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Eggs, Larvae and Biological Notes on *Disonycha leptolineata* Blatchley (Coleoptera: Chrysomelidae)

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Abstract

The early stages of the alticine *Disonycha leptolineata* Blatchley are discussed with the known biological history. A brief summary of the systematic placing of the species in relation to other *Disonycha* species is mentioned.

Introduction

Beetles of the genus *Disonycha* are rather large alticines, many of which are considered minor pests of garden crops. Of the 32 species in the genus north of Mexico (Blake 1933) only four have been studied biologically: *collata* (Fabricius) (Chittenden 1912), *glabrata* (Fabricius) (Chittenden 1922, Garman 1889, Hemenway and Whitcomb 1968), *latifrons* Schaeffer (Whitehead 1918) and *xanthomelas* (Dalman) (Chittenden 1899).

Disonycha leptolineata Blatchley belongs to the *discoidea* group, consisting of three very closely related species: *discoidea* (Fabricius), *antennata* (Jacoby) and *leptolineata*. Originally named as a variety of *abbreviata* Melsheimer (Blatchley 1917) from Dunedin, Florida, it was later given species status (Blatchley 1924, Blake 1933). *Disonycha abbreviata* is designated to include various as yet undistinguishable Mexican and Central American species (Blake 1933) and still needs study. *Disonycha leptolineata* (excluding subspecies *texana* Scheer) has been recorded only in Florida (Blatchley 1924, Blake 1933) and Alabama (Balsbaugh and Hays 1972). Blake (1933) and Balsbaugh and Hays (1972) described the adults based on preserved specimens. Live adults are bright red with pure white elytra longitudinally marked with thin black vittae (Figure 1).

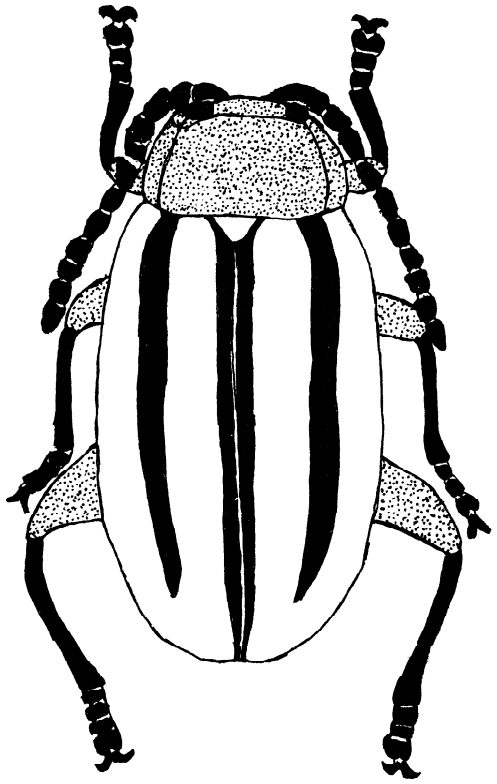

Figure 1. Disonycha *leptolineata* Blatchley. Adult habitus.

Blatchley (1924) indicated that this species occurred in association with ferns but the host plant is now known to be *Itea virginica* L. (Saxifragaceae).

Methods and Materials

In March 1985, adult beetles of both sexes were collected on *Itea virginica* in Jacksonville,

Duval County, Florida. and confined to wide-mouthed jars with a sprig of host plant. Eggs were removed when laid and transferred to large petri dishes, 56 mm by 2.6 mm, with moist paper toweling in the bottom. Larvae were reared at 26.6 C and a photoperiod of 14.5L:9.5D. SEM photographs were made of the third instar head capsule. Lateral views of the larvae and anal plate were drawn using an Olympus JM microscope with a G15X ocular containing a grid.

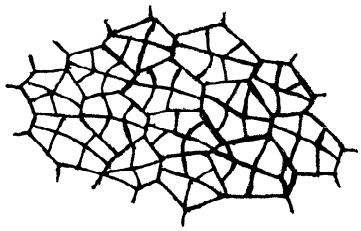

Figure 2. Close-up of the sculpturing on the egg chorion.

Description

Ova- length 1.77 mm to 2.23 mm (average of 2.06 mm), width 0.66 mm to 1.09 mm (average of 0.83 mm), n=14. The eggs, light uniformly orange, are laid in clusters of up to 10 on the upper surface of young leaves and stems of the host plant. The eggs have a reticulated pattern consisting of roughly hexagonal cells that are further subdivided into 4 to 6 smaller cells (Figure 2), apparently typical of the genus (Chittenden 1899, Garman 1889).

1st instar - (Figure 3); length 1.72 mm to 2.43 mm, width 0.45 mm to 0.66 mm, n=12.

Body a light orange with greenish midline (from alimentary tract contents). Head capsule, legs and anal plate shiny dark brown. Stemma cream colored. Specimens were measured on the day of hatching, after they had fed for awhile. Head capsule setae (Figures 4, 5) same in all instars. Setal nomenclature on the head capsule follows LeSage (1986). Nine pairs of posterior epicranial setae (pes): pes_1 in upper third of head capsule near ecdysial line; pes_2 in upper third of head capsule ventrolateral of pes_1 and above the stemma; pes_3 minute, just mesad of stemma at the ecdysial line; pes_4 less than 1/2

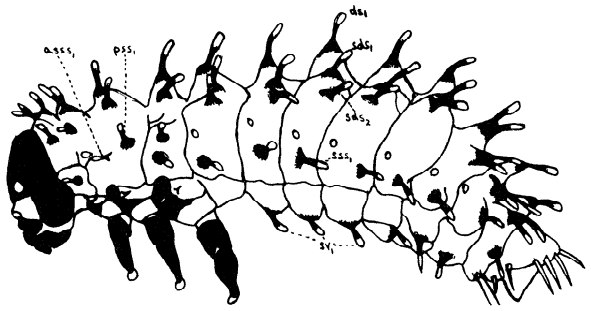

Figure 3. Lateral view of first instar. asss (anterio-subspiracular seta) ds (dorsal seta), pss (posterio-spiracular seta), psss (posteriosubspiracular seta), sds (subdorsal seta), sp (spiracle), svs (subventral seta).

stemma diameter from stemma, between stemma and frontal suture; pes_5 caudad of stemma and in line with pes_4; pes_6 posterioventrad of stemma and posteriodorsad of antenna; pes_7 located posterior of the antenna and just above the anterior edge of the mandibles; pes_8 just posteriad and even with pes_7; pes_9 posterior of pes_8 and just above it. Three pairs of frontal setae (fs) present: fs_1 even with stemma, halfway to midline; distance between fs_1 slightly greater than distance between fs_1 and stemma; fs_2 near antennal base; fs_3 between fs_2 and midline; distance between fs_3 subequal to distance between fs_2 and fs_3. Clypeolabrum with a sclerotized, arcuate, transverse suture. Clypeal setae (cs_1) near lateral edge. Two pair of labral setae (lrls): $lrls_1$ ventrad of cs_1 on lateral edge; $lrls_2$ between and slightly below line connecting $lrls_1$ and midline. Mandibles with two pairs of setae (ms): ms_1 about midway from base and anterior of ms_2; ms_2 about two-thirds from base and midway between anterior and posterior margin. Maxillae well developed. Stipes as wide as long with two outer marginal setae (mms): mms_1 near the base; mms_2 laterally near the maxillary palp. Maxillary palp with three pairs of setae (mps): base of maxillary palp bearing mps_1 and mps_2 on its inner edge; mps_3 minute, on apical segment. Postmentum of labium with two pairs of setae (pms): pms_1 at posterior edge of base; pms_2 ventromesad of pms_1. Prementum with one pair of setae ($prms_1$) near the base of

the labial palp. Antennae with three subequal segments.

All setae on the body follow the author's own terminology. Prothorax with 5 pairs of tubercles bearing setae at the anterior dorsal edge in two rows; the first row with 3 setae and the second with 2 setae. Below these and laterally there are 3 setae. Posteriorly, there is a dorsal (ds) and two subdorsal (sds) setae; sds_1 slightly anterior to sds_2.

Meso- and metathorax possess the following tubercles with a setum: a dorsal (ds); a subdorsal (sds); a posteriospiracular (pss); and an anteriosubspiracular (asss). Three minute subventral setae (svs) may or may not be present above the coxal base of each leg. Prothoracic spiracle biforous, located anteriorly. Abdominal segments 1-8 possess the following tubercles with a seta: a dorsal (ds); two subdorsal (sds), with the second (sds_2) anterior to the first (sds_1); a posteriosubspiracular (psss); a subventral (svs). Abdominal segment 9 is modified dorsally into an anal plate with 5 pairs of setae (aps) located at its posterior edge. Ventrally A8 with two pair of anterior setae and one pair of posterior setae on a common sclerotized plate. All setae are capitate except those on the venter of A8 and all of those on A9 which are thicker and non-capitate. The capitate setae are dark basally and whitish at the apex. Spiracles on A1-8 conspicuous and located anteriorly.

2nd instar - similar to 1st. Light orange with red-brown tubercles. Length from about 1.72 mm to 2.41 mm (average of 1.96 mm), width from about 0.45 mm to 0.63 mm (average of 0.52 mm), n=7, measured a day after entering the instar. All setae as in the first instar with the following modifications: A9 with two extra protuberances without setae. Ventrally with non-capitate setae: one pair between the coxae, two pairs on A7 on one sclerite; three pairs, each on a separate sclerotized area on A8.

3rd instar- (Figures 4, 5, 6 and 7).Similar to 2nd. Length from about 10.36 mm to 11.68 mm (average of 10.68 mm), width from 2.33 mm to 3.25 mm (average of 2.67 mm), n=11, measured a few days after entering the instar. Color same as 2nd instar. All setae as before with the following modifications: anterior setae of prothorax in an even row; meso- and metathoracic

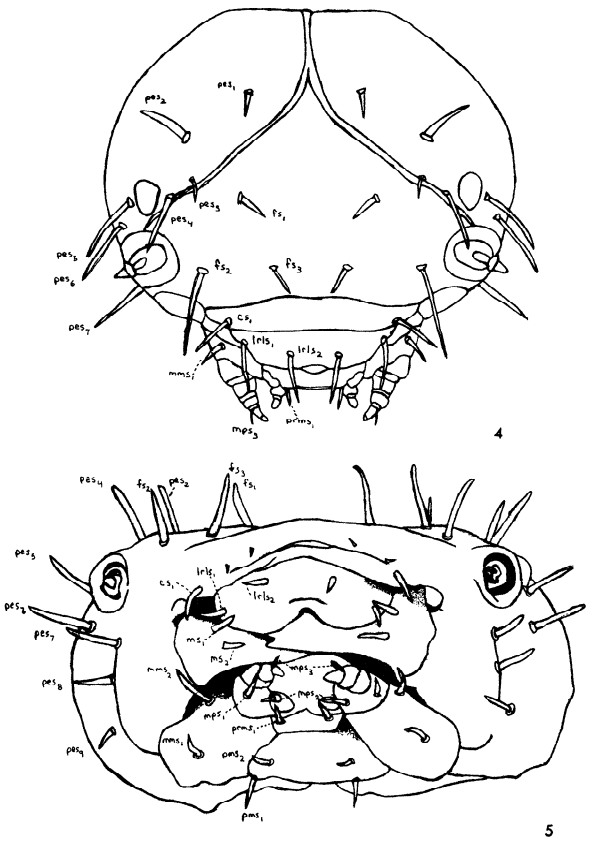

Figure 4-5. Head capsule of final instar of *Disonycha leptolineata* Blatchley. 4) frontal view. cs (clypeolabral seta), fs (frontal seta), lrls (labral seta), ms (mandibular seta), mms (maxillary marginal seta), mps (maxillary palp seta), pes (posterior epicranial seta), pms (postmental seta), prms (premental seta). 5) Ventral view. cs (clypeolabral seta), fs (frontal seta), lrls (labral seta), ms (mandibular seta), mms (Maxillary marginal seta), mps (maxillary palp seta), pes (posterior epicranial seta), pms (postmental seta), prms (premental seta).

segments with a posteriosupraspiracular setum ($pspss_1$); and a anteriosubspiracular ($asss_1$) and posteriosubspiracular ($psss_1$) seta on meso- and metathoracic segments; A9 with 7 pairs of setae, aps_1 and aps_6 less than half the length of $aps_{2\text{-}5}$ and aps_7.

Discussion

The sparse information available on *Disonycha leptolineata* is mostly taxonomic (Blatchley 1917, Blake 1933). Some consider *leptolineata*

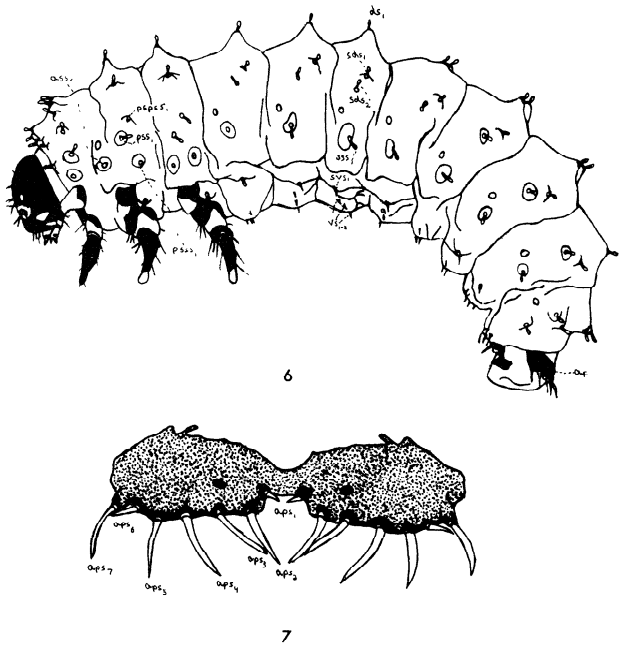

Figure 6-7. *Disonycha leptolineata* Blatchley. 6) Lateral view of final instar, asss (anteriosubspiracular seta), ds (dorsal seta), pspss (posteriosupraspiracular seta), pss (posteriospiracular seta), psss (posteriosubspiracular seta), sds (subdorsal seta), sss (subspiracular seta), svs (subventral seta), vs (ventral seta); 7) Dorsal view of anal plate on final instar, aps (anal plate seta).

and *antennata* as varieties of *discoidea* (Blake 1933). Since *discoidea* feeds on *Passiflora* sp. and occurs in old fields and along mesic wood edges where its host plant grows, it is improbable that *leptolineata* is conspecific. *Disonycha antennata* has been collected only twice in the United States from Big Pine Key in Monroe County, Florida (Blake 1933) and no host is recorded. Too little is known about *antennata* to comment further on its relationship to the other two species. Adult *D. leptolineata* appear in late February to early March and start feeding on the budding *Itea*, a shrub of alluvial woods and various other wet places. The adults perch conspicuously on the upper surface of leaves or near branch tips. They take flight readily if disturbed. Larvae were observed in the wild on only one occasion and were also conspicuous, indicating possible inedibility. The species is apparently univoltine as no ova could be obtained from captive females reared from ova or from females collected later in the year after the host had finished putting out new growth. Duration of the egg stage was 4-9 days, averaging 6. Larvae in the lab were gregarious at first but became progressively less so in subsequent instars. Early instars eat small holes while the last instar tended to eat most of the leaf except the midrib. Duration of the 1st stadium was 5-12 days, averaging 8; 2nd stadium lasted 3-11 days, averaging 6.5; and the 3rd stadium 6-13 days, averaging 9.3 days. The duration of the egg stages and stadia were based on observations of 6 egg clusters.

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