



TECHNOLOGY TRANSFER NOTE

A-015

FOREST INSECT AND DISEASE NOTES

JULY, 1990

CONTENTS

POPLAR LEAF AND SHOOT BLIGHT	2
BRUCE SPANWORM INFESTATIONS IN THE PRAIRIE PROVINCES	2
PEST SITUATION REPORT	4



Government
of Canada

Gouvernement
du Canada

Canadian
Forestry
Service

Service
canadien des
forêts

Canada

POPLAR LEAF AND SHOOT BLIGHT

by
Ken Mallett

Poplar leaf and shoot blight is a disease of aspen, balsam and hybrid poplars in the prairie provinces. The disease can be found on young saplings as well as older trees. It can lead to disfigurement and growth loss in young trees but seldom affects the growth of older trees. Typical symptoms of the disease include a blackening and wilting of the shoots and leaves. Terminal branches are wilted and bent over resembling a shepherd's crook. On leaves large, irregularly shaped, brownish black spots develop. Often the infected leaves and shoots have a greenish-black velvet-like appearance due to the spores.

The disease is caused by the ascomycete fungus Venturia macularis on aspen and V. populina on balsam poplar. These fungi produce ascospores (sexual spores) and conidia (asexual spores) on the dead overwintered tissues in the spring. Spores are disseminated by the wind and infect newly emerged shoots and leaves. More conidia are then produced on the newly infected leaves and other shoots and infect later growth. Older mature leaves appear to

have some resistance to the disease and are not damaged.

Control

There are no fungicides registered for the control of poplar leaf and shoot blight at this time. In high value trees, affected shoots should be pruned and burned. In conifer regeneration areas, where poplar is not desired, this disease may be considered as a form of biological control.

Further reading

Dance, B.W. 1961. Leaf and shoot blight of poplars (section Tacamahaca) caused by Venturia populina (Vuill.) Fabric. Can. J. Bot. 39: 875-890.

Hiratsuka, Y. 1987. Forest tree diseases of the prairie provinces. Canadian Forestry Service. Northern Forestry Centre, Edmonton, Alberta. Information Report NOR-X-286.

BRUCE SPANWORM INFESTATIONS IN THE PRAIRIE PROVINCES

by
Herb Cerezke

The Bruce spanworm, Operophtera bruceata (Hulst), is a lepidopterous defoliator native to North America. In Canada, it occurs from coast to coast, but in the prairie provinces, its infestations have been most commonly reported in central and western Alberta, less commonly in Saskatchewan and the Northwest Territories, and was reported in the Duck Mountains area of Manitoba in 1988. Since 1900, 5 outbreaks in Alberta are known to have

occurred, each one likely resulted in several hundreds of km² of defoliated aspen forests. The first two occurred in 1903 and in 1913. A third outbreak, which peaked in 1958, resulted in an estimated 130,000 km² of moderately to severely defoliated aspen forests. The outbreak was prominent from 1957 to 1959, but was preceded by a period of population buildup dating back to 1951. More recent survey records indicate a fourth outbreak occurred

between 1967 and 1971. Small but low infestations have persisted at scattered locations in Alberta since 1977; these expanded significantly after 1986 in Alberta and Saskatchewan and may have peaked in 1990. This year, defoliated aspen forests were widespread in the following provincial forest regions: Bow-Crow, Rocky-Clearwater, Whitecourt, Edson, Grande Prairie and Peace River. While trembling aspen is the main host tree, the Bruce spanworm also attacks willows, white birch, Manitoba maple, chokecherry and white elm.

Life cycle: The Bruce spanworm has a one-year life cycle. It overwinters as eggs, which are deposited singly or in clusters in bark crevices or in moss near the base of tree trunks. These hatch into larvae in the spring about the time that aspen flushes. The larvae are loopers and commence feeding on the new foliage, but will also mine the buds if leaf development is delayed. They complete their feeding and development in 5 to 7 weeks, usually by the third week of June, then drop to the ground to pupate in cocoons spun in the leaf litter or soil. There are four larval instars; fully-grown larvae are about 18 mm long and are commonly light green with one distinct and two less distinct yellowish lines along each side of the body. Emergence of adult moths occurs in late fall, mostly in October. Male moths are winged, greyish-brown in color and have a wingspan of 25-30 mm. Female moths are wingless and of a similar grey-brown color. The moths are adapted to cool weather and may be active when snow is on the ground.

Damage impact: Damage by the Bruce spanworm is caused only during larval feeding. If buds are mined they may be destroyed, or early feeding may cause small holes in the leaves. Later, the larvae may feed more openly on the leaves or within leaves webbed together with silken threads. Defoliation is more severe in the upper crown of trees. Partly defoliated trees may appear ragged as a result of the feeding characteristics. High larval populations may be associated with an abundance of silk webbing draping the trees. Severe infestations tend to be short lived, lasting 2-3 years and contribute to reduced radial stem growth. The

Bruce spanworm has often occurred in association with other defoliators such as the forest tent caterpillar and large aspen tortrix, and thus may contribute to top-kill of aspen and long-term stand decline.

Dispersal behaviour: The wingless condition of the female moth precludes its dispersal from stand to stand by flight. However, young larvae are known to spin long silken threads which subsequently break and allow the larvae to be transported long distances by wind. Distances of one km or more have been documented.

Controlling agents: Many species of native parasitic insects have been reared from Bruce spanworm larvae and pupae but they do not appear to provide major control of populations except perhaps at low population levels.

In 1949, a defoliator species native to Europe and a close relative to the Bruce spanworm, known as the winter moth [*Operophtera brumata* (L.)], was discovered in Nova Scotia, and in 1976 on Vancouver Island. Populations of the two species were often intermixed, but thus far the winter moth does not appear to have spread much beyond its original locations. The two species appear to share many of the same insectivorous parasitoids and therefore, these are important in their natural control. Two exotic insect parasites were introduced into Nova Scotia and have subsequently provided control of the winter moth. Similar parasite releases have been made on Vancouver Island and have demonstrated some success for biological control.

Recently, the sex pheromone components of the Bruce spanworm have been identified and synthetically produced. Use of the sex attractant was described as a possible monitoring tool for the winter moth and Bruce spanworm. However there is some concern that the two species may hybridize where their populations coexist.

A polyhedrosis virus found in collections of Bruce spanworm, and believed to be effective in causing its population decline during outbreaks, was field-tested in Alberta as a

biological controlling agent. The trials demonstrated that the virus has potential to protect aspen trees against defoliation but the cost of production may preclude its practical use at the present.

Many species of birds and insects actively prey on the larval and adult stages of the Bruce spanworm and may contribute substantially to local population reductions. During outbreak periods of the Bruce spanworm, large predatory carabid beetles of Calosoma species are often observed in abundance and may respond numerically in response to increasing populations of this defoliator.

Selected references:

Anonymous. 1939 - 1978. Annual reports of the Forest Insect and Disease Survey. Environ. Can., Can. For. Serv., Ottawa, Ont.

Brown, C.E. 1962. The life history and dispersal of the Bruce spanworm, Operophtera bruceata (Hulst), (Lepidoptera: Geometridae). Can. Entomol. 94: 1103-1107.

Crin, W.J. 1980. Two aggregations of Calosoma frigidum (Coleoptera: Carabidae) in Ontario during 1976. Entomological News 91(5): 155-158.

Gillespie, D.R.; Finlayson, T. 1981. Final-instar larvae of native Hymenopterous and Dipterous parasites of Operophtera spp. (Lepidoptera: Geometridae) in British Columbia. Can. Entomol. 113: 45-55.

Ives, W.G.H.; Cunningham, J.C. 1980. Application of nuclear polyhedrosisvirus to control Bruce spanworm (Lepidoptera: Geometridae). Can. Entomol. 112: 741-744.

Martineau, R. 1984. Insects harmful to forest trees. Multiscience Publications Ltd., Montreal, Quebec.

Pivnick, K.A.; Barton, D.L.; Millar, J.G.; Underhill, E.W. 1988. Improved pheromone trap exclusion of the Bruce spanworm Operophtera bruceata (Hulst) (Lepidoptera: Geometridae) when monitoring winter moth Operophtera brumata (L.) populations. Can. Entomol. 120: 389-396.

Underhill, E.W.; Millar, J.G.; Ring, R.A.; Wong, J.W.; Barton, D.; Giblin, M. 1987. Use of a sex attractant and an inhibitor for monitoring winter moth and Bruce spanworm populations. J. Chem. Ecol. 13: 1319-1330.

PEST SITUATION REPORT

by

Jim Emond and Kim Jakubec

Forest Tent Caterpillar (Malacosoma disstria)

Forest tent caterpillar infestations collapsed over much of the area where outbreaks occurred in 1989.

In east-central Alberta, moderate and severe defoliation was reported in the Cold Lake, Iron River, and St. Paul areas south to

the Vermilion, Wainwright and the Provost areas. To the east of the above listed areas the populations had virtually collapsed and only small, isolated areas of light, moderate, or severe defoliation were evident.

In the Peace River Block, moderate and severe defoliation was reported throughout the Saddle Hills from Highway 2 west to the B.C.

border. Severe defoliation was present along the Peace River valley between the towns of Peace River and Grimshaw.

In Saskatchewan, moderate and severe defoliation was reported in the Cold Lake area between the Beaver and Martineau rivers and east of the Alberta border to the vicinities of Lac des Isles, Loon Lake, and Steele Narrows. Populations of the forest tent caterpillar have collapsed in other areas that had outbreaks in 1989.

In Manitoba, the population in the north appeared to collapse. Some pockets of moderate and severe defoliation persisted in the Jenpeg Road - Devil's Lake area and also in the Fisher Bay - St. George area. In many of these areas, leaf rollers, tiers and the Bruce spanworm contributed to some of the aspen defoliation.

Bruce Spanworm (*Operophtera bruceata*)

A marked increase in Bruce spanworm defoliation was evident in many areas of Alberta. In the southwest and central part of the province, moderate and severe aspen defoliation was evident in the following general areas; between High River and Turner Valley, north to Cochrane, Cremona and Didsbury; along Highway 11 from the Jackfish Lake area east to Rocky Mountain House and Bentley; along Highway 12 between Mirror and Castor; along Highway 56 between Rumsey and in the vicinity of Ferintosh. Moderate and severe defoliation was also evident along the Yellowhead Highway in the Obed-Marlboro area east of Hinton and also in the vicinity of Hinton. Scattered pockets of similar defoliation were also noted between Peers and Whitecourt and the vicinity of Carson Lake; at several locations near Beaverlodge and Hythe; and along the Mackenzie Highway near Dixonville and north of Hotchkiss. There were no reports of Bruce spanworm from Saskatchewan or Manitoba.

Grey Willow Leaf Beetle (*Tricholochmaea decora*)

Moderate and severe skeletonizing of willow foliage was found throughout the

forested area in mid-central and northern Alberta and also in some areas of Saskatchewan. There were no reports of outbreaks of grey willow leaf beetle in Manitoba.

In the Northwest Territories similar defoliation was reported in the Fort Simpson area through to the B.C.-Yukon border.

Poplar Leaf Beetles (*Chrysomela* spp.)

Defoliation of both poplar and willow was reported throughout most forested areas of Alberta and Saskatchewan. Damage was very common in most of the Rocky Mountain national parks examined. There were no reports of outbreaks of poplar leaf beetle in Manitoba.

Fall Cankerworm (*Alsophila pometaria*)

In Alberta, defoliation of hardwoods was evident in the cities of Lethbridge, Medicine Hat, Calgary, Red Deer and Edmonton. Moderate and severe defoliation of hardwoods was observed in Saskatchewan in the cities of Prince Albert, Saskatoon, Regina, Yorkton and Swift Current. There have been no reports of outbreaks of fall cankerworm in Manitoba.

Birch Leafmining Sawflies (*Arge* spp.)

Birch leafminers were responsible for severe defoliation of cutleaf and white birches in most urban areas of Alberta and Saskatchewan. Moderate and severe leafmining of native birch stands has also been reported throughout the forested areas. In Manitoba, some increase in infestation levels and damage was reported.

Fireblight (*Erwinia amylovora*)

Fireblight on apples, plums and mountain ash increased substantially this season over that reported in recent years from the urban centers in central and southern Alberta. There have been no reports of outbreaks of fireblight in Saskatchewan or Manitoba.

Spruce Budworm (*Choristoneura fumiferana*)

In Alberta, moderate and severe defoliation was observed in white spruce stands along the Chinchaga River west of High Level and along the Peace River in the Eaglesham area. Some increase in size of the infestation area was evident in the Chinchaga outbreak. Moderate to severe budworm defoliation in white spruce stands was found in the Hawk Hills area along both sides of Highway 35. Light and moderate defoliation was reported along the Athabasca River southwest of Fort McMurray.

In Saskatchewan, moderate and severe defoliation was observed in the Tall Pines, Red Earth, Pancake Lake and Taggart Creek outbreak areas. Several new outbreaks were observed in the Hyas area and in the west block of the Cypress Hills Provincial Park.

In the Northwest Territories, moderate and severe defoliation was found between Fort Simpson and the B.C.-Yukon border, along the Mackenzie River between Fort Simpson and Wrigley. Small pockets of moderate injury were noted between Wrigley and Fort Norman. There was a significant increase in damage reported in the Hook Lake outbreak along the Slave River.

In Manitoba, the infestation in the Whiteshell and Nopiming areas has decreased. In the Grindstone, Hecla, Black Island and Spruce Woods areas, an increase in spruce defoliation was evident. Light and moderate defoliation was noted in the Birds Hill area.

Yellowheaded Spruce Sawfly (*Pikonema alaskensis*)

Moderate and severe defoliation of ornamental spruce was reported from most urban centres and rural areas in Alberta and Saskatchewan. Damage was estimated to be more severe than in previous seasons. There have been no reports of outbreaks of yellowheaded sawfly in Manitoba.

Spruce Needle Rust (*Chrysomyxa ledicola* and *C. ledi*)

Medium to high incidence of needle rust has been reported on spruce species throughout the majority of forested areas in central and northern Alberta. Low to medium incidence was evident in Jasper, Banff, Kootenay and Yoho National Parks. Similar incidence of needle rust was reported in Saskatchewan. In the Northwest Territories, low incidence of needle rust was noted in some areas. In Manitoba, high incidence of the disease were reported in the Rennie-Brereton areas of the Whiteshell.

Needle Cast of Pine (various species)

This foliar disease was widely distributed in native lodgepole pine stands in Banff, Kootenay and Jasper national parks. There was a high incidence of the disease in lodgepole pine stands in the Bow-Crow forest region. Needle cast was also prevalent in some pine shelterbelts and ornamentals in the Edmonton and Red Deer areas.

Compiled by K.I. Mallett

This note, if cited, should be referred to as personal communication with the author(s).

Northern Forestry Centre
5129 - 122 Street
Edmonton, Alberta
T6H 3S5
(403) 435-7210

Saskatchewan District Office
1288 Central Avenue
Prince Albert, Saskatchewan
S6V 4B8
(306) 953-8544

Manitoba District Office
104-108 Main Street
Winnipeg, Manitoba
R3C 1A6
(204) 983-7001