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A REVIEW OF IMPORTANT FOREST INSECT AND DISEASE PROBLEMS IN THE PEMBROKE DISTRICT OF ONTARIO, 1950-1980

Compiled by

H.J. Weir and M.J. Thomson[1]

FORESTRY CANADA

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GREAT LAKES FORESTRY CENTRE

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[1] *Forest Research Technicians, Forest Insect and Disease Survey Unit*

FOREWORD

The first forest insect surveys in Ontario were carried out in 1936 from the Dominion Entomological Laboratory in Ottawa and continued from this location until 1944, when the province of Ontario was divided, for the purpose of these surveys, into northern and southern Ontario. In 1945, personnel from Ottawa continued to conduct and report on surveys in the area south of the Algonquin Park and Parry Sound forest districts, while personnel from the Forest Insect Laboratory in Sault Ste. Marie carried out surveys in the area to the north. In 1950 responsibility for reporting insects for all of Ontario fell to the Sault Ste. Marie laboratory. In 1952 the Forest Disease Survey was initiated with headquarters in Maple, Ontario, then was moved to Sault Ste. Marie in 1967. The results of these surveys of insects and diseases are reported in the Annual Report of the Forest Insect and Disease Survey (FIDS) published by Canadian Forestry Service headquarters in Ottawa. In addition, annual district and regional reports, begun in 1948, are prepared by FIDS technicians (Rangers) in Sault Ste. Marie. In 1980 a new provincial report was released in Ontario. The contents of the following review have been abstracted from these reports and compiled in alphabetical order by the scientific names of species in each of the following three categories:

Major Insects or Diseases

Capable of causing serious injury to or death of living trees or shrubs.

Minor Insects or Diseases

Capable of causing sporadic or localized injury but not usually a serious threat to living trees or shrubs.

Abiotic Damage

Damage caused by non-living factors.

All measurements in this review are in metric form and conversions from Imperial measurements from the earliest reports are taken to the second decimal point, i.e., [sq. mi. to km^2 = area (sq. mi.) x 2.59 = area km^2]. Infestation maps in this review were copied from the original maps in the FIDS technicians' reports. Abbreviations for the common names of the host tree species, along with the scientific names, are shown in Appendices A and B. To facilitate the location of hosts, deciduous and coniferous species have been separated and listed alphabetically under the common names.

Appendix C is a series of maps for southern Ontario grouped alphabetically by insect species or disease pathogen and showing the location of infestations within a region or infestation boundaries that extend beyond regions.

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INTRODUCTION

This report is a review of significant forest insects and diseases that have occurred in the Pembroke District during the period between 1950 and 1980 with a brief summary of outbreaks prior to 1950. In selecting the pests for this report particular attention was paid to the major working groups of host species in the area, namely tolerant hardwoods (sugar maple, hemlock, yellow birch, red oak) and white pine/red pine (white pine, red pine, jack pine, poplar, balsam fir, poplar and white birch); also included are some pests that cause damage to ornamental and plantation trees (e.g., Scots pine, white spruce). The insects and diseases included are capable of causing, or have caused, tree mortality or a reduction in growth. Also included are abiotic problems that caused tree damage, i.e., drought, frost, salt, snow, and winter drying.

SUMMARY

FOREST INSECTS

Birch Skeletonizer, *Bucculatrix canadensisella* Cham. [Major]
pages

Defoliation by this insect seldom causes mortality of the host but weakened trees are subject to attack by secondary insects and diseases. Large outbreaks of this insect usually last three to four years, then decline rapidly. Moderate-to-heavy infestations were present during the early 1960s and in 1974.

Spruce Budworm, *Choristoneura fumiferana* (Clem.) [Major]
pages

This insect is considered the most destructive insect pest of several coniferous hosts in eastern Canada; the main hosts are white spruce and balsam fir. Though not major hosts, black spruce, eastern hemlock and tamarack are attacked and considerable tree mortality can occur. In Pembroke district, the infestation began in 1965. Defoliation increased through 1967, and resulted in top and whole-tree mortality that began in 1974. In the period prior to that covered by this report, infestation was reported from 1941 to 1945.

Jack Pine Budworm, *Choristoneura pinus pinus* Free. [Major]
pages

This is a destructive pest of pines that can cause mortality after about two years of severe defoliation. The first record of damage was reported between 1938 and 1940, near Petawawa, and defoliation was reported near Chalk River in 1944. In 1969 an aerial spray program was carried out at the Petawawa National Forestry Institute (PNFI) and at Canadian Forces Base Petawawa. Results were good.

Larch Casebearer, *Coleophora laricella* (Hbn.) [Major]
pages

A serious pest of both native and European larch, this insect can cause reduced tree growth and tree mortality after two successive years of complete defoliation. No extensive damage has been reported in the district.

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.) [Major]
page

A serious pest of red oak in eastern North America, this insect can cause reduced growth and tree mortality after successive years of defoliation. Moderate-to-severe defoliation of oak stands was recorded in 1973, 1974 and 1975.

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (F.) [Major]
pages

This insect defoliates both red maple and sugar maple but prefers understory trees of red maple. Medium-to-high population levels were reported in Rolph Twp in 1974 and 1975.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr. [Major]
page

This insect usually infests lateral shoots and causes only aesthetic damage. When high populations develop, some leaders are infested and killed, which causes deformity of infested trees. No extensive damage was recorded except in Westmeath Township, from 1961 to 1964.

Birch Leafminer, *Fenusa pusilla* (Lep.) [Major]
pages

Defoliation by this miner can weaken trees and leave them susceptible to secondary insects and diseases, and may be a predisposing factor in birch decline. As a rule these insects attack single trees, but when populations build up, stands of trees are severely defoliated. Population levels have fluctuated from year to year since 1952.

Pine Root Collar Weevil, *Hylobus radicis* Buch. [Major]
pages

This weevil is a destructive pest of most pines, but Scots pine trees 2.5 to 10 cm in diameter are the preferred host. A number of trees in a plantation can be severely damaged before there is any indication of attack. The insect was first reported causing damage in 1956 and has persisted in the southeastern part of the district.

Hemlock Looper, *Lambdina fiscellaria fiscellaria* Gn. [Major]
page

This destructive pest of eastern hemlock, cedar and balsam fir can cause tree mortality after one year of severe defoliation (50% or more of the foliage). Small numbers of larvae were reported periodically from 1950 to 1968.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. [Major]
pages

This caterpillar is widely distributed throughout North America. Infestations usually last an average of five years and high population levels can result in the defoliation of large areas of susceptible stands. The principal host attacked is aspen; however, many other deciduous species also suffer severe defoliation. Repeated defoliation retards tree growth and vigor and leaves the host susceptible to attack by other pests. Outbreaks of this insect occurred from 1950 to 1953, between 1962 and 1967, and in 1977 and 1978.

Balsam Fir Sawfly, *Neodiprion abietis* complex [Major]
pages

Severe defoliation can cause mortality to balsam fir and white spruce trees when an infestation persists over a period of years. Severe defoliation was recorded from 1952 to 1956, from 1958 to 1960, and from 1967 to 1975. Light defoliation has been recorded periodically since 1940. Some top mortality of balsam fir was recorded in 1971.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) [Major]
pages

This destructive pest of pine plantations can cause mortality after several years of severe defoliation. Its preferred hosts are Scots pine, red pine and jack pine planted in pure stands. Damage by this insect was widespread in plantations throughout the district.

Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh. [Major]
pages

This sawfly is capable of causing mortality of semi-mature and plantation pine trees when populations are high. Various levels of defoliation, some severe, were recorded during the period covered by this report.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) [Major]
pages

Although this insect has not been known to cause tree mortality, severe browning of foliage over a period of years can cause a reduction in growth. This miner caused various levels of damage, some severe, during the period covered by this report.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) [Major]
pages

This destructive insect has been categorized as a serious pest of young spruce plantations and open-grown ornamentals. High mortality can occur after successive years of severe defoliation. Defoliation caused by this sawfly varied from light to severe between 1950 and 1980.

White Pine Weevil, *Pissodes strobi* (Peck) [Major]
pages

This weevil is considered to be the most destructive pest of white pine in North America. Successive weeviling over a period of years results in multiple-stemmed trees. Damage caused by the weevil was reported from 1950 to 1980, in several areas.

Larch Sawfly, *Pristiphora erichsonii* (Htg.) [Major]
pages

The larch sawfly is the primary defoliator of native and of most exotic species of larch. On good sites, larch trees can withstand six to nine years of severe defoliation before mortality occurs; on less favorable sites, mortality may occur after three or more years of complete defoliation. During the period covered by this report, the sawfly caused damage ranging from light to severe.

Other Noteworthy Insects [Major and Minor]
pages

Insects that have the potential for causing damage to stands, regeneration and plantations.

FOREST DISEASES

Armillaria Root Rot, *Armillaria mellea* (Vahl.:Fr.) Kummer [Major]
page

This root rot disease often kills trees previously stressed by drought, insects, other pathogens or unfavorable environment. However, under some circumstances the fungus, or certain strains of the fungus, can kill vigorous trees. Both deciduous and coniferous trees are attacked. Armillaria caused high mortality several times prior to 1968, but caused little damage thereafter.

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard [Major]
pages

This pathogen can cause considerable mortality in young natural regeneration and plantations. However, damage caused by the canker was light during the period covered by this report.

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau [Major]
page

This major disease organism, which affects all species of elm, was first recorded in Ontario in Prescott County in 1946, and has gradually spread throughout most of the known range of elm in Ontario. In Pembroke district, this disease caused light mortality between its first appearance in the district in 1960 and the middle of the decade; from 1965 to 1980, levels of mortality increased and damage became more widespread.

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver [Major]
pages

This ink spot disease is widespread throughout the range of aspen. Many poplar species and hybrids are susceptible, but trembling aspen is most commonly affected. Heavily infected trees may be defoliated prematurely and repeated attacks can reduce increment and even kill regeneration. Damage caused by this disease during period covered by the report varied from light to severe.

Sweetfern Blister Rust, *Cronartium comptoniae* Arthur [Major]
page

This rust may kill trees outright or make them more susceptible to insects, decay, and wind breakage depending on the degree of infection. During the period covered by this report, damage caused by the rust was moderate at worst (1970-72).

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer [Major]
pages

White pine blister rust is the most serious disease of eastern white pine. The disease caused top killing and mortality in trees of all ages in many areas of the district.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller [Major]
pages

Mortality caused by this disease is usually restricted to trees in the 7-cm to 13-cm diameter class, growing on poor sites, but branch and top mortality may occur in trees of greater diameter. The canker was common between 1950 and 1980, and caused various levels of damage.

Shoot Blight, *Venturia macularis* (Fr.) E. Müller & v. Arx [Major]
page

Reduced stocking of regeneration aspen occurs when the incidence of this disease is high. Trees more than 5 years old are seldom affected and, therefore, the disease is of little economic importance in natural stands. Despite this, severe damage caused by shoot blight occurred in 1961, 1962 and 1978.

Other Noteworthy Diseases [Major and Minor]
pages

There are diseases with the potential for causing damage to natural stands, regeneration and plantations.

DIEBACKS AND DECLINES
pages

Balsam fir and red oak mortality, not associated with any specific pathogen, occurred between 1950 and 1980. Low levels of semi-mature tissue needle blight were also reported.

ABIOTIC DAMAGE
pages

Abiotic damage is caused by a variety of influences, i.e., drought, frost, salt, snow, and winter drying. Weakened trees are susceptible to a number of insects and diseases. Abiotic factors caused various degrees of damage throughout the district.

ANIMAL DAMAGE
page

Damage caused by browsing animals was light during the period covered by this report.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): birch [Major]

Year	Remarks
1950-1958	not reported
1959	Heavy infestations resulted in defoliation in the southwestern part of the district (see map, page 12).
1960	The previous year's infestation persisted and spread to include the western part of the district (see map, page 13).
1961	The area of heavy infestation increased for the third consecutive year and affected birch stands throughout the district (see map, page 14).
1962	Heavy infestations persisted throughout the northern part of the district, but declined in the south (see map, page 15).
1963	Populations declined further; one small area of heavy infestation and an area of light defoliation persisted in the northern part of the district (see map, page 16).
1964	The previously reported infestation collapsed. Neither insect nor defoliation was found.
1965-1970	not reported
1971	Small areas of heavy infestation occurred in townships in the northwestern portion of this district (see map, page 17).
1972	The infestation collapsed.
1973-1980	not reported

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): wS, bF, eH, tL [Major]

Year	Remarks
1950	A small area of heavy infestation persisted in Wilberforce Twp; light infestations occurred in parts of seven townships surrounding this infestation (see map, page 21).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

Host(s): wS, bF, eH, tL [Major]

Year	Remarks
1951	The area of heavy infestation increased and spread into Gratton, Bromley, Ross, Westmeath and Stafford twps. The area of light infestation increased in size (see map, page 22).
1952	The population of this insect declined sharply and caused only light defoliation; however, the distribution of the infestation remained approximately the same (see map, page 23).
1953	A marked decrease in the area of infestation occurred. The area of light infestation was confined to Bromley, Westmeath and Wilberforce twps. Defoliation of balsam fir reached approximately 10% in Bromley Twp.
1954	A light infestation persisted in Bromley, Wilberforce and Westmeath twps. Defoliation was about 20% in Bromley Twp.
1955	Populations declined for the third consecutive year to reach low levels in Bromley, Westmeath and Wilberforce twps. Small numbers of larvae were found in Admaston Twp.
1956	A new, moderate infestation caused approximately 35% defoliation in a 5-ha white spruce woodlot in Admaston Twp. Very low population levels persisted in Bromley Twp.
1957	The infestation in Admaston Twp declined and caused approximately 10% defoliation in the area. No budworm were found elsewhere.
1958	The infestation reported in Admaston Twp over the past two years declined to a trace level.
1959-1964	not reported
1965	Small numbers of larvae were found in Westmeath Twp.
1966	Trace populations were reported at one point in South Algona Twp.

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (cont'd)

Host(s): wS, bF, eH, tL [Major]

Year	Remarks
1967	Population levels and distribution increased markedly. Pockets of heavy infestation were recorded in Bromley, Westmeath and Ross twps. Light damage was observed at 11 points elsewhere (see map, page 24).
1968	A spectacular increase in population levels and area infested was recorded. The pockets of heavy infestation reported in three townships in 1967 coalesced and expanded to cover six townships. Moderate defoliation occurred throughout most of the district south of the heavy infestation. Light defoliation occurred in the remainder of the district, except in Raglan Twp (see map, page 25).
1969	The total area heavily infested by spruce budworm increased considerably over the previous year in the southern half of the district. New pockets of heavy damage also occurred at five points in the northern half and low populations were distributed throughout the remainder of the district (see map, page 26).
1970	The area of heavy infestation by this insect increased by about 100%; this caused severe defoliation of host trees throughout more than half of the district (see map, page 27).
1971	The area of heavy infestation increased for the fifth consecutive year and severe defoliation resulted throughout all of the district except in parts of two townships on the southeastern boundary (see map, page 28).
1972	Heavy infestations persisted and caused severe defoliation of host trees throughout the entire district (see map, page 29).
1973	A slight decrease in the area of infestation was recorded; populations declined in parts of three townships on the southeastern boundary of the district (see map, page 30).
1974	The area of infestation decreased markedly in all or parts of eight townships in the eastern part of the district (see map, page 31). However, after several years of repeated severe defoliation considerable balsam fir top and tree mortality occurred in the southwestern part of the district (see map, page 32).

(cont'd)

Spruce Budworm, *Choristoneura fumiferana* (Clem.) (concl.)

Host(s): wS, bF, eH, tL [Major]

Year	Remarks
1975	Little change occurred in the area of heavy infestation from the previous year (see map, page 33). The area in which balsam fir tree mortality and top mortality occurred increased over that of the previous year (see map, page 34).
1976	A marked decrease in the area of infestation occurred; only small areas of heavy infestation in six townships and small pockets in five additional townships remained (see map, page 35). Areas within which balsam fir tree mortality or top killing occurred increased by at least 100% (see map, page 36).
1977	The area of infestation decreased for the fifth consecutive year; a small, heavily infested area on the southwestern boundary of the district and small pockets of infestation in four additional townships persisted (see map, page 37). The amount of tree mortality or top killing increased and spread to cover a larger area (see map, page 38).
1978	Populations decreased for the sixth consecutive year, but small pockets of heavy infestation persisted at 11 scattered points (see map, page 39). No change in the area of tree mortality or of top killing could be determined (see map, page 40).
1979	After six consecutive years of decreases, a slight increase in the area of infestation occurred (see map, page 41). Areas of heavy infestation were mapped in five townships in the southwestern part of the district and small pockets were found at 20 points elsewhere. Little change in tree mortality occurred (see map, page 42).
1980	Although little change occurred in the area of infestation previously reported in the southwestern part of the district, a decrease in the number of pockets of infestation was noted (see map, page 43). The area in which tree mortality or top killing occurred decreased slightly (see map, page 44).

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

Host(s): jP, scP, rP [Major]

Year	Remarks
1950-1960	not reported
1961	Small numbers of larvae were collected in Richards Twp.
1962-1966	not reported
1967	A pocket of heavy infestation occurred in Petawawa Twp. Small areas of moderate infestation occurred in Wylie, Buchanan, Alice and Richards twps (see map, page 46).
1968	A marked increase in the budworm's incidence occurred. Heavy infestations were recorded in parts of five townships in the northeastern portion of the district and in parts of two townships in the northwestern part. Light defoliation was common throughout the remainder of the northern half of the district (see map, page 47).
1969	A dramatic decrease in the area of infestation occurred; only four small pockets of heavy infestation could be found in the northern half of the district (see map, page 48). An aerial spray project was carried out at PNFI and at Canadian Forces Base Petawawa.
1970	A further decrease in the area of infestation and damage was recorded. Small pockets of moderate defoliation occurred in Buchanan and Petawawa twps (see map, page 49).
1971	A slight increase in the area infested was noted when small pockets of moderate infestation were found in four townships (see map, page 50).
1972	Low population levels persisted at a few scattered points in the northern half of this district. Moderate top killing occurred at several points, particularly in stands on poor sites, as a result of repeated defoliation.
1973	not reported
1974	Trace populations were observed at a few points.
1975	Trace populations persisted at scattered points.
1976-1980	not reported

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): larch [Major]

Year	Remarks
1950-1951	Low population levels were reported at scattered points (see map, page 52).
1952	Populations remained at a low level except in Westmeath Twp, where light damage occurred.
1953-1961	Populations remained at a low level and few casebearers were observed.
1962	Populations increased. Casebearers were common at many points that were examined and heavy defoliation occurred on a small number of tamarack in Petawawa Twp.
1963	The heavy infestation previously reported in Petawawa Twp declined to moderate intensity; elsewhere, little change in population levels could be determined.
1964	Populations declined to a low level throughout the district.
1965	Populations remained at a low level.
1966	Although populations remained at a low level, a slight increase in numbers occurred.
1967	No change in population levels could be determined.
1968	Populations declined to trace levels.
1969	A light infestation occurred in Westmeath Twp; elsewhere, populations remained at trace levels.
1970	not reported
1971	Small numbers of casebearers were recorded throughout the district.
1972	not reported
1973	Populations increased and larvae were observed at many points in the district.
1974-1977	not reported
1978-1980	Small numbers of larvae were observed at scattered points.

Map

Oak Leaf Shredder, *Croesia semipurpurana* (Kft.)

Host(s): rO [Major]

Year	Remarks
1950-1971	not reported
1972	Moderate-to-severe defoliation was reported in stands in Buchanan, Petawawa, Wylie, McKay, Fraser and Richards twps.
1973	Moderate-to-severe defoliation was recorded in Rolph, Wylie and Buchanan twps. Several stands in Head, Fraser and Richards twps were lightly defoliated.
1974	Moderate-to-severe defoliation occurred in McKay and Raglan twps.
1975	Pockets of moderate-to-severe defoliation were reported in Petawawa, Brougham, Blithfield, Raglan and Jones twps.
1976	Infestations declined to low levels.
1977	Light defoliation was recorded in McKay and Griffith twps.
1978	Light defoliation was general in Petawawa, Westmeath, Wilberforce and McKay twps.
1979	One small pocket of light defoliation was reported in Grattan twp.
1980	not reported

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (F.)

Host(s): maple [Major]

Year	Remarks
1950	Trace populations were observed in Rolph and Wylie twps.
1951	Small numbers of larvae were observed on red maple at scattered points.
1952	A small pocket of light infestation occurred in Rolph Twp.
1953-1970	not reported

(cont'd)

Greenstriped Mapleworm, *Dryocampa rubicunda rubicunda* (F.) (conl.)

Host(s): maple [Major]

Year	Remarks
1971	Low population levels were reported in Rolph Twp.
1972-1973	not reported
1974	Populations increased. Severe defoliation occurred on red maple and sugar maple in the northern part of Rolph Twp (see map, page 55).
1975	Severe defoliation occurred for the second consecutive year in Rolph Twp (see map, page 56).
1976	The infestation previously reported in Rolph Twp collapsed; however, some branch mortality occurred.
1977	Small numbers of larvae were observed at scattered points.
1978-1980	not reported

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Host(s): pine [Major]

Year	Remarks
1950-1960	not reported
1961	A light infestation occurred in a red pine plantation in Westmeath Twp, and 13% leader damage was recorded.
1962	The infestation previously reported in Westmeath Twp increased and damaged 21% of the leaders in the plantation.
1963-1964	Little change in the infestation in Westmeath Twp could be determined. No damage was observed elsewhere.
1965	The population previously reported in Westmeath Twp decreased to a low level.
1966	Populations remained at a low level in Westmeath Twp. No damage was found elsewhere.
1967	Small numbers of damaged shoots were observed in Westmeath and South Algona twps.
1968	Small numbers of borers were observed at a few points in South Algona Twp.
1969-1976	not reported
1977	A small infestation was reported in a white pine plantation in McNab Twp.
1978-1979	not reported
1980	A small infestation was reported in a red pine plantation in Westmeath Twp.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): birch [Major]

Year	Remarks
1950-1951	not reported
1952	Extensive defoliation of small white birch trees occurred at a few points.
1953-1956	not reported
1957-1961	Light leafmining was observed at several points.
1962	Populations increased; heavy foliar mining occurred in Buchanan Twp, and moderate damage was found in Rolph and Westmeath twps. Light leafmining was observed elsewhere at several points, especially in McNab and Gratton twps.
1963	Little change in population levels could be determined except in Horton Twp, where a new, heavy infestation was found.
1964	A heavy infestation persisted in Buchanan Twp, where leafmining reached 92%. Moderate damage was recorded in Westmeath Twp and light leaf mining was observed commonly elsewhere.
1965	Populations increased, and severe leafmining occurred in Buchanan, Rolph and Westmeath twps. Pockets of light infestation were observed at numerous points elsewhere in the district.
1966	Populations increased and caused severe foliage damage in Ross, Buchanan, Pembroke and Petawawa twps. Close to 100% leafmining occurred in Ross Twp. Light-to-moderate damage occurred at numerous points elsewhere.
1967	High population levels persisted in Buchanan, Rolph, Ross, South Algona, Hagarty, McKay and Westmeath twps. Foliar damage ranged from 50% to 90% and averaged 65% in these areas. Repeated defoliation over several years caused mortality in groups of small trees at scattered points.
1968	Pockets of heavy damage occurred in Raglan and Grattan twps; elsewhere, populations decreased by about 50%.
1969	Little change in incidence could be determined. Small pockets of damage were observed at a few points.

(cont'd)

Birch Leafminer, *Fenusa pusilla* (Lep.) (concl.)

Host(s): birch [Major]

Year	Remarks
1970	Light-to-moderate damage was observed at numerous points.
1971	Population levels increased appreciably, and moderate-to- heavy foliage damage occurred at scattered points.
1972	not reported
1973	Low population levels were observed at scattered points.
1974	Populations increased and caused pockets of moderate damage at numerous points.
1975	Small pockets of heavy infestation were observed at several points in the eastern half of the district.
1976	Although no change in population levels could be deter- mined, leafmining was more widely distributed than in the previous year.
1977	Light damage was widespread in the district.
1978	Populations increased, and severe foliar damage on shade trees in urban areas was observed at a few points.
1979	Heavy infestations persisted in urban areas and spread into forests in Richards, Wilberforce, South Algona and Alice twps.
1980	Moderate-to-severe foliar damage was observed in Rolph and Westmeath twps. Infested white birch trees were common at many points in the district.

Pine Root Collar Weevil, *Hylobius radicis* Buch.

Host: pine [Major]

Year	Remarks
1950-1955	not reported
1956	The weevil was recorded for the first time in this district. Severe damage was found in a Scots pine plantation in Petawawa Twp.

(cont'd)

Pine Root Collar Weevil, *Hylobius radicis* Buch. (cont'd)

Host: pine [Major]

Year	Remarks
1957	Additional areas of infestation were found in Hagarty and Westmeath twps. A second area of infestation was located in Petawawa Twp. Severe damage occurred at the original point of discovery and in Hagarty Twp.
1958	Infestations persisted and increased in intensity in Westmeath and Petawawa twps. Some tree mortality occurred in each township.
1959	The heavy infestation previously reported in Westmeath Twp persisted and a second area of infestation was recorded in the same township. The infestations previously reported in Petawawa Twp were eradicated by removal of the infested trees.
1960	The two heavy infestations in Westmeath Twp persisted.
1961	High population levels persisted in the two areas of infestation in Westmeath Twp and a new area of light infestation was recorded in a third plantation in the township. Heavy mortality occurred in one plantation in the older infestation.
1962	Little change occurred in the previously reported infestations; however, a new area of light infestation was found in Wilberforce Twp.
1963	Heavy infestations persisted and severe damage continued to occur in Westmeath Twp.
1964	Heavy infestations persisted in Westmeath Twp.
1965	Heavy mortality occurred in infested areas in Westmeath Twp.
1966	Heavy infestation persisted in Westmeath Twp, and considerable mortality occurred.

(cont'd)

Pine Root Collar Weevil, *Hylobius radicis* Buch. (concl.)

Host: pine [Major]

Year	Remarks
1967	Severe damage occurred in two Scots pine plantations in Westmeath Twp.
1968	Small numbers of infested trees were found in South Algona Twp.
1969-1972	not reported
1973	Small numbers of weevils were reported at one point in Westmeath Twp.
1974-1980	not reported

Hemlock Looper, *Lambdina fiscellaria fiscellaria* (Gn.)

Host(s): eH, bF, eC [Major]

Year	Remarks
1950	Small numbers of larvae were collected in Jones Twp.
1951	not reported
1952-1953	Trace populations were observed at several points.
1954-1957	not reported
1958	Trace populations were observed at six scattered locations.
1959	not reported
1960	Small numbers of larvae were collected in South Algona and Wilberforce twps.
1961	not reported
1962	A trace population was reported in Wilberforce Twp.
1963-1965	not reported
1966-1968	Occassional larvae were found at numerous locations.
1969-1980	not reported

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): deciduous [Major]

Year	Remarks
1950	A heavy infestation occurred in three townships in the extreme northeastern part of the district. Light defoliation was recorded in all or parts of eight townships south of the heavily infested area. Light defoliation also occurred in eight townships along or near the southern boundary of the district (see map, page 64).
1951	A marked increase in population levels occurred. Various degrees of infestation were present throughout the district (see map, page 65).
1952	Population levels increased for the third consecutive year and severe defoliation of many host species resulted throughout more than 95% of the district (see map, page 66).
1953	A spectacular decrease in population levels and area of infestation occurred. Defoliation was light and, except for four pockets, was confined to the southern half of the district (see map, page 67). Extremely high incidence of the parasite *Sarcophaga aldrichi* Park. over the past two years undoubtedly played a major roll in the decreases in population levels and area infested.
1954-1960	not reported
1961	Small numbers of larvae were found in Buchanan Twp.
1962	A major increase in populations occurred. Pockets of heavy infestation were observed in Buchanan and Richards twps, and pockets of light infestation occurred in the area west of the town of Pembroke.
1963	The area of infestation increased for the second consecutive year. Four small areas and three small pockets of heavy infestation were found and mapped in the northern half of the district (see map, page 68).
1964	The area of infestation increased and severe defoliation of many host species resulted throughout much of the northern half of the district (see map, page 69).

(cont'd)

Forest Tent Caterpillar, *Malacosoma disstria* Hbn. (concl.)

Host(s): deciduous [Major]

Year	Remarks
1965	Although there was little change in the area of previously reported heavy infestations, a considerable increase in the overall area infested was recorded. Light defoliation was mapped throughout the southeastern part of the district (see map, page 70).
1966	After four consecutive years of increases, a marked decrease in the area and intensity of infestation was recorded. Heavy defoliation was confined to five small areas and one pocket, which were surrounded by light infestations in the central portion of the district (see map, page 71).
1967	Further decreases in the intensities of infestation were recorded. Although a light infestation persisted in much of the same area as in the previous year, only small pockets of heavy infestation could be detected (see map, page 72).
1968	The infestation collapsed and no caterpillars were found.
1969-1970	not reported
1971	Scattered colonies were observed in Westmeath and Ross twps.
1972	not reported
1973	Small numbers of larvae were observed at numerous points.
1974-1975	not reported
1976	A small pocket of light defoliation occurred in Raglan Twp (see map, page 73).
1977	A small area of heavy infestation occurred in Bagot Twp, on the southeastern boundary of the district (see map, page 74).
1978	The heavy infestation reported in the previous year collapsed. Large numbers of a parasitic fly *(Sarcophaga aldrichi* Park.) were present and undoubtedly played a major role in the collapse.
1979-1980	not reported

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF, spruce [Major]

Year	Remarks
1950-1951	not reported
1952	A small pocket of light infestation was observed in North Algona Twp.
1953	Populations increased. The light infestation previously reported in North Algona Twp persisted, a new light infestation was found in Rolph Twp, and moderate defoliation was observed in Buchanan Twp.
1954	A marked increase in populations occurred. A moderate infestation persisted in Rolph Twp and new moderate infestations were recorded in Buchanan and North Algona twps. The upper portion of tree crowns was defoliated in each area. Small areas of light infestation were observed elsewhere.
1955	Infestations decreased in intensity, and only light damage could be found in areas where medium infestations were reported previously. Small areas of light infestation were also found in Horton and McNab twps.
1956	The small pocket of light infestation previously reported in McNab Twp increased to moderate intensity and caused severe defoliation of the upper crowns of trees. Elsewhere only small numbers of colonies could be found.
1957	Populations declined.
1958	Populations increased markedly. A heavy infestation occurred and caused as much as 80% defoliation in Horton Twp. A pocket of medium infestation was found in McNab Twp, in the southeastern corner of the district.
1959	Little change in population levels could be determined. Small pockets of medium infestation occurred in McNab and Horton twps. Small numbers of colonies were observed elsewhere.
1960	A small pocket of light infestation was recorded in Horton Twp; elsewhere in the survey area, no larval colonies could be found.
1961	not reported

(cont'd)

Balsam Fir Sawfly, *Neodiprion abietis* complex (cont'd)

Host(s): bF, spruce [Major]

Year	Remarks
1962	A trace population occurred in Westmeath Twp.
1963-1966	not reported
1967	A marked increase in populations occurred. A pocket of severe defoliation resulted in heavy damage to the upper third of tree crowns in McNab Twp. Numerous pockets of light-to-medium infestation were observed in Horton, Admaston, Grattan, Brougham, Bagot, North Algona, Wilberforce, Bromley and Ross twps.
1968	Populations increased, which resulted in heavy defoliation on small trees in five townships in the southeastern part of the district. Surveys elsewhere revealed the occurrence of light infestations in 15 additional townships.
1969	Populations increased for the third consecutive year. Heavy infestations persisted in the southeastern townships and pockets of medium-to-heavy infestation were observed in numerous townships north of this area.
1970	Heavy infestations persisted in the southeastern part of the district. Balsam fir trees were severely defoliated in the area. Elsewhere, sawfly populations declined.
1971	Heavy infestations persisted in the southeastern part of the district. Severe defoliation during the previous four years caused considerable top mortality in balsam fir stands in the Bonnechere Valley.
1972-1973	Heavy infestations persisted, which resulted in severe defoliation of balsam fir trees in Horton and McNab twps. Population levels decreased elsewhere.
1974	Populations declined to reach the lowest level since 1969. The only high population level recorded was confined to the eastern half of McNab Twp. No defoliation could be found elsewhere.
1975	A small pocket of heavy infestation persisted in McNab Twp. Elsewhere, scattered instances of light defoliation observed in the eastern part of the district. This marked an increase in populations and distribution over those of the previous year.

(cont'd)

Balsam Fir Sawfly, *Neodiprion abietis* complex (concl.)

Host(s): bF spruce [Major]

Year	Remarks
1976	Pockets of light-to-moderate defoliation were observed in Raglan, Grattan and Rolph twps.
1977	Populations increased. Small pockets of light-to-moderate defoliation were recorded in Radcliffe, Raglan, North Algona, Sherwood and Hagarty twps.
1978	Populations decreased markedly, and scattered colonies were confined solely to Richards Twp.
1979	not reported
1980	Populations increased. Light-to-moderate defoliation was observed on scattered trees at a few points.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Host(s): pine [Major]

Year	Remarks
1950	not reported
1951	Small numbers of larval colonies were observed in Ross Twp.
1952	not reported
1953	Populations increased and caused as much as 10% defoliation in red pine plantations in Westmeath, North Algona, South Algona and Ross twps.
1954	Population levels decreased slightly; however, moderate defoliation was found on small red pines in Rolph, Buchanan, North Algona and Bromley twps. Small numbers of colonies were observed at scattered points in Ross, Westmeath, Wilberforce, Alice and Wylie twps.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) (cont'd)

Host(s): pine [Major]

Year	Remarks
1955	Populations of this sawfly decreased for the second consecutive year; however, light infestations were found on small roadside red pine trees in Westmeath, Rolph and South Algona twps.
1956	A marked increase in population levels occurred. Severe defoliation was observed on red pine windbreaks in Jones and Sherwood twps and on regeneration red pine in Rolph and Westmeath twps. Moderate defoliation was observed at one point in Ross Twp. Scattered colonies were found at several points elsewhere.
1957	Little change in population levels could be determined. Severe damage occurred at a few locations. The most serious damage was found in Ross Twp, where 75% defoliation was recorded. Control measures (chemical spraying and, in some instances, hand picking of larval colonies) were conducted in crown-owned and private plantations at numerous points.
1958	A general decrease in population levels occurred throughout the district. Only small pockets of light infestation of scattered colonies could be found.
1959	Populations declined for the second consecutive year. Trace populations were present at only seven of 17 points examined.
1960-1961	not reported
1962	A small number of colonies were found in a red pine plantation in Alice Twp.
1963	Populations increased, and moderate damage occurred in a red pine plantation in Wilberforce Twp. Pockets of light infestation were also found in Wilberforce and Rolph twps.
1964	Populations of this sawfly increased for the second consecutive year. A heavy infestation occurred in a private plantation in Wilberforce Twp. A spray operation in the area prevented serious defoliation. Light damage was observed in Westmeath and Rolph twps.
1965	Populations increased for the third consecutive year. Heavy infestations occurred in Westmeath, Petawawa and McNab twps. Small numbers of colonies were observed at numerous points elsewhere.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) (cont'd)

Host(s): pine [Major]

Year	Remarks
1966	Except in McNab Twp, where a heavy infestation persisted, a general decrease in populations occurred. Only light damage could be found.
1967	Little change in population levels could be determined. Light damage was observed in red pine plantations at numerous points. Small numbers of trees were severely defoliated in some instances in the lightly infested areas.
1968	A sharp decline in population levels occurred and only small numbers of larval colonies could be found at widely separated points.
1969-1972	not reported
1973	Small numbers of larvae were observed in plantations in South Algona Twp.
1974	Moderate-to-severe defoliation was observed in a red pine plantation in Matawatchan Twp. Light defoliation was observed at a few points elsewhere.
1975	Population levels increased, and light infestations were reported in Bagot, Horton and Raglan twps. Scattered colonies were observed at numerous points elsewhere.
1976	Populations increased for the second consecutive year. Moderate infestation occurred in Wilberforce Twp and light damage was recorded in Grattan, McNab and Raglan twps.
1977	Little change in population levels could be determined. Light infestations were reported in Wilberforce, Raglan, McNab and Ross twps. Scattered colonies were observed elsewhere.
1978	Populations increased, and severe defoliation occurred in a red pine plantation in South Algona Twp. Light defoliation was observed at a few points elsewhere.
1979	Small pockets of light infestation were reported in Grattan and Wilberforce twps. Scattered colonies were observed at numerous points elsewhere.

(cont'd)

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch) (concl.)

Host(s): pine [Major]

Year	Remarks
1980	A general increase in populations of this destructive pest developed in the Algonquin Region over the previous three years. Concern by the Ontario Ministry of Natural Resources over the damage caused by this insect in Crown- owned, Woodland Improvement Act and private plantations prompted a request to the Forest Pest Management Institute in Sault Ste. Marie to carry out an experimental aerial and ground spray program (using nuclear polyhedrosis virus) in the Region to combat defoliation by this sawfly. In 1980 a control program was conducted in 96 plantations in six districts (see map, page 81). Eight plantations were treated by aerial application and 88 by ground spray treatment. In all, 539.8 ha were treated. The spray treatment was applied when the majority of the larvae were in the second and third instar of development, but when third and fourth instar larvae were encountered later in the summer, malathion was added to the treatment at some locations to speed up the destruction of the pest. Preliminary results of this spray project were considered to be excellent, but final results will be evaluated in 1981 when surveys are conducted to determine population levels.

map

Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh.

Host: jP [Major]

Year	Remarks
1950	A light infestation occurred in a 0.5-ha plantation in McNab Twp.
1951	A heavy infestation caused severe defoliation in a small jack pine plantation in Horton Twp.
1952	not reported
1953	Light-to-moderate defoliation was observed in Petawawa and McNab twps.
1954	An increase in population levels occurred. Pockets of heavy infestation were found in McNab Twp and moderate defoliation occurred in Petawawa and Buchanan twps. Light defoliation was observed in Wylie, McKay and Alice twps.
1955	Population levels increased for the second consecutive year. The heavy infestation reported previously in McNab Twp persisted and moderate damage was observed in Buchanan, Petawawa, Alice and Rolph twps (see map, page 84). Pockets of light infestation were found in North Algona, Fraser and Wilberforce twps and along the fringes of the moderate infestation in the aforementioned twps.
1956	Although little change in population levels could be determined, an increase in distribution was recorded. Light infestations previously reported expanded slightly and trace populations were found in Richards, Burns and South Algona twps (see map, page 85).
1957	A marked decrease in population levels occurred. Only low population levels could be found at a few points.
1958	Little change in population levels could be determined. Small pockets of light infestation were observed in McNab and Westmeath twps.
1959	Little change occurred in population levels. The light infestation persisted in McNab Twp and scattered colonies were observed in Petawawa, Westmeath, Richards and Buchanan twps.
1960-1961	Populations remained at much the same level.

(cont'd)

Jack Pine Sawfly, *Neodiprion pratti banksianae* Roh. (concl.)

Host: jP [Major]

Year	Remarks
1962	A slight increase in population levels and distribution occurred. Trace or light defoliation was detected in Petawawa, Buchanan, Westmeath, Richards and North Algona twps.
1963	Populations remained at much the same low levels.
1964	Populations generally remained at a low level, except in Petawawa Twp, where a small pocket of moderate defoliation was observed.
1965	Populations increased. Pockets of severe defoliation occurred in Horton and McNab twps and moderate damage was observed in Petawawa, Westmeath and North Algona twps. Scattered colonies were present in Richards Twp.
1966	Pockets of heavy infestation persisted in Horton and McNab twps; elsewhere, populations decreased to low levels.
1967	Populations increased at numerous points, which resulted in light-to-moderate defoliation in Buchanan, Petawawa, Richards and Westmeath twps.
1968	A marked decrease in populations occurred. The only defoliation observed was confined to a small stand of jack pine in Buchanan Twp.
1969-1971	not reported
1972-1973	Small numbers of colonies were reported at scattered points.
1974-1976	not reported
1977	Small numbers of colonies were observed on a few trees in Buchanan Twp.
1978	Light-to-moderate defoliation occurred at one point in North Algona Twp.
1979	Population levels increased, which resulted in severe defoliation at one point in North Algona Twp. Small numbers of colonies were found in Buchanan and Westmeath twps.
1980	Populations increased, and a heavy infestation persisted in North Algona Twp. Control measures were carried out in this area. Elsewhere, moderate-to-severe defoliation was observed on small clumps of jack pine in Sebastopol and Fraser twps.

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.)

Host: Aspen [Major]

Year	Remarks
1950-1951	not reported
1952	Leaf mining by this insect was common in Rolph and Wylie twps.
1953	Severe foliar damage occurred at one point in Wylie Twp. Small pockets of various degrees of damage were observed at numerous points elsewhere.
1954	Populations increased and caused heavy foliar damage in the eastern part of the district.
1955	A decline in population levels occurred, except in the most northerly townships, where severe leaf mining persisted in some stands.
1956	Populations declined for the second consecutive year, and reached generally low levels.
1957-1959	not reported
1960	Small numbers were reported in Stratton and Westmeath twps.
1961-1963	not reported
1964	Small numbers of mined leaves were observed in McNab Twp.
1965	Populations increased and caused moderate damage in Richards Twp. A pocket of light infestation also occurred in Wilberforce Twp.
1966-1971	not reported
1972	A population increase was evident. Small numbers of miners were observed at numerous points.
1973	Populations increased, and small pockets of heavy infestation were observed at scattered points.
1974	not reported
1975	Conspicuous damage was observed in Sherwood Twp.

(cont'd)

Aspen Leafblotch Miner, *Phyllonorycter ontario* (Free.) (concl.)

Host: Aspen [Major]

Year	Remarks
1976	Populations increased, and severe mining was observed in Sherwood and Hagarty twps.
1977	Populations decreased to low levels.
1978-1979	Populations remained at low levels.
1980	Small pockets of heavy foliar damage were observed at a few points.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

Host: spruce [Major]

Year	Remarks
1950-1951	not reported
1952-1955	Small numbers of larvae were observed on small, open-grown spruce at several points.
1956	Light-to-moderate defoliation was observed on roadside trees in Jones Twp.
1957-1958	not reported
1959-1961	Light defoliation occurred on roadside trees at a few scattered points.
1962	A light infestation was observed at one point in Westmeath Twp.
1963	A light infestation persisted in Westmeath Twp and a new light infestation was found in South Algona Twp.
1964-1965	not reported
1966	Trace populations were observed at a few points.

(cont'd)

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.) (concl.)

Host: spruce [Major]

Year	Remarks
1967	Population levels increased. A heavy infestation caused as much as 65% defoliation on 2-m white spruce trees at one point in Buchanan Twp.
1968	The heavy infestation reported previously in Buchanan Twp persisted. Defoliation reached approximately 60% on 2-m trees.
1969	The infestation reported previously in Buchanan Twp collapsed. Trace populations were observed at a few points elsewhere.
1970-1972	not reported
1973	Small individual open-grown white spruce trees were severely defoliated at widely separated points.
1974	A small pocket of heavy infestation occurred in white spruce plantation in Horton Twp.
1975	Severe defoliation was observed on individual open-grown trees at a few points.
1976-1977	Light-to-moderate defoliation was observed on scattered open-grown white spruce in Grattan and Admaston twps.
1978	Populations increased and moderate-to-severe defoliation occurred on scattered open-grown white spruce in Grattan, Admaston, North Algona and Wilberforce twps.
1979	No discernable change in population levels occurred.
1980	Severe defoliation occurred on scattered individual white spruce at a few points. Moderate damage was recorded in an experimental black spruce plantation in Petawawa Twp.

White Pine Weevil, *Pissodes strobi* (Peck)

Host: pine, spruce [Major]

Year	Remarks
1950-1952	not reported

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (cont'd)

Host: pine, spruce [Major]

Year	Remarks
1953	Weevils were widely distributed throughout the district and considerable damage occurred in some plantations. Light damage was observed on small roadside jack pine trees in Petawawa Twp.
1954	Heavy damage to white pine occurred in a mixed pine plantation in Rolph Twp. Light damage was recorded in spruce and Scots pine plantations in Petawawa Twp. Elsewhere, trace damage could be found at numerous points.
1955	Populations increased. Heavy infestations occurred in a mixed pine plantation in Rolph Twp and in a white pine plantation in Petawawa Twp. Terminal shoot mortality was 67% in the latter area. Light damage was recorded in Westmeath Twp. Small numbers of weevils were found at numerous points elsewhere.
1956	Little change in population levels could be determined. The heavy infestations reported previously in Rolph and Petawawa twps persisted.
1957	A decrease in population levels occurred; however, damage by this insect could be found in all pine species throughout the district.
1958	No discernible change over the previous year could be determined.
1959-1960	Population levels remained low; however, damaged tree leaders could be found throughout the district.
1961	A heavy infestation occurred in a white pine plantation in Buchanan Twp where 30% terminal mortality was recorded. Small numbers of weevils were observed at numerous points throughout the remainder of the district.
1962	The heavy infestation reported previously in Buchanan Twp persisted. Leader mortality was 20% in this area. Control (leader pruning) was carried out by the Ontario Ministry of Natural Resources in areas of white pine and jack pine regeneration in Westmeath Twp. Small amounts of damage were observed at numerous points elsewhere.

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (cont'd)

Host: pine, spruce [Major]

Year	Remarks
1963	Populations remained at much the same level as in the previous year.
1964	A heavy infestation persisted in Buchanan Twp. Leader mortality was 38% at one point. Pockets of light and moderate infestation were observed at numerous points elsewhere in the eastern part of the district.
1965	Populations were generally lower than in the previous year; however, a heavy infestation persisted in Buchanan Twp, where leader mortality amounted to 29%. Light infestations were present in McNab and Horton twps.
1966	Little change in population levels could be determined. A heavy infestation persisted in Buchanan Twp and a new heavy infestation killed 29% of tree leaders in an area in Alice Twp. Light infestations were recorded in Petawawa and Wylie twps.
1967	The heavy infestation reported previously in Buchanan Twp persisted. Elsewhere, little change in population levels could be determined.
1968	Little change in population levels could be determined except in Buchanan Twp, where the incidence of leader damage increased by more than 50%.
1969	Heavy infestations were recorded in McNab and Radcliffe twps. Little change in population levels could be determined elsewhere.
1970	Populations increased in Buchanan Twp and 59% leader mortality was recorded at one point. A heavy infestation recurred in McNab Twp. Elsewhere, little change in the incidence of weevil damage could be determined.
1971	Populations increased in Buchanan and Wylie twps, where the incidence of leader damage reached 64% and 70%, respectively. Little change in numbers could be determined elsewhere.
1972	Little change in population levels could be determined. Leader attack was widespread and ranged from 8% on jack pine to 58% in one white pine plantation.

(cont'd)

White Pine Weevil, *Pissodes strobi* (Peck) (concl.)

Host: pine, spruce [Major]

Year	Remarks
1973	No change in populations could be determined. Damage was widespread throughout the district, at various levels.
1974	Heavy infestations occurred in white pine plantations in McNab and Hagarty twps. The incidence of leader damage ranged from 31%, in the former township, to 66% in the latter. Various degrees of damage were observed at numerous points elsewhere.
1975	High population levels recurred in McNab and Hagarty twps. Little change in incidence of attack could be determined elsewhere.
1976-1977	No significant change in damage levels or in distribution could be determined.
1978	Various degrees of damage were observed at many points in the district; however, populations decreased markedly in Hagarty Twp.
1979-1980	No change in population levels or distribution could be determined.

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host: larch [Major]

Year	Remarks
1950-1958	not reported
1959	A light infestation was found in Bagot Twp.
1960	The light infestation recurred in Bagot Twp and a new light infestation was found in Brougham Twp.
1961	Populations increased and caused moderate-to-severe defoliation at one point in Grattan Twp.

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (cont'd)

Host: larch [Major]

Year	Remarks
1962	Populations increased markedly. A heavy infestation occurred in Buchanan Twp and numerous small pockets of light defoliation were observed elsewhere.
1963	Little change in population levels could be determined. The heavy infestation reported previously in Buchanan Twp declined to a moderate level; however, many small pockets of light infestation persisted elsewhere.
1964	Populations declined, and a medium infestation reported previously in Buchanan Twp declined to light intensity. Elsewhere, only small numbers of colonies could be found.
1965	Populations continued to decline, and very few larval colonies could be found.
1966	Occasional larval colonies were observed in South Algona Twp.
1967	A spectacular increase in populations occurred, which resulted in severe defoliation in Alice, Wilberforce and Westmeath twps. Light-to-medium infestations occurred at several points elsewhere. Scattered colonies were observed as well.
1968	Populations declined to light-to-moderate intensity in Alice, Wilberforce and Westmeath twps. Scattered colonies were observed at a few points elsewhere.
1969	Small numbers of larval colonies were observed at widely scattered points.
1970	A small pocket of heavy infestation occurred in Petawawa Twp; little change in numbers occurred elsewhere.
1971	The heavy infestation recurred in Petawawa Twp, and no change could be determined elsewhere.
1972	Populations increased. The heavy infestation reported previously in Petawawa Twp persisted and new light-to-medium infestations were observed in Rolph and Wilberforce twps.
1973	Little change in population levels or distribution could be determined.

(cont'd)

Larch Sawfly, *Pristiphora erichsonii* (Htg.) (concl.)

Host: larch [Major]

Year	Remarks
1974	Populations increased and this resulted in severe defoliation in Alice, Petawawa, Wilberforce and Rolph twps.
1975	Populations increased for the second consecutive year. Severe defoliation occurred in Alice, Hagarty, Rolph, Sherwood, Wilberforce and Wylie twps. Small numbers of larvae were observed elsewhere.
1976	Populations increased and severe defoliation resulted at many points in the northern half of the district.
1977	There was little change over the previous year, and heavy infestations persisted in the northern half of the district.
1978	A marked decrease in populations occurred in the northern half of the district; however, small pockets of light-to- moderate damage could be found in McNab, Buchanan, Alice and Sherwood twps.
1979-1980	Population levels decreased for the second consecutive year, except in Buchanan Twp, where moderate-to-severe defoliation was noted.

Other Noteworthy Insects

Pine False Webworm, *Acantholyda erythrocephala* (L.)

Host(s): pine [Major]

Year	Remarks
1950-1979	not reported
1980	Small numbers of larvae were found at one point in Raglan Twp.

Fall Cankerworm, *Alsophila pometaria* (Harr.)

Host: deciduous [Major]

Year	Remarks
1950-1966	not reported
1967	Light defoliation of roadside elm was reported in Horton and McNab twps.
1968-1975	not reported
1976	Light defoliation was observed in the eastern part of the district.
1977-1979	not reported
1980	Moderate-to-severe defoliation was recorded at one location in Petawawa Twp.

Saratoga Spittlebug, *Aphrophora saratogensis* (Fitch)

Host(s): conifers [Major]

Year	Remarks
1951	A moderate-to-heavy infestation occurred at one point in Petawawa Twp.
1952-1973	not reported
1974	The spittlebug damaged trees severely in the central part of the district.
1975	Moderate-to-severe damage occurred in red pine plantations in Fraser, Hagarty, Matawatchan, North Algona and Sherwood twps.
1976	Populations declined in previously infested areas.
1977	Low population levels were reported at a few locations.
1978	not reported
1979	Low numbers of spittlebugs were reported in Hagarty Twp.
1980	not reported

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): birch [Major]

Year	Remarks
1950	not reported
1951	The sawfly was common on lakeshore and riverbank trees.
1952	Small numbers of sawflies were common throughout the district.
1953	Moderate-to-severe defoliation was reported in Wilberforce Twp.
1954	Moderate-to-severe defoliation occurred in Hagarty and Wilberforce twps.
1955	Populations declined to low levels.
1956	Lightly defoliated trees were reported in Wilberforce, Hagarty, Ross and Westmeath twps.
1957-1966	not reported
1967	Moderate-to-severe defoliation occurred in Ross Twp, and light defoliation occurred in Westmeath and Wilberforce twps.
1968-1969	not reported
1970	Small numbers of sawflies were reported at several locations.
1971-1978	not reported
1979	A few colonies were found in Wylie Twp.
1980	not reported

Cedar Leafminers, *Argyresthia thuiella* (Pack.) and
Coleotechnites thujaella (Kft.)

Host(s): cedar [Major]

Year	Remarks
1950-1973	not reported

(cont'd)

Cedar Leafminers, *Argyresthia thuiella* (Pack.) and
Coleotechnites thujaella (Kft.) (concl.)

Host(s): cedar [Major]

Year	Remarks
1974	Light damage occurred at scattered locations in the southern part of the district.
1975-1980	not reported

Linden Looper, *Erannis tiliaria* (Harr.)

Host(s): deciduous [Major]

Year	Remarks
1950-1958	not reported
1959	Small numbers of loopers were found in Westmeath Twp.
1960	not reported
1961	Small numbers of loopers were found in the eastern part of the district.
1962	Large numbers of loopers were reported in Raglan, Lyndock, Hagarty and Griffiths twps.
1963	Moderate-to-severe defoliation occurred in Gratton, Matawatchan, Hagarty and Wilberforce twps.
1964-1973	Moderate-to-severe defoliation occurred in the northern half of Rolf Twp.
1974-1975	not reported
1976	Low numbers of loopers were reported throughout the district.
1977-1980	not reported

Pine Needleminer, *Exoteleia pinifoliella* (Cham.)

Host(s): jP [Major]

Year	Remarks
1950-1961	not reported
1962	Large numbers of larvae caused 75% defoliation at one point in Petawawa Twp.
1963-1980	not reported

European Spruce Sawfly, *Gilpinia hercyniae* (Htg.)

Host(s): spruce [Minor]

Year	Remarks
1950-1955	Trace populations were observed at scattered points in the southern half of the district.
1956	not reported
1957-1968	Trace populations were observed at scattered points.
1969	not reported
1970	Trace populations were reported at numerous points.
1971-1972	not reported
1973	Low numbers of sawflies were reported at scattered points.
1974-1976	not reported
1977-1980	Small numbers of sawflies were found at numerous points.

Pine Engraver, *Ips pini* (Say)

Host(s): pine, spruce [Major]

Year	Remarks
1950-1960	not reported

(cont'd)

Pine Engraver, *Ips pini* (Say) (concl.)

Host(s): pine, spruce [Major]

Year	Remarks
1961	Large numbers of pine engravers were observed in Richards and South Algona twps.
1962-1963	not reported
1964	High population levels were reported at two locations in Petawawa Twp.
1965	not reported
1966	Light-to-moderate mortality occurred on a pole-size red pine plantation in Buchanan Twp.
1976	Light tree mortality occurred in Hagarty, Rolf and Alice twps.
1977	not reported
1978	Some tree mortality occurred in red pine plantations in Lyndock and Stafford twps.
1979-1980	not reported

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Host(s): rP, jP [Major]

Year	Remarks
1950-1953	not reported
1954	A medium infestation occurred and caused considerable defoliation in a stand of near-mature red pine on the boundary of Alice and Fraser twps.
1955-1961	not reported
1962-1964	Small numbers of colonies were observed in Richards Twp.
1965	Populations increased, and pockets of heavy infestation were observed on jack pine trees in Westmeath and Petawawa twps.

(cont'd)

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl. (concl.)

Host(s): rP, jP [Major]

Year	Remarks
1966	Populations increased. Small pockets of heavy infestation and severe defoliation of jack pine occurred at one point in Petawawa Twp and in a red pine plantation in Westmeath Twp.
1967	Populations increased for the third consecutive year. Severe defoliation occurred in jack pine and red pine plantations in Petawawa, Ross and Westmeath twps. Several small pockets of light-to-moderate infestation were observed elsewhere.
1968	High population levels persisted in Ross Twp. A stand of semi-mature pine and a young plantation of pine were severely defoliated. Individual trees in Alice, Fraser and Wilberforce twps were severely defoliated at scattered points. Elsewhere in the district, populations declined.
1969-1980	not reported

Redheaded Jack Pine Sawfly, *Neodiprion virginiana* complex

Host(s): jP [Major]

Year	Remarks
1950-1952	not reported
1953	A small area of moderate-to-heavy infestation was observed in Horton Twp.
1954	Moderate-to-heavy infestation occurred in Horton Twp.
1955	Lightly defoliated trees were observed in two plantations in McNab Twp.
1956	not reported
1957	Small numbers of larvae were reported in Grattan Twp.
1958	Scattered colonies were reported in Grattan Twp.
1959-1961	not reported

(cont'd)

Redheaded Jack Pine Sawfly, *Neodiprion virginiana* complex (concl.)

Host(s): jP [Major]

Year	Remarks
1962	Light infestations occurred in Wylie and Westmeath twps.
1963	Small numbers of larvae were reported in Wylie and Westmeath twps.
1964	not reported
1965	Scattered colonies of sawflies were reported in McNab and Horton twps.
1966	not reported
1967	Light defoliation occurred at one point in Petawawa Twp.
1968-1974	not reported
1975	Moderate-to-severe defoliation occurred in plantations in North Algona and Wilberforce twps.
1976-1980	not reported

Spring Cankerworm, *Paleacrita vernata* (Peck)

Host(s): elm, sM [Minor]

Year	Remarks
1950-1955	not reported
1956	A small pocket of moderate-to-severe defoliation occurred in McNab Twp.
1957	Moderate defoliation occurred in a small area in Horton Twp.
1958-1980	not reported

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

Host(s): maple [Major]

Year	Remarks
1950-1958	not reported
1959	Light foliar damage occurred in South Algona Twp.
1960	Light foliar damage occurred at one point in McNab Twp.
1961	not reported
1962	Moderate-to-severe defoliation was recorded in Bagot Twp. Light damage occurred in McNab Twp.
1963	Light foliar damage occurred in McNab, Grattan and Hagarty twps.
1964-1980	not reported

Northern Pitch Twig Moth, *Petrova albicapitana* (Bsk.)

Host(s): jP [Minor]

Year	Remarks
1950-1953	not reported
1954	Medium-to-high population levels were observed in Alice, Petawawa and Buchanan twps.
1955	Trace populations were reported in Westmeath Twp.
1956-1958	not reported
1959	Larvae were common in Wilberforce Twp.
1961	Trace populations were reported in Richards and Petawawa twps.
1962	not reported
1963-1964	Small numbers of larvae were found throughout the district.
1965-1967	not reported
1968	Large numbers of larvae were found at one point in Westmeath Twp.

(cont'd)

Northern Pitch Twig Moth, *Petrova albicapitana* Bsk. (concl.)

Host(s): jP [Minor]

Year	Remarks
1969-1980	not reported

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.)

Host(s): aMo [Major]

Year	Remarks
1950-1951	not reported
1952	Moderate-to-heavy infestations occurred on ornamental trees in urban areas.
1953	not reported
1954-1955	Heavily defoliated trees were reported throughout Wilberforce Twp.
1956	Lightly defoliated trees were commonly observed in Alice, Wylie and Petawawa twps.
1957-1958	not reported
1959	Heavily defoliated trees were reported in the town of Pembroke.
1960	Scattered colonies of sawflies occurred at several points.
1961	Moderate-to-severe defoliation occurred on ornamental trees in Pembroke. Scattered colonies were observed at many points elsewhere in the district.
1962	Moderate-to-severe defoliation occurred in Pembroke. Light damage was recorded in Wylie and Rolf twps.
1963	Light damage occurred on ornamentals in Pembroke.
1964-1966	not reported

(cont'd)

Mountain-ash Sawfly, *Pristiphora geniculata* (Htg.) (concl.)

Host(s): aMo [Major]

Year	Remarks
1967	Various degrees of defoliation occurred in the northern part of the district.
1968-1969	not reported
1970-1971	Various degrees of defoliation were reported throughout the district.
1973	not reported
1974-1976	Small numbers of larvae were reported at a few locations.
1977-1979	not reported
1980	Colonies of larvae were observed at many points throughout the district.

Pine Tortoise Scale, *Toumeyella parvicornis* Ckll.)

Host(s): jP, scP Major]

Year	Remarks
1950-1965	not reported
1966	Heavy damage occurred at one point in Buchanan Twp. Occasional trees were infested in North Algona, Wilberforce and Wylie twps.
1967	not reported
1968	Some light tree mortality occurred in a 3-ha plantation in Radcliffe Twp.
1969-1970	not reported
1971-1972	Small numbers of trees were heavily infested at scattered locations.
1973-1979	not reported
1980	Small number of infested trees were reported in Wylie Twp.

D I S E A S E S

Armillaria Root Rot, *Armillaria mellea* (Vahl: Fr.) Kummer

Host(s): coniferous, deciduous [Major]

Year	Remarks
1950-1954	not reported
1955	High levels of whole-tree mortality of balsam fir occurred in Wylie Twp (63%). Mortality of red pine Twp was also high (53%) in Buchanan Twp.
1956-1961	not reported
1962	Severe damage to red pine trees occurred in South Algona and Sherwood twps.
1963-1964	not reported
1965	Severe damage to red pine trees occurred in Bagot and Wilberforce twps.
1966	Light incidence was reported throughout the district.
1967	Moderate damage occurred in Hagarty and Buchanan twps.
1968-1974	not reported
1975	Light incidence was reported throughout the district.
1976	Low levels of tree mortality occurred in Richards Twp.
1977-1980	not reported

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard

Host(s): rP, scP, jP, wP [Major]

Year	Remarks
1950-1965	not reported
1966	The first record of the canker in the district, low incidence in Alice and Hagarty twps, was reported.
1967	not reported
1968	Trace incidence was reported in Hagarty Twp.

(cont'd)

Scleroderris Canker, *Ascocalyx abietina* (Lagerb.) Schläpfer-Bernhard (concl.)

Host(s): rP, scP, jP, wP [Major]

Year	Remarks
1969-1970	not reported
1971	Trace incidence was reported in Hagarty Twp.
1972-1973	not reported
1974	Light incidence was reported in Rolph Twp.
1975-1978	not reported
1979-1980	Light incidence was reported in Hagarty Twp (see map, page 109).

Map

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Host(s): wE [Major]

Year	Remarks
1950-1959	not reported
1960	The first record of infection in the district was a single tree near Deep River in Rolph Twp.
1961	Ten new areas of infection were reported in the district.
1962-1963	Mortality was light throughout the district.
1964	Mortality increased. Dead trees were reported in Westmeath (22% mortality), North Algona (1%) and Buchanan (2%) twps.
1965-1967	Mortality was common in the district.
1968	High tree mortality levels were reported in Pembroke (90%) and Stafford (50%) twps.
1969-1975	Mortality increased throughout the district.
1976	High tree mortality (65%) occurred in Hagarty Twp.
1977	Mortality generally increased and averaged 51% at 10 locations.
1978-1980	Mortality increased throughout the district.

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver

Host(s): tA [Major]

Year	Remarks
1950-1958	not reported
1959-1960	Foliar damage was common in district.
1961	Light foliar browning occurred in Lyndock Twp.
1962-1965	not reported

(cont'd)

Ink Spot of Aspen, *Ciborinia whetzelii* (Seaver) Seaver (concl.)

Host(s): tA [Major]

Year	Remarks
1966	Light incidence was reported between the villages of Dacre and Calabogie.
1967-1968	Trace levels of infection were reported in Wilberforce Twp.
1969	not reported
1970	Severe foliar browning occurred in Wylie Twp.
1971	not reported
1972	Severe foliar browning occurred in Buchanan Twp. Damage was light in Hagarty Twp.
1973	not reported
1974	Severe foliar browning occurred in Griffith Twp (90% incidence).
1975	Moderate incidence was reported in Raglan Twp.
1976-1979	not reported
1980	Low incidence was reported throughout the district.

Sweetfern Blister Rust, *Cronartium comptoniae* Arthur

Host(s): jP [Major]

Year	Remarks
1950-1968	not reported
1969	The first record of this disease in the district was low incidence in Buchanan, Petawawa, Rolph and Wylie twps.
1970-1972	Moderate incidence was reported in Richards Twp.
1973-1974	not reported
1975	Moderate incidence was reported in Petawawa Twp.
1976-1980	not reported

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer

Host(s): wP [Major]

Year	Remarks
1950-1952	not reported
1953	Low incidence was reported in Hagarty and South Algona twps. Trace incidence was reported in the southern part of the district.
1954-1955	Low incidence was reported in the district.
1956-1959	not reported
1960	High incidence was reported in Buchanan and Wylie twps.
1961	not reported
1962	Severe damage occurred in Bagot and Raglan twps.
1963	Severe damage was reported in the eastern part of the district.
1964	High incidence was reported in Stafford, McNab and Westmeath twps.
1965	Severe damage (23% mortality) occurred in Westmeath Twp.
1966	Severe damage (27% mortality) occurred in Westmeath Twp. High incidence was reported on shade trees in Deep River and Rolph twps.
1967	High incidence was reported in Rolph and Wylie twps. Low incidence was reported in Lyndock Twp.
1968	High incidence was reported in Raglan and Lyndock twps. Trace incidence was reported in Petawawa Twp.
1969-1971	Blister rust was common, but incidence was light in Renfrew County.
1972	Moderate incidence (23%) was reported in Stafford Twp.
1973	Blister rust was common, but incidence was light in the district.
1974	High incidence was reported and some mortality occurred in Rolph and Wylie twps.

(cont'd)

White Pine Blister Rust, *Cronartium ribicola* J.C. Fischer (concl.)

Host(s): wP [Major]

Year	Remarks
1975	Moderate incidence was reported in Brougham and Horton twps.
1976-1979	not reported
1980	Light damage occurred in Brougham, Ross and Wilberforce twps.

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller

Host(s): tA [Major]

Year	Remarks
1950-1952	not reported
1953	Light incidence was reported in Fraser and Wilberforce twps. Cankers were common elsewhere.
1954	Cankers were common but damage was light in the district.
1955	Moderate infection levels (27% incidence) were reported in Radcliffe Twp. Trace levels were reported elsewhere.
1956-1958	Trace levels of infection were common in the district.
1959	A few infected trees were reported in Raglan Twp.
1960-1961	not reported
1962	High incidence was reported in Lyndock, Stratton and Richards twps.
1963	not reported
1964	High incidence was reported in Fraser and Bagot twps.
1965-1967	Cankers were common but damage was light in the district.
1968	Moderate incidence was reported in Radcliffe Twp. Incidence was light in Alice and Fraser twps.

(cont'd)

Hypoxylon Canker, *Hypoxylon mammatum* (Wahlenb.) J. Miller (concl.)

Host(s): tA [Major]

Year	Remarks
1969	High incidence was reported in Buchanan, Fraser, McKay and Wylie twps.
1970-1972	Cankers were common in the district but damage was light.
1973	High incidence was reported in Fraser and Buchanan twps.
1974-1980	Cankers were common in the district but damage was light.

Shoot Blight, *Venturia macularis* (Fr.) E. Müller and v. Arx

Host(s): tA [Major]

Year	Remarks
1950-1957	not reported
1958-1960	Damage was common but incidence was light in the district.
1961	Severe damage (50% tip mortality) occurred in Griffith Twp.
1962	Severe damage occurred in Lyndock Twp.
1963-1965	The disease was common in aspen stands in the district.
1966-1975	not reported
1976	Low incidence was reported in Hagarty Twp.
1977	not reported
1978	High incidence (62% tip mortality) was reported in Wylie Twp.
1979-1980	not reported

Other Noteworthy Diseases

Twig Blight, *Cenangium ferruginosum* Fr. : Fr.

Host(s): pine [Major]

Year	Remarks
1950-1973	not reported
1974-1976	Light damage occurred in Hagarty Twp.
1977-1980	not reported

Pine Needle Rust, *Coleosporium asterum* (Dietel) Sydow

Host(s): rP [Major]

Year	Remarks
1950-1954	not reported
1955-1958	Damage caused by this rust was common, but incidence was light in the district.
1959-1972	not reported
1973	High incidence (83%) was reported in Wilberforce Twp.
1974	High incidence was reported in Raglan (62%) and Grattan (78%) twps.
1975-1977	not reported
1978	High incidence (86%) was reported in Ross Twp.
1979-1980	not reported

Pine Needle Rust, *Coleosporium pinicola* (Arthur) Arthur

Host(s): rP [Minor]

Year	Remarks
1950-1961	not reported

(cont'd)

Pine Needle Rust, *Coleosporium pinicola* (Arthur) Arthur (concl.)

Host(s): rP [Minor]

Year	Remarks
1962	The first record in Ontario of this disease was reported: high incidence occurred in Richards Twp, and light incidence in Buchanan, Rolph and Petawawa twps.
1963	Severe incidence persisted in Richards and Petawawa twps. The pathogen was found in McNab and Westmeath twps.
1964	The area affected increased and intensity decreased in Petawawa and McNab twps.
1965	Incidence decreased in Petawawa and McNab twps.
1960-1980	not reported

Eastern Gall Rust, *Cronartium quercuum* (Berk.) Miyabe ex Shirai

Host(s): jP, scP [Major]

Year	Remarks
1950-1959	not reported
1960	Gall rust was common in Westmeath Twp.
1961	not reported
1962-1963	Gall rust was common in Westmeath Twp.
1964-1976	not reported
1977	High incidence was reported in Buchanan Twp.
1978-1980	not reported

Tar Spot Needle Cast, *Davisomycella ampla* (J. Davis) Darker

Host(s): jP [Major]

Year	Remarks
1950-1957	not reported
1958	Severe infections occurred in Buchanan and Westmeath twps.

(cont'd)

Tar Spot Needle Cast, *Davisomycella ampla* (J. Davis) Darker (concl.)

Host(s): jP [Major]

Year	Remarks
1959	Low incidence was reported in Rolph Twp.
1960-1961	not reported
1962	Damage was common but incidence was light in Wylie, Westmeath, Stratton and Richards twps.
1963	Severe defoliation occurred in Wylie, Westmeath and Petawawa twps.
1964	not reported
1965-1966	Light defoliation was common in the district.
1967-1970	not reported
1971	Severe damage occurred on a few trees in Admaston Twp.
1972	Severe incidence (95%) was reported in Buchanan Twp.
1973-1974	Moderate incidence was reported in Buchanan and Richards twps.
1975	not reported
1976	Severe defoliation occurred in Alice and Fraser twps.
1977	High incidence (84%) was reported in Buchanan Twp.
1978-1980	not reported

Dothichiza Canker, *Dothichiza populea* Sacc. & Briard

Host(s): cPo [Major]

Year	Remarks
1950-1973	not reported
1974	Severe damage occurred in Buchanan and Wylie twps.
1975	not reported
1976	Moderate damage occurred in Rolph Twp.
1977	Severe browning occurred in Rolph Twp.
1978-1980	not reported

Eutypella Canker, *Eutypella parasitica* Davidson & Lorenz

Host(s): sM [Major]

Year	Remarks
1950-1967	not reported
1968	Several trees were infected in Buchanan Twp.
1969	Moderate-to-heavy incidence was reported in Griffith Twp.
1970-1980	not reported

Tomentosus Root Rot, *Inonotus tomentosus* (Fr.) Gilbertson

Host(s): wS, bF [Major]

Year	Remarks
1950-1966	not reported
1967	Light levels of infection were reported in Buchanan Twp.
1968	not reported
1969	Light levels of infection were reported in Buchanan Twp.
1970	not reported
1971	Light levels of infection were reported in Admaston and Griffith twps.
1972-1975	not reported
1976	Some mortality occurred in plantations at the Petawawa National Forestry Institute (PNFI).
1977-1979	not reported
1980	Some mortality occurred in plantations at PNFI.

Needle Cast, *Lophodermium pinastri* (Schrader : Fr.) Chev.

Host(s): rP, wP

Year	Remarks
1950-1954	not reported
1955-1960	Damage was common, but incidence was light in the district.
1961-1977	not reported
1978	Light damage occurred in Brudenell, Fraser and Sherwood twps.
1979	Light damage occurred in Fraser Twp.
1980	not reported

White Trunk Rot, *Phellinus igniarius* (L. : Fr.) Quélet

Host(s): [Major]

Year	Remarks
1950-1953	not reported
1954	Infections were reported in Admaston Twp.
1955	Trunk rot was common throughout the district.
1956-1966	not reported
1967	Light levels of infection were reported in Buchanan Twp.
1968-1970	not reported
1971	Trunk rot was common in Griffith Twp.
1972-1980	not reported

Red Ring Rot, *Phellinus pini* (Brot. : Fr.) A. Ames

Host(s): wS, wP [Major]

Year	Remarks
1950-1965	not reported
1966	High incidence was reported at the Petawawa National Forest Institute.
1967-1980	not reported

Felt Fungus, *Septobasidium pinicola* Snell.

Host(s): wP [Minor]

Year	Remarks
1950-1956	not reported
1957	Low incidence was reported in Lyndock Twp.
1958	Low incidence was reported in Wylie Twp.
1959	Low incidence was reported in Petawawa Twp.
1960-1980	not reported

DIEBACKS AND DECLINES

Birch Dieback

Year	Remarks
1950-1966	not reported
1967-1968	Dieback of white and yellow birches was common throughout the district.
1969-1980	not reported

Maple Decline

Year	Remarks
1950-1962	not reported
1962-1965	Roadside trees were damaged in the eastern part of the district.
1966-1980	not reported

Red Oak Mortality

Year	Remarks
1950-1969	not reported
1970	Top and tree mortality was high (35%) in 1,010 ha in Fraser, Wilberforce, Alice and North Algona twps. A predisposing factor may have been severe defoliation caused by the forest tent caterpillar between 1962 and 1967.
1971	Little change occurred. A new area of mortality was observed in McKay Twp (45% mortality).
1972-1974	not reported
1975-1980	Light tip mortality occurred in Alice and Wylie twps.

Semi-mature Tissue Needle Blight (cause unknown)

Host(s): wP

Year	Remarks
1950-1952	not reported
1953	Low incidence was reported in South Algona, Hagarty and Brudenell twps.
1954	Moderate incidence was reported in Buchanan Twp.
1955	Damage was light throughout the district.
1956-1966	not reported
1967-1968	Damage was light throughout the district.
1969-1971	not reported
1972-1973	Damage was light throughout the district.
1974-1980	not reported

Single-tree Mortality of Balsam Fir

Host(s): bF

Year	Remarks
1950-1953	not reported
1954	Severe damage occurred in Alice Twp. Moderate damage occurred in Bromley Twp.
1955	Severe damage (61% mortality) occurred in Stafford Twp.
1956	not reported
1957	Mortality was common throughout the district.
1958	Light damage (15% mortality) occurred near Killaloe in Hagarty Twp.
1959-1974	not reported
1975-1977	Moderate damage (43% mortality) occurred in Hagarty Twp.
1978	Moderate damage occurred throughout the district.
1979-1980	not reported

A B I O T I C D A M A G E

Drought

Year	Remarks
1950-1965	not reported
1966	Drought caused early defoliation of aspen in Petawawa Twp.
1967-1974	not reported
1975	Drought caused premature leaf fall on aspen and birch throughout the district.
1976	not reported
1977	Drought caused premature foliar browning on largetooth aspen in Jones, Sherwood and Radcliffe twps.
1978-1980	not reported

Frost

Year	Remarks
1950-1954	not reported
1955	Frost caused severe damage in the district.
1956-1959	not reported
1960	Frost caused severe damage on balsam fir in Lyndock Twp and on white spruce in Wilberforce Twp (300 seedlings killed), and moderate damage on Scots pine in Buchanan Twp.
1961-1962	not reported
1963-1964	Frost caused severe damage throughout the district.
1965-1971	not reported
1972-1974	Frost caused severe damage throughout the district.
1975-1976	not reported
1977	Frost caused severe damage throughout the district.

(cont'd)

Frost (concl.)

Year	Remarks
1978	Frost affected 80% of the trees in Fraser Twp, and caused moderate damage at PNFI.
1979	not reported
1980	Frost caused severe damage to white spruce throughout the district.

Salt

Year	Remarks
1950-1965	not reported
1966	Salt caused moderate damage to red pine in McNab and Horton twps.
1967	Salt caused some mortality in McNab and Horton twps.
1968-1980	not reported

Snow and Sleet

Year	Remarks
1950-1954	not reported
1955	Sleet caused severe damage in Grattan Twp.
1956-1980	not reported

Winter Drying

Year	Remarks
1950-1958	not reported
1959	Winter drying was common on exposed sites.
1960-1980	not reported

ANIMAL DAMAGE

Animal Damage

Year	Remarks
1950-1971	not reported
1972-1974	Porcupine browsing caused light damage to mature white pine at PNFI.
1975	Rodent feeding caused mortality of transplanted red pine in South Algona Twp.
1976-1980	not reported

APPENDIX A

DECIDUOUS HOSTS

Common Name	Scientific Name	Abbreviations
Alder	*Alnus* spp.	Al
Apple	*Malus* spp.	Ap
Ash, black	*Fraxinus nigra* Marsh.	As
Aspen, largetooth	*Populus grandidentata* Michx.	lA
trembling	*tremuloides* Michx.	tA
Basswood	*Tilia* spp.	Ba
Beech	*Fagus grandifolia* Ehrh.	Be
Birch, white	*Betula papyrifera* Marsh.	wB
yellow	*alleghaniensis* Britt.	yB
Butternut	*Juglans cinerea* L.	Bu
Cherry, eastern choke	*Prunus virginiana* L.	eaCh
pin	*pensylvanica* L.f.	pCh
Elm, white	*Ulmus americana* L.	wE
Horse-chestnut	*Aesculus hippocastanum* L.	hChe
Ironwood	*Ostrya* spp.	I
Maple, Manitoba	*Acer negundo* L.	mM
red	*rubrum* L.	rM
sugar	*saccharum* Marsh.	sM
Mountain-ash, American	*Sorbus americana* Marsh.	aMo
Oak, bur	*Quercus macrocarpa* Michx.	bO
red	*rubra* L.	rM
Poplar, balsam	*Populus balsamifera* L.	bPo
Carolina	X *canadensis* Moench	cPo
Lombardy	*nigra* var. *italica* Muenchh.	lPo
silver	*alba* L.	sPo
Willow	*Salix* spp.	W

APPENDIX B

CONIFEROUS HOSTS

Common Name	Scientific Name	Abbreviations
Cedar, eastern white	*Thuja occidentalis* L.	eC
Fir, balsam	*Abies balsamea* (L.) Mill.	bF
Larch	*Larix laricina* (Du Roi) K. Koch	tL
Pine, Austrian	*Pinus nigra* Arn.	aP
eastern white	*strobus* L.	wP
jack	*banksiana* Lamb.	jP
mugho	*mugo* Turra var. *mughus* Zenari	mP
red	*resinosa* Ait.	rP
Scots	*sylvestris* L.	scP
Spruce, black	*Picea mariana* (Mill.) B.S.P.	bS
Colorado	*pungens* Engelm.	colS
Norway	*abies* (L.) Karst.	nS
red	*rubens* Sarg.	rS
white	*glauca* (Moench) Voss	wS