

## NOTES ON THE LIFE HISTORY AND EARLY STAGES OF *CORYTHUCHA CELTIDIS* O. & D.

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This lace-bug was described by Osborn & Drake in 1916 in the Ohio State University Bulletin (Vol. XX, No. 35, Bulletin 8, Vol. II, No. 4, p. 227) from specimens taken at Columbus, Ohio, during September, 1903, on hackberry. Later these same authors in the OHIO JOURNAL OF SCIENCE (Vol. XIX, No. 7, May, 1919) recorded its occurrence in Kentucky, Tennessee and South Carolina. Gibson also treats this species in his paper on the genus *Corythucha* which appeared in 1918 (Tr. Am. Ent. Soc. XLIV, 69-104). Heretofore nothing has appeared on its life history and early stages and the following is presented as an addition to the knowledge of the biology of this species.

Adults were first noted in New Jersey at Riverton on June 1, depositing eggs on the lower surfaces of hackberry leaves. Later, on June 21, adults and eggs were collected at New Brunswick, N. J., and from this it appears that the insect is well distributed in this state. About two weeks are necessary for the eggs to hatch and the various stages each require from 2 to 4 days of very warm weather in which to complete their growth. Cool weather retards development. There are 5 nymphal stages and from 16 to 20 days are necessary for a newly hatched nymph to become an adult. Two generations occur in the latitude of New Brunswick, N. J. Newly hatched nymphs feed in colonies on the lower leaf surface but as they become older they scatter and feed more or less independently. Many colonies of nymphs are wiped out completely by spiders and predaceous bugs and their nymphs.

The eggs are inserted in the tissue of the lower leaf surface at right angles to the leaf, usually in the angle formed by the juncture of two veins: Only the basal end of the egg is inserted and each egg protrudes well beyond the leaf surface. They are laid close to one another and the clusters may contain anywhere from 4 to 18 eggs. The adults appear to wander over the tree considerably in the spring and as a result the egg clusters are scattered. Only rarely was it possible to find more than one or

two clusters on a single leaf. In many cases each cluster was found in the basal half of the leaf and the first nymphal feeding took place in this area.

**EGG.** Length, 0.55 mm. Greatest width, 0.17 mm. Subelliptical, one side more convex than the other; tapering most at basal end which is acute with rounded end, end slightly constricted where it is inserted in the leaf tissue; sides of apical half tapering slightly; extremity of apical end truncate with rim-like collar and projecting cone-shaped cap. Cap white, remainder of egg brownish to brownish black, shining.

**FIRST STAGE NYMPH.** Length exclusive of spines, 0.61 mm. Greatest width exclusive of spines, 0.19 mm. Subelliptical, whitish or slightly brownish with a median dorsal, white area which includes part of the metathorax and the first two abdominal segments. Armature apparently similar to that of second stage nymph except that the only apparent tubercles are those on the head and the tubercular bases of the median abdominal spines. Remainder of armature appears to consist of simple spines with slightly tuberculate bases. Ventral surface, legs, antennæ whitish, most of spines white. Abdomen margined.

**SECOND STAGE NYMPH.** Length exclusive of spines, 0.78 mm. Greatest width exclusive of spines, 0.31 mm. Oval elongate; similar in color and armature to the third stage nymph. Armature more pronounced than in first stage.

**THIRD STAGE NYMPH.** Length exclusive of spines, 1.10 mm. Greatest width exclusive of spines, 0.40 mm. Oval; armature similar to that of fourth stage nymph except that the smaller spines on the margins of the thoracic lobes are absent and the lateral abdominal spines are single instead of double. Color and markings similar to those of fourth stage nymph. Color slightly darker than that of second stage nymph.

**FOURTH STAGE NYMPH.** Length exclusive of spines 1.18 mm. Greatest width exclusive of spines 0.68 mm. More oval than third stage nymph. Color and markings similar to those of fifth stage nymph. Armature similar to that of fifth stage except that in addition, the second and third abdominal segments bear single lateral spines. Sides of prothorax produced laterally. Mesothoracic lobes reaching to second abdominal segment.

**FIFTH STAGE NYMPH.** Length exclusive of spines, 1.75 mm. Greatest width exclusive of spines, 0.78 mm. Oval, dorsal surface dark brown, except for lateral half of prothoracic lobes and tubercles located on this surface, median dorsal portion of mesothorax, metathorax, and first abdominal segment and spines, posterior half of mesothoracic lobes and tubercles on this surface, the median portion of the eighth abdominal segment, the margins of abdominal segments seven and eight, the dorsal and lateral abdominal spines which are light. Antennæ, sparsely hairy, four-jointed, third joint about twice as long as the first two combined, fourth joint clubbed. Antennæ white except for clubs which are brownish. Eyes prominent consisting of numerous, reddish ommatidia. Head bears a pair of separated spines

between the eyes, posterior to this pair is a median tubercle bearing four spines, posterior to this tubercle and close to anterior edge of prothorax is a large pair of prominent tubercles each bearing five spines. Prothorax with a median dorsal elevation bearing a tubercle with two long spines and three shorter ones anterior to the long spines, behind this tubercle is a smaller median tubercle bearing a pair of diverging spines; posterior lateral margin of prothorax with a prominent tubercle bearing four spines; anterior to this tubercle on the margin are usually two large and three or four smaller spines (these spines vary in number and size); mesothorax with a pair of median separated tubercles each bearing three large spines; each mesothoracic lobe bears a prominent tubercle with four spines on lateral margin just posterior to middle; anterior to this tubercle are usually three large and two smaller marginal spines; centre of mesothoracic lobe slightly elevated; median separated spines on abdominal segments two, five, six, eight and nine; each posterior lateral margin of abdominal segments four, five, six, seven and eight bears a tubercle tipped with two long spines (sometimes a third short spine is present). All spines with tuberculate bases. All spines tipped with a short probably secreting hair. Abdomen strongly margined. Mesothoracic lobes reaching almost to fifth abdominal segment. Ventral surface brownish black except for the portion of the thorax between the legs and the first and second abdominal segments which are white. The lateral edges of abdominal segments six and seven are usually somewhat light. Legs whitish except for dark tarsi and claws. Legs sparsely hairy, hairs short and light brown in color. Rostrum extending to third thoracic segment, whitish except for brownish tip.