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NOTES ON OUR EASTERN SPECIES OF THE MAY-FLY
GENUS *HEPTAGENIA*.

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The May-fly genus *Heptagenia* is a very well marked one, in the form that Walsh used the name. Eaton split up the genus into several, none of which are readily identified; most of these genera are based on secondary sexual characters, which I cannot recognize as of generic value. *Epeorus* (with *Iron*) is perhaps the most distinct group, and may yet be used in a subgeneric sense, if some character can be discovered to support it. In the male the basal joint of tarsus I is subequal to the second joint, and in most of the species the setæ are brown, not marked with black at tips of joints; however, in *H. (Epeorus) modestus*, described below, the setæ are as in other *Heptagenia*.

It may be remarked here that in *Heptagenia* every alternate joint of the setæ is unmarked or only faintly marked at its tip; whereas in *Siphonurus* every joint of the setæ is equally marked with black at its tip; this enables one to readily distinguish the setæ of these two genera, when, as frequently happens, they are broken off in a vial or box containing both genera.

I have added the description of one Californian species of *Epeorus*.

The following table of the Eastern species of *Heptagenia* (except *Epeorus*) applies to the males; females, however, will, in some cases, also run out correctly. There are several species described from the Eastern United States or Canada that I have not identified; and one or two of my identifications are somewhat doubtful to me, especially *H. simplex*. The form I have from Washington may very possibly be a new species allied to the true *H. simplex*.

1. Thorax with a broad dark median stripe, or two narrow stripes close together, male with basal joint of tarsus I longer than apical joint..... *H. verticis*.
Thorax without dark median stripe..... 2.
2. Tips of hind wings distinctly dark; beneath the bulla the cross-veins are more numerous than elsewhere and faintly clouded. *H. vicarius*.
Tips of hind wings not darker..... 3.
3. Anterior margin of head black; colour pale yellowish, with black spots on the pronotum and pleura, no dash in wings..... *H. marginalis*.
Anterior margin of head not black, though there may be black spots above it..... 4.

4. Two black spots or a band on face under the antennæ; femora banded in the middle..... 5.
 No black spots on face under antennæ 7.
5. No dash in wing; about two cross-veins margined with black near the place, thorax brownish *H. frontalis*.
 A dark dash in wing, thorax and abdomen often yellowish..... 6.
6. A spot each side on face under antennæ; abdomen mostly pale..... *H. interpunctata*.
 A band on face under antennæ; abdomen usually darker..... *H. Canadensis*.
7. All costals before bulla broadly margined with black, also some other cross-veins; small species *H. maculipennis*.
 Not so many costals margined. 8.
8. Small species, veins hyaline..... *H. simplex*.
 Larger species, veins yellowish, costal area yellowish. *H. flavescens*.
 Veins brown or marked..... 9.
9. Femora unbanded in middle, veins all brownish..... *H. placita*.
 Femora banded in middle..... 10.
10. Two small dark dots on median carina between antennæ, thorax dark *H. tripunctata*.
 No such dots..... 11.
11. Thorax and abdomen very pale; the longitudinal veins mostly pale *H. pulchella*.
 Thorax and abdomen darker, some of the longitudinal veins brown. 12.
12. Apical costal area darker; larger species, 10 mm. long. *H. luridipennis*.
 Apical costal area not much darker; smaller species, 8 mm. long *H. terminata*.

Heptagenia marginalis, n. sp.

A rather large pale species, but not as pale as *H. flavescens*, the anterior margin of the produced clypeus black: pronotum each side with a black stripe, and the lower margin black; a black mark on the hind edge of coxa I, one each side of coxa II, one behind the last and rather above it, and one above coxa III at base of abdomen, dorsal segment narrowly margined behind with black, and a dark oblique stripe each side, setæ rather dark; venter pale, unmarked, except the ventral plate of female is rather darker; this plate is nearly hemispherical and nearly covering the next segment; wings faintly darker along the costal area, especially near

the tip; venation brown, none of the veins margined, basal costal cross-vein wholly pale; last dorsal segment of abdomen with two narrow parallel depressions above. Legs pale, femora a little darker at tips, not in middle. In the male the basal joint of tarsus I is shorter than the fifth. Length, 10 mm.

From Glencarlyn, Va., July 23; Harrisburg, Penna., Wetzels' Swamp, Oct. 2, and Great Falls, Va., June 18, ♂.

Heptagenia placita, n. sp.

Male: Head pale, a transverse dark band on vertex; notum rich brown; pleura pale, mostly white; abdomen pale, posterior margin of dorsal segments narrowly black; last two segments reddish-brown; setæ very pale, the joinings barely marked; venter pale; legs pale, femora without median mark, but distinctly darker at tips, tip of tibia I black. Wings hyaline, with brown venation, apical marginal area suffused with brown, basal costal cross-veins black, and costal area before it rather darkened, no other veins margined, six cross-veins before bulla, twelve beyond it. First tarsal joint of leg I one-half as long as second joint, and a trifle longer than the fifth joint. Length, 8.5 mm; wing, 9.5 mm.

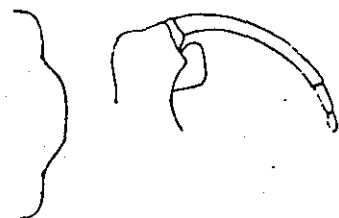


FIG. 13.—*Heptagenia placita*, male forceps and last dorsal segment.

From Sport Island, Sacandaga River, N. Y., June 12. (Alexander.)

Heptagenia tripunctata, n. sp.

Male: Thorax as dark as in *H. terminata*, femora with middle and apical dark bands, tip of tibia I dark; basal joint of tarsus I one-half as long as second joint, subequal to fifth joint; a few brown dots on face, especially two near middle below the anterior ocellus. Each segment of the abdomen with three dark dots on its hind border, one at middle, and one on each lower side, near the stigma; venter unmarked. Wings with dark on the apical costal part; basal cross-vein very heavy and black, other costals also dark; anterior pleura with an oblique dark streak; eight to ten costals before bulla, about fifteen beyond. Length, 10 mm.

From Milwaukee, Wisconsin, also Westfield, N. Y.

Heptagenia frontalis, n. sp.

Male: Pale yellowish, resembling *H. pulchella* and *H. terminata*. There is on the face a black spot under each antennæ and adjoining the

not marked; wings hyaline, rather darker in costal area near the tip; venation pale brown, the costal cross-veins very faint in basal part of wing. Leg I of male very long, the basal tarsal joint as long as the second, the third about as long, and the fourth plainly shorter. About six or eight costal cross-veins before bulla, and twelve to fifteen beyond. The male forceps very long and slender, the submedian appendages, seen from side, show a submedian erect, slender tooth or spine. Length, 9 mm.; wing, 9 mm.

From near Gloversville, N. Y., May 15. (Alexander.)

Heptagenia (Epeorus) modestus, n. sp.

Pale; thorax and tip of the abdomen dark; other segments of the abdomen narrowly tipped with dark; legs pale, femora banded near the middle with brown, tip of tibia I of male black; basal joint of male tarsus I about as long as the second joint, the third as long as second, the fourth much shorter, fifth one-half of the basal; the first, second and third together a little longer than the tibia; setæ pale, their alternate joints tipped with dark; wings scarcely darker in the apical costal area, longitudinal veins faintly brown, the cross-veins darker brown, none marked with black, except the basal costal; five or six costals before bulla, eight or ten beyond. Length, 6.5 mm.

From Washington, D. C., and High Island, Md., Sept. Readily separated from other species by the pale setæ marked with dark at tips of joints.

Heptagenia (Epeorus) Californicus, n. sp.

Thorax pale brownish; abdomen pale, hind margin of each segment dark; tip of abdomen darker than elsewhere; setæ brown, unmarked; wings with the costal margin rather dark, especially toward tip; venation pale brown, no heavily-marked veins; femora unmarked, but rather brownish, tip of tibia I of male dark; basal joint of tarsus I fully as long as the second, third also as long, fourth a little shorter; first and second tarsal joints together nearly as long as the tibia.

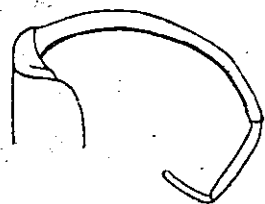


FIG. 16.—*Epeorus Californicus*, male forceps.

The submedian appendages, seen from the side, do not show any spine above; the last segment of the male forceps is very long. Length, 10 mm.

From the mountains near Claremont, Calif. (Baker.)