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J. R. WATSON, Gainesville.....Editor
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OVOVIVIPAROUS MAYFLIES IN FLORIDA [1]

LEWIS BERNER
University of Florida

The phenomenon of ovoviviparity is present in several of the metazoan phyla and is of fairly common occurrence among the Arthropoda. Insects of many species give birth to either nymphs or larvae instead of laying eggs, some parthenogenetically, others with bisexual reproduction. Among the latter are representatives of the Ephemeroptera, Orthoptera, Hemiptera, Lepidoptera, Coleoptera, Strepsiptera, and Diptera.

Ovoviviparity in mayflies has been observed in *Callibaetis vivipara* of South America and *Cloeon dipterum* of Europe. In North America, the production of living young seems to be confined to the genus *Callibaetis*. According to Needham, Traver, and Hsu (1935: 85), a single female of an undetermined species of *Callibaetis*, taken at McLean, New York, in 1924, was found on dissection to contain first instar nymphs 0.6 mm. long; however, this adult was poorly preserved and the immatures were consequently unsuitable for study.

In July, 1939, I collected at a lighted sheet placed near the bank of a clear, calcareous stream, Blue Springs Creek, near Marianna, just below an area which has been dammed to form a rather long lake. Among the many insects which were attracted to my light were numerous specimens of *Callibaetis floridanus*, the nymphs of which, I assume, had lived in the

[1] A paper presented before the Florida Academy of Sciences, November, 1939.

artificial lake across the road from where I was lighting. Since this is such a common species and there seemed to be so many mayflies which I thought would be more interesting, only five females were taken in order to record their occurrence in this particular area.

After returning to the University at Gainesville, I examined this material and found in the bottom of my dish numerous oval-shaped objects which proved on closer study to be well-developed eggs. Opening one, there was revealed a completely formed mayfly nymph. Looking then at the female specimens of *Callibaetis floridanus*, I noted several of these eggs, some apparently with the chorion ruptured, protruding from between the seventh and eighth abdominal segments. These females were probably ready to oviposit when collected and stimulated by immersion in alcohol, had released some of their young.

Following the discovery of ovoviviparity in these five specimens, I examined the remainder of my material of this species and found some females with eggs which appeared to be unfertilized, some with young partially developed, and others with young nymphs fully formed but still within the egg. I believe that, following mating, the females remain quiescent until the eggs have completed development within the abdomen, and that the nymphs are normally released from the eggs at approximately the moment of laying.

The egg is oval shaped with a very thin, transparent chorion. The nymph, tightly coiled within this shell, has the legs folded beneath the thorax, the abdomen bent double so that the legs are concealed, cerci are held beneath and the antennae close against the head. The head is the most prominent feature of the nymph and on it, five dark spots, the developing eyes stand out clearly against the white body. Abdominal segments, mouth parts, and the rather long legs are clearly discernible when a specimen is uncoiled. Gills, of course, have not yet formed and if they behave in this species as in others in which the post-embryonic development has been studied, these structures will probably develop in the second or third instar.

Longevity is probably correlated with ovoviviparity in mayflies. Normally the life span of adults is from a few hours to two to three days, but a female *Cloeon dipterum*, the European ovoviviparous mayfly, was kept alive for twenty-one days. In the summer of 1937, I kept a female *C. floridanus* alive in a paper sack for eight days, a period which I believe would be

more than sufficient for development of eggs to occur. Males of *C. floridanus* die within one to two days after the subimagal molt.

The females of another Florida species, *Callibaetis pretiosus* Banks, likewise contained fully developed nymphs. Furthermore, I found a female *Callibaetis* from Michigan whose abdomen was filled with eggs which were almost ready to hatch. It, therefore, appears likely that many if not all of the species of this genus are normally ovoviviparous.

REFERENCES

COMSTOCK, J. H. 1936. An Introduction to Entomology. Comstock Publishing Co., Ithaca, N. Y.

EATON, A. E. 1883-1887. A revisional monograph of recent Ephemeridae or mayflies. Trans. Linn. Soc. London, Sec. Ser. Zool. 3: 1-352, pls. 1-65.

NEEDHAM, J. G. and MURPHY, H. E. 1924. Neotropical mayflies. Bull. Lloyd Lib. 24, Ent. Ser. 4: 1-79, pls. 1-13.

NEEDHAM, J. G., TRAVER, J. R., and HSU, Y. 1935. The Biology of Mayflies. Comstock Publishing Co., Ithaca, N. Y.

A SUICIDE HOST

The blue-tailed skink *(Plestiodon fasciatus)* often called the "scorpion", is a true host of the immature stages of the black-legged tick *(Ixodes scapularis)* in the vicinity of Gainesville, Florida. Two specimens collected in early May, 1939, were infested with a total of 123 larvae and 8 nymphs all of which were alive and in various stages of engorgement. The fence lizard *(Sceloporus undulatus)* often called the pine lizard or swift, is also attacked by the same stages of this tick. Death, however, is the penalty for those that attach to this host. Seven fence lizards collected in the same vicinity and during the same period as the blue-tailed skinks mentioned above, were infested with a total of 42 larvae and 6 nymphs of which 34 of the larvae and 5 of the nymphs were dead and the condition of some of the others indicated that the rest were destined to succumb.

H. HIXSON