DAMAGE BY A WILLOW SHOOT-BORING SAWFLY IN ALBERTA

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Whips in willow cutting beds were seriously damaged by a shoot-boring sawfly in a tree nursery. The life history, damage, and hosts of Euura atra ()urine) are presented. A soil drench with dimethoate gave 93 percent control of this sawfly in 1975.

Over 200,000 willows are shipped annually to Alberta farmers and municipalities from the Alberta Agriculture Provincial Tree Nursery, Oliver, for shelterbelt and conservation material' Many whips from the willow cutting beds, however, had to be culled in 1974 because they contained larvae of a shootboring sawfly, *Euura* atra (Jurine).

The purpose of this report is to alert nurserymen, agricultural representatives, landscape gardeners, and homeowners to the presence of this insect in the Canadian Prairies, the damage it causes, and a possible control measure.

Distribution in Alberta and Known Hosts

This willow shoot-boring sawfly is known in both Europe and North America. It was first recorded in Quebec in 1888 (5)' and since then from the Maritime Provinces to Alberta in Canada (4). It was first noted in Alberta at Brooks in 1952, at Vauxhall in 1967, at Devon in 1975, and at the Alberta Agriculture Provincial Tree Nursery, Oliver, in 1974 where it caused serious damage to willows.

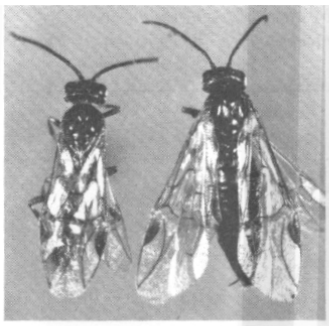

Figure 1. — *Male and female of Euura atra (Jurine).*

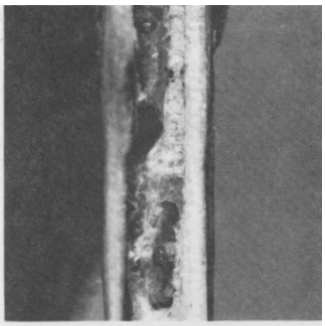

Figure 3. — *Larvae of E. atra in new shoot of acute leaf willow.*

Figure 2. — *Egg scar of E. atra in golden leaf willow.*

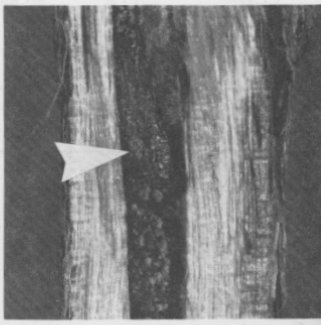

Figure 4. — *Cocoon of E. atra in acute leaf willow.*

Larvae of E. atra have been observed boring into the new shoots of acute leaf willow, Salix *acutifolia* Wilid. (figure 3), golden leaf willow Salix *alba* var. *tristis* L., and laurel leaf willow, Salix *oentandra* L., in Alberta. It attacked weeping willow, Salix *babylonica* L. in Ontario, and crack willow, Salix *fragilis* L., and European yellow willow, Salix *alba* var. *vitellina* L. in the Maritimes (4). In Europe, it was recorded from Salix *repens L.,*

1 Personal communication with G.D. Granger, Superintendent, Alberta Agriculture Provincial Tree Nursery, Oliver. 1975.

2 Described as *Euura nigra* Provancher in Quebec but placed (1) as a synonym of *Euura* atra ()urine).

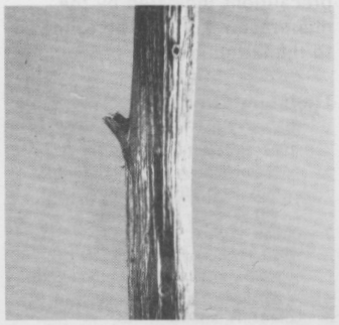

Figure 5. — *Emergence holes of E. atra from golden leaf willow.*

Figure 6. — *Dead shoots and new growth of acute leaf willow in late May.*

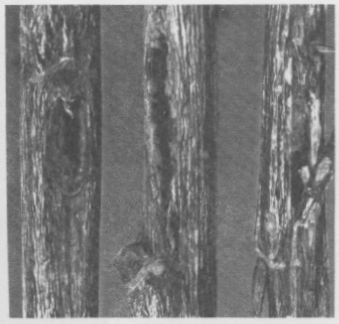

Figure 7. — *Predation damage by downy woodpecker on acute leaf willow.*

Figure 8. — *Dead shoots of acute leaf willow infested with Cytospora capreae Fckl.*

Salix *viminalis* L., Salix *purpurea* L., and also *Populus* tremula L. (1); cricket-bat willow, Salix *alba* var. caerulea Smith (2); and Salix *lapponum* L. and Salix *cinerea L. (3).*

Life History

Euura atra overwinters in the larval stage generally inside a brownish transparent cocoon (figure 4). A few larvae were observed overwintering without constructing a cocoon. If these were not parasitized or diseased, they probably pupated without spinning a cocoon. Pupation occurs in early spring and the adults (figure 1) emerge in late May and early June. The adult female inserts pale whitish eggs individually into tender new shoots next to the pith, often near the base of the shoot in mid-June (figure 2). The eggs are elongate and markedly tapered at one end, measuring from .28 x .74 to .26 x .94mm with an average of .26 x .83mm. Young larvae hatching from the eggs in late June have a pale black head and a greenish white body. The larvae tunnel into the pith and undergo about seven stages of development, growing up to 8 mm in length. Young larvae produce reddish brown frass and the older larvae whitish frass, which is generally pushed to one end of the tunnel along with the cast head capsules. Each gallery contains only one living larva. If there are two larvae in a gallery, one of them is killed and together with the frass and cast head capsules is pushed to one end of the gallery. The larva makes an exit hole extending through bark at one end of the gallery in late September and early October, which is generally plugged with frass, bits of pith, and webbing. Externally the exit hole, which may also be unplugged in a few cases, is indicated by a slightly

depressed, round discolored area (figure 5). At the other end of the gallery, the larva generally constructs an overwintering cocoon in late October and early November. There is only one generation a year.

Damage

This sawfly attacks not only the new stems but also the new laterals of willow. As many as 30 larvae have been observed in a single whip of acute leaf willow measuring about 2 m in length. Most of the damage was observed in new shoots between 3 and 18 mm in diameter. The feeding activity of *E.* atra causes the affected tissues to die. Its presence in the new shoots of some willows may be indicated by a slight swelling. The following spring the infested stems frequently die (figure 6), and some are attacked by a fungus disease, Cytospora capreae Fckl. (figure 8). Each larva makes a gallery 10-21 mm in length, which may parallel or overlap another gallery (figure 3). The downy woodpecker, *Dendrocopos pubescens (L.),* also damages the willow shoots by digging out larvae from the tunnels with its beak (figure 7).

Examination of 100 46-cm shoots taken at random near the base of willow whips in November from each of 4 species in the cutting beds at the Alberta Agriculture Provincial Tree Nursery, Oliver, disclosed that some species are more susceptible than others. Acute leaf willow was the most heavily infested, with 359 larvae, followed by golden willow with 67 larvae. No larvae of *E.* atra were observed in the samples taken from peach leaf willow, *Salix amygdaloides* Anderss. Although no *E.* atra larvae were observed tunnelling in the whips of the laurel leaf willow cuttings bed at Oliver, the occasional larva was found in this species used in shelterbelts.

Control

Willow shoot borers are controlled by natural factors such as parasites and predators. Mechanical control to augment natural control factors would be ineffective because it is difficult to tell which shoots are infested until the following spring when no foliage appears on the dead shoots. By this time most of the adults have emerged.

Field tests in 1975 showed that a soil drench with dimethoate (Cygon 4E)(R) applied at the rate of 11 $^{ml/cm}$ or 1 oz/in. of stem diameter (cumulation of stems) in early July gave 93 percent larval mortality. It should he noted that chemicals are toxic and all precautions indicated by the manufacturer should be followed to the letter.

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