

A R E V I E W O F I M P O R T A N T F O R E S T
I N S E C T A N D D I S E A S E P R O B L E M S
I N T H E B A N C R O F T D I S T R I C T
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FORESTRY CANADA
ONTARIO REGION
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FOREWORD

The first forest 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 given in the earliest reports are taken to the second decimal point [i.e. sq. mi. to km² = area (sq. mi.) x 2.59 = area (km²)]. 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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1974-1975	H.J. Weir and H.D. Lawrence
1976-1979	H.J. Weir and V. Jansons
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INTRODUCTION

This report is a review of significant forest insect and diseases that have occurred in the Bancroft District from 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 district, namely tolerant hardwoods (sugar maple, hemlock, yellow birch, red oak, beech) and white pine-red pine (white pine, red pine, jack pine, white spruce, balsam fir, poplar and white birch), as well as some ornamental and shade trees. The insects and diseases included are those that are capable of causing, or that have caused, tree mortality or a reduction in growth. Also included are abiotic problems that cause tree damage, such as salt, frost, winter drying and snow damage.

SUMMARY

FOREST INSECTS

Pine False Webworm, *Acantholyda erythrocephala* (L.) [Major]
pages

This insect causes severe defoliation of red and Scots pine trees in plantations. As a rule, the insect does not feed on the current year's foliage until the older foliage is devoured, so damage is usually limited to a reduction in growth. Severe infestations have persisted in red pine plantations in Burleigh Twp from 1972 until 1980. No infestations were reported prior to 1971.

Cedar Leafminers, *Argyresthia canadensis* Free., *A. thuiella* [Major]
(Pack.) and *Coleotechnites thujaella* (Kft.)
pages

These serious pests can cause tree mortality after a number of years of severe mining. High population levels that occurred between 1973 and 1977 have caused some mortality in the southern part of the district. Prior to 1973, the insect was reported causing light browning in 1966 in the northern part of the district.

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

This insect defoliates both white and yellow birch and widespread outbreaks usually last 3-4 years, then virtually disappear. Defoliation seldom causes mortality but weakened trees are hosts for secondary insects and diseases. This may be a predisposing factor in the deterioration of birch. Severe browning of foliage was recorded between 1959 and 1961, and in 1972. Defoliation caused by this insect was not reported prior to 1959.

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

[Major]

This insect is considered to be 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. The insect was not reported prior to 1968, but populations increased between 1969 and 1975, decreased in 1976, then increased between 1977 and 1980. Top and whole tree mortality of balsam fir was first reported in 1974 and has increased yearly; white spruce and other coniferous species have also begun to exhibit mortality.

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

[Major]

Defoliation by this leafminer 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. Severe browning of foliage has been recorded between 1958 and 1959; in 1963, 1966 and 1968; from 1971 to 1973; and in 1980. No defoliation was reported prior to 1958.

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

[Major]

Severe defoliation of hemlock by this destructive insect can cause mortality of mature trees in one season of attack when more than 50% defoliation occurs. Low populations have been recorded periodically between 1950 and 1968; severe defoliation, with some mortality, occurred in 1970; and the infestation collapsed completely in 1979.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.
pages

[Major]

This caterpillar is widely distributed throughout North America. Infestations usually last an average of five years and high population levels denude 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 tree susceptible to attack by other pests. Severe defoliation of deciduous trees has occurred from 1936 (or earlier) until 1938, between 1949 and 1954, from 1963 to 1966 and from 1974 to 1978.

Balsam Fir Sawfly, *Neodiprion abietis* complex
page

[Major]

Severe defoliation by this sawfly can cause mortality to balsam fir and white spruce trees when an infestation persists over several years. Severe defoliation was recorded between 1959 and 1962, and in 1967 and 1970; moderate defoliation occurred in 1977. There is no record of defoliation prior to 1955.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)
pages

[Major]

This destructive pest of pine plantations can cause mortality after several years of severe defoliation. The preferred hosts are Scots pine, red pine and jack pine in pure stands.

This perennial pest of red pine plantation trees was first reported in the Ottawa Valley in 1936 when the Insect Survey was first formed. Since then infestations of various degrees of intensity have been reported periodically in the district. Annual population trends are difficult to record because of the efforts of the government and of private plantation owners to control the insect by clipping of infested branches and by ground or aerial applications of insecticides and viruses.

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh.,
N. pratti paradoxicus Ross

[Major]

page

These closely related sawflies were considered to be one species prior to 1969. In 1969 the species were separated and most of the sawflies collected in the southern part of Ontario are now identified as *N. pratti paradoxicus*. Tree mortality can occur after prolonged periods of severe defoliation. High population levels were recorded between 1962 and 1968, with mortality observed in some stands. Low population levels have been reported periodically since 1954.

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

[Major]

This destructive pest has been categorized as a serious pest of young spruce plantations and open-growing ornamentals. High mortality can occur after successive years of severe defoliation. Although no large areas of mortality have been reported in the district, severe defoliation and single-tree mortality has occurred since 1937.

White Pine Weevil, *Pissodes strobi* (Peck)
page

[Major]

This weevil is considered the most destructive pest of white pine in North America. Successive weeviling over a period of years results in multiple-stemmed trees. High population levels have occurred periodically since 1953 and leader death has varied from a reported low of 8% to a high of 68% during the period covered by this report.

Larch Sawfly, *Pristophora erichsonii* (Htg.)
page

[Major]

The larch sawfly is the primary defoliating insect 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 follow three or more years of complete defoliation. Severe defoliation was recorded between 1958 and 1963, and low population levels have occurred periodically since 1950. This insect was not reported prior to 1950.

Other Noteworthy Insects

[Major and Minor]

These are insects with the potential for causing damage to stands, regeneration, and plantations.

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

This destructive pathogen of young pine trees in plantations was first reported in 1979.

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

[Major]

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.

Ink Spot of Aspen, *Ciborinia whetzellii* (Seaver) Seaver
page

[Major]

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 movement and even kill regeneration. Moderate levels of infection and damage occurred during the 1970s.

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

White pine blister rust is the most serious disease of eastern white pine. The disease causes top killing and whole-tree mortality in trees of all ages. Low incidence has been observed in numerous years since 1953.

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

Mortality caused by this disease is usually restricted to trees in the 7- to 13-cm diameter class, growing on poor sites, but branch and top mortality may occur in trees of greater diameter. Low incidence was recorded in the district from 1953 to 1980.

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

Reduced stocking of aspen regeneration occurs when the incidence of this disease is high. Trees more than five years old are seldom affected and, therefore, the disease is of little economic importance in natural stands. Various degrees of incidence occurred through the district from 1959 to 1980.

Other Noteworthy Diseases [Major]

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

ABIOTIC DAMAGE

pages

Abiotic damage is caused by a variety of influences such as frost, winter drying, salt, etc. Weakened trees are susceptible to a number of diseases.

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

Host(s): rP, scP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1971	not reported
1972	Severe defoliation occurred in red pine plantations in Burleigh Twp, where 100% of trees were infested.
1973-1974	Severe defoliation occurred in Burleigh Twp.
1975	Severe defoliation recurred in Burleigh Twp, where 64% of trees were infested.
1976-1977	Severe defoliation recurred in Burleigh Twp, where 87% of trees were infested.
1978	Severe defoliation recurred in Burleigh Twp, where 82% of trees were infested.
1979	Severe defoliation occurred in Burleigh and Wollaston twps, where 100% and 34% of trees were infested, respectively.
1980	Severe defoliation occurred in Wollaston and Burleigh twps, where 45% and 50% of trees were infested, respectively.

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

Host(s): eC

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1965	not reported
1966	Light foliar browning was reported in the northern half of Hasting County.
1967-1972	not reported
1973-1974	Severe foliar browning occurred in Burleigh Twp.

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1975	Severe foliar browning occurred in Burleigh, Methuen, Chandos and Wollaston twps.
1976-1977	Severe foliar browning occurred in Anstruther, Methuen, Chandos and Wollaston twps.
1978	Light defoliation was reported in Burleigh Twp.
1979	not reported
1980	Light foliar browning occurred in Burleigh Twp.

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Host(s): wB, yB

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	Severe browning of foliage occurred in the northern part of the district (see map, page 11).
1960	Increased population levels resulted in severe browning of foliage throughout the entire district (see map, page 12).
1961	Severe foliar browning occurred throughout the entire district (see map, page 13).
1962	Populations noticeably decreased in the district.
1963	A further decline in population levels occurred in the district.
1964-1971	not reported
1972	Severe browning of white birch foliage occurred in McClure and Wicklow twps (see map, page 14).
1973-1980	not reported

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

Host(s): wS, bF, eH, tL

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1967	not reported
1968	Light defoliation was reported in Faraday Twp.
1969	Severe defoliation occurred near McArthur's Mills in Mayo Twp (see map, page 17). Light defoliation was reported in McClure, Wicklow and Bangor twps.
1970	Severe defoliation of balsam fir and white spruce trees occurred in Wicklow, Monteagle, Carlow, Dungannon and Mayo twps (see map, page 18).
1971	Populations increased throughout most of the district (see map, page 19).
1972	Severe defoliation was observed in most townships in the district (see map, page 20).
1973	Severe defoliation persisted across 90% of the district (see map, page).
1974	Little change occurred in the infestation (see map, page 22). Mortality of balsam fir was reported in Wicklow, Monteagle and Carlow twps (see map, page 23).
1975	Severe defoliation persisted throughout the entire district (see map, page 24). Mortality increased in McClure, Wicklow, Monteagle and Carlow twps (see map, page 25).
1976	Populations generally decreased in the district, except in Bangor, Cardiff, Anstruther, Cashel and Limerick twps (see map, page 26). Mortality was common in recently defoliated areas (see map, page 27).
1977	An increase in levels of defoliation occurred throughout the central part of the district (see map, page 28). Mortality increased in the eastern part of the district (see map, page 29).
1978	Pockets of severe defoliation were reported at numerous locations (see map, page 30). High levels of mortality persisted (see map, page 31).

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1979	The extent of severe defoliation increased throughout the district (see map, page 32). Mortality remained high (see map, page 33).
1980	Defoliation levels decreased in the western part of the district (see map, page 34). Mortality remained high (see map, page 35).

Birch Leafminer, *Fenusa pusilla* (Lep.)

Host(s): wB [Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	Severe foliar browning occurred in Monteagle Twp.
1959	Severe foliar browning occurred in Monteagle, Wicklow, McClure, Bangor, Herschel and Carlow twps.
1960-1962	Low population levels were reported in Monteagle Twp.
1963	High population levels were reported in Faraday Twp.
1964-1965	not reported
1966	Extremely high population levels were reported in Cardiff Twp.
1967	not reported
1968	Severe foliar browning was reported in McClure, Wicklow and Carlow twps.
1969-1970	not reported
1971	Severe foliar browning occurred in Cashel, Methuen and Burleigh twps.
1972	Moderate foliar browning occurred in Cashel, Faraday and McClure twps.
1973	Severe foliar damage occurred near Bancroft, in Faraday Twp.
1974-1978	not reported
1979	Light foliar browning was common in the district.
1980	Moderate-to-severe foliar browning occurred in Faraday Twp.

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

Host(s): eH, eC, bF

[Major]

<u>Year</u>	<u>Remarks</u>
1950	Low population levels were reported in the district.
1951-1956	not reported
1957	Low population levels were reported in Chandos Twp.
1958	Trace populations were reported at two locations.
1959-1960	not reported
1961	Small numbers of larvae were reported in Bangor Twp.
1962-1967	not reported
1968	Small numbers of larvae were commonly found in the district.
1969-1977	not reported
1978	Pockets of severe defoliation occurred in approximately 161 ha of mature hemlock in Burleigh and Anstruther twps. Defoliation levels ranged from 5 to 95% and mortality was 18% in Burleigh Twp.
1979	A marked decrease in population levels occurred; only individual larvae were observed in Anstruther Twp. Mortality increased from 18% to 39% in Burleigh Twp. The number of adults found in the flying stage in Burleigh Twp declined.
1980	Very low population levels were observed in Anstruther Twp. No increase in mortality was recorded.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

Host(s): tA, sM, rO

<u>Year</u>	<u>Remarks</u>
1950	A small pocket of severe defoliation occurred in parts of Anstruther and Burleigh twps; light defoliation was observed in the southern two-thirds of the remainder of the district (see map, page 40).
1951	Severe defoliation occurred throughout the entire district (see map, page 41).
1952	Severe defoliation persisted in the townships in the central part of the district (see map, page 42).
1953	Moderate-to-severe defoliation persisted throughout most of the district (see map, page 43).
1954	Unfavorable weather during the hatching period resulted in a major reduction in populations. Residual populations caused pockets of severe defoliation in Limerick, Chandos and Methuen twps.
1955-1959	not reported
1960	Numerous larvae were found in Wicklow Twp.
1961	not reported
1962	Small numbers of larvae were reported in Wollaston Twp.
1963	Severe defoliation occurred in the northeastern part of Bangor Twp. Light defoliation occurred in Chandos Twp (see map, page 44).
1964	High population levels were reported in Wicklow and Bangor twps (see map, page 45).
1965	Severe defoliation occurred in Bangor Twp, and low population levels were reported in McClure, Monteagle and Bangor twps (see map, page 46).
1966	Late spring frosts resulted in mortality of young larvae and only light defoliation occurred in Bangor Twp (see map, page 47).
1967	A further decrease in population levels occurred in Bangor Twp (see map, page 48).

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1968-1973	not reported
1974	Pockets of severe defoliation were reported in Anstruther and Wollaston twps; light defoliation occurred in Cardiff, Cashel, Chandos and Methuen twps (see map, page 49).
1975	Pockets of severe defoliation occurred in the southwestern part of the district (see map, page 50).
1976	Infestations generally increased despite a premature egg hatch at numerous locations that followed unseasonably warm weather in mid-April (see map, page 51).
1977	Unusually hot and humid weather in late April and early May provided ideal hatching conditions; consequently, defoliation increased in the southern part of the district (see map, page 52).
1978	An almost complete collapse of the infestation occurred, caused by starvation of larvae and an increase in cocoon parasitism in 1977. A small pocket of moderate-to-severe defoliation persisted in Cardiff Twp (see map, page 53).
1979	Population levels remained very low in the district.
1980	not reported

Balsam Fir Sawfly, *Neodiprion abietis* complex

Host(s): bF, wS

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1954	not reported
1955-1958	Low population levels were reported in Faraday, Cardiff, Bangor, McClure, Dungannon and Wollaston twps.
1959-1962	Severe defoliation occurred in Bangor, McClure and Dungannon twps; light defoliation occurred in Faraday and Herschel twps.
1963	Low population levels were reported in Cardiff, Bangor, Dungannon, Faraday and Herschel twps.
1964	Low population levels were reported in Cardiff Twp.
1965-1966	not reported
1967	Pockets of severe damage occurred in Bangor Twp.
1968	not reported
1969	Low population levels were reported in Cardiff and Anstruther twps.
1970	Severe defoliation occurred in Herschel Twp.
1971-1976	Low population levels were reported in Chandos Twp.
1977	Moderate levels of damage were reported in Chandos and Wollaston twps.
1978-1980	not reported

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Host(s): rP, scP, jP, mP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1951	Low population levels were reported in the district.
1952	Severe defoliation occurred in a 4-ha plantation in Cashel Twp.
1953	Moderate levels of infestation were reported in Herschel, Monteagle and McClure twps. Defoliation was severe in Cardiff, Chandos and Burleigh twps.
1954	Severe defoliation occurred in Cardiff and Chandos twps, and light defoliation was observed in Methuen and Harcourt twps.
1955	Severe defoliation occurred near Coe Hill, in Wollaston Twp, as well as in Cardiff Twp. Low population levels were reported in Chandos Twp.
1956	Severe defoliation and some mortality were observed in Chandos and Faraday twps. Numerous colonies were reported in McClure and Wicklow twps.
1957	Severe defoliation occurred in Wicklow, Bangor and Carlow twps; light defoliation occurred in Chandos and Faraday twps; 30% mortality occurred in Faraday Twp.
1958	Severe defoliation occurred in Mayo, Chandos, Anstruther and Burleigh twps; light infestation was reported in Wicklow, Bangor and Faraday twps. Some mortality occurred in Faraday and Chandos twps.
1959	A decline in population levels occurred; light defoliation was reported in Wicklow Twp.
1960	not reported
1961	Low population levels were reported in Chandos and Limerick twps.
1962-1963	not reported
1964	Severe defoliation occurred in Limerick Twp.
1965	Severe defoliation occurred in Faraday and Cashel twps.
1966	Increased population levels resulted in moderate defoliation in McClure, Dungannon, Wollaston and Limerick twps; mortality occurred in Limerick Twp.
1967	Population levels increased in Herschel and Faraday twps; light defoliation occurred in Cardiff, Chandos and Methuen twps.
1968	Severe defoliation occurred in Faraday Twp; light defoliation occurred in Cardiff and Harcourt twps.

(cont'd)

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

<u>Year</u>	<u>Remarks</u>
1969	Population levels declined and only light defoliation (with some mortality) was reported in Faraday Twp.
1970-1972	not reported
1973	Only light defoliation occurred in Faraday Twp.
1974	Severe defoliation occurred in Faraday Twp, and light defoliation was reported in Chandos Twp.
1975-1976	not reported
1977	Moderate defoliation occurred in Dungannon Twp.
1978	Severe defoliation occurred in Anstruther, Chandos, Wollaston and Burleigh twps.
1979	Severe defoliation occurred in Wicklow and Herschel twps; light defoliation occurred in McClure and Dungannon twps.
1980	A general decrease in population levels has occurred in the Algonquin Region since 1977. Damage caused by this insect in Crown-owned, W.I.A. and private plantations prompted OMNR to request that the Forest Pest Management Institute in Sault Ste. Marie carry out an experimental aerial and ground spray program (using nuclear polyhedrosis virus) to combat this sawfly. In 1980 a control program was conducted in 96 plantations in six districts; 8 plantations received aerial applications of the virus, and 88 were sprayed from the ground. A total of 539.8 ha were treated, Spraying was performed when the majority of the larvae were in the second and third instars 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 assist in 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.

Jack Pine Sawflies, *Neodiprion pratti banksianae* Roh.,
N. pratti paradoxicus Ross

Host(s): jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954-1956	Low population levels were reported in Wicklow Twp.
1957-1961	not reported
1962-1963	Small pockets of severe defoliation occurred in Chandos, Wollaston, Burleigh and Monteagle twps.
1964	Severe defoliation (70 to 90%) occurred in Bangor Twp and light defoliation occurred in Chandos and Burleigh twps.
1965	Severe defoliation occurred in Bangor Twp and some mortality was reported.
1966	Severe defoliation occurred in Anstruther, Burleigh, Chandos, Methuen and Bangor twps. Mortality was reported in some stands.
1967	not reported
1968	Severe defoliation occurred in Chandos Twp.
1969	Light defoliation occurred in Chandos Twp.
1970-1974	not reported
1975-1976	Colonies were common in Chandos Twp.
1977-1979	not reported
1980	Moderate-to-severe defoliation occurred in Cardiff and Dungannon twps.

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

Host(s): wS, bS

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1959	not reported
1960	Small pockets of severe defoliation were reported in Limerick Twp. Low population levels were common in the district.
1961-1962	not reported
1963	Population levels increased and severe defoliation occurred in Dungannon and Mayo twps.
1964	Severe defoliation occurred in Faraday Twp.
1965-1966	not reported
1967	Severe defoliation occurred in a white spruce plantation in Chandos Twp.
1968	not reported
1969-1972	Severe defoliation occurred in spruce plantations in Anstruther and Dungannon twps. Moderate defoliation occurred in Herschel Twp.
1973	Severe damage occurred in spruce plantations in Methuen Twp.
1974-1978	Moderate defoliation occurred in Monteagle and Faraday twps.
1980	Moderate-to-severe defoliation was common throughout the district.

White Pine Weevil, *Pissodes strobi* (Peck)

Host(s): wP, rP, jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954	High population levels were reported in Cardiff and Anstruther twps.
1955-1963	Low population levels were common in the district.
1964	Severe damage occurred in Chandos Twp.
1965	Moderate damage occurred in Chandos Twp.
1966-1970	not reported
1971	Severe damage occurred in planted white pine in Faraday Twp (35% of trees were infested).
1972	Light-to-moderate damage occurred in Faraday (16% infested) and Mayo (7% infested) twps.
1973	Severe damage occurred to white pine in Carlow and Faraday twps.
1974	Severe damage occurred in Chandos, Faraday and Limerick twps (where 84, 85 and 55% of trees were infested, respectively).
1975	Severe damage recurred in Faraday and Limerick twps (where 76% and 52% of trees were infested, respectively).
1976	Severe damage recurred in Faraday and Limerick twps (where 65% and 56% of trees were infested, respectively.).
1977	Damage was severe in Faraday Twp (41% of trees were infested).
1978-1979	not reported
1980	Damage was severe in Faraday Twp (55% of trees were infested).

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Host(s): tL

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	Low population levels were common in the district.
1959	Severe defoliation occurred in Bangor Twp. Low population levels were common elsewhere.
1960	Severe defoliation occurred in Dungannon, Wicklow and Wollaston twps. Light defoliation occurred in Chandos and Methuen twps.
1961	Severe defoliation occurred in Faraday, Wollaston, Limerick and Cashel twps. Light defoliation occurred in Faraday, Dungannon, Mayo and Cashel twps.
1962	Small pockets of high populations occurred in the northern part of Hasting County.
1963	Small pockets of severe defoliation occurred in Chandos Twp.
1964-1966	not reported
1967-1968	Light infestation was reported in Chandos Twp.
1969	Moderate defoliation occurred in Chandos Twp.
1970-1972	Low population levels were reported in Dungannon Twp.
1973-1977	not reported
1978	Light defoliation occurred in Limerick, Herschel and Cardiff twps.
1979-1980	not reported

Other Noteworthy Insects

Birch Sawfly, *Arge pectoralis* (Leach)

Host(s): wB

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1955	not reported
1956-1957	A small infestation was reported in Monteagle Twp; it resulted in 30% defoliation.
1958-1960	Severe defoliation occurred on a few trees in Monteagle Twp.
1961-1980	not reported

Large Aspen Tortix, *Choristoneura conflictana* (Wlk.)

Host(s): tA

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1974	not reported
1975	Moderate-to-severe defoliation of aspen stands occurred in Faraday, McClure, Wicklow and Herschel twps.
1976	Light defoliation occurred in McClure Twp.
1977-1980	not reported

Larch Casebearer, *Coleophora laricella* (Hbn.)

Host(s): tL, European larch

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1954	not reported
1955	Low population levels were reported in Cardiff Twp.
1956	Low populations were reported in Cashel, Herschel, Carlow, Faraday and Wicklow twps.
1957	Moderate population levels were reported in Cardiff, Cashel, Wollaston, Carlow, Faraday and Wicklow twps.
1958-1966	Small populations were reported in Cashel, Cardiff, Faraday, Wollaston and Carlow twps.
1967	Population levels in Cardiff, Carlow, Cashel, Faraday and Wollaston twps decreased.
1968	Population levels were low in Cardiff, Burleigh, Carlow and Cashel twps.
1969	Population levels decreased in Cardiff, Carlow and Cashel twps.
1970-1979	not reported
1980	Moderate-to-severe defoliation occurred in Cardiff, Methuen and Monteagle twps (see map, page 63).

Map

Red Pine Needle Midge, *Contarinia* sp.

Host(s): rP

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1966	not reported
1967	Moderate-to-severe foliar damage occurred in Mayo, Herschel, Faraday and Raglan twps.
1968-1978	not reported
1979	Moderate-to-severe damage occurred in Monteagle and Dungannon twps.
1980	Moderate-to-severe damage occurred in Monteagle, Faraday, Mayo and Dungannon twps.

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

Host(s): rO

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1971	not reported
1972	Moderate-to-severe defoliation of a 25-ha stand was reported in Burleigh Twp.
1973	Severe defoliation recurred in the same stand in Burleigh Twp.
1974	Moderate-to-severe defoliation occurred at several points in Mayo, Methuen and Burleigh twps.
1975-1979	not reported
1980	Moderate-to-severe defoliation occurred in Anstruther and Cardiff twps.

Linden Looper, *Erannis tiliaria* (Harr.)

Host(s): [Major]

<u>Year</u>	<u>Remarks</u>
1950-1962	not reported
1963	Small pockets of severe defoliation were reported in Cardiff, Burleigh, Methuen, Bangor, Faraday and Wollaston twps.
1964-1980	not reported

Nursery Pine Sawfly, *Gilpinia frutetorum* (F.)

Host(s): scP, rP [Major]

<u>Year</u>	<u>Remarks</u>
1950-1966	not reported
1967	Low population levels were reported in Burleigh Twp.
1968-1980	not reported

Saddled Prominent, *Heterocampa guttivitta* (Wlk.)

Host(s): sM, rM [Major]

<u>Year</u>	<u>Remarks</u>
1950-1975	not reported
1976	Low population levels were reported in Carlow Twp.
1977-1980	not reported

Root Collar Weevil, *Hylobius* sp.

Host(s): rP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1975	not reported
1976	Light damage occurred in Burleigh Twp.
1977	Light damage occurred in Carlow Twp.
1978-1980	not reported

Poplar Flea Beetle, *Macrophaltica populi* Brown

Host(s): bPo

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1978	not reported
1979	Moderate-to-severe defoliation occurred in Cardiff Twp.
1980	Moderate-to-severe defoliation occurred in Cardiff and Faraday twps.

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Host(s): rP, jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1965	not reported
1966	Small numbers of sawflies were reported in Chandos Twp.
1967-1974	not reported
1975	Medium-to-high population levels were reported in Burleigh and Methuen twps.
1976-1978	not reported
1979	A few colonies were reported in Faraday Twp.
1980	not reported

European Pine Sawfly, *Neodiprion sertifer* (Geoff.)

Host(s): pine

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1976	not reported
1977	The first record of this pest in the district occurred when small numbers of sawflies were reported in Monteagle, Dungannon and Chandos twps.
1978-1979	not reported
1980	Trace population levels were reported in Monteagle and Dungannon twps.

Northern Pitch Twig Moth, *Petrova albicapitana* Bsk.

Host(s): jP, scP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1965	not reported
1966	Numerous larvae were reported in Burleigh Twp.
1967-1980	not reported

Early Aspen Leafcurler, *Pseudexentera oregonana* (Wlsm.)

Host(s): tA

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	Severe foliar damage occurred in Faraday and Dungannon twps.
1966-1980	not reported

Pine Tortoise Scale, *Toumeyella parvicornis* (Ckll.)

Host(s): jP, scP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1962	not reported
1963	Heavy damage occurred on a few trees in Burleigh Twp.
1964-1966	not reported
1967	Low population levels were reported in Burleigh Twp.
1968	Low population levels were reported in Methuen Twp.
1969-1973	not reported
1974	Moderate damage occurred in Methuen Twp.
1975	not reported
1976	Light damage occurred in Chandos Twp.
1977-1980	not reported

DISEASES

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

Host(s): rP, scP, jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1978	not reported
1979	Low levels of incidence were tentatively identified in Mayo Twp.
1980	Low levels of incidence were positively identified in Mayo Twp (see map, page 72).

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

Host(s): wE

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	Dutch elm disease was found for the first time in the district, in Hasting County.
1960-1965	Increased levels of incidence were reported in the district.
1966	An average of 10% of trees in the district were infected.
1967-1976	Incidence increased in the district.
1977	Mortality of elm increased in Wollaston (to 32%) and Faraday (to 54%) twps.
1978-1980	Decimation of white elm continued throughout the district.

Map

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

Host(s): tA

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	A few infected trees were reported in Dungannon Twp.
1960	not reported
1961	Severe infections occurred in Chandos, Faraday and Wicklow twps.
1962-1965	not reported
1966	Low levels of incidence were reported in Methuen Twp.
1967-1969	not reported
1970	Trace levels of infection were reported in McClure Twp.
1971	not reported
1972	Moderate damage occurred in Faraday Twp.
1973	not reported
1974	High levels of incidence (100% of trees were infected) were reported and foliar damage averaged 41% in Faraday Twp.
1975-1979	not reported
1980	Moderate levels of infection were reported in Dungannon Twp.

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

Host(s): wP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953-1954	Infected trees were reported in Cashel, Wicklow and Bangor twps.
1955-1965	not reported
1966-1972	Blister rust was common in the district.
1973	Moderate levels of incidence were reported in Carlow and Chandos twps, and 2.5% mortality was reported at each location.
1974	not reported
1975-1977	Light damage occurred in Faraday Twp.
1978-1980	not reported

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

Host(s): tA

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953	Numerous infected trees were found in McClure, Limerick, Burleigh and Anstruther twps.
1954	Infected trees were reported in Monteagle Twp.
1955	Cankers were common throughout the district, and 12% of trees were infected in Monteagle Twp.
1956-1959	Cankers were common in the district.
1960-1972	Cankers were common in the northern part of the district.
1973	High levels of mortality were reported in Herschel, Carlow and Cardiff twps, and resulted in 7.5%, 10% and 10% mortality, respectively.
1974-1980	Cankers were common in the district.

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

Host(s): tA

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1958	not reported
1959	Shoot blight was common on aspen reproduction in the district.
1960-1964	not reported
1965	Light levels of infection were common throughout the district.
1966	not reported
1967	Infection levels were light in Cardiff Twp (70% of trees were infected), but severe in McClure Twp.
1968-1972	not reported
1973	Low levels of infection occurred in Carlow Twp (50% of trees were infected).
1974-1980	not reported

Other Noteworthy Diseases

Eastern Dwarf Mistletoe, *Arceuthobium pusillum* Peck

Host(s): bS, wS

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1963	not reported
1964	Medium-to-high levels of infection were reported in Faraday and Chandos twps.
1965-1980	not reported

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

Host(s): coniferous

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1973	not reported
1974-1976	Root rot was common throughout the district.
1977-1978	not reported
1979	Root rot caused mortality of mature red pine trees near Jack's Lake, Burleigh Twp.
1980	Light mortality occurred at one point in Dungannon Twp.

Pullularia, *Aureobasidium pullulans* (de Bary) Arnaud

Host(s): jP, bS

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	Medium-to-high levels of incidence were reported on newly planted stock in Burleigh Twp.
1966	Small centers of infection were reported in Burleigh and Chandos twps.
1967-1970	not reported
1971	add 70% incidence in Cardiff Twp, low incidence in Cardiff Twp
1972-1980	not reported

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

Host(s): scP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1972	not reported
1973	Medium-to-high levels of infection were reported in Chandos Twp.
1974-1980	not reported

Spruce Needle Rust, *Chrysomyxa ledicola* Lagerh.

Host(s): bS

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1971	not reported
1972	Trace population levels were reported in Burleigh Twp.
1973-1980	not reported

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

Host(s): rP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1957	not reported
1958	Light levels of infection were reported in Chandos Twp.
1959-1970	not reported
1971-1973	High levels of incidence (100% of trees) were reported in Burleigh Twp. Mortality of 1% occurred in 1972.
1974-1975	not reported
1976	Low levels of incidence were reported in Burleigh Twp.
1977-1979	not reported
1980	Moderate levels of incidence were reported in Dungannon and Wicklow twps.

Sweetfern Blister Rust, *Cronartium comptoniae* Arthur

Host(s): jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1974	not reported
1975	Low levels of incidence were reported in Methuen Twp.
1976-1980	not reported

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

Host(s): jP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1970	not reported
1971	Low levels of incidence were reported in Methuen Twp.
1972-1980	not reported

Eutypella Canker, *Eutypella parasitica* Davidson & Lorenz

Host(s): sM

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1968	not reported
1969	Medium-to-high levels of incidence were reported in Cardiff Twp.
1970-1980	not reported

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

Host(s): rP

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1974	not reported
1975	Low levels of incidence were reported in Wicklow Twp.
1976	not reported
1977	Foliar damage reached 69% in Dungannon Twp and was 93% at one point in Herschel Twp.
1978	At one location in Herschel Twp, incidence was 89%.
1979	In one plantation in Herschel Twp, incidence was 82%.
1980	not reported

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

Host(s): Ironwood, sM

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1953	not reported
1954	This trunk rot damaged trees throughout Wollaston and Cardiff twps.
1955	Scattered collections of pathogen were made throughout the district.
1956-1980	not reported

Juniper Blight, *Phomopsis juniperovora* Hahn.

Host(s): rJ

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1972	not reported
1973	Low levels of incidence were reported in Cardiff Twp.
1974-1980	not reported

Leaf Spot, *Septoria populicola* Peck

Host(s): bPo

[Major]

<u>Year</u>	<u>Remarks</u>
1950-1964	not reported
1965	Severe foliar discoloration was reported in Anstruther Twp.
1966-1972	not reported
1973	Medium-to-high levels of incidence were reported in Cardiff Twp.
1974-1975	not reported
1976	Incidence levels of 25% were reported in Faraday Twp.
1977-1980	not reported

ABIOTIC DAMAGE

Drought

Host(s): all varieties

<u>Year</u>	<u>Remarks</u>
1950-1962	not reported
1963-1967	Drought damage occurred on 3-5 ft white and red pine in Methuen Twp; light mortality resulted.
1968-1976	not reported
1977	Drought caused moderate damage to largetooth aspen in Bangor Twp.
1978-1980	not reported

Frost

<u>Year</u>	<u>Remarks</u>
1950-1971	not reported
1972	Late spring frosts on 11 and 12 June caused severe damage to white spruce in Faraday and Herschel twps.
1973-1976	not reported
1977	Frost caused light damage to white spruce in the district.
1978-1979	not reported
1980	Severe damage was caused to white spruce by late spring frosts in early June in Faraday Twp (100% of trees were damaged).

Hail

<u>Year</u>	<u>Remarks</u>
1950-1967	not reported
1968	Hail damage occurred on deciduous trees in Cardiff Twp.
1969-1980	not reported

Salt

<u>Year</u>	<u>Remarks</u>
1950-1976	not reported
1977	Salt caused considerable browning of roadside plantings of white and red pine trees along Hwy 62 in Herschel (91%) and Wicklow (80%) twps.
1978	Salt caused severe foliar browning in McClure and Faraday twps.
1979	not reported
1980	Salt caused mortality of 10-12 ft red pine trees in roadside plantings along Hwy 62 in Faraday Twp.

Scorch

<u>Year</u>	<u>Remarks</u>
1950-1971	not reported
1972	Severe scorch damage was reported on red maple in Cardiff Twp.
1973-1980	not reported

Semi-mature Tissue Needle Blight (causal factor unknown)

Host(s): wP

[Minor]

<u>Year</u>	<u>Remarks</u>
1950-1952	not reported
1953	Severe foliar browning occurred in Faraday and Cashel twps.
1954-1969	not reported
1970	Severe foliar browning was reported in Methuen and Chandos twps.
1971-1974	not reported
1975	Light foliar browning occurred throughout the district.
1976-1980	not reported

Snow

<u>Year</u>	<u>Remarks</u>
1950-1970	not reported
1971	Abnormally heavy snowfall caused broken branches and leaders of red pine in Burleigh Twp.
1972-1980	not reported

Winter Drying

<u>Year</u>	<u>Remarks</u>
1950-1969	not reported
1970	Winter drying of mature red spruce was severe in McClure Twp.
1971	Winter drying of white pine occurred in exposed sites in Faraday Twp.
1972-1975	not reported
1976	Winter drying of red pine caused severe foliar damage in Herschel (73%), Mayo (53%) and Limerick (44%) twps.
1977-1980	not reported

APPENDICES

APPENDIX A

DECIDUOUS HOST

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

APPENDIX B

CONIFEROUS HOST

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