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NEW CANADIAN EPHEMERIDAE WITH NOTES IV.*

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Leptophlebia pallipes Hag.

In the western portion of North America there appear to be several closely allied species belonging to the *pallipes-vaciva* group, characterized in the male sex by hyaline whitish abdominal segments 3-6 with slight black markings, the genitalia showing a narrow rod-like apical portion of the penis with the stimuli attached laterally some distance below the tip and either projecting parallel to the penes or curved up dorsally above these organs.

Very unfortunately the identity of the two species already bearing names, viz. *pallipes* Hagen and *vaciva* Eaton, is still doubtful; the latter species was described from males from Mt. Hood, Oregon, now in the McLachlan Collection and unavailable for study; Eaton's short description of the genitalia is applicable to practically any of the species but I have seen no specimens which show a "transparent white" second abdominal segment and are totally devoid of black maculation, as the description would suggest. Until material from the type locality can be secured for study I am unable to identify this species. In the case of *pallipes* the description was drawn up from a unique female from Truckee, Calif.; I have examined the type in the Museum of Comparative Zoology at Cambridge, Mass., and believe that from a single specimen of this sex it is almost impossible to make a definite determination; correctly associated specimens of both sexes from the type locality will be necessary to solve the problem. I apply the name, however, tentatively to a series of specimens captured by myself in the latter part of June, 1926, near Lillooet, in the so-called 'dry-belt' of British Columbia: the nature of the country is such that many Nevada insects occur here. The females match well with Hagen's and Eaton's descriptions; the males possess shiny black thoracic and first abdominal segments; abdominal segment two is semihyaline and largely smoky; segments 3-6 and the anterior portion of 7 are hyaline whitish, the remainder deep chocolate-brown, opaque. Dorsally on the posterior margin of segments 2-6 there is a short black transverse dash, situated in the extreme lateral corner, just above the spiracular line, which frequently shows one or two blackish dots on each segment; ventrally there are the usual brown ganglionic patches. Legs whitish, tinged slightly with pale brown, especially on the fore femora and tibiae; wings hyaline with pale venation; crossveins indistinct, except in the pterostigmatic area, where they are darker, oblique, but scarcely curved, and approximately twelve in number; genitalia with the second joint of the forceps gradually tapering from base to apex; third joint enlarged apically; penes rod-

*—Contribution from the Division of Systematic Entomology, Entomological Branch, Dept. of Agric., Ottawa.

like apically with the lateral stimuli curving upward and inward, their apices nearly meeting in the median line (fig. 1).

In two males from Platte Canyon, Colorado, with the same type of abdominal maculation, the rod-like portions of the penes are shorter and the lateral stimuli longer, curving over to meet beyond the apices of the penes: I imagine these differences may prove to be of racial but scarcely of specific value.

Leptophlebia temporalis n. sp.

Very similar to the preceding but slightly smaller. In the males the dark lateral transverse dashes of abdominal segments 2-6 are generally extended to form obscure dark lines along the entire posterior margins of these segments; the stigmatal dots are also more decided and there are frequently traces of dark geminate medio-dorsal lines. On the ventral side of the stigmatal line is a small black mark in the latero-posterior angle of each pale segment. In the genitalia (fig. 2) the penes are more widely separated apically and the lateral stimuli do not curve upward but lie in the same plane and parallel to the penes; at their base is a distinct small ventral tooth which is lacking in *pallipes*. The females are very close to those of *pallipes* but the femora and tibiae are more heavily shaded with light amber-brown. Length of body, 6 mm.; of forewing 7 mm.

Holotype— ♂, Alta Lake, Mons, B.C., June 11 (J. McDunnough); No. 2322 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratypes—12 ♂, 12 ♀, same data.

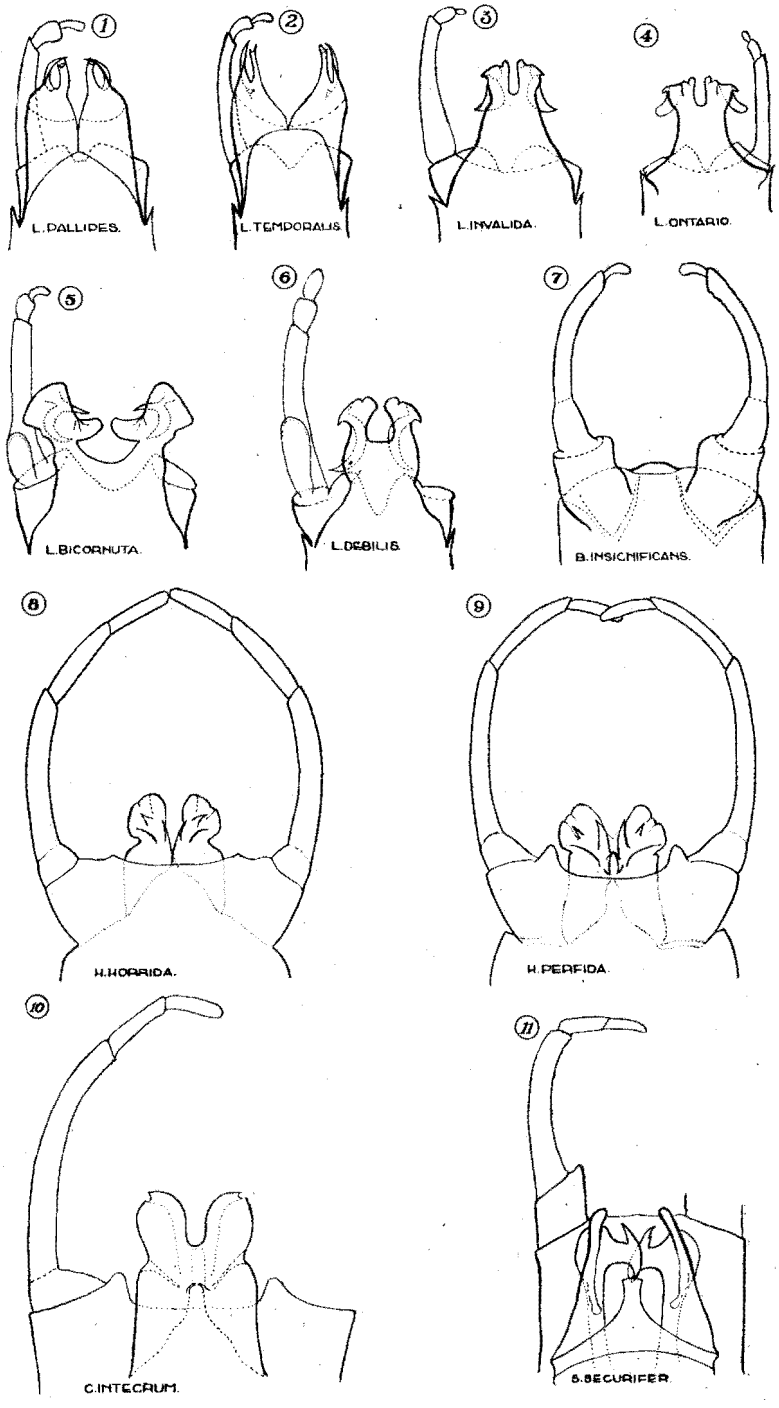
I had at first considered this species to be *vaciva* Eaton but the dark second abdominal segment and the black maculation do not tally with the original description.

A second group, occurring in the west, which presents the same difficulties as the above mentioned group, centres around the species *gregalis* Eaton, the types of which were collected on Mt. Hood, Oregon, and are also in the McLachlan collection. I am holding specimens from Santa Clara Co., Calif., under this name at present (vide Can. Ent., LVI, 222) but the identity is doubtful. Recently I have received specimens of a very similar species from Vancouver Island, B. C., which, however, shows differences in male genitalic structure from our Santa Clara species; this may be the true *gregalis* but as Eaton's description of the genitalia is not full enough to be of much service and as further the crossveins of the pterostigmatic region are stated to be irregular and sometimes sparsely branched and anastomosing, which is not the case in the Vancouver Island species, I am treating the species as undescribed. I might also note that *gregalis* female has apparently hyaline white wings, whereas the present species shows a distinct pale amber-colored tinge on the wings.

Leptophlebia invalida n. sp.

Male. Thorax and abdomen deep brown, the median segments of the latter very narrowly paler on the anterior margin; forceps pale brown; setae whitish with faint ruddy banding on basal segments; legs light brown, tarsi somewhat paler. Wings hyaline with the veins faintly brownish; the crossveins are pale and indistinct except in the pterostigmatic region where they are brown, evenly oblique, and about ten in number.

CAN. ENT. VOL. LVIII. PLATE 3



CANADIAN EPHEMERIDAE

Female. (abdomen missing). Very similar to male in color of thorax and legs. Wings tinted with light amber; crossveins also light brown, 14 present in the pterostigmatic space. Length of body 6 mm.; of forewings 7 mm.

Holotype— ♂, Departure Bay, B. C., June 23; No. 2323 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratype—1 ♂, same locality, June 11.

I figure the male genitalia (fig. 3).

Leptophlebia ontario n. sp.

Very similar to the preceding species but with much shorter forelegs in both sexes, the femora and tarsi being most noticeable in this respect; in the male genitalia (fig. 4) the shape of the ribbon-like stimuli of the penes is different. The female shows no trace of pale amber suffusion on the wings, these being pure hyaline with pale crossveins as in the male.

A very long series of this eastern representative of the group was taken by Mr. G. S. Walley in the vicinity of Jordan, Ont., in the spring of 1926.

Holotype— ♂, Jordan, Ont., June 28, (G. S. Walley); No. 2348 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratypes—17 ♂, 18 ♀, same locality, June 21, 25, 28; 3 ♂, 2 ♀, Balls Falls, Ont., June 28, 29.

Leptophlebia bicornuta n. sp.

Male. Very similar to *debilis* Wlk. Head and thorax deep black-brown. First abdominal segment black-brown; segments 2-7 semihyaline, 2 and 3 almost entirely smoky brown, 4-7 tinged with this color on posterior two-thirds of each segment, 7-10 opaque, brown; a series of lateral black dashes, based on the posterior margin of each segment and not attaining anterior margin, traces dorsally of median and subdorsal dark streaks often more evident on segments 8 and 9. Legs light brown. Forceps with the same basal enlargement of joint 2 as in *debilis;* the penes (fig. 5) with dorsal inward projections apically and with each stimulus bifid. Wings hyaline with light brown venation and pale crossveins except those of the pterostigmatic region which are dark and 12-14 in number. Length of body 9 mm.; of forewing 10 mm.

Female. Abdomen entirely brown, paler posteriorly; head clay-brown tinged considerably at times with ruddy brown; subanal plate with V-shaped excavation of moderate size; legs deep brown; wings hyaline, crossveins of primaries tinged with brown.

Holotype— ♂, Bearberry Creek, near Sondre, Alta., Aug. 10, (C. H. Young); No. 2324 in the Canadian National Collection, Ottawa.

Allotype— ♀, same data.

Paratypes—11 ♂, 16 ♀, same data, also Aug. 21, 24.

There is also a single specimen before me from Shawnigan Lake, Vancouver Island, B. C. As the entire genitalia of *debilis* Wlk. (*separata* Uhl.) have never been figured, I offer a drawing of these parts (fig. 6) for the sake of comparison.

Ephemerella semiflava n. sp.

Male. Head yellowish, tinged with ruddy brown in the region of the ocelli; eyes (living) mustard-yellow; thorax olive-ocherous, shading into light ochreous in the region of the scutellum and tinged with ruddy brown anterior to base of forewing; prothorax with blackish transverse streak near hind margin; pleura and sternum light yellow brown with an oblique streak of pure yellow from base of forewing to base of anterior legs; abdomen olive-ochreous with lateral rows of indistinct brown oblique stripes, more or less fused on segments 8-10; a faint blackish posterior margin to segments 2 and 3 dorsally. Setae white, slightly brown-ringed at base; legs light yellowish, shading into whitish on anterior tarsi; fore tibia about one and one half times the femur in length, tarsi about twice the tibia; hind femur and tibia subequal. Wings hyaline with colorless venation. Length of body 7 mm.; of forewing 8 mm.

Holotype—♂, Tilsonburg, Ont., June 4 (G. S. Walley); No. 2350 in the Canadian National Collection, Ottawa.

The species has the same type of genitalia as *excrucians* Walsh but is much paler in color; the lateral markings on the abdomen seem characteristic. The type is rather teneral and in well-developed specimens it is probably that the color will be somewhat darker.

Baetis insignificans n. sp.

Male. Turbinate eyes (dried) small, rather bright red; thorax deep brown with the pleural sutures and the anterior projection of the metanotum pale creamy; abdomen with segments 2-6 semihyaline, pale, considerably tinged with smoky brown dorsally; segments 7-10 opaque, dorsally light sepia-brown, ventrally whitish; setae white. Forelegs with the femora dull smoky brown, the tibiae and tarsi paler; mid and hind legs pale ochreous with the femora tinged with smoky. Wings hyaline with pale venation; secondaries narrow, leaf-like, with no costal projection and only two veins.

Female. Head ochreous with considerable ruddy shading in the region of the ocelli, this shading continued behind the lateral ocelli in the form of two ruddy bands extending to the vertex; thorax ochreous with traces of ruddy shading on the pleura; abdomen ochreous or greenish (when full of egg masses); legs pale creamy with tinges of smoky on fore femora. Wings hyaline with pale cross-veins; secondaries reduced to a mere thread. Length of body 4 mm.; of forewing 4 mm.

Holotype—♂, Seton Lake Cr. Lillooet, B. C., June 28, (J. McDunnough); No. 2349 in the Canadian National Collection, Ottawa.

Allotype—♀, same data.

Paratypes—24 ♂, 1 ♀, same locality, June 27, 28.

The species falls into a group with *dardanus* McD. and *frivolus* McD.; apart from its much smaller size it is separated from the former by the brown tints of the abdomen and the shorter and narrower hind-wings with great reduction in the female. The male genitalia (fig. 7) show a longer and narrower fourth joint of the forceps and a short projecting plate on the posterior margin of segment 9, lacking in *dardanus; frivolus* is a much larger species, darker in color, with a very characteristic, long fourth joint of the forceps.

Siphlonurus securifer n. sp.

Male. Thorax and dorsum of abdomen shiny, deep black-brown, almost unicolorous except for small triangular patches of pale yellowish laterally on anterior margins of abdominal segments. Ventrally the abdomen is pale yellowish with a narrow dark brown median line on each side of which is a small dark dot about the centre of each segment; laterally there is a row of much larger round brown spots, each spot situated near the anterior margin of its respective segment; forceps smoky-brown; setae dull smoky, ringed with brown. Wings hyaline with dark venation. Forelegs dull brown, mid and hind legs paler, more ochre-brown; femur with a narrow dark band near apex, most distinct on two hind pairs of legs; tarsal joints narrowly dark. Length of body 11 mm.; of forewing 11 mm.

Holotype—♂, Joe Lake, Algonquin Park, Ont., July 7, (F. P. Ide); No. 2326 in the Canadian National Collection, Ottawa.

The male genitalia (fig. 11) are quite distinct, and the ventral abdominal markings, combined with the general dark color, should render the species easily recognizable.

Heptagenia perfida n. sp.

Male. Eyes (living) pale bluish white; head yellowish with ruddy tinges and a round black spot below each lateral ocellus, near the margin of the eyes. Thorax dorsally brown with ruddy tinges on the anterior sutures and with the scutellum somewhat paler, laterally and ventrally light yellow with faint ruddy shades at bases of legs. Abdomen dorsally rather deep brown tinged with ruddy in certain lights, a fine pale broken mediodorsal line and small subdorsal lunate marks on each segment, the lateral edges of the dark areas on each segment slightly oblique, leaving a pale yellowish triangle in the postero-lateral corner; ventrally pale yellowish; setae pale, slightly ringed with ruddy brown at base. Fore legs light yellow at base, femora, except base, deep ruddy brown, tibiae smoky yellow with a black apical spot, tarsi smoky; mid and hind legs pale yellowish, femora tinged with ruddy and tibiae with slight ruddy streaks at base. Wings hyaline with fine, pale venation, the costal crossveins indistinct except 12-13 simple straight ones in the apical area. Length of body 7 mm.; of forewing 7 mm.

Holotype—♂, Jordan, Ont., June 28, (G. S. Walley); No.2351 in the Canadian National Collection, Ottawa.

Paratypes—3 ♂, same locality, June 25, 28; 1 ♂, Balls Falls, Ont., June 28.

The species is evidently allied to *cruentata* Walsh by the coloring of the forelegs but differs in the pale venation. Walsh's species having dark veins and crossveins. The male genitalia (fig. 8) are quite distinctive and show considerable resemblance to those of *inconspicua* McD.

Heptagenia horrida n. sp.

Male. Very similar to the preceding species. Head light brown, except the extreme front which is yellow; the black spot of *perfida* is present. Thorax light brown dorsally, the color deepening posteriorly in the region of the scutellum; posterior edge of meso- and metanotum blackish; pleura and sternum light ochreous, less yellow than in *perfida*, with brown tinges at base of legs. Abdomen dorsally light brown, paler in the median region and darker laterally but without the yellowish lateral triangles or the pale dorsal streaks of *perfida*, the pos-

terior margin of each segment is ringed with dark brown; ventrally light ochreous. Legs light ochreous, the fore femora strongly and the other femora slightly tinged with ruddy brown on the distal half; wings hyaline with pale veins and crossveins as in *perfida*. Length of body 7 mm.; of forewing 7 mm.

Holotype—♂, St. David's, Ont., June 11, (G. S. Walley); No. 2352 in the Canadian National Collection, Ottawa.

The male genitalia (fig. 9) as compared with those of *perfida* have different shaped stimuli to the penes and the prominent projections of the posterior margin of the ninth sternite are much reduced, to judge by the single specimen available for study.

Heptagenia solitaria McD.

This species was described from a single male from Waterton Lakes, Alta. The receipt this year of a good series of both sexes from Platte Canyon, Colo., makes it possible to note a few additional features of maculation, not visible in the type which proves to be a rather poorly marked specimen. When well-developed, the abdominal maculation consists of a dark dorsal stripe cut by a narrow pale median line and a narrow transverse band of dark color on the posterior margin of each segment from which broad dark subdorsal bands project forward but do not attain the anterior margins of the segments; there is a tendency for the subdorsal and dorsal stripes to coalesce to form either a simple dark shade (as in the type) or to enclose small lunate marks of the paler ground color, such as is so frequently observed in dark-colored Ephemerids. Just beyond the bases of the mid and hind coxae are short black streaks and dorsad of these, in a line with the wing-bases, are further similar streaks; the tip of the trochanter is also black. These black markings are, however, frequently very obscure. The female is very similar to the male in color and maculation: the vertex of the head is largely ruddy-brown. Well-developed subimagoes shows unicolorous smoky wings with the black venation well defined as in the adult; other subimagoes before me, which seem to represent the same species, judging by maculation, show pale venation. As I have noticed the same feature in *marginalis* Banks, I attribute the difference to the age of the individual subimagoes.

Cinygma integrum Eaton.

I was fortunate, whilst on a collecting trip in British Columbia in 1926 in obtaining a small series of this species at Alta Lake, Mons.

This species, the genotype of *Cinygma*, was heretofore unknown to me and after a study of the structural details, especially the male genitalia, I feel doubtful as to whether the other species generally included in the genus are strictly congeneric; I find, however, that *lyriformis* McD., doubtfully described as an *Ecdyonurus*, is a typical *Cinygma* and closely related to *integrum*, differing in the paler abdomen and certain points of the male genitalia. As Eaton's figure of the genitalia of *integrum* is made from a dried specimen and is not very accurate I offer a new figure (fig. 10).

As noted above, the *mimus-par* group may form a new generic concept or possibly be better placed in *Iron* but I am not prepared at the moment to decide the question. It might be noted that *deceptiva* McD., described from specimens without forelegs, is undoubtedly an *Iron*: a further specimen has been received

from Barkerville, B. C., which shows the first tarsal joint of fore legs fully as long as the second.