



FOREST RESEARCH REPORT

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AN AERIAL SURVEY OF RED PINE PLANTATIONS FOR SIROCOCCUS SHOOT BLIGHT

INTRODUCTION

Sirococcus shoot blight, caused by the fungus *Sirococcus conigenus* (DC.) P. Cannon and Minter, is a serious problem in red pine plantations in Nova Scotia (Magasi, 1991). This disease, which seldom causes serious damage in

plantations of other species, can result in growth loss, deformity and death in red pine. Although first described in Nova Scotia in 1974 (Magasi, 1975), it was not until the early 1980's that extensive damage was noticed, mostly in western counties (Magasi, 1984).

METHODS

A total of 849 red pine plantation diagrams were collected from the forest community and sketched onto 1:50,000 scale topographic maps. A Hughes 500 C helicopter was used to aerially assess the red pine plantations. Assessment began in the western counties in October 1990 and continued eastward through November, December, January and February 1991. Completion occurred in January of 1992 with the survey of Cape Breton counties.

Visual assessments were usually made from less than 30 metres above the plantation canopy,

and when necessary, symptoms could be observed from less than 3 metres. Visible symptoms include red flagging or shoot die back on current years growth. In addition, infected shoots often demonstrate a characteristic curl in immature shoots and a droop in mature shoots. (Nicholls and Robbins 1984).

All 849 plantations were assessed by the same observer for occurrence and severity of *Sirococcus* symptoms. Severity was classified according to the average percentage of shoots affected per infected tree (see Table 1).

Table 1. Severity classification used in this survey.

ZERO	0% of shoots affected
LOW	1-30% of shoots affected
MODERATE	31-60% of shoots affected
HIGH	61% + of shoots affected

In addition, general assessments were made on the height of plantations. For the purposes of this survey, each plantation was

labelled as young (less than or equal to 3 metres in height), pole (between 4m and 6m in height) or immature-mature (greater than 6 metres in height).

RESULTS

Of the 849 red pine plantations assessed, 138 or approximately 1 out of 6 displayed symptoms of *Sirococcus* infection. Of these, 41 or 30% were rated low in severity, 36 or 26% moderate and 61 or 44% high (Figure 1 and 2).

The low occurrence of *Sirococcus* damage overall is attributed to the fact that a large percentage (84%) of the plantations surveyed

were young and pole size stands. Sixty-eight percent were classified as young (1-3m); 16% were classified as pole (4-6m) and 16% were classified as immature-mature (7+m). Figure 3 indicates that the percentage of plantations affected increases as stand age increases, rising from 7% for young plantations to 56% for immature - mature.

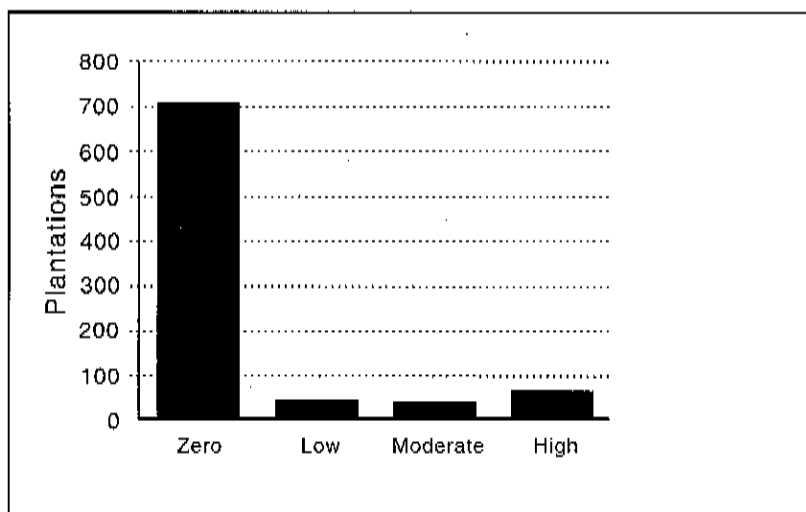


Figure 1. Number of red pine plantations assessed in each severity class, all regions.

Sirococcus Shoot Blight in Red Pine Plantations 1991 - 1992

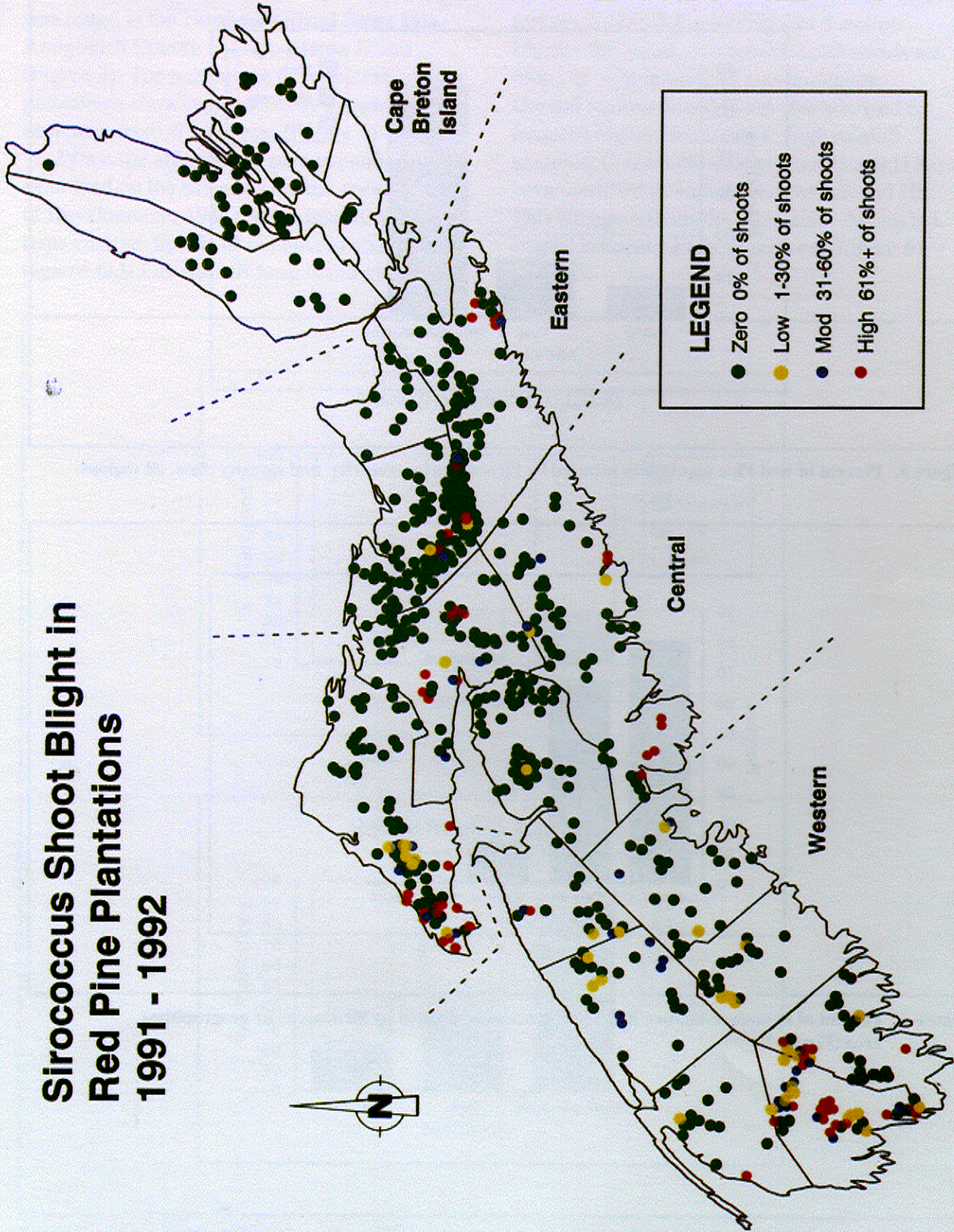


Figure 2. Severity of Sirococcus damage in Red Pine plantations 1991-1992. Where there was a high density of unaffected plantations surveyed, all the dots representing these locations may not be distinguishable.

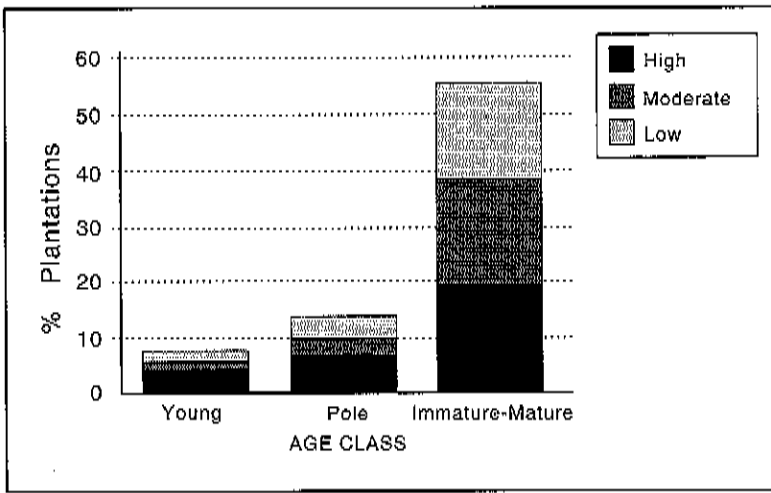


Figure 3. Percent of Red Pine plantations affected by Sirococcus by maturity and severity class, all regions.

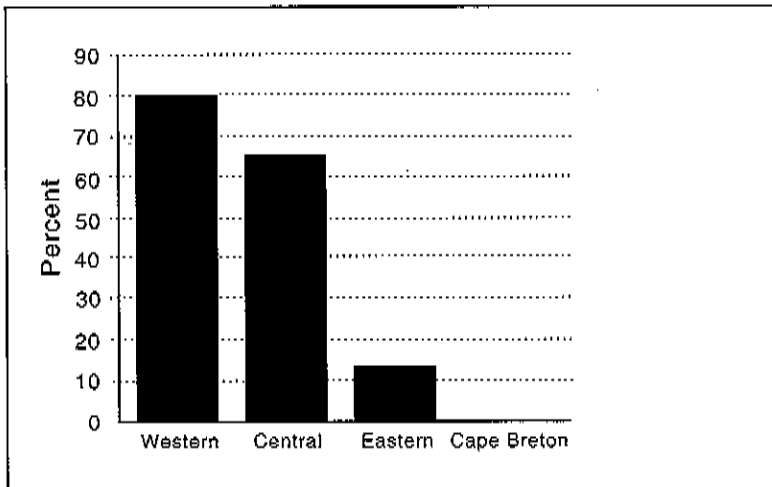


Figure 4. Percent of immature-mature Red Pine plantations affected by Sirococcus by geographical area (Figure 2).

No evidence of affected red pine plantations was found in the Northumberland Strait area, Antigonish County or Cape Breton Island (Figure 2). The percentage of immature-mature plantations showing Sirococcus symptoms decreases from west to east (Figure 4).

When the affected red pine plantations were examined on the basis of climatic regions (Dept. of Development, 1984), some interesting patterns emerge. Stands of red pine in coastal regions G,H,GB and HE have much greater

rates of infection for all age classes than inland regions A,B,C,D,E, and (Figures 5 and 6). Despite this trend, severely affected stands are found in both inland and coastal regions. Coastal regions G and H are characterised by frequent fog and moderate to high rainfall amounts. Coastal climatic regions G and H have been modified to include regions GB and HE. This change reflects the intensified downwind coastal influence in these regions. (Figure 6).

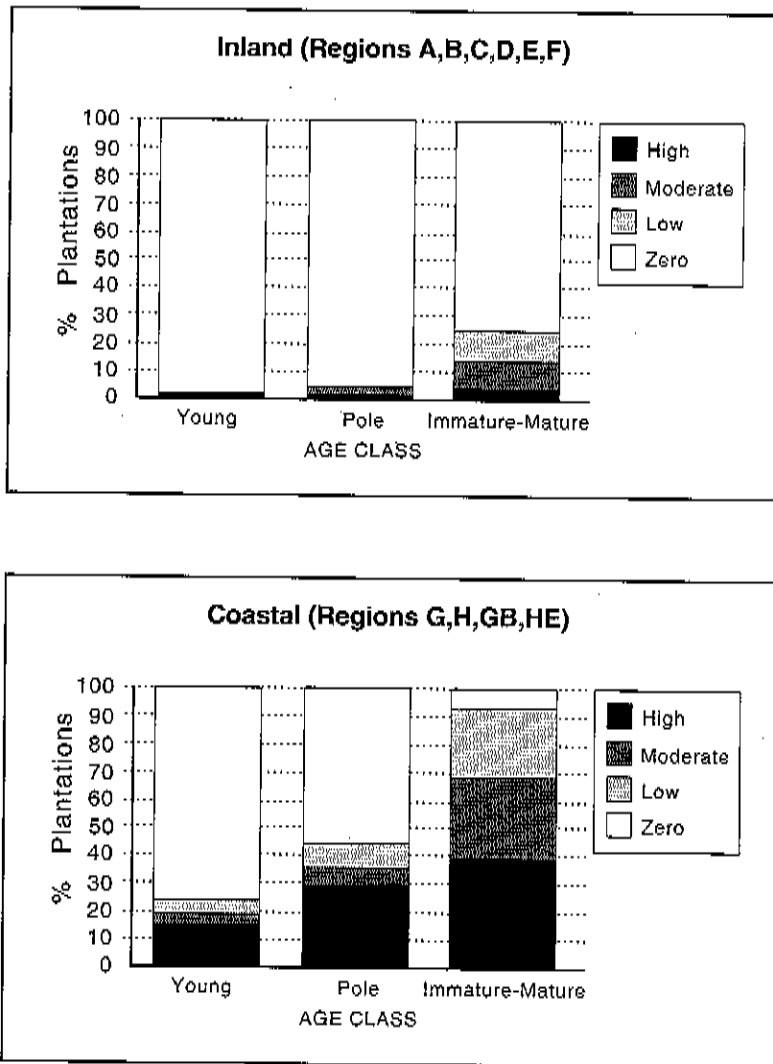


Figure 5. Percent of Red Pine plantations affected by Sirococcus by severity class and maturity, class, inland vs. coastal regions.

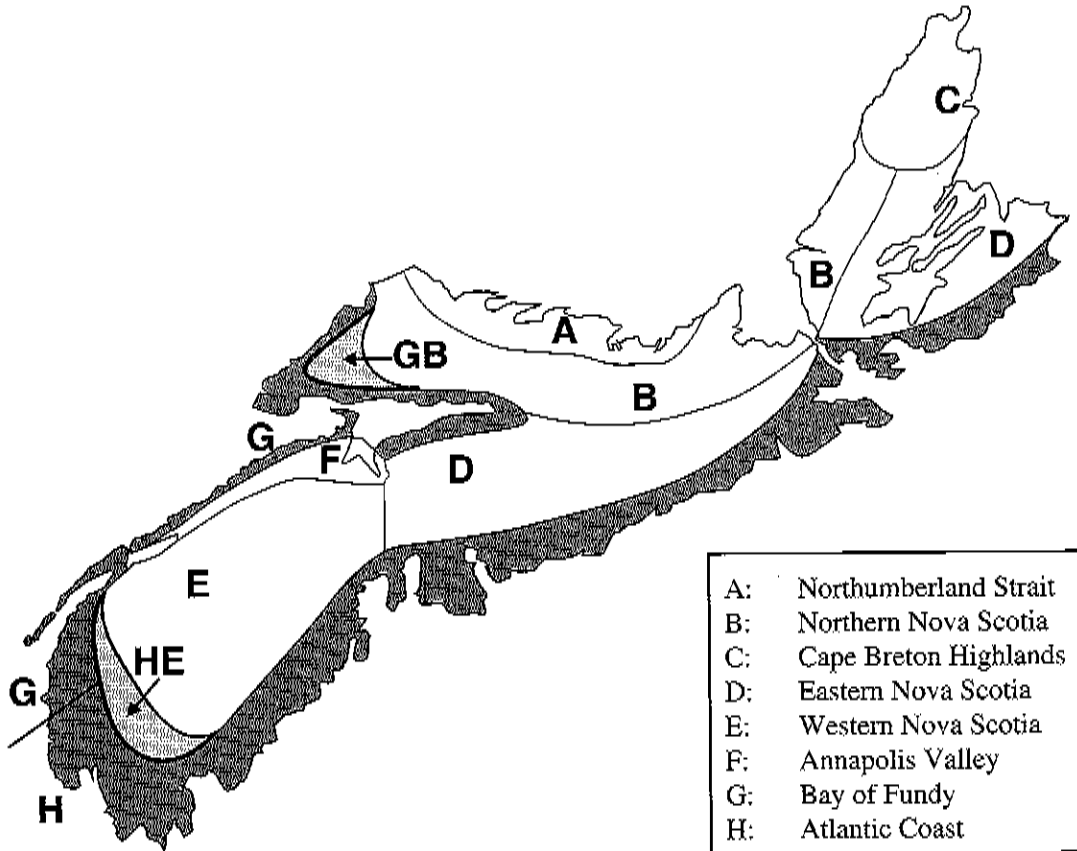


Figure 6. Modified climatic regions of Nova Scotia (GB, HE).

SUMMARY

An aerial survey of 849 red pine plantations for Sirococcus damage revealed:

1) A total of 138 or 16.3% had Sirococcus symptoms. Of these 30% have low, 26% moderate, and 44% high damage.

2) Sirococcus damage occurred more frequently in the older plantations. In fact, over 50% of the older red pine plantations surveyed showed visual symptoms of damage. Eighty-four percent of the plantations surveyed were in the younger age classes. Sirococcus damage was evident in less than 10% of these younger plantations.

3) The percentage of plantations showing

Sirococcus symptoms decreased from west to east.

4) Most of the affected plantations were distributed close to the Fundy and the Atlantic coasts. Over 90% of the coastal immature-mature plantations surveyed were affected. Inland sites show lower levels of severity at this time. No affected plantations were found in the Northumberland Strait area or Cape Breton Island.

5) Since this survey was completed, indications are that Sirococcus damage is continuing to intensify and spread. Further surveys will be undertaken to determine the extent of this spread.

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