THE ASILIDAE (DIPTERA) OF ALBERTA

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A taxonomic treatment for the adults of 85 species of Asilidae of Alberta and brief notes on their ecological relationships and habitats are presented. To the 66 species listed by Strickland (1938, 1946) the following eleven are added: Lasiopogon trivittatus *Melander,* L. hinei *Cole and Wilcox,* L. canus *Cole and Wilcox,* Heteropogon wilcoxi *James,* Cyrtopogon aurifex *Osten-Sacken,* C. inversus *Curran,* C. glarealis *Melander,* Laphria scorpio *McAtee,* L. index *McAtee,* Leptogaster aridus *Cole, and* L. coloradensis *James. Eight new species,* Lasiopogon prima, Holopogon nigripilosa, Cyrtopogon distinctitarsus, Eucyrtopogon incompletus, Pogonosoma stricklandi, Asilus aridalis, A. gramalis, *and* A. cumbipilosus, *are described.*

The Asilidae, also known as robber flies or assassin flies, are predaceous insects, easily recognized by their morphological characters as well as by their activities. All of these flies have an excavated front and vertex to form a V-shaped depression. Both sexes are dichoptic. Some characters show sexual dimorphism.

The family consists of about 5000 known species, distributed over the six zoogeographic regions. Hull (1962) listed the number of species occurring in each region. According to Martin (1965), the Nearctic Region has the greatest number of species. There are five subfamilies: Dasypogoninae, Leptogastrinae, Laphriinae, Asilinae, and Megapodinae. The last subfamily is confined to the Neotropical region. Fifteen of 18 genera described from the Eocene, the Oligocene, and the Miocene, are still living (Hull 1962).

Alberta is a province where many different zoogeographic elements meet and play roles in the diversity of the living beings occurring there. Allan (1943) has described the geology, Moss (1955) has provided the description of the plant communities in Alberta, and Odynsky (1962) has presented a map of soil zones of Alberta.

Few groups of insects or other arthropods of Alberta, have been studied on a regional basis. The systematics of the acridoid Orthoptera of southern Alberta, Saskatchewan, and Manitoba, have been presented by Brooks (1958), and a study of the spotted fever and other Albertan ticks has been made by Brown (1944). Lists of some groups of insects have been published, including an annotated list of the Diptera of Alberta by Strickland (1938, 1946). This study was mainly of taxonomy and geographical distribution, but some ecological notes, which may be useful for further ecological study, are also presented. The Asilidae of Alberta have not been studied in detail, although a few new species have been described from this province (Curran 1923). In Strickland's lists, 66 species of Asilidae were included, but eleven of these species probably do not occur in Alberta. In this study, 19 species have been added to the Alberta list, and of these eight are new species. The newly collected

specimens are deposited in the collection of the University of Alberta, and the holotypes and the allotypes of the new species are deposited in the Canadian National Collection in Ottawa. The deposition of the specimens examined is indicated by abbreviations between parentheses following locality names. The abbreviations are:

AMNH	American Museum of Natural History, New York City, N. Y.
CAS	California Academy of Sciences, San Francisco, California.
CNC	Canadian National Collection, Ottawa, Ontario.
DE	Mr. D. Elliott, Calgary, Alberta.
LMK	Mr. L. M. Kenakin, Edmonton, Alberta.
UA	University of Alberta, Edmonton, Alberta.
USNM	United States National Museum, Washington, D.C.
WSU	Washington State University, Pullman, Washington.

Habitats of the Adults

Habitats of some species of the Asilidae have been described. Melin (1923) studied the biology of the Asilidae of Sweden. James (1938) discussed the habitat preference of the Asilidae of Colorado, and Bromley studied the habitats of the adults of Connecticut (1946) and of Florida (1950). The following publications contain habitat data for certain groups: Wilcox and Martin (1936) for *Cyrtopogon* Loew; Melander (1923b) for *Lasiopogon* Loew; Baker (1939) for some species of robber flies from Coahuila, Mexico; Blanton (1939); and Cole (1916).

The robber flies are sun-loving insects of dry open areas. Habitats most commonly frequented are: dry fields, pastures, open bush country, sandy areas, and edges of woods. According to Hull (1962), in desert or semidesert country, these flies are attracted to small streams, and in temperate regions, a few species occur in swampy areas and in deep forest. Bromley (1946) stated that asilids were practically absent from deep dark woods and swamps. For the state of Colorado, James (1938) gave a list of five different habitats in which he found asilids. The grassland habitat had the greatest number of species, 36, representing nine genera. Bare areas and thickets were poor in Asilidae. Bromley (1946) listed nine habitats for Connecticut. Seventeen genera containing 43 species were recorded from woodlands and bushy pastures. The species of bushy pastures were similar to those of the woodlands, but more abundant. Adults are collected consistently in Alberta in grasslands: pastures, semi-arid short grass prairie, beach grassland (close to lake or river), openings in the parkland forests; river banks and lake beach; woodland paths; sandpits and sand dunes; coniferous forests; and bare fields.

Distribution of Asilidae

Each ecological region of Alberta seems to have certain asilid species. These species are more or less limited in their distribution by the boundaries of these regions. The zonation of the province of Alberta applied here is based on that of Moss (1955) and Brooks (1958).

Prairie

This region is by far the richest in asilid species. Of 37 species

recorded, 16 have not been found elsewhere in the province. *Lasiopogon terricola* Johnson, *L. quadrivittatus* Jones, *Stenopogon obscuriventris* Loew, *Eucyrtopogon albibarbis* Curran, and *Asilus gramalis* new species, have also been found in the Parkland; *Lasiopogon trivittatus* Melander, *Stenopogon inquinatus* Loew, and *Asilus erythocnemius* Hine, in the Boreal and the Boreal-Cordilleran Transition; while *Holopogon albipilosus* Curran, *Lestomyia sabulonum* Osten-Sacken, *Erax subcupreus* Schaeffer, *Asilus mesae* Tucker, *Asilus gramalis* new species, *Negasilus belli* Curran, have also been found in the Subalpine and the Montane regions. On the other hand, some species, *Cyrtopogon willistoni* Curran, *Bombomima columbica* Walker, *Laphria gilva* L., and *Leptogaster aridus* Cole, may have been extending from the Subalpine and the Montane regions into the Prairie region. Two species, *Stenopogon inquinatus* Loew and *Cyrtopogon bimacula* Walker, are more or less ubiquitous in Alberta.

Boreal forest

There are 17 species recorded from the Boreal forest, but the following species are limited to it: *Holopogon nigripilosa* new species, *Bombomima posticata* Say, *Laphria scorpio* McAtee, *Laphria aeatus* Walker, *Laphria index* McAtee, and *Asilus nitidifacies* Hine. The species: *Lasiopogon hinei* Cole and Wilcox, *Bombomima insignis* Banks, and *Laphria janus* McAtee, have extended southward to the Parkland, and westward (except *Bombomima insignis* Banks) to the Boreal-Cordilleran Transition and Subalpine regions. Some other species present in the Boreal region may have been the result of "invasion" from the Prairie, such as *Lasiopogon trivittatus* Melander and *Asilus erythocnemius* Hine, or from the Subalpine or the Montane region, such as *Cyrtopogon dasyllis* Williston, *Laphria sedales* Walker, and *Asilus callidus* Williston. *Cyrtopogon distinctitarsus* new species is found in the Boreal forest and in the Prairie.

Subalpine and Montane regions

The Subalpine region is the second richest in the species of Asilidae in the province. Of 23 species recorded, only two are confined to this region: *Cyrtopogon sansoni* Curran and *Cyrtopogon albovarians* Curran. The remainder are elsewhere, mostly in the Montane region, with some others in the Boreal and the Prairie regions. Another species found here, *Asilus erythocnemius* , might have entered this zone from the Prairie region.

Parkland and Boreal-Cordilleran

These regions are transitional. As one might have expected, asilids found here are a mixture of species from two or more regions. In the Parkland region, the species are mostly from the Prairie region, while those in the Boreal-Cordilleran region, are mostly from the Subalpine or the Montane regions. The Boreal species seem to have extended equally to these two transitional regions.

Feeding Habits

Without exception, all species of the Asilidae are predaceous in the adult stage. Food selection of this group, according to Hull (1962), has been studied considerably, by Hobby and Poulton for the British

Asilidae, Carerra for South American species, and in North America by Bromley. However, according to James (1938), as far as food is concerned, the Asilidae are indiscriminate. The food is variable, including dragonflies, grasshoppers, Hemiptera, Hymenoptera, Coleoptera, Lepidoptera, and Diptera. Spiders as food have been reported by Bristowe (1924) and Bromley (1946). Cannibalism has been reported in *Diogmites angustipennis* Loew by Alex (1936), and in Alberta, there is a cannibalistic tendency in *Stenopogon inquinatus* Loew. Cannibalism in association with courtship has been reported in *Dasypogon diadema* Fabricius by Poulton (1906).

TABLE 1. Dates of first appearance of some species of the Asilidae and numbers collected, from some localities in southern Alberta.

Species	Locality	June 1964 1,	2,	10,	Aug. 1963 3,	6,
Lasiopogon quadrivittatus Jones	Writing-on-Stone Park, river bank		18			
Lestomyia sabulonum Osten-Sacken	Writing-on-Stone Park, upper plain		10			
Lestomyia sabulonum Osten-Sacken	Comrey, Milk River Valley	6				
Aslius mesae Tucker	Kinbrook Island Park, Lake Newell			12		
Asilus cumbipilosus new species	Kinbrook Island Park, Lake Newell			14		
Asilus aridalis new species	Kinbrook Island Park, Lake Newell			2		
Asilus gramalis new species	Kinbrook Island Park, Lake Newell			2		
Stenopogon coyote Bromley	Writing-on-Stone Park, river bank				6	
Stenopogon coyote Bromley	Comrey, Milk River Valley				3	
Stenopogon neglectus Bromley	Comrey, Milk River Valley				11	
Leptogaster aridus Cole	Writing-on-Stone Park, upper plain				1	
Proctacanthella cacopiloga Hine	Writing-on-Stone Park, river bank				8	
Nerax bicaudatus Hine	Writing-on-Stone Park, upper plain				3	
Nerax bicaudatus Hine	Comrey, Milk River Valley				8	
Asilus erythocnemius Hine	Kinbrook Island Park, Lake Newell					7

Predators

The asilids have enemies: spiders, wasps, birds, lizards, mantids (Hull 1962), and in very rare cases, the larvae of *Cicindela* Linnaeus. A species of red mite was found attached to the external parts of some specimens of the species *Lasiopogon cinereus* Cole and *L. trivittatus* Melander.

Seasonal Succession of Species

Seasonal succession occurs in the adult Asilidae. Bromley (1934) mentioned the occurrence of four distinct groups of the Asilidae, in Brazos County, Texas, according to the period or time of appearance. Data from a few Alberta localities are presented in Table 1. Although no conclusion can be drawn, there is slight indication, that in the southern parts of Alberta, the adults occur as two seasonal groups. The first group appears in early June. Included here are *Lasiopogon quadrivittatus* Jones, *Lestomyia sabulonum* Osten-Sacken, *Asilus mesae* Tucker, *Asilus cumbipilosus* new species, *Asilus aridalis* new species, and *Asilus gramalis* new species. The second group appears in early August, and includes *Stenopogon coyote* Bromley, *Stenopogon neglectus* Bromley, *Leptogaster aridus* Cole, *Proctocanthella cacopiloga* Hine, *Nerax bicaudatus* Hine, and *Asilus erythocnemius* Hine.

TAXONOMIC TREATMENT

All of the subfamilies except the Megapodinae, which occurs only in the Neotropical Region (Hull 1962), are represented in Alberta. Eighty five species of 23 genera were recorded. The Dasypogoninae is the largest subfamily: 11 genera with 49 species, followed by the Asilinae with 19 species in eight genera. The Laphriinae is represented by 15 species of three genera, while Leptogastrinae has only two species of *Leptogaster* Meigen.

KEY TO THE SUBFAMILIES OF ASILIDAE OF ALBERTA

1. Abdomen slender and cylindrical (fig. 102); second abdominal segment six times as long as first (fig. 103); wings with alula greatly reduced or absent; hind femora club-shaped (fig. 85). ..... Leptogastrinae

   Abdomen not slender, almost as broad as thorax (fig. 87); second segment at most three times as long as first (fig. 104); alula present; femora not club-shaped..... 2

2. Wings with marginal cell open (fig. 57).....Dasypogoninae

   Marginal cell closed (fig. 161) 3

3. Abdomen gradually tapering apically (fig. 104); second segment three times as long as first; mediocubital crossvein of wings absent, or M_3 and Cu_1 fused for a short distance at the place of crossvein (fig. 165).....Asilinae

   Abdomen, up to sixth segment, parallel-sided, or broader at the middle (fig. 101); second segment subequal to first; wings with mediocubital crossvein present (fig. 161).....Laphriinae

Subfamily Dasypogoninae

Ten tribes comprise this subfamily, of which the Stichopogonini, Stenopogonini, and Dasypogonini, are represented in Alberta. The Stichopogonini is represented by *Stichopogon* Loew and *Lasiopogon* Loew; Stenopogonini by *Stenopogon* Loew, *Ospriocerus* Loew, *Holopogon* Loew, *Cyrtopogon* Loew, *Eucyrtopogon* Curran, and *Heteropogon* Loew; Dasypogonini by *Comantella* Curran, *Lestomyia* Williston, and *Nicocles* Jaennicke.

Hull (1962) distinguished the Dasypogonini from the Stenopogonini by the presence of a bent spine at apex of the front tibia, and placed *Comantella* Curran in the former, *Eucyrtopogon* Curran in the latter. Based on some other characters, these two genera should be placed in the same group. *Eucyrtopogon* is more similar to *Comantella* Curran than to the rest of the Stenopogonini.

Key to the Genera of Dasypogoninae of Alberta

1. Face bare, except on the oral margin; gibbosity not conspicuous (fig. 3); ocellar bristles absent; dorsocentrals absent (also from *Lasiopogon terricola* Johnson)..... *Stichopogon* Loew
   Face with hairs or bristles between oral margin and at least halfway to antennal base (figs. 5, 10); ocellars and dorsocentrals present (except in *Lasiopogon terricola* Johnson).....2
2. Palpus one-segmented (fig. 40); vertex with posterior margin at least twice as wide as front at antennal base (figs. 7, 9)..... ..... *Lasiopogon* Loew
   Palpus two-segmented (fig. 42); vertex not widened posteriorly, posterior margin at most one and half times as wide as front at antennal base (figs. 15, 22).....3
3. Head (including eyes) higher than wide (fig. 14); front narrow, at most as wide as long; upper occiput behind eyes strongly convex.....4
   Head wider than high (fig. 19); front wider than long; upper occiput behind eyes flat..... 5
4. Third antennal segment with prominent excision on inner side (figs. 123, 125)..... *Ospriocerus* Loew
   Third antennal segment without such excision..... *Stenopogon* Loew
5. Wings with branches of third longitudinal vein slightly distad of posterior crossvein (fig. 156)..... 6
   Branches of third longitudinal vein clearly proximad to posterior crossvein (fig. 158) 10
6. Dorsocentrals (at least behind mesonotal suture) and scutellars present; front forming an almost right angle with vertex....7
   Dorsocentrals and scutellars absent; front almost horizontal, slightly arched, not forming sharp angle with vertex.....9
7. Humerals absent..... *Nicocles* Jaennicke
   Humerals present..... 8
8. Metapleuron pilose or with bristles; third antennal segment tapering apically (fig. 130); no bent spine on apex of front tibia...

.....*Heteropogon* Loew

Metapleuron bare, third antennal segment dilated subapically (fig. 128); apex of front tibia with a bent spine ventrally.....
.....*Lestomyia* Williston

9. Hind basitarsus and hind tibia swollen distally (fig. 84); face almost flat (fig. 16); mesopleuron pilose..... *Holopogon* Loew

Hind basitarsus not swollen, hind tibia slender (fig. 79); gibbosity rounded; mesopleuron with stiff hairs..... *Cyrtopogon* Loew

10. Front tibia with curved spine at apex ventrally (fig. 77).....
..... *Comantella* Curran

Front tibia without such a spine..... *Eucyrtopogon* Curran

Genus *Stichopogon* Loew

Stichopogon Loew 1847 : 499. Type species: *Dasypogon elegantulus* Wiedemann.
Stilopogon Costa 1883 : 62. Type species: *Stilopogon aequicinctus* Costa.
Neopogon Bezzi 1910a : 147. Type species: *Dasypogon trifasciata* Say.
Lissoteles Bezzi 1910b : 177. Type species: *Lissoteles hermanni* Bezzi.

The genus *Neopogon* Bezzi was considered as a different genus from *Stichopogon* Loew by Hull (1962) on the basis of the characteristics of the chaetotaxy, the palpi, the vertex, and the body size. Curran (1934) recognized only one genus under the name *Neopogon* Bezzi. Both Hull and Curran treated *Lissoteles* Bezzi as a different genus from *Stichopogon* Loew. Hull further added three subgenera to the genus *Stichopogon* (s. s.), namely *Dichropogon* Bezzi, *Echinopogon* Bezzi, and *Cryptopogon* White. Bromley (1951) considered *Neopogon* Bezzi, *Lissoteles* Bezzi *Echinopogon* Bezzi, and *Dichropogon* Bezzi, as synonyms of *Stichopogon* Loew.

Two species of this genus, *argenteus* Say and *trifasciatus* Say, are known from Alberta.

Key to the Species of *Stichopogon* of Alberta

Uniformly silvery pollinose; mesonotal and abdominal pile long; bristles on first abdominal segment weak, hardly distinguishable from pile..... *argenteus* Say

Abdomen with black markings on dorsum of second, third, fifth, and sixth segments; mesonotum with short suppressed hairs; bristles on first abdominal segment strong and distinct.....
.....*trifasciatus* Say

Stichopogon argenteus Say

Dasypogon argenteus Say 1823 : 51; 1869 : 65.
Stichopogon argenteus Back 1909 : 334.

This species is easily recognized by its uniform silvery color of the pollen and the hairs. Antennae brownish black, bristles present on lower sides of first two segments and upper side of second segment;

face flat with slight elevation above epistoma (fig. 2); mystax of few rows; palpus one-third as long as labium, pilose sub-basally; proboscis with basal one-third of lower side silvery pollinose, basal half pilose. Thoracic pile long; scutellum with long hairs along posterior margin; one presutural, one postalar, and a row of metapleural bristles present. Legs with pile anterolaterally on front coxa, laterally on middle coxa and hind coxa, and on lower sides of femora; bristles present on tibiae and tarsi; last tarsal segment, empodium, and pulvilli of equal length, claws slightly longer than last tarsal segment. Wings clear, evenly covered with microtrichiae; mediocubital vein absent, M_3 and Cu_1 fused for a short distance. Abdomen elongate, pile longest on first two segments; ventral pile absent from first segment, shorter in females. Slight variation occurs among the specimens, in the length of the first segment of the style and the length of the fusion of M_3 and Cu_1.

The presence of this species in Alberta is doubted, but Strickland (1938) included it in his list. It has been recorded from Manitoba to Colorado, west to California, east to New York, south to Maryland; 22 specimens were examined.

Localities - MANITOBA: Onah (CNC). ONTARIO: Grand Bend (CNC). NEW YORK: Oak Beach, Long Island (UA); Fire Island (AMNH); New York City (USNM). NEW JERSEY: Avalon (USNM); Sea Side Park (USNM). ILLINOIS: Lake Forest (USNM). KANSAS: Medora (USNM). CALIFORNIA: Los Angeles.

Stichopogon trifasciatus Say

Dasypogon trifasciatus Say 1823 : 51, 1869 : 64.
Dasypogon candidus Macquart 1846 : 67.
Dasypogon fasciventris Macquart 1850 : 69.
Dasypogon gelascens Walker 1860 : 277.
Stichopogon trifasciatus Williston 1886 : 289.

This species is easily distinguished from *argenteus* Say, by the characters in the above key. Antennae with bristles on lower sides of first two segments, and apical upper side of second; front and vertex golden yellow pollinose; face pale yellow pollinose; mystax white, single row, along upper margin of epistoma; palpus one-fifth as long as labium; proboscis black, with silvery white pollen on basal half of lower side. Thoracic pile sparse, absent from mesonotum; the latter provided with semi-appressed short black hairs; one presutural, one postalar, a row of six metapleural bristles present. Legs with sparse pile; bristles present on apices of femora, on tibiae, and on tarsi. Wings clear, evenly covered with microtrichiae; veins brown; mediocubital crossvein present, short. Abdomen silvery white pollinose, with triangular black markings on second, third, fifth, and sixth segments, with apices facing forward (fig. 87); pile very sparse, short, but longer on side of first segment. The antennae and the mediocubital crossvein vary slightly.

This species seems to prefer bare areas, including exposed rocks, wind blown areas, and stream sides (James 1938), open beach, sand plains, restricted sandy or gravelly areas (Bromley 1946), and also pastures or bare fields (including unpaved roads) near streams. It is widely distributed in the United States and Canada; 63 specimens were examined.

Localities - ALBERTA: Edgerton; Medicine Hat (UA).
Other localities - MANITOBA: Aweme; Onah (CNC). CALIFORNIA: San Diego Co. (CNC). ARIZONA: Madera Canyon, St. Rita (UA). NEW MEXICO: Silver City (UA). TEXAS: Brazos; Madison; Frio; Bexar; Travis; Burleson. WYOMING: New Castle, Weston Co. (AMNH). NEBRASKA: Broken Bow (AMNH). IOWA: Iowa City (AMNH); Ames (AMNH). ONTARIO: Point Pelee (UA CNC); Orilla (UA); Grand Bend (CNC). QUEBEC: Hull (CNC). NEW YORK: Long Island (AMNH).

Genus *Lasiopogon* Loew

Lasiopogon Loew 1847 : 508. Type species: *Dasypogon pilosellus* Loew.
Daulopogon Loew 1874 : 377.

This genus and *Stichopogon* Loew are grouped in the tribe Stichopogonini (Hull 1962). Species of both genera have a complete prosternum (fig. 66), wide front and vertex (fig. 9), but they are distinguished by the shape of the gibbosity and the mystax (fig. 8).

Antenna with abundant strong hairs on lower sides of first two segments and apical upper side of second; third segment with apical style (figs. 118-121); ocellar bristles present; palpus one-segmented; left and right cardostipites separate, held together by membrane; upper half of occiput usually with bristles, at least present behind orbital margin as continuation of verticals; bristle-like hairs present on frontovertex, except in *trivittatus*. Melander and *terricola* Johnson. Bristles on thorax mostly on mesonotum; dorsocentrals absent from *terricola* Johnson; Metapleuron always with a vertical row of bristles; short or longer bristle-like hairs on humeri; posterior margin of mesopleuron with long bristle-like hairs, except in *trivittatus* Melander and *terricola* Johnson; pale pile on upper posterior corner of sternopleuron. Bristle-like hairs present anteriorly on front coxa, laterally on middle coxa, and sparsely on hind pair; femoral bristles if present, subapical; tibial bristles arranged in five rows, nine to 11 subapical bristles also present; tarsal bristles arranged in circles. Wings hyaline, evenly covered with microtrichiae; marginal cell open, two submarginal cells always present, open; four posterior cells always open; anal cell always closed; anterior crossvein always before middle of discal cell. Sides of first abdominal segment usually with bristles and pale pile; male genitalia rotated 180°, bristles present on hypandrium; ovipositor with acanthophorites and spines, valves of eighth sternum prominent (figs. 106, 107).

Nine species of this genus are present or listed as occurring in Alberta. The record of one of them, *ripicola* Melander, is doubted, while *prima* is described as a new species.

Key to the Species of *Lasiopogon* Loew of Alberta

1. Mystax entirely white 2
   Mystax entirely black or mixed black and white 5
2. Dorsocentrals and scutellars absent ..... *terricola* Johnson
   Dorsocentrals and scutellars present 3
3. Scutellars white ..... *quadrivittatus* Jones
   Scutellars black 4
4. Two scutellars (fig. 67); mesonotum with few setulae; metapleural bristles white ..... *trivittatus* Melander

Scutellar bristles numerous (fig. 68); mesonotum with more or less numerous long hairs ..... *ripicola* Melander

5. Mystax mixed white and black ..... *prima* new species
Mystax entirely black 6

6. Apical abdominal bands absent; pollen if present, not forming definite bands ..... *hinei* Cole and Wilcox
Pollinose apical bands present and definite 7

7. Abdominal bands golden yellow, less than one-fourth of corresponding abdominal segments, the rest of segment more or less shining black ..... *canus* Cole and Wilcox
Abdominal bands greyish, wider than one-fourth of corresponding segments, the rest of segment mostly brown 8

8. Male 9
Female 10

9. Genitalia with superior forceps (surstyli) broad, length less than twice the width; hypandrial bristles convergent ..... *aldrichi* Melander
Superior forceps with length four times the apical width (fig. 180); hypandrial bristles more or less parallel ..... *cinereus* Cole

10. Ovipositor not entirely black, valve of eighth sternum orange ..... *aldrichi* Melander
Ovipositor entirely black ..... *cinereus* Cole

Lasiopogon terricola Johnson

Daulopogon terricola Johnson 1900 : 326.
Lasiopogon terricola Back 1919 : 300-301.
Alexiopogon terricola Curran 1934 : 183.

Curran (1934) separated this species from the rest of *Lasiopogon* Loew, and erected a new genus for it, *Alexiopogon*. However, the following characters of this species show that it belongs in *Lasiopogon* Loew: the shape of the gibbosity and the mystax, the size of the front and vertex, the presence of the ocellar and the occipital bristles, the presence of the long sparse pile on the vertex, the presence of the short hairs on the humerous, the mouthparts, the male genitalia, and the ovipositor. Front and vertex widened posteriorly, golden yellow pollinose, with a pair of parallel grooves, convergent toward neck (fig. 7); bristles on head pale yellowish; face oale yellowish pollinose. Thorax golden yellow pollinose, paler on pleura; one or two presuturals, one or two intraalars, one or two postalars, black; metapleural bristles pale yellowish; dorsocentrals and scutellars absent; mesonotum with a pair of brownish vittae and short semi-appressed pale yellow hairs. Legs brownish; coxae black, pollinose; femora black dorsally; tibiae with pale yellowish hairs and pale and black bristles; tarsi with black bristles; claws reddish brown basally, black apically; empodium black; pulvilli yellow. Wings slightly longer than abdomen; veins brownish. Abdomen shiny black, reddish brown apically; very short, sparse, appressed pale hairs present; side of first segment with weak bristles or bristle-like hairs; male genitalia reddish, hypandrial bristles pale yellow, convergent; ovipositor reddish

brown.

This species is found on the low damp ground (Johnson 1900; Cole and Wilcox 1938) as well as on dry sand bars or bare sand dunes. It ranges from Alberta to Massachusetts, south to Virginia; 69 specimens were examined.

Localities - ALBERTA: Fabyan (UA); Wainwright (UA); Provost (UA); Manyberries-Orion (UA); Writing-on-Stone Provincial Park (UA); Lethbridge, Oldman River (UA); Medicine Hat.

Other localities - NORTH DAKOTA: Mott (CNC). INDIANA: Bare Sand, Lafayette. OHIO: Pine Creek, Hocking Co. VIRGINIA: Great Falls. MARYLAND: Plummer's Island; Beltsville. NEW JERSEY: Clementon; Lahaway, Ocean Co.; Riverton; Wenonah. MASSACHUSETTS: Amherst; Chicopee.

Lasiopogon trivittatus Melander

Lasiopogon trivittatus Melander 1923b : 144-145.

Males of this species are described for the first time. Vertex golden yellow pollinose; short stiff hairs present as a row of three to four between grooves and orbital margin, and two pairs in front of ocellar plate; ocellars black; occiput yellowish grey pollinose, occipital bristles on upper margin and transversely behind vertex; mystax pale yellow; antennae black, hairs on lower and apical upper sides of first two segments black; proboscis black, pile on lower basal half white; beard white. Prothorax golden yellow pollinose, paler toward ventral sides; pile on pronotum, on episternum, and on epimeron, pale yellowish; mesonotum grey to yellowish pollinose; dorsocentral and acrostichal vittae present, complete; presutural, intraalar, and postalar bristles always single; presutural dorsocentrals usually two, rarely one; posthumerals sometimes present; postsutural dorsocentrals always two; setulae present on mesonotum in front of suture; scutellars black, two, sometimes with two black and few white setulae; metapleurals pale yellowish. Legs grey pollinose; coxal hairs pale yellowish; lower sides of femora with pale bristles and pile; tibial and tarsal bristles black, absent from ventral surfaces; claws brown, tips black; empodium black. Wings hyaline, evenly covered with microtrichiae; anterior crossvein at basal one-third or half of the length of discal cell; anal cell closed. Abdomen brownish pollinose basally, posterior one-third to half greyish pollinose, extending forward on lateral margins, sides of first segment with bristles and sparse pile; appressed setulae on all abdominal segments; male genitalia (figs. 175-179), black, yellowish grey pollinose; hypandrial bristles convergent. Number and color of bristles and setulae, and total length (6.0 - 9.0 mm) vary. In very rare cases, one or two black bristles are present among white mystax.

This species is abundant along river banks, often resting on rocks. Red mites were found attached to the ventral side of the neck and behind the hind coxae (membraneous parts) of a female specimen from Luscar, Alberta (UA). Another species, *Lasiopogon cinereus* Cole, collected from the same locality, was also found to have the same species of mites associated with it. *Lasiopogon trivittatus* Melander in some localities, is associated with *L. cinereus* Cole and *L. quadrivittatus* Jones. This species has been recorded from Montana and Alberta; 148 specimens were ex-

amined.

Localities - ALBERTA: Flatbush, Pembina River (UA); Edmonton, Emily Murphy Park (UA), Beverly Municipal Dump (UA and LMK); Luscar, McLeod River (UA); Red Deer River, Red Deer (UA and LMK); Drumheller (UA); Dinosaur Park (UA); Nordegg, North Saskatchewan River Valley (UA and LMK); Crowsnest Forest, Dutch Creek (UA); Banff, Eisenhower lookout (CNC).

Other localities - MONTANA: Gold Creek.

Lasiopogon quadrivittatus Jones

Lasiopogon quadrivittatus Jones 1907 : 278.

Among the species of *Lasiopogon* Loew occurring in Alberta, this is the most easily recognized, for the bristles are all pale. In general appearance it is similar to *ripicola* Melander, but the latter has black scutellar bristles. Face and lower occiput grey pollinose; front vertex, and upper occiput yellowish pollinose; bristles and hairs pale yellowish. Thorax golden yellow pollinose; dorsocentral vittae rusty brown, with golden orange lining; acrostichal vitta grey or golden yellow; space between dorsocentral and acrostichal vittae brownish, giving appearance of four vittae; six dorsocentrals, two to three before suture; posthumerals present or absent; presuturals two to three; intraalars two; postalars two; scutellars six; mesopleural and sternopleural pile white; metapleural bristles five to eight. Legs light yellowish pollinose; middle and hind pairs less pilose; hind femora with a row of bristles on anterior sides; claws reddish brown basally, black apically; empodium black. Wings hyaline, vein brownish; fourth posterior cell open, narrower or wider than the first; anal cell closed. Abdomen grey pollinose; bristles and pile pale yellowish; a pair of basal semicircular brown markings on each, except first segment; male genitalia black, golden yellow pollinose, hairs and bristles pale yellowish; hypandrial bristles convergent; ovipositor black, yellowish pilose. Total length 7.0 - 10.0 mm in males, and 8.0 - 11.5 mm in females; number of metapleural and mesonotal bristles exhibit variation.

In southern Alberta this species is common in late spring, but it appears later in the northern parts of the province. It has been found associated with *Lasiopogon terricola* Johnson, *L. trivittatus* Melander, *L. canus* Cole and Wilcox, *Eucyrtopogon albibarbis* Curran, and *Asilus aridalis* n. sp. This species inhabits several different habitats: bare paths, along river banks, and sand dunes near river. It ranges from Alberta and Wyoming, east to Nebraska; 134 specimens were examined.

Localities - ALBERTA: Edmonton, Beverly Municipal Dump (UA and LMK), Country Club (LMK), Emily Murphy Park (UA), White Mud Park (UA); Fabyan, Campsite (UA); Bindloss (UA); Empress (UA); Sandy Point Bridge (UA); Army Expt. Sta. (UA); Medicine Hat (UA; CNC); Seven Persons (UA); Burdett (UA); Pendant d'Oreille (UA); Writing-on-Stone Provincial Park (UA); Milk River (CNC); Lethbridge (UA; CNC); Taber (UA); Dinosaur Park (UA); Drumheller (UA); Calgary (CNC).

Other localities - MONTANA: "Montana, C.U.". WYOMING. NEBRASKA: Halsey War Bonnet Canyon; Bad Lands; Mouth of Monroe Canyon. NORTH DAKOTA: Bismarck.

Lasiopogon ripicola Melander

Lasiopogon ripicola Melander 1923b : 143-144.

This species is similar to *Lasiopogon quadrivittatus* Jones, but is distinguished by the black color of the scutellar bristles; the male genitalia are also different.

The presence of this species in Alberta is doubted, but it was included by Strickland (1946) in his list. It ranges from Washington and Idaho to California; seven specimens were examined.

Localities - WASHINGTON: Wayawai (CNC); Pasco (USNM); Cashmere. IDAHO: Lewiston. OREGON: The Dalles.

Lasiopogon cinereus Cole

Lasiopogon cinereus Cole 1919 : 229.

This species is distinguished from the others by the following characters: the black mystax, the wide grey bands on the abdominal posterior sides, the shape of the superior forceps of the male genitalia (tapering apically), and the entirely black ovipositor. Face grey pollinose, mystax as long as antenna; front and vertex yellowish tinged; frontal and vertical hairs weak; brownish transverse band across lateral ocelli; antennae black, first two segments with black hairs. Thorax grey pollinose; prothorax yellowish pilose; mesonotal hairs black, long; dorsocentral bristles weak, two before suture, three to four behind suture; two to three presuturals; posthumerals present or absent; humeri yellowish tinged, black hairs present; mesopleuron with hairs on front half of upper margin and posterior upper corner, pale yellow pile present on posterior corner of sternopleuron; metapleural bristles black, mixed with white pile; scutellum yellowish grey pollinose, bristles black. Legs average for the genus, with long pale pile on lower sides of femora; bristles black. Wings hyaline, slightly infuscated; halteres brownish. Basal three-quarters of abdominal segments rusty brown pollinose, apical one-fourth grey pollinose; long pale yellowish pile present on lateral sides of first four of male and first two of female abdominal segments; last four segments of males and last five segments of females with black setulae; bristles present on sides of first segment; venter long yellowish pilose; male genitalia (figs. 180-184) black, superior forceps yellowish grey pollinose, black haired; hypandrial bristles black, convergent; ovipositor black, sparsely yellowish pilose, spines black.

This species has been found associated with *Lasiopogon trivittatus* Melander. The adults are active, flying from rock to rock in the river, or along river banks. It ranges from Alberta to California, east to Utah and Colorado; 51 specimens were examined.

Localities - ALBERTA: Nordegg, North Saskatchewan River (LMK); Luscar, McLeod River (UA); Red Deer (UA); Crowsnest Forest, Wilkinson Creek (UA), Dutch Creek (UA); Banff (CNC); Frank (CNC); Waterton (CNC); Blakiston Brook, Waterton Park (UA).

Other localities - WASHINGTON: Blewett; Buckley; Cle Elum; Gaynor; Goldendale; Kalama River; Lake Cushman, Mason Co.; Mt. Rainier, Ipsut Creek Camp, Old White River Entrance; Naches; Rainier National Forest, Indian Flat Camp, Lodgepole Camp; Satus Creek; Virden; Walla Walla (CNC). OREGON: Mehama (AMNH); Hood River; Joseph; Lebanon;

Wallowa Lake. CALIFORNIA: Tuolumne Meadows, Yosemite Park. MONTANA: edge of Musselshell River, Winnecook. WYOMING: near Lander; Thumb Station, Yellowstone National Park. UTAH: Uinta Mountains; Duchesne Mountain; Sheep Creek, Duchesne Co. COLORADO: Rockwood (USNM).

Lasiopogon prima new species

This species is readily distinguished from the rest of the Albertan species by the color of the mystax, which is mixed black and white. The genitalia are also diagnostic of the species; the superior forceps (surstyli of Cole) are provided with disc-like projections on the inner sides (fig. 187).

Male. Face greyish yellow pollinose; lower side of mystax white, upper side black; front and vertex dull greyish yellow pollinose; frontoorbital hairs two rows; hairs in front of ocellar plate black, abundant; ocellar bristles black; upper half of occiput dull greyish yellow pollinose, lower half greyish pollinose; antennae black (fig. 119); hairs on first two segments black; style half as long as third segment; proboscis black, palpus black, one-eighth as long as labium. Prothorax brownish grey pollinose, white pilose; mesonotum greyish pollinose, dorsocentral vittae brown, acrostichal vitta faint, ended at mesonotal suture, lateral mesonotal margins brownish; hairs and bristles black; four left and three right presuturals, one left and two right intraalars, one pair postalar, six pairs presutural dorsocentrals, three left and unidentified right postsutural dorsocentrals; scutellum black, greyish pollinose, eight bristles black, mixed with black hairs; mesopleuron yellowish grey pollinose, paler on lower side, black hairs on upper posterior corner; upper posterior corner of sternopleuron whitish pilose; a row of eight metapleural bristles black. Legs black, average for *Lasiopogon* Loew; pile on coxae, on femora, and on tibiae white; left front femur with two, right front femur with four bristles on dorsoposterior surface, two bristles on middle pair, a row of six on left and five on right anterior side of hind femora; front and hind tibiae with three rows of four bristles on dorsal surfaces, middle pair with four rows; tibiae with nine to twelve apical bristles; tarsal bristles arranged in circle subapically; claws brown basally, black apically; pulvilli tawny, empodium black, as long as pulvilli. Wings hyaline, evenly covered with microtrichiae, veins brown; anterior crossvein at middle of discal cell; fourth posterior cell open, as wide as first, fifth three times as wide as fourth; anal cell closed at margin (fig. 148). Abdomen shining black, yellowish grey pollinose on apices, extending forward at sides and middle, leaving a pair of black spots on each segment; yellowish white pile on lateral sides of first four segments, semiappressed on the rest, venter grey pollinose, white pilose; male genitalia black, hypandrial bristles black, convergent, superior forceps broad basally, tapering apically, with disc-like projection on ventral inner side (fig. 187).

Females. Except for the number and position of the bristles, females of this species are similar to the males; bristles on first abdominal segment mixed with black; last four segments with setulae on lateral sides; ovipositor black.

This species varies individually in the number of bristles, es-

pecially those on the mesonotum, the position of the anterior crossvein, and the width of the fourth posterior cell. Total length is from 7.0 - 9.0 mm. The habitat is the same as that of the other species of *Lasiopogon* Loew.

Holotype: male, Nordegg, North Saskatchewan River Valley, Alberta, 28-V-1963 (Adisoemarto, Freitag, Ball, collectors); deposited in CNC.

Paratypes: one male, three females, same data; male, female, North Saskatchewan River, near Rocky Mountain House, Alberta, 29-V-1963, same collectors; one male, three females, Garth, Alberta, same collectors; male, Brazeau Dam, Lodgepole, Alberta, 9-VII-1964 (L. M. Kenakin). All these localities are on the eastern slopes of the Rocky Mountains, in the vicinity of the North Saskatchewan River. Except the last specimen, kept in LMK collection, the paratypes are deposited in UA collection.

The name *prima* has been chosen, because this species was the first asilid collected in 1963, on an expedition to the Rocky Mountains.

Lasiopogon canus Cole and Wilcox

Lasiopogon canus Cole and Wilcox 1938 : 32-34.

According to Cole and Wilcox (1938), this species in general appearance resembles European rather than North American members of the genus. It is distinguished from the other species by the black mystax and the narrow golden yellow abdominal bands. Face, front, and vertex golden yellow pollinose; hairs and bristles black; hairs in front of ocellar plate weak; antennae and hairs on first two segments black; occiput golden yellow pollinose, paler toward chin, bristles black; beard yellowish white. Thorax golden yellow pollinose; dorsocentral vittae brown, not reaching humeri, acrostichal vitta faint, incomplete; bristles and hairs entirely black. Legs golden yellow pollinose; coxae greyish pollinose; pile entirely golden yellow. Wings hyaline, brownish, covered with microtrichiae; fourth posterior cell varies from closed to widely open; anal cell closed with stalk. Abdomen black, slightly golden yellow pollinose, pile yellow; in some specimens, last three segments with black setulae on lateral sides; male genitalia shining black, superior forceps broad basally, tapering apically, bristles black, convergent on hypandrium; ovipositor with orange valves, but comparatively shorter and broader than those of *aldrichi* Melander. The bristles on the sides of the first abdominal segment vary in number, from six to eight, and are all black, or black mixed with white.

The species is found on bare paths or gravelly river banks. A few specimens, which were probably just emerged, have the male genitalia not completely inverted or still in uninverted situation. These specimens are kept in UA. It is known from Alaska and Alberta; 32 specimens were examined.

Localities - ALBERTA: Rocky Mountain House, North Saskatchewan River (UA); Edmonton, Whitemud Park (UA), Emily Murphy Park (UA), Country Club (LMK).

Other localities - ALASKA: Savonoski, Naknek Lake; Healy; Fairbanks.

Lasiopogon hinei Cole and Wilcox

Lasiopogon hinei Cole and Wilcox 1938 : 51-53.

This species is recognized by the obscure abdominal pollen, not arranged as apical bands, and also by the long and dense pile on the abdomen of the males. Face, front, and vertex yellow pollinose; frontal and vertical hairs long, black, abundant, continued to occiput; occiput greyish pollinose; proboscis black, pile yellowish, palpus black, yellowish pilose. Prothorax pale yellowish grey to golden yellow pollinose, pile yellowish; mesonotum golden yellow pollinose, dorsocentral vittae brownish to velvety black with golden yellow lining on inner sides, acrostichal vitta paler, greyish or golden yellow, incomplete, space between dorsocentral and acrostichal vittae brownish; dorsocentral bristles weak, varying from five to eight (two to three presutural, and three to five postsutural); posthumerals present or absent; two to three presuturals; two to three intraalars; two pairs of postalars; usually eight scutellars, sometimes hardly distinguishable from hairs; metapleural bristles eight to nine in a row, black, mixed with pale yellowish pile. Legs golden yellow pollinose; numerous long black bristles present on apical halves of femora and tibiae; claws brownish basally, black apically. Wings hyaline, slightly infuscated; fourth posterior cell as wide or half as wide as first; anal cell always closed, with stalk. Ground color of abdomen black, pollen yellowish grey; long yellowish pile present on first; anal cell always closed, with stalk. Ground color of abdomen black, pollen yellowish grey; long yellowish pile present on first four abdominal segments of males or first three of females, the rest segments with brownish black hairs; bristles on first abdominal segment pale yellowish, on male genitalia black; hypandrium orange, bristles convergent; ovipositor black, spines black, valves brownish orange. The number of bristles on the mesonotum varies.

The adults of this species, in Alberta, have been found along bare paths near streams or rivers with grasses or bushes next to them. It is known from Alaska and Alberta; 14 specimens were examined.

Localities - ALBERTA: Flatbush, Pembina River (UA); Edmonton, Rainbow Valley (UA), Whitemud Park (UA); Rocky Mountain House, North Saskatchewan River (UA).

Other localities - ALASKA: Katmai.

Lasiopogon aldrichi Melander

Lasiopogon aldrichi Melander 1923b : 139-140.

The females of this species and of *canus* Cole and Wilcox have orange valves of the ovipositor, but they are distinguished from one another by shape. The males of this species are recognized by the shape of the superior forceps. Slight variation occurs in the shape of the third antennal segment (figs. 120, 121). The number of mesonotal bristles varies. The fourth posterior cell varies from completely closed to widely open. A female specimen from Drumheller (UA), Alberta, is slightly different from the other specimens with respect to the shape of the ovipositor (fig. 107). This specimen might belong to *Lasiopogon pacificus* Cole and Wilcox.

This species ranges from British Columbia and Alberta to Califor-

nia, east to Utah and Colorado; 48 specimens were examined.

Localities - ALBERTA: Banff (UA and CNC); Drumheller (UA).
Other localities - BRITISH COLUMBIA: Robson (CNC). OREGON: Mt. Hood (USHM); Anthony Lake; Blue Mountains, Tollgate; Fish Lake, Steins Mts.; Haines; Strawberry Mt., Grant Co.; Sumpter; Wallowa Lake, Aneroid Lake Trail. WASHINGTON: Blue Mts.; Signal Peak; White Rock Springs, Steven Pass, Cascade Mts.; Mt. Spokane (USHM). IDAHO: Moscow Mt. (CNC); Long Valley, Alpha. WYOMING. COLORADO: La Veta Pass. UTAH: Beaver Creek. CALIFORNIA: Samoa (USNM).

Genus *Stenopogon* Loew

Stenopogon Loew 1847 : 483. Type species: *Asilus sabaudus* F. 1794.
Scleropogon Loew 1866 : 26. Type species: *Scleropogon picticornis* Loew 1866.

This genus contains robust species. Curran (1934) and Hull (1962) considered this genus (*sensu stricto*) different from *Scleropogon* Loew, on the basis of the absence of pile or hairs from the metapleuron. The definition was thought by Bromley (1937) to be trivial; he (1951) treated *Scleropogon* Loew as a synonym of *Stenopogon* Loew. Back (1909) was the first to consider these two groups as congeneric.

Head slightly higher than wide; face, front, and vertex narrow; gibbosity of two types: in "*inquinatus* group" gibbosity very prominent, starting close to antennal base (figs. 12, 13), in "*coyote* group", gibbosity starting farther away (fig. 11), third antennal segment tapers apically, without obvious apical excavation (fig. 126); style tapers apically. Prothorax with bristles, pile present among bristles and on anterior corner of sternopleuron and posterior one-third of sternopleuron; bristles or hairs present on, or absent from, metapleuron; mesonotal bristles more abundant on posterior half. Legs pilose; front femora with bristles on apices, middle pair with a row of bristles on anterior sides, hind pair with two rows on anterior sides; tibiae with three or four rows of bristles; tarsi with bristles subapically. Wings hyaline, axillary cell and alula fuscous or smokey; second and third veins slightly recurved; anterior crossvein at, or slightly before, middle of discal cell; fourth posterior cell open or closed; anal cell closed or narrowly open (figs. 150, 151). Abdomen more or less cylindrical, elongate, tapering apically; male genital organ not inverted (fig. 93); ovipositor with acanthophorites and spines (figs. 89-92).

According to the definition of the genus *Ospriocerus* Loew by Martin (pers. comm.), *consanguineus* Loew and *pumilus* Coquillett belong to that genus, not to *Stenopogon* Loew.

There are five species in Alberta: *obscuriventris* Loew, *rufibarbis* Bromley, *inquinatus* Loew, *coyote* Bromley, and *neglectus* Bromley, but Strickland (1938 and 1946) included also *gratus* Loew in his lists.

Key to the Species of *Stenopogon* Loew of Alberta

1. Metapleuron with hairs, or with weak or strong bristles 2
   Metapleuron without hairs or bristles, at most tomentose or pollinose 3
2. Wings with first and fourth, posterior cells open; abdomen black-

ish or less pollinose; first antennal segment blackish..... ..... *neglectus* Bromley

First posterior cell narrow at tip or sometimes closed with stalk (figs. 150, 151); fourth posterior cell closed with stalk; abdomen greenish grey pollinose; first antennal segment brownish orange..... *coyote* Bromley

3. Abdominal dorsum uniformly black.....4
Abdominal dorsum reddish brown, black only on sides 6
4. Humeri orange brown..... *inquinatus* Loew
Humeri black..... 5
5. Evenly greyish pollinose species; pile and bristles yellow..... ..... *obscuriventris* Loew
Darker, bright orange pollinose; pile and bristles bright orange. ..... *rufibarbis* Bromley
6. Humeri orange-brown, covered with greyish pollen . *inquinatus* Loew
Humeri black, covered with yellowish orange pollen.. *gratus* Loew

Stenopogon obscuriventris Loew

Stenopogon obscuriventris Loew 1872 : 30.

This species is easily recognized by the uniform greyish pollen and yellow bristles and pile. Back (1909) treated this species as conspecific with *californiae* Walker. Antennal segments unicolored; style orange brown apically; palpal segments equal (fig. 42); gibbosity almost touching antennal base (fig. 12). Thorax unicolored; prothorax with bristles only on pronotum; presutural dorsocentrals absent; humerals absent; dorsocentral vittae blackish brown; pile on anterior corner and posterior half of sternopleuron long. Coxae and basal three-fourths of femora black, the rest yellowish; claws brownish basally, black apically. Wings hyaline, veins brownish; in males, axillary cell and alula tinged silvery white, less obviously so in females; all posterior cells open; anal cell open narrowly or almost closed. Abdomen unicolored; pile on first three segments long; male genitalia (figs. 194-198) and ovipositor orange brown. Number of bristles varies. Sexual dimorphism is shown only by the white infuscation on the wings of the males.

This species ranges from Alberta and Colorado, west to California; 23 specimens were examined.

Localities - ALBERTA: Czar (UA); Medicine Hat (CNC); Lethbridge (CNC).

Other localities - SASKATCHEWAN: Pike Lake; Great Sand Hills, west of Swift Current. OREGON: Summer Lake; Chewaucan R., near Paisley. IDAHO: Victor (AMNH); Giveout (AMNH); Mt. Pelier (AMNH). WYOMING: Jackson (AMNH); Rawlins (AMNH); Green River (AMNH); Medicine Bow (AMNH); Carbon (AMNH); Rock Spring (AMNH); Centenial (AMNH). UTAH: Promontory Point (USNM); Huntsville (USNM); Logan Canyon (USNM). COLORADO: Animas (AMNH); Monte Vista (AMNH); Ouray (AMNH); Jefferson (AMNH); Blanca (USNM). ARIAONA: Kaibab Forest, Grand Canyon. CALIFORNIA: Mone Lake (AMNH); Mariposa Co. (AMNH); Mount Diablo (AMNH); Mt. Hamilton (AMNH).

Stenopogon rufibarbis Bromley

Stenopogon rufibarbis Bromley 1931 : 431.

This species is very similar to *obscuriventris* Loew. The male genitalia (figs. 199-203) and the ovipositors of these two species are very slightly different from one another. The two species may be distinguished by the different color of pollen, pile, and bristles.

This species ranges from British Columbia to Arizona, and east to Utah. Strickland (1938) included this species in his list, but the record was based on misidentified specimens of *Stenopogon obscuriventris* Loew. It probably does not occur in Alberta; 31 specimens were examined.

Localities - BRITISH COLUMBIA: Osoyoos; Anderson Lake; Seton Lake; Oliver. WASHINGTON. OREGON: Cherry Creek, Klamath Lake; Alberta Lake. IDAHO: Giveout (AMNH). CALIFORNIA: Keddi Plumas Co. (AMNH); Sierra Nevada (AMNH); Coleville (AMNH); Philo Mendocino (AMNH); Mt. Hamilton (AMNH); Feather River (AMNH); Butte Co. (AMNH); Cedarville (AMNH); Clio Plumas Co. (AMNH); Lassen Co.; San Antonio, Ontario; Los Angeles; Pasadena; Lake of Woods; Echo Portals, Eldorado Co. UTAH: St. George (AMNH). ARIZONA: Lacobs Lake.

Stenopogon gratus Loew

Stenopogon gratus Loew 1872 : 31.
Stenopogon univittatus Loew 1874 : 358.

This species is similar to *californiae* Walker, but can be distinguished by the mesonotal vestiture and the color of the pile and bristles. The bristles and pile are orange, darker than those of *californiae* Loew, and the mesonotum is provided with longer dorsocentral black hairs. The male genitalia are also different in the shape of the hypandrium and of the superior forceps (figs. 204-217).

This species is known from California only, but Strickland (1938) included it in his list; two specimens were examined.

Localities - CALIFORNIA: San Francisco (USNM).

Stenopogon inquinatus Loew

Stenopogon inquinatus Loew 1866 : 47.
Stenopogon modestus Loew 1866 : 46.
Stenopogon morosus Loew 1874 : 356.

This species is distinguished from *gratus* Loew, by the reddish brown humeri. There are two forms: one with reddish brown abdomen, the other with black abdomen.

Brown form: front and vertex greyish yellow pollinose; gibbosity very prominent (fig. 13); antennae brownish or reddish black; proboscis and palpi black. Thoracic ground color black, humeri reddish brown; pollen greyish yellow; prothorax pilose, pronotum and episternum with bristles; dorsocentral vittae brownish black; presutural dorsocentral bristles absent; metapleuron bare; scutellum reddish brown with black posterior edge. Coxae and dorsal sides of femora black, the rest reddish brown; basal one third of claws reddish brown, the rest black. Wings hyaline, semi-infuscated; posterior cells open; anterior crossvein slightly before, or at the middle of discal cell. Abdomen reddish brown on the middle, black on lateral sides; venter black; pile long on sides of first two segments, shorter and sparser on the following segments;

ventral pile long; male genitalia orange brown with black hairs; apical end of eighth segment of females with lateral pits submarginally (fig. 91); acanthophorite orange brown, spines black.

Black form: this differs only in the coloration. Trochanters black, femora black with reddish brown apices; femoral bristles black; abdomen black, eighth segment in both sexes reddish brown with apical black band; male genitalia the same as those in brown form; acanthophorites reddish brown, spines black.

In addition to these forms, there is also intermediate form, with broad lateral sides of abdomen black and narrow middle part reddish brown.

In Colorado, this species inhabits wheat grassland (James 1938). In Alberta, it has been collected in various habitats, such as in grassland of long grass, in semi-arid prairie grassland, on gravelly river banks, in sand pits, at the edge of, or in the openings in the coniferous forests. It has been found associated with *Asilus callidus* Williston. This species has been recorded from British Columbia eastward to Minnesota, and south to Arizona; 143 specimens were examined.

Localities - ALBERTA: Peace River (UA); Lac la Biche (UA and LMK); Opal-Coronado (UA and LMK); Celestine Lake, Jasper National Park; Jasper (CNC); Nordegg, North Saskatchewan Valley (UA); Seebe (DE); Banff (UA and CNC); Gorge Creek (UA); Redrock Canyon, Waterton Lakes Park (UA); Calgary (UA); Lethbridge (CNC); Bow River (CNC); Orion (UA); Medicine Hat (UA); Steveville-Wardlow (UA); Consort (UA).

Other localities - BRITISH COLUMBIA: Vernon; Nicola Valley; Lillooet (CNC); Aspen Groove (CNC); Seton Lake (CNC). SASKATCHEWAN; Pike Lake (CNC). MANITOBA: Aweme (CNC). MINNESOTA: Red River of the North. IDAHO: Victor (AMNH); Giveout (AMNH); Mt. Pelior (AMNH). WYOMING: Jackson (AMNH); Rawlins (AMNH); Rock Springs (AMNH). NEBRASKA: Glen, Sioux Co.; Spring View Bridge, Point Co.; West Point. COLORADO: Walsenburg (AMNH); Monte Vista (AMNH); Alamosa (AMNH); Cochetopa National Forest (AMNH). UTAH; Hatch (AMNH). ARIZONA: N. Rim Grand Canyon (AMNH); Oracle (AMNH). CALIFORNIA: Benton (AMNH); Clio Plumas Co. (AMNH).

Stenopogon neglectus Bromley

Stenopogon neglectus Bromley 1931 : 430.

Scleropogon neglectus Hull 1962 : 126.

This species is readily recognized by the presence of hairs on the metapleuron. *Stenopogon coyote* Bromley has also hairs on the metapleuron, but the two species are readily distinguished by the difference in the wing venation. The male genitalia are also different (figs. 213 - 217). In *neglectus* Bromley, the superior forceps and the gonopods vary from reddish brown to black.

The habitats of this species are mainly pastures, wheat grass of the grassland (James 1938), long grass prairie, and semi-arid short grass prairie. It ranges from Alberta to Arizona; 19 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA); Comrey, Milk River Valley (UA).

Other localities - OREGON: Castle. IDAHO: Lewiston. WYOMING: Lander; Jackson (AMNH); Carbon Co. (AMNH). COLORADO: Creeds. UTAH: Ac. SL. Dsrt. NEVADA: Fallon (AMNH). ARIZONA: White Mts. (AMNH).

Stenopogon coyote Bromley

Stenopogon coyote Bromley 1931 : 429.

This species is similar to *neglectus* Bromley in having the metapleural hairs, but it is easily distinguished by the wing venation. The first posterior cell is always narrower apically, and the fourth posterior cell is always closed with long stalk (figs. 150, 151). The habitat is similar to that of *neglectus* Bromley. It ranges from Alberta to Arizona and New Mexico; 47 specimens were examined.

Localities - ALBERTA: Drumheller (UA and CNC); Steveville-Wardlow (UA); Dinosaur Trail, Dinosaur Provincial Park (UA); Lake Newell, Kinbrook Island Park (UA); Brooks (CNC); Medicine Hat (UA); Orion (UA); Writing-on-Stone Park (UA); Comrey, Milk River Valley (UA); Lethbridge (CNC).

Other localities - WYOMING: Lander; Lusk. SOUTH DAKOTA: Custer (USNM); Piedmont, Nowlin Co. (USNM). COLORADO: Walsenburg (CNC); Salida; Poncha Spring; Colorado City. ARIZONA.

Genus *Ospriocerus* Loew

Ospriocerus Loew 1866 : 29. Type species: *Asilus abdominalis* Say 1823.

This genus is known only from the New World. It is very similar to *Stenopogon* Loew, but readily distinguished by the third segment of the antenna, which has a pit or excavation on the apical lower side (figs. 123, 125). There are three types of style in this genus (Martin pers. comm.): the hidden type with a spine inside (*Ospriocerus abdominalis* Say) ; the short type with apical pit and spine inside (*Ospriocerus latipennis* Loew); and the Mexican type. The second type of style is like that of *Neoscleropogon* Malloch, as described and illustrated by Hull (1962). Most of the characters are like those of *Stenopogon* Loew; gibbosity not prominent (fig. 10); metapleuron with hairs; wings broad, fourth posterior cell always closed.

In Alberta, there are two species, *Ospriocerus abdominalis* Say and *O. consanguineus* Loew, but another species, *pumilus* Coquillett was also included by Strickland (1938), probably on the basis of misidentified specimens; two male specimens of *Stenopogon coyote* Bromley were labelled as *Stenopogon pumilus* Coquillett by Curran and Strickland.

Key to the Species of *Ospriocerus* Loew of Alberta

First antennal segment four times as long as second; style hidden (fig. 124) ..... *abdominalis* Say

First antennal segment at most twice as long as second; style short, with apical pit (figs. 122, 123) ..... *consanguineus* Loew and *pumilus* Coquillett*

Ospriocerus abdominalis Say

Asilus abdominalis Say 1823 : 375.

Dasypogon aeacus Wiedemann 1823 : 390.

*These two species are hardly distinguishable; they are possibly conspecific.

Dasypogon spatullatus Bellardi 1861 : 82.
Ospriocerus aeacides Loew 1866 : 51.
Ospriocerus abdominalis Coquillett 1898 : 37.
Ospriocerus ventralis Coquillett 1898 : 37.

This species is easily distinguished from the other two by the color of the abdomen and the wings. Coquillett (1898) distinguished *ventralis* from *abdominalis* Say on the basis of the color of the venter of abdomen, orange in the former and black in the latter. Head, thorax, legs, and all bristles, and pile black; antennae black, style cryptic; second segment of palpus spindle-shaped. Wings broad, purplish, infuscated. Abdomen mostly orange, with first and basal half of second segment black, in some females lateral margins of each segment black; eighth segment of females black, sixth and seventh segments of some females black; venter black, orange, or black and orange; male genitalia and female acanthophorites black.

This species has been recorded from the Northwest Territories to Arizona and Texas, east to Pennsylvania; 24 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA); Chin, prairie coulee (UA).

Other localities - NORTHWEST TERRITORIES. BRITISH COLUMBIA: Oliver (CNC). SASKATCHEWAN; Roche Percee (CNC). NORTH DAKOTA: Beach (CNC). WYOMING: Carbon Co. (AMNH); Jackson (AMNH). UTAH: Stockton (CNC); Howel, Dolemite (CNC); Moab, Grand Co. COLORADO: Mesa Verde (AMNH): Pagosa Spring (AMNH): Palisade (AMNH); Fort Collins; Colorado Springs; Spaniard Peak. NEBRASKA: Sioux Co. KANSAS: Golden City. OKLAHOMA: Optima (AMNH): Wichita National Forest (CNC). TEXAS: Travis Co. (AMNH); Austin (AMNH); Round Mts. NEW MEXICO: Cortez; White's City, Eddy Co. ARIZONA: Carr Canyon, Huachuca Mts., Cochise Co.; Wilcox (AMNH); Tucson (AMNH). CALIFORNIA. IDAHO: Snake Co. MONTANA: Lombard. WASHINGTON: Squaw Creek.

Ospriocerus consanguineus Loew

Stenopogon consanguineus Loew 1866 : 48.
Stenopogon latipennis Loew 1866 : 49.
Ospriocerus consanguineus Martin, pers. comm.

Specimens of this species are easily distinguished from *abdominalis* Say by the size of the antennae, coloration, and wing venation. Abdominal segments greyish pollinose; pile yellowish, longer on lateral sides of first segment; male genitalia and ovipositor orange brown; gonopods of male genitalia with hair lamellae subapically (fig. 190).

James (1938) recorded this species from moist sedge meadows, arid mixed and bunch grassland, and tall weed waste land, where natural vegetation has been disturbed. It ranges from Alberta to Manitoba, and south to Texas; 16 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA).

Other localities - MANITOBA: Onah (CNC). SOUTH DAKOTA: Sioux Co. WYOMING: Douglas (AMNH). NEBRASKA: Pierre; Chandron; Agate (CNC). COLORADO: Boulder (AMNH); La Junta (AMNH); Regnier; Wray; Rocky Ford; Roggen; Denver. NEW MEXICO: San Jon (AMNH). OKLAHOMA: Greer Co.; Chickasha. TEXAS: Dallas.

Ospriocerus pumilus Coquillet

Stenopogon pumilus Coquillett 1904 : 33.

Scleropogon pumilus Hull 1962 : 126.

Ospriocerus pumilus Martin, pers. comm.

This species is strikingly similar to *consanguineus* Loew and may be conspecific. The male genitalia of the two are not different.

This species is known from Texas and Kansas. Strickland (1938) included it in his list, but this was probably based on misidentified specimens; five specimens were examined.

Localities - KANSAS: Clarke Co.; Ellis Co. (USNM). TEXAS: Brownsville (USNM); Spur (USNM); Hidalgo Co. (USNM).

Genus *Holopogon* Loew

Holopogon Loew 1847 : 473. Type species: *Dasypogon nigripennis* Meigen 1820.
Podoctria Megerle (Ms) *in* Meigen 1820 : 279. *Nomen nudum*.
Ceraturgus Rondani, *not* Wiedemann 1856 : 156.

The species of this genus are small, 4.5 - 9.0 mm, mostly black with long curly pile. In the United States and Canada, 17 species have been described (Martin 1959). They are grouped into two subgenera: three in *Dasyholopogon* Martin, and the rest in the subgenus *Holopogon* Loew. The species of the subgenus *Holopogon* Loew are very similar to one another; the male genitalia are non-diagnostic, and most of the remaining characters are relative and variable. Because of this, Martin grouped the species into four species complexes: *seniculus* complex, *acropennis* complex, *phaenotus-oriens* complex, and *guttula* complex. Further, he stated that the taxonomic status of these complexes is not certain. They may be indeed more than one species, two or more subspecies, or each may be a single highly variable species.

Head broad and short (figs. 16, 17); face broad and flat; front slightly narrower at antennal base, with depression in front of ocellar plate; the latter elevated, more or less rounded; front with lateral protuberance; antennae black, first two segments equal, third elongate, tapering apically, style with two microsegments (fig. 127), the first very small; palpi two segmented; face, front, and vertex pilose and pollinose. Thoracic ground color black; pleura white pollinose; presutural mesonotum, except dorsocentral vittae and posterior inner quarter, white pollinose, the rest of mesonotum and scutellum black; pile on prothorax, mesopleuron, anterior and posterior corners of sternopleuron, metapleuron, and mesonotum and scutellum, long, sometimes shorter on mesonotum; lower slope of metanotum golden yellow tomentose; bristles weak, hardly distinguishable from pile. Legs black; coxae greyish pollinose, with long pile on anterior sides of front, and lateral sides of middle and hind pairs; femora stout, with pile; hind tibiae club-shaped, ventral sides of front and hind tibiae golden yellow tomentose; ventral sides of tarsi golden yellow tomentose, hind basitarsi swollen; claws curved, empodium short. Wings hyaline, alula small; venation varies slightly within the species; fifth vein slightly curved anteriorad; branching of third vein at or slightly beyond the tip of discal cell; marginal, submarginal, and posterior cells open; anal cell closed, with or without stalk, in some others open (Hull 1962). Abdomen pilose laterally, more

or less shining dorsally; venter pilose; bristles absent, or undetectable; male genitalia short, reddish, partly rotated (90°); gonopods with arms and spine-like process (fig. 220); clasper also spine-like; ovipositor reddish, acanthophorites with four to five pairs of spines. The coloration of the pile shows sexual dimorphism.

Three species are present in Alberta: *albipilosa* Curran, *seniculus* Loew, and *nigripilosa* new species. All three species belong to the subgenus *Holopogon* Loew.

Key to the Species of *Holopogon* Loew of Alberta

1. Wing veins yellow ..... *seniculus* Loew
   Wing veins brown 2
2. Pile on mesonotum and scutellum white ..... *albipilosa* Curran
   Pile on posterior mesonotum and scutellum black ..... *nigripilosa* new species

Holopogon albipilosa Curran

Holopogon albipilosus Curran 1923 : 207.

This species shows sexual dimorphism in the coloration of the pile. The pile on the front and the vertex is black in the males, white in the females; the mystax is black with few white hairs in the males, white with one or two black hairs in the females; the antennal hairs are black in the males, white in the females; the rest of the pile is brownish in the males and white in the females.

This species ranges from British Columbia to Manitoba, south to Nevada and Wyoming; holotype, allotype, and 19 additional specimens were examined.

Localities - ALBERTA: Wainwright (UA); Drumheller (UA); Medicine Hat (UA and CNC); Orion (UA); Lethbridge (CNC); Oldman River, Lethbridge (CNC); Picture Butte (UA).

Other localities - BRITISH COLUMBIA: Vernon (type locality : CNC); Chilcotin (CNC). SASKATCHEWAN: Saskatoon (CNC); Saskatchewan Landing (CNC). MANITOBA. IDAHO: Montpelier (AMNH). WYOMING: Carbon Co. (AMNH); Green River (AMNH); Jackson (AMNH); near Lander (AMNH). NEVADA.

Holopogon seniculus Loew

Holopogon seniculus Loew 1862 : 62.

This species is readily distinguished from the others by the yellow wing veins. The pile is long, white in the males and yellowish in the females.

This species is known from Alberta and Saskatchewan, south to Colorado, and west to Nevada; 10 specimens were examined.

Localities - ALBERTA: Scandia (CNC); Medicine Hat (CNC); Lethbridge (CNC).

Other localities - SASKATCHEWAN: Saskatoon (CNC). WYOMING. NEBRASKA: Chandron (WSU). COLORADO: Lamar (AMNH). NEVADA.

Holopogon nigripilosa new species

This species is easily distinguished from *albipilosa* Curran and *seniculus* Loew by the color of the mystax, which is black in females, and the black pile on the posterior mesonotum and on the scutellum. It is described from three female specimens. Length: 8.0 mm.

Female. Face, front and vertex, pale golden yellowish pollinose; pile on vertex, front, and ocellar triangle golden yellow, mixed with black on frontal protuberance; mystax black, pale golden yellowish pile present along lateral margins of face; antennae black, with black hairs on first two segments; occiput black, lower half golden yellowish pollinose, bristles and hairs on upper part black; pile on lower half of occiput, on proboscis and palpi, and beard, white. Prothorax yellowish white pollinose and pilose, middle pronotum brownish tomentose; dorsocentral vittae brown; humeri, anterior lateral margins of mesonotum, white pollinose, the rest of mesonotum brownish tomentose; white pile present on anterior one fourth of mesonotum, anterior lateral margins, to sutures, the rest of mesonotal pile black; scutellum brownish tomentose, black pilose; mesopleuron brownish pollinose, paler on anterior half, white pilose; metanotum brownish pollinose. Coxae greyish brown pollinose, white pilose; femora, and front and middle tibiae white pilose, hind tibiae with black hairs; bristles on tibiae and tarsi black; claws, basal half reddish brown, black apically. Wings hyaline, microtrichiae brownish, veins brown; venation of average *Holopogon* Loew (fig. 152), anal cell closed with stalk. Abdomen shining black with lateral sides of first two segments yellowish brown pollinose; pile white, longer on sides of first two segments, shorter on succeeding segments, very short and sparse on dorsum; ventral pile long, white; acanthophorites black, with four black spines.

This species is called *nigripilosa*, because of the black mesonotal and scutellar pile, which distinguishes this species from the other two species from Alberta.

This species was collected from a glade in a coniferous forest, with short grass and herbs.

Holotype: female, Opal-Coronado, Alberta, 5. VII. 1963 (L. Kenakin and S. Adisoemarto); deposited in CNC.

Paratypes: same data; deposited in UA.

Genus *Heteropogon* Loew

Heteropogon Loew 1847 : 488. Type species: *Dasypogon manicatus* Meigen 1820.
Anisopogon Loew 1874 : 377.

The name *Anisopogon* Loew was used as a substitute for *Heteropogon* Loew, the latter name having been used for a plant (Back 1919). However, *Anisopogon* Loew was used by Hull (1962) for the second subgenus of *Heteropogon* Loew.

Head wide and flat or short; face and occiput pilose; pile similar to "plume"; first two antennal segments equal, third segment tapering apically, one and half times as long as first two segments together (fig.

150); style two-segmented, the first segment small. Thorax with more or less rounded mesonotum; anterior mesonotum and mesopleuron pilose; humerals, presuturals, intraalars, dorsocentrals, postalars, and scutellars present. Legs slender; coxae pilose; bristles present on anterior sides of femora, several rows on tibiae, subapically on tarsi; basitarsi long, at least twice as long as second segment; ventral sides of tarsi setulate. Wings hyaline, partly smokey or diffusedly maculate (fig. 153); venation normal, all posterior cells open, anal cell open very narrowly apically or closed, alula present. Basal abdomen as broad as thorax, tapering apically to one third basal width; male genitalia shiny dorsally, more or less pointing downward (figs. 222-225).

Coquillett (1893a) and Wilcox (1941) gave synopses of the species of *Heteropogon* Loew of North America north of Mexico. A single species, *Heteropogon wilcoxi* James, is known from Alberta.

Heteropogon wilcoxi James

Heteropogon wilcoxi James 1934 : 84.

Mystax, frontal and vertical pile, and beard, white; four ocellars white; antennae black, one bristle on apical lower side of second antennal segment white; occiput black, white pilose, bristles white; palpi two-segmented, subequal, first segment excavated laterally (fig. 45). Thorax greyish yellow pollinose; prothoracic pile long; mesonotal pile present marginally, dorsocentrally and acrostichally; long pile also present on anterior and posterior corners of sternopleuron, on mesopleuron, on metapleuron, and on upper center of hypopleuron. Coxae and femora black, tibiae and tarsi yellow to orange brown; coxae yellowish pollinose with long white pile; femora with pile on ventral sides. bristles on basal ventral and apical posterior sides of front, and anterior sides and apices of middle and hind pairs; ventral sides of front and hind tibiae, and tarsi, golden yellow tomentose; claws strong, curved, black; empodium short, brown. Wings slightly longer than abdomen, veins brown; anal cell open narrowly; branching of third vein above tip of discal cell; anterior crossvein behind the middle of discal cell (fig. 153).

Abdomen yellowish grey pollinose; white pile present on lateral margins, shorter on posterior segments; dorsum covered with short, sparse pile; ventre white pilose; last three segments of female shining black, acanthophorites black, bearing five pairs of black spines; male genitalia shining brownish orange (figs. 222-225).

This species ranges from Alberta to Arizona; seven specimens were examined.

Localities - ALBERTA: Lethbridge (UA and CNC).

Other localities - WYOMING. COLORADO: Model, Hochne; Mesa de Maya, Tobe; Springer. ARIZONA: Holbrook. ILLINOIS: Joliet.

Genus *Lestomyia* Williston

Lestomyia Williston 1884 : 19. Type species: *Clavator sabulonum* Osten-Sacken 1877.
Clavator Osten-Sacken *not* Philippi 1877 : 391.

In appearance, these flies resemble *Lasiopogon* Loew, but are distinct in the antennae and some other characters, such as the vertex, the front, the gibbosity, and the presence of a bent tibial spur on front tibiae. Male genitalia are rotated about 90°; hypandrium subtriangular; aedeagus long; superior forceps more or less like those of *Heteropogon* Loew (fig. 58).

Face broad, gibbosity not too prominent; front and vertex convex marginally, ocellar plate elevated, rounded; first two antennal segments subequal, third swollen apically, style single segmented, truncate, hollow on tip (fig. 128); palpi two-segmented. Thorax with strong bristles, markedly pollinose, less pilose. Legs slender; pile short, appressed; bristles stout, mostly on tibiae and tarsi; claws long; empodium two thirds as long as claws, sharp. Wings hyaline, all posterior cells open, anal cell open narrowly; branching of third vein above or beyond tip of discal cell; anterior crossvein slightly beyond middle of discal cell; alula well developed (fig. 154). Abdomen elongate, pile short and semi-appressed, longer on first segment; bristles present on sides of first segment. Seven species are included in this genus, all Nearctic in distribution. In Alberta this genus is represented by one species, *Lestomyia sabulonum* Osten-Sacken.

Lestomyia sabulonum Osten-Sacken

Clavator sabulonum Osten-Sacken 1877 : 392.
Lestomyia sabulonum Williston 1884 : 20.

This species is yellowish grey pollinose; all bristles are white. Size 7.0 - 11.0 mm in males, 8.0 - 12.0 mm in females. There is no sexual dimorphism. The number of bristles varies individually; the ocellar bristles three to four pairs; metapleural bristles in a row of four to six; humerals three to four; post-humerals none to two; intra-alars two to three; dorsocentrals eight to ten; scutellars three to four pairs.

This species lives in mainly dry fields, with short grass and cacti, near to, or far from, water.

This species is known from British Columbia and Alberta, south to California, east to Wyoming; 35 specimens were examined.

Localities - ALBERTA: Burdett (UA); Medicine Hat (UA); Comrey, Milk River Valley (UA); Writing-on-Stone Provincial Park (UA); Little Bow Park, McGregor Lake (UA).
Other localities - BRITISH COLUMBIA: Oliver (CNC). CALIFORNIA: Claremont (CNC). WYOMING: Rawlins (AMNH).

Genus *Nicocles* Jaennicke

Nicocles Jaennicke 1867 : 355. Type species: *Nicocles analis* Jaennicke 1867.
Pygostolus Loew 1866 : *not* Haliday 1833. Type species: *Dasypogon politus* Say 1823.

This group includes flies with rather flat abdomens. The head is similar to *Heteropogon* Loew and *Lestomyia* Williston, but the shapes of the antennae (fig. 129) and the mystax (figs. 20-22) readily distinguish the two groups. The humeral bristles are absent from *Nicocles* Jaennicke.

Face flat, bristles present along epistomal margin; first two antennal segments subequal, third segment tapering apically, bristles present on lower side of second segment; vertex and front broad, semiparallel (fig. 22); proboscis short; palpi two-segmented, subequal (fig. 44). Thorax with bristles on posterior half of mesonotum; humerals absent; presuturals present; metapleuron with bristle-like hairs. Legs slender; bristles present on middle femora, on tibiae, and on tarsi; front and hind basitarsi twice as long as second tarsal segments (figs. 75, 76). Wings longer than abdomen, maculate in some species; discal cell elongate; third vein branch above or beyond tip of discal cell; anterior crossvein at apical two-thirds of discal cell; all posterior cells open except anal cell narrowly open at tip or closed; alula not well developed. Abdomen shiny and rather flat (figs. 94-96). In males: seventh segment concealed under broader sixth segment; male genitalia small, not rotated, concealed under sixth abdominal segment. In females: eighth segment concealed inside seventh segment; acanthophorites with five pairs of spines.

This genus is represented in the Neotropical Region by one species, and in the Nearctic Region by 14 species. One species, *Nicocles utahensis* Banks, occurs in Alberta.

Nicocles utahensis Banks

Nicocles utahensis Banks 1920 : 66-67.
Nicocles punctipennis Melander 1923c : 217-219.

This species is easily recognized by the shiny black abdomen and incomplete silvery white marking on the fifth segment of males and females. The silvery markings differ between the sexes. In the males, the marking on the fifth abdominal segment is incomplete, interrupted medially, broader laterally, and on the sixth segment, the marking is entire (fig. 94). In the females, the markings are present on the last three segments, broad on the lateral margins, tapering, and separated by a small gap medially (fig. 96).

This species ranges from British Columbia and Alberta, south to Oregon and Utah.

Localities - ALBERTA: Medicine Hat (CNC).
Other localities - BRITISH COLUMBIA: Robson (CNC).

Genus *Cyrtopogon* Loew

Cyrtopogon Loew 1847 : 516. Type species: *Asilus ruficornis* F. 1794.
Euarmostus Walker 1851 : 102. Type species: *Euarmostus bimacula* Walker 1851.
Eupalamus Jaennicke 1867 : 86. Type species: *Eupalamus alpestris* Jaennicke

1867. Preoccupied in Hymenoptera, Wesmael 1844, and in Coleoptera, Schmidt-Goebel 1846.

Palamopogon Bezzi 1927 : 61. Type species: *Palamopogon alpestris* Jaennicke 1867.

Philammosius Rondani 1856 : 156. Type species: *Dasypogon fimbriatus* Meigen 1820.

Wilcox and Martin (1936) included 68 species in this genus. The species were arranged in 21 groups and five "single" species: *falto* Walker, *laphriformis* Curran, *lyratus* Osten-Sacken, *alleni* Back, and *tenuis* Bromley.

This genus seems to be the most successful group in North America north of Mexico; so far it has not been reported from Mexico (Wilcox and Martin 1936). Twenty three species have been reported from the Palaearctic, two from the Ethiopian, and three from the Oriental Region (Hull 1962). There are 14 species known from Alberta.

There are many characters for the identification of the species, depending on the group, such as shape, color, and ornamentation of the tarsi; ornamentation of abdomen; markings on the wings; shape of the mystax; the scutellum; the metapleura; the legs; the claws; the gibbosity and width of the face; and the antennae (Wilcox and Martin 1936).

Back (1909) noticed that some species were aberrant forms of the genus; these were placed in different genera: *Eucyrtopogon* by Curran (1923), *Metapogon* by Coquillett (1904); *Nannocyrtopogon* by Wilcox and Martin (1936).

Most species live in areas near or within coniferous forests. Other known habitats are: sand near willows along running water, and open desert. Limited data on the phenology and mating behaviour of some of the species were presented by Wilcox and Martin (1936). Melin (1923) provided information on the biology of the Palearctic species, *Cyrtopogon lateralis* Fallen.

See Wilcox and Martin (1936) for the description of the genus.

Key to the Species of *Cyrtopogon* Loew of Alberta

1. Last segment of front tarsus elongate, as long as three preceeding segments together, flattened (fig. 81); first abdominal segment with a posterior pollinose fascia ..... *lineotarsus* Curran
   Fore tarsus with subequal segments; first abdominal segment without a posterior pollinose fascia 2
2. Hind tibiae entirely black 3
   Hind tibiae entirely or partly reddish or orange brown 6
3. Mystax entirely black; tibial pile short 4
   Mystax with white or yellow pile; tibial pile long, black or mixed with white 5
4. Tibial pile in both sexes black; hairs of male genitalia black .... *nigator* Osten-Sacken
   Tibial pile white; hairs of male genitalia white .... *sansoni* Curran
5. Silvery hairs on segments 1 to 5 of male front tarsus not noticeably longer apically; first two abdominal segments with yellow hairs;

hind femora yellowish haired ..... *praepes* Williston
Silvery hairs on segments 2 to 5 of male front tarsus longer apically; more than two basal abdominal segments with pale yellow hairs; hind femora with black hairs ..... *willistoni* Curran

6. Abdomen with dense, erect, light colored pile, covering at least the dorsum of abdominal segments 2 and 3.... *dasyllis* Williston
Pile of abdomen not as above 7

7. Hind tibia with long white pile ..... *montanus* Loew
Hind tibia without such long pile 8

8. Metapleural bristles entirely black 9
Metapleural bristles mixed with orange, or entirely orange or pale yellow 10

9. Third antennal segment orange; tarsal segments mostly black. . ..... *aurifex* Osten-Sacken
Third antennal segment black; last tarsal segment black, the remaining reddish brown ..... *bimacula* Walker

10. Scutellum silvery pollinose; hind tibia black; metapleural bristles entirely orange or pale yellow ..... *nugator* Osten-Sacken
Scutellum not or hardly pollinose; hind tibia partly or entirely orange, reddish, or yellow; metapleural bristles mixed orange and black 11

11. Antennae entirely black 12
Third antennal segment orange 14

12. Basal one third of hind tibia black, the remaining orange or reddish brown 13
At least basal half of hind tibia orange, tibial apex black 14

13. Anterior tibia black; tibial pile long ..... *inversus* Curran
Anterior tibia orange brown; tibial pile practically absent ..... *albovarians* Curran

14. Abdominal bands interrupted medially .... *distinctitarsus* new species
Abdominal bands complete, orange 15

15. Male 16
Female 17

16. Front tibia and tarsus with white fringe of hairs, as long as diameter of segments; pile on face orange; 2-4 abdominal segments with orange pile across the segments ..... *auratus* Cole
Front tibia and tarsus without fringe of hairs; bristles or hairs on face black mixed with white or yellow; pile of abdomen only on lateral sides, absent from fourth segment... *glarealis* Melander

17. Pile on third abdominal segment as long as that on second ..... *auratus* Cole
Pile on third abdominal segment shorter than that on second .... *glarealis* Melander

Cyrtopogon auratus Cole

Cyrtopogon auratus Cole 1919 : 230.
Cyrtopogon albitarsis Curran 1922 : 278-279.
Cyrtopogon albitarsis Curran 1924 : 279.

This species belongs to the *aurifex* group, in which the male abdominal segments 2-4 are provided with dense fulvous pile across the segments.

Males. Face with mane-like orange pile; front tibia and front tarsus with fringe of white hairs on outer sides (fig. 78); fifth to seventh abdominal segments short, tectiform; male genitalia black, form as in figs. 226-229.

Females. Mane on gibbosity sparser; fringe of white hairs absent from front tibia and front tarsus; abdominal segments not tectiform, yellow pile on first three segments shorter than that of male, still shorter on fourth, and almost absent from fifth.

A female specimen from Yellowstone Park, Cascades Y.R., 22. Vii. 1923 (A. L. Melander), was chosen as allotype of *albitarsis* Curran, 1922, but determined by G. Stuart Walley, 1932, as not the allotype.

This species rangès from Alberta to Oregon, southeast to Colorado; holotype and 14 additional specimens were examined.

Localities - ALBERTA: Banff (type locality; CNC); Banff, Lake Minnewanka, Davil's Gap Trail (UA); Waterton (AMNH); Gorge Creek (UA).

Other localities - WASHINGTON: Mt. Spokane. OREGON: Strawberry Mtn., Grant Co. (CNC); Wallowa Lake. IDAHO: Long Valley, Alpha (UA). WYOMING: Yellowstone National Park, Medison Junction (AMNH); Yellowstone N.P., Cascades Y.R. (CNC); Sylvan Pass, Yellowstone Park. COLORADO: Malta (AMNH). UTAH: Uintah Mts.

Cyrtopogon aurifex Osten-Sacken

Cyrtopogon aurifex Osten-Sacken 1877 : 301-302.

This species is similar to *auratus* Cole, but the two are distinguished by the color of the metapleural bristles: entirely black in *aurifex* Osten-Sacken, mixed with orange in *auratus* Cole.

This species ranges from Alberta and British Columbia, south to California; two specimens were examined.

Localities - ALBERTA: Seebe, Kananaskis Forest (DE).

Other localities - BRITISH COLUMBIA: Vancouver Island. WASHINGTON: Mt. Adams, Clearwater; Mt. Adams, Signal Peak. OREGON: Mary's Peak; Crater Lake. CALIFORNIA: Weber Lake, Sierra Nevada; Gold Lake, Sierra Co.

Cyrtopogon willistoni Curran

Cyrtopogon willistoni Curran 1922 : 277-278.

This species belongs to the *callipedilus* group, in which the last two segments of the middle tarsus of the males are provided with a disc of black hairs (fig. 80). The males of this group are more or less easily separated from one another by the shape of the silvery hairs on the front tarsi, but the females are hardly distinguishable.

This species ranges from Alberta and British Columbia, south to California and Colorado; 32 specimens were examined.

Localities - ALBERTA: Banff (UA and CNC); Calgary (UA and DE); Mountain View (CNC); Twin Butte (CNC); Waterton Lakes Park (CNC and UA).

Other localities - BRITISH COLUMBIA: Chilcotin (AMNH); Aspen Grove (AMNH). Minnie Lake; Nicola, Oliver. WASHINGTON: Signal Peak (AMNH); Blue Mts., Godman Springs; Colville; Mt. Adams; Mt. Spokane; Tampico; Yakima. OREGON: Fish Lake; Steins Mts.,

Harnery Co.; Ontario; Strawberry Mt., Grant Co. IDAHO: Long Valley, Alpha. MONTANA: Gallatin Co.; Madison Co.; Bozeman. WYOMING: Mammoth Hot Springs, Yellowstone National Park (AMNH); Grand Teton Nat'l Park; COLORADO: Elbert (AMNH); Electra Lake (AMNH); Ouray (AMNH); South Fork (AMNH). UTAH: Roosevelt Creek, Raft River Mts.; Zion Nat'l Park. CALIFORNIA: Coleville, Mono Co. (AMNH); Sacramento.

Cyrtopogon praepes Williston

Cyrtopogon praepes Williston 1884 : 12.

This species is similar to *willistoni* Curran. The males are distinguished by the presence of the silvery hairs on the first tarsal segment of the front tarsus, and the females are distinguished by the yellowish hairs on the hind femora.

Strickland (1938) included this species in his list, but I do not believe it occurs in Alberta. This species ranges from British Columbia to California and Nevada; four specimens were examined.

Localities - BRITISH COLUMBIA: Vaseaux (CNC); Penticton (CNC); Robson (USNM). WASHINGTON: Olympia; Roy. OREGON. IDAHO. NEVADA: Elko (USNM). CALIFORNIA: San Francisco; Santa Cruz; Santa Rosa.

Cyrtopogon bimacula Walker

Euarmostus bimacula Walker 1851 : 102.

Cyrtopogon melanopleurus Loew 1866 : 61.

Cyrtopogon bimacula Loew 1874 : 365.

This species is easily recognized by the wings of the males: maculated at the apex and the tip of the anal cell (fig. 155); in the females, there is a tendency to light infuscation on the wings of the same pattern as in the males; both sexes have largely yellowish white pile and black metapleural bristles.

This species is transcontinental in the North, ranging from the Northwest Territories to New Mexico; 71 specimens were examined.

Localities - ALBERTA: High Level (UA); Flatbush, Pembina River (UA); Lac la Biche, Owl River (UA); Chipewyan (CNC); Opal (UA); Sandy Lake (UA); Beaverlodge (UA); Nordegg; Columbia Icefield (UA); Calgary (UA); Wilkinson Creek, Bow River Forest (UA); Lethbridge (UA); Morrin (CNC); Medicine Hat (CNC); Elkwater (CNC); Cypress Hills (UA).

Other localities - NORTHWEST TERRITORIES: McKenzie Delta, Reindeer Depot (CNC). BRITISH COLUMBIA: Steelhead; Lorna. WASHINGTON: Mt. Rainier, Sunrise, Paradise; Mt. Baker. OREGON: Aneroud Lake Bule Mts.; Horst Mts., Lane Co.; Frog Meadows, Lane Co. IDAHO. MONTANA: Skalkadho Pass, Ravalli Co. WYOMING: Yellowstone Nat'l Park. COLORADO: Camp Creek R. Station; Aspen; South Peak; Ward. NEW MEXICO: Las Vegas Mts. SASKATCHEWAN: Dandrum (CNC); Saskatoon (CNC); St. Victor (CNC). MANITOBA: Douglas (CNC). ONTARIO: Sand Lake (CNC); Sadbury. QUEBEC: Megantis (CNC); Seven Isles (CNC). NOVA SCOTIA: Truo. NEW HAMPSHIRE: Breton Woods; Mt. Washington; White Mountains.

Cyrtopogon distinctitarsus new species

This species resembles *bimacula* Walker to some extent, but is distinguished by the color pattern of the legs and the color of the meta-

pleural bristles.

Female. Face, front, and vertex, golden yellow pollinose; mystax black, mixed with golden yellow pile on center of gibbosity; hairs on front, vertex, occiput, first two antennal segments, and second palpal segment, black; beard, pile on first palpal segment and on lower side of proboscis, white; antennae black; gibbosity prominent near antennal base (fig. 18). Thorax golden yellow pollinose; pleura without shiny bare area; pollinose color pattern similar to *bimacula* Walker; pile on propleuron white, on pronotum, metanotum, and scutellum, black; metapleural haris orange yellow. Legs bicolored; basal halves of tibiae, basal three-fourths of basitarsi, basal halves of tarsal segments 2 - 3, orange brown; the remainder of legs black; basal half of claws orange, apex black; empodium very short, orange; pulvilli broad; pile on coxae yellowish, on lower sides of femora white, on upper sides black, short, appressed, longer on apices of hind pair, on tibiae, black, short, sparse; bristles of tibiae and tarsi black. Wings hyaline, with microtrichiae, brownish maculate on the following: anterior crossvein, base of discal cell, anterior branch of cubitus and mediocubital crossvein, apex of discal cell and branching of third vein (fig. 156); anterior crossvein at basal one fourth of discal cell; halteres orange. Abdomen black, more or less similar to *bimacula* Walker; pile yellowish; spines reddish brown.

This species has been named *distinctitarsus*, because the color pattern of the tarsi is quite distinct from the remaining species of *Cyrtopogon* from Alberta.

Holotype: Female, Opal, Alberta, 5. VII. 1963 (L. Kenakin and S. Adisoemarto); deposited in CNC.

Paratypes: Female, Lac la Biche, sand dunes, N. E. shore, Alberta, 2-4. VII. 1964 (L. M. Kenakin and S. Adisoemarto); female , Lethbridge, Alberta, 24. VI. 1960 (D. Larson); deposited in UA.

Cyrtopogon montanus Loew

Cyrtopogon montanus Loew 1874 : 362.

This species is easily recognized by the color of the mystax, and the long pile on the abdominal segments and the legs, mostly black in the males and white in the females. Upper middle part of mystax white, the remaining black; frontal, vertical, and upper occipital pile black; beard white; antennae black, third segment slightly orange, pile on first two segments white. Propleural pile white, pile on the remainder of thorax black. Legs mostly black, hind tibiae and hind tarsi reddish brown; pile on coxae, lower basal femora, and dorsal sides of hind tibiae, white, the remaining pile of legs black. Abdominal pile of male bicolored, on posterior corners of each segment white, the remaining black; male genitalia (figs. 230-233) black, with black hairs; abdominal pile of females entirely white.

This species is found in central western North America, from British Columbia, south to California, and east to New Mexico; holotype (CNC) and eight additional specimens were examined.

Localities - ALBERTA: Banff (type locality; CNC).

Other localities - BRITISH COLUMBIA: Seton Lake (UA); Vernon; Departure Bay; Gold Stream; Lillooet; Oliver. WASHINGTON: Cle Elum; Mt. Adams, Signal Peak, West Klickitat; Mt. Rainier, Sunrise, White River; Olympia; White Rock Spring, Steven Pass, Cascade Mountains. OREGON: Anthony Lake; Canby; Fox; Hood River; Marys Peak; McKenzie Pass; Mt. Hood; La Grande; North Powder. IDAHO: Lake Waha; Long Valley, Alpha; Mosco Mt.; Potlach. UTAH: Ogden. CALIFORNIA: Towle (AMNH); Emigrant Gap (AMNH); Gold Lake (AMNH); Sierra Nevada; Fallen Leaf Lake; Lake Tahoe; San Bernardino Mts.; Mt. St. Alens; Sequoia Nat'l Park, Welverton; Truckee; Yosemite Valley. COLORADO: Boulder; Gold Hill; Longs Peak Inn; Ward; Poncha Pass. NEW MEXICO.

Cyrtopogon albovarians Curran

Cyrtopogon albitarsis Curran 1923 : 134-135, *not* Curran 1922 : 278-279.

Cyrtopogon albovarians Curran 1924 : 279-280.

The first specimen was first described as the allotype of *albitarsis* Curran 1922 (= *auratus* Cole), but then Curran (1924) realized that the specimen belongs to a different species, and described it as *albovarians* .

It differs from *auratus* Cole (= *albitarsis* Curran) in the following characters: antennae entirely black; upper one third of mystax white, the remainder black; pile on posterior mesonotum white; pile on mesopleuron longer, white on lower side, black on upper side; metapleural pile white; metanotal pile black; pile on sides of third and fourth abdominal segments mixed with black.

This species is known only from Alberta; holotype (CNC) and one additonal specimen were examined.

Localities - ALBERTA: Banff (type locality; CNC); Wabamun (UA).

Cyrtopogon inversus Curran

Cyrtopogon inversus Curran 1923 : 172-173.

This species is similar to *albovarians* Curran, but can be distinguished by the black anterior tibiae and the long tibial pile.

This species ranges from Alberta and British Columbia, south to Oregon, and east to Colorado; two specimens were examined.

Localities - ALBERTA: Seebe, Kananaskis Forest (DE).

Other localities - BRITISH COLUMBIA: Aspen Grove; Darcy; Nicola; Chilcotin; Hadley; Kamloops; Lillooet, Seton Lake. WASHINGTON: Signal Peak, Ranger Station; Virden. OREGON: Eagle Ridge, Klamath Lake. WYOMING: Yellowstone Nat'l Park. COLORADO: Longs Peak.

Cyrtopogon glarealis Melander

Cyrtopogon glarealis Melander 1923a : 113-114.

This species belongs to the *pulcher* group, but is distinguished from *pulcher* Back by the color of the pile on the second abdominal segment of the males (black in *glarealis* Melander, orange in *pulcher* Back), and by the color of the metapleural hairs in the females (largely black in the former, orange in the latter). Males of this group are easily recognized by the form of the abdominal segments, which are gradually compressed later-

ally toward the posterior end, and by the orange third antennal segment.

This species ranges from Alberta and British Columbia, south to California and Wyoming; three specimens were examined.

Localities - ALBERTA: Kootenay Plains, 116° 25'W 52° 7'N (LMK).

Other localities - BRITISH COLUMBIA: Salmon Lake, Nicola District. WASHINGTON: Spokane; Wolf Fork, Touchet River, Blue Mts. OREGON: Wallowa Lake, Aneroid Lake Trail. IDAHO: Gold Hill, Latan Co.; Moscow Mts.; Long Valley, Alpha (UA). MONTANA: Big Hole Battle Field, Beaverhead Co.; Gallatin Co. WYOMING: Madison Junction, Yellowstone Nat'l Park; Dunroven Pass. CALIFORNIA: Angora Peak, Tahoe.

Cyrtopogon lineotarsus Curran

Cyrtopogon lineotarsus Curran 1923 : 187-188.

This species is a member of the *leptotarsus* group, in which the last tarsal segment of the front tarsus is elongate (fig. 81). In the males, the gibbosity is almost triangular from the anterior aspect; it reaches the antennal base and is very prominent. A female specimen from Glacier Park, Montana, 5. VIII. 1925 (G.A. Mail) was doubtfully identified by Wilcox (1935) as *Cyrtopogon lineotarsus* Curran, and also described as the female of *lineotarsus* Curran by Wilcox and Martin (1936), although they were doubtful, because this specimen differed in the color of the mystax from the type specimen; the mystax is entirely white in the female, and some other differences are also obvious: the thoracic, abdominal, coxal, and femoral pile, is entirely white. According to Wilcox and Martin (1936), *lineotarsus* Curran could be the same species as *predator* Curran, based on a comparison of the specimens of both sexes with the types of both species.

This species ranges from Alberta to Montana; holotype (CNC) and two additional specimens were examined.

Localities - ALBERTA: Banff (type locality; CNC); Kananaskis Valley, Pocaterra Creek (CAS).

Other locality - MONTANA: Glacier Park.

Cyrtopogon sansoni Curran

Cyrtopogon sansoni Curran 1923 : 138-139.

This species belongs to the *nugator* group, in which the scutellum is flat, largely pollinose on the center, shining on the edge. The hypopleural hairs are entirely white, and the abdominal bands are interrupted medially. Face broader than long; gibbosity golden brownish pollinose, more or less rounded; front, vertex, and occiput greyish pollinose, black pilose; mystax black; beard white. Mesonotal pile and scutellar hairs brownish black; mesonotal bristles black.

This species is known from Alberta only; holotype (CNC) and allotype (CNC) were examined.

Localities - ALBERTA: Banff (type locality; CNC).

Cyrtopogon nugator Osten-Sacken

Cyrtopogon nugator Osten-Sacken 1887 : 307.

This species is strikingly similar to *sansoni* Curran and hardly distinguished from it. See Wilcox and Martin (1936) for the diagnostic characters.

This species ranges from British Columbia, south to Arizona and New Mexico. Strickland (1938) included this species in his list, but I do not believe it occurs in Alberta; six specimens were examined.

Localities - BRITISH COLUMBIA: Saanich; Vernon; Agassiz. WASHINGTON: Signal Peak; Rainier Nat'l Forest; Sumner (UA). OREGON: Mt. Hood. IDAHO: Lake Wala. CALIFORNIA: Weber Lake, Sierra Co. (CNC); Grass Lake, Tahoe; Tioga Road; Yosemite. COLORADO: Aspen (AMNH). NEW MEXICO: Cloudcroft. ARIZONA: Santa Catalina Mts. (AMNH and USNM).

Cyrtopogon dasyllis Williston

Cyrtopogon dasyllis Williston 1893 : 66.

Males have maculate wings, but the pattern is different from that of *bimacula* Walker: specimens of *dasyllis* Williston have one black macula on the apex of the wing, and a narrow one around the second cubital vein (fig. 157); the abdomen is provided with yellowish long pile on the entire first four abdominal segments, black on the remaining; hypandrium of the male is provided with a pair of spine-like structures (fig. 236). The wings of the females are not distinctly maculate, but are slightly infuscated in the place of the maculae.

This species ranges from Alaska and the Northwest Territories, south to Oregon, and Colorado; 16 specimens were examined.

Localities - ALBERTA: Banff (UA, CNC, and AMNH); Lake Louise (CNC); Jasper (CNC).
Other localities - ALASKA: Skagway (AMNH). NORTHWEST TERRITORIES: Cameron Bay, Great Bear Lake (CNC). YUKON TERRITORIES: Whitehorse (CNC). BRITISH COLUMBIA: Davie Lake (CNC); Robson (CNC); Shaswap (CNC); Tuktakamin (CNC); Kaslo. WASHINGTON: Mt. Rainier, Sunrise; Mt. Rainier, Paradise Inn; Mt. Rainier, White River Camp; Randle. OREGON: Strawberry Mt., Grant Co. IDAHO. COLORADO: Deer Mt.

Genus *Eucyrtopogon* Curran

Eucyrtopogon Curran 1923 : 95. Type species *Cyrtopogon nebulo* Osten-Sacken 1877.

This genus is confined to the Nearctic Region, and includes 11 species (Hull 1962). In Alberta, *Eucyrtopogon* is represented by seven species, one of them, *incompletus*, is new.

Face, front, and vertex, broad, narrower at antennal base; front less slanting than *Cyrtopogon* Loew; third antennal segment elongate, tapering apically (fig. 131); antennal style half as long as third segment; first two antennal segments oval, subequal; proboscis short, stout (fig. 61); palpi two-segmented, long (fig. 43). Thorax slightly elongate; mesonotum pilose; dorsocentral bristles weak; metapleural hairs always present. Legs slender; femora and tibiae subequal, the former thicker; bristles short, strong on tibiae and tarsi; pile present on tibiae; claws

strong, long. Wings hyaline, maculate in certain areas (figs. 158, 159); one and a half times as long as abdomen; microtrichiae usually present, but absent from *albibarbis* Curran. Abdomen semiparallel, curved dorsally, about one and a half times as long as thorax; posterior corners of segment 1 to 6 always pilose, seventh segment in some species bare; pile longer on sides, short and appressed on dorsum; male genitalia black, concealed, almost constant in form within the genus (figs. 238-242); acanthophorites with four to six pairs of spines. Sexual dimorphism very slight, present in some species on the pattern of pile and hairs, pattern of costal setulae, and pollen of the abdomen.

Key to the Species of *Eucyrtopogon* Curran of Alberta

1. Male 2
   Female 7
2. Wing clear, microtrichiae absent ..... *albibarbis* Curran
   Wing with microtrichiae 3
3. Middle line of thorax with very conspicuous mane-like white and black hairs ..... *comantis* Curran
   No condensation of pile to form a mane 4
4. Wings with a double row of setulae, black, curved 5
   Costal setulae pale brownish or orange, not curved 6
5. From side aspect mystax with ends of hairs pale yellowish or white ..... *diversipilosus* Curran
   Mystax with ends of hairs brownish ..... *nebulo* Osten-Sacken
6. Costal setulae end between tip of subcosta and first longitudinal vein ..... *incompletus* n. sp.
   Costal setulae complete, reaching wing tip ..... *calcarata* Curran or *spinigera* Curran
7. Wings without microtrichiae ..... *albibarbis* Curran
   Microtrichiae present 8
8. Seventh abdominal segment without sericeous pollen ..... *nebulo* Osten-Sacken
   Seventh abdominal segment with sericeous pollen 9
9. Mesonotum with acrostichal white mane anteriorly 10
   Mesonotum without such mane 11
10. Front tibia and all tarsi with prominent white mane-like pile ..... *comantis* Curran
    Front tibia and tarsi with less conspicuous mane-like pile ..... *incompletus* new species
11. Sericeous pollen on sixth abdominal segment extending broadly almost to base of segment ..... *calcarata* Curran
    Pollen not extending over two-thirds the distance to base, or only very narrowly so on sides 12
12. Acanthophorite with four pairs of spines ..... *diversipilosus* Curran
    Acanthophorite with five or six pairs of spines ..... *spinigera* Curran

Eucyrtopogon comantis Curran

Eucyrtopogon comantis Curran 1923 : 116-117.

This species is recognized by the presence of the mane-like white pile on the acrostichal area of the mesonotum; this vestiture is also present in *albibarbis* Curran, but these two species are easily distinguished by the presence or absence of microtrichiae of the wings. Sides of face with white mane; each bristle of mystax bicolored, brownish black basally, yellowish white apically; ocellar and antennal bristles brownish yellow. Legs black; coxal pile yellowish; femoral pile long, white, appressed on dorsal sides; pile on front and middle tibiae white, short, appressed, mane-like, half as long as tibia diameter, continued to dorsal sides of tarsi, less conspicuous on hind pair; pile in females longer; claws black. Posterior corners of fourth, fifth, and sixth abdominal segments with bristle-like brownish hairs, absent from females; venter white pilose; male genitalia black; acanthophorite with five pairs of spines.

This species is known from British Columbia and Alberta, south to Colorado; holotype (CNC) and nine additional specimens were examined.

Localities - ALBERTA: Fabyan, Campsite (UA); Medicine Hat (UA and AMNH); Calgary (CNC); Magrath (CNC).

Other localities - BRITISH COLUMBIA: Chilcotin (type locality; CNC); Vernon (CNC); Departure Bay (CNC). WYOMING. COLORADO: Maez Creek, Huerfano Co. (USNM); Wet Mts., Huerfano Co. (USNM).

Eucyrtopogon albibarbis Curran

Eucyrtopogon albibarbis Curran 1923 : 117.

This species is similar to *comantis* Curran, but is readily distinguished by the absence of villi or microtrichiae from the wings. Upper two thirds of face white pilose; each bristle of mystax bicolored, black basally, white apically. Mesonotum is provided with acrostichal mane. Dorsal faces of front tibia and of all tarsi with appressed mane-like white pile, of equal size in both sexes.

This species is known from Alberta and Saskatchewan; holotype (CNC) and 16 additional specimens were examined.

Localities - ALBERTA: Fabyan, Campsite (UA); Medicine Hat (CNC); Calgary (UA).

Other localities - SASKATCHEWAN: Saskatoon (CNC); Moose Jaw (type locality; CNC); Regina (USNM).

Eucyrtopogon incompletus new species

This species resembles *comantis* Curran and *albibarbis* Curran, but differs in the following respects: the male has curved costal setulae on the wing, which end a considerable distance before the wing tip; the wing tip; the front tibia of the females is without obvious white mane.

This species is distinguished from *comantis* by the following characters: mesonotal pile less abundant, acrostichal mane less obvious; costal setulae not complete, ending between subcosta and first longi-

tudinal vein; costa from this point to apex bare; front tibia of female without obvious white mane. From *albibarbis* Curran, it is distinguished by the following characters: microtrichiae present on wings of both sexes; costal setulae present.

Male. Face white pollinose; mystax black, mixed with white pile on upper and lateral margins; front, vertex, and occiput brownish pollinose; hairs on front, vertex, and occiput brownish; six ocellar bristles black half basally, white apically; first two antennal segments subequal, black, white pilose; third antennal segment missing; beard and pile on proboscis and palpi, white. Thorax more or less similar to *comantis* Curran, but acrostichal pile shorter. Legs similar to *comantis* Curran. Wings with microtrichiae, costal setulae end between subcosta and first longitudinal vein; shape and color of costal setulae similar to those of *comantis* Curran.. Abdomen similar to *comantis* Curran.

Female. Pile on front tibia normal, not produced into long, manelike pile as in *comantis* Curran; the remainder similar to *comantis* Curran.

The name *incompletus* has been chosen for this species on the basis of the shape of the incomplete costal setulae.

Holotype: Male, Cypress Hills, Alberta, 26. V. 1964 (S. Adisoemarto); deposited in CNC.

Paratypes: Two females, same locality, 24. V. 1964 (S. Adisoemarto); deposited in UA.

Eucyrtopogon calcarata Curran

Eucyrtopogon calcarata Curran 1923 : 119.

The males of this species are readily recognized by the costal setulae, which are longer than the diameter of the costa, and by the presence of a conical tubercle on the anterior apex of the hind coxa. The sixth abdominal segment of the females is provided with broad sericeous pollen on the sides.

This species is known from British Columbia and Alberta; holotype (CNC) and 12 additional specimens were examined.

Localities - ALBERTA: Waterton Lakes (CNC); Cowley (UA); Coleman (CNC); Banff (type locality; CNC); Jasper (UA); Edmonton (UA).

Other localities - BRITISH COLUMBIA: Robson (CNC); Cranbrook (CNC); Princeton (CNC).

Eucyrtopogon spinigera Curran

Eucyrtopogon spinigera Curran 1923 : 117-118.

The males are very similar to *calcarata* Curran, but the females are distinguished by the size of the pollinose marking on the sixth abdominal segment, being less than two thirds of the length of the segment.

This species is known from the Northwest Territories to Alberta and British Columbia; holotype (CNC) and 10 additional specimens were examined.

Localities - ALBERTA: Calgary (CNC); Cowley (CNC); Medicine Hat (UA).

Other localities - BRITISH COLUMBIA: Victoria (type locality; CNC); Pass Creek (CNC); Copper Mtn. (CNC).

Eucyrtopogon diversipilosis Curran

Eucyrtopogon diversipilosis Curran 1923 : 118.

This species is similar to *spinigera* Curran. The males are distinguished by differences in costal setulae: *diversipilosis* Curran, they are black and curved; in *spinigera* Curran, they are orange and not curved.

This species is known from British Columbia and Alberta; holotype (CNC) and four additional specimens were examined.

Localities - ALBERTA: Banff (CNC); Coleman (CNC).

Other localities - BRITISH COLUMBIA: Chilcotin (type locality; CNC); Lavington (CNC); Wilmer (CNC).

Eucyrtopogon nebulo Osten-Sacken

Cyrtopogon nebulo Osten-Sacken 1877 : 309.

Eucyrtopogon nebulo Curran 1923 : 120-121.

This species is similar to *diversipilosis* Curran, especially the males, but the females are readily distinguished by the absence of the pollen from the seventh abdominal segment.

This species ranges from British Columbia and Alberta, south to California, Wyoming, and Utah; six specimens were examined.

Localities - ALBERTA: Waterton (CNC).

Other localities - BRITISH COLUMBIA: Royal Oak (CNC); Duncan (CNC); Trinity Valley (CNC); Cranbrook (AMNH). IDAHO: Moscow (USNM). WYOMING: Jackson's Lake (AMNH). UTAH: Logan Canyon (USNM); Logan Peak (USNM). CALIFORNIA.

Genus *Comantella* Curran

Comantella Curran 1923 : 93. Type species: *Cophura fallei* Back 1909.

This genus is similar to *Eucyrtopogon* Curran, but is distinguished by the presence of a curved spur on the apex of the front tibia. The male genitalia show similarity in general appearance to those of *Eucyrtopogon* Curran (figs. 243-247). Four species are included in this genus, all found in the Nearctic Region. In Alberta, two species are known. The species of this genus are very similar to one another. James (1937) has presented a key to the species of this genus.

Key to the Species of *Comantella* Curran of Alberta

Thoracic mane on a clearly defined black vitta..... *rotgeri* James

Medial vitta of thorax at most poorly defined..... *fallei* Back

Comantella fallei Back

Cophura fallei Back 1919 : 378-379.
Comantella maculosa Curran 1923 : 93-94.
Comantella fallei Curran 1923 : 311-312.

This species is strikingly similar to *rotgeri* James. For the diagnostic characters, see James (1937). This species has been recorded from Medicine Hat, Alberta, in late winter, and early and mid fall. It ranges from Alberta southeast to Colorado and Nebraska; 12 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA and CNC).
Other localities - WYOMING. COLORADO: Denver (CNC). NEBRASKA: Crawford (CNC).

Comantella rotgeri James

Comantella rotgeri James 1937 : 61.

This species is distinguished from *fallei* Back on the following characters: medial vitta of thorax definitely demarcated, mystax coarser, not white tipped, pale hairs and bristles deeper yellow, pale pile coarser, less dense, ventral pile coarser, more extensively black.

This species ranges from Alberta to New Mexico; two specimens were examined.

Localities - ALBERTA: Medicine Hat (USNM).
Other localities - COLORADO: Rio Seco, Costilla Co. NEW MEXICO.

Subfamily Laphriinae

This subfamily is represented by three genera, which belong to two tribes. They live either in coniferous or parkland forests. *Laphria* Meigen and *Bombomima* Enderlein are difficult to distinguish, but there is a tendency in *Bombomima* Enderlein towards a more rounded abdomen. There is also a difference in the shape of the pseudoclaspers of these two groups: in *Laphria* Meigen, they are relatively simple; in *Bombomima* Enderlein, they are forked (figs. 266, 270, 273, 276). Before the genus *Bombomima* Enderlein was erected, its species were treated under *Dasyllis* Loew. Banks stated that *Dasyllis* Loew (s.l. : *Dasyllis* Loew and *Bombomima* Enderlein) was an offshoot of the genus *Laphria* Meigen. Hull (1962) placed these genera in different tribes.

Key to the Genera of Laphriinae of Alberta

1. Proboscis on apical half compressed dorsocentrally (fig. 62); third antennal segment dilated, as long as first two segments together (fig. 132); wings with first submarginal cell divided into two (fig. 160) ..... *Pogonosoma* Rondani
   Proboscis compressed laterally; third antennal segment slender (fig. 133), longer than first two segments together; first submarginal not divided (fig. 161) 2
2. Abdomen robust, more or less rounded, densely pilose; pile on

mesonotum covers ground color; pseudoclasper forked (fig. 266) ..... *Bombomima* Enderlein

Abdomen parallel-sided, less pilose; mesonotal ground color, not entirely covered by pile; pseudoclasper simple (fig. 251 pcl) ..... *Laphria* Meigen

Genus *Pogonosoma* Rondani

Pogonosoma Rondani 1856 : 160. Type species: *Asilus maroccanum* F. 1794.

In the Nearctic Region, this genus has only three species. Cresson (1920) treated *melanoptera* Wiedemann as conspecific with *dorsata* Say, but Hull (1962) treated them as two different species. The third species is *ridingsi* Cresson.

Face thick, with slight slit under antennal base; gibbosity rounded, starting at about middle of face (fig. 23); vertex deeply excavated (fig. 24); ocellar plate with one or two pairs of bristles; bristles or bristle-like hairs present on orbital margin of front (opposite to antennal base, fig. 24); first antennal segment stout, second shorter and smaller in diameter, third narrow at base, dilated and oval apically, bristles present on apical lower side of first segment (fig. 132); proboscis compressed dorsocentrally, pointed apically; palpi two-segmented, second segment flattened, thin, and scoop-like (fig. 47). Thorax opaque, thinly pollinose; hairs present on prothorax, posterior half of mesopleuron, upper half of pteropleuron, and scanty on mesonotum, semierect; bristle-like hairs present on metapleuron; dorsocentral bristles absent. Femora slightly thicker subapically; tibiae slightly curved, provided with hairs, hind pairs with bristles; bristles present on tarsi; second to fourth segments of tarsus heart-shaped; claws strongly curved apically; empodium long. Wings longer than abdomen (fig. 160), evenly covered with microtrichiae, sometimes infuscated along veins; marginal cell closed with long stalk; first submarginal cell divided by crossvein; first posterior cell open or closed, sometimes with stalk; fourth posterior cell closed with stalk; anterior crossvein at basal one-third of discal cell; alula well developed. Abdomen semiparallel in males, slightly wider subapically in females; first five segments with two to four bristles on middle of each side; pile short, longer on venter, subappressed on dorsum.

Strickland (1938) recorded one species, *ridingsi* Cresson, from Alberta.

Key to the Species of *Pogonosoma* Rondani of Alberta

Beard on lower orbital margin black; coxal pile mixed black and white; front femoral and tibial hairs entirely black; metapleural hairs in female black; abdominal hairs in female entirely black ..... *stricklandi* new species

Beard entirely white; coxal pile entirely white; front femoral and tibial hairs mixed black and white; metapleural hairs in female white; abdominal hairs in female white on first three segments

..... *ridingsi* Cresson

Pogonosoma ridingsi Cresson

Pogonosoma ridingsi Cresson 1920 : 214-215.

This species is similar to *dorsata* Say (Cresson 1920), but is distinguished from the latter mainly by the difference of the color of the pile, hairs, and bristles.

This species ranges from British Columbia southeast to California and Texas. Strickland (1938) included this species in his list. So far, I have seen only a female specimen of *Pogonosoma* from Alberta, which is *stricklandi* new species; holotype (USNM) and 10 additional specimens were examined.

Localities - BRITISH COLUMBIA: Robson (CNC and USNM); Copper Mtn. (CNC); Kamloops (CNC); Departure Bay (CNC); Victoria (CNC). CALIFORNIA: Plumas Co. COLORADO: Florissant (type locality; USNM). TEXAS: Waco (USNM).

Pogonosoma stricklandi new species

This species is easily distinguished from *ridingsi* Cresson by the presence of black pile on the lower orbital margin and the entirely black pile or hairs on the front and the middle legs. The female differs from those of *ridingsi* Cresson in the color of the metapleural hairs, entirely black, and the abdominal pile, also entirely black.

Female. Pile, hairs, and bristles on face white, few black bristles on middle of gibbosity; beard white, mixed with black on maxillae; occipital pile white on lower half, black on upper half and on orbital margin; frontal, vertical, and ocellar pile black; ocellar bristles black; antennal first two segments orange, bristles black, pile white on lower sides, black on upper sides. Thorax white pollinose; pile mostly black, white on proepimeron, and on anterior and posterior corners of mesopleuron; metapleural hairs black; all bristles black. Legs black, coxae white pollinose; pile, hairs, and bristles black, sparse white pile on front coxae, few white hairs on subapical dorsal side of hind femur. Wings covered with brown microtrichiae; halteres black. Abdominal pile, hairs, and bristles entirely black.

This species is named in honor of the late Dr. E. H. Strickland.

Holotype: Female, Waterton, Alberta, 12. VII. 1923 (E. H. Strickland); deposited in CNC.

Genus *Bombomima* Enderlein

Bombomima Enderlein 1914 : 253. Type species: *Laphria fulvithorax* Fabricius 1805.

This genus resembles *Laphria* Meigen. The distinguishing characters are, so far, not satisfying. The females of *Bombomima* usually have a broad abdomen, but the abdomen of the males is slender as in *Laphria* Meigen. Another character which may be used for distinguishing these

two groups is the shape of the pseudoclaspers. Pseudoclaspers of 13 species of *Bombomima* and 11 species of *Laphria* have been examined. In *Laphria sackeni* Wilcox, the pseudoclasper is not as in the other species of *Laphria* Meigen, but rather provided with a "tooth", although not as complex as those of *Bombomima* Enderlein (figs. 266, 270, 273, 276).

This genus is known only from the Nearctic Region. In Alberta, five species have been recorded, most of them were from the Montane or Subalpine region.

Key to the Species of *Bombomima* Enderlein of Alberta

1. Third and fourth, sometimes also fifth, abdominal segments with vivid orange-red hairs posteriorly; the succeeding segments with yellow hairs ..... *fernaldi* Back
   Abdominal hairs unicolored, yellow 2
2. Humerus, and usually also pronotum and upper occiput with black hairs 3
   Humerus, pronotum, and upper occiput with pale yellow hairs ...4
3. Two apical abdominal segments entirely yellow haired .... *columbica* Walker
   Three apical abdominal segments yellow haired ..... *partitor* Banks
4. Posterior half of mesonotum vivid orange-red haired, contrasting with yellow hairs of anterior half ..... *insignis* Banks
   Mesonotum uniformly with pale yellow hairs ..... *posticata* Say

Bombomima columbica Walker

Laphria columbica Walker 1868 : 338.
Bombomima columbica Hull 1962 : 325.

This species is similar to *partitor* Banks, but is distinguished by the absence of yellow pile from the fourth abdominal segment. The male genitalia are similar (figs. 264-270).

This species ranges from British Columbia and Alberta, south to California; 14 specimens were examined.

Localities - ALBERTA: Grimshaw (UA).
Other localities - BRITISH COLUMBIA: Robson (CNC); Sugar Lake (CNC); Agassiz (CNC); Victoria (CNC). WASHINGTON: Ellensburg (AMNH). OREGON. CALIFORNIA.

Bombomima partitor Banks

Dasyllis partitor Banks 1917 : 54.
Bombomima partitor Hull 1962 : 325.

This species is easily recognized by the pattern of the pile. The pile is unicolored yellow; on the anterior half of the mesonotum it is erect, and from dorsal view the ground color of the mesonotum is visible; on the posterior half of the mesonotum, the pile is decumbent, and conceals the ground color. Pile is present on the last five abdominal segments.

This species is known from British Columbia and Alberta, south to Idaho and Oregon; 36 specimens were examined.

Localities - ALBERTA: Banff (CNC); Banff, Lake Minnewanka, Campsite (UA); Seebe (CNC); Nordegg, North Saskatchewan River Valley (UA).

Other localities - BRITISH COLUMBIA: Robson (CNC); Copper Mtn. (CNC); Chilcotin (CNC); Sugar Lake (CNC); Seton, Lillooet (CNC); Uclucet (CNC); Nicola (CNC); Douglas Lake (CNC); Shuswap Falls (CNC); Ft. St. James (CNC); Ft. Steele (CNC); Westwold (CNC); Chase (CNC); Vernon (CNC); Keremeos (CNC); Kelowna (CNC); Penticton (CNC); Summerland (CNC). IDAHO: Victor. WASHINGTON. OREGON.

Bombomima fernaldi Back

Dasyllis fernaldi Back 1904 : 290.

Bombomima fernaldi Bromley 1929 : 160.

This species is similar to *columbica* Walker and *partitor* Banks, but is distinguished by the color pattern of the pile and by the male genitalia (figs. 271, 273). The pile on the presternum varies from entirely black to mixed black and yellow; on the mesopleuron, the pile is of three different patterns, entirely black, entirely yellow, or mixed black and yellow.

This species ranges from Alberta and British Columbia, south to Arizona and New Mexico; 127 specimens were examined.

Localities - ALBERTA: Jasper (CNC); Waterton (CNC and UA).

Other localities - BRITISH COLUMBIA: Robson (CNC); Revelstoke Mtn. (CNC); Lillooet (CNC); Victoria (CNC); Departure Bay (CNC). WASHINGTON. OREGON. IDAHO: Moscow Mts. (AMNH). WYOMING: Yellowstone (AMNH): Jackson (AMNH). UTAH. COLORADO: Summit Road (AMNH); Aspen (AMNH); Ouray (AMNH); Electra Lake (CNC); Pingree Park (AMNH). NEW MEXICO: Santa Fe Canyon (AMNH). ARIZONA: Flaggstaff (AMNH); Grand Canyon (AMNH); San Francisco (AMNH). MONTANA: Glacier Park (UA).

Bombomima posticata Say

Laphria posticata Say 1824 : 374.

Bombomima posticata Bromley 1929 : 160.

This species is recognized by the uniformly yellow pilose mesonotum. The mesonotal pile is more or less decumbent on the mesonotum, erect only on the acrostichal line and transverse suture, from dorsal view it appears as an inverted-T black marking. Bromley (1929) described two varieties, *brunnea* and *scutellaris*, which were treated as different species by Hull (1962). The specimens found in Alberta belong to *scutellaris* Bromley, but here they are treated as *posticata* Say, because the difference between these two forms is slight: scutellar bristles are black in *posticata* Say, and yellow in *scutellaris* Bromley.

This species ranges from Alberta and the Northwest Territories, east to New Brunswick, and south to New York and Connecticut; holotype of *scutellaris* Bromley (CNC) and 26 additional specimens were examined.

Localities - ALBERTA: Lesser Slave Lake (UA); Cross Lake (UA); Nordegg (CNC).

Other localities - NORTHWEST TERRITORIES. MANITOBA: Victoria Beach (CNC); Sandilands (CNC). ONTARIO: Lake Nipigon (CNC); Sadbury (CNC); Ottawa (CNC); Guelph (CNC); Orilla (CNC); Sand Lake (CNC). QUEBEC: Aylmer (CNC); Fairy Lake (CNC). NEW BRUNSWICK: St. Leonard (CNC); Nerepis (CNC). MAINE: Great Pond (USNM). NEW HAMPSHIRE: Franconia (AMNH). MASSACHUSETTS: Amherst (USNM); Boston (AMNH). NEW YORK: North Elba (AMNH). CONNECTICUT: Avon (AMNH).

Bombomima insignis Banks

Dasyllis insignis Banks 1917 : 54.
Bombomima insignis Hull 1962 : 325.

This species is similar to *posticata* Say, but is distinguished by the presence of orange pile on the posterior half of the mesonotum. The male genitalia are in general similar (figs. 274-276).

This species ranges from Alberta to Nova Scotia, south to Minnesota; 21 specimens were examined.

Localities - ALBERTA: Bilby (UA and CNC); Chipewyan (CNC).
Other localities - SASKATCHEWAN: Attons Lake (CNC); Weskesin Lake (CNC). MANITOBA: Aweme (CNC); Teulon (CNC). MINNESOTA: Duluth (AMNH). ONTARIO: Lake Nipigon (CNC). QUEBEC: Norway Bay (CNC). NOVA SCOTIA: Kentville (CNC).

Genus *Laphria* Meigen

Laphria Meigen 1803 : 270.

In this genus the abdomen tends to have parallel sides in both sexes, but in *janus* McAtee, the abdomen of the females broadens slightly, as in the species of *Bombomima* Enderlein. The pseudoclasper in the male genitalia of *janus* McAtee, has a projection (fig. 261). This same form of pseudoclasper is found in *Laphria vultur* Osten-Sacken and *L. sackeni* Wilcox (figs. 262-263). The mesonotal and abdominal pile varies from very sparse and short, as in *felis* Osten-Sacken and *xanthippe* Williston, or appressed, as in *aimatis* McAtee and *gilva* L., to erect, as in *janus* McAtee.

There are nine species known from Alberta. Most were collected near coniferous forest.

Key to the Species of *Laphria* Meigen of Alberta

1. Dorsum of abdomen usually without pile, but if pile is present it is sparse and very appressed; third antennal segment cylindrical (fig. 133) 2
   Abdominal pile erect, at least on sides; third antennal segment dilated subapically (fig. 137) 3
2. Abdomen entirely black; femora entirely orange; third antennal segment five times as long as second (fig. 136) .. *sadales* Walker
   Abdomen black anteriorly, orange posteriorly; at least anterior femora entirely black; third antennal segment seven times as long as second (fig. 133) ..... *xanthippe* Williston
3. Ground color of abdominal dorsum entirely black 5
   Abdominal dorsum with triangular orange markings 4
4. Three abdominal segments with orange markings, sixth segment black ..... *gilva* Linnaeus
   Four abdominal segments with orange marking ... *aimatis* McAtee
5. Beard and pile on coxae white; bristles on face mainly black, mixed with yellow pile in mane 7
   Beard and pile on coxae yellow or orange; bristles on face mainly yellow or orange 6

6. Bristles on face orange and black; humeral hairs orange or yellow ..... *vivax* Williston
   Bristles on face orange-yellow; humeral hairs black in males, mixed with orange in females ..... *janus* McAtee
7. Pile and mane on face yellow or orange; abdominal pile concolorous orange-yellow ..... *scorpio* McAtee
   Pile and mane on face white; pile on face white; pile on first abdominal segment white or paler than the rest of abdominal pile 8
8. Metapleural hairs dark brown or black; all or few of scutellar bristles black ..... *aetus* McAtee
   Metapleural hairs white; scutellar bristles yellowish ..... *index* McAtee

Laphria xanthippe Williston

Laphria xanthippe Williston 1884 : 31-32.

This species is easily recognized by the almost bare abdomen and the reddish brown hind femora. There is slight sexual dimorphism in this species. The reddish color of the abdomen and of the hind femur is broader in the males. The beard is white in the males and black in the females. The facial mane is entirely white in the males, mixed with black in the females.

This species ranges from British Columbia and Alberta, south to Oregon, and east to Colorado; 26 specimens were examined.

Localities - ALBERTA: Banff (CNC); Banff, Lake Minnewanka, Campsite (UA); Bow River Forest, Wilkinson Creek (UA); Waterton Lakes (CNC).

Other localities - BRITISH COLUMBIA: Revelstoke Mtn. (CNC); Fort Steele (CNC); Hedley, Nickel Plate (CNC); Jesmond (CNC). OREGON: Mt. Hood (USNM). WYOMING: Yellowstone Nat'l Park (AMNH). COLORADO: Electra Lake (AMNH).

Laphria sadales Walker

Laphria sadales Walker 1849 : 378-379.

Dasyllis pubescens Williston 1884 : 32.

Laphria sadales McAtee 1918 : 161.

This species is similar to *xanthippe* Williston, but is easily distinguished by the entirely black abdomen and reddish legs, except for the black coxae. Sexual dimorphism is very slight. The abdomen of the males is paler posteriorly, with golden yellow dorsal pile. The pile on the abdomen of the females is entirely black.

This species ranges from Alberta to California and Colorado, east to New Hampshire and Connecticut. The western and eastern populations are probably connected by geographically intermediate populations in the Boreal forests; 22 specimens were examined.

Localities - ALBERTA: Assineau River, near Lesser Slave Lake (UA); Banff (CNC); Clymont (UA); Waterton (UA).

Other localities - BRITISH COLUMBIA: Robson (CNC); Trinity Valley (CNC); Nicolum River; Hope Mts.; Kaslo. WASHINGTON: Moscow Mts. (USNM); Mt. Rainier (USNM); Electron (USNM); Olympia; Pullman. OREGON: Strawberry Mt. (AMNH); Marys Peak (AMNH); Mt.

Hood. IDAHO: Long Valley, Alpha (UA). WYOMING: Yellowstone (AMNH). CALIFORNIA. Towle (AMNH); Fieldbrook; Humboldt Co. COLORADO: Chatanqua (USNM). ONTARIO: (CNC). QUEBEC: Laniel (CNC). VERMONT: Rutland; Chittenden. NEW HAMPSHIRE: Franconia (AMNH); White Mts.; Mt. Washington (AMNH). MASSACHUSETTS: Southbridge (USNM). CONNECTICUT: Avon (AMNH). NEW YORK: Axton.

Laphria scorpio McAtee

Laphria scorpio McAtee 1918 : 163-164.

This species can be distinguished from the two preceeding species by the presence of erect pile on the abdomen, and from the other species of the genus by the black bristles on the face and the concolorous abdominal pile. Facial protrusion near antennal base not too obvious (fig. 25); a row of black bristles present on each facial submargin; facial mane and pile orange; beard white; hairs on first palpal segment white, on second black; third antennal segment blade-shaped, without groove (fig. 137). Thorax black; mesonotum and scutellum shiny, the rest yellowish white pollinose; pile mostly black, white on propleuron and anterior corner of sternopleuron, and golden yellow, appressed, on mesonotum and scutellum; metapleural hairs yellow mixed with few black. Legs black; pile on coxae, on loser sides of femora, and on front and middle tibiae of female, white; hairs and bristles black; tomentum on tarsi and frontal tibiae, brownish; claws black, empodium brownish orange. Wings covered with brownish microtrichiae, darker along veins, halteres yellow. Abdomen black; male sixth segment elevated medioposteriorly, with a pair of stumpy projections, seventh also with a median projection, which more or less fits into a space between projections on sixth segment (figs. 99, 100); pile short, orange, appressed on dorsum; venter orange pilose; male genitalia black (figs. 243-258). In Alberta, this species was collected on the edge of coniferous forest.

This species has been recorded mostly from eastern central North America, from New Hampshire to Virginia, Ontario and Alberta; holotype and 19 additional specimens were examined.

Localities - ALBERTA: Kinuso, near Lesser Slave Lake (UA).

Other localities - ONTARIO: Trenton (CNC); Lake Nipigon (CNC). QUEBEC: Laniel (CNC). VERMONT: Camel's Hump. NEW HAMPSHIRE: White Mts. (type locality; USNM and AMNH); Mt. Washington (AMNH). NEW YORK: North Elba (AMNH); Chateaugay. PENNSYLVANIA: Springboro (USNM). VIRGINIA: Skyland (USNM).

Laphria aeatus Walker

Laphria aeatus Walker 1849 : 381.

This species resembles *scorpio* McAtee, but the color of the facial mane and pile immediately distinguishes it from the latter. Other diagnostic characters are as follows: the third antennal segment has a narrow apical slit (fig. 138), and the abdominal pile is white on the first segment, and yellow on the remainder. This species is found near coniferous forests in northern Alberta.

This species ranges from Vermont and Ontario to Alberta; five specimens were examined.

Localities - ALBERTA: Assineau River, near Lesser Slave Lake (UA).

Other localities - ONTARIO: Lake Nigipon (CNC). VERMONT: Laurel Lake (USNM).

Laphria index McAtee

Laphria index McAtee 1918 : 164.

This species is similar to *aeatus* Walker, but is distinguished by the longer mystax, the pattern of the mesonotal pile, triangular from dorsal view, and entirely yellow scutellar bristles.

The species *scorpio* McAtee, *index* McAtee, and *aeatus* Walker, have one character in common: the tubercles on the ends of the sixth and the seventh abdominal segments. In Alberta, this species was collected from the same habitat as that of *Laphria aeatus* Walker.

This species is known from eastern central North America and Alberta; holotype (USNM) and 29 additional specimens were examined.

Localities - ALBERTA: Assineau River, near Lesser Slave Lake (UA).

Other localities - MANITOBA: Aweme (CNC). ONTARIO: Lake Nipigon (CNC); Lake Abitibi (CNC); Point Pelee (CNC); Guelph (CNC); Jordan (CNC); Orilla (CNC); Bobcaygeon (CNC); Ottawa (CNC). QUEBEC: Aylmer (CNC); Chelsea (CNC); Montreal (CNC); Hemmingford (CNC); Wakefield (CNC); Quoey Hill (CNC). NEW YORK: Nepara Park Yonkers, Flushing (USNM); New York. CONNECTICUT: Avon (USNM). NEW JERSEY: Ramsey (USNM); Fort Lee. PENNSYLVANIA: Harrisburg (type locality; USNM); Linglestown; Stoverdale. VIRGINIA: Dead Run.

Laphria janus McAtee

Laphria janus McAtee 1918 : 153-154.

This species is readily distinguished from the other species of *Laphria* Meigen of Alberta, by the bright orange color of the abdominal pile, and the yellow mesonotal pile. The abdomen of the female is rather rounded (fig. 101), and is more or less similar to that of *Bombomima* Enderlein. The male genitalia are also similar to those of *Bombomima* Enderlein, but the fork of the pseudoclasper is not very strong (fig. 261). Most of the specimens from Alberta were collected near coniferous forest.

This species is known in eastern and western central North America. In the west it is distributed from Alberta to Washington, east to Colorado, and in the east it is recorded from Maine to Michigan; holotype (USNM) and 23 additional specimens were examined.

Localities - ALBERTA: High Level (UA); Kinuso (UA); Assineau River, near Lesser Slave Lake (UA); Cross Lake (UA); Bilby (UA); Edmonton (UA); Nordegg, North Saskatchewan River Valley (UA); Gorge Creek (UA); Banff (CNC).

Other localities - BRITISH COLUMBIA: Kaslo. WASHINGTON: Brodie. WYOMING. COLORADO: Creede; Tolland. ONTARIO: Heyden; Sault St. Marie. MICHIGAN: Isle Royal; Dickinson Co. NEW HAMPSHIRE: Mt. Washington (type locality; USNM); Mt. White; Ottolengui. NEW YORK. MAINE.

Laphria vivax Williston

Dasyllis vivax Williston 1884 : 30.

Laphria vivax McAtee 1918 : 156.

This species is recognized by the pattern of the pile. The pile is

yellow; on the abdomen it is decumbent on the posterior margins and from a dorsal aspect it is visible only on the lateral and posterior margins.

This species ranges from Alberta and British Columbia, south to Washington, and east to Colorado; 10 specimens were examined.

Localities - ALBERTA: Banff (UA); Banff, Sulfur Mt. (CNC).

Other localities - BRITISH COLUMBIA: Robson (CNC); Chilcotin (CNC); Copper Mountain (CNC); Kaslo (CNC). WASHINGTON. IDAHO: Moscow (USNM). COLORADO: Marshall Pass (USNM); Summit Co.

Laphria aimatis McAtee

Laphria aimatis McAtee 1918 : 160-161.

This species is easily recognized by the presence of orange-yellow markings on some of the abdominal segments.

This species ranges from Alberta and British Columbia south to California and Colorado; holotype and 21 additional specimens were examined.

Localities - ALBERTA: Brule Lake, near Jasper (USNM).

Other localities - BRITISH COLUMBIA: Robson (CNC); Midday Valley (CNC); Merritt (CNC); Vernon (CNC); Oliver (CNC). IDAHO: Moscow Mts. (AMNH); Krasel (USNM) CALIFORNIA: Baron (type locality; USNM); Midway (AMNH); Carrville, Trinity Co. (AMNH); Shasta (AMNH); Edwards; Sierra Nevada; Placerville. COLORADO: El Paso (USNM); Leadville (AMNH).

Laphria gilva Linnaeus

Asilus gilvus Linnaeus 1858 : 605.

Laphria gilva McAtee 1918 : 155-156.

This species is similar to *aimatis* McAtee, but is distinguished by a difference in the number of orange markings on the dorsum of the abdomen: there are three on *Laphria gilva* L., and one each on the third, fourth, and fifth segments; the sixth segment is entirely black. The male genitalia are also different from those of *aimatis* McAtee: in *gilva* L., each of the superior forceps is provided with two lamellate appendages, while in *aimatis* McAtee, each forceps has one lamellate appendage (figs. 259, 260).

This species occurs in eastern as well as western central North America, and is also known from Europe; 65 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA); Whitla (CNC); Lethbridge (CNC); Castle Mountain (CNC); Banff (UA and CNC).

Other localities - NORTHWEST TERRITORIES: Cameron Bay, Great Bear Lake (CNC). BRITISH COLUMBIA: Robson (CNC); Copper Mt. (CNC); Tuktakamin (CNC); Vavenby (CNC). WASHINGTON. OREGON. MONTANA: Lame. WYOMING: Lander (AMNH). COLORADO: Empire; Estes Park. ARIZONA: St. Catalina Mts. (AMNH). ONTARIO: Sudbury (CNC); Ottawa (CNC); Thor Lake (CNC); Fort Williams (AMNH); Macbeth (AMNH); Sault St. Marie; Whitefish Point. QUEBEC: Fort Cologne (CNC); Cascapedia (CNC); Trinity Bay (CNC); Abbotsford (CNC); Laniel (CNC). NEW BRUNSWICK: Bathurst (CNC); NOVA SCOTIA: Baddeck (CNC). MASSACHUSETTS: Tyingsboro; Blanchard; Dedham; Beverly; Burgess. MICHIGAN: Alpena; Dickinson.

Subfamily Leptogastrinae

In 1909 Back recorded only one genus of this subfamily in North America north of Mexico. He presented a synopsis of 15 species. Later, additional genera were erected; *Tipulogaster* By Cockerell (1913), *Psylonyx* by Aldrich (1923), *Beameromyia* and *Apachekolos* by Martin (1957).

In Alberta, the subfamily is represented by one genus with two species, *Leptogaster aridus* Cole and *L. coloradensis* James.

Genus *Leptogaster* Meigen

Leptogaster Meigen 1803 : 269. Type species: *Asilus cylindricus* De Geer 1776.

Gonypes Latreille 1805 : 309. Type species: *Asilus cylindricus* De Geer 1776.

This genus is recognized by the following combination of characteristics: the wings are without bands or spots, with five posterior cells, the legs are slender, but the femora are somewhat club-shaped (fig. 85), and the pulvilli are absent.

Head silvery white tomentose; face narrow, epistoma broader; front narrow, wider toward vertex; mystax present along epistomal margin; first antennal segment small, second wider, with short hairs on apical lower and upper sides, third elongate and attenuate, style long, slender, spine present (fig. 139); palpi one-segmented, shining, clavate, borne on a tubercle (fig. 46); occiput convex on lateral sides, few hairs present on lower side, few short bristles on upper side behind vertex. Thorax white tomentose; mesonotum convex, slightly protruding anteriorly (fig. 64); mesonotal vittae present, not reaching hind margin; two bristles present above wing base. Legs shining, pale orange; coxae white pollinose; hind femora swollen distally; tibiae slender, hind pair gradually thicker apically (fig. 85); basitarsi as long as second tarsal segments; claws long, empodium half as long as claws; pulvilli absent. Wings shorter than abdomen, covered with microtrichiae; alula absent; all peripheral cells open; third branch of media and anterior branch of cubitus fused for a considerably long distance (fig. 163); second branch of cubitus and second anal vein almost parallel; halteres brownish with long stalk. Abdomen slender, elongate (fig. 102); second segment much longer than first; posterior segments wider; posterior margin of first with one or more pairs of bristles; superior forceps of male genitalia with ventral excavation; ovipositor short.

Key to the Species of *Leptogaster* Meigen of Alberta*

Occipital bristles black; superior forceps of male genitalia without spine-like projection apically ..... *aridus* Cole

Occipital bristles white, pale, or tinged with color; superior forceps of male genitalia with spine-like projection apically ... .

*From Martin (1957).

..... *coloradensis* James

Leptogaster aridus Cole

Leptogaster aridus Cole 1919 : 229.

According to Martin (1957), this species is easily recognized by the characteristics of the male genitalia. A female specimen was collected from Writing-on-Stone Provincial Park, an almost arid area, where the vegetation was short grass and cacti. This species was also found in association with *Nerax bicaudatus* Hine.

This species is known from Alberta, and according to Martin (1957), is found along the Pacific coast and some localities in California; 10 specimens were examined.

Localities - ALBERTA: Writing-on-Stone Provincial Park (UA).

Other localities - WASHINGTON: Yelm (UA). OREGON: Mt. Hood. CALIFORNIA: Big Bear Lake, Hannah Flats (AMNH); Idyllwild, San Jacinto Mts. (AMNH); Strawberry, Tuolumne Co.; Snowline Camp, Eldorado Co.; Yosemite Nat'l Park; Whitney Portal, Inyo Co.; Tanbark Flat, Los Angeles Co.; Glendale.

Leptogaster coloradensis James

Leptogaster coloradensis James 1937 : 14.

Variation in the pollen color was described by Martin (1957).

This species ranges from Alberta to Kansas; one specimen was examined.

Localities - ALBERTA: Lethbridge (CNC).

Other localities - WYOMING. SOUTH DAKOTA: Cedar Canyon; Cottonwood; Buffalo; Highmore; Presho; Kennebec; Desmet; Gettysburg. COLORADO: Boulder (type locality); Berthoud Pass. KANSAS: Ellis Co.; Sheridan Co.

Subfamily Asilinae

This subfamily is a highly specialized and complex group. Specialists have devoted much effort to defining the genera. The members of this group inhabit various habitats, such as open grassland, sandy beach, and near coniferous forest.

Key to the Genera of the Asilinae of Alberta

1. Wing with three submarginal cells (fig. 164) ..... *Promachus* Loew
   Wing with two submarginal cells 2
2. Antennal style longer than third antennal segment (fig. 141) 3
   Antennal style as long as or shorter than third segment (fig. 143) 4
3. Facial gibbosity very prominent, bulging on top (fig. 27); antennal style, including spine, at least twice as long as third segment (fig. 141); scutellum at base less than twice its length (fig. 70); male genitalia longer than high (fig. 280); ovipositor almost

three times as long as seventh abdominal segment (fig. 114) .. .. *Nerax* Hull

Facial gibbosity almost flat on top (fig. 26); antennal style one and a quarter as long as third antennal segment (fig. 140); scutellum at base twice as long as its length (fig. 69); male genitalia higher than long (fig. 277); ovipositor less than twice as long as seventh abdominal segment (fig. 113); ninth sternum provided with spines (fig. 113) ..... *Proctacanthella* Bromley

4. Scutellum with bristles (fig. 71, 72) ..... *Asilus* complex

Scutellum without bristles (fig. 73) ..... *Negasilus* Curran

Genus *Promachus* Loew

Promachus Loew 1848 : 390. Type species: *Asilus maculatus* F. 1775

Trupanea Macquart 1838 : 91. Type species: *Asilus maculatus* F. 1775. Preoccupied by Schrank 1803, Diptera.

Telejoneura Rondani 1864 : 48. Unnecessary change of name.

Bactria Megerle (Ms) *in* Meigen 1820 : 307. *Nomen nudum.*

Promachus can be easily recognized by the character of the wing venation: three submarginal cells, with the radial crossvein near the middle of the first (fig. 164).

There is one species, *dimidiatus* Curran, known in Alberta.

Promachus dimidiatus Curran

Promachus dimidiatus Curran 1927 : 87-88.

According to Curran (1927) this species can be easily confused with *bastardi* Macquart, but is distinguished by the absence of black hairs from the first abdominal segment of the male. By comparing two females and one male of *bastardi* Macquart with six pairs of *dimidiatus* Curran, the following characters, which are more or less constant, have been found useful for distinguishing these two species: in *dimidiatus* Curran, the metanotal hairs and the hairs on the third abdominal segment, are entirely white, while in *bastardi* Macquart, the metanotal hairs are mostly black, and the hairs on the third abdominal segment are mixed black and white. Both species have black bristles on the first abdominal segment.

This species ranges from Alberta to Manitoba, south to New Mexico; holotype (CNC) and 18 additional specimens were examined.

Localities - ALBERTA: Orion (UA and CNC); Milk River (CNC); Dunes (CNC).

Other localities - MANITOBA: Aweme (type locality; CNC), Onah (CNC). COLORADO: Master, Plainview (USNM). NEW MEXICO: Arroyo, Pecos River (USNM).

Genus *Proctacanthella* Bromley

Proctacanthella Bromley 1934 : 96. Type species: *Asilus cacopilogus* Hine 1909.

This group was separated from *Asilus* by Bromley (1934) on the

basis of the absence of hairs from the metanotal slopes, and by the cylindrical ovipositor, which is provided with a circlet of spines.

There are five species of this genus, all Nearctic, and in Alberta, this genus is represented by one species, *cacopiloga* Hine.

Proctacanthella cacopiloga Hine

Asilus cacopilogus Hine 1909 : 165-166.
Proctacanthella cacopiloga Bromley 1934 : 96.

Hine (1909) placed this species and *leucopogon* Williston in the *Rhadiurgus* group of the genus *Asilus* L. Curran (1924) was the first to realize that *Asilus cacopilogus* Hine was different from the other species of *Asilus* L., and suggested it belonged to *Erax* Scopoli. The males of this species are easily recognized by the shape of the male genitalia (figs. 277-279), but the females are hard to distinguish from one another.

This species ranges from Alberta to Texas, and east to New Jersey; 32 specimens were examined.

Localities - ALBERTA: Medicine Hat (UA); Orion (UA); Writing-on-Stone Provincial Park (UA).

Other localities - MANITOBA: Aweme (CNC). WYOMING: Lance Creek (AMNH). NEBRASKA: Mitchell (CNC); Fromont. COLORADO: White Rock (AMNH); Wray (AMNH); La Junta (AMNH); Pueblo (AMNH); Olney (AMNH); Fort Collins (AMNH). KANSAS: Clark Co. OKLAHOMA: Admore. TEXAS: Forestburg (AMNH); Rosser. ILLINOIS: Havana. INDIANA: Mineral Springs (CNC). NEW JERSEY: Anglesea.

Genus *Nerax* Hull

Nerax Hull 1962 : 476. Type species: *Asilus aestuans* L. 1767.
Erax Macquart 1838. Type species: *Erax rufibarbis* Macquart 1838.
Efferia Coquillett 1893. Type species: *Efferia candidus* Coquillett 1893.

This group is readily recognized by the form of the male genitalia (fig. 280) and the ovipositor (fig. 114), the shape of the third antennal segment and the style (fig. 141), and the wing venation (figs. 165-168).

This genus is confined to the New World. In Alberta, *Nerax* is represented by four species.

Key to the Species of *Nerax* Hull of Alberta

1. Third vein of wing branched before tip of discal cell (figs. 165, 166) 2
   Third vein branched beyond tip of discal cell (figs. 167, 168) 3
2. Acrostichal line with long hairs and bristles; last two segments of abdomen of male silvery pollinose, hairs sparse, few in number; abdomen of female yellowish pollinose .... *bicaudatus* Hine
   Acrostichal line without hairs and bristles, but with short setulae; all abdominal segments of male silvery pollinose, hairs numerous, long, except for a longitudinally-directed bare line at

middle; abdomen of female silvery white pollinose.....
..... *canus* Hine

3. Tibiae black.....*subcupreus* Schaeffer
Tibiae orange-brown.....*costalis* Williston

Nerax bicaudatus Hine

Erax bicaudatus Hine 1919 : 138.
Nerax bicaudatus Hull 1962 : 478.

This species is recognized by the wing venation, the pollen pattern of the males and the females, and the presence of comparatively long hairs on the acrostichal line of the mesonotum. The color of the bristles varies from entirely white to entirely black in almost every arrangement. In the males, this variation occurs in the ocellar bristles, frontal hairs, few bristles of the mystax, upper occipital bristles, presutural dorsocentral bristles, postalar bristles, mesopleural bristles, and scutellar bristles. In the females, the variation is less obvious. This species inhabits arid grassland, pastures, and short grass areas with cacti. It has been found associated with *Stenopogon neglectus* Bromley and *Leptogaster aridus* Cole.

This species ranges from British Columbia to Manitoba, and south to Texas; 65 specimens were examined.

Localities - ALBERTA: Drumheller (UA); Wardlow (UA); Medicine Hat (UA and CNC); Burdett (UA); Manyberries (UA); Orion (UA and CNC); Comrey, Milk River Valley (UA); Writing-on-Stone Provincial Park (UA); Lethbridge (UA and CNC).
Other localities - BRITISH COLUMBIA: Summerland (UA). MANITOBA: Aweme (CNC). COLORADO. TEXAS: Amarillo; Plainview; Hereford; Coyote Lake, Bailey Co.

Nerax canus Hine

Erax canus Hine 1916 : 22.
Nerax canus Hull 1962 : 478.

This species is similar to *bicaudatus* in the wing venation (figs. 165, 166), but is distinguished by other characters: the acrostichal bristle-like hairs are absent, the abdomen is evenly silvery white pollinose in both sexes, and the ocellar bristles are two in number (six in *bicaudatus* Hine).

This species ranges from British Columbia to California. I have not seen Alberta specimens, but Strickland (1946) included this species in his list; 14 specimens were examined.

Localities - BRITISH COLUMBIA: Kamloops (CNC); Seton Lake (CNC); Nicola (CNC); Lone Pine (CNC); Vernon (CNC); Oliver (CNC). CALIFORNIA: Crescent Co. (USNM); Mariposa (USNM); Westgard Pass Plateau (USNM); Midway (USNM); Sierra Nevada (USNM); Antioch (USNM).

Nerax subcupreus Schaeffer

Erax subcupreus Schaeffer 1916 : 66.

Nerax subcupreus Hull 1962 : 478.

This species belongs to the *carinatus* group (Hine 1919), in which the acrostichal mane is present, and the costal and the subcostal veins of the wings of the males are slightly bent (fig. 167). This species ranges from Alberta to Arizona, and from Colorado westward to California; holotype (USNM) and nine additional specimens were examined.

Localities - ALBERTA: Medicine Hat (UA and CNC).
Other localities - IDAHO: Victor (AMNH). WYOMING: Stewart R. Sta. (AMNH). COLORADO: Alamosa (AMNH); Electra Lake (AMNH). ARIZONA: Prescott (type locality; (USNM). CALIFORNIA: Essex (AMNH).

Nerax costalis Williston

Erax costalis Williston 1885 : 64.

Williston (1885) included this species in his key, but did not describe it. Aldrich (Hine 1919) and Hull (1962) did not recognize this species, but it is accepted by some other authors. It is similar to *subcupreus* Schaeffer, but readily distinguished by its orange-brown tibiae.

This species ranges from Alberta and Saskatchewan, south to Colorado; seven specimens were examined.

Localities - ALBERTA: Medicine Hat (UA); Lethbridge (CNC); Oldman River, Lethbridge (CNC).
Other localities - SASKATCHEWAN: Rockglen (CNC). MONTANA. WYOMING. COLORADO.

The *Asilus* Complex

This complex probably includes several related genera, but no attempt is made to separate them. All of the species involved in this discussion are treated under the name *Asilus* Linnaeus.

There are 12 species of this complex present in Alberta.

Key to the Species of the *Asilus* Complex of Alberta

1. Apical margins of abdominal segments provided with distinct bristles 2
   Apical margins of abdominal segments without bristles 9
2. Femora black, at most only with apical reddish brown or yellow bands 3
   Femora reddish brown or yellow on posterior sides ..... *delusus* Tucker
3. Posterior margin of eighth sternum of abdomen of the male extended into a subtriangular lobe, provided with tuft of hairs; ovipositor three to four times as long as sixth and seventh segments together (figs. 115, 116) ..... *occidentalis* Hine
   Posterior margin of eighth sternum of abdomen of male not extended; ovipositor at most twice as long as sixth and seventh segments together 4
4. Four scutellar bristles ..... *callidus* Williston

Two scutellar bristles, sometimes with additional small ones ... 5
5. White bristles on postero-ventral side of front tibia 6
Black bristles on postero-ventral side of front tibia 8
6. Antennal style two-thirds as long as third antennal segment ..... *erythocnemius* Hine
Antennal style less than half as long as third antennal segment .. 7
7. Male genitalia and eighth sternum of abdomen of female orange; penis as in figure 297; black hairs on sternum of abdomen of female ..... *mesae* Tucker
Male genitalia and eighth sternum of abdomen of female dark brown; penis as in figure 300; white hairs on eighth sternum of abdomen of female ..... *cumbipilosus* new species
8. Ventral side of front femur with rather stout black bristles ..... *paropus* Walker
Ventral side of front femur with pale long hairs and pile ..... *snowi* Hine
9. Metanotal slope without pile or hairs ..... *auriannulatus* Hine
Metanotal slope with pile or hairs 10
10. Posterior sides of femora reddish brown ..... *aridalis* new species
Femora uniformly black 11
11. Mystax and mesonotal pile black ..... *nitidifacies* Hine
Mystax and mesonotal pile white ..... *gramalis* new species

Asilus delusus Tucker

Asilus delusus Tucker 1917 : 92.

This species is readily recognized by the color of the femora: black on the anterior sides, orange on the posterior sides. Another species, *aridalis* n. sp., has the same color pattern of the legs, but the abdomen is without bristles on the posterior sides. Antennal style slender, as long as third segment (fig. 142). Upper side of mystax black, lower side white; bristles on mesonotum and legs mostly black; two black scutellar bristles present; superior forceps of male genitalia twice as long as gonopods (fig. 282).

This species ranges from Alberta southward to Arizona, and from Utah eastward to Kansas; seven specimens were examined.

Localities - ALBERTA: Medicine Hat (UA and CNC); Lethbridge (UA).
Other localities - MONTANA. UTAH: Glacier Lake (USNM). COLORADO. KANSAS. ARIZONA: Santa Rita Mts. (USNM); Chiricahua Mts. (USNM).

Asilus occidentalis Hine

Asilus occidentalis Hine 1919 : 147-148.

This species is readily recognized by the presence of a lobe-like extension on the posterior margin of the eighth sternum of the abdomen of the male (figs. 115, 116), and the ovipositor is three to four times as long as the sixth and seventh abdominal segments together.

This species ranges from British Columbia to California, and the

presence of this species in Alberta is doubted. Strickland (1938) might have based his record on a misidentified specimen of *Asilus callidus* Williston; six specimens were examined.

Localities - BRITISH COLUMBIA: Royal Oak (CNC); Aspen Grove (CNC); Nicola Lake, Merritt (UA); Keremeos (UA); Victoria (CNC). OREGON: Antelope Mt., Harney Co. (UA). CALIFORNIA. NEVADA.

Asilus paropus Walker

Asilus paropus Walker 1849 : 455.

This species is similar to *callidus* Williston and *erythocnemius* Hine. It is distinguished from *callidus* Williston by the number of the bristles present on the scutellar margin (figs. 71, 72), and from *erythocnemius* Hine by the size of the antennal style (figs. 143, 144). This species also resembles *snowi* Hine, but is distinguished by the presence of stout bristles on the ventral side of the front femur, instead of hairs and pile (figs. 82, 83).

This species ranges from Alberta to New Mexico, and eastward to New Hampshire and Connecticut; 64 specimens were examined.

Localities - ALBERTA: Bilby (UA); Golden Spike (UA); Devon (UA); Cypress Hills (UA); Calgary (CNC).

Other localities - SASKATCHEWAN: Saskatoon (CNC); Skipton (CNC). MANITOBA: Teulon (CNC); Melita (CNC). ONTARIO: Ottawa (CNC). QUEBEC: Hull (CNC); Aylmer (CNC). NOVA SCOTIA: Digby Co. (CNC). NORTH DAKOTA. WYOMING. UTAH. CALIFORNIA. NEW MEXICO.

Asilus callidus Williston

Asilus callidus Williston 1893 : 75.

This species can be easily mistaken for *occidentalis* Hine, but can be distinguished by the absence of a lobe-like projection from the eighth sternum of the abdomen of the male; the female has a comparatively short ovipositor. The male genitalia of the two species are slightly different from one another (figs. 283-286). This species inhabits open spaces near or within coniferous forests. In Alberta, this species has been found in numbers together with *Stenopogon inquinatus* Loew. It ranges from British Columbia to Massachusetts, southward to California and Utah. In Alberta it is not found in the prairies. It is probably a boreal and subalpine species; 169 specimens were examined.

Localities - ALBERTA: Lac la Biche (UA); Opal (UA); Tawatinaw (UA); Bilby (UA); Golden Spike (UA); Jasper, Lake Celestine (UA); Gorge Creek (UA); Flat Creek (UA); Banff (CNC); Banff, Lake Minnewanka, Davil's Gap Trail (UA); Nordegg (UA); Seebe (DE); Cowley (CNC); Coleman, Lake Island (CNC); Waterton Lakes (CNC).

Other localities - BRITISH COLUMBIA. WASHINGTON. OREGON. CALIFORNIA: Colville, Rock Creek (CNC); Coalinga (CNC); Carson Pass (CNC); Lone Pine (CNC). NEVADA: Ormsby Co. (USNM). UTAH: Zion Nat'l Park (USNM). MASSACHUSETTS: Springfield (USNM).

Asilus erythocnemius Hine

Asilus erythocnemius Hine 1919 : 163.

This species resembles *callidus* Williston, but it is paler, yellowish pollinose, and it has only two scutellar bristles. It is distinguished from other species by the length of the antennal style (fig. 144). The pollinose excresence of a number of specimens is bright golden yellow instead of yellowish, and the mesonotal vittae are clearly defined blackish brown. All other characters are the same. This species is found in open grassland or in the open spaces within the parkland or coniferous forests. It ranges from British Columbia to Wyoming, and east to Massachusetts and Maryland; 126 specimens were examined.

Localities - ALBERTA: Peace River (UA); Lac la Biche (UA); Edmonton (UA and LMK); Consort (UA); Rosebud (UA); Cassils (UA); Oyen (UA); Medicine Hat (UA); Orion (UA); Manyberries (UA); Burdett (UA); Lake Newell, Kinbrook Island Provincial Park (UA); Scandia (UA); Cypress Hills (UA); Lethbridge (UA); Seebe (UA); Waterton (UA).

Other localities - BRITISH COLUMBIA: Trinity Valley (CNC); Prince George (CNC). QUEBEC: Natashqua (CNC). MASSACHUSETTS. MARYLAND. MONTANA. WYOMING.

Asilus snowi Hine

Asilus snowi Hine 1919 : 160.

This species is similar to *paropus* Walker, but the ventral side of the front femur is provided with hairs and pile only, and is without bristles.

This species occurs mainly in eastern central North America, from South Dakota to Kansas, eastward to Nova Scotia, and south to Virginia. The presence of this species in Alberta is doubted, but Strickland (1938) listed it, possibly on the basis of misidentified specimens; 13 specimens were examined.

Localities - ONTARIO: Ottawa (UA). QUEBEC: Hemmingford (CNC). NOVA SCOTIA: Truro (CNC). CONNECTICUT: Cornwall; Hamden; Stratford; Marlborough; Wallington; Stamford. DISTRICT OF COLUMBIA: Little Falls (USNM). VIRGINIA: Great Falls (USNM). ILLINOIS: Fort Sheridan (UA).

Asilus nitidifacies Hine

Asilus nitidifacies Hine 1919 : 165.

This species is recognized by the black mesonotal pile, and also by the shape of the superior forceps of the male genitalia (fig. 288). The wings are evenly covered with microtrichiae, and brownish markings are absent from the middle of the subcostal cell (fig. 169). This species is mostly found on the edges or in the open spaces of coniferous forests. It ranges from British Columbia to Oregon, eastward to Quebec; 19 specimens were examined.

Localities - ALBERTA: Cross Lake Trail (UA): Flatbush (UA); Opal (UA); Banff (UA); Flat Creek (UA); Moraine Lake (CNC).

Other localities - BRITISH COLUMBIA: Terrace (USNM); Ainsworth (USNM). OREGON: Mt. Hood (USNM). ONTARIO: Larder Lake (CNC). QUEBEC: Seven Isles (CNC).

Asilus auriannulatus Hine

Asilus auriannulatus Hine 1906 : 29.

This species is easily recognized by the color pattern of the legs. The legs are mostly orange-yellow, but the coxae are black, the front and the middle femora are black on the anterior basal two-thirds. The male genitalia are easily distinguished from those of the other species (figs. 291-294).

This species ranges from Alberta, British Columbia, south to California; 21 specimens were examined.

Localities - ALBERTA: Seebe (DE); Banff (UA and CNC); Gorge Creek (UA); Waterton (CNC).

Other localities - BRITISH COLUMBIA: Fernie (CNC); Mara (CNC). OREGON: Prineville, Hood River (USNM). CALIFORNIA. WYOMING.

Asilus mesae Tucker

Asilus mesae Tucker 1907 : 92.

This species is easily recognized by the orange color of the male genitalia and of the eighth sternum of the abdomen of the females. This species is similar to *erythocnemius* Hine, but can be distinguished by the size of the antennal style: less than half of the third antennal segment in *mesae* Tucker, and more than two-thirds in the latter. It is also similar to *cumbipilosus* new species. For details, see under *cumbipilosus*. In Alberta, this species inhabits the grasslands of the paririe.

This species ranges from British Columbia and Alberta, southward to Colorado; 23 specimens were examined.

Localities - ALBERTA: Drumheller (UA); Lake Newell, Kinbrook Island Provincial Park (UA); Medicine Hat (UA); Manyberries (UA); Taber (CNC).

Other localities - BRITISH COLUMBIA: Oliver (CNC). IDAHO: Bear Lake (CNC); Paris (CNC); Mt. Pelier (CNC). WYOMING: Green River (CNC); Rock Springs (CNC); Rawlins (CNC); Carbon Co. (CNC). UTAH: Benson (CNC); Snowville (CNC). COLORADO: Pagosa Spring (CNC); (CNC); Regnier (CNC); White Rock (CNC); Walsenburg (CNC); Grand Junction (CNC); Animas (CNC). KANSAS.

Asilus cumbipilosus new species

This species is markedly similar to *mesae* Tucker, and is distinguished by differences in the male genitalia and the ovipositor. The other characters are more or less similar in both species. These two species occur in the same habitats. Other characters, except male genitalia and ovipositor, similar to those of *mesae* Tucker; male genitalia dark brown; penis with short arms, as long as penis sheath (fig. 300); ovipositor dark brown, eighth sternum of abdomen of female with white hairs.

The name *cumbipilosus* has been chosen, because of the appressed hairs present on the legs. This species is an inhabitant of short grass prairie.

Holotype: Male, Etzikom Coulee, Alberta, 3. VIII. 1963 (J. & C. D. Sharplin and S. Adisoemarto); deposited in CNC.

Paratypes: three females, same data as for holotype; one female, Welling, Alberta, 19. VII. 1922 (H. L. Seamans); one male Medicine Hat, Alberta, 8. VII. 1932 (F. S. Carr); one female, Orion, Alberta, 9. VII. 1950 (E. H. Strickland); two males, two females, Kinbrook Island Provincial Park, Lake Newell, Alberta, 10. VI. 1964 (S. Adisoemarto); all are deposited in UA.

Asilus aridalis new species

This species is more or less easily recognized by the greyish pollinose body, and distinguished from *mesae* Tucker and *cumbipilosus* new species by the absence of the bristles from the posterior sides of the abdominal segments and the color pattern of the femora.

Male. Head yellowish grey pollinose; gibbosity from about the middle of face; mystax white with few black hairs on top; antennae black, first segment one and one half times as long as second, third segment attenuate apically, as long as first two together; style about two-thirds as long as third antennal segment (fig. 145); frontal hairs white; ocellar hairs black; occipital bristles mostly white, mixed with a few black on upper side; beard and pile on lower side of proboscis white; palpi black, long, one-segmented, white haired; proboscis black. Thorax yellowish grey pollinose; pile white; hairs on postsutural dorsocentral area, on scutellum, and on metanotal slope, white; mesonotal setulae white, black on acrostichal line; mesonotal bristles black, two presuturals, two intraalars, one postalar, and five dorsocentrals; two scutellars black; metapleural bristles white. Legs with coxae greyish pollinose; pile and hairs on front and middle coxae white; anterior sides of femora black, posterior sides reddish yellow, provided with appressed, short, white setulae, and long white hairs also present on ventral sides; tibiae orange-yellow, black on tips, with appressed, short, white setulae and golden tomentum on antero-ventral sides of front pair and on posterior sides of hind pair; tarsi orange-yellow, black haired, tomentum present as continuation from tibiae; claws black; empodia as long as claws, black; femoral bristles white, tibial bristles mostly black; tarsal bristles entirely black. Wings hyaline, microtrichiae light brownish; halteres greyish yellow, black tinged. Abdomen greyish pollinose, brownish markings on mid-dorsum of each segment; hairs white, on first segment erect, appressed on the remaining; white bristles present on sides of first segment; male genitalia reddish brown (figs. 301-303).

Female. Most characters, similar to those of male, different in the followings: mystax mostly black, white bristles only on epistomal margin; hairs on first two antennal segments black, few white on dorsal sides; frontal hairs black; mesonotal setulae entirely black; bristles on legs mostly black; dorsal abdominal hairs black; ovipositor black, twice as long as seventh abdominal segment, black haired.

This species is called *aridalis*, because the specimens live in the arid areas. The habitat of this species is similar to that of *cumbipilosus* new species.

Holotype: Male, Dinosaur Park, Steveville, Alberta, 9. VI. 1964

(S. Adisoemarto); deposited in CNC.

Allotype: Female, same data as for holotype; deposited in CNC.

Paratypes: one male, two females, same data as for holotype (UA); male, female, Kinbrook Provincial Park, Lake Newell, Alberta, 10. VI. 1964 (S. Adisoemarto) (UA); two males, female, Scandia, Alberta, 20. VI. 1956 (E. E. Sterns) (CNC); female, Medicine Hat, Alberta, 16. VII. 1956 (E. E. Sterns) (CNC); male, Lethbridge, Alberta, 4. VII. 1923 (H. E. Grey) (CNC); female, Lethbridge, 6. VII. 1956 (E. E. Sterns) (CNC); male, female, Lethbridge, 7. VII. 1956 (E. E. Sterns) (CNC).

Asilus gramalis new species

This species is similar to *mesae* Tucker and *cumbipilosus* new species, but is readily distinguished by the absence of the bristles from the posterior sides of the abdominal segments. It is distinguished from *aridalis* new species by the golden pollinose body and entirely black femora. Total length ranges from 9.0 mm to 13.0 mm.

Male. Face, front, and vertex golden yellow pollinose; gibbosity from about the middle of face; mystax mostly white, three black bristles present on top and few on lower corners; antennae black, first two segments black haired, third segment tapers apically, one and a half times as long as first two together; style one-third as long as third antennal segment (fig. 146); frontal hairs white; ocellar hairs black; occipital bristles entirely white; beard white, pile on lower side of proboscis white; palpi black, long, one-segmented, black haired; proboscis black. Thorax golden yellow pollinose, pile, hairs, and bristles mostly white; hairs on mesonotum not setula-like, more or less erect; black hairs present on space between humeri and dorsocentral area; mesonotal postalars, and six dorsocentrals (eight on right side), mostly black; two scutellars black; metapleural bristles white. Coxae golden yellow pollinose, anterior pairs with white pile and bristles; femora black, reddish brown streaks present on ventro-posterior sides, with appressed, short, white setulae, and a row of white bristles on ventral sides; tibiae reddish brown, black on tips, with appressed, short white setulae, and golden tomentum on antero-ventral sides of front pair, and on posterior sides of hind pair, bristles white; tarsi reddish brown, white haired, tomentum present as continuation from tibiae, bristles mixed black and white; claws black, empodia orange-yellow. Wings hyaline, microtrichiae brownish; halteres slightly brownish yellow. Abdomen greyish yellow pollinose; hairs white, appressed; bristles white, present only on sides of first segment; male genitalia reddish brown; superior forceps one and a half times as long as gonopods (figs. 304-306); hairs white.

Female. Similar to male; ovipositor black, one and a half times as long as seventh segment, black haired.

This species has been named *gramalis*, because the specimens live in grass fields. The habitat of this species is similar to that of *aridalis* and *cumbipilosus*.

Holotype: Male, Scandia, Bow River, Alberta, 10. VI. 1964 (S. Adisoemarto) *in copula* with allotype; deposited in CNC.

Genus *Negasilus* Curran

Negasilus Curran 1934 : 184.

This genus is distinguished from *Asilus* complex by the absence of the scutellar bristles. The other characters are not different from those of the *Asilus* complex.

The genus is monotypic.

Negasilus belli Curran

Negasilus belli Curran 1934 : 184.

This species is similar to *Asilus cumbipilosus* new species, but is easily distinguished by the absence of the scutellar bristles and the bristles on the posterior margins of the abdominal segments. The genitalia are also different. A female specimen from Lethbridge, Alberta differs slightly from the others in the following respects: occipital bristles black, frontal hairs black, body with golden yellow pollen, brighter than in the other specimens; kept in CNC.

This species ranges from Alberta to Colorado, and west to California; 25 specimens were examined.

Localities - ALBERTA: Consort (CNC); Claresholm (CNC); Bow Island (CNC); Cypress Hills (UA); Scandia (CNC); Taber (CNC); Lethbridge (CNC).

Other localities - SASKATCHEWAN: Assiniboia (CNC). WYOMING: Laramie (USNM). COLORADO: Creede (USNM). UTAH: Laketown (USNM); Manila (USNM). NEVADA: Fallon (AMNH). CALIFORNIA: Cedarville (USNM); Lake Mono Co. (AMNH).

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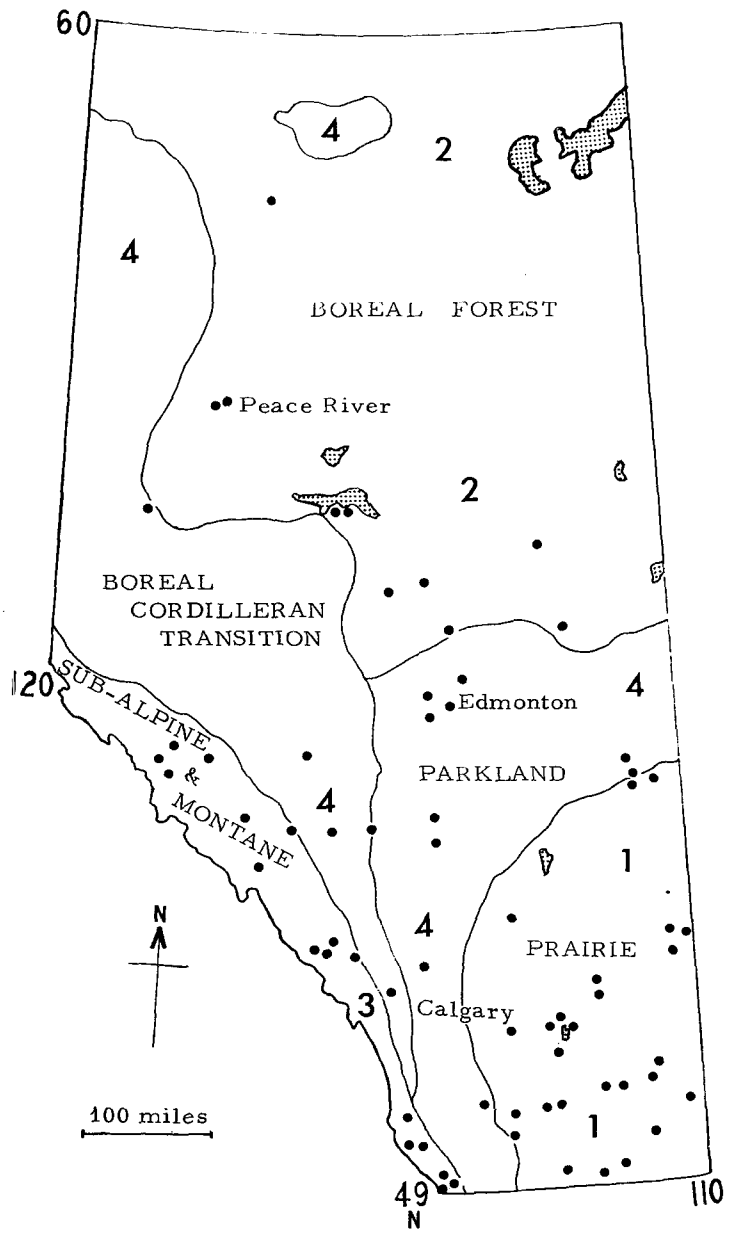
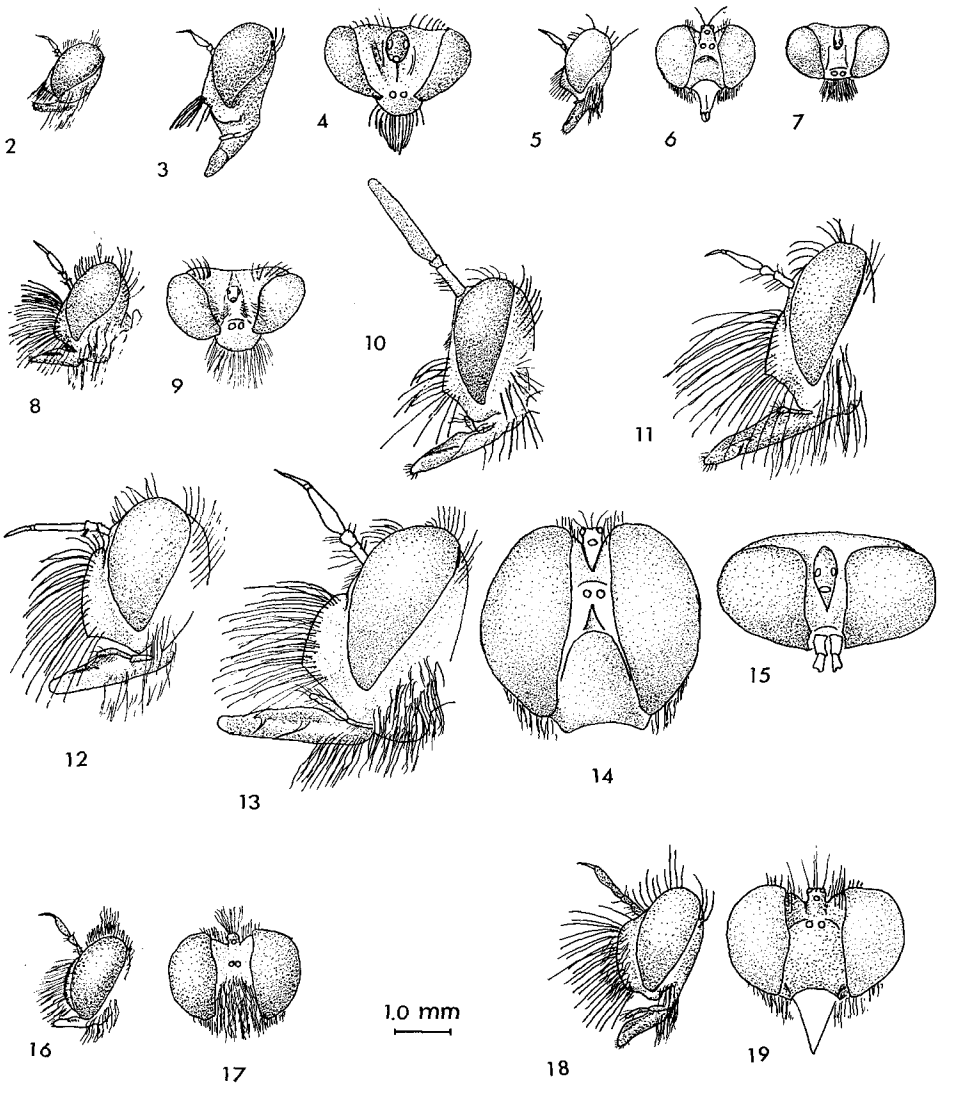
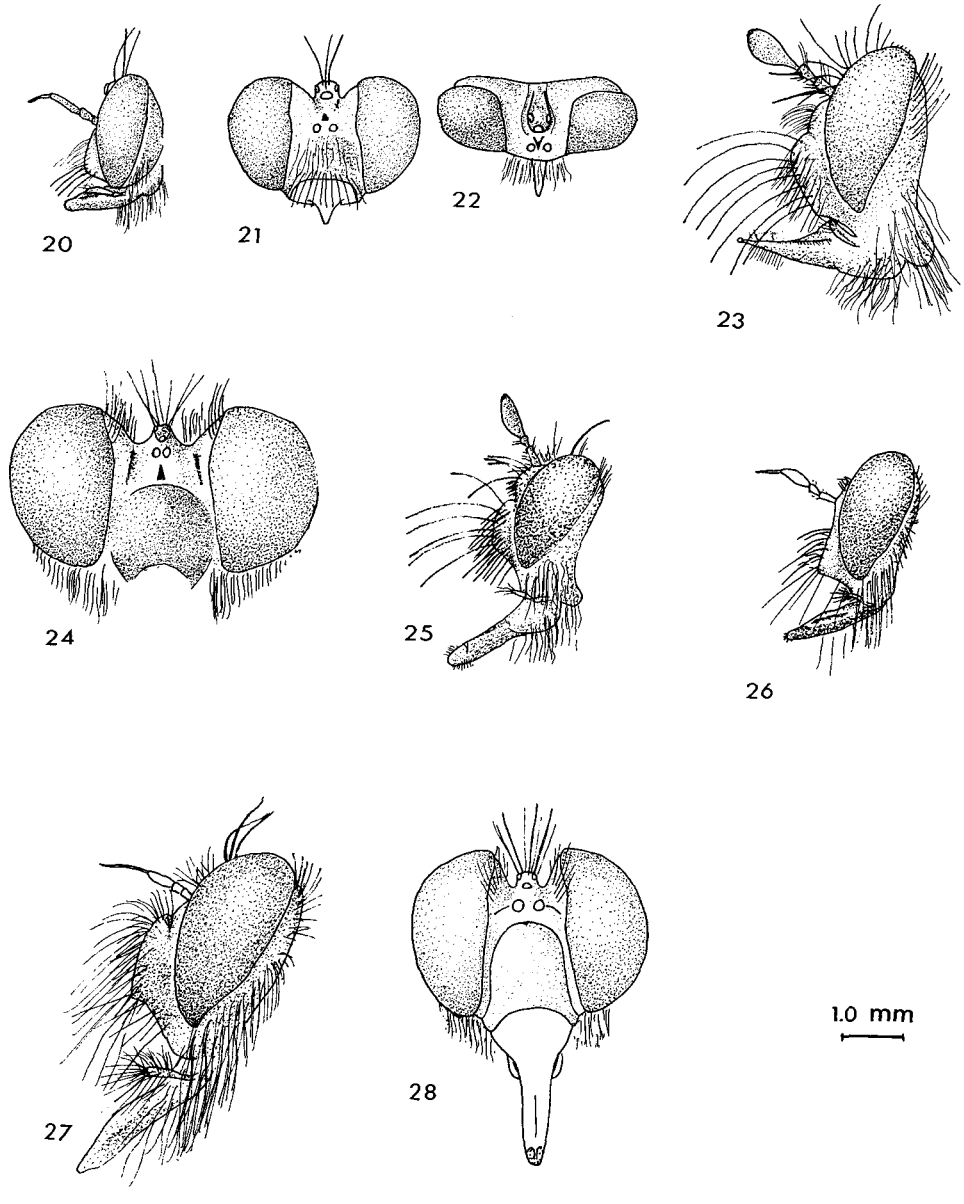


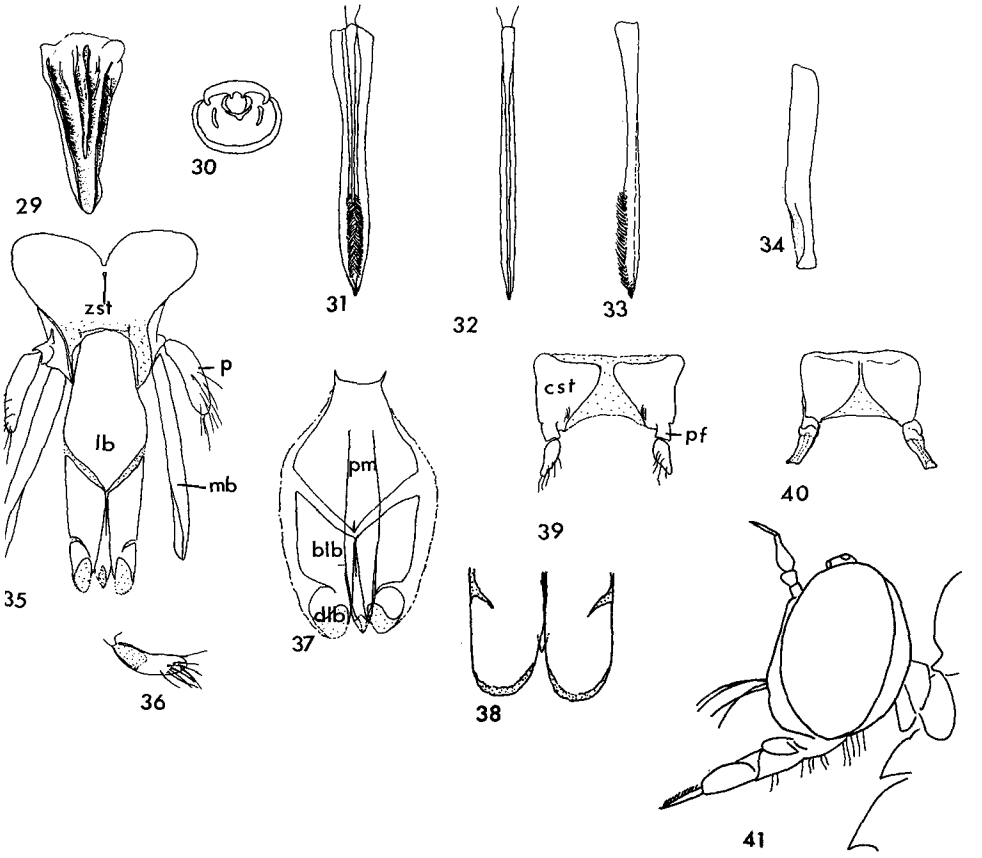
Fig. 1; map of Alberta showing ecological regions (after Moss 1955 and Brooks 1958) and collecting sites. 1, Prairie; 2, Boreal Forest; 3, Subalpine and Montane; 4, Parkland and Boreal-Cordilleran.



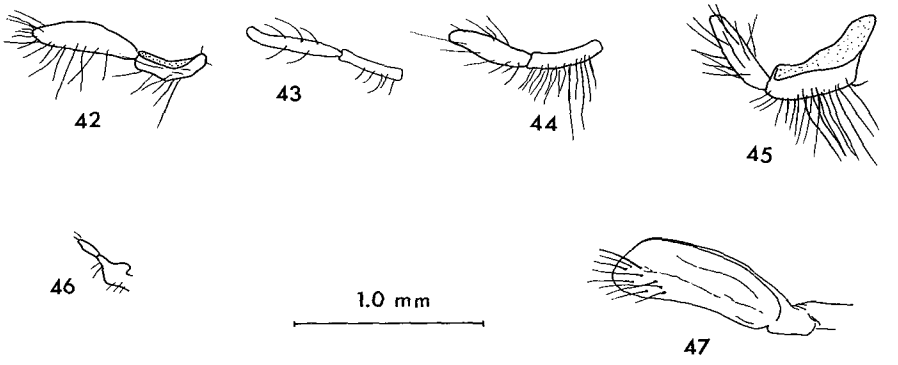
Figs. 2-19 head; 2 *Stichopogon argenteus* Say, 3-4 *S. trilasciatus* Say, 5-7 *Lasiopogon terricola* Johnson, 8-9 *L. cinereus* Cole, 10 *Ospriocerus abdominalis* Say, 11 *Stenopogon coyote* Bromley, 12 *S. obscuriventris* Loew, 13-15 *S. inquinatus* Loew, 16-17 *Holopogon albipilosa* Curran, 18-19 *Cyrtopogon distinctitarsus* new species.



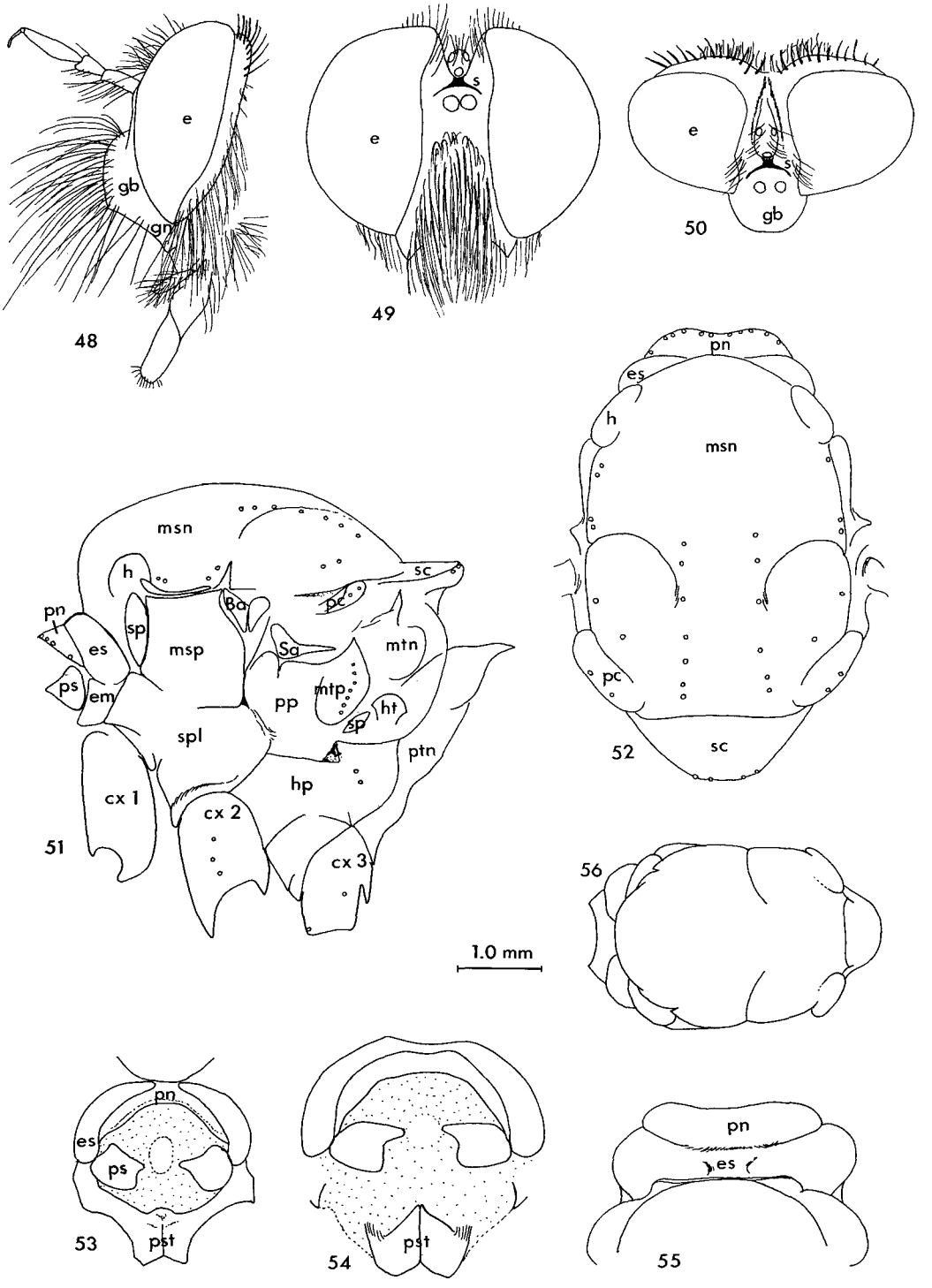
Figs. 20-28 head; 20-22 *Nicocles utahensis* Melander, 23-24 *Pogonosoma stricklandi* new species, 25 *Laphria scorpio* McAtee, 26 *Proctacanthella cacopiloga* Hine, 27-28 *Nerax bicaudatus* Hine.



Figs. 29-37 mouthparts; *Asilus callidus* Williston, 29 labrum epipharynx, ventral aspect, 30 cross-section of proboscis, 21-33 hypopharynx, 34 maxillary blade, 35 maxillae and labium, ventral aspect, 36 palpus, 37 labium, dorsal aspect, 38 apical part of labium, *Laphria janus* McAtee, 39-40 cardostipites and palpi, 41 *Leptogaster aridus* Cole, lateral aspect.



Figs. 42-47 palpus; 42 *Stenopogon obscuriventris* Loew, 43 *Eucyrtogpogon incompletus* new species, 44 *Nicocles utahensis* Melander, 45 *Heteropogon wilcoxi* James, 46 *Leptogaster aridus* Cole, 47 *Pogonosoma stricklandi* new species.



Figs. 48-53 *Asilus callidus* Williston, 48-50 head, 51 thorax, lateral aspect, 42 same, dorsal aspect, 53 prothorax, anterior aspect, 54 *Stenopogon neglectus* Bromley, prothorax, 55 same, dorsal aspect, 56 *Stichopogon trifasciatus* Say, thorax, lateral aspect; Ba, basalare; cx, coxa; e, eye em, epimeron; es, episternum; gb, gibbosity; gn, gena; h, humerus; hp, hypopleuron; ht, haltere; msn, mesonotum; msp, mesopleuron; mtn, metanotum; mtp, metapleuron; pc, posterior callus; pn, pronotum; pp, pteropleuron; ps, presternum; pst, prosternum; ptn, postnotum; s, suture; Sa, subalare; sc, scutellum; sp, spiracle; spl, sternopleuron.

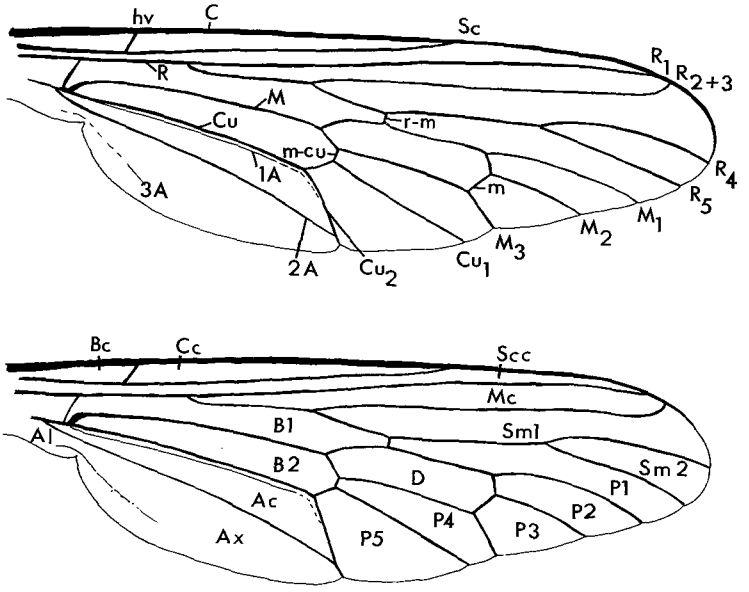
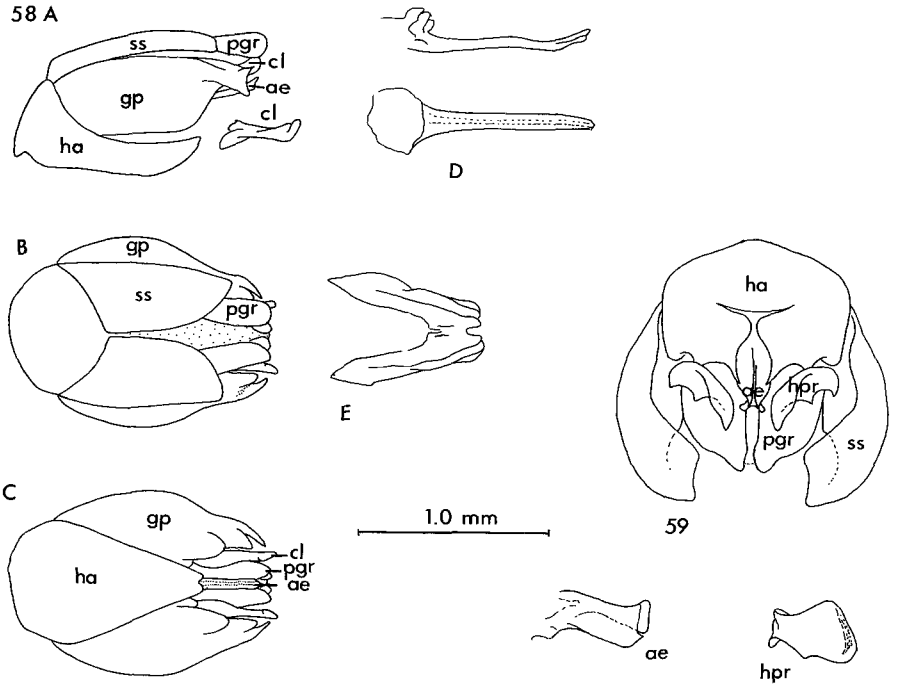
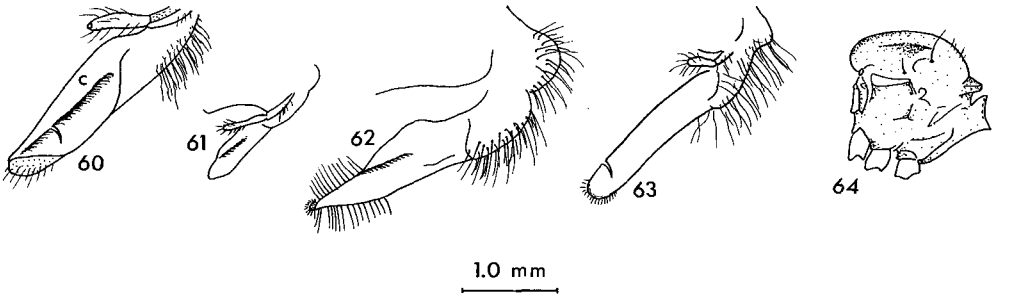


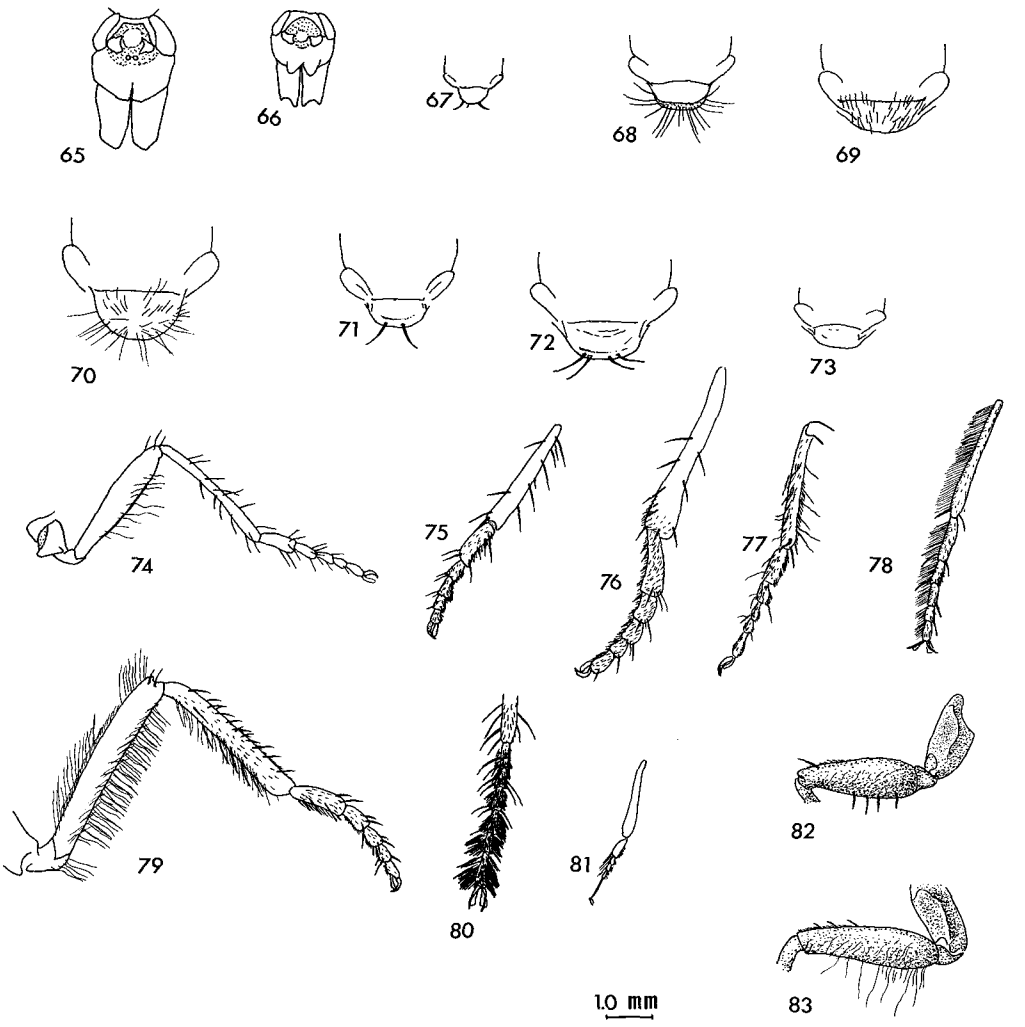
Fig. 57 *Lasiopogon cinereus* Cole, wing; A, anal vein; Ac, anal cell; Ax, axillary cell; B, basal cell; Bc, basal costal cell; C, costal vein; Cc, costal cell; Cu, cubital vein; D, discal cell; hv, humeral vein; M, medial vein; m, medial crossvein; Mc, marginal cell; m-cu, medio-cubital crossvein; P, posterior cell; R, radial vein; r-m, anterior crossvein; Sc, subcostal vein; Scc, subcostal cell; Sm, submarginal cell.



Figs. 58-59 male genitalia; 58 *Lestomyia sabulonum* Osten Sacken; A, lateral aspect; B, dorsal aspect; C, ventral aspect; D, aedeagus; E, proctiger; 59 *Lasiopogon quadrivittatus* Jones; ae, aedeagus; cl, clasper; gp, gonopod; ha, hypandrium; hpr, hypandrial process; pgr, proctiger; ss, superior forceps.



Figs. 60-63 proboscis; 60 *Stenopogon inquinatus* Loew, 61 *Eucyrtopogon incompletus* new species, 62 *Pogonosoma stricklandi* new species, 63 *Laphria xanthippe* Williston; 64 *Leptogaster aridus*, thorax, lateral aspect.



Figs. 65-66 prothorax, anterior aspect; 65 *Stichopogon trifasciatus* Say, 66 *Lasiopogon cinereus* Cole; 67-73 scutellum; 67 *Lasiopogon trivittatus* Melander, 68 *L. ripicola* Melander, 69 *Proctacanthella cacopiloga* Hine, 70 *Nerax bicaudatus* Hine, 71 *Asilus paropus* Walker, 72 *Asilus callidus* Williston, 73 *Negasilus belli* Curran; 74-88 leg; 74 *Lasiopogon quadrivittatus* Jones, 75 *Nicocles utahensis* Melander, front tibia and tarsus, 76 same, hind tibia and tarsus, 77 *Comantella fallei* Back, front tibia and tarsus, 78 *Cyrtopogon auratus* Cole, front tibia and tarsus, 79 *Cyrtopogon auripilosus* Wilcox and Martin, hind leg, 80 *Cyrtopogon willistoni* Curran, middle tarsus, 81 *Cyrtopogon lineotarsus* Curran, front tibia and tarsus, 82 *Asilus paropus* Walker, 83 *Asilus snowi* Hine, front femur.

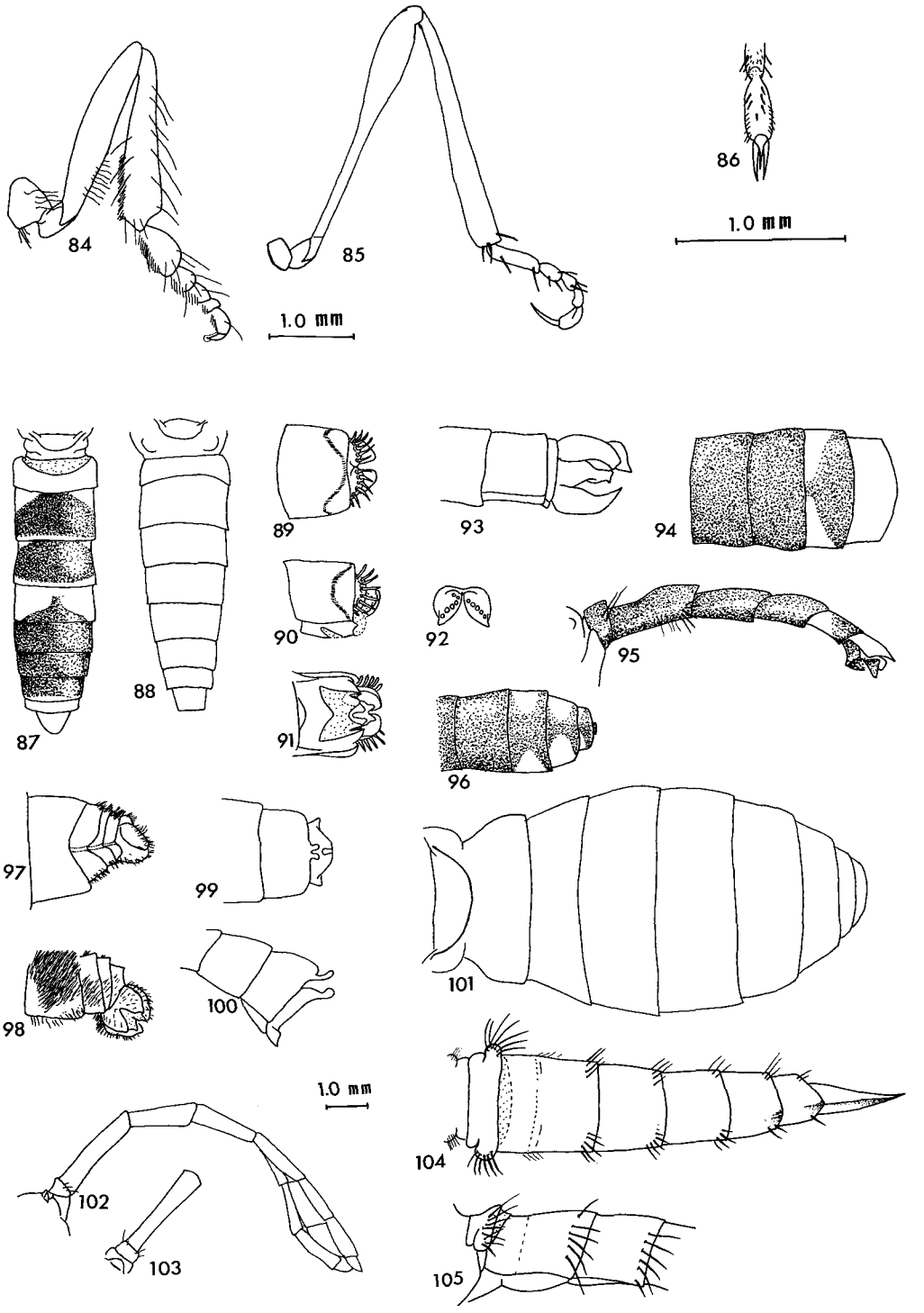
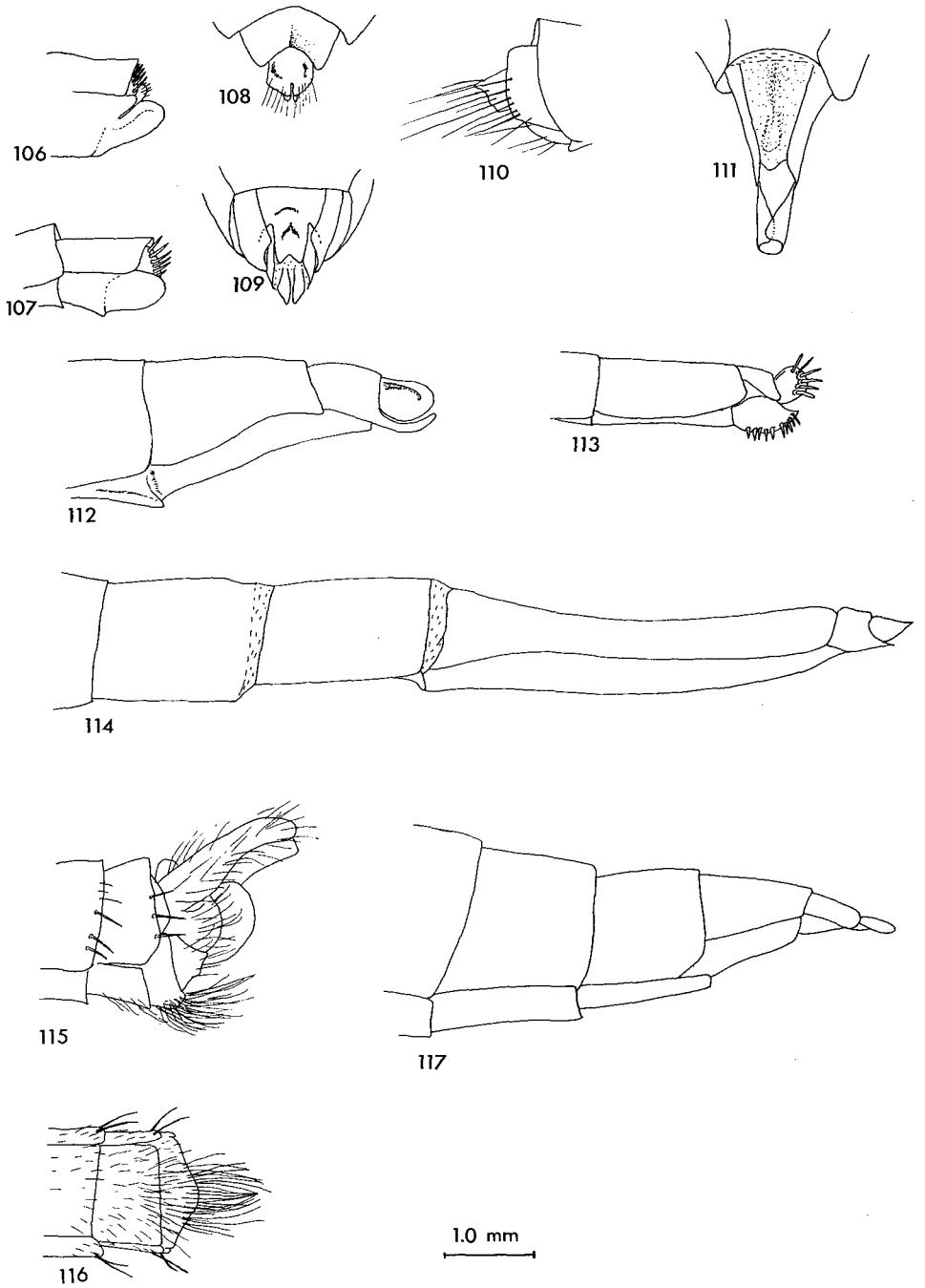
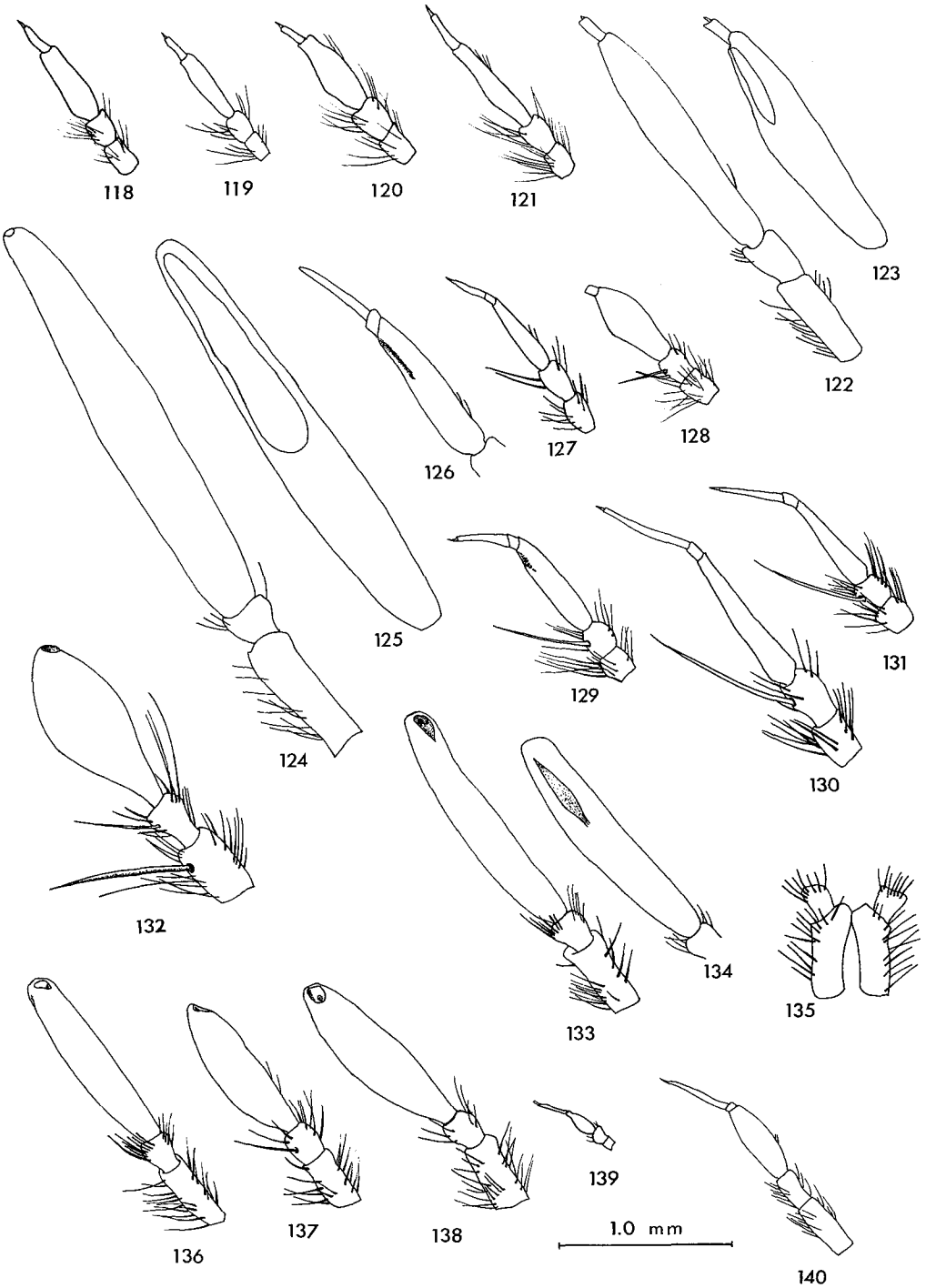


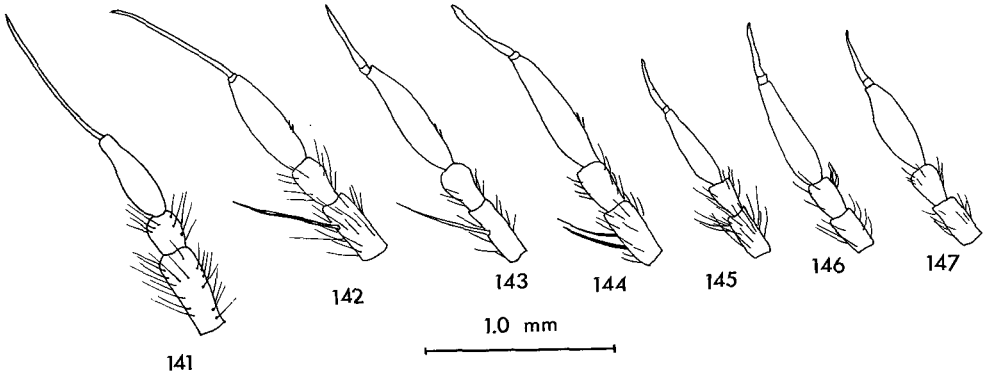
Fig. 84 *Holopogon albipilosus* Curran, hind leg; 85 *Leptogaster aridus* Cole, same; 86 *L. aridus* Cole, last tarsal segment; 87-105 abdomen; 87 *Stichopogon trifasciatus* Say, ♀, 88 *Lasiopogon quadrivittatus* Jones, ♀, 89-91 *Stenopogon inquinatus* Loew, eighth segment and ovipositor, 92 same, acanthophorite, 93 same, ♂. 94-95 *Nicocles utahensis* Melander, ♂, 96 same, ♀, 97 *Cyrtopogon auratus* Cole, ♂, dorsal, 98 same, lateral, 99 *Laphria scorpio* McAtee, ♂, dorsal. 100 same, lateral, 101, *L. janus* McAtee, ♀, 102-103 *Leptogaster aridus* Cole, ♀, 104-105 *Asilus callidus* Williston, ♀.



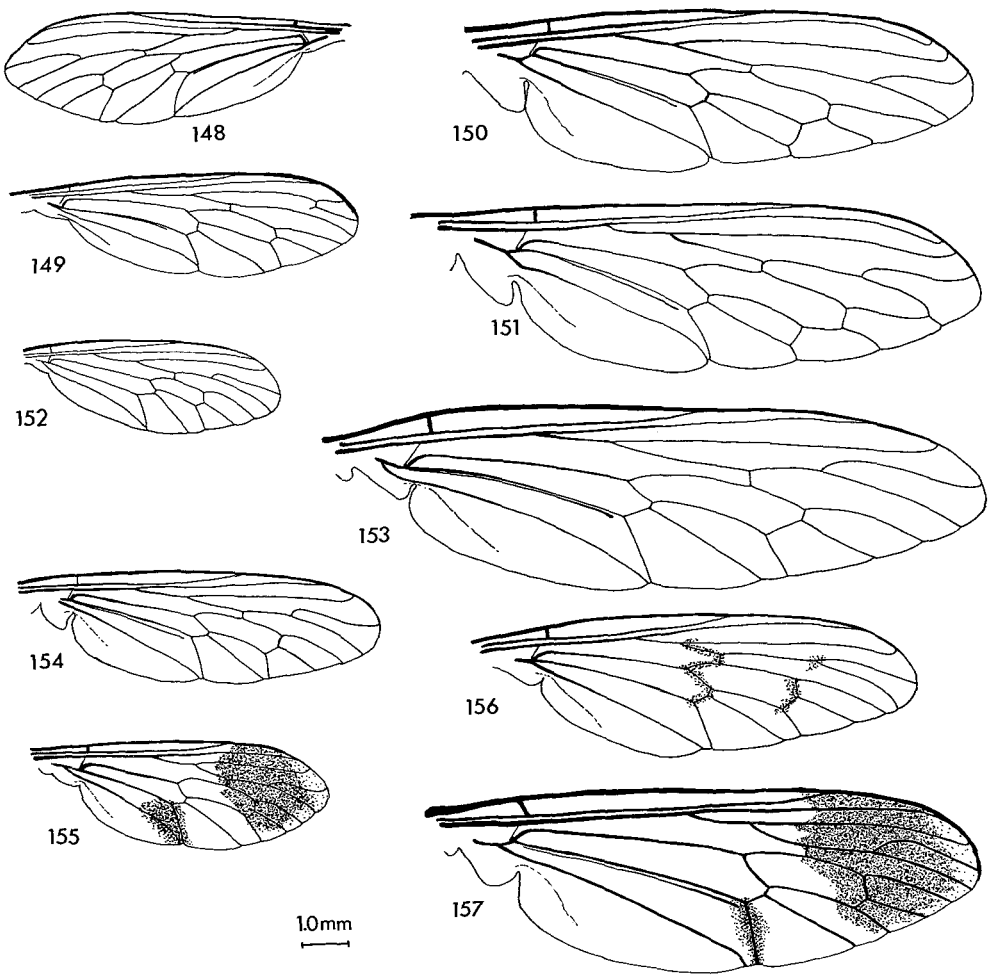
Figs. 106-117 ovipositor; 106 *Lasiopogon aldrichi* Melander, specimen from Grant Co., Oregon, 107 same, specimen from Drumheller, Alberta, 108-119 *Laphria xanthippe* Williston, 111 *Pogonosoma ridingsi* Cresson, 112 *Promachus dimidiatus* Curran, 113 *Proctacanthella cacopiloga* Hine, 114 *Nerax bicaudatus* Hine, 115-116 *Asilus occidentalis* Hine, ♂, 117 *Asilus callidus* Williston.



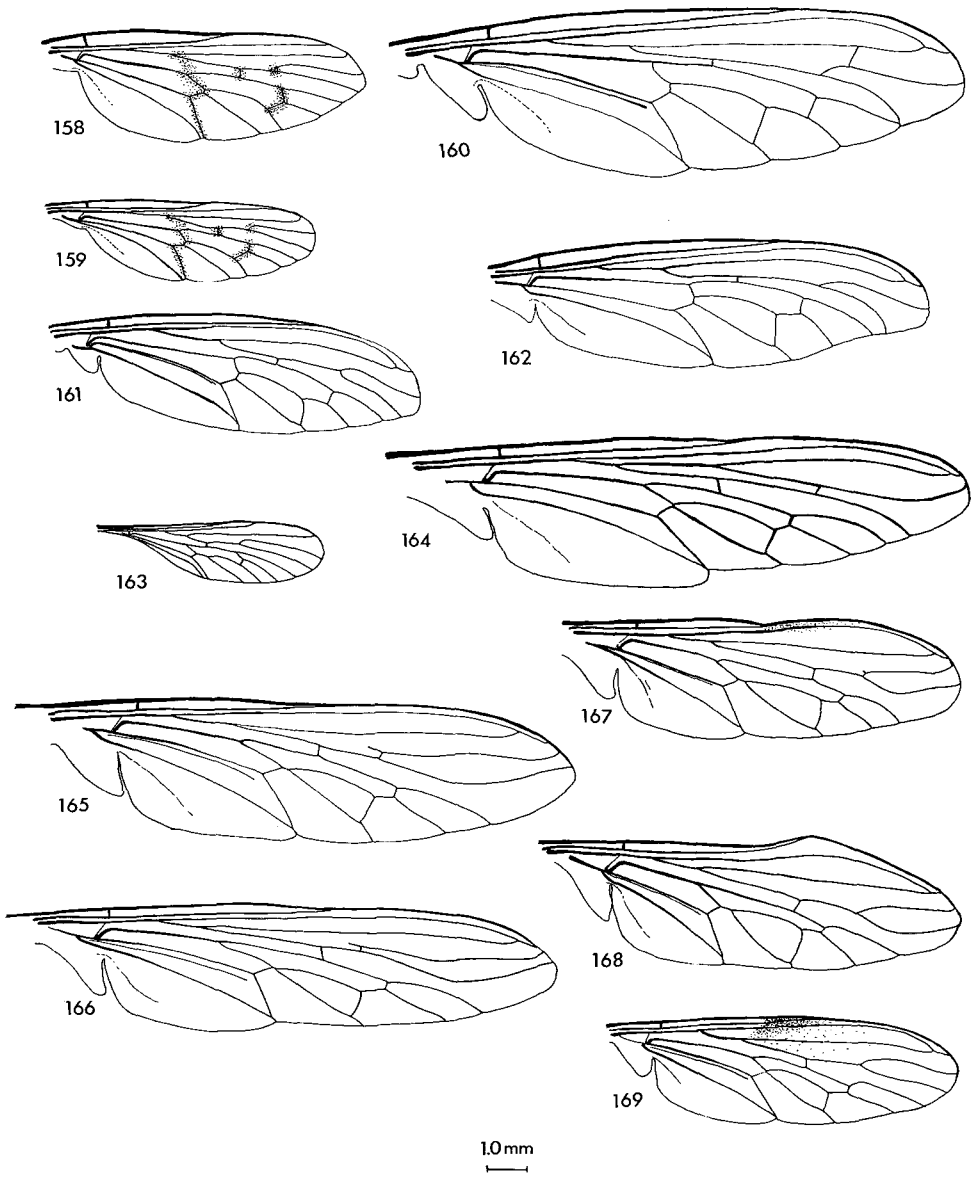
Figs. 118-140 antenna; 118 *Lasiopogon cinereus* Cole, 119 *L. prima* new species, 120 *L. aldrichi* Melander, specimen from Grant Co., Oregon, 121 same, specimen from Drumheller, Alberta, 122-123 *Ospriocerus consanguineus* Loew, 124-125 *O. abdominalis* Say, 126 *Stenopogon inquinatus* Loew, 127 *Holopogon albipilosus* Curran, 128 *Lestomyia sabulonum* Osten Sacken, 129 *Nicocles utahensis* Melander, 130 *Heteropogon wilcoxi* James, 131 *Eucyrtopogon incompletus* new species, 132 *Pogonosoma stricklandi* new species, 133-134 *Laphria xanthippe* Williston, 135 same, first two segments, dorsal, 136 *L. sedales* Walker, 137 *L. scorpio* McAtee, 138 *L. aeatus* Walker, 139 *Leptogaster aridus* Cole, 140 *Proctacanthella cacopiloga* Hine.



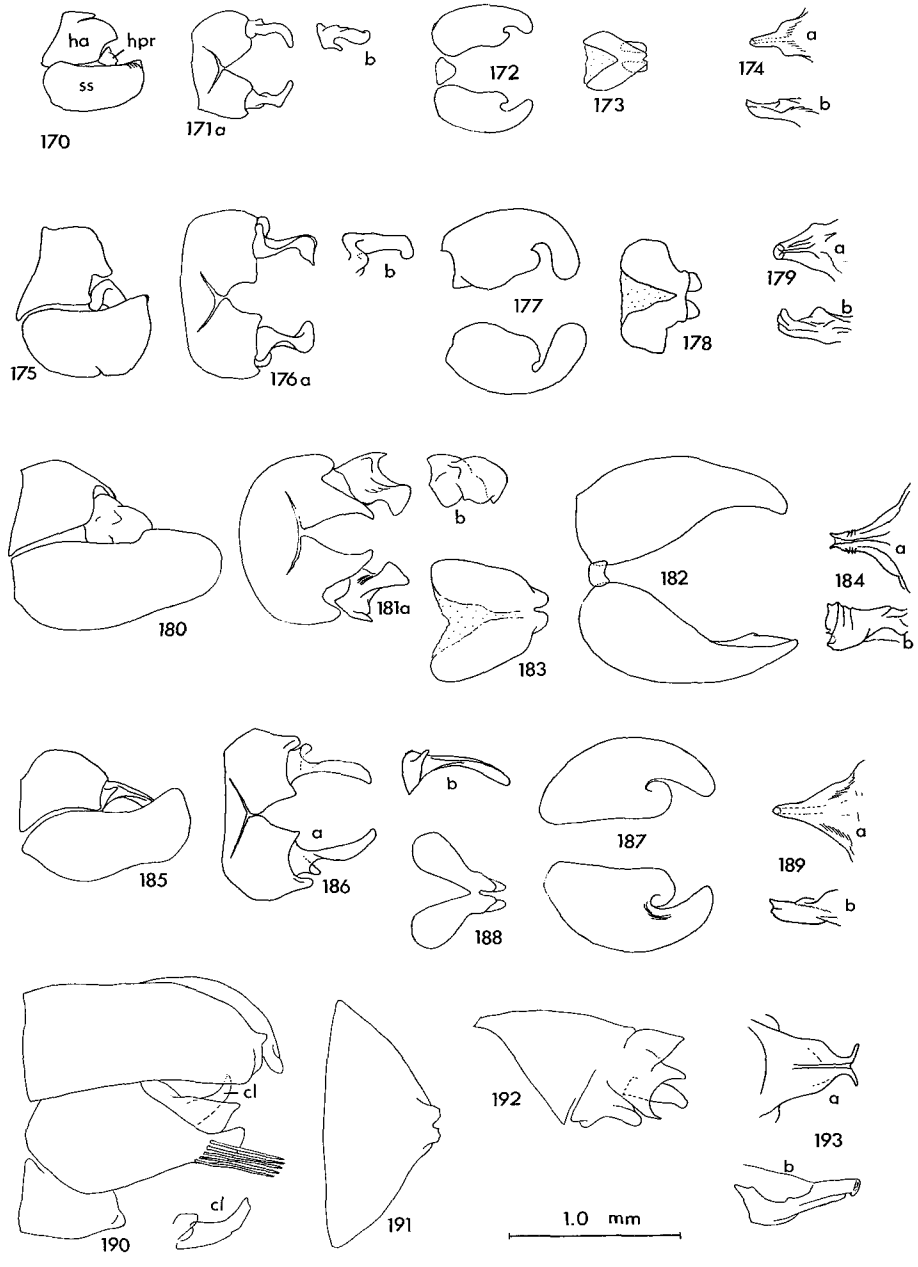
Figs. 141-147 antenna; 141 *Nerax bicaudatus* Hine, 142 *Asilus delusus* Tucker, 143 *Asilus paropus* Walker, 144 *Asilus erythocnemius* Hine, 145 *A. aridalis* new species, 146 *A. gramalis* new species, 147 *Negasilus belli* Curran.



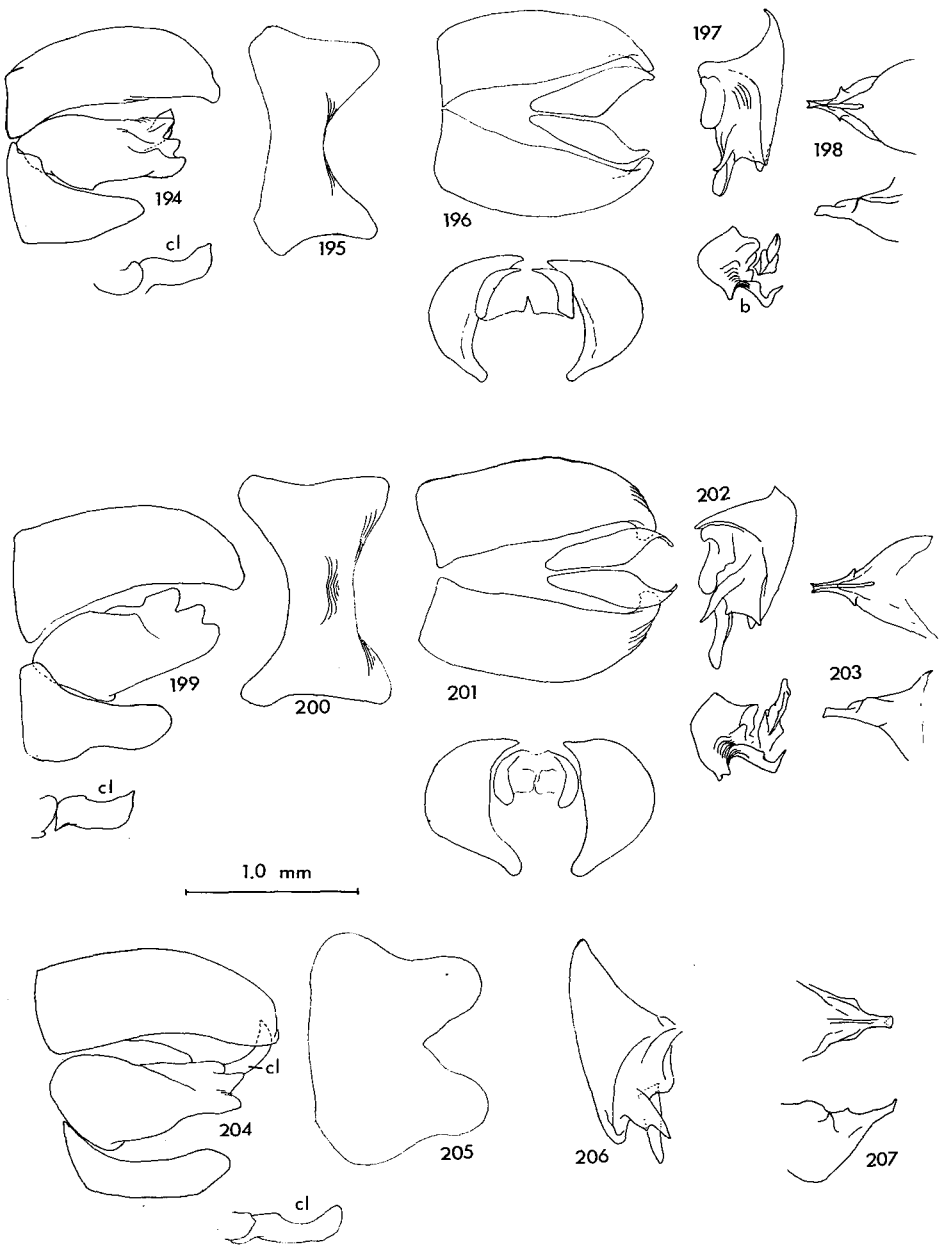
Figs. 148-157 wing; 148 *Lasiopogon prima* new species, 149 same, cf. 3rd longitudinal vein, 150 *Stenopogon coyote* Bromley, 151 same, cf. first posterior cell, 152 *Holopogon nigripilosa* new species, 153 *Heteropogon wilcoxi* James, 154 *Lestomyia sabulonum* Osten Sacken, 155 *Cyrtopogon bimacula* Walker, ♀, 156 *C. distinctitarsus* new species, ♀, 157 *C. dasyllis* Williston, ♀.



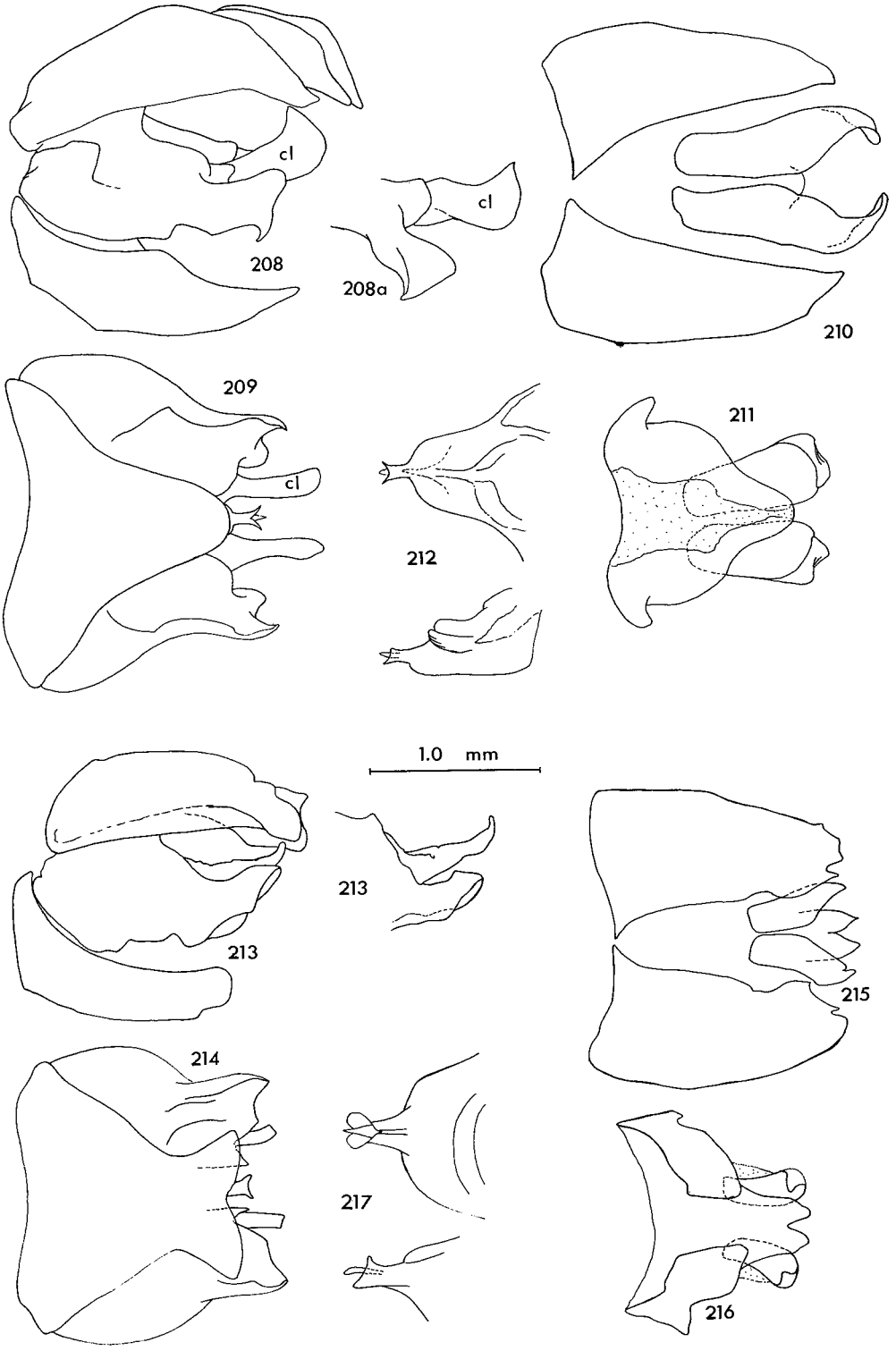
Figs. 158-169 wing; 158 *Eucyrtopogon comantis* Curran, 159 *E. diversipilosus* Curran, 160 *Pogonosoma stricklandi* new species, 161 *Laphria xanthippe* Williston, 162 *L. janus* McAtee, 163 *Leptogaster aridus* Cole, 164 *Promachus dimidiatus* Curran, 165 *Nerax bicaudatus* Hine, 166 *N. canus* Hine, 167 *N. subcupreus* Schaeffer, 168 *N. costalis* Williston, 169 *Asilus nitidilacies* Hine.



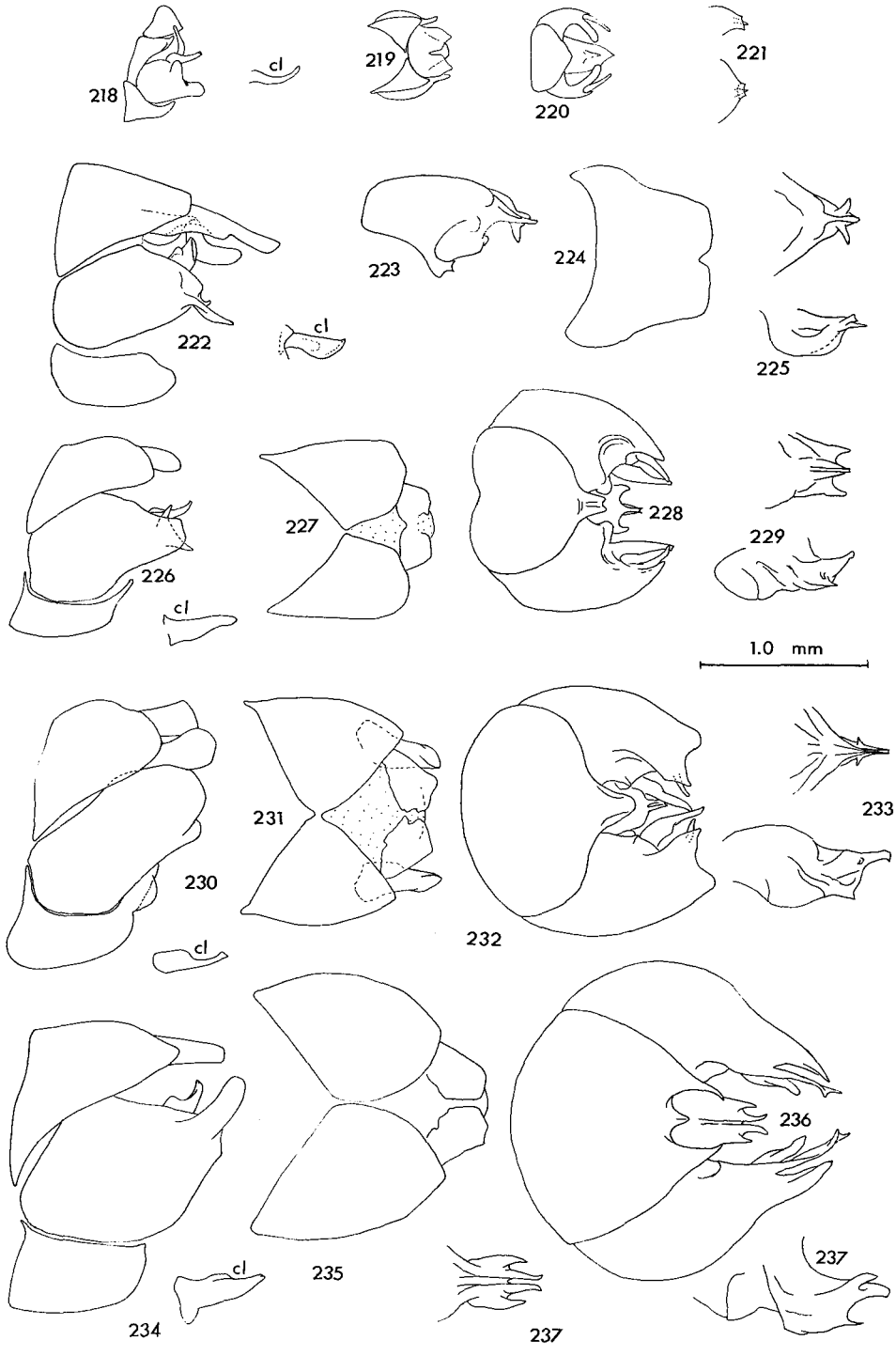
Figs. 170-193 male genitalia; 170-174 *Lasiopogon terricola* Johnson, 175-179 *L. trivittatus* Melander, 180-184 *L. cinereus* Cole, 185-189 *L. prima* new species 190-193 *Ospriocerus consanguineus* Loew.



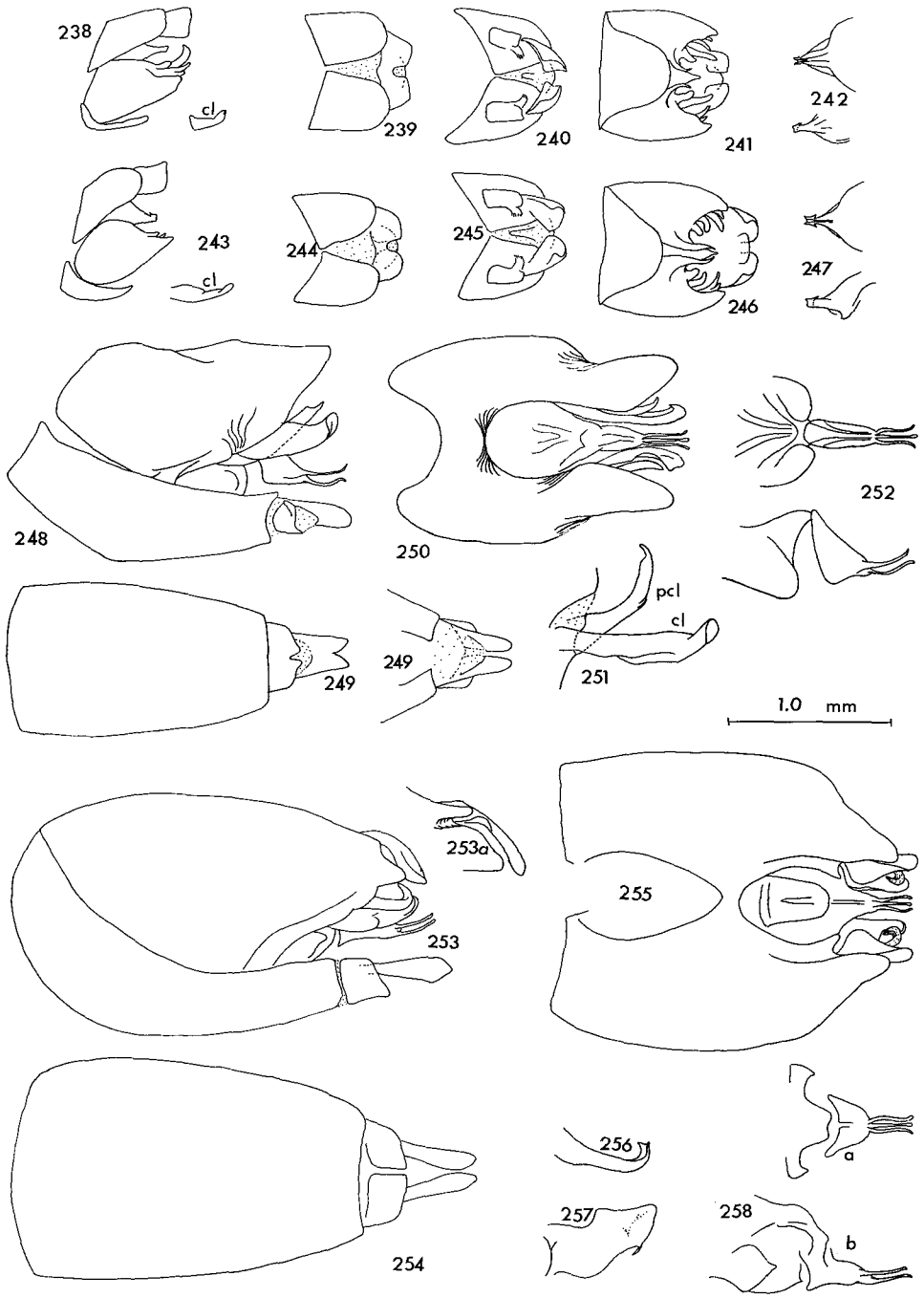
Figs. 194-207 male genitalia; 194-198 *Stenopogon obscuriventris* Loew, 199-203 *S. rufibarbis* Bromley, 204-207 *S. gratus* Loew.



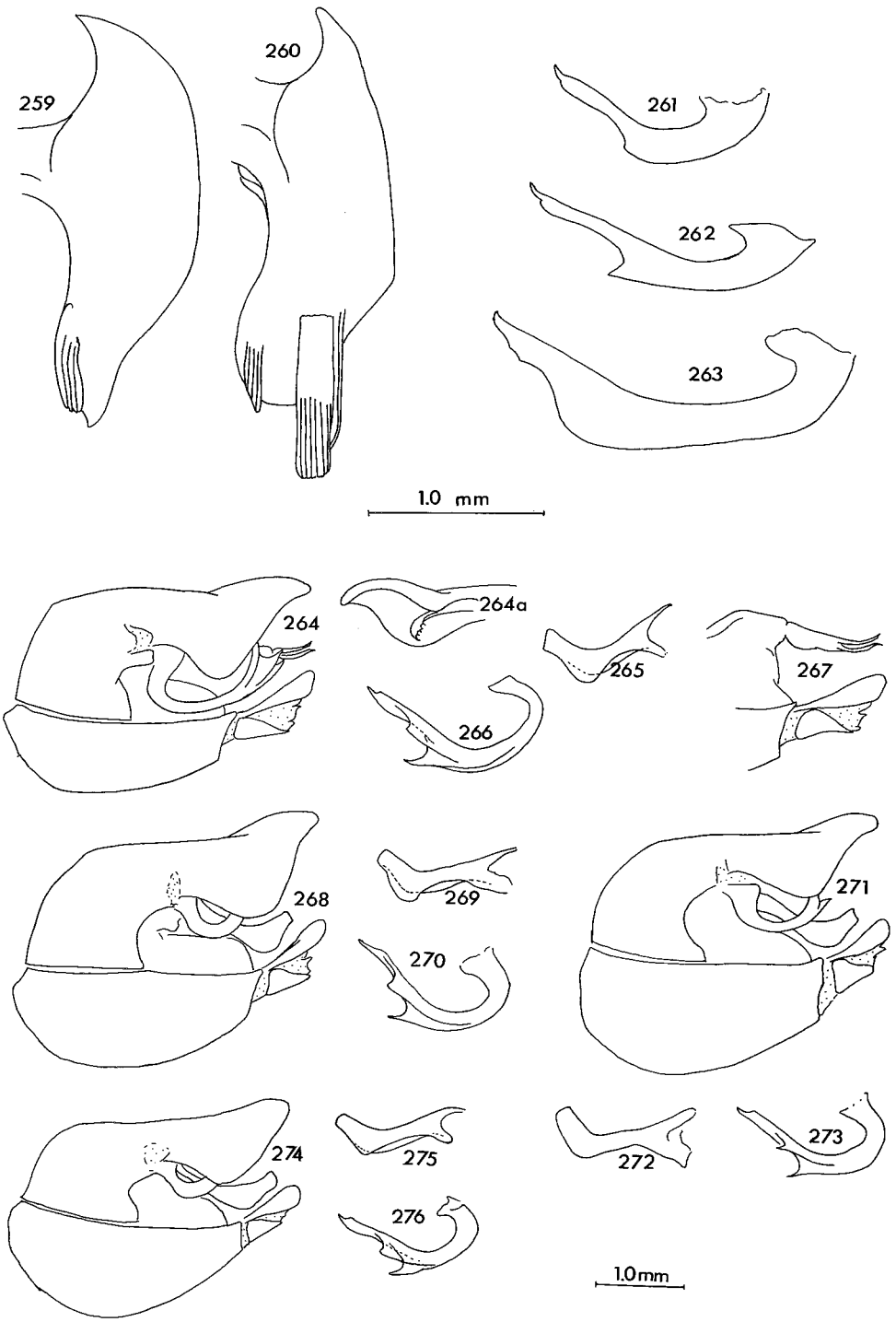
Figs. 208-217 male genitalia; 208-212 *Stenopogon inquinatus* Loew, 213-217 *S. neglectus* Bromley.



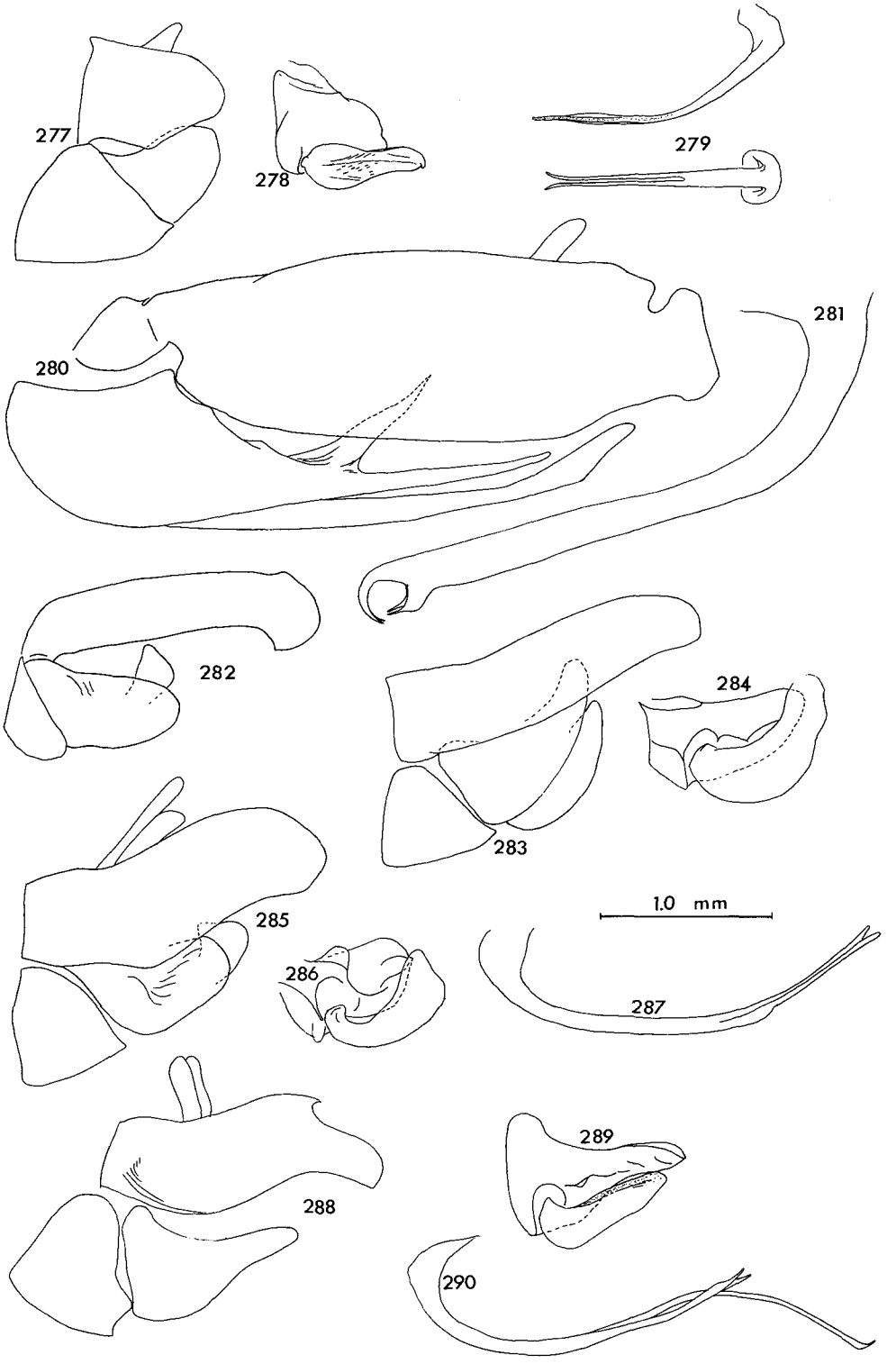
Figs. 218-237 male genitalia; 218-221 *Holopogon albipilosa* Curran, 222-225 *Heteropogon wilcoxi* James, 226-229 *Cyrtopogon auratus* Cole, 230-233 *C. montanus* Williston, 234-237 *C. dasyllis* Williston.



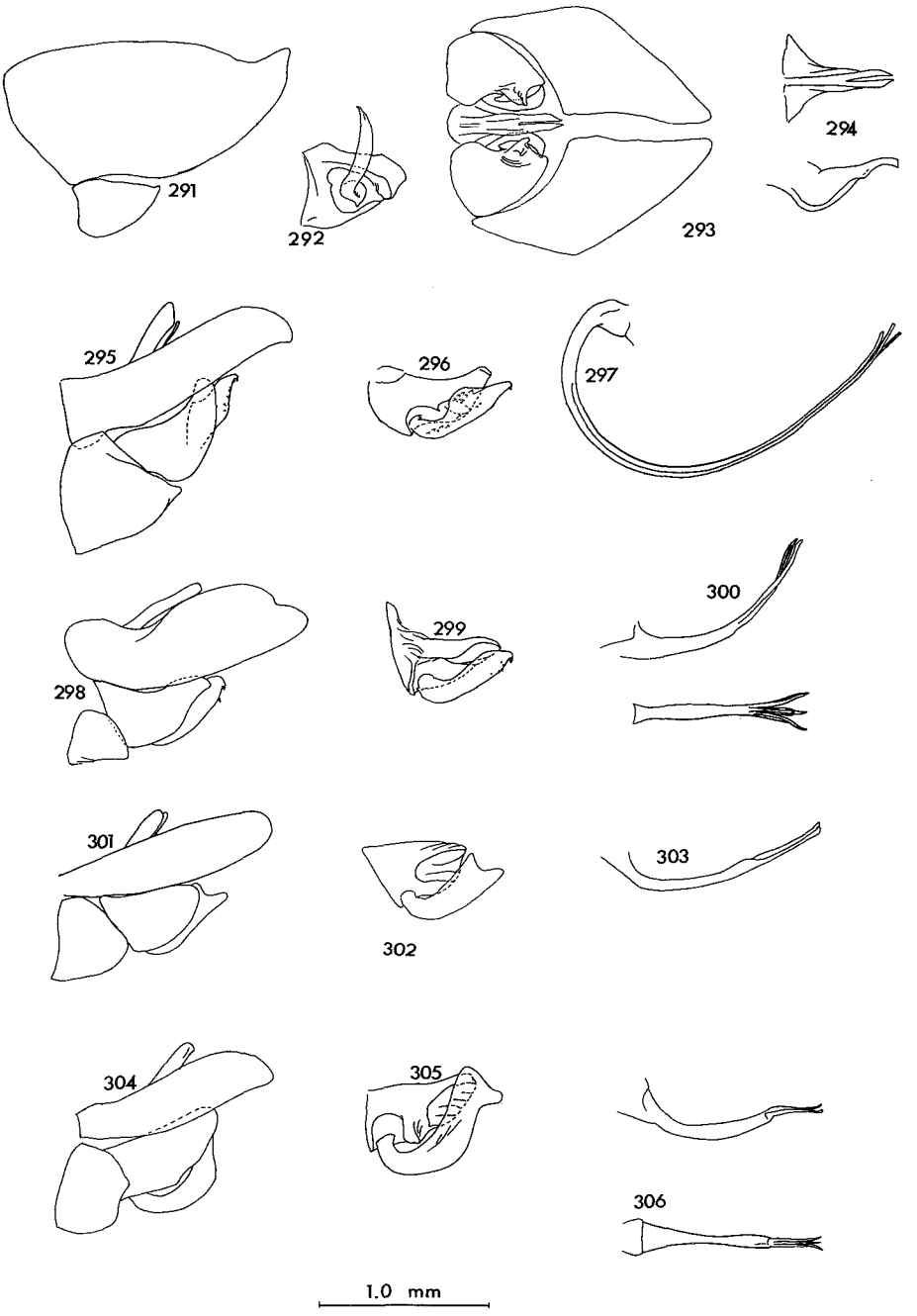
Figs. 238-258 male genitalia; 238-242 *Eucyrtopogon albibarbis* Curran, 243-247 *Comantella fallei* Back, 248-252 *Laphria xanthippe* Williston, 253-258 *L. scorpio* McAtee; cl, clasper; pcl, pseudoclasper.



Figs. 259 *Laphria aimatis* McAtee, gonopod, 260 *L. gilva* Linnaeus, same, 261-263 pseudoclasper; 261 *L. janus* McAtee, 262 *L. vultur* Osten Sacken, 263 *L. sackeni* Wilcox; 264-276 male genitalia; 264-267 *Bombomima partitor* Banks, 268-270 *B. columbica* Walker, 271-273 *B. fernaldi* Back, 274-276 *B. posticata* Say.



Figs. 277-290 male genitalia; 277-279 *Proctacanthella cacopiloga* Hine, 280-281 *Nerax bicaudatus* Hine, 282 *Asilus delusus* Tucker, 283-284 *A. occidentalis* Hine, 284 gonopod and clasper, inner side, 285-287 *A. callidus* Williston, 288-290 *A. nitidifacies* Hine.



Figs. 291-306 male genitalia; 291-294 *Asilus auriannulatus* Hine, 295-297 *A. mesae* Tucker, 298-300 *A. cumbipilosus* new species, 301-303 *A. aridalis* new species, 304-306 *A. gramalis* new species.