

FOREST INSECT PESTS AND THEIR CONTROL.

One of the most effective means of controlling destructive forest insects at the present time is by the propagation and distribution of parasites. This method has been adopted with success in the case of the larch saw-fly and is now under test with the spruce saw-fly. These pests, together with the spruce bud-worm and the jack pine bud-worm, have caused tremendous damage to the forests of Eastern Canada. Other methods of control illustrated are: the use of 'predator' insects which prey on the pests, and artificial control by which poison dust is spread from the air.

The layout on the opposite side of this insert shows:—

European Saw-Fly.—(1) The effects of European saw-fly infestation in the Gaspé peninsula. (2) Enlarged view showing an adult ovipositing in a spruce needle. (3) Larvæ on a spruce twig.

Parasitic Control of the European Saw-Fly.—(1) A forest ranger placing a square cage containing parasites under a tree. The moss in his left hand will later be placed over the cage. (2) Greatly enlarged view of the adult of the European saw-fly parasite. (3) Adult laying its eggs in the cocoon of the European saw-fly. (4) Newly-formed pupæ of the parasite in the cocoon.

Predator.—A predator attacking a larva of the European saw-fly.

Artificial Control.—The most practical method of artificial control is by spreading poison dusts over the forest from aeroplanes. This means of control is restricted, however, under Canadian conditions.

Bud-Worm Pests.—(1) Defoliation of a jack pine by the bud-worm. (2) Stages in the development of the spruce bud-worm: (a) lateral view of the pupa; (b) views of the adult female; (c) larva at the fourth stage of development; (d) larva at the sixth stage of development.

Secondary Insects.—Pine attacked by secondary insects—in this case *Ips pini* and *Monochamus confessor*—showing the deterioration of the wood.