

LIFE HISTORIES OF NORTH AMERICAN GEOMETRIDAE.—LX, LXI.

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LX. *Melanolophia canadaria* Guenée. I have distinguished the Eastern and Western races of this species in an article on the fauna of the Kootenay District of British Columbia (Proc. U. S. Nat. Mus., XXVII, 910, 1904); the larvæ here described are those of the Western race.

Egg. Elliptical, flattened, depressed, truncated end rounded and only slightly flattened; reticulations fine, formed by the edges of concave pits which are irregularly hexagonal with no defined pattern except centrally, where the egg is somewhat constricted; they tend to line in longitudinal rows; they are distinctly raised, but have broad bases. Bluish green, slightly frosted, later shaded and spotted with pink at the truncated end. Size .9 x .6 x .5 mm. Most of the eggs were laid stuck under a piece of paper and they are probably laid in nature in the crevices of the bark.

Stage I. Head rounded bilobed, higher and wider than joint 2, pale testaceous, eye black, mouth brown. Body rather short, normal, actively looping. Pale green, with dorsal, subdorsal and lateral smoky olivaceous bands, stigmatal region broadly pale; a broken subventral line and ventral band of smoky. Shields concolorous, but without the lines; tubercles and setæ concolorous, obscure; setæ short, white, capitate; feet pale.

Stage II. Head rounded bilobed, luteous, eye black, mouth brown; width .6 mm. Body normal, moderate, smoky greenish, finely obscurely lined in whitish, appearing as before. The pale lines are addorsal, subdorsal, lateral and stigmatal. Cervical shield lined, anal plate with whitish edges. Tubercles pale, hair dots and setæ black, small.

Stage III. Head rounded, bilobed, clear orange yellow with faint dusky mottlings on the lobes, ocelli black; width 1.05 mm. Body moderate, not elongate, pale green, the anal end orange tinted. Stripes broad, dusky olivaceous, obscurely geminate by their edges; dorsal, subdorsal, lateral, suprastigmatal, subventral and ventral, leaving the substigmatal space obscurely whitish. Tubercles and setæ small, black.

Stage IV. Head rounded bilobed, full, yellowish green, setæ black; width 1.6 mm. Body moderate, not elongate, anal feet large, spreading. Green, the addorsal line pale, darker green filled, subdorsal pale; sides faintly darker with a

pale waved lateral line close to a broad yellowish white stigmatal one; venter dark, shaded with pale subventral and broad medio-ventral bands. Feet pale; tubercles concolorous, setæ short, dark; no shields.

Stage V. Head bilobed, flattish before, oblique; light green, faintly reticulate, ocelli in part black; width 2.6 mm. Body cylindrical, moderate, smooth, light green, the color of the young needles, slightly white shaded, leaving a dorsal line of darker green edged by the white. Subdorsal and substigmatal lines white, moderate, equal; faint traces of a waved lateral line; subventral and geminate ventral line yellowish, very faint. Tubercles obsolete, setæ dark, fine; spiracles ochraceous; feet green, smoky tipped; no shields.

The larvæ, when mature, became reddish and entered the ground to pupate. Eggs June 4, mature larvæ July 9; single brooded, hibernation in the pupa. The larvæ fed on the needles of spruce, eating only the pale ones of the same year's growth, which they closely matched in color. Larvæ from Kaslo, British Columbia.

LXI. *Petrophora convallaria* Guenée. This species is not improbably the same as the European *munitata* Hübner. My specimens agree with what Guenée says of his *convallaria*, and I have no doubt that it was this form he had before him.

Egg. Rounded elliptical, no flattening, truncation and depression indicated, but rounded; smooth, shining pale yellow, reticulations barely indicated as shadowy lines, regularly reticulate; very shining; size .6 x .5 x .4 mm.

Stage I. Head cordate, pale brown, eye dark. Body slender, curled in S-shape, all dark sordid olivaceous with short capitate setæ; no shields, no marks; tubercles and feet concolorous.

Stage II. Head whitish, dotted, especially on the sides, with dark brown, eye black; width .5 mm. Body slender, elongate, translucent green from the food; broken dorsal, faint subdorsal, distinct lateral, faint suprastigmatal brown lines, the lateral line olivaceous brown. Venter finely streaked in brown; faint substigmatal, more distinct subventral and medioventral lines. Setæ very short, capitate; tubercles colorless with black hair dots. Stigmatal region and feet pale.

Stage III. Head scarcely bilobed, erect, pale luteous, a linear dotted band from the antennæ to the outer side of the vertex and second faint one within; width .9 mm. Body moderate; obscure, sordid, pale, on joints 5 to 8 a small blackish dorsal spot and two small subdorsal ones; dorsal, subdorsal, lateral and suprastigmatal faint reddish lines; subventer broadly pale, feet pale. Setæ

short, with rather large glandular tips; tubercles concolorous, roundedly elevated; venter obscurely reddish lined.

Stage IV. Head rounded bilobed, white, thickly mottled with brown dots, leaving a vertical band of the ground color on the face of the lobe and one up from the eye, between which the dottings are darker; width 1.3 mm. Body moderate, the central segments not over one-third longer than broad, smooth. Light brown, the ground yellowish, mottled with purplish brown. On the central segments a black patch anteriorly and before tubercle ii and a small subdorsal one just above ii. Faint addorsal, subdorsal and lateral dotted pale lines. Stigmatal region broadly pale, sharply limited above on joints 10 to 13, with a conspicuous black patch on the base of the foot of joint 10 before. Subventral and adventral pale lines with dark shading between them. Feet pale, tubercles white, setæ short, brown. The dorsum of joints 9 and 10 is broadly pale, as also joint 5, but less conspicuously.

The larvæ are probably somewhat general feeders on low plants. They were given *Polygonum* and *Epilobium*. Larvæ from Kaslo, British Columbia.



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