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HOSTS, BIOLOGY, AND DISTRIBUTION OF *ZALE PHAEOCAPNA* (NOCTUIDAE)

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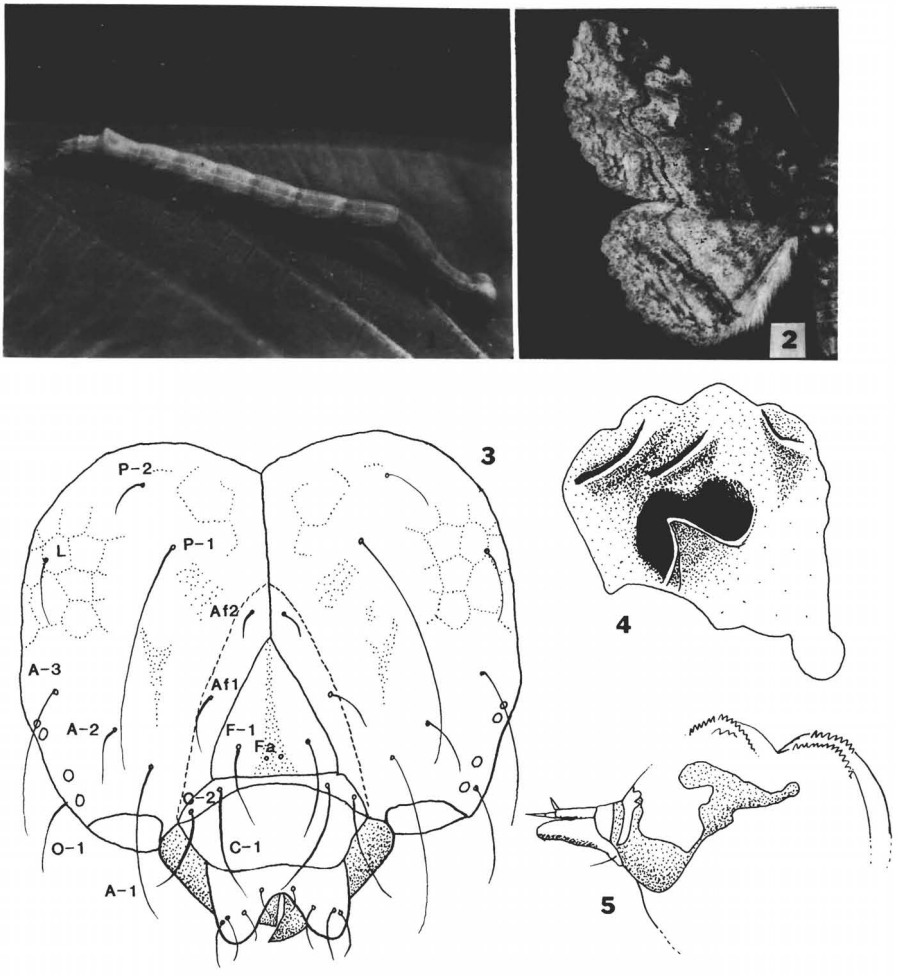
ABSTRACT. First-instar *Zale phaeocapna* Franclemont (Noctuidae: Catacolinae), when offered hosts from the immediate environs of the parental female in the Adirondack Mountains, New York, fed on *Corylus cornuta* Marsh. and *C. americana* Walt. (Corylaceae). Two field-collected larvae, compared to the bred larvae and judged conspecific, were beaten from *Ostrya virginiana* (Mill.) K. Koch (Corylaceae) in Florida. A second clutch of larvae was reared on *Hamamelis virginiana* L. (Hamamelidaceae). The larva is described, illustrated, and compared to *Zale minerea* (Gn).

Additional key words: Catacolinae, larvae, *Zale minerea*, Corylaceae.

During field studies near Indian Lake in the Adirondack Mountains of New York, I obtained a gravid female of *Zale phaeocapna* Franclemont which oviposited in captivity. The resulting first instars were offered a selection of plants growing in the immediate environs. *Corylus cornuta* Marsh. (Corylaceae) proved to be an acceptable host. *Acer rubrum* L., *Pinus strobus* L., *Abies balsamea* (L.) Mill., *Larix laricina* (Du Roi) K. Koch, *Alnus rugosa* (Du Roi) Spreng., *Betula papyrifera* Marsh., *Salix rigida* Muhl., and *Prunus virginiana* L., the dominant trees at the site, were not accepted. I have since reared *Zale phaeocapna* repeatedly on *Corylus cornuta* and *C. americana* Walt. from ova of females taken on the Pine Bush Preserve in Albany Co., New York. In addition, I was sent two mature *Zale* larvae collected on *Ostrya virginiana* (Mill.) K. Koch (Corylaceae) in Torreya State Park, Florida, on 22 April 1979. I compared them to my bred *Zale phaeocapna* and determined them to be the same species. Another brood from the Pine Bush locale was switched in later instars to *Hamamelis virginiana* L. (Hamamelidaceae). *Hamamelis* forms buds later than *Corylus*, and its leaves are not present when first instars usually eclose. According to Hall (1952), the Corylaceae possibly were derived from an ancestral stock close to the present-day Hamamelidaceae. Certainly several noctuids can survive the shift from *Corylus* to *Hamamelis* (*Pyreferra* spp.). All the plants known to serve as larval hosts for *Zale phaeocapna* are closely related.

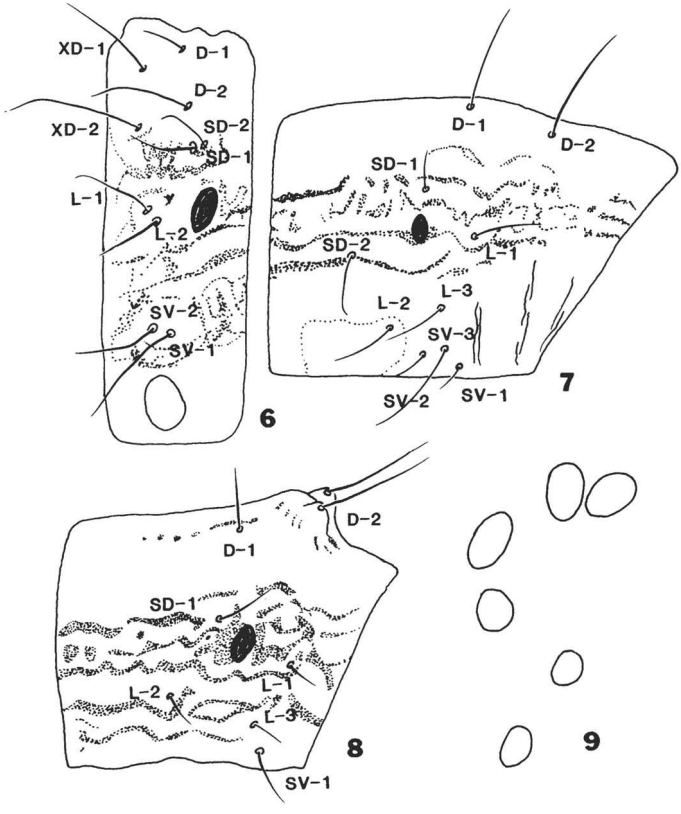
Zale phaeocapna was once a rare insect, originally described from Pennsylvania and Alabama (Franclemont 1950), but is now known from northern New York to northern Florida, and is apparently becoming more common. The moth is abundant on the Pine Bush in Albany, but was not collected there despite intensive collecting in the 1880's on the barrens. The species will come to bait as well as light, so the advent of



FIGS. 1–5. *Zale phaeocapna*. **1,** Living larva, Adirondack Mts., New York; **2,** Adult; **3,** Setal map and pattern of head. P = posterior head seta, L = lateral head seta, A = anterior head seta, Af = adfrontal seta, F = frontal seta, Fa = frontal puncture, C = clypeal seta. **4,** Oral face of left mandible; **5,** Hypopharynx.

the ultra-violet collecting light does not account for its apparent increased abundance. Baiting was a popular collecting practice in the 1880's and was used on the Pine Bush. The Albany Pine Bush is a sandy, pitch pine–scrub oak barrens, and *Corylus* is a common shrub. *Hamamelis* is uncommon and *Ostrya* is rare, whereas the moth is common. In the immediate locale where *Zale phaeocapna* was collected and reared in the Adirondacks, *Ostrya* and *Hamamelis* were absent.

The parental female oviposited on 21 May 1980, and first stage larvae



FIGS. 6–9. *Zale phaeocapna*. **6,** Setal map of prothorax, lateral expanded view (from middorsal to midventral line); **7,** Setal map of 1st abdominal segment, lateral view (ventral seta not visible); **8,** Setal map of 8th abdominal segment, lateral view (ventral seta not visible). D = dorsal seta, XD = primary seta, SD = subdorsal seta, L = lateral seta, SV = subventral seta. **9,** Ocellar map.

eclosed 29 May. Fully mature larvae were obtained by 1 July 1980. Larvae were reared in clear plastic containers under ambient conditions. The pupae overwintered and were held in a refrigerator at 4°C until 30 March. Adults began emerging 1 April 1981, suggesting overwintering as a pharate adult within the pupal shell (N = 17), a supposition supported by early spring emergence of the adults in nature. Voucher specimens are in the New York State Museum.

Description of Mature Larva
(Figs. 1, 3–9)

Total length 36–40 mm (N = 10). **Coloration** (living material): head silver-gray with irregular dark markings. Body with an alternating blue-gray and yellow striped pattern

as follows: a narrow, yellow dorsal stripe; a broad, blue-gray subdorsal stripe; a broad, yellow supraspiracular stripe; a broad blue-gray spiracular stripe; a fine, narrow, yellow subspiracular stripe.

Head (Fig. 3). Average head width 3.2 mm; epicranial suture 1.6 mm; height of frons 0.75 mm (N = 10). Ocellar interspaces as in Fig. 9.

Mouthparts. Hypopharyngeal complex with distal and proximolateral teeth as in Fig. 5. Mandible with inner tooth and ridges as in Fig. 4. Spinneret extending beyond second segment of labial palpus.

Thoracic segments (Fig. 6). Cervical shield weakly sclerotized; prothoracic spiracle averaging 0.33 mm high.

Abdominal segments. Ab-1 (first abdominal segment) shown in Fig. 7. Crochets a uniordinal mesoseries of 13, 24, 31, 33, and 34 for segments 3, 4, 5, 6, and 10, respectively (rounded to nearest whole number). Ab-8 (Fig. 8) spiracle 0.33 mm high, remaining spiracles 0.24 mm high; spiracles black. D1 (first dorsal) setal bases on Ab-8 markedly protuberant; protuberance slightly higher than height of Ab-8 spiracle.

Material examined. 10 specimens, 10 km E of Indian Lake, Hamilton Co., New York, lat. 43°45′30″ long. 74°10′14″, elevation 555 m.

Diagnosis. In the original description of *Zale phaeocapna,* Franclemont (1950) considered it allied to Z. *minerea* (Gn.) based on adult morphology. Superficially, the adults look like Z. *galbanata* (Morrison), but can be distinguished by the lack of an adterminal bar below M3 on the forewing (Fig. 2). The larvae of Z. *minerea* (based on 10 specimens in the New York State Museum as well as Crumb's [1956] description) compares to that of Z. *phaeocapna* as follows: Z. *minerea* has a much broader oral tooth on the mandible; hypopharyngeal complexes appear the same; Z. *minerea* head capsule maculation is much more extensive, reaching to the front of the head; Z. *phaeocapna* has alternating longitudinal blue-gray and yellow stripes and is narrow-bodied, whereas Z. *minerea* is brown and thick-bodied. *Zale minerea* has been recorded on rose and willow (Crumb 1956), birch and many other trees (Forbes 1954).

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