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FURTHER NOTES ON THE GENUS AMELETUS WITH DESCRIPTIONS OF NEW SPECIES.* (EPHEM.).

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The work of my assistant, Mr. A. N. Gartrell, in southern British Columbia during the season of 1935 has resulted in considerable additions to our knowledge of the genus *Ameletus* in this province; not only have the nymphs of *A. oregonensis* McD. and *vernalis* McD. been tied down, but two new species have been discovered.

It is proposed to deal with these in the present article but before doing so it might be well to call attention to an error which has crept into Traver's key to the adults (1935, *Biology of Mayflies*, 447); in this key the first caption reads "Several cross-veins in forewing margined with brown, so that wing appears speckled" and under this heading is included as first species *validus* McD. This is incorrect as the wings of *validus* are *not speckled* but lightly and evenly suffused with brownish-amber, and the species, if properly keyed, would fall into caption 6, where it is distinguished from *shepardi* Trav. apparently by the darker-colored abdominal segments. *Similior* McD., as second species under caption 1, is also wrongly keyed; in this species the wings are practically clear hyaline and the

*Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa.

correct keying would lead to caption 13 (*alticolus* McD.) to which species it is allied but differs in genitalic characters.

***Ameletus oregonensis* McD.**

Nymph. 10-12 mm. Head brown with pale mouth-parts; a triangular pale area between the antennae and pale shading laterad and cephalad of the two posterior ocelli; a faint pale medio-dorsal line, broadening near vertex into a small rectangular patch. Antennae with brown basal joint; remainder with alternating broad bands of pale and light brown, presenting a distinctly ringed appearance. Thorax light brown, shaded with pale; scutellum pale with *two prominent oval brown spots*, one on each side of the median line. Abdomen light brown with broad deep brown median patches, and a narrow deep brown posterior border projecting forward laterally beneath the gills. On segments I-V and X there are rather indistinct pale subdorsal spots bordering the median dorsal patches above referred to and tending on V to coalesce across postero-dorsal portion of segment; the lateral edge is pale, except in posterior corner; segments VI and VII are largely brown, but on VIII and IX the pale areas are more extended, consisting of large white spots subdorsally and near posterior margin, lateral oblique bands, terminating in a round spot on anterior margin and the quite distinct pale lateral edge; there is considerable tendency for the pale areas of each side not only to coalesce among themselves, but also to coalesce across the posterior portion of the segment. Ventrally pale brown with no ganglionic marks nor any distinct pattern. Well marked individuals show pale lateral streaks and a row of four small equidistant pale dots across anterior margin of segments VI-IX, the anterior segments showing only faintly the outer pair of these. Tails brown at base and then very *characteristically banded alternately with pale and dark brown*, except the extreme tips which are whitish. Gills pale, with poorly defined tracheation, a *dark brown interior band of chitin* much as in *velox* Dodds and the ventral margin broadly but rather indistinctly thickened with chitin. Legs with basal area of femur pale; a broad deep brown median band and apical section shaded more or less with lighter brown, especially on fore-femora. Tibiae and tarsi with basal half pale, apical section brown, claw brown.

There is considerable variation in the pattern of the abdominal segments according to the amount of coalescing between the white spots both on anterior and posterior segments, but segments VI and VII usually remain brown; the very characteristic color of the tails should render the nymphs readily recognizable.

***Ameletus vernalis* McD.**

Nymph. Male. 9-10 mm. Head brown, shading into gray-brown above antennae; mouth parts largely pale; a pale area between the antennae and in medio-dorsal line before vertex; antennae pale, with single dark band beyond middle. Thorax light brown, strongly marked with pale streaks and dashes; scutellum pale. Abdomen with segment II dorsally largely pale with two oval brown patches bordering the mediodorsal line anteriorly and a small lateral dark spot below the gill; segments III-V brown with very obscure paler maculation consisting (as far as can be determined) of a rather large oval median spot and two subdorsal semioval spots on each side; of these the posterior one is smaller

and more distinct; the lateral edge is clear whitish except at posterior corner and there is a fairly clear round whitish spot adjoining the gill in anterior section. On VI the pale lateral areas are considerably extending leaving a large, roughly quadrangular brown patch dorsally and a comma-like dash attached to the anterior margin laterally, the postero-lateral angle being dark as in the preceding segments. Segment VII shows still further reduction of the dark areas and is much as segment II but with rather larger dark dorsal patches. Segment VIII is pale with narrow dark anterior and posterior borders, two small oval subdorsal brown spots more or less connected with posterior dark border and occasionally, but not constantly, a narrow oblique dark band connecting the lateral comma-mark with the posterior border. Segment IX *brown* with *two small pale triangular lateral spots* attached to anterior margin; segment X with anterior dark and posterior pale halves and a narrow medio-dorsal dark band. Ventrally pale brown with broadly pale lateral edge except on segment IX and the usual small pale dot near antero-lateral corner. Tails pale, whitish, broadly banded with brown just beyond middle and with the extreme tips brown. Gills pale with faint tracheation, an interior dark band just within the dorsal margin, much as in *alticolus* McD. and faint traces of chitinous thickening along ventral edge. Legs pale; femora with large brown median patch on outer side; tibiae entirely pale, except at extreme base; tarsi with brown bands both basally and apically; claw pale brownish.

In the female nymphs there is a tendency towards diffusion of the maculation.

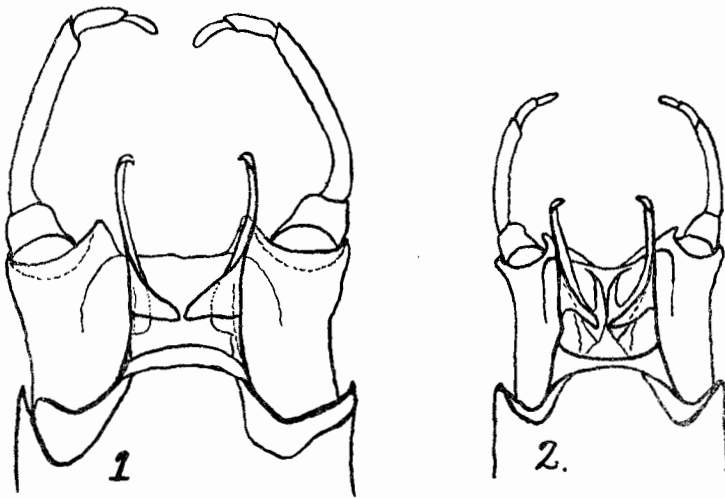
Occurs apparently along with the preceding but can easily be separated by the different position of the dark band on gills and by the entirely different color of the tails.

***Ameletus connectus* n. sp.**

Male. Head pitch-black, paler at base of antennae and with a small yellowish patch posterior to ocelli. Thorax, pleura and sternum shiny pitch-black, the more membranous portions of pleura at bases of wings and legs dull brownish with slight ochreous tinges. Abdomen dorsally with segment I deep brown, II-VII semihyaline ochreous or creamy with broad deep brown posterior margin, slightly paler mid-dorsal brown band and lateral brown triangles based on the posterior margin; VIII-X more opaque with slight increase of brown-shaded areas; tracheae forming dark network over paler portions. Ventrally pale ochreous without ganglionic marks. Forelegs deep pitch, faintly paler at base of femur; mid- and hind-legs somewhat paler, femora tinged with purplish and tibiae and tarsi of a deep dirty amber color. Wings hyaline with fine dark brown longitudinal veining; crossveins fine, light brown, uncolored and almost invisible in costal area except in pterostigmatic space where they are brown and evenly anastomosed, forming a row of small marginal cells based on a second row of much larger ones. In the genitalia the penes-lobes are long, parallel and strongly bent dorsad at apex; stimuli are lacking. The posterior margin of the forceps-plate between the two tubercles is straight and without the V-shaped excavation frequently found. Length of body 12 mm.; of forewing 12 mm.

Nymph. If the single nymphal skin before me has been correctly associated the nymph is very similar in maculation to that of *vernalis* McD., but apart from

larger size the pale spotting is more indistinct and the brown areas more extended; segments V and VI and IX are almost unicolorous dark brown; on segments VII and VIII the brown areas have increased in size, leaving a large diamond-shaped dorsal patch and an irregular, oblique lateral band of the pale color; on X the whole dorsal area is broadly brown with a narrow oblique lateral pale stripe. The tails are similar marked to those of *vernalis* but the dark band is broader and starts closer to the bases of the tails. In the gills the interior dark band is still closer to the dorsal margin than in *vernalis* and the chitinous thickening of the ventral edge much heavier; the tracheation is also slightly better defined but still improminent. The femora are pale with a large rectangular brown patch in median area, small brown areas at base and apex and a brown streak extending back from apex along dorsal edge, the tibiae are slightly tinged with brown at base and the tarsi are broadly ringed with black-brown at both base and apex. Ventrally the abdomen shows no distinct maculation except the pale lateral edge and the usual white dots situated in the anterior-lateral region.



Male Genitalia of 1. *Ameletus connectus* n. sp.; 2. *Ameletus suffusus* n. sp.

Holotype.—♂, Shingle Cr. Penticton, B. C., May 5, 1935, (A. N. Gartrell); bred from nymph (B 1075); No. 4109 in the Canadian National Collection, Ottawa.

The species seems to connect the *velox* and *validus* groups, the nymph showing affinities in abdominal and femoral maculation with the latter group whilst the genitalia are distinctly reminiscent of the former.

***Ameletus suffusus* n. sp.**

Male. Head and thorax shiny blackish, the mesothorax with scutellum shaded with brown and preceded by two orange-yellow streaks; a similarly colored lateral streak below anterior section of mesothorax and the membranous portions of pleura at bases of wings and legs considerably shaded with light brownish. Abdomen dorsally with segment I blackish and other segments rather bright yellow.

low, broadly bordered with brown posteriorly and slightly brown-shaded along lateral edge where the tracheation shows as a fine dark network; segments VIII-X opaque with brown suffusion rather more extended than on the preceding semi-hyaline segments. Ventrally dull pale ochreous without ganglionic marks, segment IX and forceps-plate centrally tinged with yellow; forceps and lateral portions of forceps-plate deep brown. The genitalia are quite similar to those of *aequivocus* McD., but the penes-lobes are wider apart and the stimuli finer with apices directed outward. The forceps-plate is scarcely as broad in the present species. Tails smoky, faintly dark-ringed. Forelegs deep blackish, paling somewhat on tarsi; femora with slight purplish tinge. Mid- and hindlegs considerably paler, dirty amber, with traces of a ruddy patch at apices of femora. Wings *decidedly tinged with umber-brown*, paling somewhat outwardly; longitudinal veins rather bright brown, cross-veins more smoky brown; costal crossveins before bulla very numerous, in pterostigmatic area evenly anastomosed as in preceding species. Length of body 9 mm.; of forewing 10 mm.

Nymph. Male. From the nymphal skin of the holotype it is apparent that the maculation is essentially that of *validus* (1935, Can. Ent. LXVII, 102); on II the pale spots have spread and coalesced so that the dark area is confined to triangular patches on the anterior margin and a small lateral patch; on III and IV the maculation is well-defined; in V, VIII and IX the pale markings are reduced so that these segments appear largely brown; in VI and VII on the contrary the pale areas are extended by a coalescing of the subdorsal and anterolateral spots, leaving a large, roughly triangular central area of the dark color; X is largely pale. Tails pale brownish at base and whitish terminally with a broad deep brown median band and similarly colored tips.

Ventrally on the first seven segments there is a broad dark broken medio-ventral band, tapering cephalad on each segment to a point and not quite attaining anterior margin, but broadening out in posterior half of segment, especially of V and VI, where it almost coalesces with a dark lateral stripe, extending down the segments slightly interior to the pale edge; VIII and IX largely brown with the exception of small white spots on the anterior margin. Gills pale, with indistinct tracheation and the *dorsal edge strongly chitinized*. Legs pale with dark central patch on femur and tarsus banded basally and apically with brown. Separable from *validus* by the dark segments VIII and IX and the much more defined ventral maculation.

In the skin of the paratype the white areas seem more extended but the segments V, VIII and IX still remain the darkest; the ventral maculation is not apparent but the specimen is poorly marked and apparently faded by too long immersion in water.

Holotype.—♂, Shingle Creek, Penticton, B. C., May 3, 1935 (A. N. Gartrell), bred from nymph (B. 1066); No. 4110 in the Canadian National Collection, Ottawa.

Paratype.—♂, same locality, June 30; bred (B. 1136).