NOTES ON ELACHISTA. II. (MICROLEPIDOPTERA).

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This paper is a continuation of "Notes on Elachista with Descriptions of New Species," which appeared in the March, 1920, number of this journal. Further rearing from mines during the past season in the vicinity of Cincinnati has resulted in the discovery of the life histories of several species previously known only in the adult stage, and in the addition of two new species.

Elachista cucullata n. sp.

Palpi white, second segment dark brown outwardly, third sometimes with fuscous shading outwardly. Antennæ black. Face and head white, except the collar, which is black. Thorax and extreme base of fore wing black; a silvery fascia almost at base, broadest on the dorsum; remainder of wing very dark brown; a silvery fascia just before middle, curved or slightly angulated on the middle of the wing, extends beyond the fold, but ends abruptly before reaching the dorsal margin; a silvery triangular spot at tornus and a little beyond it, a longer, usually oblique, costal silvery streak. Cilia dark brown. Hind wings and cilia dark grayish brown. Legs dark brown, basal segments in the male, and the tips of segments and a band around the hind tibiæ in both sexes silvery. Abdomen blackish, silvery beneath. Expanse: 8–9 mm.

Type (♂) and twenty-seven paratypes, reared from larvæ mining leaves of *Carex Jamesii*, Cincinnati, Ohio; imagoes May 13 to June 5.

The mine made during the antumn on the overwintering leaves is a narrow linear tract running down alongside the midrib, not at all or but very little enlarged until spring. Toward the end of March, the larva begins to feed actively again, and the mine becomes transparent and occupies most of the breadth of the leaf, which is inflated, due to the elevation of the midrib into a ridge on the upper side. Mines were collected March 31 and April 10; on the latter date most of the larvæ were full grown.

The larva is red; head brownish red, thorax with mid-dorsal line, abdomen with mid-dorsal and lateral lines pinkish. The coloration of the larva is retained in the pupa, with median

and lateral ridges pinkish. In general, the pupa belongs to the elongate tapering type, but the median ridge is convex from anal end to head when viewed from the side, extending out on to the head, where it divides, a projecting ridge extending on each side to the antennæ, thus forming a pointed hood which projects over the face. Lateral ridges also prominent, with prominent lateral thoracic tubercles. The pupa is attached by a median band of silk, and also enclosed in a few strands of silk.

The abrupt ending of the median fascia before it reaches the dorsum, easily distinguishes this species from all other described species. In the fore wing, veins 7 and 8 are long stalked and vein 6 arises from the extreme base of 7; other points of the venation as in the figure in Meyrick's Handbook.

Elachista enitescens n. sp.

Palpi and entire head dark leaden metallic, almost black; antennæ grayish black throughout. Thorax and base of fore wing leaden metallic, with a reddish and purplish luster which is most decided at base of dorsum, where the leaden color is sometimes replaced by metallic golden or silvery scales like those of the fascia and spots. Fore wing dark brown, faintly shining; a silvery or golden metallic fascia with reddish and purplish luster before the middle of the wing, is oblique in its costal half, broader and nearly perpendicular in its dorsal half with a slight projection along the fold; at two-thirds a silvery or golden metallic costal and an opposite dorsal spot; beyond them in the middle of the wing near the tip a silvery or golden spot. Cilia dark gray. Hind wings broad, dark brown. Legs dark gray, hind tarsi paler tipped. Abdomen dark gray, underside yellowish. Expanse: 7–7.5 mm.

Type (♂) and four paratypes (♂ and ♀), reared from larvæ mining leaves of the bulrush, *Scirpus atrovirens*, near Cincinnati; imagoes May 13 to June 8.

The larva makes a long transparent mine in a basal leaf, extending from the base of the leaf upwards. In March and the early part of April, they are mining in the old leaves, indicating that feeding began in the preceding autumn. Later the larva enters a new leaf at its base where it is not visible unless the old outer leaves are torn away. Each mine may be four or five inches in length. The larvæ feed at night only at the upper end of the mine, retreating in day time down to the base of the leaf, (sometimes beneath the surface of the water). The larva is yellow, with an ill-defined irregular darker patch

toward the posterior end of the first thoracic segment on each side of the middle. Pupation takes place toward the end of April or in May. The pupa lies on the upper surface of a leaf over the midrib and is covered by a flat cocoon, formed of two series of oblique parallel threads of silk, crossing one another at an acute angle. The pupa is more nearly allied to the stout ovate type, but the dorsal abdominal surface is flattened, without median or lateral ridges, but with a dorso-lateral series of erect short blunt spines, one spine on each abdominal segment except the first; three or four prominent lateral mesothoracic tubercles.

This species is closely allied to *E. madarella* Clemens, agreeing with it in venation and in shape of the hind wings, and differing from it only by the entirely black antennæ, the darker head, less golden base of fore wing, and darker legs. It is apparently rather rare and local, as I found the larva in but one locality, although the food plant is very common.

Elachista madarella Clemens.

Specimens of this species were reared from mines on several species of *Carex*, very commonly on *Carex pubescens* and *Carex cristata*, and on *Scirpus atrovirens*. The mine is very similar in character to that just described for *E. enitescens*, and is indistinguishable from it on *Scirpus*. The larva makes several mines, the earlier ones in the outer overwintering leaves, the later ones in the new inner basal leaves. The larva feeds in the upper end of the mine during the night, retiring down into the base of the leaf almost to the rootstock during the day. Mining larvæ were collected from April 3 to May 16.

Larva whitish or pale green, with the first thoracic segment marked with a pair of prominent dark brown or blackish L-shaped marks. Pupa covered with a flat cocoon formed of two series of parallel silken threads, as in *E. enitescens;* very similar to that of *enitescens*, but somewhat broader, with rougher thorax, and across vertex, a transverse beaded ridge, with a broad sinus in its middle.

The reared imagoes emerged from May 24 to June 28; a few captured specimens were taken as late in the season as July 10. Often the silvery gray at the base of the wing is almost entirely replaced by the pale golden color of the fascia.

Elachista leucofrons Braun.

By some confusion of data which I can not now explain, the mine and larva described as belonging to this species (Ohio Jn. Sci., XX, 170, 1920) belong to *Elachista orestella*, in which the larva is either grayish or green and marked as described. The mine of *Elachista orestella* is grayish, with epidermis wrinkled in the middle of the length of the mine, which here only is green.

The mine of *E. leucofrons* is whitish, with epidermis nowhere wrinkled; the mine lies just beneath the upper epidermis, extending usually across the leaf; the underside of the leaf remains green. The mine occurs on both *Hystrix* and *Elymus*, most commonly on the latter grass, while that of *E. orestella* occurs most commonly on *Hystrix*. The larva of *E. leucofrons* is pale grayish or greenish, with narrow mid-dorsal and broad lateral lines whitish; first segment of thorax marked posteriorly by a transverse brownish mark, curving forwards at each end.

Elachista irrorata Braun.

The larvæ of this species commonly mine leaves of *Glyceria nervata*, a tall grass occurring in moist meadows and wet places. The larva mines toward the tip of the leaf, the narrow indistinct pale yellowish green mine usually beginning low down on the leaf sheath, where the larva lies concealed during the day. The larva sometimes makes a short detached mine near the tip of the leaf; such mines are always untenanted in day time. Even when the larva is full grown, the mine is scarcely wider than the body of the larva. Mines were collected from the middle of April to the early part of May; the imagoes emerged from May 19 to June 10. Larva yellow when young, glaucous above when full grown.

The pupa is always attached near the base of the leaf on the upper side with head pointing toward the stem. The pupæ may easily be collected on the food plant at the proper season. The pupa, which shows a general resemblance to that of *E. leucofrons*, has a broader mesothorax with more tubercles, the median ridge of the abdomen more depressed, the lateral ridges projecting farther.

The occurrence of the mine of the type specimen on another species of grass (*Agrostis perennans*) was apparently accidental, as no other mines have been found on this grass. Most of the specimens reared on *Glyceria* are considerably larger than the type, expanding 8.4 to 11 mm.