

A Fossil Leaf Mine of Nepticulidae (Lepidoptera) from Japan

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Synopsis

A mine of *Stigmella* (Nepticulidae) on a fossil leaf of *Betula grossa* or an allied species was discovered in the Upper Miocene strata of the Kabutoiwa Plant Bed, located on the boundary of Nagano and Gumma Prefectures. This is the first record of a fossil mine in Japan.

Key words :Nepticulidae, *Stigmella*, fossil mine, Kabutoiwa, plant bed.

Fossil mines of *Nepticula* [= *Stigmella*] were recorded from strata in the Middle to Upper Miocene in western North America by Opler (1973), the host plants of which were members of *Quercus*, except for one species of *Lithocarpus*. Opler also stated that the "healed meandering wounds" on a fossil leaf of *Proteoides wilcoxensis* from Wilcox deposits in Tennessee (Lower Eocene) shown by BROOKS (1955) is the earliest record of a nepticulid mine. In England, a mine considered to be that of *Stigmella* was described from the Reading Beds of the Upper Paleocene by CRANE and JARZEMBOWSKI (1980).

Several orders of fossil insects, viz. Thysanura, Ephemeroptera, Odonata, Isoptera, Plecoptera, Orthoptera, Hemiptera, Lepidoptera, Diptera, Coleoptera, and Hymenoptera, have been found in Japan but fossil materials of Lepidoptera are very few (Hiura, 1965; Koshimizu, 1982; Fujiyama, 1983, etc.). And no lepidopterous fossil mine has previously been discovered from Japan. This fossil mine was found in the Kabutoiwa Plant Bed (Upper Miocene) on the boundary of Nagano and Gumma Prefectures in central Honshu by TACHU KOSHIMIZU on 20th March 1979. The fossil plant bearing the mine was identified by KAZUHIKO UEMURA of the National Science Museum as *Betula grossa* Sieb. et Zucc. (Betulaceae) or an allied species of the Upper Miocene.

Fossil Mine of *Stigmella* sp.

Material : The fossil is well preserved and the mined area is clearly distinguished from the remaining leaf lamina by its lighter color. The frass line is a distinct dark color.

Description : A trace of the egg is recognized as a dark brownish elliptical spot (about 0.3 × 0.2 mm) on the lamina separate from but bounded by two lateral veins. The track of the larval mine is distinct : a sinuous linear mine, it starts in a slender gallery confined by a lateral vein, with linear dark frass occupying about 1/3 of the mine width, extends into neighbouring space by crossing the distal lateral vein, becomes gradually wider and forms

a sinuous shape where a dark brownish dotted line of frass occupies 1/5 to 1/6 of the mine width, and then returns to the previous space near the terminal in a portion without frass. Length of mine is about 55 mm and maximum width is about 3 mm.

The specimen is currently stored in the private collection of Mr. KOSHIMIZU.

The author has never found a mine of extant species of *Stigmella* on a leaf of *Betula grossa*. According to the finder's information, *Betula grossa* does not normally grow in the Mt. Kabutoiwa area although there are a few plants at present.

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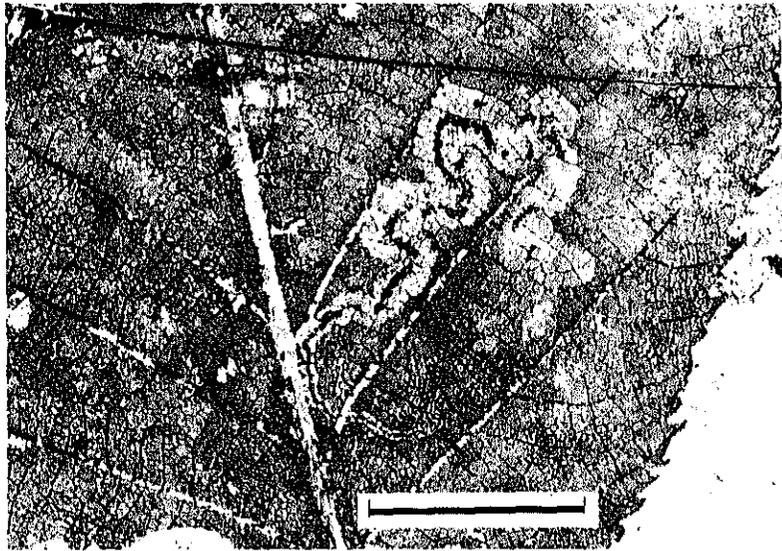


Fig. 1. Fragment of the fossil leaf of *Betula* with the *Stigmella* mine (scale bar, 10 mm).

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