THE LAUXANIIDAE OF EASTERN CANADA

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by

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A THESIS

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C O N T E N T S

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INTRODUCTION

It was my original intention, in this paper, to deal only with the Quebec species of the Lauxaniidae. This intention has, in the main, been carried out, but since most of the commoner species covered have been recorded from other Eastern provinces, and those that have not been recorded are almost certainly to be found there, I decided to give the paper its present title. The title is also suitable for the inclusion of a new species which is, so far, only recorded from Nova Scotia. On the other hand, I have not included species recorded from Ontario, except those taken at Ottawa or in the Ottawa district, unless they are recorded also from Quebec.

The primary object of the paper is to make it possible for workers to recognize with little difficulty and absolute certainty the forms that are known to occur in this region. I had hoped that, while collecting material during two summers in the Abbotsford district, I would be able to learn something of the biology of the group. However, other work claiming my attention at what seemed to me the most hopeful period, namely late June and early July, has prevented this, and, to my great regret, I have nothing to add to our scanty knowledge of this important subject.

ACKNOWLEDGEMENTS

I am greatly indebted to Dr. Curran of the American Museum of Natural History, New York, for suggesting this study in the first place, for giving me the unrestricted use of his valuable material, and for being consistently generous with advice, suggestions and help ever since I began to collect material for the work.

The scope of the paper would have been greatly restricted had it not been for the loan of material by private collectors and institutions. Of these, I chiefly wish to express my appreciation to Rev. Bro. Joseph Ouellet of the Deaf and Dumb Institute, Montreal, and to M. Gustave Chagnon of the University of Montreal, who placed their entire collections in this family at my disposal. Mr. C. E. Petch also allowed me the use of the material in the collection of the Dominion Entomological Laboratory, Hemmingford, and Dr. J. McDunnough accorded me every facility for studying material in the Canadian National Collection, Ottawa, and lent me duplicates. Dr. Nathan Banks, of the Museum of Comparative Zoology, Cambridge, Mass., lent me a male of Homoneura conjuncta Johnson, determined by the author of the species.

LITERATURE ON THE LAUXANIIDAE

From a systematic standpoint, these flies have been given a fair amount of attention and their arrangement is as satisfactory as present knowledge will allow. Of European

workers, Hendel has been the chief contributor with his catalogue of the genera and species in Genera Insectorum(9), and his revision of the genera in Encyclopédie entomologique(10). On this continent, Melander's synopsis(20), and Malloch and McAtee's keys to the Eastern species(18) offer a sound basis for the determination of species.

Of the biology of Lauxaniidae, however, little or nothing is known. A few species of the genus Lonchaea, which was at one time included in this family, but which has now been recognized as not particularly closely related and has been isolated as a monogeneric family, are known in their immature stages. They have been reared from under bark and in decaying vegetation and excrement and some of them are probably predaceous. Perris[x] has described the life habits and figured the immature stages of Sapromoyza quadripunctata Linn., an Old-World form. The larvae of Camptoprosopella mine in clover, vetches and allied plants, as do also, probably, Lauxania and Minettia species, since adults of both the latter have been swept in numbers from alfalfa. Camptoprosopella vulgaris Fitch was first described in this connection by Fitch(8) as an insect pest, in his New York Report.

Most of the American literature is confined to descriptions of species, which are for the most part full and accurate, enabling the student to determine material without doubt or difficulty. However, I hope that this paper will shed more light on the rather difficult and little-known groups which include Minettia obscura Loew, Sapromyza annulata Melander and Sapromyza quadrilineata Loew.

[x]Perris, E. Ann.Soc.Ent.Fr. 2:594. 1852.

In regard to the important paper by Malloch and McAtee(18), it must be mentioned that Fig.16, Plate 2, in that paper, which is described as the female genitalia of Campto-prosopella verticalis Loew is undoubtedly a drawing of a male hypopygium in ventral view, identical with my drawing of C. vulgaris Fitch. However, the identity of these two species is still uncertain, pending an examination of types. Considerable individual variation occurs, (though not, so far as I am aware, in the male genital characters) and C. vulgaris has been redescribed no less than three times as a new species by various authors, including Fitch himself. In spite of this it is not certain that other species close to these two do not exist. A series of specimens, unfortunately all females, from Florida, Georgia and Illinois, lent to me by Dr. Curran and labelled verticalis Loew, differ in certain well-defined characters from the two species of this region, namely in the shape of the antennae, plumosity of the arista and the shape of the palpi, which are broad and spatulate. Two other minor printer's errors in the same paper are apt to be misleading. Fig.'s 10a and 14a, of the superior forceps of Sapromyza serrata and S. pictiventris respectively, are described as inferior forceps.

HABITS OF THE ADULTS

Except for a single specimen of Minettia lupulina Fab. on sumac blossom, I have not taken any species of Lauxaniids at light nor on flowers, though Malloch and McAtee(18) have recorded a number of species of Minettia, Homoneura and Sapromyza

taken in these ways. The flies are for the most part shade-loving and, except for one or two very common species, are not found far from a brook, stream or natural swamp. I have taken seventeen species, or just over half of those dealt with in this paper, including all genera except Camptoprosopella by sweeping clumps of basswood (Tilia americana) in half-cleared maple bush. The flies rest in the dense shade on the underside of the large leaves of this plant. Lauxania cylindricornis Fabr. and Minettia spp. of the group obscura Loew are to be found frequently on sugar-maple saplings where these form dense thickets. Species of Minettia and Homoneura are sometimes to be taken on both pink and white spiraea (Spiraea latifolia and S. tomentosa) which grow in swampy ground. The two species of Camptoprosopella are usually not to be found with members of the other genera except Homoneura. They may be swept from rushes, vetches, willows and other low-growing foliage along the banks of rivers and streams where they are often very plentiful.

GENERAL CHARACTERS AND SYSTEMATIC POSITION

The Lauxaniidae are small cyclorrhaphous flies of the acalyptrate group. They are distinguished from other families by the following characters enumerated in part by Curran(6):-

Auxiliary vein (subcosta) entire; preapical dorsal bristles on all tibiae; postocellar bristles convergent; oral

vibrissae absent or, rarely, very weakly developed; shape of head, especially face, variable; front wide with two pairs of frontals, usually reclinate, the anterior pair sometimes decussate; ocellars usually well developed; antennae variable in length, arista plumose to bare; thorax bristled; scutellum usually bare, except for the marginal bristles; propleural bristle present or absent; one or two sternopleurals; wing venation complete, wings sometimes pictured; general form fairly robust, abdomen oval, rarely elongate.

The species from this region are all five millemetres or less in length. They are pale tawny yellow, black, cinereous (pale slate-gray usually with a bluish tinge), or brown, ofteh attractively combining several of these colors. Some species of Homoneura have pictured wings.

CONCERNING THE CHARACTERS USED IN THE KEYS

Malloch and McAtee(18) have listed thirteen genera and forty-nine species of Lauxaniids from the District of Columbia region alone, and somewhat more than that number for the Eastern United States as a whole. The comparable figures for the Quebec region South of the St. Lawrence and West of the Maine border are about half in each case (to be exact, 6 genera and 24 species, exclusive of the new forms herein described). Some of the more southerly species undoubtedly include Eastern Canada in their range, as shown by the one or two isolated records that already exist. In preparing the keys, it was decided to go into more detail in some cases,

than was necessary for the separation of the species, so that there could be little doubt of their identity, rather than to include in them species which had not been recorded, although they might reasonably be expected to occur. Thus, in the key to the genera, there are included in several of the couplets, after the main characters distinguishing the six genera of this region, a series of characters, in brackets, which distinguish each genus from other genera in the family which have not been included in the key. If anyone using these keys traces out a genus or species, but is still uncertain of its identity through insufficiency of cited characters, he will be able to check his specimen by the keys in Malloch and McAtee's paper. In the lists of species, those which have also been recorded from the District of Columbia region are marked by an asterisk.

The new species described in this paper are separated from each other and from previously known species mainly by genital characters in the keys and elsewhere. This is a pity, but it cannot be helped. It is not for want of searching that I have been unable to find other characters. I am aware that students wishing to determine species accurately will have difficulty in doing so among the very similar forms of Minettia and Sapromyza. In spite of familiarity with these groups, I would still hesitate to distinguish between males of M. americana and M. americanella without making a dissection of the genitalia, although the difference is immediately clear when this is done. The important processes of the genital sternites in the males of this group are normally

hidden by the anteriorly-directed superior forceps, and they are easily broken off or damaged when the genitalia are pulled backward to expose them, even though the specimen has been thoroughly relaxed. The male hypopygia of the members of the two groups of Sapromyza, on the other hand, often shrivel and collapse when dried, so that the different parts lose their normal shape and also their proper positions in relation to each other. When this happens, only the process of dissection and liquid mounting will restore their normal shape and make it possible to determine the structure accurately. I mention this in order that the collector who regards with distaste or horror the idea of mutilating his specimens, may see that, in this case, he has a clear choice between doing so and leaving them incorrectly or only approximately determined.

The allocation of females with their respective males in the Sapromyza groups must, for the present, be only approximate according to general appearance and locality data. Exact determinations, based on the shape of the genital sternite, will be possible eventually when sufficient numbers of copulating pairs have been obtained. The females of the Mihettia group have been allocated with the males partly by the evidence of copulation and partly by observations on locality. It may be found later that wrong associations have been made, but in any case it is probably justifiable to make them rather than to leave all females loose and unattached in collections.

The members of these groups, as well as species of other genera, live in such close association in nature, that the capture of two closely similar specimens of the opposite

sex from the same bush in the same net is not proof of conspecificity.

KEY TO GENERA[x]

1. Antennae very long and slender, the first segment at least two-thirds as long as the second and with apical hairs below, the third segment cylindrical, much more than twice as long as wide; (arista with dense short hairs above and below; sternopleuron with two strong bristles; face convex; shining black species.) - - - Lauxania Latreille.

   Antennae not unusually elongate, the first segment much shorter than the second or without apical hairs below, the third segment rounded or oval, not more than twice as long as wide; (wing veins devoid of conspicuous setulae or hairs except on the costal margin.) - - - - - - 2

2. Anterior frontal bristles directed inward; first antennal segment as long as the second; (anterior frontals closer to upper frontals than to antennae; ocellars long and strong; face gently convex or plane; yellow species.) - - - - - - - - - - - - - - - -Camptoprosopella Hendel.

   Anterior frontals reclinate; first antennal segment much shorter than second; (presutural bristle present; apical cell widely open.) - 3

[x] Adapted from Malloch and McAtee(18), and Curran(6)

3. Sternopleuron with one bristle; (front not broader than long, not concave in front when viewed from above).
- Pseudogriphoneura Hendel

Sternopleuron with two bristles, the anterior one the weaker; (face gently convex or plane, not polished).- - - 4

4. Intra-alar bristle present; (scutellum bare above; frontal bristles not arising from tubercles).- - Minettia Robineau-Desvoidy

Intra-alar bristle absent; (second vein not undulate)- - -5

5. The minute black costal setulae continued to apex of third vein - - - - - - - - - - - - - - - -Homoneura Van der Wulp

The black costal setulae extend to only a little beyond apex of second vein, never to third.- - - - -Sapromyza Fallén

GENUS LAUXANIA LATREILLE

There is but a single representative of this genus recorded from Eastern Canada, Lauxania cylindricornis Fabr. It is a common and widely distributed fly, shining black in color, the wings with a luteous tinge. It is easily distinguished from other members of the family by its very long, slender antennae. The male genitalia show wide individual variation, especially in the shape of the superior forceps. Some of these types I have figured (Plate V. Fig.53 a - f). The females, on the other hand, show two structural types of genitalia which are very constant in all that I have examined. In one type, the genital sternite is broad and spatulate and

truncated posteriorly, and in the other, it is much narrower and ends in a point.

x Lauxania cylindricornis Fab. is distributed throughout Canada including the North West Territories. Collection dates range from mid-May to the beginning of September.

GENUS CAMPTOPROSOPELLA HENDEL

Two species of this genus occur in Eastern Canada, which are, probably, vulgaris Fitch and verticalis Loew. As already mentioned above, individual variation is widespread in both forms and I cannot speak with authority on either of them as I have not examined type material. The two species of this region are probably about equally abundant, although there are, at present, considerably more males of verticalis than vulgaris in Canadian collections. The males are not separable on the basis of the characters cited by Malloch and McAtee(20) in their key, but only by the male genitalia which are readily distinguishable. The females are not separable by any character that I can find. Both species are pale shining yellow, with hyaline, immaculate wings. The hairs and bristles, tips of the palpi and usually the tips of the third antennal segments and the ocellar tubercle are black. Length about 4 mms.

List of Species

x C. vulgaris Fitch. July and August, Hemmingford, Farnham, Abbotsford, St. Johns, Que.; Ottawa, Ont.

x C. verticalis Loew. June - August, Montreal, Ft. Coulonge,

Ste. Anne de Bellevue, Abbotsford, L'Assomption, Mt. Orford, Farnham, Kazubazua, Que.; Ontario.

GENUS PSEUDOGRIPHONEURA HENDEL

P. gracilipes Loew is the only species of this genus in this region. It is not scarce, but not especially abundant. I have taken it in numbers from basswood leaves in shady places. It is a rather pretty fly, mostly shining black; the tibiae and tarsi pale grayish white and contrasting strongly with the rest of the body coloration; dorsum of thorax brownish pruinescent; thoracic pleurae and parafacials silvery grayish pollinose; face glossy black; arista long plumose above; halteres pale brownish yellow; wings with a luteous tinge; length about 4 mms.

x P. gracilipes Loew. Mid-July to mid-September. La Trappe, Rigaud, Aylmer, Abbotsford, Que.; Jordan, Ottawa, Ont.

GENUS MINETTIA ROBINEAU-DESVOIDY

Key to Species

1. Knobs of halteres yellowish - - - - - - - - - - - - - - - - - - 2
   Knobs of halteres black, thorax and abdomen black - - - - - 4

2. Thorax black, densely cinereous pollinose - - - - - - - - - - 3
   Head, thorax, abdomen and legs entirely yellowish testaceous; face with a central velvety black spot on the oral margin; 7th abdominal tergite of male with a central dark spot; hair and bristles black; wings with a luteous tinge; small species(2.5 mms.) - - - - - - - puncticeps Coquillett

3. Thorax and scutellum densely cinereous pollinose, margin of scutellum sooty black; hind femora, apical half of middle femora, middle and hind tibiae yellowish testaceous; frons with a broad white band on anterior margin above antennae; rather large species(4-5 mms.) - - - lupulina Fabricius

   Thorax and scutellum densely cinereous pollinose, margin of scutellum not sooty black; mesonotal hairs strong and rather sparse; middle and hind femora and tibiae mostly black, the femora slightly gray pruinescent; abdomen yellowish testaceous; frons not with broad white band anteriorly; smaller species (3 - 3.5 mms.) - - - - - cana Melander

4. The forked process of the genital sternite of the male (8th abdominal sternum) is curved forward, away from the superior forceps, its extremities normally entirely visible in lateral view; genital sternite (8th visible abdominal sternum) of female with two deep depressions in its surface - 5

   The forked process of the male genital sternite is curved backward towards the superior forceps, its extremities normally concealed by the latter in lateral view (Figs.10,11); genital sternite of female subquadrate, its surface entirely convex (Fig.12); - - - - - - - - - - - - - - - lyraformis n.sp.

5. The prongs of the forked process of the male genital sternite not widest at their base in ventral view; the postero-lateral corners of the genital sternite not projecting beyond the middle of the superior forceps in

lateral view; female genital sternite without colorless, membranous lobes laterally - - - - - - - - - - - - - - - - - 6

Prongs of the forked process much wider at their base than at the tips in ventral view; the genital sternite long, its postero-lateral corners projecting nearly to the end of the superior forceps in lateral view, (Figs.7,8); genital sternite of female with two large colorless lobes arising from the pleural membrane and concealing its lateral edges (Fig.9) - - - - - - - - - - - - - - - - lobata n.sp.

6. Posterior edges of the superior forceps of male not reflexed; lateral edges of 8th tergite of male lobate (Figs.1,2); female genital sternite as in Fig.3. - americana Malloch

Posterior edges of superior forceps of male strongly reflexed inwards on the basal half; lateral edges of 8th tergite of male truncate (Figs.4,5); female genital sternite as in Fig.6. - - - - - - - - - - - - - - americanella n.sp.

List of Species

x M. americana Mall. Apparently not so common in this region as its three close relatives. June 6th - 28th, St. Hilaire, Covey Hill, Laniel, Que.; Coldstream, Lake of Bays, Ont.

M. americanella n.sp. Common. For locality data, see descriptions of new species.

M. cana Melander. Not common. Seven females taken by Bro. J. Ouellet at La Trappe, Que., May 29th and 30th, 1936.

Easily distinguished from lupulina by the characters cited in the key. Unlike the specimen from which Melander's (20) description was made, all these have well-developed preapical bristles on the hind tibiae.

M. lobata n.sp. Common. For locality data, see descriptions of new species.

x M. lupulina Fab. Very common and widely distributed across the continent. Late May to mid-September. In copula August 20th (Knowlton, Que.)

M. lyraformis n.sp. Common. For locality data, see descriptions of new species.

x M. puncticeps Coq. Not common. One male, Abbotsford, Que., June 11th, 1937. Swept from basswood.

GENUS SAPROMYZA FALLEN

Key to Species

1. Thorax without dark vittae just mesad of the dorsocentral bristles. Frons and scutellum also lacking dark vittae.- - - 2

   Thorax with two distinct dark vittae mesad of the dorsocentrals, these vittae continued onto the scutellum; frons with similar vittae. - - - - - - - - - - - - - - - - - - - 4

2. Shining yellow species; thorax with two pairs of dorsocentrals; wings hyaline; abdomen with a round shining black spot on each side of the last 2 or 3 tergites.
   - rotundicornis Loew.

   Black species; thorax with three pairs of dorsocentrals - - 3

3. Frons shining black, especially on orbits, conspicuously reddish testaceous on anterior margin; thorax faintly gray pruinescent; the acrosticals in four series between anterior dorsocentrals; abdomen shining black; arista pubescent. - - - - - - - - - - - - - - - - - - - hyalinata Meigen

Frons opaque, brownish pubescent, indistinctly reddish on anterior margin; thorax opaque brownish pubescent, two light grayish pubescent vittae between the dorsocentrals and the acrosticals, the latter in two rows; abdomen grayish pubescent; arista nearly bare. - hemmingfordensis n.sp.

4. Fore femur without a comb-like series of minute setulae between middle and apex on anteroventral surface; eighth abdominal tergite of male with slender pointed processes on its lateral edges or at least with distinct angularity at its posterolateral corners; male genital structures robust; bristles on posterior margins of abdominal tergites not set in fuscous spots. - - - - - - - - - - - - - - 5

Fore femur with a comb-like series of minute setulae on anteroventral surface; eighth tergite of male without processes on its lateral edges; male genital structures usually quite small, if rather large, the bristles on posterior margins of abdominal tergites are set in fuscous spots - 9

5. The heavily chitinized ventral plate behind the 5th sternite of the male bears two slender backwardly-directed processes on its posterior margin; eighth tergite of male with pointed processes on its lateral edges. - - - - - - - - 6

The ventral plate behind the 5th sternite of the male bears a central broad, blunt, backwardly-directed process on its posterior margin; eighth tergite of male with or without pointed lateral processes. - - - - - - - - - - - - - 7

6. Superior forceps of male hypopygium long, not very slender, inner margins on apical third serrate, from base to tip more or less evenly curved forward and inward beneath the other structures, tips rounded, almost entire outer surface shining black; inferior forceps cleft toward apices, the arms dissimilar in length but equal in thickness; the pointed processes of the eighth tergite arise near its anterolateral corners; penis, towards its tip, less than $\frac{1}{4}$ its width at the wides point, when viewed from the ventral side. - <u>serrata</u> Malloch

Superior forceps of male hypopygium shorter, rather evenly tapering, inner margins not serrate but with a distinct angle at the distal third, not evenly curved forward and inward, only the tips rather abruptly curved, outer surface shining black only towards the tip; inferior forceps cleft towards apices, the arms similar in length, the mesal arms more than twice as thick as the lateral ones and notched at their apices, two small

processes arising on the ventral sides at the bases of the main arms; the pointed processes of the 8th tergite arise from its postero-lateral corners; penis towards its tip nearly half as wide as at its widest point when viewed from the ventral side. - - - currani n.sp.

7. Eighth tergite of male with slender pointed processes at its postero-lateral angles. - - - - - - - - - - - - - - - 8

Eighth tergite of male without slender processes, but with a distinct angularity at this point; superior forceps rather short, slender at the tips which are abruptly curved inward; inferior forceps cleft toward apices, the lateral arms twice as long and strong as the mesal ones and bearing small pointed processes halfway along on their mesal surfaces, two small processes on the ventral surfaces at the bases of the main arms; penis towards its tip half as wide as at its widest point when viewed from the ventral side. - - - - - aspinosa n.sp.

8. Superior forceps of male hypopygium short, stout, much shorter than the 8th tergite measured opposite their bases, coarsely serrate at the tips; inferior forceps not cleft at apices, with a stout central arm and two much smaller arms, a mesoventral one at the basal third and a latero-ventral one at the distal third; processes of 8th tergite slender, smooth and pointed; penis abruptly constricted in the middle and pointed at the tip in ventral view. - - - subserrata n.sp.

Superior forceps of male hypopygium very long and slender, as long as the 8th tergite measured opposite their bases, blunt at the tips, not serrate; inferior forceps cleft at about halfway from the base, the latero-ventral arms more than twice as long and strong as the meso-dorsal ones and bearing small processes on their lateroventral surfaces at the base; processes of the 8th tergite robust, blunt and nodulate at the tips; penis not abruptly constricted in the middle nor pointed at the tip in ventral view. - - - - - - - - novaescotiae n.sp.

9. The bristles on the posterior edges of the abdominal tergites arise from fuscous spots, usually other small spots at the bases of some of the bristles anterior to them; all femora and tibiae maculated. - - - - - - - - - - 10

The bristles on the posterior edges of the abdominal tergites do not arise from fuscous spots, the maculations of the abdomen confined to two large lateral spots on tergite 2 and four large spots on each of tergites 3 to 6; fore and middle femora and tibiae not maculated; hypopygium small; superior forceps short, spatulate, the tips slightly incurved and bearing three or four minute teeth; penis and inferior forceps concealed, the latter thin, bladelike. - - - - - - - - - spatulata n.sp.

10. Superior forceps of male hypopygium more than twice as long as their width at the base in lateral view, gradually tapering, slightly bent forward and inward

from the middle, the tips distinctly incurved and hooked; inferior forceps curved posteriorly, their sides almost parallel transverse at the apex with a small angular process at either apical corner, without a bristle-bearing angle at the base anteriorly; the proximal pair of chitinous hooks on the ventral surface of the penis distinctly less than halfway from its base. - - - browni Curran

Superior forceps of male hypopygium less than twice as long as their width at the base in lateral view, not bent in the middle, the tips not hooked; inferior forceps curved anteriorly towards the apex, broadest at the base, their sides not parallel, with a distinct angle bearing a bristle near the base anteriorly; the proximal pair of chitinous hooks on the ventral surface of the penis distinctly more than halfway from its base.
- ouelleti n.sp.

List of Species

S. aspinosa n.sp. Probably fairly common. For locality data, see descriptions of new species.

S.browni Curr. Common. By far the most records are between June 1st and 15th, with a few isolated records later up to August 9th. La Trappe, Rigaud, Fairy Lake, Montreal, Lanoraie, Joliette, Abbotsford, Que.; Barberd, N.B.; Lake of Bays, Pt. Pelee, Lake Abitibi, Ont.

S. currani n.sp. One record only. See description.

S. hemmingfordensis n.sp. Not common. See description.

S. hyalinata Meigen. Not very common. Records range from May 10th to August 8th, Montreal, Oka, Knowlton, Abbotsford, Que.; Ottawa, Ont.; Cranbrook, Azassiz, Salmon Arm, B.C. Lack of material has prevented a thorough study of the genitalia, but there is evidence of considerable variation, which may be specific.

S. novaescotiae n.sp. One record only. See description.

S. ouelleti n.sp. Probably fairly common. See description.

S. rotundicornis Loew. Not common. Four specimens. A pair in copula from Grand River, N.S., July 15th, 1931, (M. L. Prebble). Two females, Hemmingford, Que., July 21st, Victoria, B.C., June 29th.

[x] S. serrata Mall. The only certain records of this species in E. Canada are four males from Abbotsford, Que., taken June 14th, 1937. It is evidently much less common than its close relative subserrata (n.sp.).

S. spatulata n.sp. Not very common. See description.

S. subserrata n.sp. Common. See description.

GENUS HOMONEURA VAN DER WULP

Key to Species[x]

1. Wings with distinct infuscations - - - - - - - - - - - - - 2
   Wings without infuscations - - - - - - - - - - - - - - - - 15

2. Apex of the second vein of the wing very little or not at all infuscated; the other infuscations mainly confined to the veins, faint on the membrane; head large; frons swollen, lemon yellow in fresh specimens; hairs and

[x] Adapted from Malloch and McAtee (20)

bristles on ventral part of head and thorax and on legs very fine, golden; abdomen short; (male) - - - - citreifrons Malloch

Apex of second vein distinctly infuscated; other characters not as above.- 3

3. Third vein with two fuscous spots in addition to the one at inner cross-vein and the one at apex. - - - - - - - - - 4

Third vein with only one fuscous spot between inner cross-vein and apex. - 5

4. Eighth abdominal tergite of male with a backwardly-directed spine at apex of the downwardly-directed lateral process, on its posterior angle.- - - - fraterna Loew.

Eighth abdominal tergite of male with a slightly curved downwardly-directed spine at apex of lateral process at its anterior angle. - - - - - - - - - - - - pernotata Malloch

5. Second, and sometimes part of basal or third segment of hind tarsus blackened, in male, the blackened parts generally dilated. - 6

Hind tarsi pale, the segments in male not dilated. - - - 10

6. Two segments of hind tarsus in male and female partly blackened; the apex of the three basal segments in male each with a pair of long apically dilated hairs. - - - - 7

Only one segment of hind tarsus blackened; no such hairs on tarsus of males. - - - - - - - - - - - - - - - - - 8

7. Second and third segments of hind tarsus in both sexes partly blackened, dilated in male; hairs at apex of cerci in male much shorter than cerci themselves.
- ornatipes Johnson

First and second segments of hind tarsus in both sexes partly blackened, dilated in male; hairs at apex of male cerci as long as or longer than cerci themselves.
- melanderi Johnson

8. Costal margin of wing infuscated from apex of auxiliary vein to apex of fourth, less distinctly so between cross-veins; second segment of hind tarsus distinctly but not greatly dilated in male; hind tibia without long fine hairs apically on posterior surface.
- Houghi Coquillett

Costal margin of wing not infuscated proximad of a line drawn vertically from outer cross-vein. - - - - - - 9

9. The spots at the apex of second vein, on middle of ultimate section of third, and on outer cross-vein almost in a straight line, sometimes forming a continuous transverse band; dilated segment of hind tarsus of male usually as broad or broader than long; hind tibia of male with some long fine hairs apically on postero-ventral and posterior surfaces.- - - compedita Loew

The three spots, referred to above, never forming a transverse band, the first two distinctly distad of the third and not continuous with it; dilated segment

of hind tarsus of male longer than broad; hind tibia of male without long fine hairs apically.- - - - disjuncta Johnson

10. The entire costal margin of wing broadly brown including the costal and subcostal cells.- - - - - sheldoni Coquillett

Costal margin of wing largely hyaline, clouded only from a little before apex of second vein.- - - - - - - - 11

11. Thorax with four pairs of dorsocentrals, the anterior pair or two pairs sometimes greatly weakened.- - - - - - 12

Thorax with three pairs of dorsocentrals.- - - - - - - - 14

12. Arista yellow for most of its length; bristles and hairs on the ventral part of the thorax, especially the ventral bristles of the sternopleura, fine, golden; frons rather distinctly swollen above antennae, lemon yellow in fresh specimens; face retreating.(female) - citreifrons Malloch

Arista black except at the base; thoracic hairs and bristles black, not conspicuously fine; frons not swollen; face vertical or only very slightly retreating.- 13

13. Hind femur with an outstanding bristle on antero-ventral surface; fuscous spot on middle of ultimate section of third vein usually separated from one at apex of second and much distad of outer cross-vein;

arista rather conspicuously plumose; posterior surface of the head entirely pale yellow.- - - - philadelphica Macquart

Hind femur without an outstanding preapical antero-ventral bristle; spot on third vein in line with that at apex of second and that on outer cross-vein and usually continuous with the former; arista not conspicuously plumose; a quadrate dark area on the posterior surface of the head between the paracephalic sutures. - - - - - - - - - - - - - - - - - - - conjuncta Johnson

14. Thorax with well-differentiated acrosticals; hind femur with an outstanding preapical antero-ventral bristle; a strong pair of acrosticals cephalad of the anterior pair of dorsocentrals; apex of second vein having distinctly the heaviest infuscation on the wing; posterior surface of the head entirely pale yellow. - incerta Malloch

Thorax without well-developed acrosticals; hind femur without an outstanding preapical antero-ventral bristle; a quadrate dark area on the posterior surface of the head between the paracephalic sutures.- - - conjuncta Johnson

15. Hind femur of male with a large number of short setulae on basal half of ventral surface; cheek over half as high as eye; hind tibia of male without erect soft hairs; last abdominal sternite of male without two long pointed processes; seventh abdominal tergite

of female compressed, almost cylindrical.
- littoralis Malloch

Hind femur of male without black setulae on basal half of ventral surface; cheek less than half as high as eye; hind tibia of male with some soft erect hairs basally on the ventral surface; last abdominal sternite of male with two long pointed processes; seventh abdominal tergite of female not compressed nor cylindrical. - - - - - - - - - - - - - - - - - bispina Loew.

List of Species

x H. bispina Loew. Fairly common and widely distributed. June 11th - July 9th, Kentville, N.S.; St. Placide, Ile Jesus, Farnham, St. Johns, Napierville, Abbotsford, Que.; Niagara Glen, Ont.; also Man., Alta. Swept from reeds on river banks with Camptoprosopella spp.

x H. citreifrons Mall. June 2nd - 14th, 1937, Abbotsford, Que., four males,eight females swept from basswood. This species is evidently very close to conjuncta Johns. by the male genital structures, and also the infuscation of the female wing which is identical with that of conjuncta. (See Figs. 35, 37, 61, 64.)

x H. compedita Loew. Common and widely distributed. June 2nd - August 25th. In copula July 5th.

x H. conjuncta Johns. June 7th - July 5th Knowlton, Lachine, Abbotsford, Que.; Leamington, Ont.

x H. disjuncta Johns. Fairly common. June 13th - August 15th,

Montreal, Joliette, St. Martin, La Trappe, Abbotsford, Que.; Orillia, Ont.

x H. fraterna Loew. The only certain records are a few males from the Ottawa district. It may not have a distribution as far East as pernotata Mall.

x H. Houghi Coq. Apparently not common. A male and female from Kazubazua, Que., August 17th, 1927 (G. S. Walley) and a female from La Trappe, Que., June 9th, 1936 (J. Ouellet)

x H. incerta Mall. Fairly common. July 14th - September 3rd, Hull, Rigaud, Knowlton, Kazubazua, Mt. Orford, Abbotsford, Que. Swept from basswood.

H. littoralis Mall. Fairly common. May 30th - July 15th, La Trappe, Missisquoi Bay, St. Placide, Que.; Pt. Pelee, Ont. In copula July 14th and 15th.

H. melanderi Johns. A long series taken by Bro. Ouellet at La Trappe, Que., between June 9th and August 26th. In copula July 4th and August 24th.

H. pernotata Mall. Fairly common. July 9th - August 30th, La Trappe, Hull, Montreal, Lanoraie, Sully, Rigaud, Abbotsford, Que. Swept from basswood and spiraea.

x H. philadelphica Macqu. Common and widely distributed. June 22nd - September 3rd. Swept from basswood.

H. sheldoni Coq. Not common. Lanoraie, Que. July(Chaghon), Mer Bleue, Ont. August 9th(Walley) September 3rd (Brown.)

DESCRIPTIONS OF NEW SPECIES

Group Minettia obscura Loew.

This group contains a number of forms which are in-

separable except on the basis of the genital structures. These, however, are so distinct and so free from individual variation and intergradation that the forms must be given specific status. The only other american species described in this group, besides Loew's species is americana Malloch. Its author separated it from obscura on the basis of the number of dorsocentral bristles (4 pairs for americana and 3 for obscura). My material does not entirely bear out this distinction, for I have series of the species in this group, including americana, which contain specimens having either 3 or 4 pairs of dorsocentrals, the presutural pair being sometimes as strong as those behind it, sometimes much weaker and sometimes entirely absent.

The chief characters common to all members of this group are as follows: - Ground color of head, thorax, and abdomen black; frons opaque, centrally faintly brownish pruinose elsewhere grayish pruinose, on the ocellar triangle and at the bases of the frontal bristles more distinctly shining, anterior margin reddish; two black stripes extending laterally from the antennal bases to the eyes; face, especially the parafacials, silvery pollinose; genal and occipital regions grayish pruinose; mouthparts shining black; antennae opaque, deep fuscous or black, except the bases of the aristae and third segments which are reddish brown, arista short plumose, third segment oval, twice as long as wide; thorax more or less opaque, faintly gray pruinose, a median vitta and two lateral vittae on the lines of the dorsocentrals more distinctly pruinose; humeri rather bare and shining; abdomen shining black, including genitalia;

legs shining black, except the middle and hind tarsi which are pale yellowish testaceous; preapical dorsal bristles usually absent from hind tibiae, when present, they are very small; wings with a luteous tinge, blackened at the bases; knobs of halteres black, the stalks brownish or yellowish testaceous; all bristles and hairs on body and legs black; length 3 - 4 mms.

Minettia americanella n.sp. (Figs. 4,5,6)

Male and female genital characters as in the key and Figs. 4, 5 and 6.

Holotype, male, July 16th, 1918, Joliette, Que., coll. by Bro. J. Ouellet. No.4261 Canadian National Collection, Ottawa. (Genitalia mounted separately.)

Allotype. June 14th, 1937, Abbotsford, Que.

Paratypes. Males, Oka, Que., May 24th, 1921, Montreal, Que., June 21st, 1918 (Ouellet. Genitalia mounted separately.) Abbotsford, Que., June 14th, 1937. Females, Abbotsford, June 4th, 1937. (Paratypes deposited in the American Museum of Natural History, New York, and in the Entomology Department, Macdonald College, Que.)

Minettia lobata n.sp. (Figs. 7,8,9)

Male and female genital characters as in the key and Figs. 7, 8 and 9.

Holotype, female, June 6th, 1927, Fairy Lake, Que., No.4259 Canadian National Collection, Ottawa.

Allotype, same date and locality (Types separated while in copula.)

Paratypes, Males, Outremont, June, Joliette, July. (Ouellet). Abbotsford, June 15th (Genitalia mounted separately), Abbotsford, May 31st, June 4th, 14th. Females, Montreal, June 11th, St. Hilaire, June 22nd. (Ouellet). Covey Hill, June 6th (Armstrong). Abbotsford, June 4th, 5th, 14th. (Paratypes deposited in the American Museum of Natural History, New York, in the Entomology Department, Macdonald College, Que., and in the Dominion Entomological Laboratory, Hemmingford, Que.)

Minettia lyraformis n.sp. (Figs. 10,11,12)

Male and female genital characters as in the key and Figs. 10, 11 and 12.

Holotype, male, June 14th, 1937, Abbotsford, Que. No.4260, Canadian National Collection, Ottawa.

Allotype, same date and locality.

Paratypes. Males, Joliette, Que., July 7th, Montreal, May 21st (Ouellet). Niagara Glen, Ont., June 2nd (Walley) (Genitalia mounted separately.) Abbotsford, June 2nd, 28th (Paratypes deposited in the American Museum of Natural History, New York, and in the Entomology Department, Macdonald College, Que.)

M. obscura Loew, according to the evidence afforded by Malloch's (18) figure of the male genitalia, does not occur in this region. It is possible, however, that one of the species

described above will be found to be synonymous with Loew's species. It is certain that these new species are at present contained in many collections under the names obscura or americana. All are apparently common and widely distributed and live in close association with each other in nature.

Sapromyza hemmingfordensis n.sp. (Fig.34)

Male: Ground color dark; head slightly broader than thorax at humeri; frons opaque, brownish pollinose, around the ocellar triangle and along the edges of the eyes grayish pollinose in some lights, above the antennal bases dark reddish; face conspicuously retreating, grayish pollinose, parafacials and cheeks with a silvery sheen, the latter one third the height of the eyes, with two semi-circular chocolate - colored spots on the oral margin above the clypeus which is dark brown and prominent; mouth parts dark brown, palpi black; two dark brown bars from antennal pits to eyes; antenna and arista dark brown; occiput grayish pollinose, with two silvery areas between the paracephalic sutures. Thorax anteriorly including the humeri, between the acrosticals and dorsocentrals, and laterally except on the mesopleurae, grayish (very slightly brownish) pollinose, elsewhere brownish pollinose; scutellum grayish pollinose; three pairs of dorsocentrals; acrostical hairs strong, in two rows, slightly closer to each other than to dorsocentrals.

Abdomen grayish pollinose including genital segments; eighth abdominal tergite not very large, its postero-

lateral corners normally directed downward, rounded, without processes; cerci very small, concealed by the eighth tergite in lateral view; superior forceps very small, also normally concealed by the eighth tergite, consisting of two median, shining black, closely appressed, anteriorly curved processes; penis entirely chitinous, dark brown, shining, dorsoventrally flattened (see Fig. 34). Legs uniformly dark brown, the femora distinctly, the tibiae faintly grayish pollinose. Wings a little more than twice the length of the abdomen, faintly luteous, the bases reddish brown, the veins dark brown. Halteres reddish brown. Length 4 mms.
Type, male, Hemmingford, Que., March 17th, 1927, coll. by G. H. Hammond. Described from a specimen labelled S. brachysoma Coquillett, lent to me by Dr. Curran. It seems unlikely that it is brachysoma, differing, as it does, quite radically from Coquillett's description of that species. Type returned to Dr. Curran.

Group Sapromyza annulata Melander

In this group, which contains also pictiventris Mall. and browni Curr., there is a comb of minute setulae on the anteroventral surface of the fore femur. S. ouelleti n.sp. is very close to browni Curr., being distinguished from it only by its slightly darker color and the male genital structures. S. spatulata n.sp. is easily distinguished from the other species in the group by its almost immaculate legs and the absence of brown spots at the bases of the bristles of the abdomen. In its small size and general coloration it is

closest to pictiventris Mall.

Sapromyza ouelleti n.sp. (Figs. 16,17)

Characters of the head, thorax, abdomen, and legs identical with those given by Curran (5) for S. browni. Genital characters of male as in the key and Figs. 16, 17. Holotype, male, Sully, Que., June 24th, 1936. Coll. by Bro. J. Ouellet. (Genitalia mounted separately). No.4253, Canadian National Collection, Ottawa.
Allotype, same locality, June 1st, 1936.
Paratypes. 1 male, 5 females, one copulating pair (July 2nd) from Sully, Que. Also 5 males, August,17th, Kazubazua, Que. June 7th, Lethbridge, Alta., May 26th, Agassiz, May 19th, Kaslo, June 17th Salmon Arm, B.C. (Paratypes deposited in the American Museum of Natural History, New York, and in the Entomology Department, Macdonald College, Que.)

Note: In browni Cur., the posterior productions at the tips of the inferior forceps may sometimes be greatly elongated so that this structure appears the same as in annulata Mel. Similarly, there is sometimes a distinct angularity or slight process on the posterior edge of the same structure in ouelleti, near the apex, making it appear similar to browni. In these cases, the evidence of the shape of the superior forceps and penis must be considered as these structures appear to be very constant.

Sapromyza spatulata n.sp. (Figs. 25,26)

Male: Ground color of head yellow, cinereous pollinose, more bluish pollinose on the ocellar triangle and lines joining the frontal and median vertical bristles, between the frontal bristles brownish yellow; the ferrugineous-yellow median vittae rather indistinct; a large crescent-shaped or subtriangular yellow area on the front above the antennal bases; cheeks with a brownish bar from the ventral edge of the eyes to the oral margin; proboscis and palpi pale reddish yellow; antennae yellow, arista brownish. Thorax distinctly and uniformly pale bluish pollinose as in pictiventris Mall., this blue tinge much more evident than in browni and ouelleti; the four thoracic vittae dark brown, almost blackish, the median pair evanescent before reaching the scutellum; disk of scutellum concolorous with the thorax, the median thoracic vittae continued on it rather faintly, its edge yellow; four pairs of dorsocentrals; acrostical hairs in four rows.

Abdomen pale yellow, faintly cinereous pollinose; second segment with two large lateral brownish spots, third to sixth segments each with four large spots. Genital structures as in the Key and Figs. 25, 26. Legs uniformly pale yellowish, the tip of the posterior femora anteriorly with a small brownish spot; squamae and halteres pale yellowish; wings without luteous tinge; length 2.5 mms.

Female: unknown

Type, male, Abbotsford, Que., June 2nd, 1937. No.4254, Canadian National Collection, Ottawa.

Paratypes, four males, June 4th, 1937, same locality (one with genitalia mounted separately). (Paratypes deposited in the American Museum of Natural History, New York, and in the Entomology Department, Macdonald College, Que.)

Group Sapromyza quadrilineata Loew.

In this group, the comb of setulae on the fore femur is absent. In all the known members, the male genital structures are large, the inferior forceps being especially strongly developed and offering excellent characters for separation of the species.

Sapromyza aspinosa n.sp. (Figs.20,21)

Male. Ground color of head pale yellowish testaceous; front cinereous pollinose, the bluish tinge distinct, laterally along the margins of the eyes silvery white pollinose, the median vittae dark brown and broad, anterior edge above the antennal bases sometimes yellowish; face faintly cinereous pollinose, latero-ventrally grayish, the parafacials silvery white pollinose; cheeks with dark brown spots between the eyes and oral margin; proboscis brownish yellow; palpi dark brown; antennae pale yellowish testaceous, arista slightly darker. Thorax cinereous pollinose, the four thoracic vittae dark brown, rather narrow, the median pair more or less evanescent at the acrostical bristles; acrostical hairs in two complete median rows and an incomplete row on either side of these; disk of scutellum concolorous with thorax, the edge pale sand-colored, vittae on the

scutellum narrow, convergent posteriorly. Abdomen pale yellowish, maculations as in spatulata; genitalia as in the key and Figs. 20, 21. Legs pale yellowish, the tibiae narrowly banded with dark brown just beyond the basal third; halteres whitish yellow; wings with faint luteous tinge. Length 3 mms.

Female. Differs only sexually.

Holotype, male, La Trappe, Que., May 30th, 1936, coll. by Bro. J. Ouellet. (Genitalia mounted separately). No.4255, Canadian National Collection, Ottawa.

Allotype, same date, same locality.

Paratypes, two males, four females, same date and locality as types. (Returned to Bro. Ouellet.)

Sapromyza subserrata n.sp. (Figs.29,30)

Male and female. Characters of head, thorax and legs, and maculations of abdomen identical with those given for spatulata, except that in this species, the median thoracic vittae are somewhat broadened posteriorly and extend to the margin of the scutellum. The vittae on the scutellum are also broad and approximate. Male genitalia as in the Key and Figs. 29, 30. Length 3 - 3.5 mms.

Holotype, male, Abbotsford, Que., June 14th, 1937. No.4256, Canadian National Collection, Ottawa.

Allotype, same date, same locality.

Paratypes. Numerous specimens of both sexes from Covey Hill, Fairy Lake, La Trappe, Lauzon, Que.; Ottawa, Lake of Bays, Ont. May 29th - July 24th. (Paratypes deposited in

the American Museum of Natural History, New York, and in the Entomology Department, Macdonald College, Que.)

Sapromyza currani n.sp. (Figs.31,32)

Male. Characters, except genitalia, as in aspinosa and subserrata. Genitalia as in the key and Figs. 31, 32. Length, 3 mms.

Female. Unknown.

Type, male, Aylmer, Que., July 18th, 1924, coll. by Dr. Curran. (Genitalia mounted separately). No.4257, Canadian National Collection, Ottawa.

Sapromyza novaescotiae n.sp. (Figs.22,23)

Male. Characters, except genitalia, as in the above three species. Genitalia as in the key and Figs. 22, 23. Length, 3.5 mms.

Female. Unknown.

Type, male, Kentville, N.S., July 8th, 1923, coll. by R.P. Gorham. No.4258, Canadian National Collection, Ottawa. (Genitalia mounted separately.)

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EXPLANATION OF PLATES

PLATE I

Fig.1. Minettia americana, male genitalia, ventral view
Fig.2. " " " " , lateral view
Fig.3. " " , genital sternite of female, ventral view
Fig.4. Minettia americanella, male genitalia, ventral view
Fig.5. " " " " , lateral view
Fig.6. " " , genital sternite of female, ventral view
Fig.7. Minettia lobata, male genitalia, ventral view
Fig.8. " " " " , lateral view
Fig.9. " " , genital sternite of female, ventral view
Fig.10. Minettia lyraformis, male genitalia, ventral view
Fig.11. " " " " , lateral view
Fig.12. " " , genital sternite of female, ventral view
Fig.13. Minettia lupulina, male genitalia, ventral view
Fig.14. " " " " , lateral view
Fig.15 Minettia puncticeps, tip of abdomen of male, lateral view

PLATE II

Fig.16. Sapromyza ouelleti, male genitalia, ventral view
Fig.17. " " " " , lateral view
Fig.18. Sapromyza browni, " " , ventral view
Fig.19. " " " " , lateral view
Fig.20. Sapromyza aspinosa " " , ventral view, part of right side of penis omitted to show structure of inferior forceps
Fig.21. " " male genitalia, lateral view
Fig.22. Sapromyza novaescotiae, male genitalia, ventral view, part of left side of penis omitted to show structure of inferior forceps
Fig.23. " " Male genitalia, lateral view
Fig.24. Sapromyza rotundicornis, " " , ventral view

PLATE III

Fig.25. Sapromyza spatulata, male genitalia, ventral view
Fig.26. " " " " , lateral view
Fig.27. Sapromyza pictiventris" " , ventral view, part of left superior forceps removed
Fig.28. " " male genitalia, lateral view
Fig.29. Sapromyza subserrata, male genitalia, ventral view
Fig.30. " " " " , lateral view
Fig.31. Sapromyza currani, " " , ventral view
Fig.32 " " " " , lateral view
Fig.33. Sapromyza hyalinata, tip of abdomen of male, lateral view
Fig.34. Sapromyza hemmingfordensis, tip of abdomen of male, lateral view

PLATE IV

Fig.35. Homoneura conjuncta, male genitalia, lateral view
Fig.36. Homoneura bispina, " " " "
Fig.37. Homoneura citreifrons, " " " "
Fig.38. Homoneura sheldoni, " " " "
Fig.39. Homoneura compedita, " " " "
Fig.40a,
40b. Homoneura philadelphica " " " "
Fig.41. Homoneura ornatipes " " " "
Fig.42. Homoneura incerta " " " "

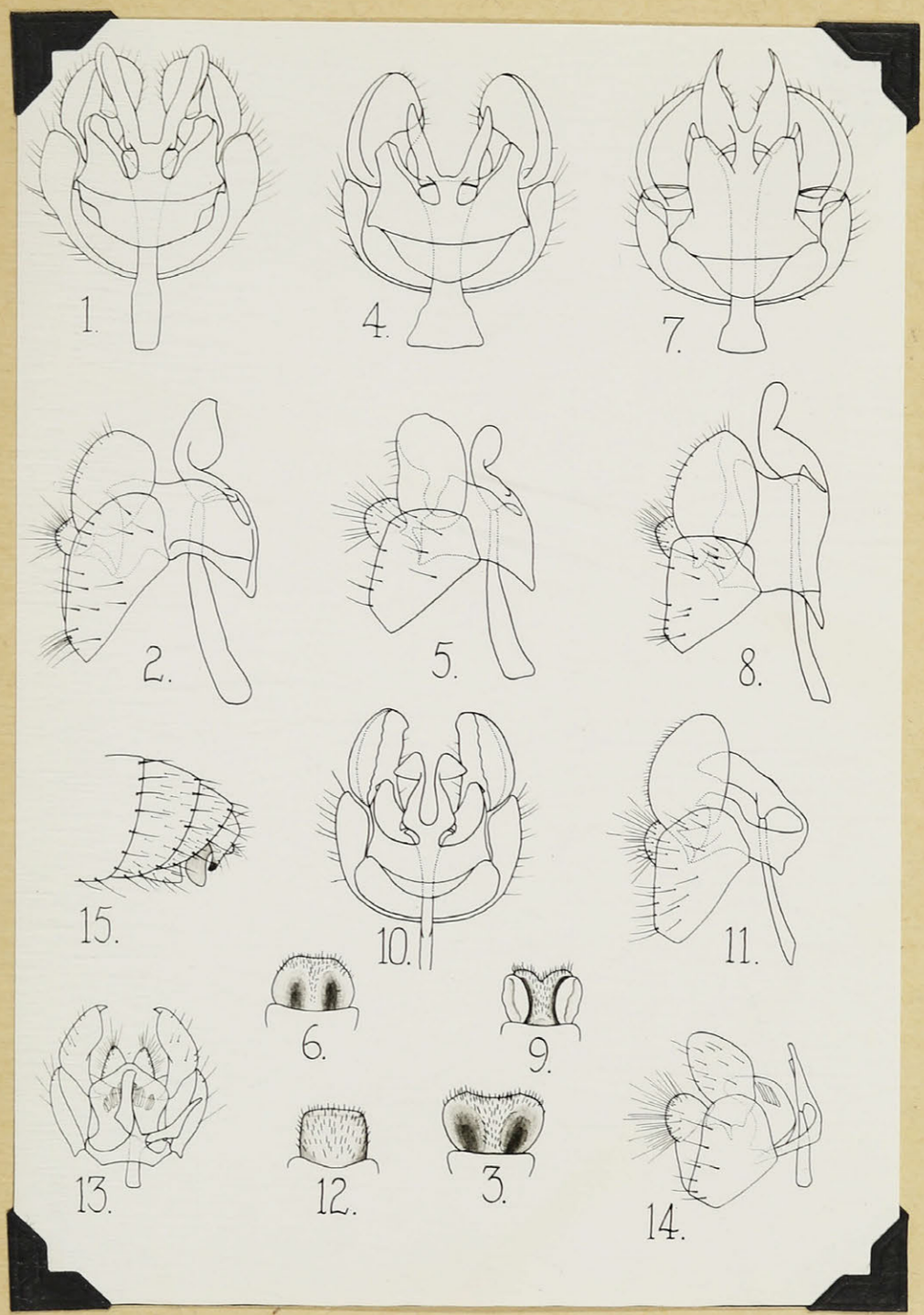
PLATE V

Fig.43. Homoneura disjuncta, male genitalia, lateral view
Fig.44. Homoneura melanderi, " " " "
Fig.45. Homoneura littoralis, " " " "
Fig.46. Homoneura Houghi, " " " "
Fig.47. Camptoprosopella vulgaris, male genitalia, ventral view
Fig.48. " " " " , lateral view
Fig.49. Camptoprosopella verticalis " " , ventral view
Fig.50. " " " " , lateral view
Fig.51. Lauxania cylindricornis, " " , ventral view
Fig.52. " " " " , lateral view
Fig.53. " " , superior forceps, variations in structure; a,b,c lateral, d,e,f ventral views
Fig.54. Pseudogriphoneura gracilipes, male genitalia, ventral view

PLATE VI

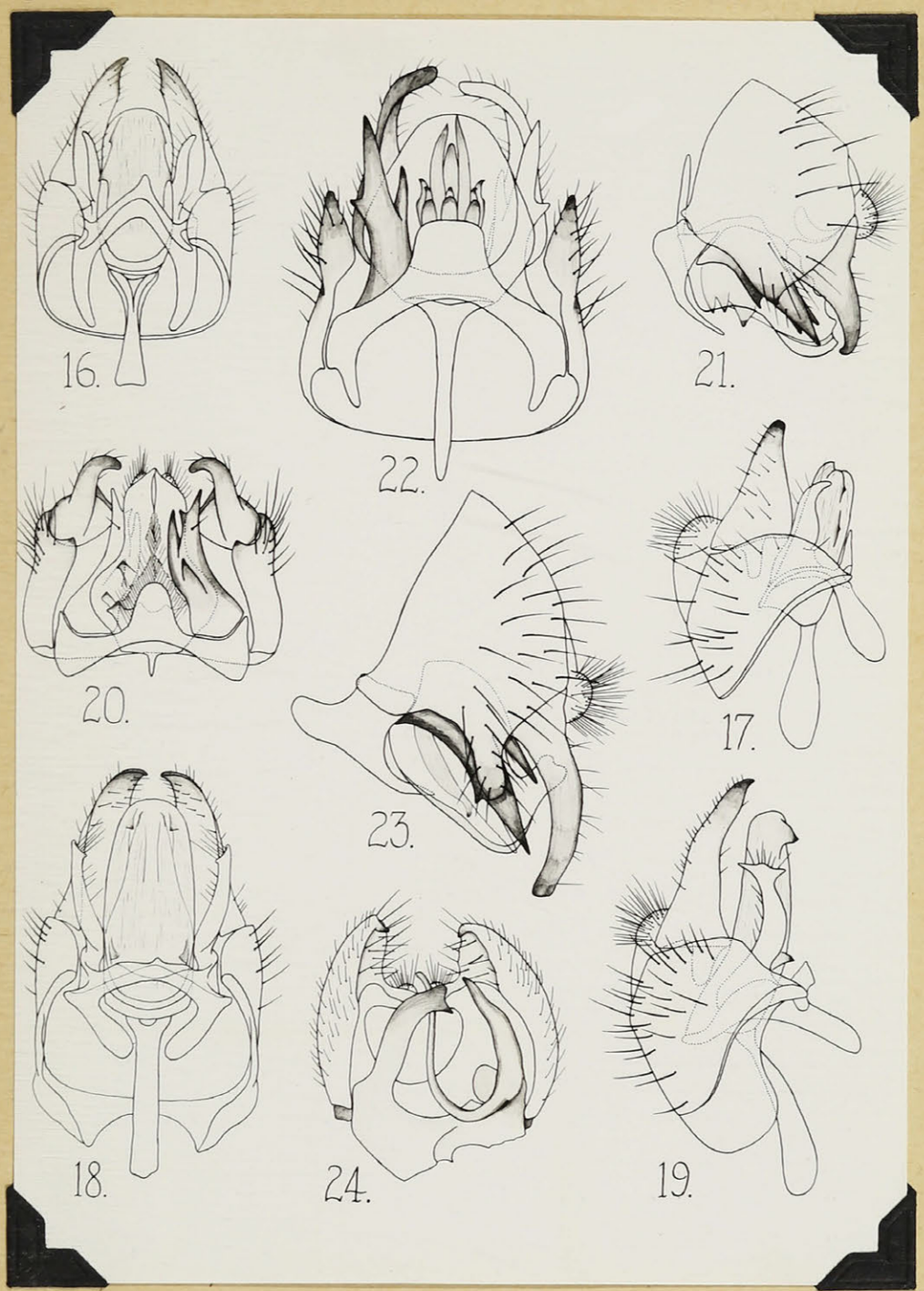
Fig.55. Homoneura compedita, wing
Fig.56. " incerta, "
Fig.57. " pernotata, "
Fig.58. " philadelphica, wing
Fig.59. " disjuncta, "
Fig.60. " Houghi, " , (female)
Fig.61. " citreifrons (female) and Homoneura conjuncta, wing
Fig.62. " sheldoni, wing
Fig.63. " melanderi , wing
Fig.64. " citreifrons, male, wing

PLATE I.



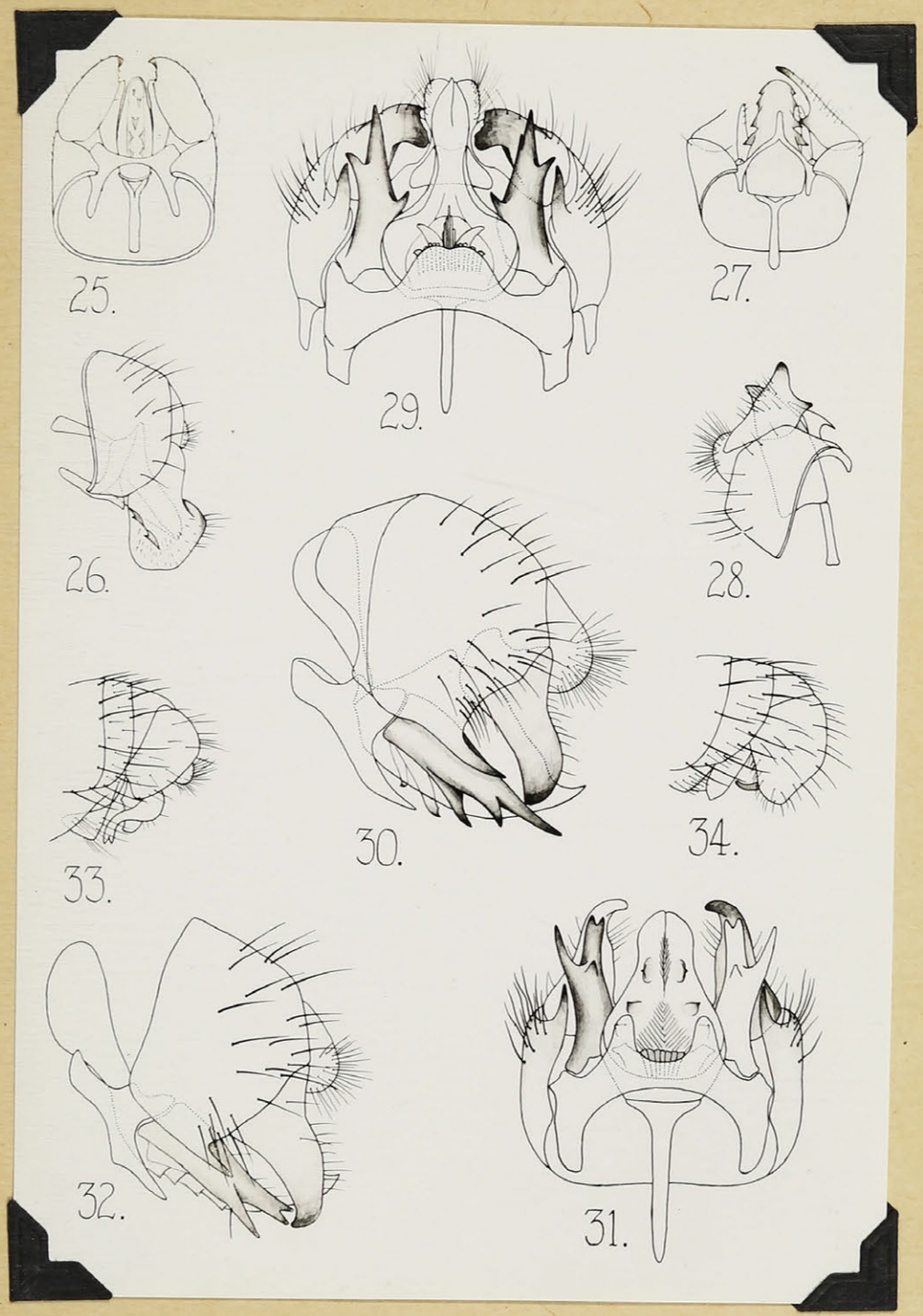
Canadian Lauxaniidae. Shewell.

PLATE II.



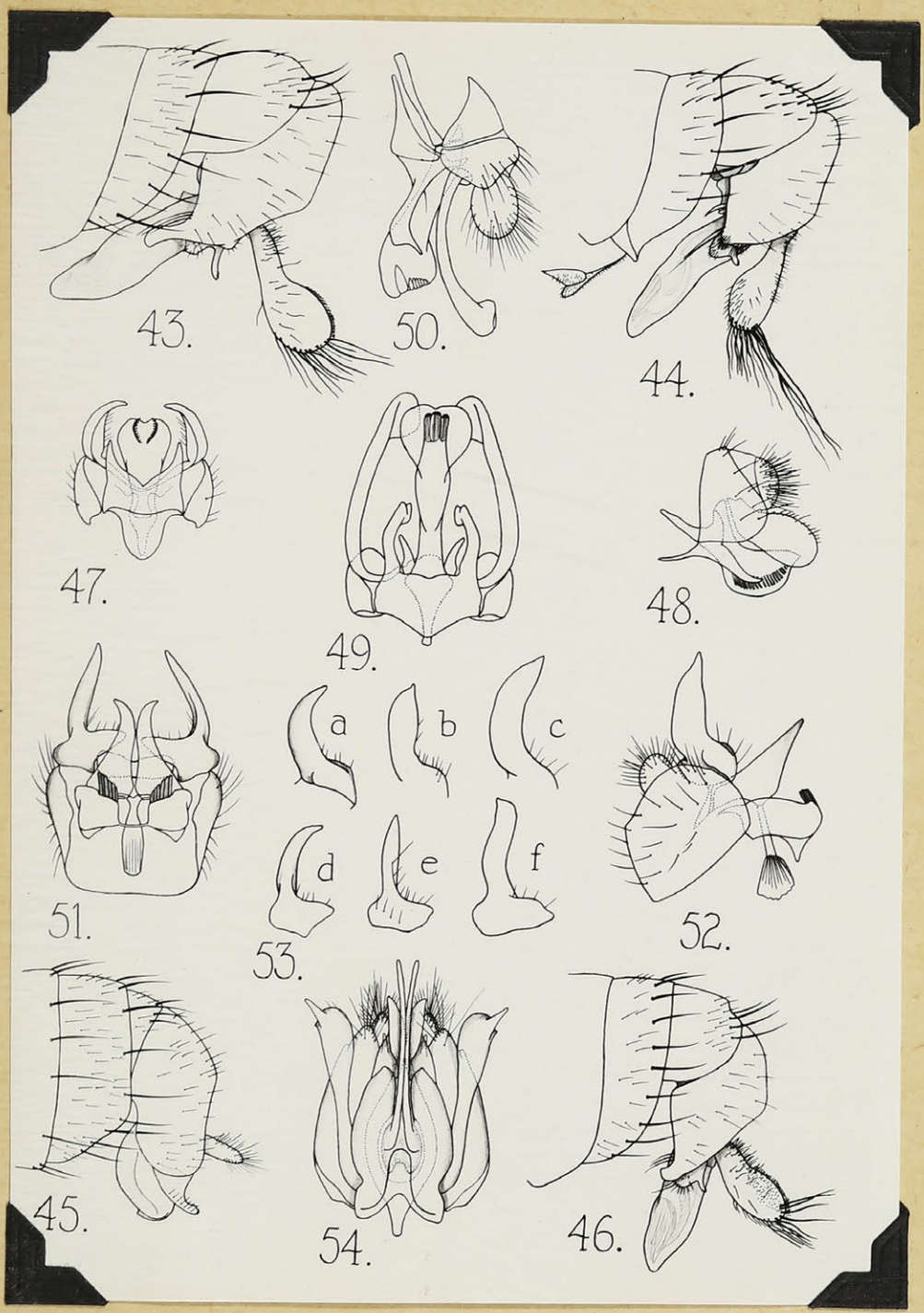
Canadian Lauxaniidae. Shewell.

PLATE III.



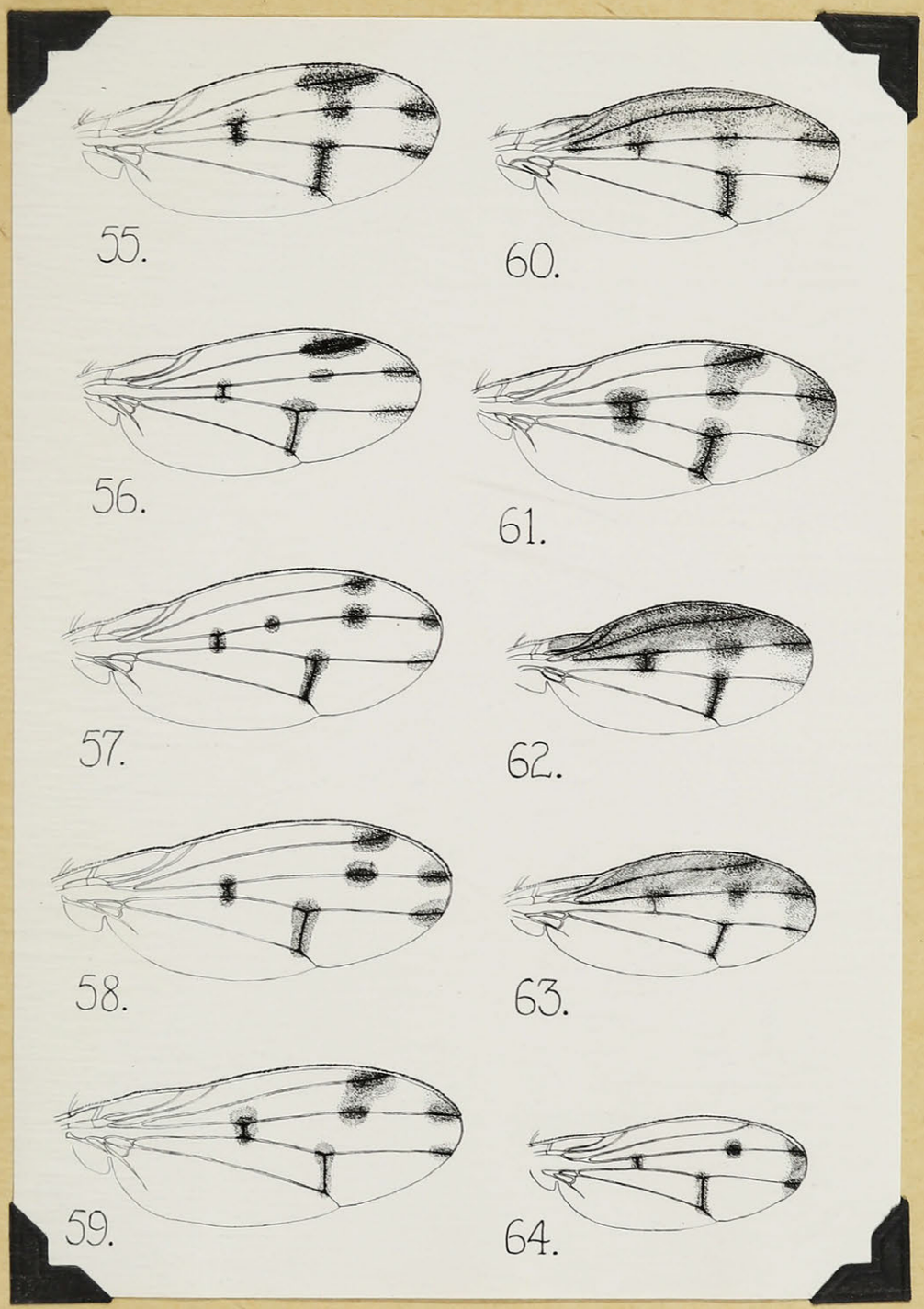
Canadian Lauxaniidae — Shewell.

PLATE V.



Canadian Lauxaniidae. Shewell.

PLATE VI.



Canadian Lauxaniidae. Shewell.