

Reprinted from BULLETIN OF THE BROOKLYN ENTOMOLOGICAL SOCIETY,
Vol. LVII, No. 2, pp. 47-50. April, 1962.

CLOEON DIPTERUM (L.) IN OHIO (EPHEMEROPTERA: BAETIDAE)

By JAY R. TRAVER
University of Massachusetts

Cloeon dipterum (Linn.)

Ephemera diptera Linnaeus, 1761, Fn. Suec. ed. 2, No. 1477; 1767,
Syst. Nat. ed. 12, pars 2,906.

Burks (1953) in his important paper on the mayfly fauna of Illinois reports the presence in that State of a single female imago of *Cloeon dipterum* (L.). He says of it: "the single female specimen from Illinois is probably an adventive." A description of the male imago of this species, based on specimens collected in Switzerland, and that of the female imago taken in Illinois, are included in Burks' paper. The above appears to be the first record of the type species of the genus *Cloeon* in North America. *Cloeon dipterum* is a common species in many parts of Europe, and one which exhibits a considerable amount of variation in color and color pattern, particularly in the male. Eaton (1885) gives a lengthy account of *C. dipterum*, with detailed descriptions of both sexes and notation on the color variants, as well as a complete synonymy for the species. Ulmer (1932) figures the abdomen of male and female and presents a brief summary of the specific characters.

In the summer and early autumn of 1960, many specimens of a baetid mayfly were captured in Lucas, Richland County, Ohio, attracted by lights on the porch of a home in that town. The females, many of which appeared at first sight to be rather pale in color, proved on closer examination to be strongly and distinctively marked with reddish or blackish brown, and with the costal margin of the wing distinctly tinged with grayed orange or dull amber color. Males taken at the same time and place were almost black: they were so much darker than the females as to appear at first to be of a different species, especially as the wing lacked the tinted costal margin. In the females, the cross veins extending in three irregular rows across the disc of the wing were blackish and much thicker than the adjacent longitudinals; in the males, these veins were but slightly thickened, yet still noticeably darker than the longitudinals. In Burks' key to the species of the genus *Cloeon* in Illinois, these specimens fall to the species *dipterum*. A careful comparison of male and female imagos from Lucas, Ohio, with Eaton's excellent and detailed descriptions seems to leave no doubt that these baetid mayflies are indeed *Cloeon dipterum*.

Variations in color and color pattern fall well within the limits for the European forms, as indicated by Eaton. Legs of the males are amber yellow, fore legs darker, faintly tinged with reddish in some specimens; tips of fore femora brownish; all femora either with subapical reddish brown band or with small spot of color in same area, and with narrow longitudinal black pencilings on surface. Claws brownish; tarsal segments usually narrowly darker. Wings faintly tinged with amber in the stigmatic area, in some but not in all males; C, Sc and R faintly amber brown, other longitudinals as far as the cubito-anals paler but still evidently brownish; cross veins slightly darker than the longitudinals but barely thickened; marginal intercalaries faintly brownish, darker on some specimens. Most of the males represent the darker form of Eaton's Variation I: abdomen wholly dark brown, or with paler triangles submedially on mid-tergites, also laterally on 4 or 5 through 8. In some males, the pale submedian triangles on the tergites are more distinct; dark oblique stripes extend laterally on each side from these triangles; the mid-abdominal sternites are translucent, paler than the dorsum, with a dark mark laterally on each, adjoining the pleural fold. In still others, however, the abdomen is paler and distinctly tinged with reddish, especially on segments 7 and 8. Tails of male pale brownish or yellowish, every third or fourth segment darker basally and in the middle; apically, segments not darkened at the joinings. Genitalia are typical of the species, as figured by Eaton (Pl. 17, Fig. 31a).

The females agree well with Eaton's descriptions, some being largely yellowish, others "of a rosy fawn-colour or rosy grey" (Eaton), but all have the reddish or brownish black abdominal markings characteristic of the species. Legs of female much as in male, the subapical femoral band rather more prominent; in addition, a reddish brown longitudinal streak may be present near base of fore femur; narrow dark line along inner margin of tibia near base. Fore leg very slightly more than one-half the length of the wing. As noted above, cross veins in the disc of the wing are much thickened and blackish, the marginal intercalaries distinctly brown except in the cubito-anal region. These facts are evidenced also in two rather dilapidated subimago females from Europe, determined by Hagen, and presented to me through the kindness of Dr. P. J. Darlington of the Museum of Comparative Zoology, Cambridge, Mass. Cross veins in the costal, subcostal and radical spaces are white. Tails in this sex are more strongly marked than in the male, with the darker joinings continuous to tip. Near the base, some entire segments may be largely reddish brown, narrow

and wide joinings alternating more or less regularly. The ground color may be tinged with reddish brown, instead of the paler yellowish of the male.

35 female imagos from Lucas, Ohio, taken from August 20 to October 6, 1960, were measured. These were arranged in seven size groups, as follows. Wing 9 mm. and body 8mm., one specimen in August; wing 8 and body 8, two in August; wing 8-8.5 and body 7-7.5, eleven in August, four in September, three in October; wing 8 and body 6.5, one in September; wing 7-7.5 and body 7, four in August, two in September; wing 7 and body 6-6.5, two in August, two in September; wing 6.5 and body 5.5, one in August, one in September. The largest female was taken on August 22; the smallest ones on August 20 and September 8.

20 male imagos taken during the same period fell into 5 categories as to size, as indicated. Wing 7 mm. and body 6.5-7.5 mm., four in August, one in September, one in October; wing 7 and body 6-6.5, two in September; wing 6.5 and body 7, one in September; wing 6-6.5 and body 6-6.5, two in August, six in September, one in October; wing 5.5 and body 5.5, two in September. The largest male was taken October 7, the smallest ones on September 21 and 27. Thus there seems to be no correlation, in either sex, between date of capture and size of the specimen. For the European forms of this species, Eaton gives 6-11 mm. for wing of male, 5-10 for body length; for females, 9-11 mm. for wing, 8-11 mm. for body. The female taken in Illinois and reported by Burks was of the same size as the largest one from Lucas, Ohio.

Representatives of both sexes of *C. dipterum* were taken on the nights of August 20 and 21, 1960, by M. A. Parsons, L. Darling and J. R. Traver. All specimens taken from August 22 to October 6 of that year were collected by Mrs. M. R. Parsons at the same location, the front porch of her home. Mrs. Parsons likewise collected what she believes to be representatives of this same species, again from her front porch, beginning in early April of 1961. These latter specimens are not yet available to me for study. It would appear that *C. dipterum* is well established in this locality in Ohio. If the early spring forms are indeed of the same species, then these insects have a relatively long period of emergence.

It is conjectured, but not yet proved, that the nymphs inhabit a small pond not far from the house in Lucas, Ohio, where all of the above specimens have been taken. Such quiet waters seem to be the usual abode of the nymphs of *C. dipterum* in Europe. Thus Eaton (p. 186) says: "In Great Britain, clean ponds that acquire a rather high summer temperature are frequented by this species;

at Paris, tanks for Nymphaeaceae and other water-plants in the Jardin des Plantes are its favourite resorts." Kimmins (1942, p. 59), writing of this species in Britain, says: "Common in ponds with a rather high summer temperature, May to September." Macan (1961) states on page 36: "Abundant in small rich ponds but also in lakes and in the slowest parts of rivers." On page 50 of the same paper, Macan, "based on unpublished information from a moorland fishpond," has this to say: "*Cloeon dipterum* overwinters as a small nymph, and there is a long period of no growth. In 1960, emergence of this generation took place in the months of June and July, and it gave rise to another overwintering one. In 1957, on the other hand, there is distinct evidence of a quick summer generation starting in July and finishing early in September." Distribution of the species in Great Britain is charted by Macan on page 58, Figure 37; likewise a summary of the life history is shown as a graph (Fig. 28d, on p. 48).

It would be of great interest to compare the life cycle and the nymphal habitat of the Ohio forms of this species with the information given above for their European relatives. For many years it has been known also that this species can be viviparous. Of this Eaton writes (p. 186): "Hitherto instances of viviparation on the part of *C. dipterum* have been observed only in the warmer parts of Italy and France." Is our climate perhaps too cold for vivipary to occur here? Certainly no evidence for it is seen in the Ohio specimens collected to date.

REFERENCES

- Burks, B. D.** 1953. The mayflies, or Ephemeroptera, of Illinois. Bul. Illinois Nat. Hist. Survey 26 (1): 1-216, 395 figs.
- Eaton, A. E.** 1883-1888. A revisional monograph of recent Ephemeridae or mayflies. Trans. Linn. Soc. London, Second Ser. 3, Zoology: 1-352, 65 pl.
- Kimmins, D. E.** 1942. Keys to the British species of Ephemeroptera with keys to the genera of the nymphs. Freshwater Biolog. Assn. of the British Empire, Scient. Publ. No. 7: 1-64, 36 figs.
- Linnaeus, C.** 1761. Fauna Suecica, Second Edit., 578 pp. 2 pls.
- 1767. Systema Naturae, ed. 12, tome 1, pars 2, pp. 533-1327.
- Macan, T. T.** 1961. A key to the nymphs of the British species of Ephemeroptera. Freshwater Biolog. Assn. Scient. Publ. No. 20: 1-64, 37 figs.
- Ulmer, G.** 1932. Tierwelt Mitteleuropas 4: 1-43, 149 figs.