# A REPORT ON TWO MAYFLY GYNANDROMORPHS[1]

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The anomalous condition of gynandromorphism has been noted in the insect order Ephemeroptera several times in the past. In view of its rarity among the mayflies, it was felt that the collection within a period of eight days of two individuals showing this characteristic was well worth reporting. A review of the literature indicates that the phenomenon of gynandromorphism is more strikingly developed in the two specimens herein discussed than in any other described North American forms, chiefly because of the remarkable enlargement of the male compound eye.

The literature concerning gynandromorphic individuals was summarized by Daggy (1944) in a paper describing two of his specimens in which the condition was seen. Until now, no anomalous individuals in either the genus *Heterocloeon* or *Pseudocloeon* have ever been reported. In Europe, a member of the same subfamily, *Baetis rhodani,* appears to be the commonest form showing gynandromorphism.

The gynandromorphic specimen of *Heterocloeon curiosum* was taken while it was in flight over the Cullasaja River at Turtle Pond Bridge, Macon County, North Carolina, on August 21, 1948. Numerous females of a species, thought at that time to be in the genus *Baetis,* were seen flying at a height of from four to ten feet above the surface of the stream. They flew over the swiftest part of the river, occasionally dropping down to the water. The flight was in bright sunlight and was usually in a straight line with intermittent dips being made by individuals in the swarm. In all, about fifty specimens were collected from 1:45-3:30 P.M. when the swarming apparently ceased. As the specimens were collected, I observed that one seemed to be a male, and yet no others of this sex were collected during the afternoon, even though a careful search of the area was made. Later examination of the specimens showed that the apparent male was no true representative of that sex, but a gynandromorph which was in flight with the females. Obviously the female characteristics or habits far overshadowed its male-like

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characters because, when it was caught, it was behaving as a female.

The following week, on May 28, while I was collecting adult mayflies about 5:00 P.M. as they flew over a small branch of the Whitewater River, Jackson County, North Carolina, the second gynandromorph was taken. Again, this was not immediately recognized as an anomaly and it was not until I returned to the laboratory at Highlands, that I became aware of my catch. This specimen proved to be in the genus *Pseudocloeon*. Fortunately, both males and females were taken along with the gynandromorph and so identification was possible. It belongs to a new species which I shall describe in a future report.

Since both males and females were taken at the same time as the second specimen, I cannot report as to whether it behaved as a male or as a female; however, at the time of collection, the individuals were not flying in swarms, but individually with the males rising and falling in the fashion typical of the group, sometimes rising to a height of at least fifteen feet and dropping to within inches of the water. The flight of the females was a straight forward advance with occasional dips. No mating was observed at that time.

DESCRIPTION OF THE GYNANDROMORPHIC SPECIMEN OF PSEUDOCLOEON SP. The right side of the head is typical of a true male with the greatly enlarged turbinate eye. Coloration of the right eye follows the usual pattern for males of this genus with the upper portion orange-red in color and the basal portion blackish gray. The distribution of pigmentation on the vertex of the right side of the head is obscured by the enlarged eye. The left side of the head bears an eye which does not differ in appearance from that of a normal female compound eye. Pigmentation on the left side of the head is similar to that of females. Figure 3 shows an oblique view of the head of the specimen.[2]

The meso- and metanotum are much more heavily pigmented on the left side of the mid-dorsal line than they are on the right. Figure 5 indi-

[2] The drawings for this paper were executed by Miss Esther Coogle, Staff Artist, Dept. of Biology, Univ. of Florida.

Figure 1. Dorsal view of a gynandromorph of *Heterocloeon curiosum* (McD.).

Figure 2. Dorsal view of the head of the gynandromorph shown in figure 1.

Fig 3. Oblique view of the head of a gynandromorph of *Pseudocloeon* sp.

Figure 4. Ventral view of the terminal abdominal segments of the *Pseudocloeon* gynandromorph.

Figure 5. Dorsal view of the *Pseudocloeon* gynandromorph.

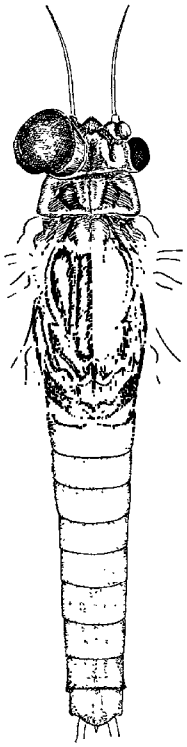

FIG. 1

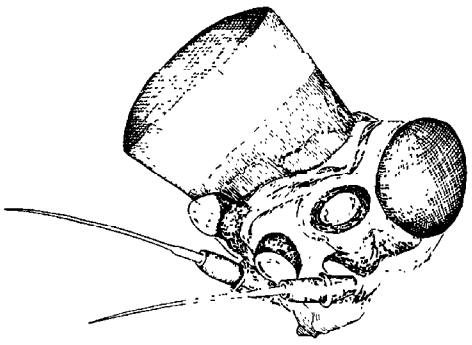

FIG. 3

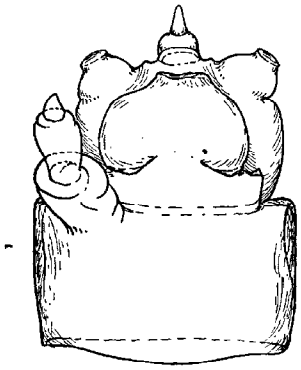

FIG. 4

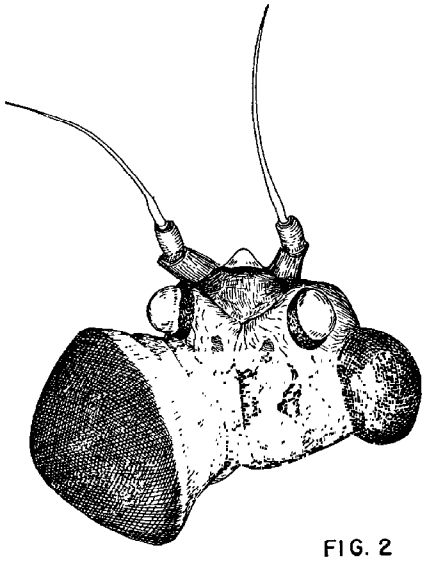

FIG. 2

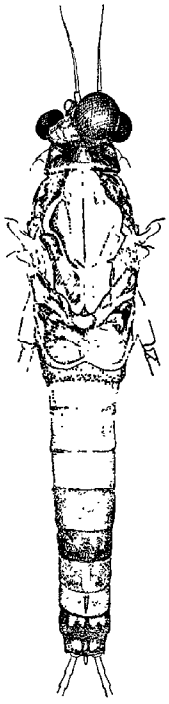

FIG. 5

cates the difference in intensity of coloration in this part of the insect. The prosternum is heavily pigmented with reddish brown, while the meso- and metasternum are pigmented laterally but in the median area, the sternites are white.

The left prothoracic leg is missing and the right appears to be similar to that of normal females taken at the same time as the gynandromorph. The meso- and metathoracic legs are not distinctive. The wings appear to be normal.

The abdomen has the typical male distribution of pigment dorsally, with tergite 1 heavily colored, tergite 2 considerably lighter, and tergites 3-5 white with brownish lateral markings. On the latter tergites, there is no indication of either the right or left sides being more heavily pigmented. Tergites 6-10 are rather dark and give the abdomen the common male color pattern consisting of a central white area (tergites 3-5) bounded anteriorly and posteriorly by darkly colored segments. It is more usual for tergite 6 to be white or light colored in normal males of other species of *Pseudocloeon*. Figure 5 illustrates the distribution of color in the dorsal part of the abdomen. Ventrally, the abdominal sternites are mostly white with some lateral reddish-brown coloring.

In most males of this genus, abdominal segments 2-6, being filled with air, appear semi-translucent, while in females which still retain their ova, the abdomen lacks the translucent appearance until the eggs are discharged. The gynandromorph, however, seems to have its abdomen partially filled with underdeveloped ovaries, and, although the central portion is white as in males, there is no evidence of any translucence.

One of the most interesting features of this specimen is the structure of the genitalia. The left gonapod has developed, but development is unusual in that the clasper is rudimentary. There is no evidence whatsoever of the development of the right clasper. The terminal abdominal segment is drawn in ventral view in figure 4.

DESCRIPTION OF THE GYNANDROMORPHIC SPECIMEN OF HETEROCLOEON CURIOSUM (McD.) The gynandromorph of *Heterocloeon curiosum*, with its male-like characteristics concentrated in the anterior part of the body, is considerably less masculine than is the specimen of *Pseudocloeon* described above.

The head is divided longitudinally into a male side on the left and female on the right. The turbinate male eye is not completely normal since it is not regularly oval in dorsal outline. It bulges upward and laterally giving it an irregular appearance. This is shown in figure 2. The color pattern on the dorsum of the head is somewhat obscured on the left side by the enlarged compound eye. A normally developed female eye is present on the right side of the head. The left dorsal side of the thorax has the dark brown coloration characteristic of males, while the right side is much more lightly colored and is approximately the same shade as that of a normal female taken in flight along with the gynandromorph (Figure 1). Ventrally, the thorax is rather uniformly dark colored. The forelegs on both sides of the specimen are normal and resemble those of typical females. The other legs are also normal. The forewings are normal but the hind wings are so minute as to be almost lost against the coloration

of the thorax. This is true of normal females as well, and is characteristic of the genus.

The remainder of the specimen seems to be identical with that of a normal female. Abdominal segments 1-6 appear, when viewed from the side, to be filled with air, and are semi-translucent; however, one ovum protrudes from the opening of each oviduct between the 7th and 8th segments. The removal of a small part of the lateral wall of the posterior part of the abdomen showed the presence of ova within that section. It is very likely that this specimen had mated as a female and then released most of its eggs before capture. There is no indication of the development of any male external genitalia. The caudal filaments resemble those of a normal female.

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# NOTES ON THE FLORIDA BUPRESTIDAE (COLEOPTERA)[1]

REUBEN CAPELOUTO

Since the author undertook the study of the Buprestid fauna of Florida many new and interesting data have come to light. These data will be presented in this paper and it is hoped that the information will add to the knowledge of the Coleopterous fauna of Florida. At present eighty-one species, two varieties and two subspecies are recorded from Florida.

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