STEREMNIUS CARINATUS (BOHEMAN), A WEEVIL DAMAGING CONIFEROUS SEEDLINGS IN BRITISH COLUMBIA

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INTRODUCTION

Steremnius carinatus belongs to the hylobiinid group of weevils, which contains several important seedling pests in Europe and eastern North America. The weevil was considered as a scavenger until 1961, when it was recognized as a pest of coniferous plantations and natural regeneration in coastal British Columbia. S. carinatus is found on the Pacific Coast from Alaska to California and in the interior wet-belt areas of British Columbia. Damage has been recorded in damp, cool sites on Vancouver Island and Queen Charlotte Islands.

Recent increases in rate of restocking forests in British Columbia, with reduction in seedling density, have made losses more significant. Practical means for avoiding or reducing weevil damage require consideration.

DAMAGE

Seedlings are chewed by adult weevils from $\frac{1}{2}$ inch below, to several inches above, the soil surface (Fig. 1). Girdled seedlings usually die, whereas those partially girdled may survive. Douglas-fir plantation seedlings younger than 2-0 stock are attacked more frequently and damaged more severely than older seedlings. In some plantations 40 to 60% of

seedlings have been attacked and about half of these were girdled.

One- and two-year-old plantation stock is generally free from severe attack following one growing season on site.

Observations of container-planted seedlings on Vancouver Island in 1968 indicate a lower incidence of attack than on older bare-rooted stock planted in the same sites.

Natural regeneration of Sitka spruce, hemlock and cedar on the Queen Charlotte Islands has been heavily attacked. Many young seedlings only a few inches tall have been almost completely devoured.

DESCRIPTION OF THE INSECT

The adult is a typical weevil, about 1/4 to 3/8 inches long, brick-red to brown or yellowish, with a prominent snout.
The wing-covers are fused and the wings are undeveloped. The adults assume a death feint when disturbed.

The larva is white and grub-like with a brownish head, and is 3/8 inches long when full grown.

The pupa, similar in size to the larva, is initially white, but turns darker with development. The snout and legs are discernable on the underside.

BIOLOGY

Eggs are laid from spring through summer in niches chewed in the bark of stump roots and buried logging slash. Hatching occurs after several weeks and the larvae mine the inner bark, making irregular, winding galleries. Larval development is completed in 18 to 24 months and pupation follows in

shallow chip cocoons constructed in the sapwood or in the corky bark. Adults emerge from spring to autumn, but usually overwinter before they reproduce. They are known to overwinter at least three times and are capable of establishing a brood each year. Douglas fir and spruce are preferred breeding material but hemlock and balsam will also support broods. Adults feed on ground vegetation, coniferous foliage on the ground, inner bark and other detritus. They feed most actively under moist conditions during spring and autumn, and retreat into the soil during hot dry spells in summer and cold periods in winter.

CONDITIONS ASSOCIATED WITH DAMAGE

Steremnius carinatus commonly occurs in undisturbed forests in small numbers, feeding on detritus and breeding in roots of wind-broken trees. Construction of access roads provides stump roots and buried slash in which the weevils breed and populations increase. Logging then opens vast breeding sites to these populations, enabling them to increase massively in material that may be suitable for brood production for several years. Burning of surface slash, often necessary to reduce brush competition for seedlings, destroys the natural vegetation and materials the weevils normally eat, and focuses their attention on newly planted seedlings. Seedlings planted after weevil populations have increased may be severely damaged or destroyed. Seedlings that have grown on site for one season or more before adult weevils appear, escape severe damage. Also, seedlings planted where natural ground vegetation is plentiful are less frequently attacked. Infestations of 15,000 weevils per acre have been recorded. Although these weevils are flightless, their longevity contributes to cumulative increase and to spread between adjacent areas.

SAMPLING FOR WEEVIL POPULATIONS

Indications of weevil numbers in a particular site may be obtained by trapping with poison bait and counting the number of adults attracted over a period of time. This is best done during favorable weather in spring or autumn. The traps are freshly peeled conifer bark, about 3 by 8 inches, dipped in a 0.5% aquaeous solution of lindane or DDT (wetable powder). These are set in the field phloem-side down on paper towelling on the ground, in the shade to avoid drying. At least 10 traps should be spaced over a site and examined over a 15-day period at about 5-day intervals. A return of 30 or more weevils per 10 traps indicates potential hazard.

PREVENTIVE MEASURES

Because buildup of weevil populations and damage depends mainly on local conditions which vary between sites, forecasting of outbreaks over large areas is not possible. However, current knowledge of the insect suggests the following measures to minimize S. carinatus damage in plantations.

1) Planting should proceed immediately following logging and slash-burning to allow one growing season before broods of weevils emerge from the stumps.
2) Weevil populations should be sampled in suspected hazard areas to determine the need for protective measures.
3) Where adults have already emerged from stumps in rights-of-way or cutover areas, older seedlings, less attractive to the weevils, should be used.
4) In hazard areas, planting in spring rather than in autumn, especially of young stock, is advantageous because this allows a season of growth before exposure to autumn

feeding.

Further information may be obtained from:

Forest Research Laboratory,

Canada Department of Fisheries and Forestry,

506 West Burnside Road,

Victoria, British Columbia.

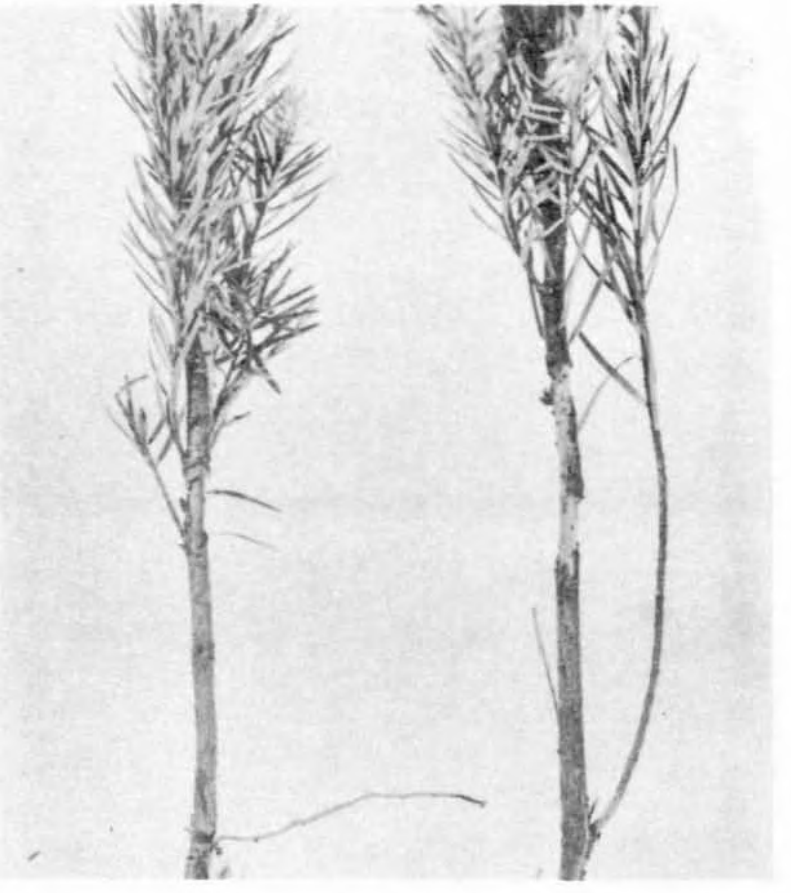

Fig. 1 Weeviled Douglas-fir seedlings.