

THE LIFE-HISTORY OF *LEUCOBREPHOS BREPHOIDES* WALK. (LEPIDOPTERA).\*

BY ARTHUR GIBSON AND NORMAN CRIDDLE.

*Leucobrephos brephoides* Walk. was for several years known in Canadian collections as *L. middendorfi* Men. It was not until 1907† that the late John B. Smith corrected the error and stated that the former "is the only species thus far known to inhabit North America." In the Entomological Record, for the years 1901 and 1903, the species is recorded under the name *middendorfi*, which name is also used by Fletcher in *The Ottawa Naturalist*, XXIII, 67.

We have been much interested in the habits and life-history of this interesting and rare moth. In 1903, the junior author forwarded to the late Dr. James Fletcher some eggs of the species, and these and the larvæ were then studied, as time permitted, by Fletcher and the senior author. In 1915, Mr. F. H. Wolley-Dod forwarded, to Ottawa, 35 eggs, which had been obtained at Midnapore, Alta., on April 5-10. These latter gave us an opportunity of studying, more definitely, the preparatory stages. The notes made by Fletcher, in 1903, were incomplete, but such as are of value we include herewith.

*The Egg*.—0.5 mm. in diameter; 0.9 mm. in length; oblong, rounded at both ends; indistinctly longitudinally striate; densely granulate-punctate, the granules acute and irregularly connected to form faint transverse ridges.

When received from Mr. Dod (April 20) the ova were darkened preparatory to hatching. Fletcher, in ms., states that the colour of the egg is "pinkish-ochre at first, turning a leaden gray before hatching." The egg shell is opalescent; the larva emerges through a rather large, ragged, hole at one end.

The eggs which were sent to Fletcher in 1903 were laid in confinement at Aweme, Man., on April 15-16. Fletcher's ms. note reads: "Laid on the leaf scars of young shoots of *Populus tremuloides*, above the scar, and deposited flat on their sides, 2 or

---

\*Contribution from the Entomological Branch, Department of Agriculture, Ottawa.

†Canadian Entomologist, XXXIX, 370.

April, 1916

3 sometimes at a single scar." The junior author has frequently found the eggs under natural conditions near the tips of the branches of Aspen Poplar, the place selected being the scar left by the fallen leaves of the previous autumn. Oviposition has been noted high up among the terminal twigs of trees, thirty feet or more in height; at other times the female moths were observed to choose a tree of about five feet in height. As a rule, not more than one egg is deposited on a leaf scar. From close observation, made on three occasions, a single female moth undoubtedly deposits several eggs on the same tree. In one instance the junior author noticed a female visiting at least a dozen different situations on the same tree for the purpose of oviposition. The largest number of eggs obtained from a single female was 135. This individual was collected at Aweme, Man., on 14th April, 1903, and in confinement continued ovipositing for six days.

The eggs which were deposited at Midnapore, Alta., on April 5-10, mostly hatched at Ottawa, on April 21 and 22.

#### DESCRIPTION OF LARVAL STAGE.

*First Instar.*—The newly-hatched larva is 2.0 mm. in length and dark-green in colour. Head 0.3 mm. wide, rounded, somewhat quadrate, darker than body, of a greenish-brown shade, margined posteriorly with brown; ocelli black. No markings on body; lateral area and dorsum of first thoracic segment, paler. Tubercles pale brownish, indistinct, circled with sordid whitish; setæ short, stiff, very conspicuous. Spiracles brown. First three pairs of prolegs aborted. Feet concolorous with body. After feeding, the larva is of a greenish-gray colour.

*Second Instar.*—Length 5.5 mm. Head 0.6 mm. wide, greenish-white, with dark green blotches, particularly on cheeks; ocelli black; mandibles pale reddish. Body marked longitudinally with pale white stripes as follows: addorsal stripe; subdorsal stripe wider than addorsal stripe; lateral stripe, just above tubercle iii; wide stigmatal band enclosing tubercles iv and v (the skin here is conspicuously wrinkled); and a rather indistinct medio-ventral stripe. Ventral surface distinctly glaucous. Tubercles brown. Spiracles dark brown, white in centre. Prolegs concolorous with venter. As the stage advances the skin of dorsum, particularly

on posterior segments, assumes a yellowish-green tint. The wide stigmatal band is the most conspicuous marking on the body.

*Third Instar.*—Length 8 mm. Head 0.9 to 1.0 mm. wide. The larva in this instar is similar in appearance to the second instar. The venter is decidedly glaucous. All the stripes are distinct and white in colour. The stigmatal band is wide and conspicuous, and more or less tinged with yellow. Length before third moult 10.5 mm.

*Fourth Instar.*—Length 12 mm. Head 1.5 to 1.7 mm. wide. Body dark velvety green, later becoming a paler green. The addorsal and lateral stripes irregular but distinct; stigmatal band very conspicuous, extending to end of anal flap, the edges being even. Medio-ventral stripe inconspicuous. All markings white. Tubercles circled with white. Venter distinctly glaucous. Length before fourth moult 15 mm.

*Mature larva—Fifth Instar.*—Length 18 mm. Head 2.2 to 2.5 mm. wide, rounded, somewhat quadrate, depressed at vertex; smooth, paler green than body and of a glassy appearance; clypeus high; ocelli black, between the ocelli the skin is whitish, like enamel; labrum also whitish; mandibles reddish-brown. Body cylindrical, lettuce green\* in colour, with a yellowish reflection, excepting venter, which is glaucous. The folds between the segments are yellowish. The addorsal stripe, the subdorsal stripe and the lateral stripe are thinner than in previous instars and hence are not so distinct. In colour they are now decidedly yellow. The wide, bright pale-yellow stigmatal band is very conspicuous from the back of the head to the end of the anal flap, where it narrows. The two dorsal and the lateral stripes are more or less broken and sinuous in outline. The lateral stripe is distinctly wavy on the thoracic segments. Medio-ventral stripe now distinct, of a milky white colour. Spiracles whitish, ringed with black. Tubercles minute, circled with pale yellow, each bearing a short black hair. On abdominal segments tubercle iii is nearly midway between the lateral line and the spiracle, and immediately above the spiracle, excepting on segments 6, 7, 8, 9 and 12, where it is noticeably

---

\*Ridgeway's Colour Standards and Colour Nomenclature, 1912.

anterior. Tubercle iv, behind the spiracle, v almost immediately below the spiracle, both enclosed in the stigmatal band, the former near the upper edge and the latter near the lower edge. Thoracic feet pale, somewhat translucent; prolegs concolorous with sub-ventral area; crotchets slightly pinkish; legs on segment 10 normal, on segments 9, 8 and 7 much reduced, the latter being the smaller and decidedly rudimentary. Length of full grown larva at rest 26 mm.

*The Pupa.*—Length 12-14 mm.; width at widest part 5 mm. When newly formed green, soon changing to pale brown, and later to dark reddish-brown; thorax and wing-covers darker, almost blackish, wrinkled; abdominal segments coarsely pitted on anterior three-quarters and minutely pitted on posterior one-quarter. Spiracles pale yellowish in centre. Cremaster two-spined, the spines stout and arising from either side, curved outwardly from towards the tip, and forming, almost, a perfect letter U.

*Food Plant.*—All larvæ reared at Ottawa were fed on the foliage of Aspen Poplar, *Populus tremuloides* Michx. This tree is the only food plant upon which we have found the larvæ feeding under natural conditions.

#### HABITS OF LARVA.

During the different instars the larvæ spun considerable silk. Under natural conditions, at Aweme, Man., they have been frequently observed hanging at the end of a silken thread spun from the branches of Aspen Poplar. This habit and that of looping when walking corresponds well with many of the Geometridæ. A ms. note by Fletcher reads as follows: "A semilooper, the three first pairs of abdominal legs not used in walking, although apparent. When at rest the young caterpillar rests as a geometer on the anal and fourth pairs of abdominal prolegs, with the front of the body raised. The larvæ have the same habit as *Brephos infans* of catching several leaves tightly together with single threads, and when resting, either lie along the petiole or inside a curl of a young leaf. When they began to feed, they attacked the edge of a leaf or ate straight into the surface either above or below."

When mature the larvæ entered the earth to pupate. The larvæ studied in 1915 were full grown on May 15 and 16. By May 20 all had changed to pupæ. The earthen cell is slight.

On June 13, 1902, two larvæ in the last instar collected at Aweme, Man., were received at Ottawa. On the earth in the breeding jar small pieces of bark and rotten wood were placed to see if the larvæ would use such for pupation. Both specimens, however, entered the earth (June 14) and there transformed to pupæ (June 17).

#### HABITS OF THE ADULT.

The moth of *Leucobrephephos brephoides* is a sun-loving creature, being most active between the hours of 11 a.m. and 3 p.m. It is among the earliest of the moths to appear in spring. It has been collected in Manitoba as early as March 18 and as late as May 11. The time of emergence from over-wintering pupæ is, of course, largely governed by the prevailing climatic conditions. It is not unusual to see the moths on the wing before the snow has all disappeared. Oviposition habits have already been referred to. Owing to a quick, jerky, flight and habit of darting upwards at the least sign of alarm, and also in view of the fact that the moth has a marked colour resemblance to the surrounding landscape, it is difficult to follow with the eye and individuals, therefore, are extremely hard to catch. Its remarkably acute eyesight and habit of flight undoubtedly account for its rarity in collections.

Experiments with the usual "sugar" mixtures, in daytime instead of at night, indicated that such are of no value to attract the moths. They have, however, on several occasions been induced to alight upon putrid flesh, which had been placed on the ground. The moths also seek moisture and are often found frequenting muddy roadways in the vicinity of aspen woods.

*Distribution.*—Midnapore, Alta., April 12-19, 1914 (Tams), April 7-10, 1915 (Dod and Tams); Saskatoon, Sask., April 11, 1913 (Willing); Beulah, Man., April 16, 1903 (Dennis); Aweme, Man., collected almost every year since 1901, earliest date March 18, latest date May 11 (Criddle Bros.); Rounthwaite, Man. (Marmont); Winnipeg, Man., April 17, 1910 (Wallis); Hymers, Ont., April 9, 1908 (Dawson); Mayo River, Yukon Territory, April 16, 1907 (Davidson); Portage at Grand Falls, Hamilton River, Labrador, May 12, 1894 (Low); Jenerk, Klutlan Glacier, elevation 5,500 feet, 141 Meridian, North of Mt. Natazhat, May 2, 1913 (Nesham).

In addition to the above localities the species has been recorded by Walker\* from "St. Martin's Falls, Albany River, Hudson's Bay (Dr. Barnston)"; "Fort Confidence (Sir J. Richardson)"; by Grote† from "Yukon River, mouth of Porcupine River (R. Kennicott)"; and ‡ "Racine, Wis. (P. R. Hoy)"; and by Zeller†† from "Fort Resolution am Sklaven-see (Great Slave Lake) Westlich von der Hudson's Bay unter dem 61° N. Br. (Baron Osten Sacken).

\*C. B. Mus. Het. XI, 702, 1857.

†Proc. Ent. Soc. Phil. III, 74, 1864.

‡Bull. Bkln, Ent. Soc. III, 30.

††Stett., Ent. Zeit. XXIV, 136.

### NEW SPECIES OF MICROLEPIDOPTERA.

BY ANNETTE F. BRAUN, CINCINNATI, O.

#### **Coptodisca magnella**, n. sp.

Palpi and lower part of face silvery white; head with a decided pale golden lustre. Antennæ fuscous.

Thorax and basal half of fore wings pale silvery gray, almost white; extreme costa on basal half black. Apical half of fore wings golden yellow; a triangular silvery white spot at the apical third of the costa edged with black on both sides; a similar but narrower spot a little anterior on the dorsal margin, also edged with black on both sides. The outer edge of the dorsal spot forms part of the dark patch of scales which extend from it to the dorsum and termen. This patch is often pale gray and ill-defined, except at its outer edge, which is marked by a row of dark scales along the termen. It is separated from the dark margins of the costal silvery spot by the golden ground colour. Beyond the costal spot and almost parallel to its outer margin is a streak of black scales. Apical patch wedge-shaped, formed of a circular velvety black spot, and the terminal row of black scales immediately beyond it. It is preceded and edged on either side with one or two silvery white scales; and well separated from the dark dorsal patch by the golden yellow ground colour. Cilia whitish yellow, with an apical black pencil extending outward from the apical black patch. Hind wings gray.

Legs yellow, except the fore tibiae and all the tarsi, which are fuscous. Abdomen fuscous above, yellow beneath.

April, 1916