

THE LODGEPOLE PINE NEEDLE MINER IN THE CANADIAN ROCKY MOUNTAIN PARKS (Lepidoptera, Gelechiidae)¹

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The needle miner (*Recurvaria milleri* Busck)² attacks lodgepole pine (*Pinus contorta* Douglas) and Jeffrey pine (*Pinus jeffreyi* Greville and Balfour). An outbreak in lodgepole pine was noted as early as 1903 in Yosemite Park, Calif., where large areas were affected (Patterson, 1921). This infestation has continued in varying intensity up to the present time. Many trees have been killed by repeated defoliation and many others have been badly disfigured. This miner has also been recorded from the Deschutes National Forest in Oregon (Doane, Van Dyke, Chamberlin and Burke, 1936).

In Canada, a heavy infestation was first noticed by park wardens in early June of 1942 in Banff National Park, Alberta. Over large areas lodgepole pine commenced to turn reddish-yellow in a band on the slopes between the 5,000 and 6,500 foot elevations. This was in the midst of a bark beetle control area and the wardens at first thought it was a terrific increase in bark beetle attack. In 1942, intensive infestation occurred on nearly all slopes on the south side of the Bow River from Vermilion Pass eastward to Brewster Creek. On the north side of the Bow Valley discoloration was evident from Johnston Canyon, westward to Castle Mountain. A small area was also affected near Lake Louise, Alta. By 1944, the area severely affected was extended westward into Yoho Park in the vicinity of Wapta Lake, B. C., and from Vermilion Pass southward into Kootenay Park for a distance of eight to ten miles. A few specimens were also collected in the Sunwapta district of Jasper National Park, Alta., but no outbreaks have been reported from this locality.

Although the first outbreak was known in 1903, eleven years passed before the

moth was described (Busck, 1914). It is a small grayish moth with a wing expanse of 12 to 14 mm. The head, fore-wings and thorax are silvery gray, irregularly sprinkled with black scales. The front of the head is silvery-white, the antennae gray and black annulated. The abdomen is mainly silvery-white, the legs more or less barred with black.

Not all details of the life-history have been observed at Banff, but the general development follows that described by Patterson (1921). The moths appear in alternate years: in the odd-numbered years in Yosemite and in the even-numbered years in Banff. In 1942 the peak of moth emergence occurred between July 19 and 24. By July 26 over 60% of the pupae had produced adults. At that time, the jarring of a young tree produced a swarm of the tiny moths like a halo about the crown.

The eggs are deposited usually at the bases of the current year's needles and are generally concealed beneath the needle sheaths. The eggs hatch in from twelve to fourteen days. The emergence of the larvae continues from early August to about September 10.

The young larva enters a needle of the current year's growth and about one-third of this needle is mined the first year before activity ceases for the winter. Feeding is resumed in early spring of the following year. After mining about two-thirds of the original needle, the larva moves to a needle of the new growth during August. By the end of the second year about one-half of this needle has been mined and the larva settles down for another winter. In the following spring the mining of this needle is completed and the larva goes to another needle of the same year's growth. After mining this one, it pupates in the gallery. In years of moth emergence the discoloration of the foliage is more pronounced due to the mining of two needles of the same year's growth

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² This determination was not made by a specialist in the group, but was made by the writer after checking specimens with the description (Busck 1914).

by each larva. This practically disappears by the end of September because by then most of the old mined needles have fallen and the mines made by the young larvae in the new growth are too small to cause noticeable browning.

In intensified form the outbreak has been in progress for four years, 1942 and 1944 being the moth flight years. Thus far, the recovery of the trees has been satisfactory except on a small area near Lake Louise, where a few of the older trees appeared to be dying when examined in September, 1944. It is probable that older trees are less able to withstand the miner attack than young stands. In one mature stand on Brewster Creek, the needle miner attack appears to have complicated the bark beetle control work. The weakening of these trees seems to have attracted beetles from surrounding areas

less affected by the miner. Consequently, it has been necessary to cruise and burn beetle-infested trees on the Brewster area on three successive years, while other areas required only two treatments.

At the present time it is impossible to predict what the final outcome of this infestation by the needle miner will be. If it should continue for another four years, mortality in mature stands probably would become severe. Fortunately, young reproduction occupies much of the affected area. A more serious consideration is the possibility of bark beetle attack on the mature trees weakened by the miner. As yet there is no indication of any material decrease in the needle-miner population. Several species of parasites have been recovered, but examination of over 12,000 needles showed parasitism to be less than 20%.

LITERATURE CITED

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- Doane, E. W., E. C. Van Dyke, W. J. Chamberlin and H. E. Burke.** 1936. Forest Insects, McGraw-Hill Book Co., New York and London, P. 303-304.
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POPULATION COUNTS OF POTATO FLEA BEETLES AT AGASSIZ AND CHILLIWACK, B.C. (Coleoptera: Chrysomelidae).—During the course of studies of the new tuber flea beetle, *Epitrix tubensis* Gentner in the lower Fraser valley, a remarkable diminution in numbers of the common western potato flea beetle, *Epitrix subcrinta* (LeConte) has been noted. Population counts of adults on potato foliage have been made each season since 1941 by means of sweeping, the beetles being then killed and counted in connection with our life history studies.

In 1941 75 per cent of those taken were *subcrinta*. In 1942 *subcrinta* out-numbered *tubensis* until June, after which the numbers were about equal. In 1943 the *subcrinta* collected in our sweepings were less than 10% of the total at any time throughout the season, and were usually so few that they were disregarded in our population estimates. In 1944 *subcrinta* was even scarcer and although it emerges from hibernation from two to three weeks earlier than *tubensis*, it was not collected in appreciable numbers even in May, before *tubensis* appears in any numbers, and throughout the season formed less than 1% of the beetle population at any time. These population counts were made both at Agassiz and Chilliwack, and the same conditions were found in both districts.

Although this reduction in numbers of *subcrinta* might be due to a natural cyclical phase, pressure of population by the great increase of *tubensis* in these years may be responsible, though it is difficult to see in what way one species could interfere with the other except during copulation. Parasitism is negligible in either species.—R. Glenndening, Agassiz, B.C.

EROS THORACICUS IN BRITISH COLUMBIA (Coleoptera: Lycidae).—On July 6, 1934, I took a specimen of *E. thoracicus* (Rand) at Fernie, B.C., on herbage along the bank of the Elk River. W. J. Brown, who identified the specimen, advises me that G. S. Wallely found a specimen at Likely, B.C., on July 7, 1938.—Hugh B. Leech.

THE WATER BEETLE AGABUS GRISEIPENNIS IN OREGON (Coleoptera, Dytiscidae).—H. C. Fall in his revision of *Agabus* listed *A. griseipennis* LeConte as inhabiting the Rock Mountain and Plateau region. Localities were cited in Wyoming, Montana, New Mexico, Nevada and California (Owens Lake). C. W. Leng in his checklist of Coleoptera noted it from Nebraska and California. H. B. Leech (1942 Canad. Ent. 74(7):131, fig 11) added Utah: Far West; Skull Valley; Provo; California: Lone Pine, Inyo Co.; Bodie, Mono Co. At the same time he questioned the accuracy of the Montana determinations. I have two specimens (det. Leech) from Burns, Harney Co., Oregon, taken June 26, 1941, from a roadside ditch. This is a new record for the state and one I deem worthy of note.—Kenneth M. Fender, McMinnville, Ore.

APHODIUS ALTERNATUS IN BRITISH COLUMBIA (Coleoptera: Scarabaeidae).—On April 19, 1942, a specimen of the pretty, vittate *Aphodius alternatus* Horn (det. W. J. Brown) was found floating in a small pond on top of the Birney range, about a mile south of Vernon. Though dead, the beetle was fresh and in good condition; cattle were numerous in the vicinity, and several species of dung-inhabiting *Aphodius* were in flight at the time.—Hugh B. Leech.