

Discussion and Summary

This study is aimed at separating the different species and their damage, working out their life histories, and determining a means of control for the important species in seed orchards. It is difficult to draw definite conclusions following only one year's work.

However, it is apparent that a number of insect species are involved and that some of these are potentially capable of destroying appreciable amounts of Douglas-fir seed.

In 1957, seed chalcids, cone moths, and cone gall midges were present in appreciable numbers with the latter being the most important single group.

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Two remarkable Moth Chrysalises

Towards the end of May 1925, I received from the government fumigation station in Vancouver, four sapling Chinese elms with curious hard lumps projecting from the stems. The lumps were smooth, oval, nearly $\frac{1}{2}$ inch long by $\frac{5}{16}$ inch wide, striped with six alternate brown and white longitudinal bars and were stuck tightly to the stems. I had an idea that they were of lepidopterous origin so kept them in the laboratory.

On June 20 when working at a table I heard a curious little "plop!" and immediately something flashed to the window which fortunately was closed, and banged up against a pane. It was a stout-bodied brownish-orange-yellow moth with a wing spread of about $1\frac{1}{2}$ inches. Closely watching the other lumps on the stems, I was fortunate enough to see the emergence of another moth; suddenly the rounded top of the chrysalis, like an operculum, flew off with a click and in one fluid movement, without the pause for wing expansion and drying common to most moths, this one emerged from the chrysalis and flew straight towards the light, to hit the window with a thud.

Having no references to Chinese insects, I consulted Maxwell Lefroy's "Indian Insects" and found an illustration and brief description of a very similar moth; it belongs to the Limacodidae, closely related to the Eucleidae or flannel moths which have caterpillars with extremely irritating spines.

In the Blackmore-Wynne collection of Lepidoptera at the University, are specimens of only one species of Limacodidae in this Province, *Tortricidia testacea crypta* Packard, from Saanichton and Enderby, with no notes about its chrysalis.

The emergence of these moths from their hard chrysalises is so remarkably swift as to raise the question "Why?". Every other moth that I have ever heard of or seen takes some little time for the expansion and drying of its wings and the large silk worm moths take several hours. Against what enemies or danger is this moth so protected that it emerges from its chrysalis like a jack-in-the-box?

The second remarkable chrysalis was brought to my attention by Mr. F. Jackson, 440 E. 35th Avenue, Vancouver, who rang me up in June 1957 to ask "What insect is made of gold?" As usual in such cases, I said that I did not know but to send in specimens. In a few days he sent some withered leaves tied into clumps with scanty silk and showing in spots, touches of gold. On tearing open the leaves I was amazed to find small obtected pupae of pure, polished gold, the most beautiful things imaginable. For once a citizen was correct, they were of gold. From July 2 to July 5, four moths emerged from these pupae leaving behind them delicate empty cases with only the faintest tinge of gold. The moths are geometrids *Sicya macularia crocearia* Packard and from the Blackmore-Wynne collection I find that they are quite commonly distributed at the coast and at Enderby where Mr. Wynne lived, and in the southern interior. Larvae of the form *macularia* are recorded by Llewellyn Jones as feeding upon *Acer*, *Betula*, *Vaccinium*, *Spirea*, *Pinus contorta*, *P. monticola* and *Tsuga*, a very wide range of food plants. It would be interesting to know if all the pupae from larvae that feed on such diverse hosts have this polished gold reflection.

The moths, nicknamed "Pink-bordered Yellow" by Blackmore, possess none of this metallic sheen; and the nickname indicates, the colour is yellow with a pinkish-brown margin on the front wing. I can find no references accounting for metallic gold in insects. Other colours, especially yellows, are accounted for by pigments and environmental factors, but not gold. The gold in these pupae may be pigment, rendered

metallic by interference lines, that emerges in the adult wing as yellow.

Finally it is of interest to note that the word "Chrysalis" comes from the Greek "Khrusallis" meaning "golden thing". Did the first entomologist-etymologist to employ that word *Chrysalis* to the obtect pupae of Lepidoptera, have before him the metallic golden pupa of this insect *Sicya macularia*? —G. J. Spencer, University of British Columbia, Vancouver.

ANNOTATED LIST OF FOREST INSECTS OF BRITISH COLUMBIA PART VIII — SEMIOTHISA SPP. (GEOMETRIDAE)¹

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The larvae of *Semiothisa* spp. are leaf eaters; seven of the forest species feed on conifers, three on deciduous-leaved hosts. None has been known to occur in destructive numbers in British Columbia. The larvae are medium-sized loopers: some species are green with white stripes, a few have two colour phases. All species overwinter as naked pupae in the duff.

S. adonis B. & McD. *Pinus ponderosa*, *P. contorta*, *P. monticola*, *Pseudotsuga taxifolia* (3), *Larix occidentalis* (1); southern B.C.; rather uncommon. **Larva:** 1½ inches; head, pale green, dull reddish patch above and before ocelli; body, green; cream-coloured subdorsal stripes (includes abdominal setae ii of Dyar and Forbes) continuous onto the head; broader cream subspiracular stripe.

S. granitata Gn. *Pseudotsuga taxifolia*, *Picea engelmanni*, *P. glauca*, *P. mariana*, *P. sitchensis*, *Tsuga heterophylla*, *Abies lasiocarpa*, *A. grandis*, *A. amabilis*, *Pinus contorta*, *P. monticola*; believed to be accidental on *P. ponderosa* and *Larix* spp. Generally distributed; sometimes very numerous over small areas. In 1949 numerous adults emerged during early fall; normally the species overwinters in the pupal stage. **Larva:** 1½ inches; head, greenish, with dark reddish-brown blotch or herringbone pattern on sides, occasionally also on vertex; body, green; middorsal area

dark; white subdorsal stripe ventrad of setae ii; whitish "bloom" over dorsum; fine blackish lines on dorsum, below subdorsal stripe and on sub-venter (these blackish lines may be obscured by the "bloom"; cream spiracular-subspiracular stripe; white lines on venter.

S. perplexa McD. *Pseudotsuga taxifolia*, *Picea engelmanni*; southern Interior with a few records along the southern and central Coast. **Larva:** apparently similar to *S. granitata*.

S. sexmaculata Pack. *Larix occidentalis*, *L. laricina*; southern Interior on western larch and central Interior north into the Yukon on eastern larch; frequently numerous. Sometimes this species has a partial second brood. **Larva:** length ¾ inch: **green phase** — head and body green; white addorsal lines dorsad of seta i; broader white subdorsal stripe ventrad of ii, bordered below by black line; cream subspiracular stripe; white midventral and subventral lines; no black lines on venter; **brown phase** — head, off-white, with brown blotch or herringbone pattern on vertex; body, off-white, overlaid with brown; irregular broad anteriorly directed dark brown wish-bone mark on the dorsum of each abdominal segment.

S. triviata B. & McD. *Juniperus scopulorum*; Australian, Marguerite, Alexandria, Williams Lake, Mara Meadows, Fort Steele, Hedley. **Larva:** ¾ inch; head, off-white with irregular brown patch through setae ii (Dyar); pale herringbone pattern on vertex;

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