

SOME OBSERVATIONS ON THE LIFE CYCLE AND  
HABITS OF DORYDIELLA FLORIDANA BAKER  
(HOMOPTERA-CICADELLIDÆ).

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While working with *Cicadellidæ* during the past few years, several interesting species have been found and studied. *Dorydiella floridana* is one which has been especially interesting to the writer because of its accidental discovery and in view of the fact that practically nothing was known concerning its habits. It was described by Baker in 1897 from material collected in Florida. During the past twenty-five years it has been taken occasionally in New Jersey, Tennessee, Massachusetts, Pennsylvania, Indiana, Illinois and South Dakota. Its range is therefore quite extensive, although it has been considered as a so-called rare insect and there are very few specimens even in specialists collections. During the summer of 1919 an ecologic study of the leafhoppers of Presque Isle, Pa., was undertaken and this species was collected in general sweeping near one of the numerous lagoons. When it was known that the insect occurred in this area, a detailed search was made to determine under what conditions and upon what plant the insect lived.

It was found to be living on *Scleria verticellata* in the *Eleocharis obtusa* association. Further observations showed that it may be found any place where it is sufficiently moist for the growth of this plant, but the optimum condition apparently for the insect, judging from relative numbers, is on the moist sandy soil within the lagoon basin, but far removed from the receding water. Undoubtedly the reason it has been collected so rarely is due to the fact that it feeds in both nymphal and adult stages on the succulent growth just above the surface of the ground and within the clump. Although only an occasional adult could be obtained by sweeping, several hundred specimens, both nymphs and adults, were obtained by picking apart clumps of *Scleria*. The nymphs were especially difficult to find at first because they were so well concealed between the leaves and so protectively colored. The brownish mottled

color, together with their elongate flattened shape, causes them to resemble so closely the dried blades of grass that their movements alone are responsible for their recognition. The movements of the nymphs especially, and to some extent those of the adults, are very sluggish and even when disturbed they will usually cling to some portion of the plant.

#### LIFE CYCLE NOTES.

Observations on the life cycle show that there is but one generation a year. The insect overwinters as an egg. These begin hatching in late May or early June, the first adults appearing about the middle of July. Although specimens in nymphal instars are found until September, all of these are late individuals of the first generation. Observations have been made only on the number of instars and the total length of time spent in the nymphal stage. No attempt has been made to obtain data on the length of time for the individual instars. The total length of time from egg to adult is about six weeks. There are five nymphal instars, three of which have been photographed and described here.

#### DESCRIPTION OF INSTARS.

##### *Second Instar.* (Figure 1).

Vertex long and flattened, apex blunt, spoon-like, slightly concave. Vertex longer than thorax, four times longer than pronotum, more than two-thirds as long as entire abdomen. Face with a very prominent keel extending from tip of vertex to clypeus. Sides of face deeply concave from edge of keel to edge of vertex. Length, 4 mm.

Color: Dirty white, irrorate with brown. Tip of vertex with a brownish cross, a rather broad median longitudinal stripe, and a short one next either eye, pale. Eyes red. Three longitudinal pale stripes, a continuation of those on vertex, extending across thorax and abdomen. Each abdominal segment excepting last with a conspicuous black spot either side just above rounded pleural portions. Face dark brown. Edge of keel, margin just below vertex and two oblique lines crossing face, pale. Legs irrorate with brown, venter pale yellow to reddish, a double median longitudinal line and side portions of plates brownish.

Posterior segment of abdomen cleft, forming two pointed projections.

##### *Fourth Instar.* (Figure 2).

Length 7 mm.

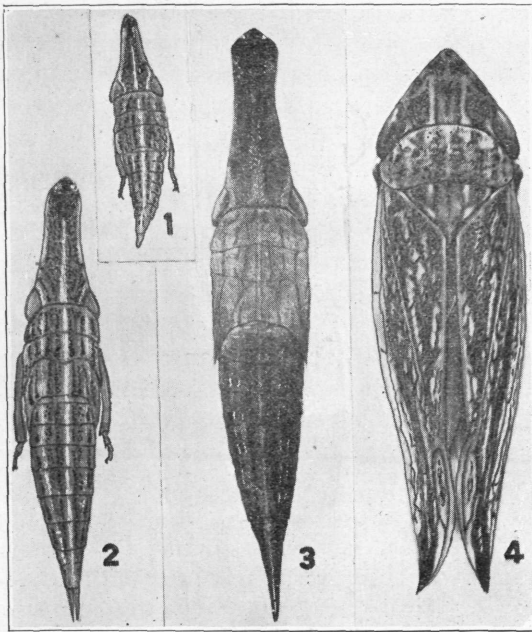
Similar to preceding with abdomen much longer proportionately, almost twice as long as vertex. Vertex about one-fourth longer than thorax. Wing pads only slightly visible. The coloration is very similar to the preceding, except that the markings are more pronounced

in this instar. The dark cross on the tip of the vertex is much more conspicuous. Thorax and abdomen with four rather definite brownish longitudinal lines, separating the three pale stripes. Face dark brown to black with similar pale markings, as in preceding instars.

*Fifth Instar.* (Figure 3).

Length, 9 mm.

In this, the last nymphal instar, the vertex is longer proportionately. It is considerably longer than the thorax and more than one-half as long as the abdomen. The vertex is even more spoon-shaped than in preceding instars and the apical portion is quite concave. The keel on the face is proportionately larger. Coloration darker and more conspicuous than in preceding instars.



Photographs of the various stages of the life cycle.

Fig. 1. Second instar nymph.

Fig. 3. Fifth instar nymph.

Fig. 2. Fourth instar nymph.

Fig. 4. Adult.

*Adult.* (Figure 4).

Length, 7 mm.

On comparing the adult and last nymphal instar, it will be noticed that the adult is much shorter, which is rather unusual among the *Cicadellidae*. Furthermore the vertex is greatly shortened and broadened in the adult. It is only slightly longer than the pronotum and is much shorter than the thorax. The conspicuous keel on the face is lost entirely, and one not familiar with the nymphal stages would scarcely place

nymphs and adults of this insect together as the same species. The elytra are well developed and pointed at the apex. The entire insect is marked with brown irrorations or ramose pigment lines.

#### PHYLOGENETIC RELATIONSHIP.

In regard to relationship, it is our belief that the earlier stages of any animal give more evidence pertaining to its relationship to other species and its ancestry than we are able to judge from the adult condition. The fact that the nymphal forms exhibit a long foliaceous vertex would certainly place this species with the *Dorydiaria*, which is composed of a group of species with this vertex character. Prof. Osborn\* placed it in this position without having seen the nymphal stage and the author† after examining the nymph also allied it with the *Dorydiaria*. Van Duzee‡ has placed it intermediate between *Phlepsius* and *Acinopterus*. The resemblance to *Phlepsius* is more or less superficial, but he has evidently placed it here because in coloration it is brownish irrorate and has definite ramose pigment lines especially on the elytra. In this respect it does resemble a species of that genus. It is true, however, that after the vertex is greatly reduced in the adult stage, the head resembles very closely the foliaceous type of *Phlepsius* head. In the nymphal stages of these *Phlepsius* species, however, so far as the author has been able to examine them, there is nothing to compare with the vertex of the *Dorydiella*. It has been placed close to *Acinopterus* no doubt because of the pointed apex of the elytron. The usual condition is a well rounded apex. In the American *Cicadellidae* this pointed elytron is found in very few genera. In addition to the *Dorydiella* and *Acinopterus* it is also found in *Dorydium*, which is one of the *Dorydiaria*. Furthermore, the nymphs of *Acinopterus* and *Dorydiella* are entirely different, suggesting diverse affinities, and the adults have very little in common except the pointed elytron, so this would seem to indicate parallel development instead of a close relationship and the emphasis should be placed upon the nymphal characters. In view of the fact we have found only one species belonging to this genus we are able to designate relationship only by the characters of the various stages of this species.

\* Ohio Journal Sci., Vol. XX, No. 5, p. 160, 1920.

† Bull. 34, St. Geol. & Nat. Hist. Survey, Conn., p. 91, 1923.

‡ Univ. of Calif. Pub., Tech. Bull, Vol. II, 1917, p. 675,