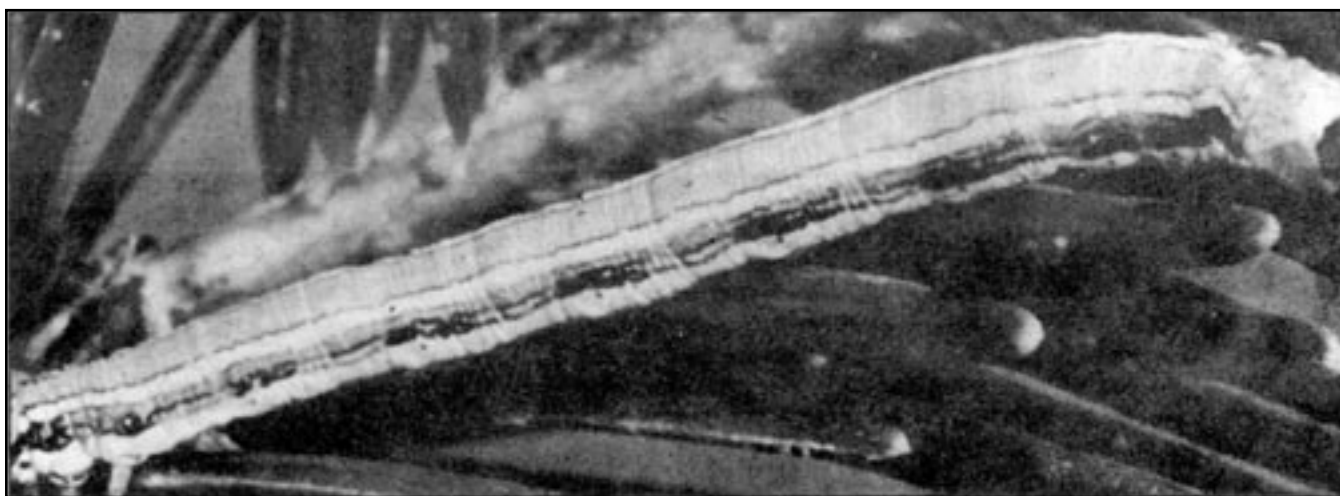


FOREST Pest LEAFLET

Pacific Forestry Centre

Western False Hemlock Looper

R.L. Ferris



Full-grown larva (5X)

Introduction

The western false hemlock looper, *Nepytia freemani* Munroe (*Lepidoptera: Geometridae*), is a native pest of immature Douglas-fir in southern interior British Columbia, southwestern Alberta, and the northwestern United States. Larva populations periodically reach epidemic proportions in British Columbia. There have been five major outbreaks recorded in British Columbia.

Past infestations

1947 to 1949. The population reached epidemic proportions on 100 km² in the Windermere Valley. Since the Christmas tree industry was threatened, approximately 4400 ha were sprayed with DDT in 1948. As a result of both spraying and disease, the infestation collapsed in 1949. Repeated defoliation resulted in top-killing and scattered tree mortality over several thousand hectares.

1963 to 1964. There was moderate to heavy defoliation of Douglas-fir near Chase. The

population declined before any major damage occurred.

1972 to 1976. Outbreaks occurred near Salmon Arm, Enderby, Chase, Lavington, Monte Lake, and Barriere. In 1974, the infestation affected 5600 ha. This was the largest outbreak of this insect in British Columbia. The population collapsed due to parasitism of the overwintering eggs.

1973 to 1976. Approximately 200 ha of pole-sized trees in the Windermere Valley were moderately defoliated. The infestation collapsed



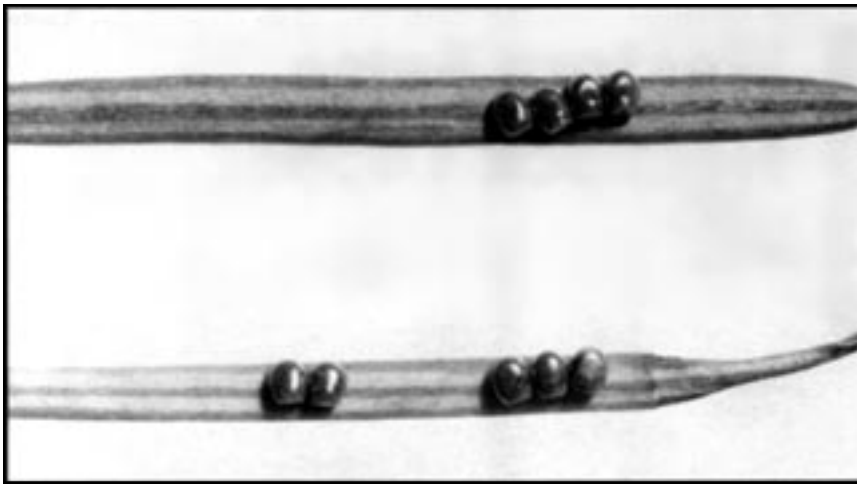
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Eggs laid on needles (5X)



Pupa (5X)

in 1976, presumably due to a virus disease of the larvae and unsuitable weather conditions during the larval feeding period. No tree mortality was recorded.

1980 to 1982. Light defoliation occurred over 350 ha near Sunnybrae, Tappen, White Lake, Grinrod, and Herald-Paradise. In 1982, the infestation increased to cover 1100 ha near Tappen, Canoe, Enderby, and Carquile.

Since the early 1980s, the insect

has been collected infrequently during annual surveys and damage to hosts has been rare. Most recently, evidence of a resurgence of the western false hemlock looper was noted in Douglas-fir stands in the Kamloops Region during 1989. The insect was common again during 1990 at sampling sites from Falkland to Savona, Cherry Creek, Pritchard, and near Spences Bridge, but trees were not defoliated or damaged.

Substantial increases were noted in 1991 along the west side of the North Thompson River from Kamloops to Barrière.

Host and distribution

The larva is a pest of regeneration, immature, and semi-mature Douglas-fir. Larvae are occasionally found on western hemlock, Engelmann spruce, alpine fir, and ponderosa pine. It is common in the Interior Douglas-fir Zone of the Kamloops, Nelson, and southern Cariboo forest districts. Infestations usually occur in almost pure stands of Douglas-fir on dry rocky sites often near residential areas.

Distribution extends to southwestern Alberta and south through Idaho to Utah in the United States where white fir is the preferred host.

Description

Egg: Hemispherical, about 1 mm diameter; pale green, gradually becoming light brown. (Fig. 1).

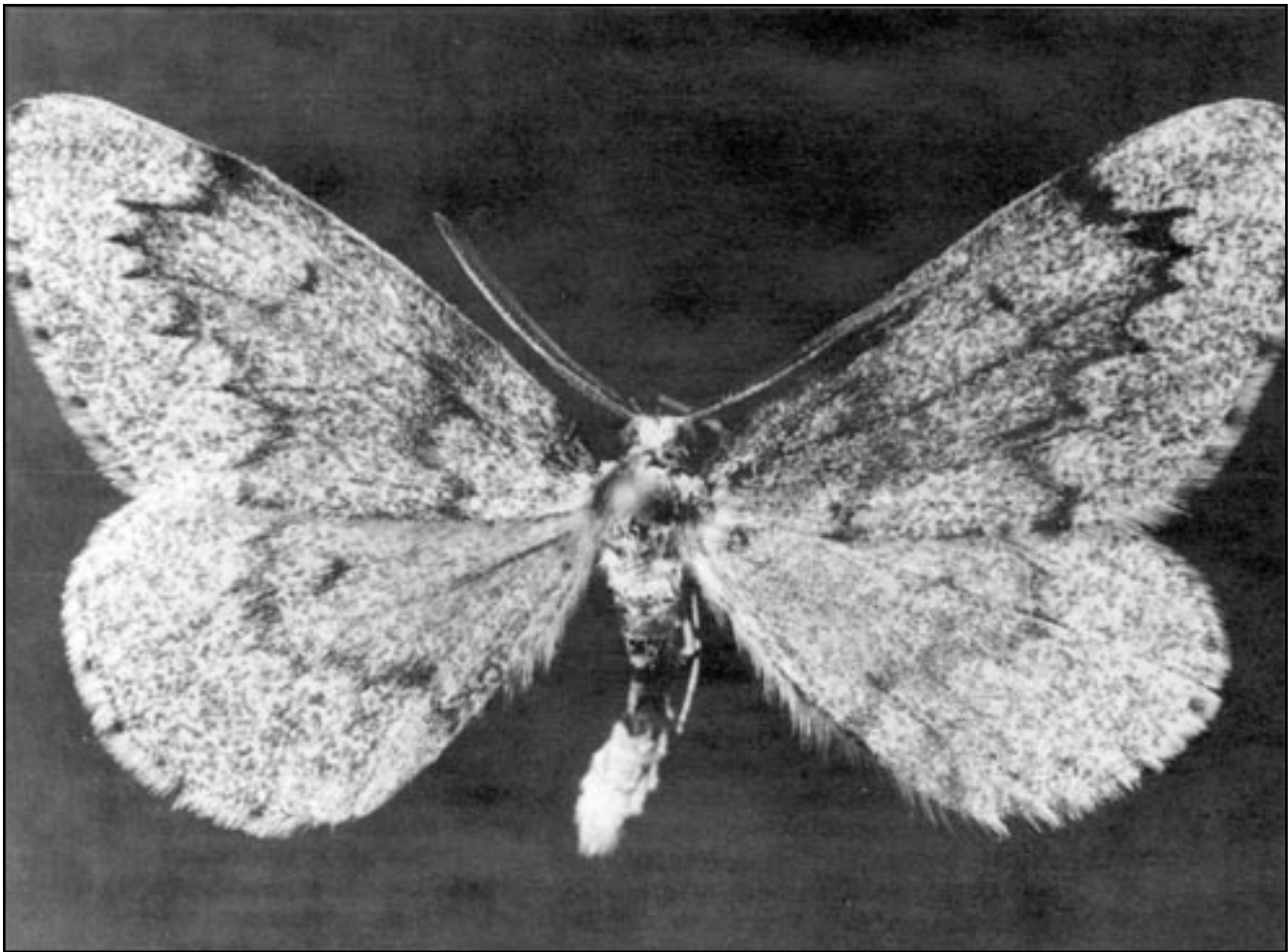
Larva: First stage green-brown, fuzzy, less than 6 mm long; later stages up to 37 mm long, thickly haired and strikingly tufted in shades of red-brown, yellow and black. (Fig. 2).

Pupa: Light amber, becoming glossy, dark red-brown, 12-20 mm long and about 12 mm diameter; loosely contained in an avoid brown cocoon of woven hairs, about 25 mm long. (Fig. 3).

Adult: Wingspan averaging 40 mm in male, 47 mm in female. Robust and conspicuously patterned: forewings dull to dark brown, conspicuously marked with numerous cream-yellow spots, including five pale yellow spots along the leading edge and six paler spots at the sides; hind wings cream-colored with faint brown markings on the front margin. The thorax is covered with fine hairs and patterned with cream-yellow and brown stripes; the abdomen, also silky-haired, is pale yellow above and brown-spotted below. Antennae are comb-like in the male and thread-like in the female.

Life history and habits

Eggs are laid from August to October, singly or in groups of up to 13, although the average number of eggs is about four. Eggs are usually laid on the undersides of the host needles, but when defoliation is severe eggs may be found on bud scales, twigs, or in bark crevices. They hatch the following spring. Young larvae begin to feed on new foliage in the upper crowns of trees during late May, progressing to the older foliage and dropping to the lower branches on silken threads until about mid-August. Although the larvae are solitary feeders, they tend to congregate in loosely webbed enclosures among the needles and twigs to pupate. Pupation occurs in late July or August and adults emerge from August to October. The moths are nocturnal fliers.



Adult (5X)

Damage and detection

The western false hemlock looper is a potentially serious pest. Larvae are wasteful feeders; they seldom devour entire needles, but eat only part of one before moving to another. The partially consumed needles dry out and change color, producing the reddish brown appearance of damaged trees. During an infestation, trees may be entirely defoliated in one season. Douglas-fir are seldom killed after only one year of severe defoliation, but repeated attacks may result in top-kill or mortality. As eggs are often laid on defoliated twigs, the resultant larvae may quickly consume new, adventitious foliage, causing twig mortality. Defoliation appears in June in the upper crowns, and by July or August entire trees may be defoliated. By this time, the ground beneath

heavily defoliated trees may be carpeted with partially eaten needles and frass. Extensive webbing is evident in heavily infested stands.

Management

The western false hemlock looper has occurred cyclically in British Columbia at intervals of about 10 to 20 years since the 1940s. Outbreaks may last for one to three years, and usually collapse rapidly due to exhaustion of the food supply, weather factors, and rapidly building populations of natural enemies such as insect parasites or natural disease agents. This situation appears to be common for several insect defoliators of coniferous trees, including competing species such as the Douglas-fir tussock moth (*Orgyia pseudotsugata*; see Forest Pest Leaflet No. 9). Apparently, host

conditions (healthy, lush foliage) and weather factors (warm, dry conditions) will trigger outbreaks of these and other pest species.

As infestations occur in the future, concern for damage to young managed stands – particularly those of good sites or those which have received considerable investments in establishment and tending – will mount and the need to protect such sites will become an important consideration.

Preventative treatments can be applied at the planning or prescriptive phase. In areas where the looper has occurred most frequently, management of stands to include a mix of tree species and ages will minimize damage.

Insecticides may be used for direct control, particularly where prevention is impossible and when



Douglas-fir trees defoliated by western false hemlock looper

timber or aesthetic values are high. Advice and technical details concerning ground sprays for individual trees should be available from local pesticide control, horticultural or forestry officials. Please follow all instructions carefully.

While some past aerial spray operations with synthetic organic insecticides and the bacterial agent *Bacillus thuringiensis* var. *Kurstaki* (Btk) gave some protection, these experiences did not result in established spray protocols for this insect. As a result, there are currently no recommended direct control treatments available for high-value stands, private properties, parks, Christmas tree farms, and communities. However, operational trials of new commercial preparations of Bt may be conducted during the next outbreak. The objective of such trials would be Canadian registration and marketing of a new naturally-occurring control agent.

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Additional Information

Additional copies of this and other leaflets in this Forest Pest Leaflets series, as well as additional scientific details and information about identification services, are available by writing to:

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