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THE LARVA OF *AUTOGRAPHA FLAGELLUM* (WALKER) (NOCTUIDAE: PLUSIINAE)

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ABSTRACT. The mature larva of *Autographa flagellum* (Walker) is described and illustrated.

The noctuid genus *Autographa* Hübner (Plusiinae) is represented in North America by sixteen species (Eichlin & Cunningham, 1968). Larval descriptions of only eight species have been published to date. The larvae of our known species of *Autographa* are all semi-loopers, lacking prolegs on abdominal segments 3 and 4. In the past, identification of all our nearctic Plusiinae has been difficult due to the small number of reliable differentiating characters available. Recent investigations have shown that the larval mouthparts, especially the hypopharyngeal complex, offer good separating characters (Eichlin & Cunningham, 1969, 1978). The larvae have been reported as feeding on a wide variety of low plants and trees (Eichlin & Cunningham, 1978).

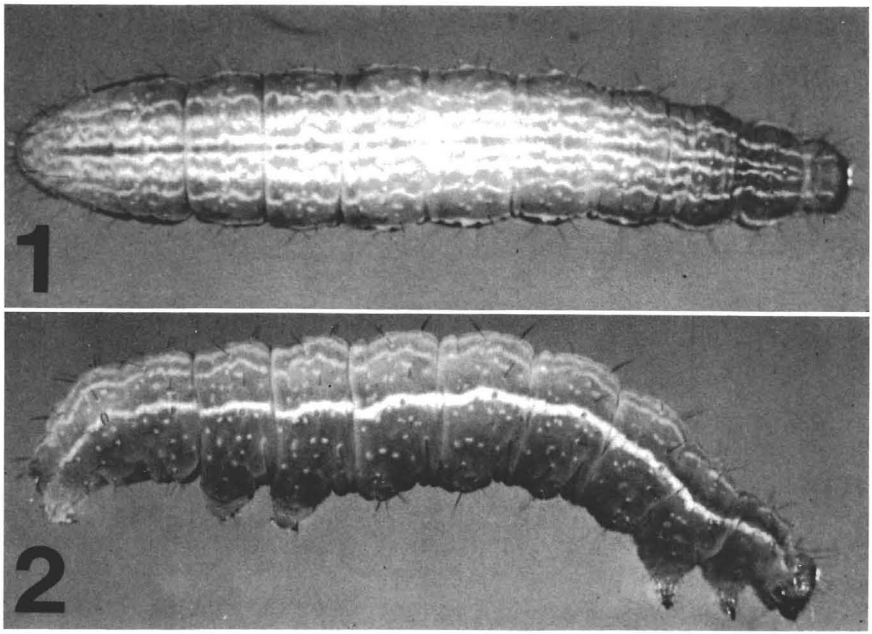
Autographa flagellum was described by Sir Francis Walker in 1857 from material collected at St. Martins Falls, Ontario. *A. flagellum* is a boreal species distributed from Newfoundland west to Alberta (Forbes, 1954) and British Columbia (Llewellyn-Jones, 1951) and in the east, south to Maine and New Hampshire (Eichlin & Cunningham, 1978). Although Tietz (1972) lists *Helianthus* sp. and *Liatris* sp. as host plants, no description of the immature stages has been published.

Ova were obtained from a female *A. flagellum* collected on 4 July 1978 at Belliveau Cove, Digby County, Nova Scotia. Larvae were fed an artificial diet based on that of Hinks and Byers (1976). All larvae grew quickly and had pupated by 1 September 1978. Adults emerged 1–10 October. Under natural conditions, *A. flagellum* overwinters as a third or fourth instar larva, as do most northern Plusiinae (Eichlin & Cunningham, 1978).

This paper describes the mature larvae of *Autographa flagellum*. The terminology and abbreviations used follow Godfrey (1972) and Eichlin and Cunningham (1969, 1978). All illustrations were drawn to scale using a camera lucida and stereomicroscope.

Autographa flagellum (Walker)

General. Head 2.4–2.9 mm wide. Total length 33.5–36.1 mm. Head and body smooth, no microspines or granules present. No vestige of prolegs present on Ab3–4. Prolegs on



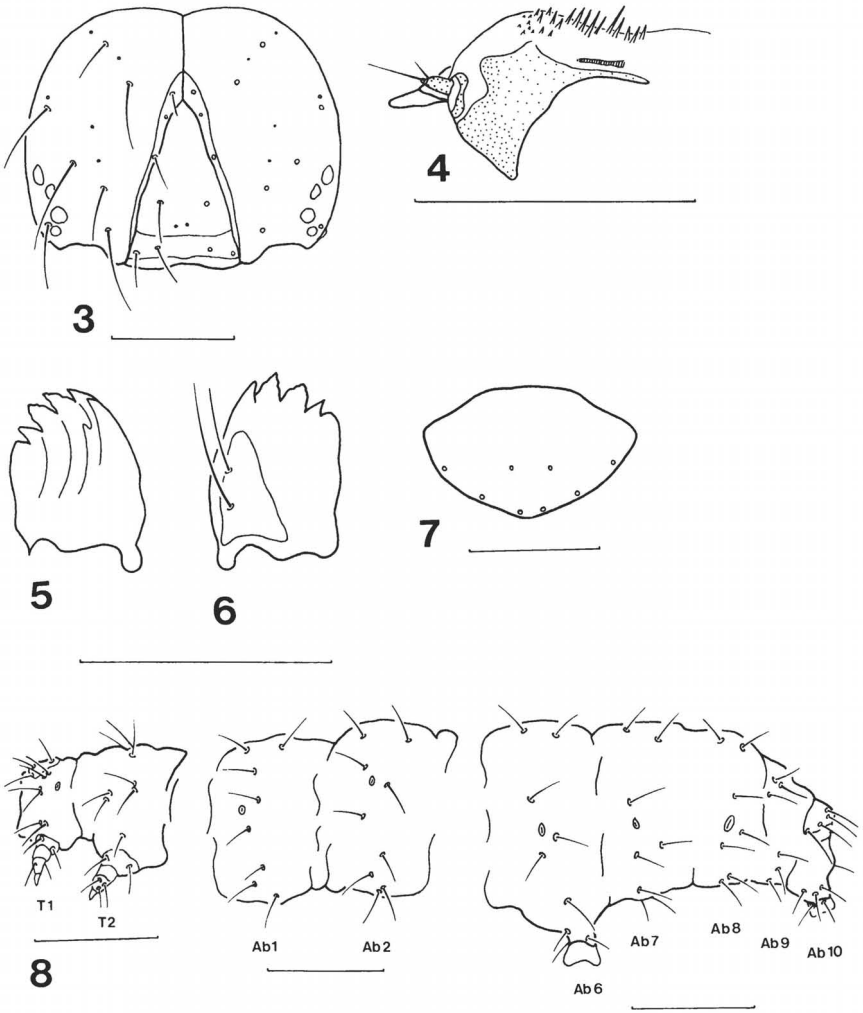
FIGS. 1 & 2. *Autographa flagellum:* **1,** dorsal view; **2,** lateral view (×3).

Ab5 same size as those on Ab6. Crochets biordinal, 21–23 per fifth and sixth abdominal proleg. All setae simple.

Coloration (living material). Head (Fig. 3): Yellowish brown, no coronal freckles or reticulations present. Body (Figs. 1 & 2): Green with white flecks, flecks heaviest in subdorsal, lateral, and ventral areas; ventral half of subdorsal area on T1–3 darker green; dorsal margin of lateral area white; middorsal line green with narrow white line on edges; white lines obsolete on T1; subdorsal area green with narrow white line on dorsal and ventral edges; lines on dorsal edge obsolete on T1–3. Spiracles yellowish brown with darker brown peritremes. Lateral shield of prolegs green, becoming yellowish brown distally. Thoracic legs yellowish brown, darker brown distally. Prothoracic shield yellowish brown.

Head (Fig. 3). Epicranial suture 0.59–0.64 mm long; height of frons (apex to Fa's) 0.75–0.78 mm; distance from F1 to anterior edge of clypeus 0.40–0.42 mm; interspace between F1–F1 0.31–0.34 mm; AFa anterior and AF2 posterior to apex of frons; A1–A3 forming an obtuse angle at A2; P1–P1 0.67–0.71 mm; P2–P2 0.85–0.87 mm. Distance from P1 to epicranial suture about ⅔ that from P1 to L; L posterior of juncture of adfrontal ecdysial line. Ocellar spacing: Oc1–Oc2 0.07–0.09 mm; Oc2–Oc3 0.05–0.07 mm; Oc3–Oc4 0.03–0.04 mm.

Mouthparts. Hypopharyngeal complex (Fig. 4): Spinneret elongate, tapering distally, subequal to Lp2; Lps1 shorter than Lp2; Lps2 less than ⅔ the length of Lp1; stipular setae extremely short, about $\frac{1}{16}$ length of Lps1, $\frac{1}{12}$ length of Lp1, and about $\frac{1}{22}$ length of Lp2; distal and proximal regions of hypopharyngeal complex continuous; distal ⅓ bare, remainder spined, spines becoming much longer and more robust proximally. Raduloid with 18 ridges. Mandible (Figs. 5 & 6): Two well-separated outer setae present; inner surface with three distinct ridges and small, acutely angled inner tooth on rib 2; six outer



FIGS. 3–8. *Autographa flagellum:* **3,** head capsule, frontal view; **4,** hypopharyngeal complex, left lateral view; **5,** left mandible, oral surface; **6,** left mandible, outer surface; **7,** anal shield, dorsal view; **8,** dorsolateral chaetotaxy of prothoracic (T1), mesothoracic (T2), and abdominal segments (Ab1–2 and Ab6–10). Scale lines = 1 mm.

teeth present, first small, second to fifth well-developed and angular; second to fourth serrated on both sides; sixth outer tooth about twice width of fifth, low and rounded.

Thorax. Segment T1 (Fig. 8): Prothoracic shield smooth and weakly sclerotized; SD1 and SD2 setal insertations well-separated from shield; SD1 very fine and hairlike with thickened sclerotized annulus at base; L2 as in SD1 but with annulus thinner and less heavily sclerotized; interspace D1–D1 about 0.67 XD1–XD1; D1–SD2 about 1.34 SD2–XD2; spiracle transversely aligned with posterior margin of prothoracic shield, elliptical,

0.21–0.23 mm high, 0.13–0.14 mm wide; peritreme wider laterally; coxal bases contiguous. Segments T2–3 (Fig. 8): SD1 very fine, but with annulus narrower and less heavily sclerotized than on T1; SV2 obsolete; all setae hairlike, tapering and sharply pointed; coxal bases narrowly separated.

Abdomen. No vestige of prolegs present on Ab3–4. Dorsal and lateral chaetotaxy of Ab1–10 as in Fig. 8. SD1 thicker, not fine as on T1–3. Ab1 and Ab7–8 with SV2 lacking, Ab2–4 with SV1 and SV2 partially fused. Ab4: V1–V1 close together; V1–SV2 about twice the distance of V1–V1. Ab10: Anal shield as in Fig. 7. Dorsal margin convex, posterior margin entire. Length of D1 on Ab6–7 0.57–0.61 mm; D2 0.71–0.72 mm. Asp7 0.22–0.25 mm high, 0.13–0.14 mm wide; Asp8 0.35–0.36 mm high, 0.17–0.20 wide.

Material examined. 10 specimens: Belliveau Cove, Digby County, Nova Scotia. Reared on artificial diet (Hinks and Byers, 1976) from ova obtained from a female collected on 4 July 1978. Adults emerged 1–10 October 1978. Moth collected, determined, and larvae reared by K. A. Neil.

Remarks

Based on the key to the known species of Plusiinae larvae given by Eichlin and Cunningham (1978), *A. flagellum* appears closest to *A. rubida* Ottolengui, as both species have a tooth on the second mandibular ridge. *A. flagellum* differs from that species, however, by its overall green color including the head, the smooth integument, the V1–V1 interspace on Ab4, and by the raduloid which has 18 ridges.

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