FOREST INSECT AND DISEASE SURVEYS IN THE EASTERN REGION OF ONTARIO, 1974

C. A. BARNES AND H. J. WEIR

GREAT LAKES FOREST RESEARCH CENTRE

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Director,
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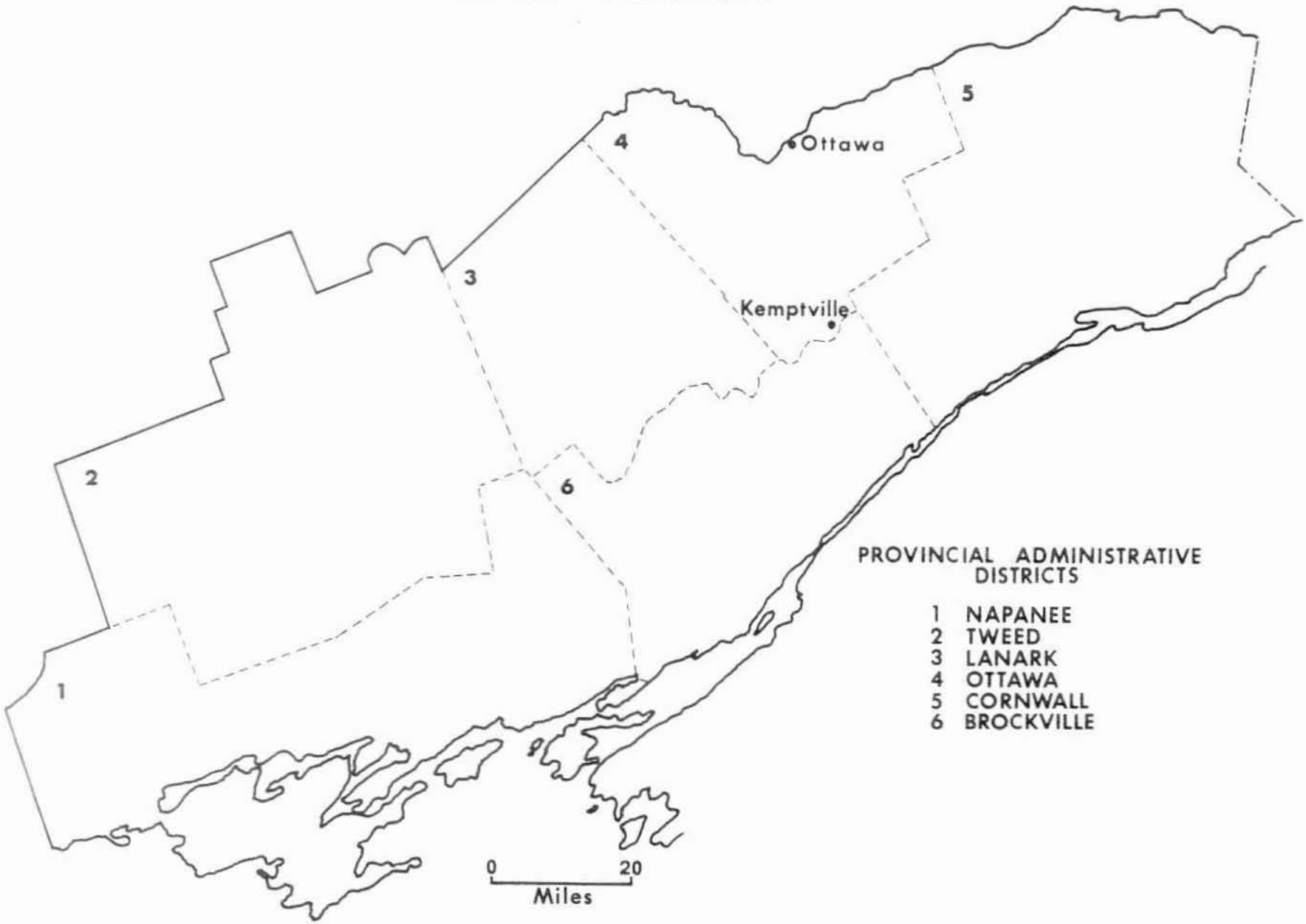
EASTERN REGION



SURVEY HIGHLIGHTS

The following report deals with the more important forest insects, tree diseases and abiotic conditions of the Eastern Region in 1974. The spruce budworm, which was again the most important forest pest, is described in Information Report O-X-228 which provides information on areas infested, population trends, tree mortality caused and forecasts for 1975. The oak leaftier, balsam fir sawfly, forest tent caterpillar and European pine sawfly all showed marked increases in population levels and severe defoliation of their respective hosts was quite extensive. Damage by cedar leafminers showed a marked reduction; however, previous infestations contributed to host mortality which is evident at numerous points.

Tip blight of juniper and cedar apple rust caused considerable damage to shoots and branches of red juniper at many points in Prince Edward County. White elm mortality caused by Dutch elm disease continues unabated. Wind damage caused moderate blowdown near the village of Tweed, and rodents were responsible for the dead trees in a Scots pine plantation near Kemptville.

C. A. Barnes
Technician
Eastern Region

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INSECTS

Elm Leaf Beetles, *Altica ulmi* Woods and *Pyrrhalta luteola* (Mull.)

Combined infestations of these two species of leaf beetle increased in intensity at several locations. Foliage damage exceeding 50% was noted on white elm (*Ulmus americana* L.) and Siberian elm (*Ulmus pumila* L.) near Kemptville in the Ottawa District and near MacDonalds Corners in the Lanark District. Pockets of light infestation were common at scattered locations elsewhere in the Region.

Cedar Leafminers, *Argyresthia aureoargentella* Brower, *A. freyella* Pack., *A. thuiella* Pack., and *Pulicalvaria thujaella* (Kft.)

Although localized populations of leafminers remained high, infestations did decline at many points throughout the Region. The outbreak virtually collapsed in the Cornwall District where numbers of miners were the lowest for many years. Moderate-to-heavy mining persisted in parts of Napanee and Brockville districts. Mortality of eastern white cedar (*Thuja occidentalis* L.) was recorded north of Belleville and at scattered locations in Prince Edward County. Light browning of foliage was noted at several locations in the Lanark and Tweed districts.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts have been included with those of other survey regions in a special information report by G. M. Howse et al. (O-X-228). This report provides a complete description and analysis of developments in the spruce budworm situation in Ontario in 1974 and gives infestation forecasts for the province in 1975.

Oak Leaftier, *Croesia semipurpurana* (Kft.)

The infestation reported in Darling and Pakenham townships in 1973 increased appreciably, and within an area of approximately 100 sq. miles (259.0 sq. km) red oak (*Quercus rubra* L.) was severely defoliated by late June (see Appendix, Fig. A1). Pockets of heavy defoliation recurred in Olden and Nepean townships and a new heavy infestation occurred just east of Perth in Drummond Township. Light-to-moderate defoliation was also noted from Denbigh Township east to the Ottawa River. For the past several years, a light trap has been operated near White Lake in Olden Township to monitor the adult flight of certain important forest pests. In 1974, between 1 and 29 July, over 1,100 adult moths of this species were collected, compared with 1,609 in 1973.

Eastern Pine Shoot Borer, *Eucosma gloriola* Heinr.

Increases in population levels of this shoot-boring insect on red pine (*Pinus resinosa* Ait.), Scots pine (*Pinus sylvestris* L.) and white pine (*Pinus strobus* L.) occur sporadically. Trees were moderately infested in a 20-acre (8.1-ha) red pine plantation located near Stittsville in the Capital Commission Greenbelt Forest. Many lateral and terminal shoots were damaged, causing many trees in this planting to take on a shaggy appearance. Trace levels of infestation were noted at widely separated locations.

Birch Leafminer, *Fenusa pusilla* (Lep.)

Severe browning of white birch (*Betula papyrifera* Marsh.) and wire birch (*Betula populifolia* Marsh.) foliage was evident at several locations (Table 1). Defoliation was severe along highways 2 and 401 near Cornwall and Lancaster in the Cornwall District. Moderate infestations were commonly observed on clumps of white birch near Sharbot Lake in Lanark District and at several points along Highway 62 in Tweed District.

Table 1. Summary of damage by birch leafminer on white birch and wire birch in three districts in 1974 (based on the examination of 100 leaves selected randomly from three trees at each location)

Location (Twp)	Host	Avg DBH (in.)[a]	Leaves mined 1974 (%)
Cornwall District			
Cornwall	wiB	3	71
Lancaster	wiB	3	100
Tweed District			
Tudor	wB	4	20
Ottawa District			
Oxford	wB	3	51

[a] 1 in. = 2.54 cm

Fall Webworm, *Hyphantria cunea* Dru.

For the second consecutive year, the number of webs and the amount of defoliation by this webworm increased considerably on a variety of deciduous hosts, especially in an area between Lake Ontario and Highway 7. The unsightly nests were particularly evident near Cornwall, Kemptville, Ottawa and along Highway 401 from the Quebec border west to Belleville. Scattered heavy infestation recurred in Huntley, Goulbourne, Nepean, Osgoode and Gloucester townships in the Ottawa District and near Lanark in Lanark District. Ornamental broad-leaved trees were severely defoliated in the cities of Kingston and Ottawa. Small clumps of white elm and black ash (*Fraxinus nigra* Marsh.) were moderately infested at other points.

Eastern Tent Caterpillar, *Malacosoma americanum* F.

This defoliator of roadside trees, which constructs silken tents in the spring, was present in infestation proportions. Pin cherry (*Prunus pensylvanica* L.f.), choke cherry (*P. virginiana* L.) and apple (*Malus* spp.) were heavily defoliated at many points. Among infestations the most notable observed were located in the Napanee, Brockville, Tweed and Lanark districts. Moderate infestations were common in the Cornwall and Ottawa districts. At one point near MacDonalds Corners in Lanark District, host trees were stripped of foliage and migrating larvae caused additional defoliation to adjacent hardwoods.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

The area infested increased from several acres in 1973 to over 30 sq. miles (77.7 sq. km) in 1974 (see Appendix, Fig. A2). The largest infestation occurred north of Kaladar in parts of Barrie, Anglesea, Kennebec and Kaladar townships, where defoliation of trembling aspen (*Populus tremuloides* Michx.) ranged from moderate to severe (see Frontispiece). Dissections of cocoons after moth emergence showed that parasitism by *Sarcophaga aldrichii* Park. was relatively low and that the proportion of cocoons giving rise to moths was high (Table 2). High egg counts indicate the continuance of the infestation in 1975 (Table 3). Many larvae were observed at scattered locations in the Lanark and Tweed districts. A total of 431 adult moths were captured in the light trap located in Olden Township compared with 344 in 1973, another indication of building populations.

Table 2. Results of forest tent caterpillar cocoon dissections at two locations in 1974 (100 cocoons dissected at each location)

Location (Twp)	Parasitized (%)	Diseased (%)	Showing adult emergence (%)
Tweed District			
Kaladar	37	5	58
Anglesea	28	9	63

Table 3. Summary of forest tent caterpillar egg-band counts and infestation forecasts

Location (Twp)	Avg DBH of sample trees (in.)[a]	No. of trees examined	Avg no. of egg bands per tree	Infestation forecast for 1975
Tweed District				
Kaladar	5	1	52	heavy
Anglesea	5	1	31	heavy

[a] 1 in. = 2.54 cm

Balsam Fir Sawfly, *Neodiprion abietis* complex

A further increase in defoliation by this insect was evident in 1974. Moderate-to-severe infestations were observed in balsam fir (*Abies balsamea* [L.] Mill.) and white spruce (*Picea glauca* [Moench] Voss) stands at many points in the Ottawa and Lanark districts. The heaviest infestations were noted in Pakenham, Fitzroy, Darling and Lanark townships (see Appendix, Fig. A3). Feeding by this insect on old needles, coupled with feeding on the new shoots by spruce budworm, caused up to 80% loss of foliage on some trees.

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Although infestations appear to be on the increase, spraying operations using either a virus (1 g virus to 5 gal [22.73 liters] of water) or pesticides (Malathion, Sevin, Methoxychlor, etc.) carried out by Ontario Ministry of Natural Resources personnel and by private land

owners, have kept some infestations under control. Moderate-to-heavy infestations recurred in plantations in Beckwith, Osgoode, Olden, Oxford and Kingston townships and on roadside Scots pine in Oso Township. Scattered colonies of sawfly larvae were observed at many other points.

Red Pine Sawfly, *Neodiprion nanulus nanulus* Schedl.

Numerous colonies were observed on hedgerows and plantation red pine trees at scattered points in the Lanark County Forest, but the heaviest infestations were located along County Road 12 west of the village of Lanark, where defoliation was in excess of 25%. Light-to-moderate infestations were observed at scattered locations in Darling, Dalhousie and Lanark townships. Counts based on the examination of 100 trees at each of two locations are summarized in Table 4.

Table 4. Summary of red pine sawfly colony counts in 1974 (based on the examination of 100 red pine trees at each location)

Location (Twp)	Avg DBH (in.)[a]	No. of colonies
Lanark District		
Dalhousie	2	73
Darling	1	81

[a] 1 in. = 2.54 cm

Jack Pine Sawfly, *Neodiprion pratti paradoxicus* Ross

For the second consecutive year, populations of this sawfly remained high in jack pine (*Pinus banksiana* Lamb.) plantations. In a plantation managed by South Nation Conservation Authority near Monckland, over 230 colonies were counted on 100 sample trees and damage to 1973 foliage on some trees exceeded 75%. Smaller heavy infestations occurred near Belleville and at scattered locations within the Lanark County Forest. Light infestations were common near the village of Merrickville and on occasional trees through the Capital Commission Greenbelt Forest.

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

A sharp increase in population levels was recorded in a 500-acre (202.5-ha) tract of Scots pine and red pine near Sandbanks and Outlet provincial parks in Prince Edward County (Table 5) and defoliation was severe (Fig. 1 and 2). Light and moderate infestations were common at

Figure 1. Defoliation of a Scots pine tree by the European pine sawfly

Figure 2. A colony of European pine sawfly feeding on Scots pine foliage

many points within the Capital Commission Greenbelt Forest. Here sprays applied by backpack sprayers using 1 g of virus to 5 gal (22.73 liters) of water provided good foliage protection. Larval colonies were again observed on ornamentals in the city of Ottawa and on roadside Scots pine in Sheffield Township, Tweed District.

Table 5. Summary of European pine sawfly colony counts in two districts in 1974 (based on the examination of 100 trees at each location)

Location (Twp)	Host	Avg height (ft)[a]	Trees infested	Avg no. of colonies per infested tree
Napanee District				
Hallowell	rP	6	100	2.4
Athol	ScP	15	100	8.6
Tweed District				
Sheffield	ScP	20	17	1.0

[a] 1 ft = 0.30 m

Larch Sawfly, *Pristiphora erichsonii* (Htg.)

Damage levels increased considerably over 1973. Severe defoliation of European larch (*Larix decidua* Mill.) and eastern larch (*Larix laricina* [Du Roi] K. Koch.) was noted at many points in the Stormont, Dundas and Glengarry forests. Moderate infestations were noted along Highway 62, north of Madoc and on occasional trees near Sharbot Lake. Light infestations were common at widely scattered locations.

Satin Moth, *Stilpnotia salicis* Linn.

As in 1973 severe defoliation of hedgerows and occasional silver poplar (*Populus alba* L.) was common in Cornwall and Lancaster townships. The heaviest infestation occurred on roadside trees along Highway 2 east of the village of Lancaster, where some trees were completely defoliated and larval migration occurred. Light infestations recurred in the northern part of Lancaster Township.

Table 6. Other forest insects

Insect	Host(s)	Remarks
Acrobasis rubrifasciella Pack.	Al	heavy infestations on roadside trees near Bourget
Adelges lariciatus (Patch)	wS	needle galls common on occasional trees near Fitzroy Provincial Park
Altica ambiens alni Harr.	Al	moderate defoliation on shoreline trees near Rideau Provincial Park
Altica populi Brown	tA	light-to-moderate defoliation of scattered trees near Sharbot Lake
Aphrophora parallela Say	eH ScP	moderate-to-heavy infestations on eastern hemlock near Spencerville and on Scots pine near Carleton Place
Archips cerasivoranus (Fitch)	cCh	heavy infestations common on cherry in open fields and along roadsides in Lanark District
Argyresthia laricella Kft.	tL	light damage at one location in Limerick Forest
Bucculatrix ainsliella Murt.	wO	This skeletonizer caused moderate damage to occasional trees on Howe Island and near Gananoque.
Cenopis pettitana Rob.	Ba	light infestations near MacDonalds Corners
Coleophora betulivora McD.	wB	small numbers of casebearers near Elphin
Datana integerrima G. & R.	bWa	heavy infestations on roadside hedgerow trees near Smiths Falls; branch and top-killing common on these trees
Erannis tiliaria Harr.	Ba	small numbers of larvae at several locations

(continued)

Table 6. Other forest insects (concluded)

Insect	Host(s)	Remarks
Eriocampa ovata Linn.	Al	roadside alder moderately defoliated at several locations within the LaRose Forest
Exoteleia dodecella Linn.	rP	light damage to buds at one location in Greenbelt Forest
Mindarus abietinus Koch.	bF	common at many points in the region
Ocnerostoma strobivorum Free.	wP	small trees lightly infested near Sharbot Lake
Petrova albicapitana (Busck.)	jP	heavy infestations caused branch and twig mortality on several trees at Presqu'ile Provincial Park
Phratora purpurea purpurea Brown	tA	understory trees heavily infested near White Lake and Rideau Provincial Park
Pissodes approximatus Hopk.	rP	winter-damaged trees heavily infested by this weevil in one compartment at the Kemptville nursery
Plagiodera versicolora Laich	W	moderate infestations on roadside trees near Kemptville and Bourget
Pleroneura brunneicornis Roh. (= *borealis* Felt)	bF	buds heavily infested at one location near the village of Northbrook
Pseudexentera oregonana Wlshm.	tA	leaf rollers common at many points in Olden Township
Pulicalvaria piceaella (Kft.)	wS	collected at scattered points; most notable infestations near Merrickville and Kaladar
Rhabdophaga swainei Felt	wS	common in buds of hedgerow trees at Kemptville nursery
Trisetacus alborum Keifer	wP	moderate twig mortality at many points; heaviest infestation noted near Cloyne in Barrie Township

TREE DISEASES

Top-killing and Branch Mortality of Hard Pines, *Cenangium ferruginosum* Fr. ex Fr.

Damage to pines similar to that reported in 1973 was noted at scattered locations but at much-reduced damage levels. Infected Scots pine, red pine and Austrian pine (*Pinus nigra* Arnold) exhibited branch and stem damage at many locations. The most common occurrence was noted along the Spruce Road in the LaRose Forest, where regeneration Scots pine was lightly to moderately damaged. Trees were affected in plantation red pine in the Limerick Forest and on roadside Austrian pine along Highway 16, near Spencerville. *Cenangium ferruginosum* was the only pathogen isolated in culture.

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

In 1974, as in 1973, there was a marked increase in infection, incidence and tree mortality in the Region (Table 7). High levels of infection with heavy killing of roadside trees were quite evident in impact plots located in Hungerford Township, Tweed District, in Camden, Tyendinaga and Sophiasburgh townships, Napanee District, near the town park in Smiths Falls and in Osgoode Township, Ottawa District. Surveys to determine the mortality rate of elm in 11 impact plots will be continued in 1975.

Table 7. Summary of current mortality caused by Dutch elm disease in 11 plots in the Eastern Region in 1973 and 1974

Location (Twp)	No. of living trees 1973	Annual rate of mortality 1973-1974 (%)
Cornwall District		
Lancaster	37	5
Lanark District		
Lanark	31	17
North Sherbrooke	28	20
Town of Smiths Falls	19	32
Napanee District		
Camden	25	27
Rawdon	27	10
Sophiasburgh	19	24
Town of Campbellford	26	10
Tyendinaga	27	25

(continued)

Table 7. Summary of current mortality caused by Dutch elm disease in 11 plots in the Eastern Region in 1973 and 1974 (concluded)

Location (Twp)	No. of living trees 1973	Annual rate of mortality 1973-1974 (%)
Ottawa District		
Osgoode	23	23
Tweed District		
Hungerford	19	45

A Needle Rust of Pine, *Coleosporium asterum* (Diet.) Syd.

There was little change in the incidence of this needle rust of hard pines in the Region in 1974. Light defoliation levels were observed in red pine plantations at many points in the Lanark County Forest and at one location in Edwardsburgh Township (Table 8). Trace levels of infection were noted in Fitzroy Township and at scattered locations within the Greenbelt Forest.

Table 8. Summary of *Coleosporium asterum* affecting red pine in 1974 (based on the detailed examination of 40 trees at each location)

Location (Twp)	Avg height of trees (ft)[a]	Incidence	Level of infection
Lanark District			
Lanark	10	100	light
Lanark	12	80	light
Brockville District			
Edwardsburgh	8	20	light
Ottawa District			
Fitzroy	15	0	nil[b]

[a] 1 ft = 0.30 m

[b] Infection found on other than sample trees

Cytospora Canker of Poplar, *Cytospora* sp.

A moderate-to-high level of tip-killing of the leading shoots of hybrid poplar occurred at two locations. Damage was most pronounced in a plantation managed by the Ontario Ministry of Natural Resources in the Brockville District, where 60% of the trees were infected. Light-to-moderate damage was observed in a small planting located within the Stormont, Dundas and Glengarry forests in the Cornwall District (Fig. 3).

Figure 3. Cytospora canker disease on hybrid poplar

Dothichiza Canker of Poplar, *Dothichiza populea* Sacc. & Briard

High levels of infection were widespread on hedgerows and ornamental Lombardy poplar (*Populus nigra* var. *italica* Muenchh.). Although some tree mortality was observed, the more usual symptom was severe crown dieback which gave the trees a distinctly ragged appearance. Generally the disease is considered to be more of a problem when the growing season is preceded by a cool wet spring, as was the case in 1974.

Cedar Apple Rust, *Gymnosporangium juniperi-virginianum* Schw.

This rust causes twig galls on branches of red cedar (*Juniperus virginiana* L.). Infection levels increased appreciably at many points in Prince Edward County and along Highway 33 west of Kingston. Although no tree mortality occurred, many branches have been killed by repeated attacks. Since the first two stages of this rust occur on apple (*Malus* spp.), the many orchards located in the infected area and the abundance of red cedar combine to create ideal conditions for high infection levels of this organism. The impact of this rust on red cedar is being measured.

Hypoxylon Canker of Poplar, *Hypoxylon mammatum* (Wahl.) Miller

This pathogen causes stem and branch cankers of trembling aspen (Fig. 4). Surveys carried out in 1974 established that infection levels are generally high. Moderate-to-severe damage occurred on roadside trembling aspen trees along Highway 43 east of Kemptville and at many points within the Cornwall District. Lighter damage was noted along Highway 41, north of Kaladar, in Tweed District.

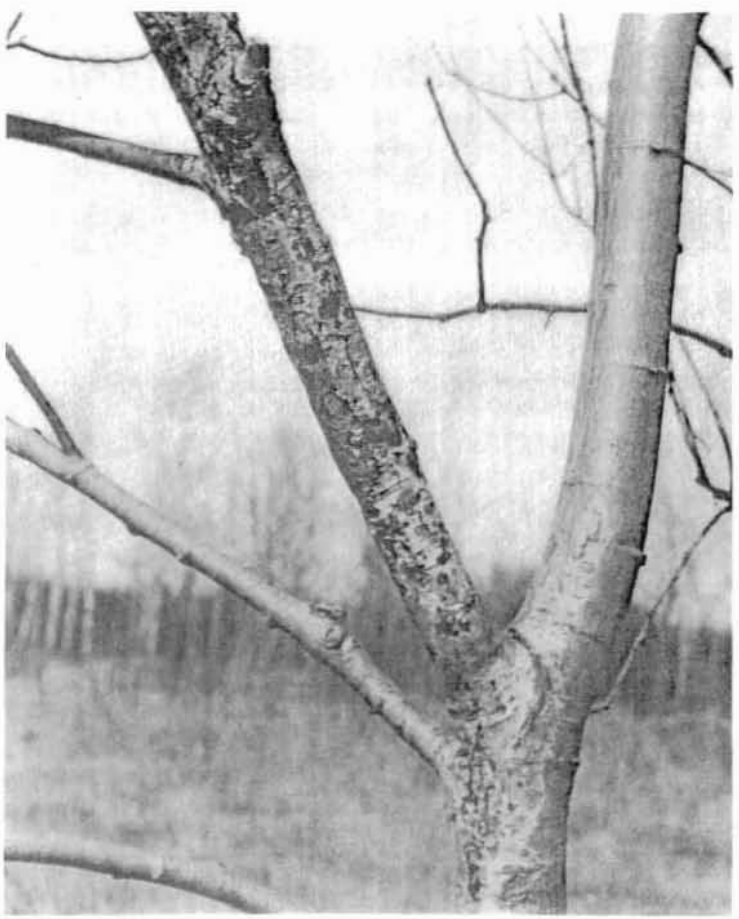

Figure 4. A trembling aspen tree damaged by *Hypoxylon mammatum*

A Tip Blight of Juniper, *Phomopsis juniperovora* Hahn.

In 1973 it was reported that this disease was responsible for causing severe browning and mortality of eastern red cedar at many points in Prince Edward County. Work done in 1974 reveals that other pathogens may be involved. The most severe damage occurs near the Picton airport, where flagging is severe and tree mortality quite extensive. Moderate damage occurred along Highway 49 in Sophiasburgh Township and at scattered points in South and North Marysburgh townships. At many other locations the presence of *P. juniperovora* could not be confirmed in 1974. Surveys will continue in 1975. Other diseases collected on red juniper were: *Cytospora* sp., *Gymnosporangium clavipes* (Cke. & Pk.) Cke. & Pk., *G. juniperi-virginianum* Schw., and *Valsa cenesia* d N. (first herbarium record).

Rodent Damage

Girdling of trees near ground level by the feeding of mice was the cause of tree mortality at many points in the Region. The most severe instance of damage occurred in a Christmas tree plantation near Oxford Mills, Brockville District. Many Scots pine and white spruce were killed on this property, causing considerable financial loss to the property owner. Occasional tree mortality resulting from rodent damage was also observed on pin cherry and choke cherry at scattered locations in the Cornwall, Lanark and Ottawa districts.

Nursery Diseases

The Kemptville Provincial Nursery is inspected several times each field season for evidence of pathogenic problems. In 1974 the inspections were done in conjunction with Dr. C. E. Dorworth, Forest Pathologist, Great Lakes Forest Research Centre. The results of the surveys carried out in the Kemptville Nursery are found in Table 9.

Table 9. Summary of diseases found in the Kemptville Nursery in 1974

Condition or disease	Host(s)	Remarks
Cenangium ferruginosum Fr. ex Fr.	rP	from bed 18, occasional top-dying, less than 1% infection
Cytospora sp.	rP	small numbers of stems infected, less than 1%
Lophodermium pinastri (Schrad. ex Fr.)	rP	bed 18, extremely low level, not a problem at present

(continued)

Table 9. Summary of diseases found in the Kemptville Nursery in 1974 (concluded)

Condition or disease	Host(s)	Remarks
Winter drying	rP	many dead trees in one compartment of rising 3-0 stock; secondary problem of northern pine weevil infesting dead or dying trees

Table 10. Other forest diseases

Organism	Host(s)	Remarks
Cenangium abietis (Pers.) Rehm	rP	cankers common on branches of this host in the Limerick Forest
Chrysomyxa ledi (Alb. & Schw.) d By.	wS	light infection of needle rust at Fitzroy Provincial Park
Gloeosporium quercinum West.	rO	Anthracnose common at many points in Beckwith Township
Melampsora abietis canadensis (Farl.) Ludw.	eH	rust infection of cones not common in the Region
Microstroma juglandis (Berang.) Sacc. (*M. brachysporium*)	bWa	moderate infection of this leaf spot on hedgerow trees in Montague Township
Pollacia radiosa (Lib.) Bald. & Cif.	tA	common throughout the Region
Taphrina caerulescens (Mont. & Desm.) Tul.	wO	This leaf blister fungus caused light damage to foliage near Carleton Place.
Torula sp.	rM	leaf and twig blight common on roadside trees near Lanark
Valsa cenesia d N.	rC	first herbarium record

APPENDIX

EASTERN REGION

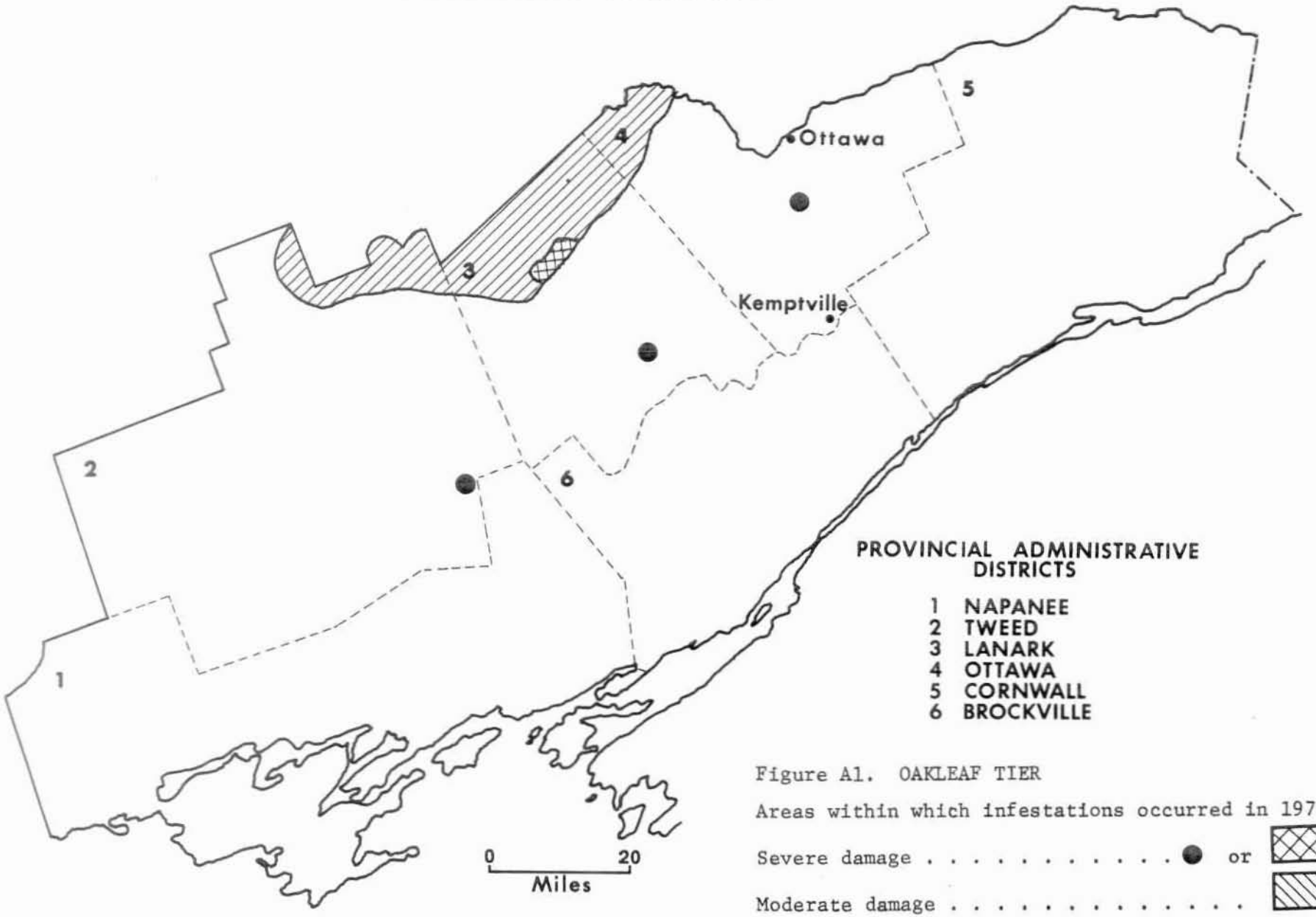

Figure A1. OAKLEAF TIER

Areas within which infestations occurred in 1974

Severe damage . . . . . ● or

Moderate damage . . . . . .

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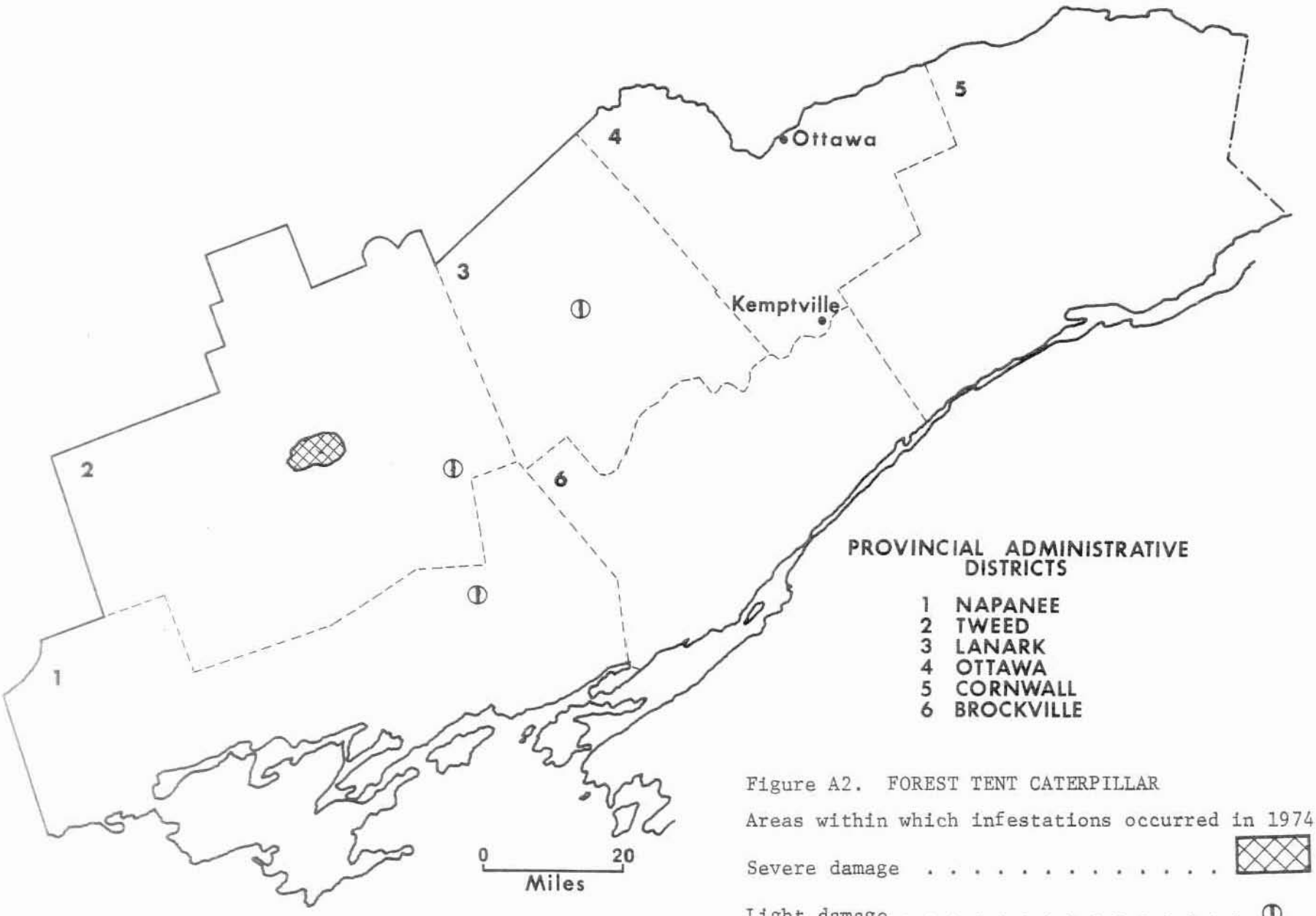

Figure A2. FOREST TENT CATERPILLAR

Areas within which infestations occurred in 1974

Severe damage . . . . . ▨

Light damage . . . . . ①

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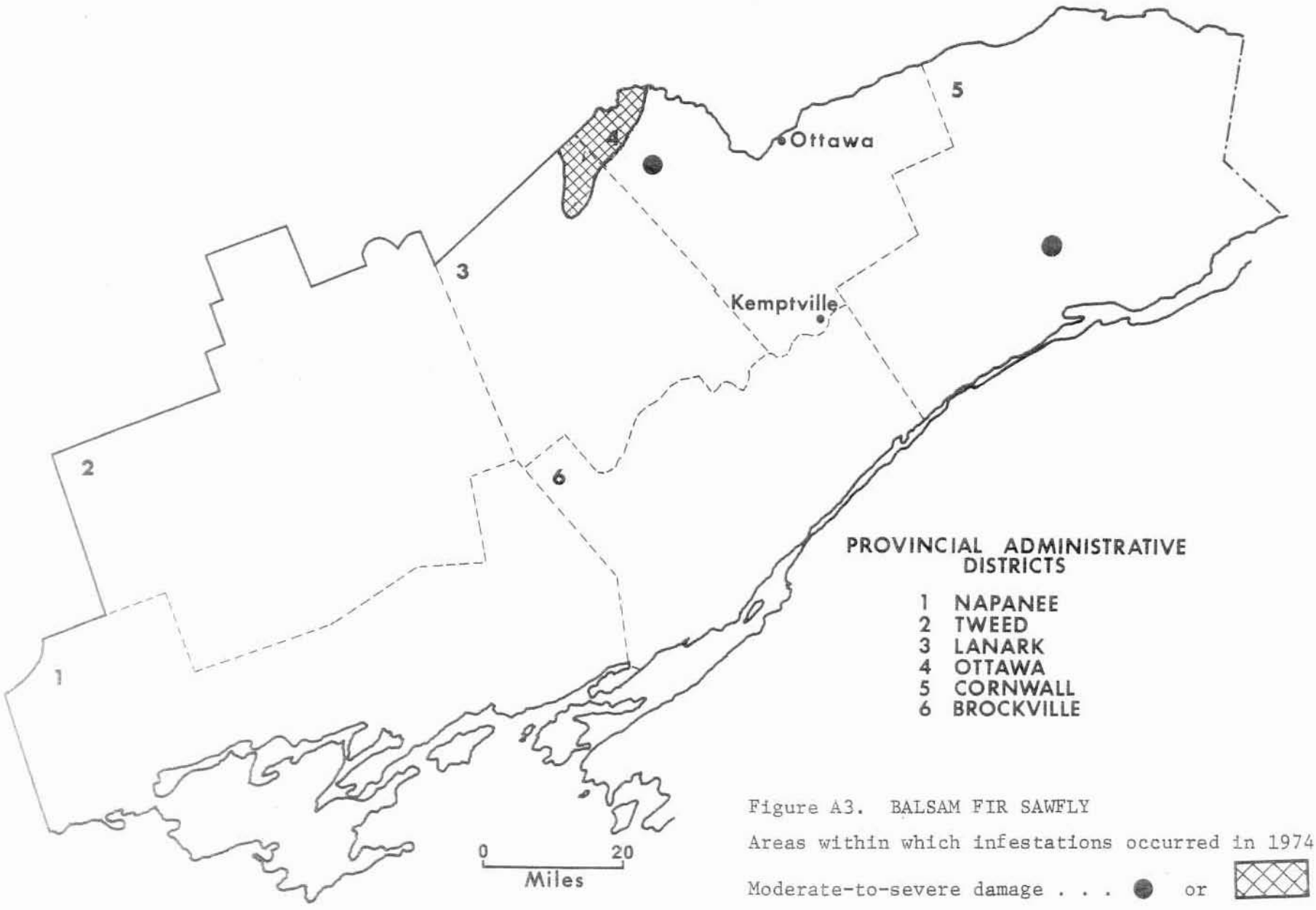

Figure A3. BALSAM FIR SAWFLY

Areas within which infestations occurred in 1974

Moderate-to-severe damage . . . ● or ▨