

AN OUTBREAK OF THE PINE LOOPER MOTH

(*Bupalus piniarius*, L.) AT CANNOCK CHASE IN STAFFORDSHIRE, AND SOME NOTES ON THE BIOLOGY OF THIS PEST

By Dr. Myles Crooke

British Forestry Commission

FORESTERS have for long realised the insect risks attached to the planting of large blocks of pure crops, and experience on the continent of Europe and elsewhere has clearly shown how serious the results of such attacks can be, particularly in coniferous woodlands. Up till the present time in Great Britain we have not suffered from epidemics of defoliating insects in conifer forests but this is due, at least in part, to the fact that we have not had areas of sufficient extent, and of suitable species composition and age to create the right conditions for outbreaks. In the last thirty years, however, large areas have been afforested with a number of conifer species and as the age of these forests increases, so does the danger of insect damage.

Bupalus piniarius, L. the Pine Looper, is a serious defoliator of pine on the continent of Europe, where it attacks pole stage and older crops, most usually where these are situated on sandy soil types in areas of low annual rainfall. This moth is of widespread distribution in Great Britain and, although it has not before caused any severe damage in this country, it has been regarded as a potential menace and has for the last two years been the subject of intensive study by the Forestry Commission Research Branch. This year, for the first time in our recent forest history, a serious outbreak of the pine looper has occurred in the forest of Cannock Chase, near Birmingham, in Staffordshire. This forest is about six thousand acres in extent and, on Bunter sandstone and pebble beds with a mean annual rainfall of twenty-five inches, is composed mainly of Scots and Corsican pines, the oldest of which are thirty-five years. Late in the summer of this year about 120 acres of Scots pine of Quality Class II and of the oldest age class were discovered to have been completely defoliated by *B. piniarius*. The effects of the caterpillars' feeding did not become obvious until early September although in the spring of the year the forester had observed badgers turning over the needle litter in the search for pupae and had also observed the mass flight of adult moths during the summer.

Since it is possible that this epidemic at Cannock may be the forerunner of a series of similar ones in other parts of the country, the following descriptions of the various stages of the insect and of its biology are appended.

DESCRIPTION OF INSECT

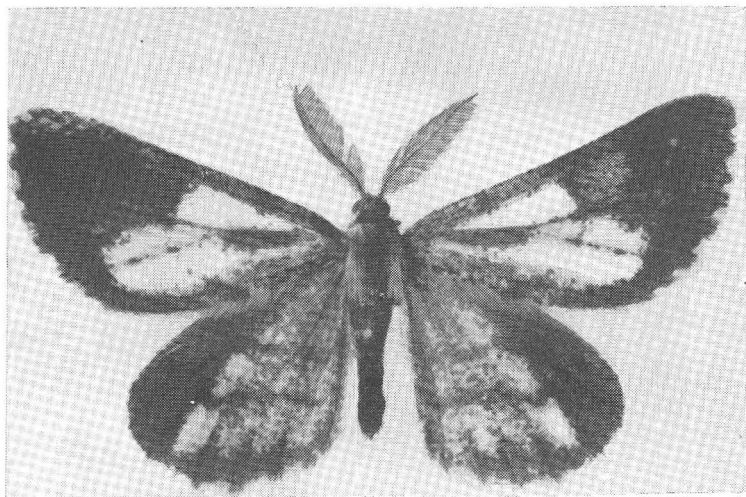
- (a) Adult (wingspan up to $1\frac{1}{2}$ ""). The male has a dark brownish ground colour and the markings are white to yellowish white. The antennae are bipectinate. The female is orange brown and the markings darker brown. The antennae are filiform.
- (b) The eggs are green when unhatched, white and iridescent when hatched. They are laid along the length of the needle in a row.
- (c) The larva is a "looper". When full grown it is green and bears five white or yellow white stripes. The head is also green and the central three stripes extend on to the head. In all stages the larvae have the ability to suspend themselves on a silk thread.
- (d) The pupa is dark brown with green wing cases, and is slightly less than $\frac{1}{4}$ " in length.

LIFE CYCLE

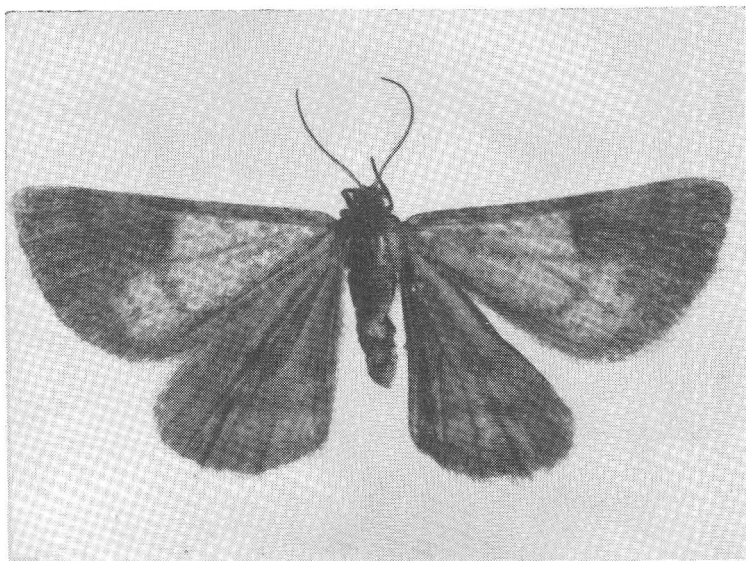
The first adult is on the wing at the end of May and the numbers flying increase to reach a maximum at the beginning of July. The flight period is completed by the end of this month. The flight of the adults is characteristic and they can be easily picked out flying amongst the crowns of the trees with a very quick zig-zag flight. The females lay their eggs throughout the crown, placing clutches of from one to sixteen, or more, eggs on a single needle in a long row. These eggs hatch within ten days or a fortnight. The life of the larva is long and development is slow, the five instars or stages taking about three or four months to complete. The effects of larval feeding during an infestation are first noticeable in the forest during the fourth stage at about the beginning of September when a distinct browning of the foliage becomes apparent. This browning is caused by the wilting of remnants of half-eaten needles. Mass feeding is normally completed by early November and at this time the appearance of the attacked trees is quite characteristic. There is a complete absence of green and the brown rather feathery needle remnants are either still attached to the shoots or are hanging from the twigs in long strands held together by the silk produced by the caterpillars. When feeding has been completed the larvae spin down from the branches on silken threads or crawl down the trunk and pupate in the soil and litter at a depth of one or one and a half inches.

The distribution of *B. pinarius* in any pine area is usually fairly uniform so that an increase in population in any part of it means that the population throughout is probably also increasing. Thus, the first signs of defoliation indicate that the risk throughout the area is high and that in the following season defoliation will probably spread not only from the nucleus but also by a general increment of numbers throughout the

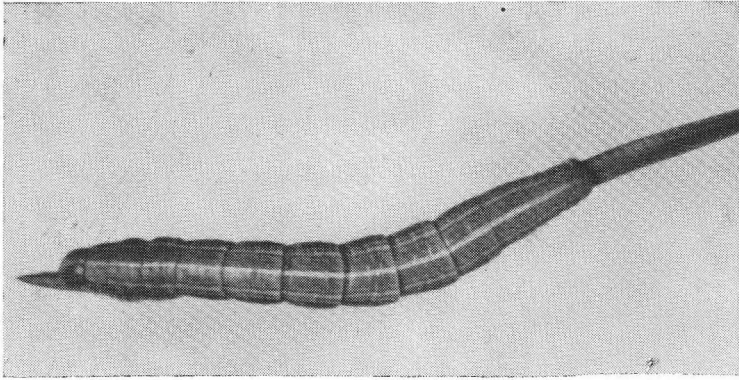
Bupalus Piniarius



ADULT MALE $2\frac{1}{2}$ times natural size



ADULT FEMALE $2\frac{1}{2}$ times natural size



B. Piniarius LARVA $2\frac{1}{2}$ times natural size

forest. Continental experience demonstrates that natural control of an outbreak is only very seldom effective so that artificial controls must be used. It is obviously important to initiate those as early as possible to prevent further damage to the crop. Normally, Scots pine will recover from a single year's defoliation but should the attack continue for another year one can expect a high proportion of deaths in the crop, often accelerated by secondary bark-beetle attack. A third year's defoliation is invariably fatal.

Early detection of pine looper outbreaks is a matter of prime importance and this preliminary notice of the epidemic at Cannock will, it is hoped, draw attention to the danger and ensure the co-operation of foresters and others in notifying any incipient outbreak.

