apices rounded. Aedeagus a sharply pointed, V-shaped structure.

Discussion: B. bivittata seems very close to B. gibbera. Macroscopically B. bivittata has the silver mesonotal vittae. B. gibbera possesses a shining mesonotum. The female genital sclerotizations and spermathecae of what is thought to be B. gibbera are also different from those of B. bivittata. The male of B. gibbera is unknown.

Type: Coquillett (1905), California, Eureka, 4 F., 24 May-6 June, H.S. Barber, (USNM).

Distribution: Coquillett (1905), California; Malloch (1915), Illinois; Kieffer (1917), Hungary; Wirth (1952), Montana, Utah; Arizona, Florida, Maryland, Michigan, New Mexico, New York, Oregon, Texas, Virginia, Wisconsin, Wyoming.

Material Studied: (pinned) ARIZONA, Wickenburg, Hassayampa R., 1F., 29 June 1953, W.W. Wirth. CALIFORNIA, Death Val., Saratoga Spr., 1F., 30 May 1953, J.N. Belkin; Eureka, 1F., H.S. Barber; Imperial Co., Hot Mineral Spr., 1F., 1M., 1t., 1 July 1948, W.W. Wirth; Mono Co., Virginia Cr., 1F., 21 June, H.G. Dyar. MICHIGAN, Gogebic Co., 1F., 15 June 1960, R & K Dreisbach. MONTANA, Laurel, 1F., 16 July 1916, H.G. Dyar. New York,

St. Lawrence Co., Cranberry L., 2M., swamp, 25 June 1963, W.W. Wirth.  
TEXAS, Kerrville, 1F., 18 July 1953, L.J. Bottimer. VIRGINIA, Alexandria,  
1F., reared ex. osmundia bog, 18 May 1952, W.W. Wirth. (slides) ARIZONA,  
Portal, sw. Res. Sta., 1F., 2M., l.t., 4 June 1967, C.W. Sabrosky. FLORIDA,  
Liberty Co., Torreya St. Pk., 1M., 15 Apr., F.S. Blanton; 1F., 20 May 1966,  
H.V. Weems; 3F., l.t., 22 Apr. 1967, W.W. Wirth. MARYLAND, Worcester  
Co., Snowhill, 1M., l.t., 19 May 1968; 1F., 1 June 1968, W.H. Anderson.  
NEW MEXICO, Taos, 1F., l.t., 27 June 1969, W.W. Wirth. OREGON, Little  
Val., sw Vale, 1F., l.t., 19 June 1963, K. Goeden. UTAH, Beaver, 1M., l.t.,  
14 July 1949, G.F. Knowlton; Logan, 1F., l.t., 1 July 1957, G.F. Knowlton.  
VIRGINIA, Falls Church, 1F., stream marg., 4 July 1950, W.W. Wirth.  
WISCONSIN, Oregon, 1F., l.t., 25 May 1962, W.W. Wirth. WYOMING, Platte  
Co., Brown Ranch, 1F., l.t., 1 Aug. 1967, M. Griffith.



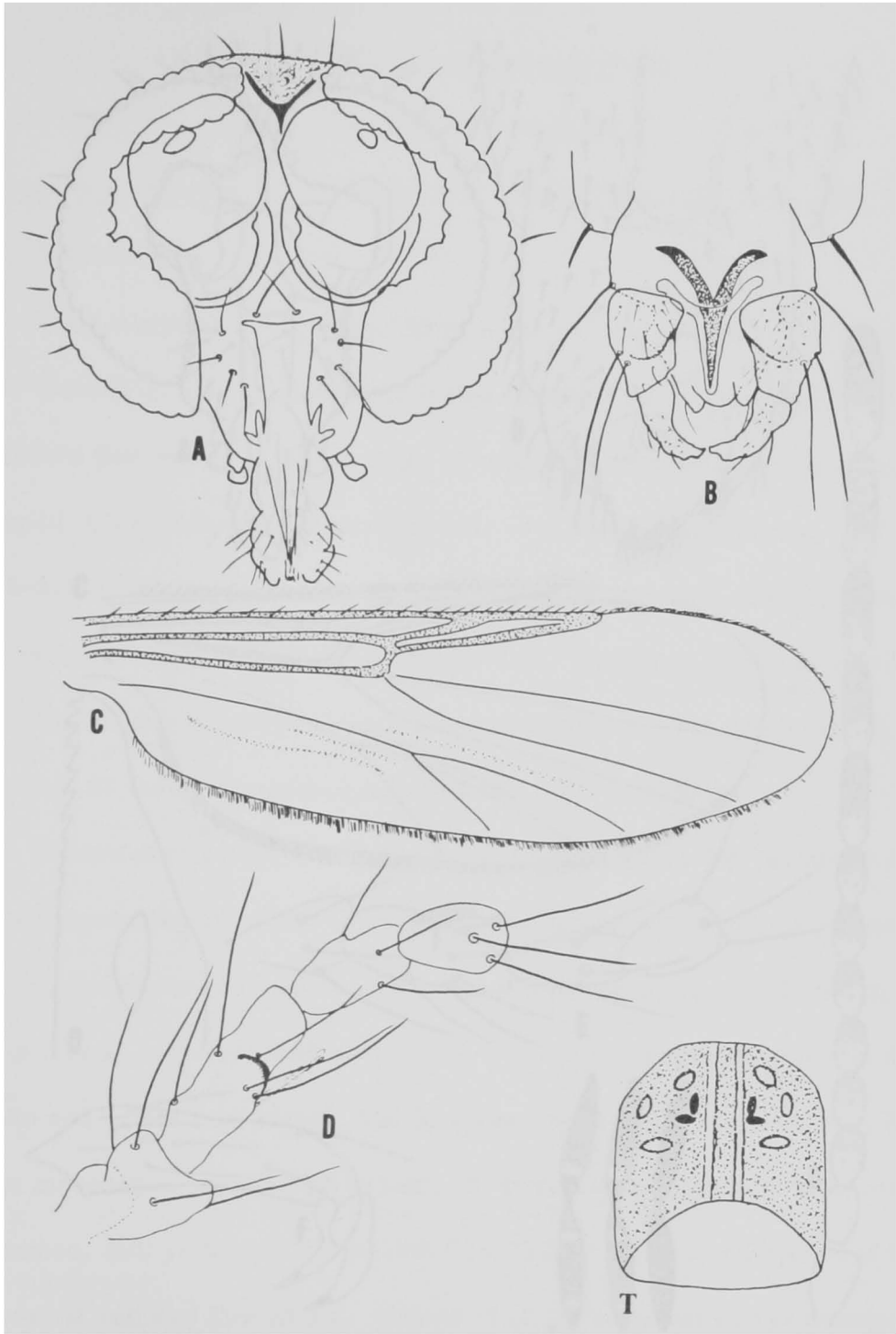


Plate 58 - *B. bivittata* (Coquillett) - M

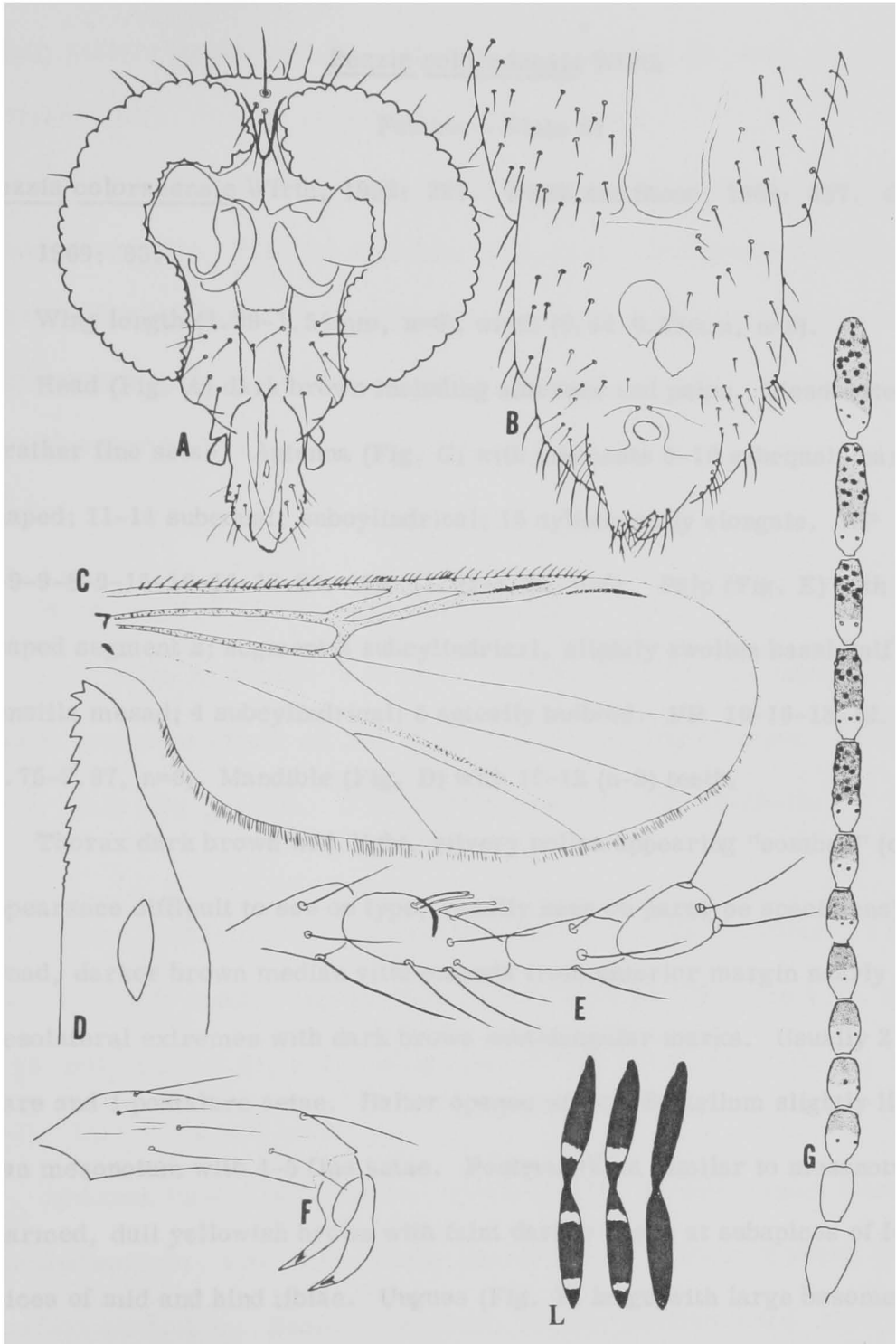


Plate 59 - *B. bivittata* (Coquillett)-F

Bezzia coloradensis Wirth

Female - Plate 61

Bezzia coloradensis Wirth, 1952: 227. Wirth and Stone, 1968: 437. Cole, 1969: 96.

Wing length (1.29-1.54mm, n=6); width (0.44-0.58mm, n=6).

Head (Fig. A) dark brown including antennae and palps. Mesovertex with 2 rather fine setae. Antenna (Fig. G) with segments 3-10 subequal, barrel-shaped; 11-14 subequal, subcylindrical; 15 cylindrically elongate. AP 14-9-9-8-9-9-8-9-15-16-16-16-23. AR (1.01-1.28, n=6). Palp (Fig. E) with pedestal-shaped segment 2; segment 3 subcylindrical, slightly swollen basal half with 4 sensilla mesad; 4 subcylindrical; 5 apically bulboid. PP 10-16-13-12. PR (1.75-2.87, n=6). Mandible (Fig. D) with 10-12 (n=3) teeth.

Thorax dark brown with light, silvery pollen appearing "combed" (combed appearance difficult to see on type, readily seen on paratype specimens). A broad, darker brown median vitta extends from anterior margin nearly to disc. Mesolateral extremes with dark brown subtriangular marks. Usually 2 fine prealare and 1 postalare setae. Halter opaque white. Scutellum slightly lighter than mesonotum with 4-5 fine setae. Postscutellum similar to mesonotum. Legs unarmed, dull yellowish brown with faint darker bands at subapices of femora and apices of mid and hind tibiae. Ungues (Fig. F) large with large basomedian tooth. Tarsi yellow except dark distal segment. TR (fore 1.53-2.14, n=6); (mid 2.15-2.50, n=6); (hind 2.27-2.71, n=6). Wing (Fig. C) translucent with anterior veins

faintly yellow; costal setae fine, sparse. CR (0.76-0.83, n=6).  $R_1$  (0.24-0.30mm, n=6). LCS (0.43-0.52mm, n=6).

Abdomen (Fig. B) subshining, brown, with tergal margins yellowish brown, broadest apically. Pygidial segments dark brown. Two pairs gold gland rods reach abdominal base. Spermathecae: 2 unequal, pyriform with ducts short. Dimensions: (.027 x .046mm -- .037 x .061mm). Genital sclerotizations directed mesad arrow-like.

#### Male - Plate 60

Wing length (1.11mm, n=1); width (0.38mm, n=1).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 3-11 subequal, somewhat barrel-shaped; 12-15 subcylindrically elongate. Antennal plume gold. Palp (Fig. D) with 4 sensilla on segment 3. PP 10-16-13-12. PR (2.28, n=1).

Thorax with fainter markings than female. Usually 2 prealare, 1 postalare and 4 scutellar setae. Ungues (Fig. E) bifid faintly. TR (fore 1.71, n=1); (mid 1.95, n=1); (hind 2.21, n=1). Wing (Fig. C) with CR (0.38, n=1).  $R_1$  (0.18mm, n=1). LCS (0.30mm, n=1).

Abdomen lighter than female. Genitalia (Fig. B) with tergum 9 broadly rounded apically, with large, fleshy lateral lobes. Sternum 9 short, with caudomedian excavation. Basimere sparsely setose, swollen basad, tapering to narrow apex, with slight basomedian lobe. Telomere bent mesad, tapering to blunt, knobby apex. Parameres long, slender, rod-like apically with simple

bifurcate basal processes. Aedeagus somewhat conical with apex blunt, appearing bilobed; basal processes simple, highly sclerotized.

Discussion: B. coloradensis is closest to B. glabra. They are easily distinguished by both male and female genitalia and mesonotal patterns as well as leg coloration.

Type: Wirth (1952), California, Imperial Co., Westmoreland, swept from alkaline slough, holotype F., 6 April 1949, W.W. Wirth, (USNM).

Distribution: Wirth (1952), California, Florida.

Material Studied: CALIFORNIA, Imperial Co., Palo Verde, 1F., paratype, 8 April; 1F., paratype, 6 April 1949, W.W. Wirth; Hot Mineral Spr., 3F., 1M., 25 April 1953, J.N. Belkin. (slides) CALIFORNIA, Imperial Co., Bravelly, 1F., 7 April 1959, E.I. Schlinger; 3 F., paratype, allotype, same data as type; Riverside Co., Blythe, l.t., 1F., paratype, 20 Aug. 1947, J.W. MacSwain. FLORIDA, Vero Veach, Ent. Res. Center, l.t., 1F., May 1950, W.W. Wirth.

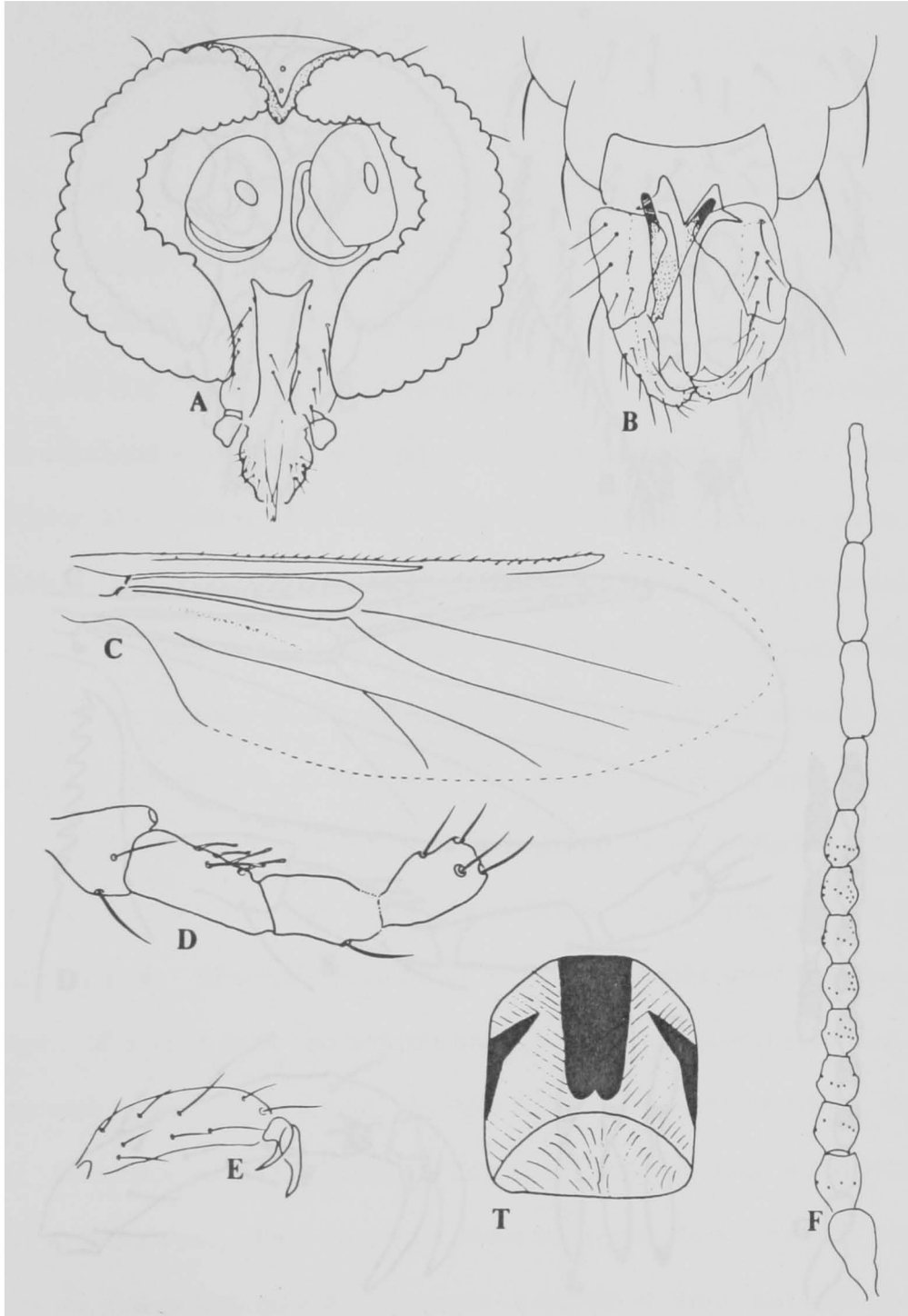


Plate 60 - *B. coloradensis* Wirth-M

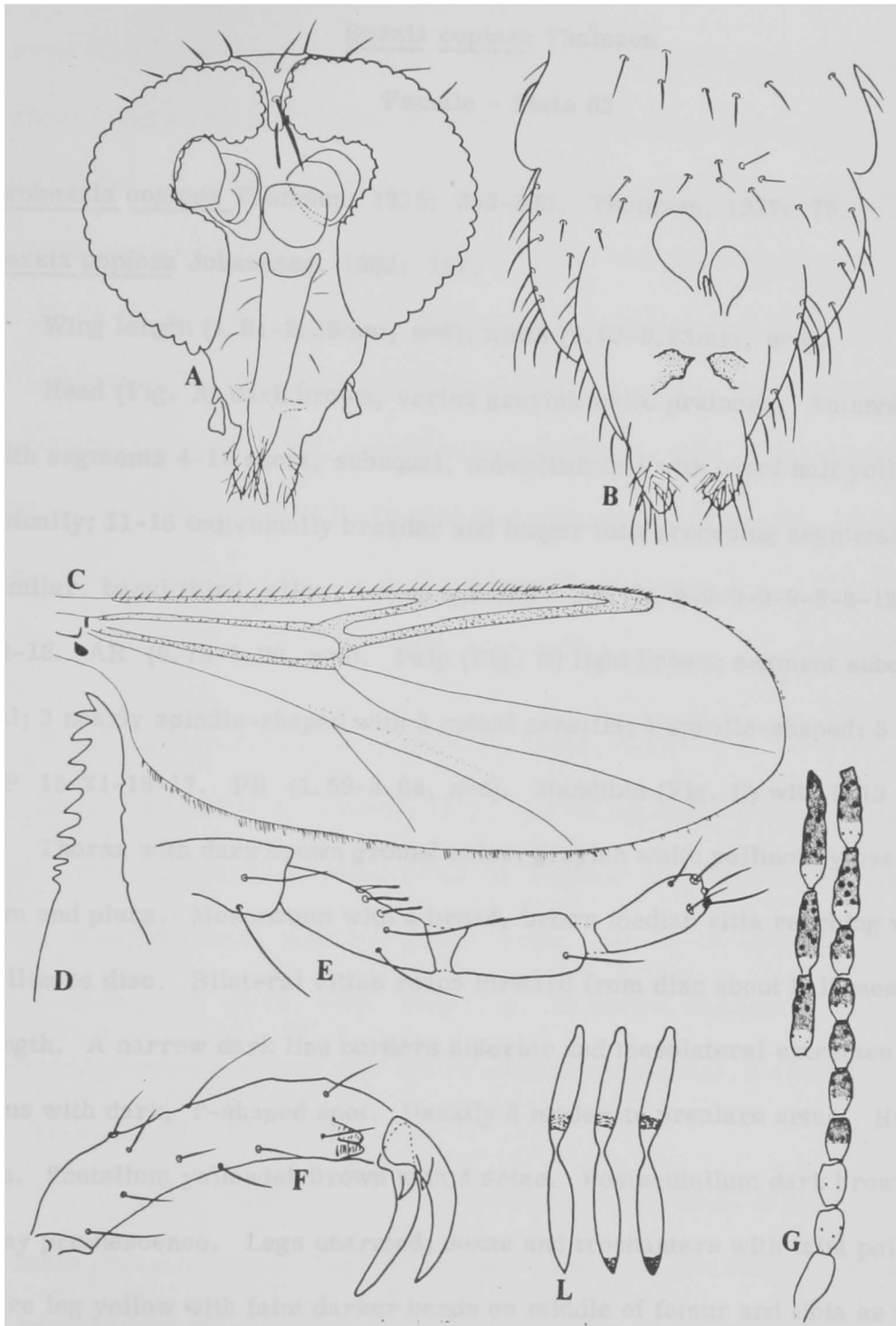


Plate 61 - *B. coloradensis* Wirth-F

Bezzia copiosa Thomsen

Female - Plate 63

Probezzia copiosa Thomsen, 1935: 292-293. Thomsen, 1937: 79.

Bezzia copiosa Johannsen, 1952: 167.

Wing length (1.61-2.35mm, n=6); width (0.59-0.83mm, n=5).

Head (Fig. A) dark brown, vertex grayish white pruinose. Antenna (Fig. G) with segments 4-10 short, subequal, subcylindrical with basal half yellow, brown apically; 11-15 individually broader and longer than preceding segments, shaped similar, basal third yellow, brown apically. AP 15-9-9-9-9-9-9-8-13-13-13-13-15. AR (0.78-1.00, n=6). Palp (Fig. E) light brown; segment subcylindrical; 3 nearly spindle-shaped with 3 mesal sensilla; 4 spindle-shaped; 5 bulboid. PP 15-21-18-17. PR (1.59-2.66, n=6). Mandible (Fig. D) with 9-13 (n=6) teeth.

Thorax with dark brown ground color; grayish white pollinosity over mesonotum and plura. Mesonotum with a broad, brown median vitta reaching white pollinose disc. Bilateral vittae reach forward from disc about half mesonotal length. A narrow dark line borders anterior and mesolateral extremes. Humerus with dark, T-shaped spot. Usually 3 moderate prealare setae. Halter light tan. Scutellum yellowish brown with 4 setae. Postscutellum dark brown with gray pruinescence. Legs unarmed; coxae and trochanters with faint pollinosity. Fore leg yellow with faint darker bands on middle of femur and tibia as well as narrow apex of tibia; dark "knee". Mid leg yellow with dark "knee" and narrow tibial apex. Hind femur dark brown with yellow subapical band; tibia yellow with



narrow dark brown basal and apical bands. Tarsi whitish yellow with apices darker. Ungues (Fig. F) large, gently curved with large basomedian tooth. TR (fore 1.66-1.95, n=6); (mid 2.04-2.19, n=6); (hind 2.15-2.34, n=6). Wing (Fig. C) translucent with anterior veins faintly yellow with fine, sparse costal setae. CR (0.77-0.79, n=6).  $R_1$  (0.32-0.52, n=5). LCS (0.43-0.71, n=5).

Abdomen (Fig. B) tan dorsally, dark brown ventrad. One pair gland rods. Spermathecae: 2 subequal, subspherical with short, duct. Dimensions (.037 x .054mm -- .039 x .064mm). Genital sclerotizations ribbon-like. Accessory membranous depressions basolaterad of sclerotizations.

#### Male - Plate 62

Wing length (1.48mm, n=1); width (0.54mm, n=1).

Head (Fig. A) black. Antenna (Fig. F) with segments 4-11 subequal, somewhat barrel-shaped; 12-15 about twice the length of individual basal segments, subequal, subcylindrical. Antennal plume brown. AP 23-12-11-11-10-10-10-10-10-19-18-19-20. AR (0.72, n=1). Palp (Fig. D) brown; segment 2 subcylindrical; 3 somewhat spindle-shaped with few sensilla; 4 cylindrical; 5 elongate-bulboid. PP 14-21-20-23. PR (2.10, n=1).

Thorax black; mesonotum lacking pruinescent markings of female. About 4 coarse prealare setae. Legs dull brown. Fore and mid femora with dark apical bands; tibiae with basal and apical dark bands. Tarsi light yellow with apices dark. Ungues (Fig. E) markedly bifid. TR (fore 1.66, n=1); (mid 1.78, n=1). (hind 2.17, n=1). Wing (Fig. C) similar to female. CR (0.74, n=1).  $R_1$  (0.30 mm, n=1). LCS (0.37mm, n=1).

Abdomen black, sparsely setose. Genitalia (Fig. B) with tergum 9 well developed, length subequal to telomere, apically rounded with lateral lobes well developed, apically rounded. Sternum 9 short, about half the length of basimere, with deep, broad, U-shaped caudomedian excavation. Basimere subovoid, widest basad, setose. Telomere subequal to length of basimere, apical half setose, apex spoon-like, slightly bent mesad. Parameres rod-like apically with simple triangular basal processes. Aedeagus subtriangular with basolateral margins highly sclerotized, spiculate.

Discussion: B. copiosa appears closest to B. biannulata. They are easily separated. B. biannulata has broad dark mesal bands on all tibiae. Separation is also readily accomplished by differences in the male and female genitalia and mesonotal patterns.

Type: Thomsen (1935), New York, Ithaca, Ringwood Pond, reared ex. algae, 18 May 1933, Holotype and allotype, (Cornell University Museum).

Distribution: Thomsen (1935) New York; Johanssen (1952) Connecticut; Alaska, Michigan, Nebraska.

Material Studied: (pinned) MICHIGAN, Livingston Co., E.S. George Res., 1 F., 4 June 1950, G. Steyskal. NEW YORK, Monroe Co., Braddock Bay, 2 F., 12 June 1963, W.W. Wirth. (slides) ALASKA, Fairbanks, emerg. t., 1 M., 20 June 1948, Lienla and Esselbough; jeep t., 1 F., 23 June, 2 F., 27 June, K.M. Sommerman. NEBRASKA, Cherry Co., Hackberry L., 1 F., 2 June 1969, W.W. Wirth. NEW YORK, Monroe Co., Braddock Bay, 2 F., 12 June 1963, W.W. Wirth.

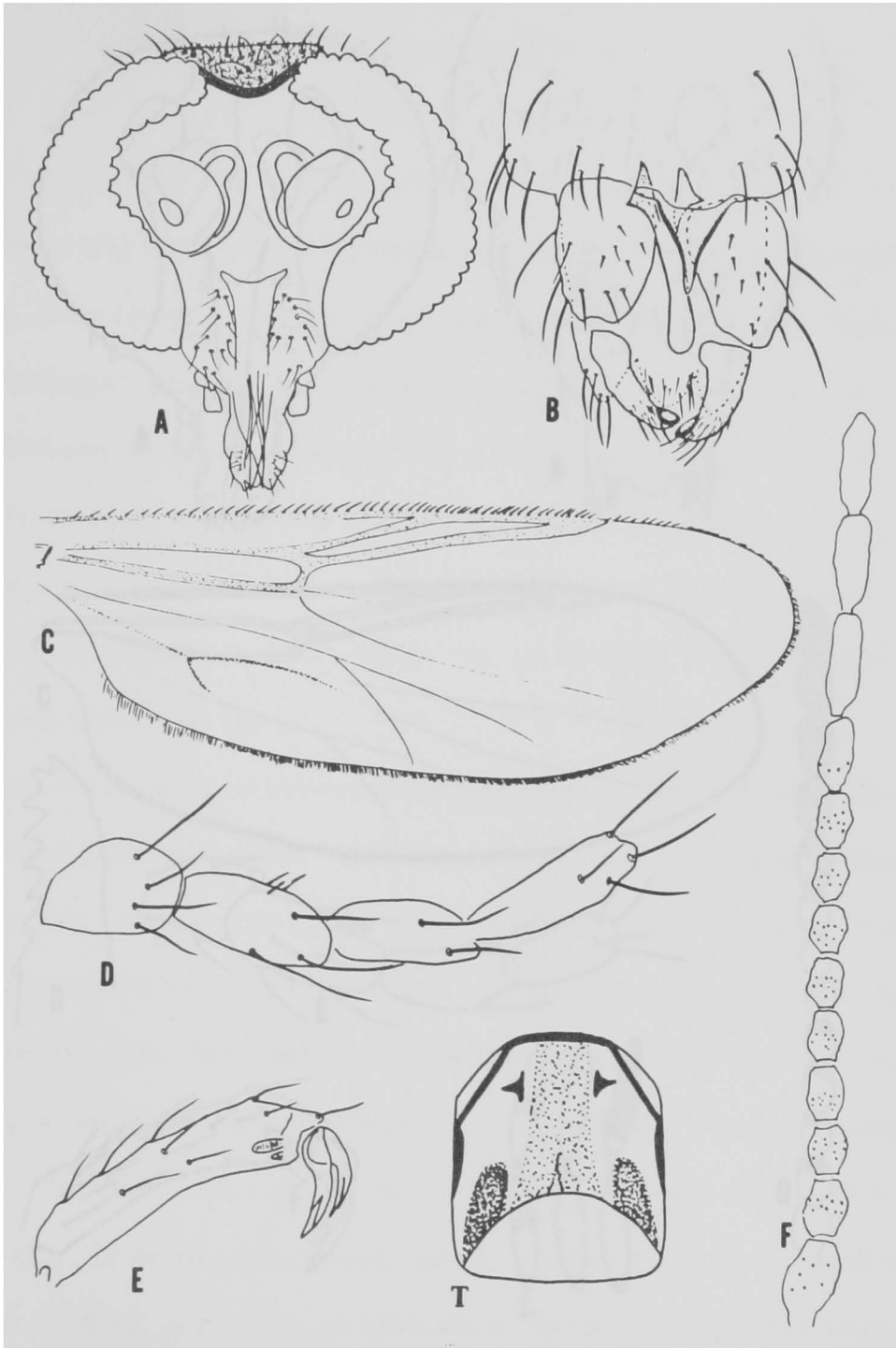


Plate 62 - *B. copiosa* (Thompsen) - M

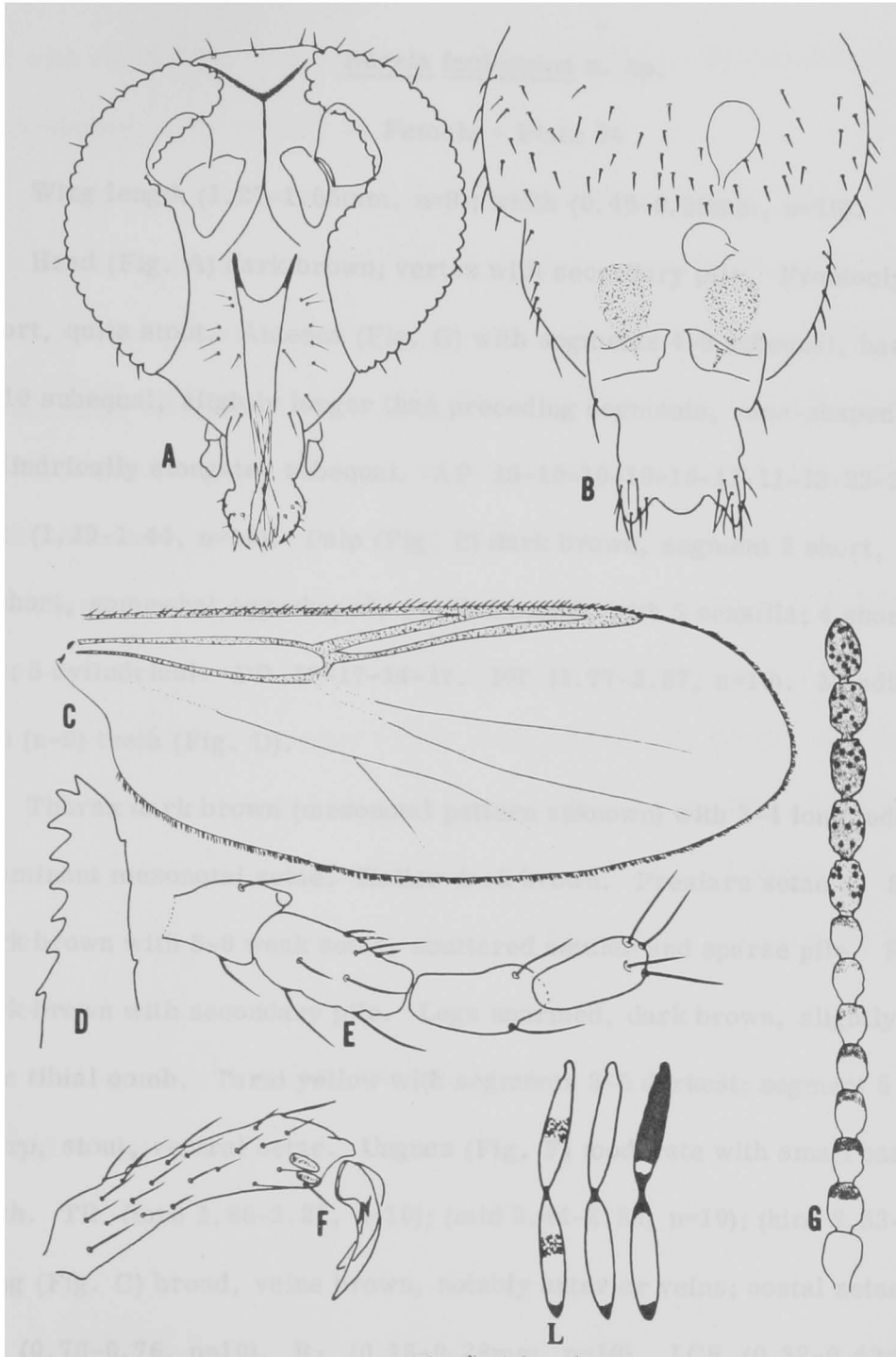


Plate 63 - *B. copiosa* (Thompsen) - F

Bezzia faciespina n. sp.

Female - Plate 64

Wing length (1.27-1.55mm, n=9); width (0.45-0.55mm, n=10).

Head (Fig. A) dark brown; vertex with secondary pile. Frontoclypeal setae short, quite stout. Antenna (Fig. G) with segments 4-8 subequal, barrel-shaped; 9-10 subequal, slightly longer than preceding segments, vase-shaped; 11-15 cylindrically elongate, subequal. AP 15-10-10-10-10-11-11-13-23-24-24-24-26. AR (1.29-1.44, n=10). Palp (Fig. E) dark brown, segment 2 short, cylindrical; 3 short, somewhat egg-shaped, swollen basad, with 5 sensilla; 4 short, cylindrical; 5 cylindrical. PP 13-17-14-17. PR (1.77-2.57, n=10). Mandible with 4-6 (n=9) teeth (Fig. D).

Thorax dark brown (mesonotal pattern unknown) with 3-4 longitudinal rows of prominent mesonotal setae. Halter dark brown. Prealare setae 3. Scutellum dark brown with 5-6 weak setae, scattered setulae and sparse pile. Postscutellum dark brown with secondary pile. Legs unarmed, dark brown, slightly lighter at fore tibial comb. Tarsi yellow with segments 3-5 darkest; segment 5 with 4-5 sharp, stout, ventral setae. Ungues (Fig. F) moderate with small basomedian tooth. TR (fore 1.86-2.21, n=10); (mid 2.44-2.85, n=10); (hind 2.33-2.66, n=10). Wing (Fig. C) broad, veins brown, notably anterior veins; costal setae sparse. CR (0.70-0.76, n=10). R<sub>1</sub> (0.15-0.28mm, n=10). LCS (0.32-0.42mm, n=10).

Abdomen (Fig. B) brown with sparse setal vestiture. One pair thick, dark gland rods extend just over 3 segments. One moderate spermatheca, subspher-

ical with short duct. Dimensions: (.061 x .086mm). Genital sclerotizations talon-shaped, very sharply pointed mesad.

Discussion: This species may be close to B. nigritula (Zett.) Edwards (1926). It is noted that the gland rods of B. nigritula are very short, not extending over one segment. Those of B. faciespina reach three segments. In North America, B. gibbera, bivittata, and flavitibia may also be closely related. This is the only known North American species with one spermatheca. It is also readily recognized by the heavy setae on the frontoclypeal region.

Type: Texas, Gillespie Co., Fredricksburg, holotype F., 2 July 1967, Blanton & Borchers; 1 paratype F., same data; 1 paratype F., 28 July, same data; Juno, Devil's R., 1 paratype F., 13 June 1953, W.W. Wirth. Arizona, Pena Blanca, 10 mi. w Nogales, l.t., 2 paratype F., 1 Aug. 1961, Werner, Nutting, and Johnson. Mexico, Sonora, 10 mi. e Navajoa, l.t., 2 paratype F., 13 Aug. 1959, Werner & Nutting; Sonora, 5 mi. w Alamos, l.t., 2 paratype F., 14 Aug. 1959, Werner & Nutting.

Distribution: Arizona, Mexico, Texas.

Material Studied: See type.

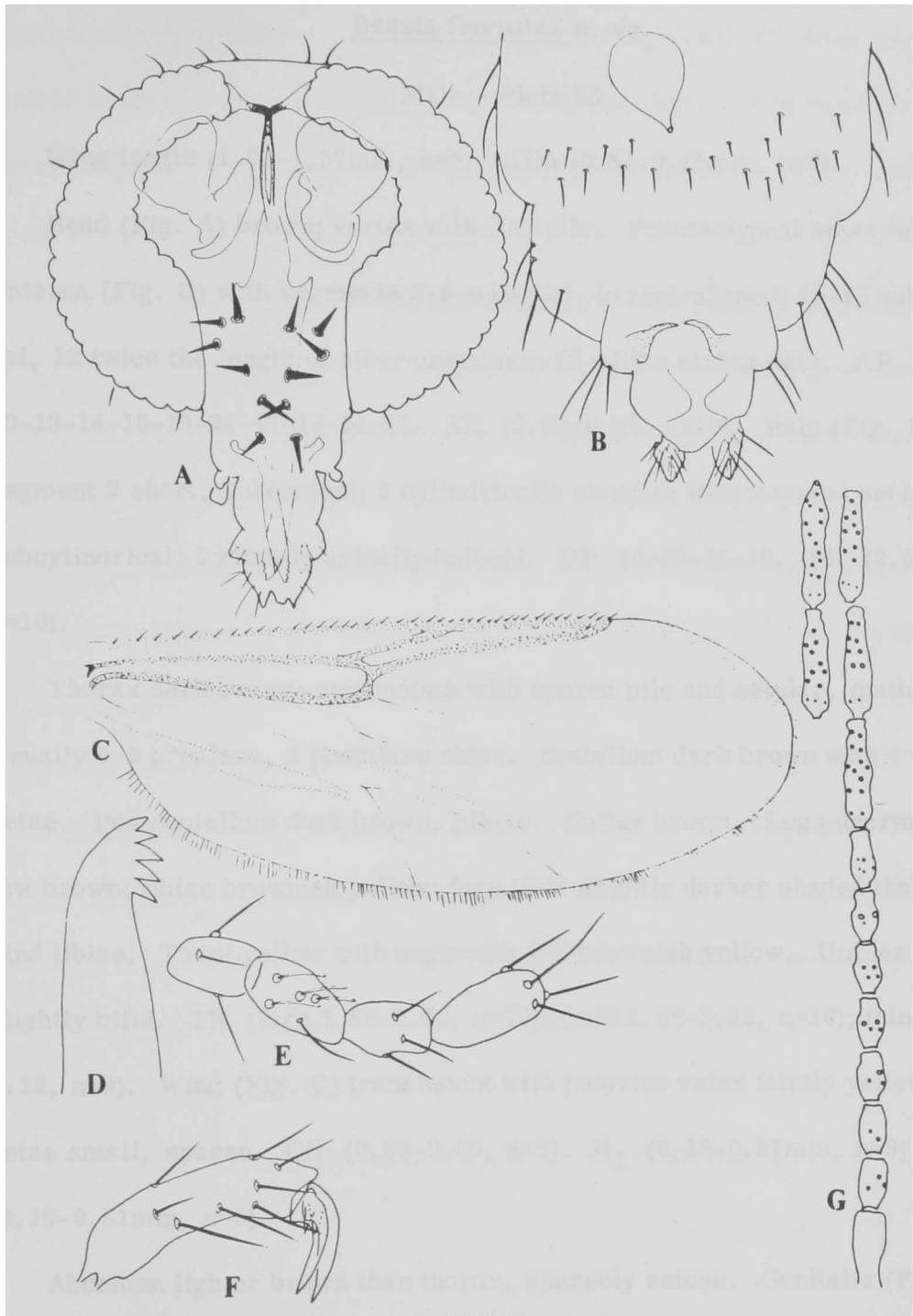


Plate 64 - *B. faciespina* n. sp. - F

Bezzia flavitibia n. sp.

Male - Plate 65

Wing length (1.01-1.57mm, n=9); width (0.38-0.45mm, n=9).

Head (Fig. A) brown; vertex with fine pile. Frontoclypeal setae long, fine. Antenna (Fig. G) with segments 3-9 subequal, barrel-shaped; 10-15 subcylindrical, 12 twice the length of other segments; 13 with a strong seta. AP 23-12-13-13-13-14-15-19-24-47-18-24-24. AR (0.67-0.98, n=10). Palp (Fig. E) brown; segment 2 short, subconical; 3 cylindrically elongate with 3 mesal sensilla; 4 subcylindrical; 5 slightly apically bulboid. PP 16-26-14-16. PR (2.50-4.28, n=10).

Thorax dark brown; mesonotum with sparse pile and setulae, (pattern unknown). Usually 4-5 prealare, 1 postalare setae. Scutellum dark brown with 4 moderate setae. Postscutellum dark brown, pilose. Halter brown. Legs unarmed; femora brown; tibiae brownish yellow; fore tibia slightly darker shaded than mid and hind tibiae. Tarsi yellow with segments 4-5 brownish yellow. Ungues (Fig. F) slightly bifid. TR (fore 1.88-2.26, n=10); (mid 1.88-2.32, n=10); (hind 1.83-2.12, n=9). Wing (Fig. C) translucent with anterior veins faintly yellow; costal setae small, sparse. CR (0.63-0.69, n=9).  $R_1$  (0.18-0.27mm, n=9) LCS (0.19-0.31mm, n=9).

Abdomen lighter brown than thorax, sparsely setose. Genitalis (Fig. B) with tergum 9 narrow, apically conical, subequal to length of lateral lobes. Sternum 9 short, with broad shallow, U-shaped caudomedian excavation. Basimere subconical with basomesal expansion, sparsely setose. Telomere stout, sub-



equal to length of basimere, nearly straight with apex slightly bent mesad, knobby setose. Parameres with ornate basal processes, long rod-like apical process slightly expanded basad. Aedeagus narrowly subconical apically with basal arms nearly laterally divergent.

Discussion: The dark halter and bicolorous legs place this species near B. bivittata and B. gibbera. It is easily distinguished by having yellow tibiae. The male genitalia also differs from B. bivittata (no male is known for B. gibbera).

This species is peculiar in that its femora are unarmed yet possesses a moderate mesovertical seta (not figured). Since the Pseudobezzia and Bezzia s. str. are separated on the basis of armed femora, this species is placed with the Aspinabezzia. Perhaps this combination of characters indicates a bridge between the three groups.

Type: New York, St. Lawrence Co., Cranberry L., swamp, holotype M., 5 paratype M., 25 June 1963, W.W. Wirth; Allegany St. Pk., sphagnum bog, 3 paratype M., 3 June 1963, W.W. Wirth; Essex, Hamilton, Newcomb, reared ex berlese funnel, 1 paratype M., 11 May 1959, H.A. Jamnback.

Distribution: New York.

Material Studied: Five slides of males with same data as type.

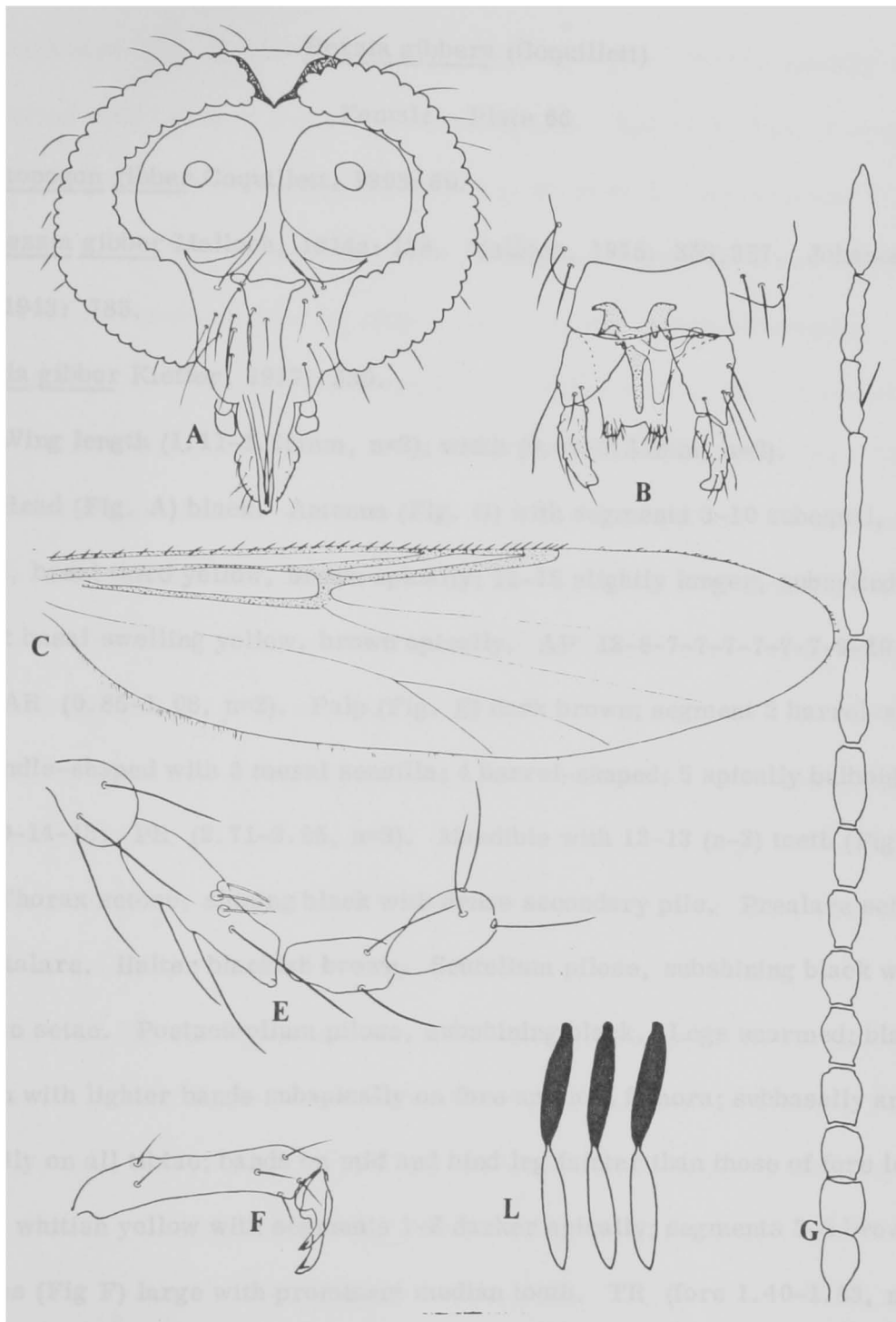


Plate 65 - *B. flavitibia* n. sp. - M

Bezzia gibbera (Coquillett)

Female - Plate 66

Ceratopogon gibber Coquillett, 1905: 60.

Probezzia gibber Malloch, 1914a: 138. Malloch, 1915: 353, 357. Johannsen, 1943: 785.

Bezzia gibber Kieffer, 1917: 330.

Wing length (1.11-1.25mm, n=2); width (0.49-0.52mm, n=2).

Head (Fig. A) black. Antenna (Fig. G) with segments 3-10 subequal, sub-ovoid, basal third yellow, brown apically; 11-15 slightly longer, subcylindrical, slight basal swelling yellow, brown apically. AP 12-8-7-7-7-7-7-7-9-10-9-10-15. AR (0.85-1.08, n=2). Palp (Fig. E) dark brown; segment 2 barrel-shaped; 3 spindle-shaped with 5 mesal sensilla; 4 barrel-shaped; 5 apically bulboid. PP 13-20-14-13. PR (2.71-2.85, n=2). Mandible with 12-13 (n=2) teeth (Fig. D).

Thorax setose, shining black with dense secondary pile. Prealare setae 3; 1 postalare. Halter blackish brown. Scutellum pilose, subshining black with 5 coarse setae. Postscutellum pilose, subshining black. Legs unarmed; blackish brown with lighter bands subapically on fore and mid femora; subbasally and subapically on all tibiae; bands on mid and hind leg fainter than those of fore leg. Tarsi whitish yellow with segments 1-2 darker apically; segments 3-5 brown. Ungues (Fig F) large with prominent median tooth. TR (fore 1.40-1.83, n=2); (mid 1.95-2.33, n=2); (hind 2.04-2.35, n=2). Wing (Fig. C) small, opaque, radial cell small, anterior veins yellow. CR (0.69-0.75, n=2). R<sub>1</sub> (0.14-0.21mm, n=2). LCS (0.28-0.35mm, n=2).

Abdomen (Fig. B) blackish brown, sparsely setose, denser apically. One pair gland rods reach to third abdominal segment. Spermathecae: 2 unequal, subovoid, one more elongate, both with very short neck. Dimensions: (.046 x .074mm -- .049 x .111mm). Genital sclerotizations band-like, laterally opposed the mesal extreme enlarged forming concave, crescent-shaped margin.

Discussion: The description and figures of internal structures are not certain. Confirmation of these structures involves dissection of the type. Figures are based on the slide from Florida and secondarily on the specimen from Arizona. The type locality is Cuba. The Florida specimen is probably closest. Several males with typical coloration are available but possess different configuration of genitalia. They are not figured.

Type: Coquillett (1905), Cuba, Cayamas, holotype F., 16 January, E.A. Schwarz, (USNM).

Distribution: Coquillett (1905), Cuba; Malloch (1915), Illinois, Kieffer (1917), Hungary; Arizona, Florida, Tennessee.

Material Studied: (pinned) TENNESSEE, Gatlinburg, Cove Forest, GSMNP, 1F., 3000' Sweep, 24 June 1947, R.H. Whitaker. (slides) ARIZONA, Portal, sw, Vale Res. Sta., 1F., l.t., 28 May 1967, C.W. Sabrosky. FLORIDA, Alachua Co., Chantilly Acres, 1F., 1 Nov. 1967, F.S. Blanton.

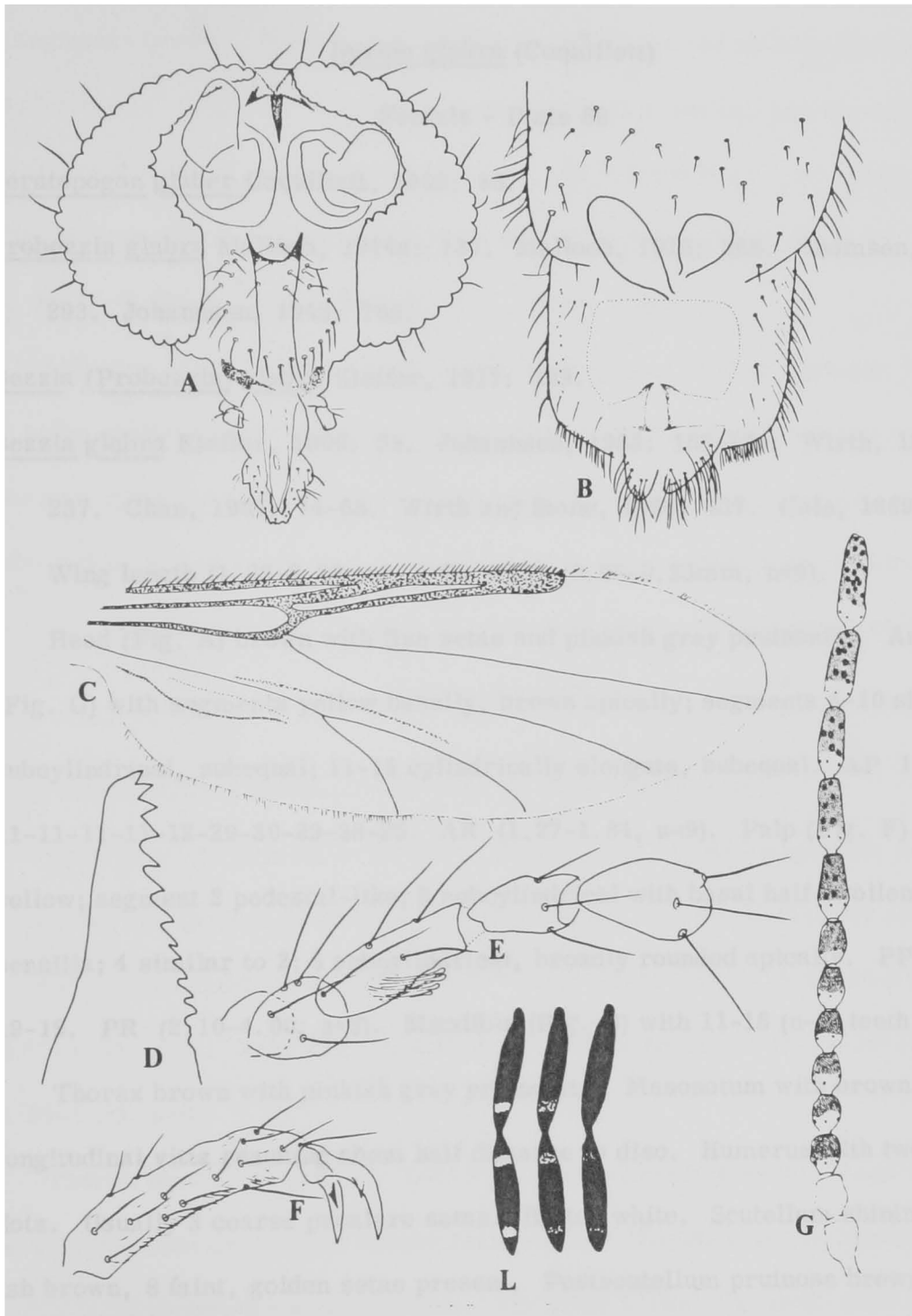


Plate 66 - *B. gibbera* (Coquillett) - F

Bezzia glabra (Coquillett)

Female - Plate 68

Ceratopogon glaber Coquillett, 1902: 85.

Probezzia glabra Malloch, 1914a: 137. Malloch, 1915: 355. Thomsen, 1935:  
293. Johannsen, 1943: 785.

Bezzia (Probezzia) glabra Kieffer, 1917: 329.

Bezzia glabra Kieffer, 1906: 58. Johannsen, 1952: 167-174. Wirth, 1952: 236-  
237. Chan, 1967: 14-68. Wirth and Stone, 1968: 437. Cole, 1969: 96.  
Wing length (1.63-2.39mm, n=9); width (0.55-0.83mm, n=9).

Head (Fig. A) brown with fine setae and pinkish gray pruinosity. Antenna  
(Fig. G) with segments yellow basally, brown apically; segments 4-10 short,  
subcylindrical, subequal; 11-15 cylindrically elongate, subequal. AP 18-11-11-  
11-11-11-11-12-29-30-29-38-25. AR (1.27-1.84, n=9). Palp (Fig. F) golden  
yellow; segment 2 pedestal-like; 3 subcylindrical with basal half swollen, 5 mesal  
sensilla; 4 similar to 2; 5 subcylindrical, broadly rounded apically. PP 15-30-  
19-19. PR (2.10-4.00, n=8). Mandible (Fig. B) with 11-16 (n=9) teeth.

Thorax brown with pinkish gray pruinosity. Mesonotum with brown, median  
longitudinal vitta reaching about half distance to disc. Humerus with two brown  
dots. Usually 3 coarse prealare setae. Halter white. Scutellum shining yellow-  
ish brown, 8 faint, golden setae present. Postscutellum pruinose brown. Legs  
unarmed, yellow. Fore femur with brown dorsomedian patch; dark "knee"; tibia  
with mesal brown band and brown apex. Mid tibia with narrow brown apex. Hind  
leg with dark "knee" and narrow brown tibial apex. Tarsi yellow with apices

of segments brown. Ungues (Fig. E) large, gently curved with moderate baso-median tooth. Fifth hind tarsomere with fine setal covering, notably ventrad. TR (fore 1.47-2.06, n=9); (mid 2.40-2.94, n=9); (hind 2.33-3.33, n=9). Wing (Fig. D) translucent with anterior veins faintly yellow. CR (0.75-0.81, n=9).  $R_1$  (0.28-0.49mm, n=9). LCS (0.49-0.79mm, n=9).

Abdomen (Fig. C) brown with lighter band at apex of each segment; fine golden setae scattered over dorsum. (Some specimens with abdomens totally tan). One pair gland rods reach about 4 segments. Spermathecae: 2 large, subequal, subovoid with very short duct. Dimensions: (.054 x .106mm -- .059 x .108mm). Genital sclerotizations as figured. Gonopore evident mesad between sclerotizations.

Male - Plate 67

Wing length (0.68-1.60mm, n=6); width (0.39-0.60mm, n=6).

Head (Fig. A) similar to female. Antenna (Fig. F) with segments 4-9 subequal, barrel-shaped; 10 similar, slightly longer; 11-15 cylindrically elongate. Antennal plume light yellow. AP 20-11-11-10-11-11-11-12-18-26-24-21-25. AR (0.77-0.91, n=5). Palp (Fig. E) with segmental proportions 15-27-20-17. PR (2.50-3.33, n=6).

Thorax similar to female. Usually 4 coarse prealare setae. Legs similar but fore femoral patch often fainter than female. Ungues (Fig. D) appearing only faintly bifid under high magnification. TR (fore 1.50-1.74, n=6); (mid 2.04-2.40, n=6); (hind 2.00-2.60, n=6). Wing (Fig. C) with CR (0.63-0.78, n=6).  $R_1$  (0.21-0.31mm, n=5). LCS (0.31-0.49mm, n=5).

Abdomen usually somewhat darker than female, sparsely setose. Genitalia (Fig. B) with tergum 9 narrow, apically conical, lateral lobes well developed, rounded apically, setose, extending to apex of basimere. Sternum 9 small, with broad U-shaped caudomedian excavation about one-third length of sternite. Basimere subcylindrical, slightly larger basad, with large basomedian lobe. Telson elongate, conical, nearly straight, sparsely setose. Parameres with highly sclerotized basal processes, a median triangular area lightly sclerotized, apical process long, rod-like. Aedeagus a subtriangular structure with apicolateral margins appearing furled.

Discussion: B. glabra is close to B. coloradensis. The mesonotum with its pinkish-gray pruinosity and brown median vitta and humeral spots readily separate this species from B. coloradensis. The fore femoral "patch" and fore tibial mesal brown band also serve as characters for separation.

Several series of female specimens which agree in every respect with the description of B. glabra, save a subapical brown band on the hind femur and a mesal brown band on the hind tibia, are known from several counties in Florida. The counties and number of specimens are as follows: Alachua-20, Glades-1, Highlands-3, Hillsborough-11, Liberty-1, Orange-1 and Putnam-1. Specimens of B. glabra s. str. were observed from few of these counties. However, substantial representation of B. glabra s. str. is noted from counties bordering or surrounding those mentioned, i. e., Guld, Highlands, Marion, Orange, and Wakulla. The existing evidence indicates the existence of a subspecific population of B. glabra in the extreme west central portion of the state. More extensive collection



and experimentation is needed for confirmation one way or the other.

Type: Coquillett (1902), Florida, Biscayne Bay, A. Slosson, (USNM).

Distribution: Coquillett (1902), Florida; Malloch (1915), Illinois; Johannsen (1943), eastern U.S., (1952), Connecticut; Wirth (1952), District of Columbia, California, Louisiana, Montana, Ontario, Virginia; Arkansas, Maine, Maryland, Michigan, Mississippi, Montana, New York, Pennsylvania, Quebec, Texas.

Material Studied: (pinned) CALIFORNIA, Selma, 1F., 10 July 1947, W. W. Wirth. FLORIDA, Citrus Co., Crystal R., 1F., l.t., 18 Aug. 1950, Hudson; Fort Meyers, 1F., l.t., 2 Feb. 1949, D. Brechtel; Highlands Co., Archbold Biol. St., 1F., l.t., 13-19 Apr. 1970, W. W. Wirth; West Palm B., Morrison Field, 1F., 28 Jan. 1943, D. E. Hardy. LOUISIANA, Baton Rouge, Univer. L., 1F., 6 May 1947, W. W. Wirth; same local., 1M., reared, 25 Feb. 1947, W. W. Wirth. MICHIGAN, Lake City, 1F., 25 June 1952, unknown; Livingston, Co., E. S. George Res., 2F., 4 June 1950, G. Steyskal. MONTANA, Big Timber, 1F., 14 July 1917, H. G. Dyar. NEW YORK, Monroe Co., Braddock Bay, 2F., 12 June 1963, W. W. Wirth. TEXAS, Kerrville, 1M., 1F., 17 May 1954, L. J. Bottimer. VIRGINIA, Richmond Co., Wausau, 2M., 26 July 1952, W. W. Wirth. WASHINGTON, D.C., 1M., 6 Aug. 1947, W. L. AcAtee. (slides) ARKANSAS, Hempstead Co., Hope Exp. St., 1M., 12 Sept. 1968, J. Sumpter. CALIFORNIA, Rockwell Pond, 1F., ex willow, 10 July 1947, W. W. Wirth. CONNECTICUT, Norwich, 1F., l.t., 9 June 1969, A. Hubert. FLORIDA, Gainesville, Chantilly Acres, 1M., 18 May 1967, F. S. Blanton. LOUISIANA, Baton Rouge, 2M., 1F., l.t., Apr. 1947, W. W. Wirth. MAINE, Old Town, Lake Pushow, 1M., 2F.,

l.t., 1 Aug. 1966, W.W. Wirth. MARYLAND, Montgomery Co., Fairland, 1F.,  
l.t., 26 May 1969, A.H. Hubert. MICHIGAN, Cheboygan Co., 1F., l.t., 21 June  
1966, R.H. Roberts. NEW YORK, Monroe Co., Braddock Bay, 1F., near  
marsh, 12 June 1963, W.W. Wirth. PENNSYLVANIA, Fulton Co., Cowan's Gap  
St. Pk., 1F., l.t., 1 Aug. 1968, T.J. Spilman. QUEBEC, Morgan Arboretum,  
1F., pond algae, 1964, K.L. Chan. TEXAS, Gillespie Co., Fredricksburg, 1F.,  
l.t., 26 June 1967, Blanton and Borchers.

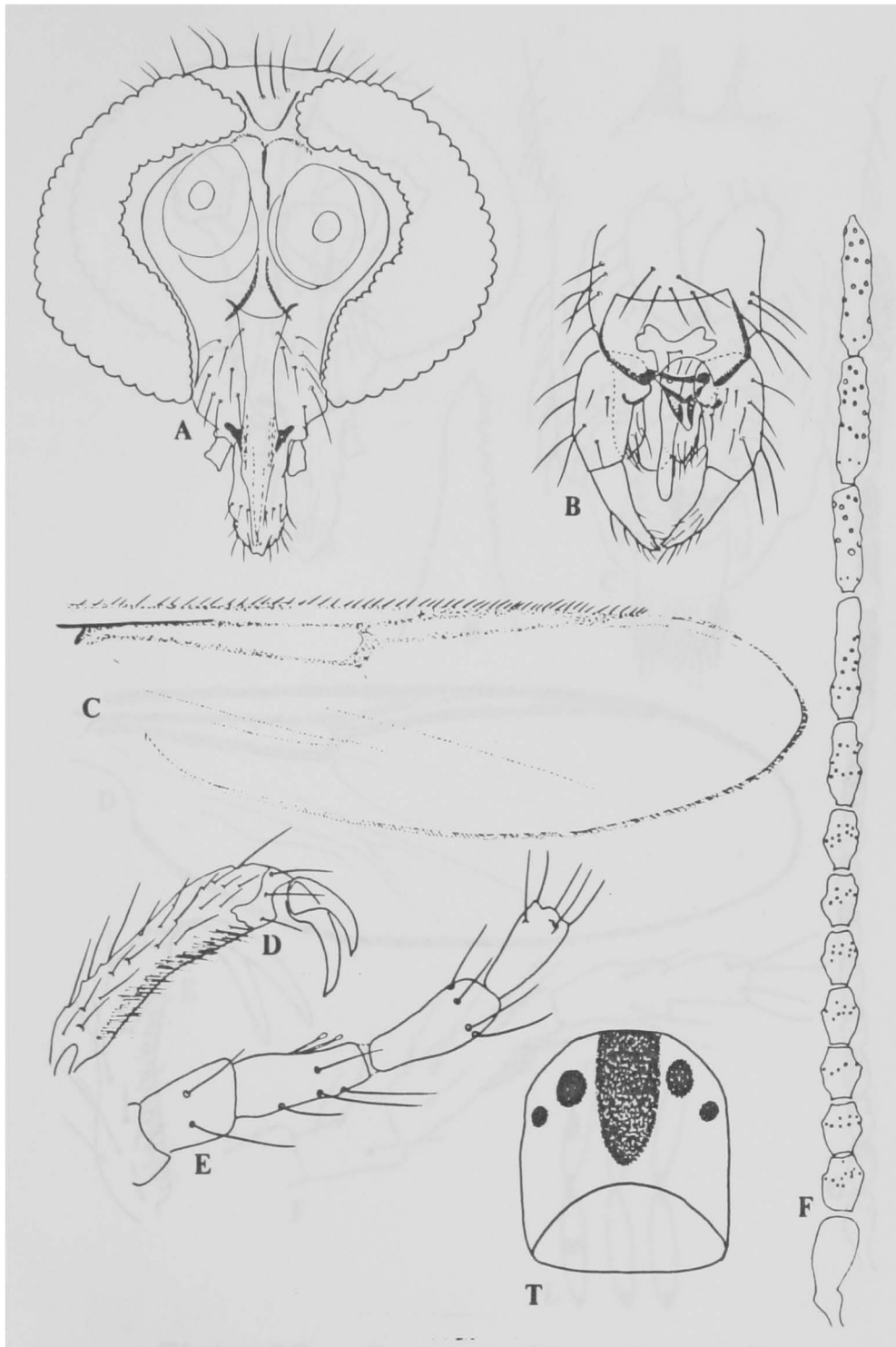


Plate 67 - *B. glabra* (Coquillett) - M

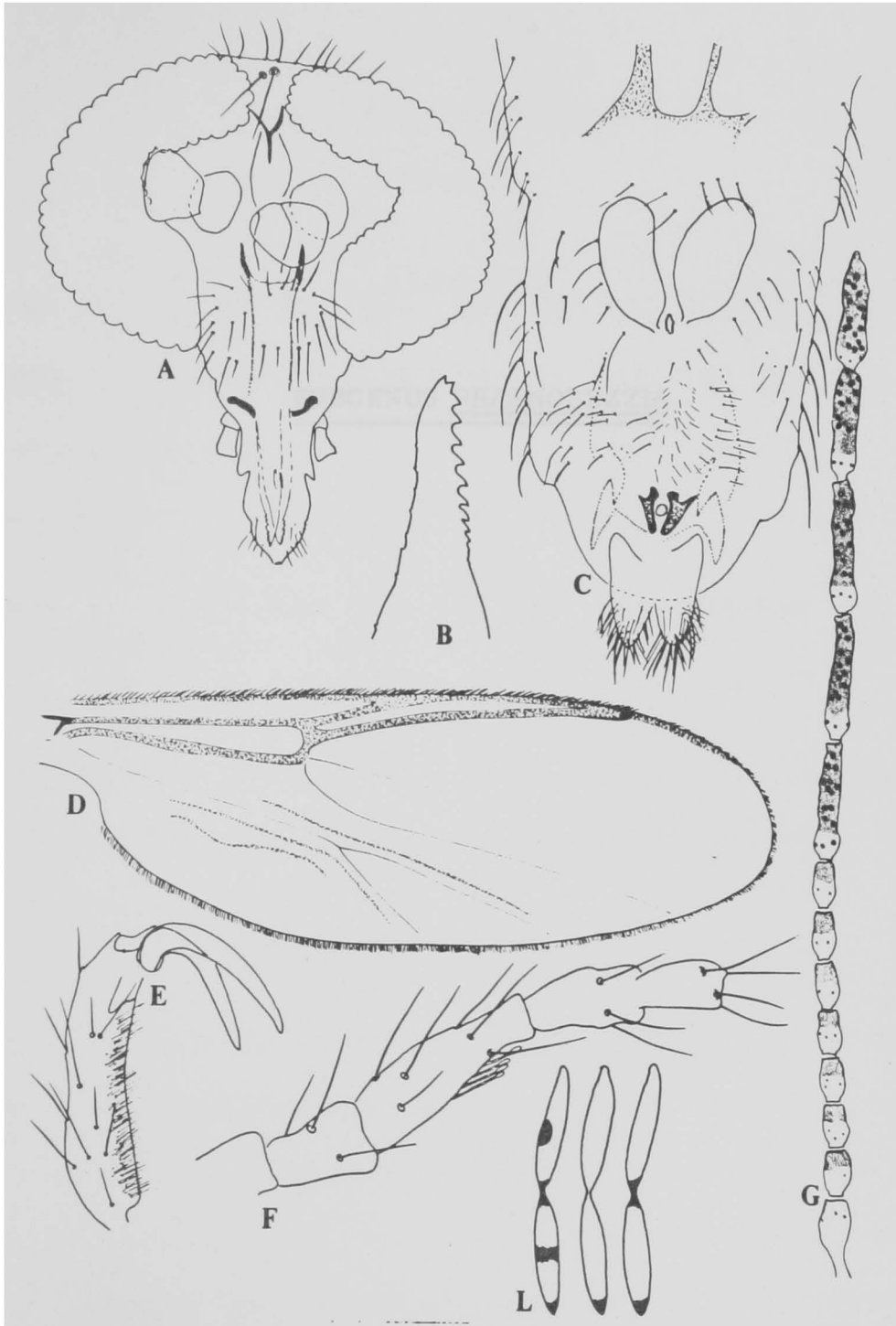


Plate 68 - *B. glabra* (Coquillett) - F

SUBGENUS PHAENOBEZZIA

Table V

Averages of Measured Data

Females

SPECIES	AR	PR	Tarsal Ratio			CR	Wing			
			Fore	Mid	Hind		L	W	R <sub>1</sub>	LCS
<u>B. opaca</u>	1.45	2.79	2.19	2.55	2.49	0.73	1.96	0.66	0.29	0.63

Males

<u>B. opaca</u>	1.11	2.84	1.93	2.28	2.36	0.76	1.28	0.46	0.21	0.31
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Bezzia opaca (Loew)

Female - Plate 70

Ceratopogon opacus Loew, 1861: 312.

Probezzia opaca Malloch, 1914a: 138. Malloch, 1915: 357. Johannsen, 1943: 785.

Bezzia (Probezzia) opaca Kieffer, 1917: 329.

Ceratopogon pachymerus Williston, 1900: 224. (Wirth, 1952: 239.).

Probezzia pachymera Malloch, 1914a: 137. Malloch, 1915: 355. Johannsen, 1943: 785.

Probezzia fulvithorax Malloch, 1915: 354. Johannsen, 1943: 785. (Wirth, 1952: 239.).

Bezzia opaca Kieffer, 1906: 58. Wirth, 1951: 324. Wirth 1952: 239-240.

Johannsen, 1952: 167. Haeselbarth, 1965: 302. Wirth and Stone, 1968: 437. Cole, 1969: 97.

Wing length (1.75-2.37mm, n=9); width (0.61-0.75mm, n=9).

Head (Fig. A) brown. Antenna (Fig. G) with segments 3-10 subequal, vase-shaped, yellow basal half, brown apically; 11-15 cylindrically elongate with slight basal swelling yellow, brown apically. AP 22-12-12-12-13-13-13-14-21-27-33-37-42. AR (1.21-1.65, n=9). Palp (Fig. F) brown; segment 2 short, subtriangular; 3 subcylindrical with basal half slightly swollen, with 6 mesal sensilla; 4 cylindrical; 5 cylindrical with broadly rounded apex. PP 20-25-15-18. PR (2.44-3.66, n=7). Mandible (Fig. D) with 6-7 (n=10) teeth.

Thorax dark brown, mesonotum densely pubescent, may appear golden in varying light. Humerus often appears darker. Usually 4 large prealare setae. Halter light brown, stalk lighter. Scutellum dark brown with 6 coarse setae. Postscutellum blackish brown, pubescent. Fore and mid legs ochreous with dark "knee" joints. Hind leg becoming darker at mid femur. Tarsi ochreous with apical 3 segments progressively darker. Fifth hind tarsomere with 5 sharp ventral setae. Ungues (Fig. E) stout rather short, with small basomedian tooth. TR (fore 2.00-2.38, n=8); (mid 2.32-2.75, n=8); (hind 2.37-2.69, n=9). Wing (Fig. C) opaque with anterior veins brown. CR (0.51-0.84, n=9).  $R_1$  (0.26-0.37mm, n=6). LCS (0.57-0.71mm, n=6).

Abdomen subshining brown, nearly black, with many fine setae. Two pairs gland rods, proximal pair often difficult to observe. Spermathecae: 2 subequal, subspherical with short duct. Dimensions: (.039 x .056mm -- .054 x .081mm). Genital sclerotizations as figured.

#### Male - Plate 69

Wing length (1.13-1.36mm, n=6); width (0.39-0.51mm, n=6).

Head (Fig. A) similar to female. Antenna (Fig. F) brown with gold plume. Segments 3-10 barrel-shaped; 11-15 cylindrical. AP 20-10-10-10-10-10-10-11-15-25-37-42. PR (2.00-4.40, n=9).

Thorax similar to female. Ungues (Fig. E) with tips faintly bifid. TR (fore 1.46-2.12, n=9); (mid 2.05-2.50, n=9). Wing (Fig. C) with CR (0.74-0.79, n=6).  $R_1$  (0.17-0.28mm, n=8). LCS (0.27-0.37mm, n=8).



Abdomen similar to female. Genitalia (Fig. B) with tergum 9 long, subconical with large lateral lobes, ventral surface spiculate. Sternum 9 short, less than length of basomere, transverse. Basimere reduced, small, subconical. Telomere reduced, very short, subtriangular. Parameres a long rod-like structure apically with apical extreme slightly swollen, basal processes somewhat butterfly-like. Aedeagus broadly subtriangular, spiculate, apical extreme rounded with internal mushroom-shaped sclerotization.

Discussion: Due to the reduced telomeres and basimeres of the male genitalia this is the only known North American species which fits Haeselbarth's (1965) definition of the group Pheanobezzia. As indicated earlier, Pheanobezzia is here considered a subgenus group.

Malloch's discussion (1915) of B. opaca indicates a close relationship to B. fulvithorax and B. incerta. Malloch admittedly did not observe specimens of B. opaca. This is the probable cause of some confusion. Wirth (1952) found B. fulvithorax to be the same as B. opaca. Examination of the type of B. incerta reveals that it is not black but very dark brown, like that of B. opaca. The leg coloration is extremely close. Study of the types seems to indicate these two species to be the same. They are considered synonymous in this paper with B. incerta being the junior synonym. Thus, the name B. opaca would stand for this species.

Type: Loew (1861), Washington, D.C., B. Osten Sacken, (holotype F. in MCA, Cambridge, Mass.)

Distribution: Loew (1861), Washington, D.C.; Wirth (1952), California,

Delaware, Florida, Illinois, Iowa, Maryland, Mexico, Michigan, Mississippi; Johanssen (1952), Connecticut, Alabama, Arizona, Arkansas, Louisiana, New York, New Mexico, Ontario, Virginia.

Material Studied: (pinned) CALIFORNIA, Modoc. Co., Alturas, 2F., July 1948, R. Coleman; Monterrey Co., 1F., 1 July 1948, W.W. Wirth. FLORIDA, Fort Lauderdale, 1F., 13 Aug. 1951, W.W. Wirth; Highlands Co., Archbold Biol. St., 1F., 13-19 Apr. 1970, W.W. Wirth; Sebring, 1F., l.t., 15 Apr. 1970, W. W. Wirth. LOUISIANA, Kilbourne, 1F., 18 May 1947, W. W. Wirth. MARYLAND, Somerset Co., Snowhill, swamp marg., 1F., 16 July 1968, W.W. Wirth. MICHIGAN, Hart, 1F., 14 July 1942, C.E. Sabrosky. NEW YORK, St. Lawrence Co., Cranberry L., swamp, 1F., 25 June 1963, W.W. Wirth. ARIZONA, Sedona Creek Canyon, 2M., 29 June 1963, W.W. Wirth. NEW MEXICO, Jemez Spr., 1M., 4 July 1953, W.W. Wirth. (slides) ALABAMA, Mobile, Dog R., 1F., l.t., Sept. 1968, Blanton & Connon. ARIZONA, Cocconino Co., Oak Creek Canyon, 1M., l.t., C.W. O'Brien. ARKANSAS, Hempstead Co., Hope Exp. St., 1F., b.l.t., 6 Sept. 1968, J. Sumpter; 1F., 2 mi e Smittle Farm 1968, R.E. Woodruff. FLORIDA, Alachua Co., Gainesville, Chantilly Acres, 1F., 19 Apr. 1967, 1F., 1M., 8 May; 1F., 14 May 1967, F.S. Blanton and W.W. Wirth; Gulf Co., Wewahitchka, 1F., l.t., Sept. 1967, Blanton & Boike; Highlands Co., Archbold Biol. St., 1F., l.t., 13-19 Apr. 1970, W.W. Wirth; Hillsboro Co., Harris Swamp, 1F., 5 Apr. 1967, 13 -14 Apr. 1967, unknown; Putnam Co., Redwater L., Weem's prop., 3M., 27-28 May 1967, F.S. Blanton. MARYLAND,

Montgomery Co., Fairland, 4M., 4F., reared, 27 May 1959, A.A. Hubert;  
Worcester Co., Snowhill, 2F., l.t., 30 June 1968, W.H. Anderson. NEW  
YORK, St. Lawrence Co., Wanakena L., marg., 2M., 25 June 1963, W.W.  
Wirth; Cranberry L., swamp 2F., 25 June 1963, W.W. Wirth; Lewis Co.,  
Whetstone Cr., 1M., 1F., 20-23 June 1963, W.W. Wirth. VIRGINIA, Alexan-  
dria, Dyke Swamp, 1F., 11 June 1952, W.W. Wirth.

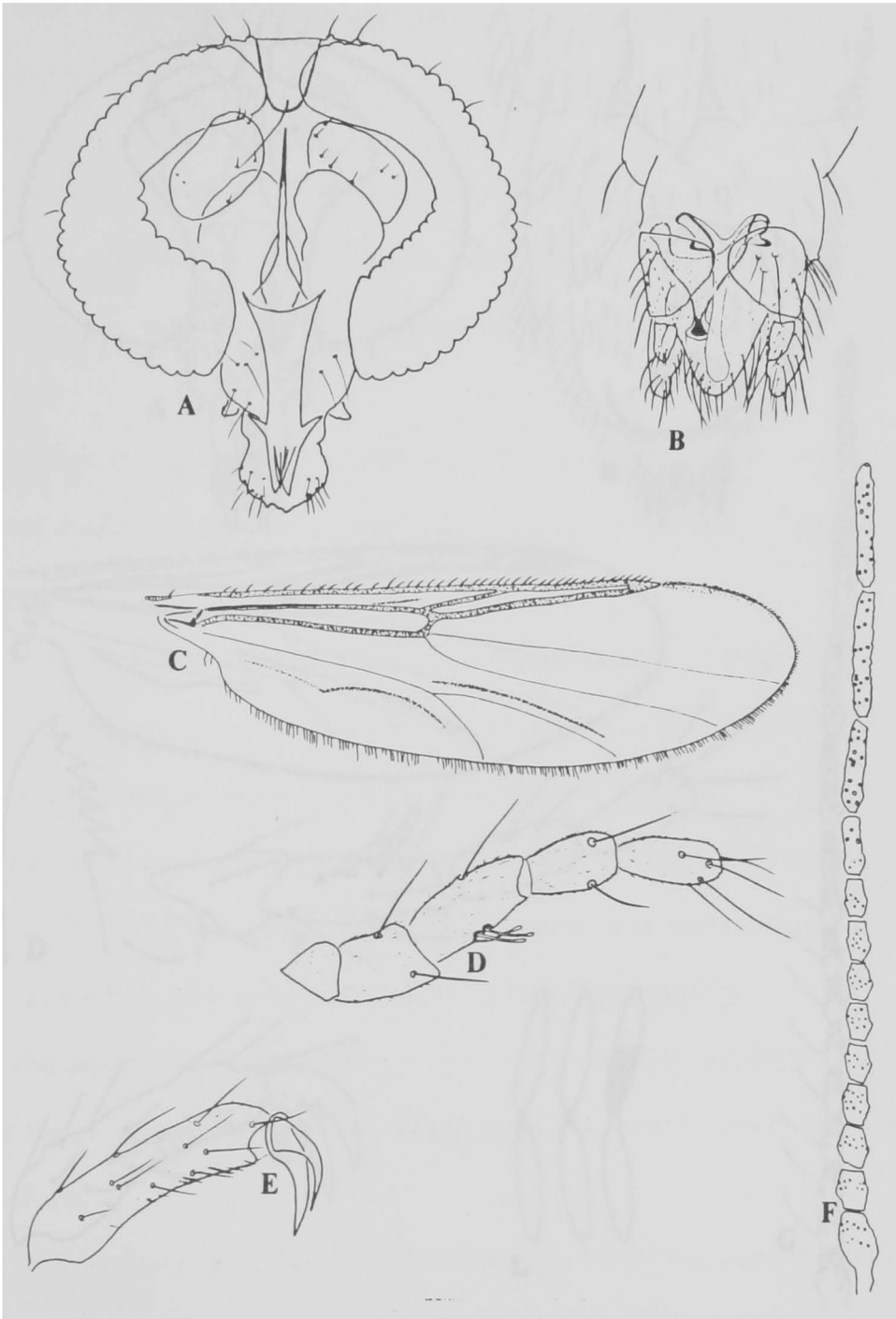


Plate 69 - *B. opaca* (Loew) - M

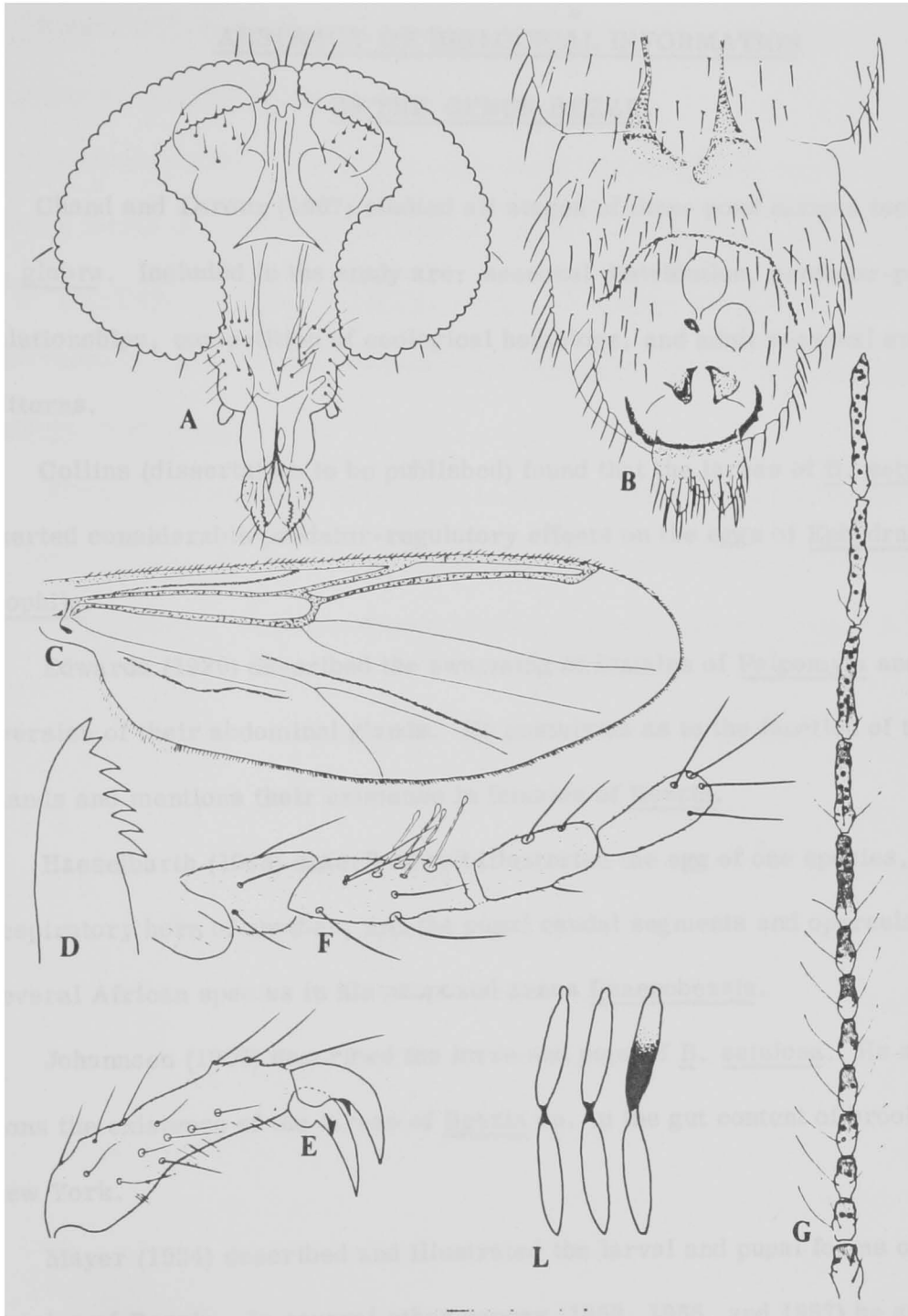


Plate 70 - *B. opaca* (Loew) - F

ABSTRACT OF BIOLOGICAL INFORMATION

OF THE GENUS BEZZIA

Chand and Leroux (1967) studied all stages of three pond midges including B. glabra. Included in the study are: seasonal distribution, predator-prey relationships, competition of ecological homologs, and adult seasonal emergence patterns.

Collins (dissertation to be published) found that the larvae of B. setulosa exerted considerable predator-regulatory effects on the eggs of Ephydra thermophila.

Edwards (1920) described the swarming of females of Palpomyia and the eversion of their abdominal glands. He postulates as to the function of these glands and mentions their existence in females of Bezzia.

Haeselbarth (1965) described and illustrated the egg of one species, the pupal respiratory horn of another, and the pupal caudal segments and opercula of several African species in his proposed genus Phaenobezzia.

Johannsen (1905) described the larve and pupa of B. setulosa. He also mentions the existence of the larvae of Bezzia sp. in the gut content of brook trout in New York.

Mayer (1934) described and illustrated the larval and pupal forms of several species of Bezzia. In several other papers (1952, 1955, and 1957) he studied the biology and immature stages of Bezzia and closely related groups.

Rieth (1915) presents some descriptive and habitat information of larvae and, or pupae of several Bezzia sp.

Thomsen (1937) produced one of the most comprehensive works on the immature forms of ceratopogonid midges. A key and descriptions for the larvae of B. setulosa, copiosa, varicolor, opaca, and glabra are given. Also given are descriptions and a key to the pupae of B. varicolor, flavitarisus, setulosa, glabra, copiosa, and opaca.

Wirth (1952) presents keys to the immature forms of the California genera of Ceratopogonidae. He also presents much descriptive, biological, and habitat information for many genera of ceratopogonids including Bezzia.

## DISCUSSION

Bezzia granulosa Wirth was not reviewed in this paper. The female lacks abdominal gland rods and the claws have an external basal tooth. For these basic reasons, Wirth and Ratanaworabhan (1972), have placed this species in a different genus.

The subgeneric groupings of the genus have been discussed by a variety of authors. Kieffer (1906) described Probezzia as a genus with the species Ceratopogon venustus Meigen as the type. Many authors have since considered Probezzia as a subgenus of Bezzia. Wirth (1952) notes that this same species, C. venustus, was also designated as the type of Dicrobezzia. Due to the rule of priority, Probezzia is the name which must prevail but with the characteristics of Dicrobezzia. However, a number of species exist with the following characteristics; femora unarmed, gland rods present, claws with internal basal tooth, batonnets absent though coarse, sharply pointed, ventral tarsal setae may be present. These species are grouped in the Probezzia of the authors.

It is this Probezzia that is considered a subgenus of Bezzia by Keiffer (1917), Ingram and MacFie (1923), Edwards (1926), Goetghebuer (1934), DeMeillon (1936), MacFie (1940), Zilahi-Sebess (1940-1943), Tokunaga (1939), Tokunaga and Murachi (1959), and Clastrier (1958a, 1961). But, Malloch (1915), Ingram and MacFie (1921), Thomsen (1935, 1937), DeMeillon (1938, 1942), Johannsen (1931, 1943), and Tokunaga (1966) considered Probezzia as a full genus.

Wirth (1962) reviewed the Palpomyia-Bezzia-Macropeza group. He recognized Probezzia as a genus with the characters of the old Dicrobezzia: "female fifth



hind tarsomere armed with blunt batonnets; abdomen lacking internal gland rods; costa extending to wing tip; claws with external basal tooth; with blunt erect scutal bristles." Those species with the characters "fifth hind tarsomere of female unarmed or provided only with slender, sharp-tipped setae; claws equal; costa not prolonged; fifth tarsomere slender; female abdomen with internal gland rods; one radial cell; femora unarmed;" are grouped with the Bezzia under the heading "(Probezzia of authors) New Subgenus".

Malloch (1915) described Pseudobezzia as distinct from Bezzia due to the presence of a petiolate medial vein. Wirth (1952) states: "The position of the fork of the media on which Malloch (1915) based his genus Pseudobezzia is variable, tending to be just at the crossvein in the females and with a very short petiole in the males. Other species of Bezzia also have the media forking at the crossvein. The large size of the male genitalia and extreme contraposition of the aedeagus and the parameres might serve as a better base of separation of Pseudobezzia, but again other species of Bezzia approach this character. Therefore, Pseudobezzia is not considered as worthy of generic rank".

Tokunaga (1939) divided Bezzia into five subgenera but did not include the Pseudobezzia. In 1959 he indicated that the Pseudobezzia were identical with the Bezzia s. str., and in 1966 included it with the Bezzia. Johannsen (1952) grouped the Pseudobezzia and the Probezzia of the authors with Bezzia s. str. Wirth (1962) recognized the Pseudobezzia subgenerically as having the medial fork just petiolate; costa short; legs very spiny.

Haeselbarth (1965) proposed a new genus, Phaenobezzia, with Probezziapistiae Ingram and MacFie as the type. The prime basis of this genus is the reduction of, or absence of telomeres of the male genitalia.

Remm (1972) recognized the Bezzia s. str. and the subgenus Homobezzia for those species with rather large genitalia and very reduced but ornate telomeres, such as B. albicornis Meigen. In 1973, Remm (personal communication) divided the 56 species occurring in the U.S.S.R. into five subgenera. He postulated that three of these subgenera are represented in the Nearctic Region; Bezzia s. str., Homobezzia and Phaenobezzia. He also stated that several of the species placed in the Pseudobezzia are marginal with Bezzia s. str. and that Pseudobezzia is not a concrete group.

At this point, it is appropriate to discuss the subgeneric arrangement presented in this paper. Haeselbarth (1965) stated: "because of the difficulties in defining generic characters for the females it would be desirable at present not to consider Phaenobezzia as a separate genus but to allocate the species in it to one of the existing genera, for instance Bezzia." Primarily for this reason, I consider the Phaenobezzia as a subgenus of Bezzia.

Opinions vary as to the validity and solidarity of the Pseudobezzia as a subgenus. As noted by the authors, the previous definitions of the group did have some variables sometimes difficult to reconcile. However, I feel that the Nearctic species of Bezzia with armed fore femora can be readily separated into two rather obvious groups. One group, those considered Pseudobezzia in this paper, possess a large (several in isolated cases) median seta in addition to the smaller setae of the

of the median vertex area of the head. The second group, those considered here as Bezzia s. str., lack the large seta. This premise is further substantiated in the female anatomy. The Nearctic species of Pseudobezzia females possess only one pair of internal abdominal gland rods. The spermathecae are usually oval to oblong. The females of Bezzia s. str. possess multiple pairs of gland rods in over half the species studied. The spermathecae of this group are usually subspherical with a few instances of suboval shaped. For these principle reasons, these two groups have been separated accordingly.

The separation of the unarmed Bezzia seems quite logical. This group is known to most students as the Probezzia. But as previously noted by Wirth, the group is in need of a new name. The name Probezzia has priority over Dicrobezzia but with the characters of the old genus Dicrobezzia. The name Aspinabezzia is proposed to take the place of the pre-occupied Probezzia.

This study has hopefully produced some changes and resolved some of the questions of earlier students.

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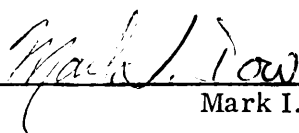
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Mark I. Dow

A TAXONOMIC REVISION OF THE NEARCTIC SPECIES  
OF THE GENUS *BEZZIA* (DIPTERA: CERATOPOGONIDAE)

Mark I. Dow

ABSTRACT

This study is intended as a collective standardization of descriptions and illustrations of the species of *Bezzia* in the Nearctic Region. Forty-three species are reviewed, 14 of which are new. Two species are thought to be junior synonyms. A new subgeneric name, *Aspinabezzia*, is proposed for the already occupied *Probezzia* of the authors. A key to the adults is presented. When possible, both sexes are illustrated. Including types, approximately 5,000 specimens have been examined. The specimens are both pinned and dissected, mounted on microscope slides. The specimens were borrowed largely from two collections, the U.S. National Collection and the Canadian National Collection. Type specimens were borrowed from several other collections. Numerical data is presented concerning measurements and ratios of the antenna, palp, length-width-costa- $R_1$ -and last costal segment of the wing, tarsi, and the female spermathecae. The subgeneric groupings are discussed. Four subgenera are recognized: *Pseudobezzia*, *Bezzia* s. str., *Aspinabezzia* n. subgen., and *Phaenobezzia*.