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EPINOTIA NISELLA: AN UNRECORDED HOST AND MODE OF FEEDING (LEPIDOPTERA: TORTRICIDAE)William E. Miller¹

ABSTRACT

The larva of *Epinotia nisella* is best known as a feeder in female catkins of *Populus*, primarily *P. tremuloides* Michx. in North America. In Minnesota, adults were reared from larvae boring in current-growth branchlets of *P. balsamifera* L., with no sign of like infestation in neighboring *P. tremuloides*, which has thinner branchlets. The behavioral variance is explained as plasticity in feeding biology, a characteristic of insects utilizing host reproductive structures whose abundance is periodic.

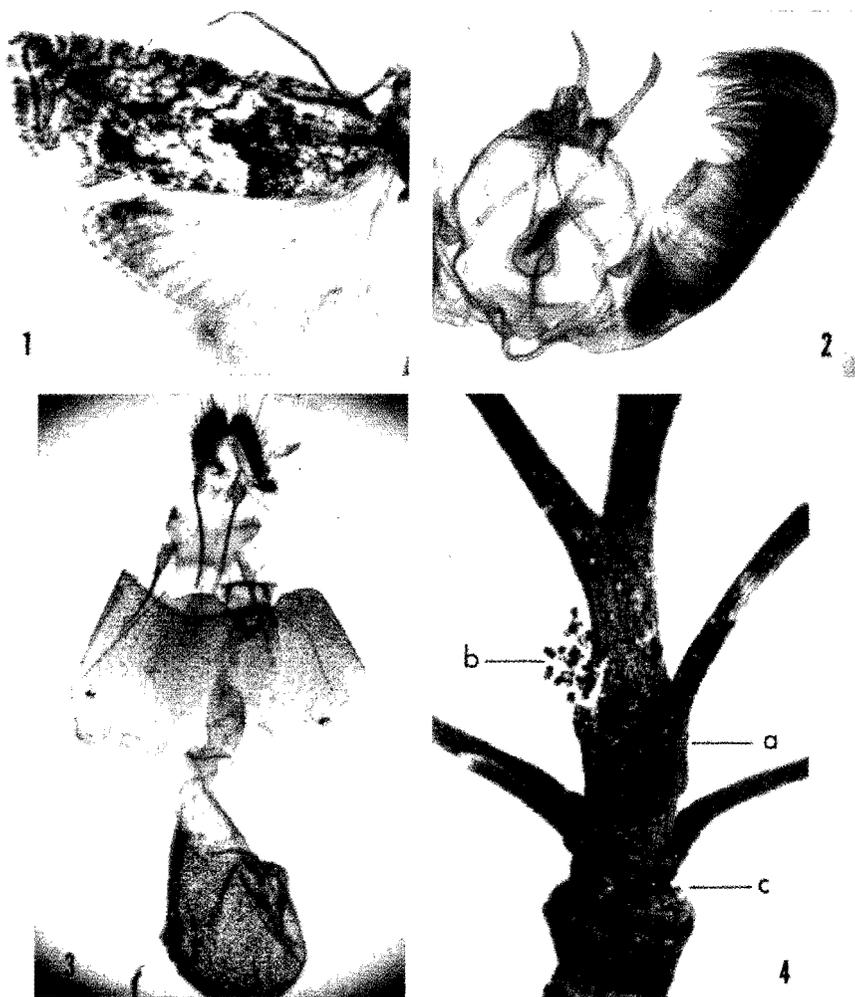
Epinotia nisella (Clerck), a Holarctic species, is often mentioned in forest insect survey reports, and adults are common in insect collections. The wing pattern is variable (Bradley et al. 1979). Before 1959, *E. criddleana* (Kearfott) was erroneously considered a form of *E. nisella* in North America (MacKay 1959).

The primary larval host is *Populus*, and the primary larval feeding site is catkins. Only occasionally are *Salix*, *Betula*, *Alnus*, and *Acer* recorded as hosts, and buds and leaves as feeding sites. The currently known *Populus* hosts in North America are *P. tremuloides* Michx., and *P. tricoarpa* Torr. & Gray (R. L. Brown, pers. comm.; Forbes 1923; Prentice 1966; Wong and Melvin 1974). The *Populus* host in Europe is *P. tremula* L. (Bradley et al. 1979; Schefer-Immel 1958, Swatchek 1958).

I reared *Epinotia nisella* adults in Minnesota from larvae boring in branchlets of *Populus balsamifera* L. Prior literature on the insect does not mention this host or mode of feeding. Rearing details follow, as well as a suggested explanation for variability in the insect's feeding biology. The reared adults are diagnostically illustrated (Figs. 1-3), and voucher specimens, including pupal exuviae, are in the insect collection of the University of Minnesota, St. Paul.

During several growth seasons, mature and near mature *P. tremuloides*, *P. grandidentata* Michx., and *P. balsamifera* growing in mixed stands in Koochiching County, Minnesota, were felled, and their foliage minutely examined for insects. By 10 June, gall-like swellings were noticeable on current-growth branchlets of *P. balsamifera* (Fig. 4). Uninfested host branchlets were 2-4 cm long at this time, as were infested ones. The swellings surrounded tunnels in which solitary larvae were feeding. Tunnels did not extend into the previous year's growth. Near the tunnel apex was an opening to the outside through which larvae ejected frass. The opening was shrouded by a silken sleeve 1-2 mm long containing incorporated pellets of frass (Fig. 4b). Before pupation, larvae lined tunnels and openings with silk. In the laboratory, and presumably also in the field, pupation took place inside branchlets. Before adults eclosed, pupae pierced these openings and protruded from them. The length of the longest of 10 tunnels in which larvae matured was 1.2 cm. Wing pattern and color variation in five reared adults matched

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Figs. 1-4. *Epinotia nisella* reared from *Populus balsamifera* in Koochiching Co., Minn., and its larval habitation. (1) Wings of adult; (2) Male genitalia; (3) Female genitalia; (4 a-c) Infested branchlet; (a) swollen area; (b) silken shroud over tunnel opening; (c) node separating current and previous year's growth.

Figures 20 and 29 of Bradley et al. (1979). No branchlet infestation was found in neighboring *Populus tremuloides* or *P. grandidentata*. Branchlets on these species were smaller in diameter than those of *P. balsamifera*. Isolated saplings of *P. balsamifera* as small as 4 m tall were also found infested.

The most detailed previous description of *Epinotia nisella* biology in North America is that of Wong and Melvin (1974). They reported that eggs were laid singly on host buds from mid-June to early July. Larvae hatched in the spring, fed first in buds, then on

female catkin capsules, and finally on leaves. Pupation took place on the ground where larvae dropped or fell along with their habitations. Similar biological observations were reported for the species in Europe (Bradley et al. 1979, Schefer-Immel 1958).

That the *E. nisella* reared from *Populus balsamifera* branchlets in Minnesota fed first on catkins seems unlikely because juvenile saplings isolated from older trees were equally infested. The disparate feeding habit and host might be explained in at least three different ways: (1) *Epinotia nisella* is a behaviorally plastic species; (2) different biotypes of *E. nisella* are involved; or (3) different species of *Epinotia* are involved. The first possibility seems most likely at present. The main resource utilized by *E. nisella* larvae, host reproductive structures, is notoriously periodic in forest trees (Matthews 1963). Insects that utilize reproductive structures usually have adaptations for surviving primary resource scarcity. Such adaptations include extended diapause, alternative feeding modes, and alternative host species (Hedlin et al. 1980), any of which may be manifested at any time. The observations reported here are consistent with the last two adaptations.

ACKNOWLEDGMENT

I thank R. L. Brown, who is currently revising *Epinotia*, for confirming the identity of the reared *E. nisella* adults.

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