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The Canadian Entomologist.

VOL. XXX. LONDON, OCTOBER, 1898. NO. 10.

CLASSIFICATION OF THE HORNTAILS AND SAWFLIES, OR THE SUB-ORDER PHYTOPHAGA.

BY WILLIAM H. ASHMEAD, ASSISTANT CURATOR, DEPARTMENT OF INSECTS, U. S. NATIONAL MUSEUM.

(Paper No. 5.)

FAMILY IX.—SELANDRIIDÆ.

After the removal of the *Strongylogasterinæ*, which, to a certain extent, form a connecting link between this family and the Tenthredinidæ, but which, on account of their elongate shape and their cephalic and abdominal characteristics, I have placed with the latter family rather than retain here, there need be no difficulty in separating the *Selandriidæ* from all the other families by the characters made use of in my table.

The species have a peculiar *habitus* quite their own, and with a little care one may easily recognize a Selandriid without even the trouble of an examination.

The head is more transverse, the temples much narrower, not nearly so quadrate as in the Strongylogasterinæ; the antennæ are shorter, the scape or first joint not or rarely much longer than the pedicel or second joint; the wings are proportionately shorter and broader, the costal vein being much dilated or broadened towards the apex, before the stigma; while the abdomen is much shorter, broader and oviform.

I have separated the family into four subfamilies, distinguished as follows:

Table of Subfamilies.

Lanceolate cell petiolate (in only a single genus *Kaliosysphinga* = Pseudodineura, Konow, does it appear contracted, but in this genus the anal vein is faint or sub-obsolete before uniting with the submedian vein, while the anal cell in the hind wing is wanting)...Subfamily I., Blennocampinæ.

Lanceolate cell contracted before the middle, but still open, and sometimes with an oblique or transverse nervure between it and the apex.

Antennæ 4-jointed, the third joint very long, the fourth or last very minute ....Subfamily II., Blasticotominæ.

Antennæ 7-15-jointed (in a single case 22-jointed), the third joint not unusually long, often shorter or not longer than the fourth .... Subfamily III., Selandriinæ.

Lanceolate cell contracted at or a little before the middle, and completely closed .... Subfamily IV., Hoplocampinæ.

Subfamily I.—BLENNOCAMPINÆ.

The distinctly petiolated lanceolate cell in the front wings readily distinguishes this group. The anal vein is usually entirely wanting; in only two or three genera is it present, and with these genera some difficulty might arise in placing, since this vein curves upwards towards the submedian, and thus resembles somewhat the contracted lanceolate cell of the *Hoplocampinæ*. The vein, however, does not quite attain the submedian, and there is always a distinct space between them.

Table of Genera.

Front wings with four submarginal cells .... 4.

Front wings with three submarginal cells, the first transverse cubitus wanting, rarely with the second transverse cubitus wanting.

Hind wings with two discal cells .... 3.

Hind wings without discal cells .... 2.

2. Antennæ 11-14-jointed .... Fenella, Westw.

Antennæ 9-jointed.

Hind wings with a distinct anal cell .... Fenusa, Leach.

Hind wings without an anal cell .... Kaliosysphinga, Tischb.
(= Pseudodineura, Konow.)

3. Front wings with the second transverse cubitus wanting; head transverse; clypeus anteriorly truncate ...... Pelmatopus, Hartig.

Front wings with the first transverse cubitus wanting; head large, quadrate, the temples broad; clypeus anteriorly deeply emarginate; antennæ densely hairy, the third joint nearly as long as joints 4–5 united .... Xenapates, Cameron.

4. Second recurrent nervure joining the third submarginal cell ...... 5.

5. Eyes extending to base of mandibles or at most with only a linear space between .... 10.

Eyes more or less distant from base of mandibles, with a distinct space between .... 6.

6. Hind wings not surrounded by a bordering nervure at apex ...... 7.

Hind wings surrounded by a bordering nervure at apex.

No discal cell in hind wings; claws bifid or with a tooth within.

Anal cell in hind wings shorter than the submedian, petiolate or subpetiolate. ♂ .... Periclista, Konow.

Anal cell in hind wings fully as long as the submedian. ♂ .... Isodyctium, Ashm.

7. Hind wings without a closed discal cell........................ 9.

Hind wings with a closed discal cell.

Claws simple, or with a very minute, scarcely perceptible tooth within........ .... 8.

Claws cleft, or with a large tooth within.

Anal cell in hind wings shorter than the submedian cell.

Transverse median nervure in hind wings received by the discal cell at or somewhat *beyond* the middle; sheaths of ovipositor equally thickened and more or less obliquely pointed at apex; third joint of antennæ almost as long as joints 4–5 united. ♀ .... Periclista, Konow.

Transverse median nervure in hind wings received by the discal cell *before* the middle; sheaths of ovipositor produced at apex into a thorn-like tip. ♀ .... Ardis, Konow.

Anal cell in hind wings as long as the submedian. ♀ .... Isodyctium, Ashm.

8. Third joint of antennæ longer than the fourth; sheaths of ovipositor at tips obtuse........................ Pareophora, Konow.

Third joint of antennæ a little shorter than the fourth, never longer; sheaths of ovipositor at tips rounded; clypeus anteriorly truncate........................ Rhadinoceræa, Konow.

9. Anal cell in hind wings as long as the submedian. ♀ .... Isodyctium, Ashm.

Anal cell in hind wings shorter than the submedian. ♂ .... Ardis, Konow.

10. Præsternum of mesosternum not at all separated by a suture.... 11.

Præsternum of mososternum separated by a distinct suture; clypeus anteriorly truncate; hind wings with one discal cell, the anal cell shorter than the submedian; claws long, simple......... .... Tomostethus, Thomson.

11. Hind wings with one discal cell................ .... 15.

Hind wings without a discal cell.

Hind wings with the marginal cell pointed at apex, and sometimes open...... ....14.

Hind wings with the marginal cell well rounded at apex, *without* an appendage; *a surrounding nervure at apex*..... 13.

Hind wings with the marginal cell well rounded at apex, but *with* an appendage; *no surrounding nervure at apex*....12.

12. Third transverse cubitus curved inwardly, not extending in the same direction with the transverse radius, the third submarginal cell considerably larger than the first and second united; antennæ densely pilose, tapering towards tips, the third joint longer than the fourth; claws cleft. ♀ ♂ .. ..Parazarca, Ashm.

Third transverse cubitus straight, or nearly so, running in the same direction with the transverse radius; antennæ pubescent, the third joint nearly as long as joints 4–5 united.

Claws cleft or bifid; anal vein in front wings straight, not curving upwards at tip; transverse cubitus in hind wings not short, the anal cell somewhat briefly petiolate. ♀ ....Erythraspides, Ashm.

Claws simple; anal vein in front wings curving upwards at tip; transverse cubitus in hind wings very short, the anal cell longly petiolate. ♀ ♂ ....Blennacampa, Hartig.

13. Third transverse cubitus curved inwardly, not extending in the same direction with the transverse radius, divergent; third submarginal cell larger than the first and second united; pedicel as long as the scape, about thrice as long as thick at apex. ♂ ....Calozarca, Ashm.

Third transverse cubitus straight, or nearly so, and running in the same direction with the transverse radius; third submarginal cell hardly larger than the second, much smaller than the first and second united; pedicel shorter than the scape, only a little longer than thick. ♂ ....Erythraspides, Ashm.

14. Third transverse cubitus in front wings not running in the same direction with the transverse radius; marginal cell in hind wings *with* an appendage; third joint of antennæ much shorter than joints 4–5 united; claws with a small tooth within..............................Scolioneura, Konow.

Third transverse cubitus almost interstitial with the transverse radius and having the same direction; marginal cell in hind wings *without* an appendage, sometimes open at apex; claws with a strong tooth at base.......................Entodecta, Konow.

15. Hind tarsi usually longer than their tibiæ; clypeus very small, transverse linear; antennæ densely pilose, the third joint longer than the fourth; anal cell in hind wings a little shorter than the submedian. ♀ ♂ ....Zarca, Cameron.

Hind tarsi not longer than their tibiæ; clypeus not unusually small, anteriorly subemarginate or truncate.

Antennæ pubescent, the third joint distinctly longer than either the fourth or fifth.

Third submarginal cell longer than 1–2 united; antennæ densely pilose, tapering off toward tips, the third joint about as long as 6–9 united........ Calozarca, Ashm.

Third submarginal cell not longer than 1–2 united; antennæ pubescent, the third joint not longer than 4–5 united.

Claws cleft; transverse radius and the third transverse cubitus running in the same direction; larvæ with forked spines.......Monophadnoides, Ashm., n. g. (Type M. rubi, Harris.)

Claws simple, or with a minute tooth near the middle; transverse radius and the third transverse cubitus *not* running in the same direction, divergent; larvæ smooth..................Monophadnus, Hartig. (Type T. albipes, Gmel.)

Antennæ clothed with long appressed hairs, the third and fourths joints equal, the fifth longer, all somewhat thickened toward tips..........................Senoclia, Cameron.

Subfamily II.—Blasticotominæ.

This group is confined to Europe, and is represented by a single genus, with one species, the *Blasticotoma filiceti*, Klug. The species in some of its characters, especially in the antennæ, is quite anomalous. It has been shifted from one place to another by different authorities, but to me seems to belong to the Selandriidæ. The shape, especially of the head and thorax, agrees quite closely with such genera as *Rhadinoceræa*, *Phymatocera* and *Tomostethus*, while the venation agrees fairly well with many other of the Selandriidæ, the only real difference being in the more distinctly petiolated first discoidal cell, caused by the cubitus originating farther away from the apex of the basal nervure than is

-sual. The first discoidal cell in *Athalia annulata* is, however, similarly petiolated. The antennæ alone, therefore, offer any very striking difference: They are four-jointed, the third joint being very long, the fourth or last very minute. At first sight they appear wholly different from other sawflies, and I was almost inclined to consider them of family value, as I have the three-jointed antennæ in the Hylotomidæ; but on submitting them to a high-power lens I was able to see that the long third joint was resolvable into seven indistinct annulations, caused by the amalgamation of seven distinct joints. This discovery demonstrated that the antennæ were originally, in ages long past, 10-jointed, and had an affinity with such genera as *Athalia* and Phyllotoma. I therefore consider *Blasticotoma* to be an anomalous Selandriid. Like *Athalia*, it probably had its origin in the tropics, and has been changed structurally in its struggle for existence in a colder clime.

In addition to the 4-jointed antennæ, the genus may be further distinguished by the following characters:

Hind wings with two discal cells; claws with a small tooth within: ovipositor subexserted.....................Blasticotoma, Klug.

Subfamily III.—SELANDRIINÆ.

This subfamily differs from the others, except the *Blasticotominæ*, by having the lanceolate cell, in the front wings, contracted a little before the middle, but still open, *the contracted part not quite attaining to the submedian vein.* This cell is also sometimes divided by an oblique or transverse nervure between this contraction and its apex, a character frequently found in the *Strongylogasterinæ*, and thus some Selandriines might be easily mistaken for species in that subfamily. The Strongylogasterines, however, are always distinguished by the more elongate shape, the larger, more quadrate head, longer antennæ, longer scape, and by the more distinct costal cell, the costal vein being slenderer, not so much thickened towards apex.

The number of joints in the antennæ, 9–22, readily separate the *Selandriines* from the *Blasticotominæ*. The abdomen is always short, oviform, the head transverse, the temples rather narrow; the vertex, seen from the side, convexly rounded from the ocelli to the base of antennæ; there is no well-marked furrow or groove between the antennæ and the eyes, as in the *Tenthredinidæ*, while the scape is small, not or scarcely larger than the pedicel.

The genera may be readily recognized with the aid of the following table:

Table of Genera.

Antennæ 9-jointed..3.

Antennæ more than 9-jointed (10- to 22-jointed).

Front wings with four submarginal cells, the second and third each receiving a recurrent nervure....................................2.

Front wings with three submarginal cells, the first transverse cubitus absent or indistinct.

Antennæ 10-15-jointed; hind wings with one discal cell..............................Phyllotoma, Fallen.

2. Hind wings with one discal cell.

Antennæ 10-15-jointed.................. ......Phyllotoma, Fallen.

Hind wings with two discal cells.

Antennæ 10-11-jointed. ♂ ♀ ....Athalia, Leach.

Antennæ 22-jointed. ♂ .... Hennedyia, Cameron.

3. Lanceolate cell with an oblique or transverse nervure between the contraction and the apex...... ....4.

Lanceolate cell without such a nervure.

Front wings with four submarginal cells. the costal vein much thickened before the stigma; hind wings with two discal cells.

Anal cell in hind wings as long or a little longer than the submedian cell; cubitus in front wings strongly angularly bent at its origin; claws strong, simple........Selandria, Klug.

Anal cell in hind wings shorter than the submedian; cubitus in front wings not angularly bent at its origin; claws with a median tooth beneath.........Paraselandria, Ashm., n. g.
(Type S. flavens, Klug.)

4. Eyes not extending to base of mandibles.......................7.

Eyes extending to base of mandibles.

Hind wings with two discal cells..........................6.

Hind wings with one discal cell.......................... 5.

Hind wings without a discal cell.

Hind wings with a surrounding nervure at apex, the anal cell shorter than the submedian; claws simple.

♂ ....Periclistoptera, Ashm., n. g.
(Type M. alba, Nort.)

Hind wings without a surrounding nervure at apex, the anal cell shorter than the submedian; claws simple.

♀ ....Periclistoptera, Ashm.

5. Anal cell in hind wings shorter than the submedian, petiolate at apex, claws with a large triangular tooth at base.............. .... Endelomyia, Ashm., n. g.
(Type M. rosæ, Harris.)
6. Anal cell in hind wings as long as the submedian; claws simple or with a small tooth within. ♀ ♂ ....Caliroa, Costa.
(= Eriocampoides, Konow.)
(Type E. cinxia, Klug., = C. sebetia, Costa.)
Anal cell in hind wings shorter than the submedian; claws cleft...............................Eriocampa, Hartig.
7. Front wings with three submarginal cells, the first transverse cubitus wanting......................... ....10.
Front wings with four submarginal celis............. ....8.
8. Hind wings with one discal cell..............................9.
Hind wings with two discal cells; claws simple..........................Eriocampidea, Ashm, n. g.
(Type E. arizonensis, Ashm.)
Hind wings without a discal cell.
Hind wings with a bordering nervure at apex...........................Tetratneura, Ashm., n. g.
(Type M. ignota, Nort.)
9. Anal cell in hind wings as long or a little longer than the submedian cell. ♀...............................Tetratneura, Ashm.
Anal cell in hind wings shorter than the submedian, petiolate at apex; claws with a tooth beyond the middle..Pœcilostoma, Dahbb.
(= Monostegia, Costa.)
10. Hind wings with one discal cell.
Anal cell in hind wings shorter than the submedian; claws with a long acute median tooth. ....Pœcilostomidea, Ashm., n. g.
(Type P. maculata, Nort.)

Subfamily IV.—Hoplocampinæ.

This subfamily is at once separated from the others by the distinctly contracted lanceolate cell in the front wings, the contracted part, unlike the Selandriinæ, *extending to and uniting with the submedian vein.* The genera are not numerous, and may be separated as follows:

Table of Genera.

Four submarginal cells, the second and third each receiving a recurrent nervure; hind wings with two discal cells.

Claws simple. ....3.
Claws cleft or with a tooth near the middle ....2.
2. Claws deeply cleft; labrum anteriorly truncate or subemarginate; first joint of flagellum distinctly longer than the second........ ....Zaschizonyx, Ashm., n. g.
(Type H. montana, Cr.)
Claws with a small tooth beneath, a little beyond the middle; labrum anteriorly rounded, semicircular; first joint of flagellum a little shorter than the second, rarely somewhat longer..........................MacGillivraya, Ashm., n. g.
(Type M. oregonensis, Ashm.)
3. Anal cell in hind wings longly petiolated; labrum anteriorly rounded; first joint of flagellum not or scarcely longer than the second..............................Hoplocampa, Hartig.

NOTE ON THE LARVA OF MELANOMMA AURICINCTARIUM, GROTE

This genus will have to be transferred to the Noctuidæ.

Larva cylindrical, feet normal on joints 7–10, 13, about equally developed. Tubercles minute, setæ long, fine, iv. opposite the lower edge of the spiracle, a little nearer to v. than to iii., and rather far behind the spiracle; setæ single, several on the smooth leg plates. Segments obscurely 5-annulate. All green; spiracles small, brown; no marks; cervical shield and anal plate uncornified, invisible. (Head broken off.) Feeds on "hockelberry" (Vaccinium ?).

Washington, D. C., colls. U. S Nat. Museum.

The larva resembles the Deltoids.

The moth is a Noctuid in venation. In Hampson's tables (which I recommend American students of Noctuidæ to study) I make it fall in the Palindiinæ near the genus *Homodes*, from which it differs in that vein 7 of fore wings does not join the stalk of 8–9 to form an accessory cell, while the third joint of palpi is rather long. Dr. Hulst's account of the genus (Trans. Am. Ent. Soc., XXIII., 294) seems to me erroneous, as I find veins 8–9 long stalked, and 6 arising well above the middle of cell.

HARRISON G. DYAR.

PAPILIO AJAX.—Mr. C. Troxter, Sr., Louisville, Ky., reports that on the 7th of May last a female P. ajax emerged from its chrysalis, which had been kept in a cellar all winter, with all the red on its wings replaced by yellow.

NOTES ON SOME ONTARIO ACRIDIIDÆ.

BY E. M. WALKER, TORONTO, ONT.

(Continued from page 126.)

III.—ŒDIPODINÆ.

10. Arphia sulphurea, Fabricius.

Gryllus sulphureus, Fab. Species Insectorum, I., 369 (1781).

Acrydium sulphureum, Palisot de Beauvois. Ins. d'Afr., et d'Am., 145 (1817).

Œdipoda sulphurea, Burm. Handbuch, II., 643 (1838).

Locusta sulphurea, Harr. Ins. Inj. to Veg., 177 (1862).

Tomonotus sulphureus, Sauss. Rev. et Mag. de Zool., XIII., 321 (1862).

Arphia sulphurea, Sauss. Prodromus Œd. Ins., etc., 71 (1884).

This species is one of the earliest to appear in the spring, making itself conspicuous on the wing by its bright yellow wings and rattling stridulation. It is quite common about Toronto in open, sandy, uncultivated lands, especially where these are scattered with low bushes and scrubby trees. I have never seen it about Lake Simcoe, though there are spots there which would apparently make a suitable home for it.

My earliest capture of the full-winged insect was on May 16th, 1896, though it probably appears some days before that.

I think it very probable that *Arphia xanthoptera*, Germ., is also found in Ontario, but have not as yet seen a specimen from here.

11. Chortophaga viridifasciata, DeGeer.

Acrydium viridifasciatum, DeG. Memoires d'Ins., III., 498 (1773).

Gryllus virginianus, Fab. Syst. Entom., 291 (1775).

Locusta (Tragocephala) viridifasciata, Harr. Ins. Inj., 182 (1862).

" " *infuscata*, Harr. Loc. cit., 181 (1862).

" " *radiata*, Harr. Loc. cit., 183 (1862).

Tragocephala viridifasciata, Thos. Syn. Acrid., 103 (1873).

" *infuscata*, Thos. Loc. cit., 102 (1873).

Chimarocephala viridifasciata, Scudd. Proc. Bost. Soc. Nat. Hist., XIX., 89 (1876).

Chortophaga viridifasciata, Sauss. Prod. Œd., etc., 72 (1884).

This is the first of our locusts, except the Tettiginæ, to make its appearance in the spring. The young are sometimes extremely abundant in the fall, but large numbers perish during the winter, and though often numerous in early spring, they are much reduced in numbers. They may be seen in sunny sheltered spots quite early in the spring and complete their last transformation about the first or second week in May. They are found until about the middle of July, but are commonest in May and early June.

This species is the least particular about its haunts of all our Œdipodinæ, appearing in open grassy places of almost any kind, whether the soil be a sandy or a clayey one. It seems to be very generally distributed in Southern Ontario. I have seen it at Hamilton, Grimsby, Toronto, DeGrassi Pt., and Clear Lake, Peterborough Co.

The males are almost always of the brown form, *infuscata*, green examples being quite rare. I have, in fact, taken but three specimens of the latter. Of the females, on the other hand, the majority are green, but the relative proportion of the two forms is not nearly so unequal as with the males.

12. Encoptolophus sordidus, Burmeister.

Œdipoda sordida, Burm. Handbuch der Entom., II., 643 (1838).
Locusta nebulosa, Harr. Ins. Inj., 181 (1862).
Encoptolophus sordidus, Burm. Scudd., Proc. Bost. Soc. Nat. Hist., XVII., 479 (1875).

A very local species in Ontario. I have taken only three specimens, 2 ♀ and 1 ♂, at Toronto, and have never seen it about Lake Simcoe. I found it, however, very abundant at Niagara, Sept. 11th, 1893, and its rattling stridulation could be heard from the trolley window all along the line between Niagara Falls and Queenston Heights. My Toronto specimens were taken on the following dates: About Sept. 10, 1892, 1 ♀; Sept. 21, 1896, 1 ♀; Oct. 17, 1897, 1 ♂. It is most commonly found in dry upland pastures.

13. Camnula pellucida, Scudder.

Œdipoda pellucida, Scudd. Bost. Jour. Nat. Hist., VII., 472 (1862).
Œdipoda atrox, Scudd. Ap. Hayden Geol. Survey of Nebraska, 253 (1872).
Camnula pellucida, Sauss. Prod. Œd., etc., 81 (1884).

This is a very abundant grasshopper in many parts of Ontario, especially towards the north. At DeGrassi Pt. it sometimes occurs in positive swarms, rising up from the grass by the dozens at every step. It is not usually as numerous as this, however, though always one of our commonest grasshoppers. At Toronto it is much less abundant. It prefers dry, grassy upland pastures, but is also commonly found in other dry situations, such as burnt woods on sandy soil.

I have taken the full-winged insect from June 24 till about the beginning of October, but it is not usually seen until July, and specimens taken in late September are apt to be ragged at the tips of the tegmina and wings. I have specimens from Nepigon, Lake Superior, Aug. 27, 1897; Clear Lake, Peterborough Co., July 7 and 16, 1897; DeGrassi Pt., Lake Simcoe, July to late September; Toronto, June and September. West of Ontario, I have taken it at various points along the Canadian Pacific Railway from Manitoba to Vancouver Island.

14. Hippiscus tuberculatus, Palisot de Beauvois.

Acrydium tuberculatum, Pal. de Beauv. Insectes d'Afr. et d'Amer., 145 (1817).

Locusta corallina, Harr. Ins. Inj. to Veg., 176 (1862).

Œdipoda phoenicoptera, Thos. Syn. Acrid., 135 (1873).

Hippiscus phoenicopterus, Thos. Ninth Rep. State Ent., Ill., 117 (1880).

Hippiscus tuberculatus, Sauss. Prod. Œd., etc., 87 (1884).

The "Coral-winged Locust" is rather local in Ontario as far as my experience in collecting goes. Where it does occur, however, it forms colonies of considerable size. It is quite numerous in certain spots about Toronto, but this is the only locality where I have met with it. Dr. Saunders says it is common at London, and Mr. Scudder reports it from Nepigon.

There is a great disparity in the relative number of individuals of the two sexes. Since 1893 I have seen probably more than one hundred males, but have taken but four females.

It is found on light sandy soil, covered preferably with rather long grass and generally with other plants, as lupine, scrub oak, blueberries, etc.

It appears from about the twelfth of May till near the end of June, and I have seen the nymphs late in autumn and again in early spring. Wherever I have found this species it has been associated with Arphia sulphurea.

15. Dissosteira carolina, Linn.

Gryllus (Locusta) carolina, Linn. Syst. Nat., I., 701.

Gryllus carolinus, Fab. Syst. Ent., II., 58 (1775).

Œdipoda carolina, Serv. Hist. Orthop., 722 (1839).
Locusta carolina, Harr. Ins. Inj. to Veg., 176 (1862).
Dissosteira carolina, Sauss. Prod. Œd., 137 (1884).

This large, well-known locust, easily recognized by its black wings with a yellow border, is common everywhere in the settled parts of Ontario, frequenting every dusty roadside during late summer and autumn. It is our most striking species when on the wing on account of its large size, ample wings, and peculiar, butterfly-like flight.

It appears about the beginning of July, the earliest date on which I have taken it being July 2, 1896, and continues till October. I have seen it at Rat Portage, the Muskoka District, DeGrassi Pt., Toronto, Hamilton, and various other places in Southern Ontario which have not been recorded.

16. Spharagemon bolli, Scudder.

Spharagemon bolli, Scudd. Proc. Bost. Soc. Nat. Hist., XVII., 469 (1875).
Spharagemon balteatum, Scudd. Proc., etc., 469 (1875).
Dissosteira Bollii, Sauss. Prod. Œd., 140 (1884).
Spharagemon aequale, Comstock. Introd. to Entom., 103, 104 (1888).

This locust is quite common about Toronto on sandy soil. It is also sometimes seen where the soil is clay, but much less frequently. I have also taken it at Stony Lake, Peterborough Co., and have seen a specimen taken at Sparrow Lake.

The earliest date upon which I have taken it was June 24, 1896 (1 ♂). Its first appearance is generally, however, a little later, and it continues to fly about until October.

Its stridulation is a rapid and rather loud, rattling sound, resembling that of *Arphia sulphurea*.

I should think it not improbable that other species of Spharagemon occur in Ontario, since there are two others in New England, one of which, *S. saxatile*, Morse, frequents rocky unsettled districts, such as abound in the northern part of our Province.

17. Scirtetica marmorata, Harris.

Locusta marmorata, Harr. Ins. Inj. to Veg., 179 (1862).
Œdipoda marmorata, Thos. Syn. Acrid., 111 (1873).
Dissosteira (Scirtetica) marmorata, Sauss. Prod. Œd., 141 (1884).
Scirtetica marmorata, Morse. Prelim. List N. E. Acrid., in Psyche, 105 (1894).

This is one of our most beautiful Acridians, but is very local in distribution. I have specimens taken at Sparrow Lake by Mr. C. T. Curelley, who found them very abundant. I have also taken it, personally, at Gravenhurst, Muskoka District, Sept. 27, 1897, where they were flying in considerable numbers about a dusty gravelly road close to the railway station. They were very rapid in flight, though they never flew very far, and being without a net and pressed for time, only a few were secured. Its stridulation resembles that of *Spharagemon bolli*, but is more rapid, the sound being almost a buzz.

It probably occurs in many parts of our Laurentian area, but I have had, as yet, but little opportunity of collecting in that region.

18. Trimerotropis maritima, Harris.

Locusta maritima, Harr. Ins. Inj. to Veg., 178 (1862).

Œdipoda maritima, Thos. Syn. Acrid., 124 (1873).

Trimerotropis maritima, Stal. Recens. Orth., I., 134 (1873).

On the sandy beaches of Toronto Island this locust flies about the coarse grass which grows at a short distance from the water's edge. In some seasons it occurs in large numbers, in others it is comparatively scarce. I have also two pairs which were taken at Kingsville on the beach of Lake Erie, by Mr. C. T. Hills, who says they were abundant there.

It is an extremely alert species and very difficult to capture, and is almost impossible to see when it alights, on account of the close similarity of its gray tints to those of the sand.

The specimens of this species found about the Great Lakes differ very considerably from the typical form of the Atlantic coast, and may possibly constitute a distinct species. The dark band crossing the wings is much broader than in the typical form, and is uninterrupted instead of being broken up into a series of sub-continuous spots. The greatest breadth of this band is nearly half the greatest breadth of the wing, while in typical *maritima* it is only about a third the greatest breadth of the wing. The base of the wings is yellower and more opaque, resembling S. bolli in this respect. All the markings are generally more distinct, and the tegmina and wings usually somewhat shorter in proportion. It is distinctly smaller in size, judging from specimens of the typical form which I have from Monmouth Beach, N. J. This form appears to be a distinct variety, and may be known as *interior*.

My Toronto specimens were taken between July 22 and about the middle of September, while those from Kingsville are dated Aug. 13, 1897.

19. Circotettix verruculatus, Kirby.

Locusta verruculata, Kirby. Fauna Bor. Amer., Insecta, 250 (1837).

Locusta latipennis, Harr. Ins. Inj. to Veg., 179 (1862).

Œdipoda verruculata, Scudd. Bost. Jour. Nat. Hist., VII., 471 (1862).

Trimerotropis verruculata, Scudd. Daws. Rep. Geol. Rec., 49th Par., 344 (1875).

Circotettix verruculatus, Sauss. Prod. Œd., 175 (1884).

With the exception of *Camnula pellucida*, this is the most abundant Œdipodine in Northern Ontario, where it finds a very congenial home, flying about the bare rocky slopes and among the burnt timber, the loud, crackling stridulation of the males resounding in every direction. It is, however, by no means confined to rocky situations, being found wherever burnt timber occurs, even in swampy places, though preferably on dry sandy soil. I found it in a burnt clearing in a large swamp of tamarack and white cedar near Lake Simcoe at a considerable distance from dry soil.

Nearly all the specimens from Northern Ontario are of a black variety, being thus afforded an excellent protection when they alight upon the blackened stumps and logs, which they very frequently do. This variety has all the markings, except those of the wings, hind tibiæ and inside of hind femora almost entirely obscured by a blackish tone. I have seldom seen specimens of the mottled or southern form, though individuals intermediate between the two extremes are not infrequent. I found a dark brown, somewhat mottled variety common at Bradford on a marshy flat covered with weathered blocks and chips of wood from a sawmill; while in the rocky islands in Stony Lake, Peterborough Co., the specimens met with were frequently ash gray mottled with black.

I have occasionally heard the female stridulate, the sound being similar to that of the male, but more subdued.

It appears about the beginning of July and continues till near the end of September. My earliest capture was at DeGrassi Pt., July 2, 1896, and I heard one stridulating at Gravenhurst, Sept. 27, 1897.

My specimens are from the following localities: Rat Portage, Aug. 28, 1897 (very abundant); Molson, Lake Superior, Aug. 28, 1897; Jackfish, Lake Superior, Aug. 27, 1897; Stony Lake, July 9 to 15, 1897; Bradford, Aug. 6, 1897; DeGrassi Pt., and various other localities about Lake Simcoe. I have also seen it at Aurora, but never at Toronto, though it has occasionally been seen there by other collectors.

A NEW ALEURODES ON OAK.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

Aleurodes gelatinosus, n. sp.—Pupa oval, rather less than 1 mm. long, pitch black, not bearing the larval skin, margin beaded; no fringe of the ordinary kind, but the pupa is surrounded by and rests on a gelatinous-looking colourless translucent substance, which extends rather further from the margin than half the diameter of the pupa. Radiating from the pupa, resting on the translucent substance, are three conspicuous lines of white secretion, one from the caudal end, and one from each side of the cephalic end.

Adult with head and body very bright lemon yellow; wings white, semitransparent, spotless. Eyes not divided. Antennæ with second segment at least twice as long as the first; formula for the slender segments 43576.

Hab.—Pupæ abundant on under sides of leaves of oak at Dripping Spring, Organ Mts., New Mexico. Adults emerging the last week of April. The oak, according to Prof. E. O. Wooton, is probably *Quercus arizonica*, Sarg.

AUTUMN CAPTURES.

Our park caretaker unwittingly caters to the wants of the entomologist by planting every year some fine beds of Phlox Drummondii and verbenas. Last year, without a net, I took with a cyanide bottle 59 Plusias in one evening about the 20th of September. I was surprised to find that 22 of them were *Biloba*, the rest were *Precationis*. This year I went to the park on the 17th of Sept., better prepared for taking anything I came across. I caught *Plusia Balluca*, one; *Æroides*, one; *Simplex*, several; and *Precationis*, a few; three Plusias of a species not yet determined; also two *Deilephela lineata*; but the capture of the evening was a very fair specimen of *Dilophonota obscura*, which was not represented in my cabinet. I have two of *ello*, but this insect is at once easily distinguished from it by the description quoted by Mr. Moffat in the last annual report, viz., smaller size, light gray primaries, and unbanded abdomen. I thought the capture was worth recording. I have taken over 40 Heterocea, new to me this season, and my Orillia list is now fairly respectable.

C. E. GRANT, Orillia, Ont.

THREE MYRMECOPHILUS MITES.

BY NATHAN BANKS, WASHINGTON, D. C.

Many American entomologists have, doubtless, been much interested in the accounts published during the past year by Charles Janet on the relations of certain Myrmecophilus Acarians and their hosts. His very interesting papers have been noticed in various English and American journals. Particular attention was paid to two species of Eamasidæ, *Discopoma comata* and *Antennophorus Uhlmanni.*

A few years ago, while collecting mites on Long Island, New York, I obtained three species of Eamasidæ, which were always associated with certain ants. One, a species of Discopoma, is attached to the body of the ant, and appears to obtain food from it in the same manner as its European relative, by piercing the skin. But while the European species appears to choose the abdomen, the American form is, at least generally, found attached to the thorax of the host; and I have not observed more than two mites attached to one ant. There is usually but one mite fastened to the dorsum of the thorax near the median line. In some nests the mites were found on about 10 per cent. of the ants, but in other nests they were much more scarce.

Of the other two mites, one, the Uropoda, was found in considerable numbers associated with the same ant as the Discopoma, but they were not attached to the ants. The other was observed only a few times in the nests of another ant.

The ants have been kindly determined for me by Mr. T. Pergande.

Holostaspis mœstus, n. sp.

Body one and one-half times longer than broad, broadly rounded behind, sides subparallel, narrowed in front on cephalic part, and narrowly rounded in front, quite convex above. Body above with four rows each side of clavate hairs; two lateral rows of about nine hairs, which start from the shoulders; the third row has about ten hairs, one on the cephalic part of body; the sub-median row has about twelve hairs, and starts from the anterior edge of head. On the soft posterior sides is a row of a few small clavate hairs; soft parts of venter with a few simple hairs, and some on the margins of the sternal and genital plates. Anal plate nearly circular, and almost its diameter from the hind border of the ventral plate. Legs of moderate length, clothed with a few clavate hairs on basal joints, and more and simple ones on the apical joints. Length, 1. mm.

In the nest of *Lasius alienus*, var. *americanus;* Sea Cliff, N. Y. Readily known by rows of clavate hairs, and small anal plate.

Uropoda punctulata, n. sp.

Body rather long oval, about one and one-fourth times longer than broad, broadly rounded behind, narrowly rounded in front; moderately convex, both above and below: dorsum with small hairs, mostly on the sides, and a row of much larger and stiffer hairs along the margin, and about four rows each side above, of slightly smaller size than the marginal ones, all erect; hairs of under side confined to the legs and a few on the anal plate; three on each side, and two smaller before anus; sternal plate more than twice as long as widest parts, which are just behind the second and third coxæ, narrowed in front and behind, truncate at each end, rather coarsely, sparsely punctate, anal plate more densely and finely punctate; legs short, concealed in repose, the femora (except I.) slightly margined beneath. Length, .85 mm.

In the nest of *Cremastogaster lineolata* at Sea Cliff, N. Y., Fitch described a Uropoda (*U. formicæ*) found in the nest of an ant, but it is evidently different from this species.

Discopoma circularis, n. sp.

Body nearly circular, a trifle longer than broad, quite convex above, with a rather broad, thin margin all around, alike at each end, so that from top view one cannot tell which is front, clothed above with minute hairs, and many scattered, short clavate hairs, arranged in concentric rows; legs very short, when in repose not showing from above; the sternum elliptical, rather narrowed behind, its margin finely serrate, containing a central plate of same shape in front, but truncate behind; the plate is sparsely punctate, the venter behind is also punctate; the legs are clothed with minute hairs. Length, .48 mm.

Attached to thorax of *Cremastogaster lineolata;* Sea Cliff, N. Y.

A NEW SCALE INSECT FOUND ON BEARBERRY.

BY T. D. A. COCKERELL, N. M. AGR. EXP. STA.

Aspidiotus Dearnessi, n. sp.— ♀. Scale suboval, about 2 mm. long, moderately convex, pale gray, more or less concentrically ridged; with the orange-yellow, partly exposed exuviæ quite to one side. Ventral scale thick and distinct. The scales resemble minute oyster-shells.

♀. Dark yellowish-brown, after prolonged boiling in K. H. O. becoming transparent and almost colorless, except that the lobes remain dark brown. No circumgenital grouped glands. Only one pair of lobes, these short, parallel, very close together, practically contiguous at the tips, their ends broad and obliquely truncate, breadth of a lobe greater than its length beyond the general margin. Apparently no squames. Margin irregularly bluntly serrulate; a small projection near the lobes, and two much larger ones at considerable distances beyond, much in the style of *A. bigeloviæ*. Anal orifice oval, a considerable distance from the hind end. Surface striated, with rows of small round dorsal glands, much in the manner of *A. bigeloviæ*. Mouth-parts large.

♂. Scale elongate, nearly parallel-sided, light brownish, with the pale orange exuvia at one end, when fresh covered by a film of white secretion.

♂. Brownish-yellow, with ample wings.

Hab.—Crowded on twigs of *Arctostaphylos uva-ursi*, collected on "shore of Lake Huron," Aug. 20, 1898, by Mr. J. Dearness.

This interesting species is not a *Diaspidiotus*, but is evidently allied to the south-western group composed of *A. bigeloviæ*, *A. yuccæ* and *A. yuccarum*. At the same time it is allied to *A. Signoreti* of Europe, which is the type of the subgenus *Targionia*, Signoret. For the present I believe we cannot do better than extend the subgenus *Targionia* to include all these five species.

[In his note to the Editor, Mr. Dearness states that the precise locality where he collected the infested plants was in the Ojibeway Indian Reserve in Saugeen, in the Bruce Peninsula, on the sandy shore of a little bay off Lake Huron, a favourite botanizing ground of Dr. Scott, of Southampton, Ont. Mr. Dearness does not know whether the inlet is generally known by the name of "French Bay," but that is what the Doctor calls it.]

A CORRECTION.

In an article in the October, 1897, number of the CAN. ENT., page 243, I used the name *subfasciatus* in describing a new species of Attalus from San Clemente Id. I have since discovered that this name had been previously used by Gorham for a Mexican species, and I would therefore propose the name *transmarinus* for the San Clemente species. Oddly enough, in looking over the Horn collection the past summer, I found specimens of *subfasciatus*, Gorh., labelled Arizona; the name must therefore enter our lists.

Superficially *subfasciatus* and *transmarinus* resemble each other very closely, but the latter may be at once distinguished by the prothorax being sinuately narrowed behind so as to produce the appearance of being broadly lobed, while in *subfasciatus* it has the normal form.

H. C. FALL.

NOTES ON ANDRENA.

BY S. N. DUNNING, HARTFORD, CONN.

ANDRENA HALLII, n. sp.

♀.—Lenth, 14–17 mm. Black, shining; pubescence black with patch on vertex, the prothorax, mesothorax (excepting posteriorly where pubescence is not so thick and has black mixed with ferruginous, forming a more or less distinct black-appearing band between the tegulæ), scutellum and postscutellum bright ferruginous, thick, entirely obscuring punctures on thorax. Clypeus shining, large quite close punctures, a median line impunctured; antennæ black, third joint equal to fourth and fifth combined; metathorax not shining, closely and more finely punctured; scutellum with two smooth shining spots anteriorly, a few scattered punctures near-by, otherwise roughened; postscutellum and metathorax roughened, enclosure triangular, distinctly outlined, carried to a point on posterior face, sometimes faintly and irregularly wrinkled in fore half, last half impunctured. Abdomen without hair bands, a few long scattered hairs on segments 3–4, 5th seg. pubescent and protuberant as is *vicina;* anal fimbria heavy, black; segments 1–4 depressed posteriorly, the first very slightly if at all, the remainder one-third or one-half of their length; fine scattered punctures on seg. 1–3, remainder impunctured; a sweep of hairs below like *vicina*. Wings dusky throughout, a violaceous reflection, otherwise like *vicina*; stigma and nervures piceous or very dark brown. Claws bifid, rufous; spurs black. Basal process of labrum prominent, emarginate.

Three females. Pullman, Wash. (coll. C. W. Piper), and Moscow, Idaho (J. M. Aldrich).

It differs at once from *vicina* by pubescence and punctures of clypeus.

A. MARIÆ, Rob.

Three females Ames, Iowa (E. D. Ball); one from flowers of gooseberry, May 6th.

A. RHODURA, Ckll.

Two females on *Salix*, April 25th, at Hartford, Conn.

A. CASADÆ, Ckll.

Two females on *Holodiscus discolor*, Evergreen, Colo. (about 7,000 feet), July 16. One specimen shows the second segment rufous throughout. Prof. Cockerell thinks a large series may show this species to be synonymous with *prunorum*.

A. Kincaidii, Ckll.

This species varies like *Synhalonia Edwardsii*, Cr. (see paper by Cockerell, Proc. Acad. Nat. Sc., Sep. '97, page 347), but owing to the unsatisfactory nature and variability of the differences I have not named the races into which it falls.

(1) Typical *Kincaidii*. Seattle, Wash. 3 ♀: Vancouver Is., B. C., 2 ♀ (July 1 and July 5); Moscow, Idaho, 1 ♀. This has the abdomen more ovate in ♀.

(2) A geographical race. Pullman, Wash. 3 ♀. Abdomen sub-depressed in ♀.

My male specimens are all from Seattle and Vancouver. The only differences they show is in colour of pubescence as mentioned by Cockerell in the original description.

A. perarmata, Ckll. (in ed.)

I have males from Seattle, Wash. (Feb. 16 – Mch. 14), and females from Seattle (March 13–14), and Vancouver Is. (Apr. 20).

Aphilanthops Bakeri.

♂. The "lobes" in the co-types take the form of dentations in a larger series. Third joint antennæ *as long or almost as long* as joints 4–5 combined. The first abdominal segment is a *little* coarser in punctuation than the rest. Sometimes a yellow spot is on the mesothorax in front of the tegulæ.

♀. Differs from ♂ in larger size (12–13 mm.), face with three broad yellow stripes (not *all* yellow), clypeus 5-dentate. Montana and Colorado, Coll. Amer. Ent. Soc. and Colo. (Baker 2044). The ♀ is much like *frigidus*; the ♂ shows differences, however.

DIASPIS AMYGDALI, Tryon.

BY C. P. LOUNSBURY, DEPARTMENT OF AGRICULTURE, CAPE TOWN, AFRICA.

The article on *Diaspis amygdali*, Tryon, by Professor Webster, in the April issue of this magazine, has left me with the impression that the introduction of this insect to several widely separated sections of the United States has not aroused the apprehension among American entomologists that the advent of a pest of its importance justifies. The quotation from Mr. Tryon's letter to the effect that the insect is neither widely distribued nor destructive in Queensland is too reassuring. It constrains me to emphasize the fact that the species is a highly injurious one in Cape Colony. A brief account of its occurrence here may not be uninteresting.

Under various common names, this insect has been known about Cape Town for at least twenty-five years. Owing to the slight attention paid to fruit culture until within a comparatively short time, and also to the lack of transportation facilities, it has not, however, become nearly so widespread as would have been the case had such favourable conditions as are found in the United States prevailed. And yet, despite of adverse circumstances, it has become established at many of the principal centres, both east and west, and in the country adjacent to the seaports. One serious occurrence in the Transvaal has been reported to me, and M. d'Emmerez de Charmoy, of the Museum at Port Louis, writes that it is destructive in Mauritius. From Cape Town, it has spread inland for about one hundred miles, and within this area I do not think there is any orchard insect pest, with the exception of the Fruit Fly *(Ceratitis capitata)*, that gives greater trouble.

The peach is pre-eminently the food-plant of *Diaspis amygdali*, and notwithstanding the vigorous growth it makes in this climate, this tree is not infrequently killed to the ground; more often, branch by branch dies, and the tree becomes misshapen and unproductive. Reddish stains, both in the rind and pulp, are produced on the fruit of some varieties; and if the attack begins when the fruit is very green, malformation results. Many other food-plants are cited by Professor Webster, but the list might be greatly lengthened. The China Tree *(Melia azedarach)*, known here as Syringa, a tree adapted to the requirements of several of our common scale pests, sometimes gets thoroughly coated with this one. Many Solanaceous plants assist in passing the infection from orchard to orchard; chief among these are *Solanum sodomæum*, *S. giganteum* and *S. aculeastrum* (?) (Natal Thorn). *Myoporum insulare*, chiefly grown here as a hedge plant, is similarly responsible. Fortunately, the pomaceous fruits are nearly exempt from attack; I have not seen it at all on apple, and not on more than a dozen pears.

Upwards of fifty per cent. of the insects are here destroyed by parasites on many trees, and a further large percentage is devoured by Coccinellids. But the loss might be ninety-five per cent., and still the increase be a hundred fold in twelve months. Three to four generations are passed in a year, and two hundred young from one female is not exceptional. The multiplication may prove less rapid in the Northern

States, but it is reasonable to suppose that many years may elapse before natural enemies prey on it there to the extent that they now do here.

That the insect is not an easy one to contend against in the United States may be inferred from the results obtained in the experiments recorded by Dr. Howard. In this warm climate the Californian lime-sulphur-salt wash will keep it in check if the wash is well made and thoroughly applied, and fumigation with hydrocyanic acid gas destroys eggs and all other stages when one ounce of cyanide is used for each one hundred and fifty cubic feet of enclosed space. Many suburban people have all their stone-fruit trees protected by whitewashing them from the ground to the tips of the twigs every winter.

All in all, I consider that *Diaspis amygdali* is almost as much to be feared in the peach orchard as *Aspidiotus perniciosus*. The whiteness of the scale renders the former easier of detection, it is true, but conspicuous as it is by reason of its colour, people here often unwittingly infect nursery stock in the process of budding. American nurserymen and fruit-growers are not, I feel sure, any the less likely to commit such a blunder. The insect is fond of secreting itself behind buds on young wood, and much of it is often to be found in such situations when the twigs elsewhere are quite clean.

STATE ENTOMOLOGIST OF NEW YORK.

We beg to offer our hearty congratulations to Mr. M. V. Slingerland upon his appointment to the important position of Entomologist to the State of New York. We may also congratulate the authorities of the State upon having selected one so eminently fitted for the position. Mr. Slingerland is a graduate of the College of Agriculture of Cornell University, and for the last eight years has been a member of the University Experiment Station at Ithaca. In this capacity he has published a number of admirable bulletins on injurious insects, and a large number of articles of a popular character on practical entomological subjects in various agricultural papers. He has also contributed to this magazine and to other scientific publications, many valuable papers of a more technical character. He has thus proved himself to be thoroughly well qualified to carry on the work at Albany, both in its scientific and practical departments, in accordance with the high standard maintained by his eminent predecessors, Drs. Asa Fitch and J. A. Lintner.

ABBREVIATIONS OF AUTHORS' NAMES.

BY A. RADCLIFFE GROTE, A.M., HILDESHEIM.

It is quite desirable that the names of authors should be uniformly treated according to a certain standard. To this end the Zoologists of the Berlin Museum have published a list, which has now appeared in a second edition. It is quite necessary that names which are borne by different persons, owing to their prevalence, should be so abbreviated that the particular bearer intended is designated. I give here a selection of the abbreviations of the names of chiefly American authors determined upon, and call attention to the pamphlet which is published by R. Friedländer and Sohn, Berlin :

Aaron	Aar.
Abbot	Abb.
Berg, C	Berg.
Boisduval	Bsd.
Butler	Butl.
Casey, Th. L	Casey.
Chambers	Chambers.
Clemens	Clemens.
Comstock, J. H.	Comst.
Coquillett	Coquill.
Cresson	Cress.
Crotch	Crotch.
Duzee, Van	Duzee.
Edwards, H	H. Edw.
Edwards, W. H	W. H. Edw.
Fabricius	F.
Fernald	Fern.
French, G. H	French.
Grote, A. R	Grote.
Guenée, A	Guenée.
Gundlach	Gdl.
Harris	Harr.
Harvey	Harvey.
Herrich-Schaeffer	H.-Sch.
Howard, L. O	How.
Hübner	Hb.
Hulst	Hulst.
Packard	Pack.
Reakirt	Reak.
Robinson	Rob.
Schwarz, E. A	E. A. Schw.
Scudder	Scudd.
Smith, Emily A	E. A. Sm.
Smith, J. B	J. B. Sm.
Smith & Abbot	Sm. Abb.
Walsingham	Wlghm.

ENTOMOLOGICAL BOOKS.

We have much pleasure in informing our readers that entomological books of all kinds can now be imported into Canada free of all customs duty, and that this concession was made by the Dominion Government in consequence of the representations made to it by the President and Council of the Entomological Society of Ontario.

Mailed October 8th, 1898.