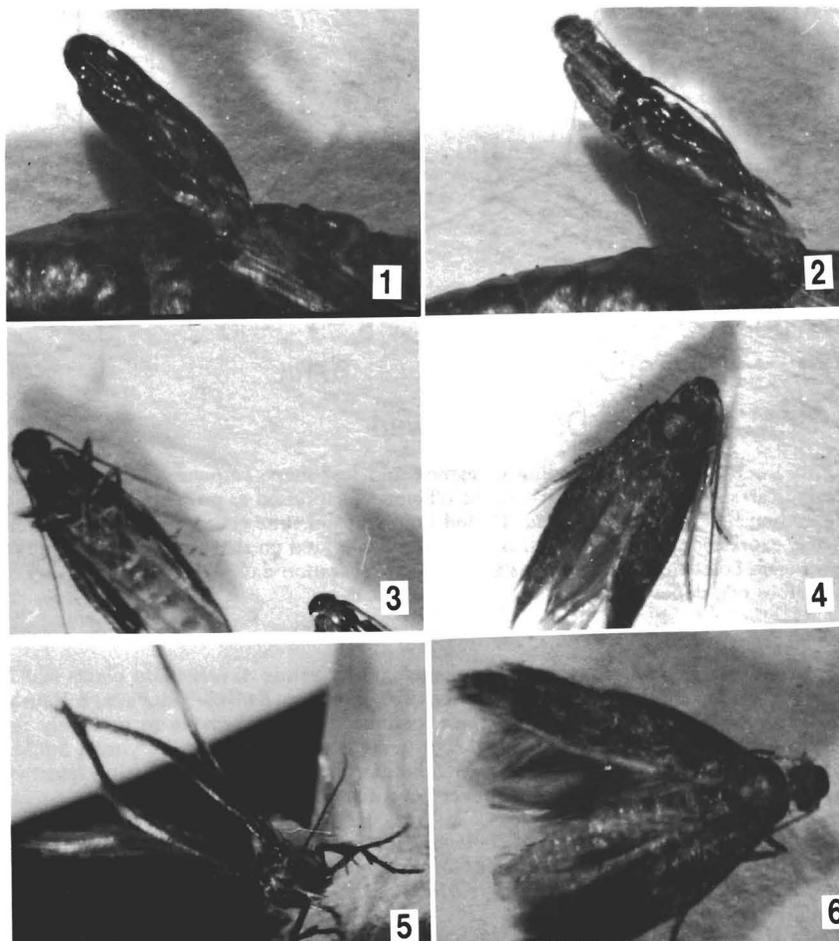


*Journal of the Lepidopterists' Society*  
40(4), 1986, 350-351

EMERGENCE OF *TISCHERIA IMMACULATA* (BRAUN) (TISCHERIIDAE)  
FROM LEAVES OF *CEANOTHUS GRISEUS* L.

*Tischeria immaculata* (Braun) larvae mine leaves of *Ceanothus griseus* L., a native ornamental in Washington State and California (Braun 1915, Entomol. News 26:271-273; Fazoranti 1983, Z. Angew. Entomol. 96:270-476). Biology and mining habits were



FIGS. 1-6. Emergence of *Tischeria immaculata*. 1, 2, Insect thrusts itself from the mine and withdraws legs; 3, Insect falls on back and rests for a few seconds; 4, It flips over suddenly and stays in this position for about 15 seconds; 5, Wing pumping, expansion, and drying accompanied by circular movements for 45 seconds; 6, Wing beating before insect rests.

elucidated in Washington by Fasoranti (1984, *Can. Entomol.* 116:1441–1448). Adults appear at the beginning of May, and there is a short cycle of development during the warm weather between May and August. The next generation takes longer, from August through May of the following year. Mating and egg laying starts immediately after emergence.

Emergence takes place mostly in the evening (1750–2400 h). Time of emergence provides some protection against the insect's principal predator, the dark eyed junco, *Junco hyemalis* L. Emergence also is temperature dependent. In field and laboratory, emergence occurred only at temperatures between 20–22°C. Insects rarely emerged below or above these temperature limits. A typical exit hole is crescentic, about 0.15–0.20 mm long (N = 350), with the convex side toward the end of the mine. The center of the crescent is about 0.20 mm from the end of the mine.

Under controlled conditions (21°C and 70% RH), emergence of 75 adults was timed and photographically documented with a 35 mm camera attached to a microscope using Panatomic X film. The subjects were illuminated with light from two opposing sources. A typical sequence of emergence is shown in Figs. 1 to 6. The whole process takes between 6–7 minutes.

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*Received for publication 1 February 1986; accepted 14 July 1986.*

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*Journal of the Lepidopterists' Society*  
40(4), 1986, 351–352

#### UNUSUAL PREDATOR DAMAGE TO *CARTEROCEPHALUS SILVICOLUS* (MEIGEN) (HESPERIIDAE)

Bird-inflicted wing damage in Lepidoptera that fold their wings above their bodies at rest was classified into two categories by Beck and Garnett (1983, *J. Lepid. Soc.* 37:289–300). To continue the earlier classification proposed by Sargent (1976, *Legion of night*, Univ. Mass. Press, Amherst, Massachusetts, 222 pp.), who worked with noctuid species, the new categories were called Type IV (for bilaterally symmetrical tears roughly parallel to the main wing veins) and Type V (for beak imprints which cross the main wing veins



FIG. 1. *Carterocephalus silvicolus* (Meigen) ♂ (dorsal), showing Type Vb wing damage.