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**GREAT LAKES FOREST RESEARCH CENTRE
CENTRE DE RECHERCHE FORESTIÈRE DES GRANDS LACS**

Results of forest insect and disease surveys in the EASTERN REGION of Ontario, 1982

CARRIED OUT BY THE GREAT LAKES FOREST
RESEARCH CENTRE IN COOPERATION WITH
THE ONTARIO MINISTRY OF NATURAL RESOURCES



Canada

SURVEY HIGHLIGHTS

The following text deals with the more important insect and disease conditions encountered in the Eastern Region in 1982.

Gypsy moth populations and distribution continued to increase, causing varying degrees of hardwood defoliation, in both the eastern and western portion of the Region. The largest area affected, consisting of 269 ha of severe and 3,341 ha of moderate defoliation, occurred in the Kaladar area of the Tweed District. Spruce budworm populations remained very low, whereas the redheaded pine sawfly increased in numbers throughout the western half of the Region. Severe browning of oaks caused by the solitary oak leafminer occurred at numerous points, and the yellow-necked caterpillar and fall webworm caused defoliation of hardwoods at widely scattered points.

The annual comprehensive aerial and ground surveys for detection of Scleroderris canker were conducted across the Region, and once again produced negative results. The maple decline problem did not recur this season. Leaf rusts and spots caused heavy defoliation again to the hybrid poplars and butternut.

Special surveys were conducted to determine the incidence of Dutch elm disease and the population levels and distribution of the disease's two insect vectors. A red pine plantation survey was completed to identify both insects and diseases with an impact on growth, and a collection of cones was made to determine the insects causing seed damage and to estimate seed loss.

The same format was followed in categorizing pests as in the 1981 Eastern Region report.

Major Insects or Diseases

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

Minor Insects or Diseases

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

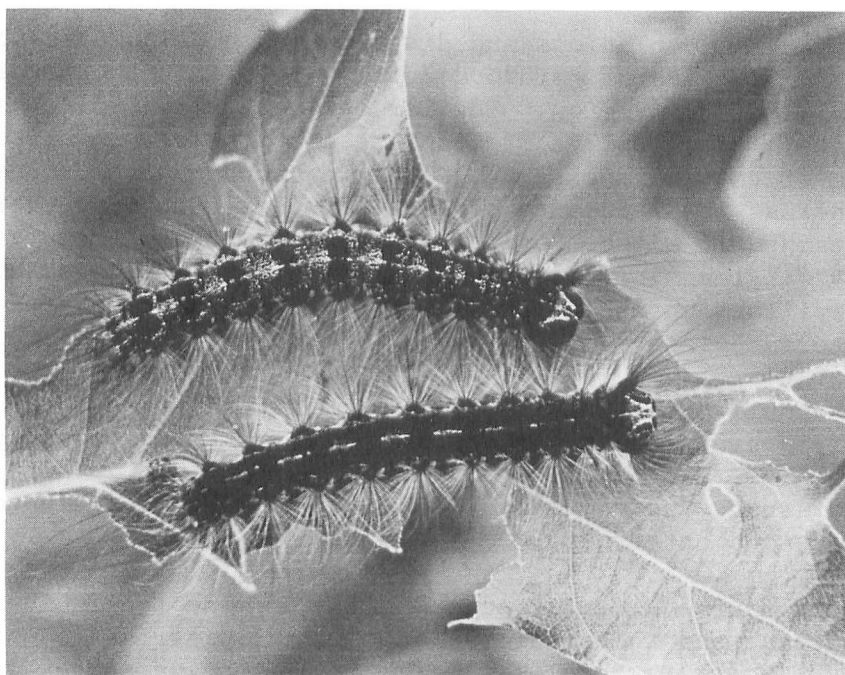
Other Forest Insects/Diseases (Tables)

These tables provide information on two types of pest: 1) those which are of minor importance and have not been shown to cause serious damage to forest trees, and 2) those which are capable of causing serious damage but, because of low populations or for other reasons, did not cause serious damage in 1982.

The author would like to express his appreciation to personnel of the Ontario Ministry of Natural Resources (OMNR) and Parks Canada for their excellent cooperation during the 1982 field season.

R. J. Sajan

Frontispiece



Mature gypsy moth, *Lymantria dispar* L., larvae



Typical cluster of gypsy moth egg masses at the base of an oak (*Quercus* spp.) tree

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INSECTS

Major Insects

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

A special survey conducted in mid-May in red pine (*Pinus resinosa* Ait.) plantations in Marlborough Township, Carleton Place District, and in Scots pine (*Pinus sylvestris* L.) plantations in South Gower Township, Brockville District, revealed high numbers of adults. However, inspections made in these areas later in May and June produced very low numbers of larvae, and occasionally unhatched eggs could be found across the plantations. Therefore, it was concluded that, as was the case in 1981, population levels of this webworm declined in the Region.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

The results of damage surveys, population sampling, and egg-mass counts will be included with those of other regions in a special report to be published later this year. That report will provide a complete description and analysis of developments in the spruce budworm situation in Ontario in 1982 and will give infestation forecasts for the province for 1983.

Fall Webworm, *Hyphantria cunea* Dru.

Fringe and open-grown trees, especially ash (*Fraxinus* sp.) and white elm (*Ulmus americana* L.), were found completely denuded of foliage in many areas in the Region, as a result of the high population levels of this webworm. Several large, conspicuous tents were frequently observed on individual trees.

The heaviest defoliation was encountered throughout Charlottenburgh Township, Cornwall District, Fitzroy and Huntley townships, Carleton Place District, and Tyendinaga Township, Napanee District.

Elsewhere in the Region, light-to-moderate defoliation was detected at numerous scattered points on fringe and ornamental trees.

Gypsy Moth, *Lymantria dispar* (L.)

There was a marked increase in population levels and distribution of this introduced forest pest (see Frontispiece and Fig. 1a) in the eastern and western portions of the Region. Aerial surveys conducted in the western half of the Region revealed that, in the Kaladar area of Tweed District, where 1000 ha of mixed hardwoods were severely defoliated in 1981, approximately 3610 ha were defoliated this season. However, only 269 ha, consisting of six small pockets, were considered to be

severely defoliated, with the remaining 3341 ha being moderately defoliated. Throughout these areas, oaks (*Quercus* spp.) were the preferred host.

In addition, 130 ha were found to be moderately defoliated south of Fifth Depot Lake in Hinchinbrooke Township, Tweed District. In Napanee District, 1000 ha of similar defoliation were detected in the north-central portion of Frontenac Provincial Park, and 2 ha were detected in the Pitts Ferry area. Light-to-moderate levels of defoliation were observed across the eastern portion of Wolfe Island.

Ground checks revealed approximately 7 ha of severe defoliation in a stand of trembling aspen (*Populus tremuloides* Michx.) along Highway 417 in Caledonia Township and moderate defoliation in a 10-ha trembling aspen woodlot in Lochiel Township, Cornwall District. West of the town of Napanee, in Richmond Township, Napanee District, a 5-ha mixed deciduous woodlot was moderately defoliated. In this particular stand, numerous larvae were observed hanging dead on the stems of the trees in an inverted "V", killed by a nuclear polyhedral virus. Throughout the eastern portion of the city of Belleville, light-to-moderate defoliation occurred on ornamentals and shade trees.

Larval trapping, consisting of a strip of burlap tied to the bole of deciduous trees, was conducted at five locations across the central portion of the Region (Fig. 1b). Moderate numbers were recovered in the Frontenac Provincial Park trapping area, and trace numbers were recovered in both Sharbot Lake and Bon Echo provincial parks. The remaining two locations in Lavant Township, Carleton Place District, were negative. However, adult pheromone traps set out at these two locations produced 10 to 12 male adults per trap.

In cooperation with the gypsy moth program at the Great Lakes Forest Research Centre, an imported gypsy moth egg parasite, *Anastatus disparis* Ruschka., was released at three locations within the Region (Fig. 1b). Approximately 3900 females and 3000 males were released in the Kaladar area, and 450 females and 200 males in the St. Isidore de Prescott area of the Cornwall District. These areas are to be closely monitored to determine if a resident population can develop and become established in Ontario.

In the spring of 1982, trials were conducted jointly by the Canadian Forestry Service (CFS) and OMNR in the infested area near Kaladar, Tweed District. In late May and early June, 263 ha were aerially sprayed by the CFS with *Bacillus thuringiensis* (B.t.) and 63 ha with the virus Gypchek. OMNR treated 90 ha with the insecticide Sevin-4-oil. Results of these treatments will be published under a separate title at a later date.

EASTERN REGION

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Kilometres

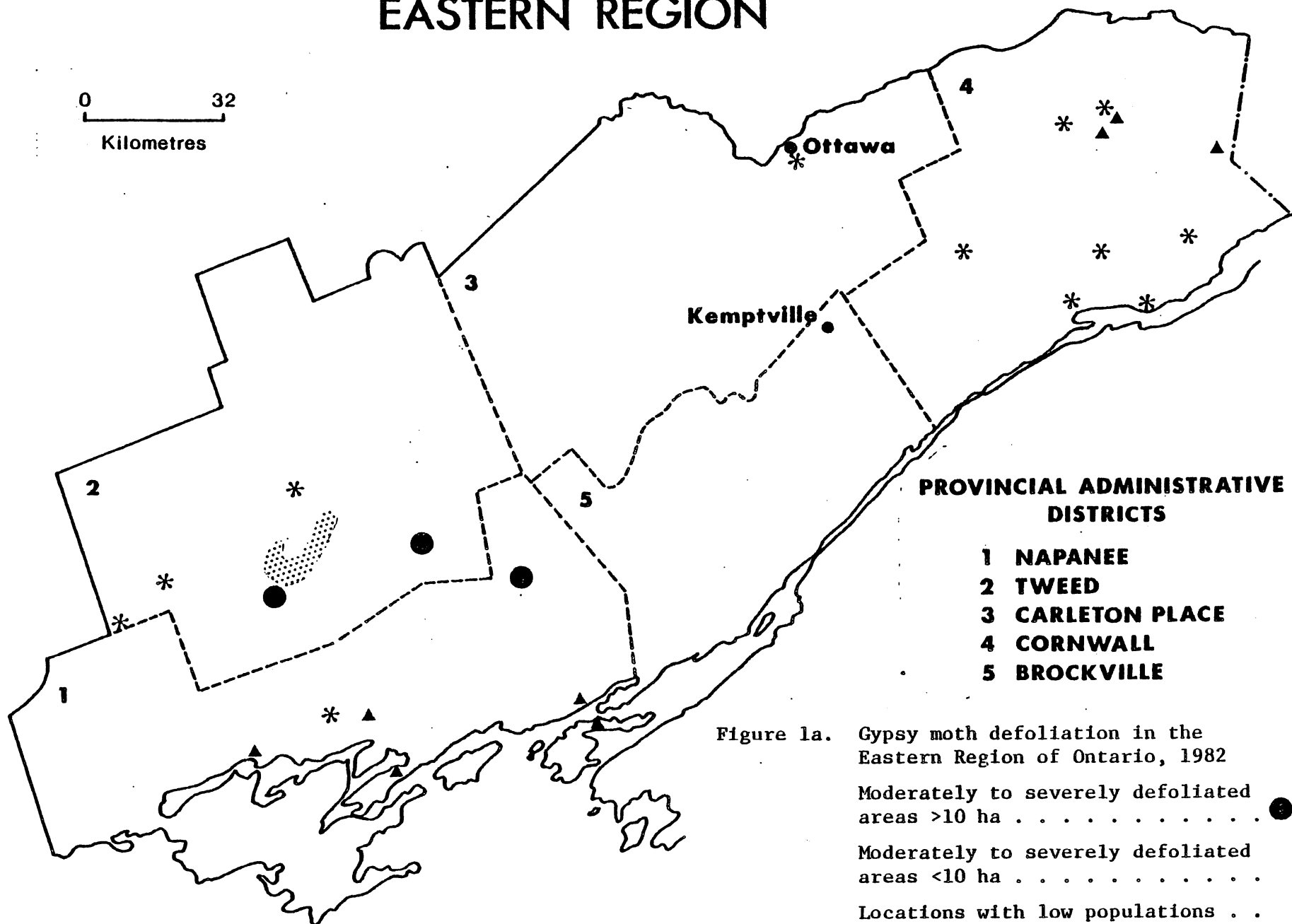


Figure 1a. Gypsy moth defoliation in the Eastern Region of Ontario, 1982

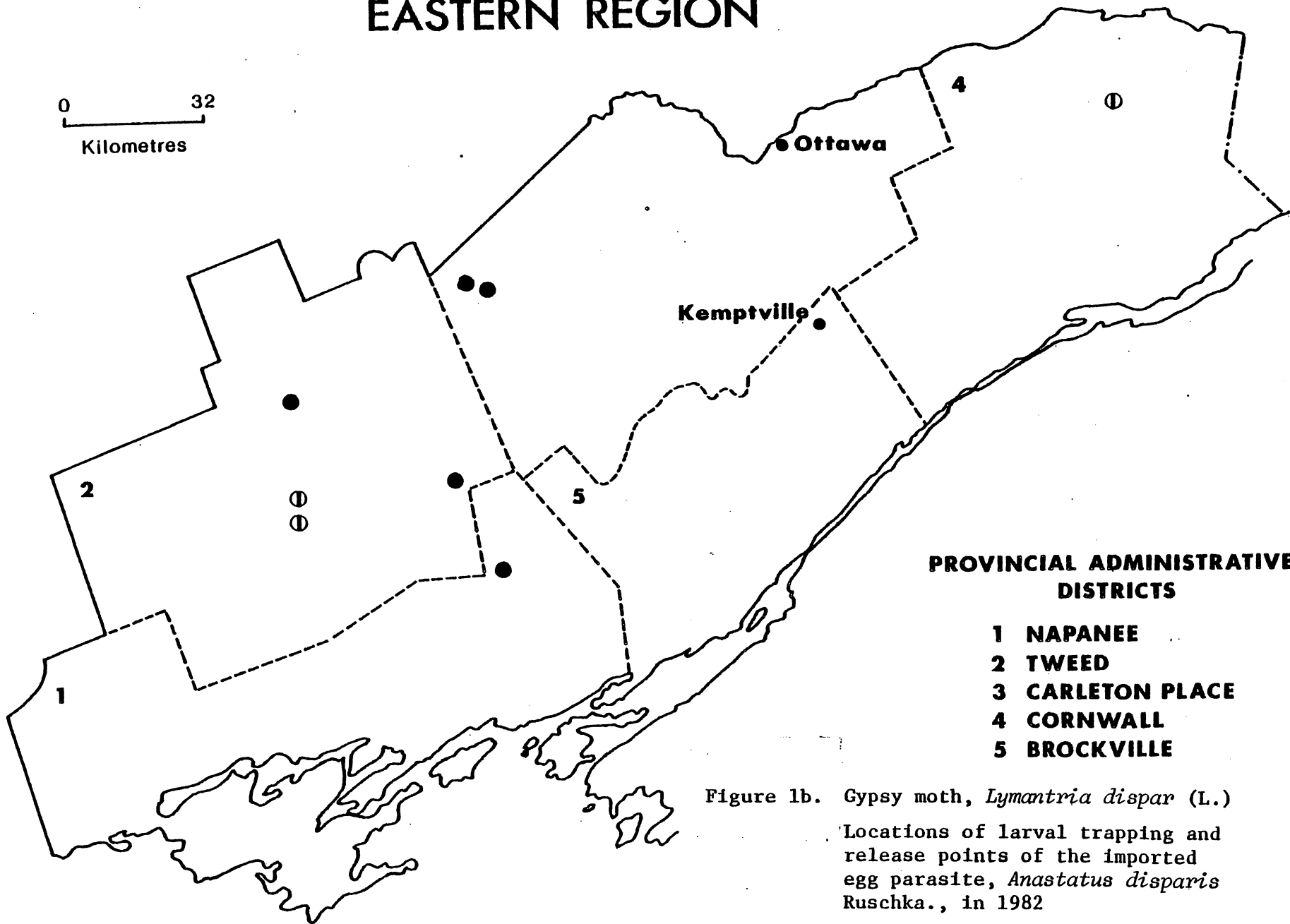
Moderately to severely defoliated areas >10 ha ● or [stippled area]

Moderately to severely defoliated areas <10 ha ▲

Locations with low populations . . . *

EASTERN REGION

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PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 NAPANEE
- 2 TWEED
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Figure 1b. Gypsy moth, *Lymantria dispar* (L.)

Locations of larval trapping and release points of the imported egg parasite, *Anastatus disparis* Ruschka., in 1982

Trapping areas ●
Egg parasite release points . . ○

Redheaded Pine Sawfly, *Neodiprion lecontei* (Fitch)

Following two consecutive years of extremely low population levels, this pine pest was detected causing varying degrees of defoliation, at several locations across the Region. The highest populations were encountered throughout the Tweed District, where historically the majority of damage by this sawfly has occurred.

Table 1 summarizes the data collected from six plantations that were found to be infested. OMNR staff from the Carleton Place District reported low numbers in three pine plantations in Marlborough Township, and successfully controlled the pest with a single application of the insecticide, malathion.

Table 1. Summary of redheaded pine sawfly colony counts at six locations in the Eastern Region in 1982 (counts based on the examination of 150 trees at each location).

Location (Twp)	Host	Avg ht of trees (m)	Area affected (ha)	Total no. of trees infested	Avg no. of colonies per tree	Avg % of defoliation per tree
Cornwall District						
Matilda	rP	2	2	11	1	5
Carleton Place District						
Lanark	rP	3	2	9	1	10
Marlborough	jP	2	8	15	1	30
Tweed District						
Marmora	rP	3	4	3	1	5
Hungerford	jP	1	12	34	1	58
Marmora	rP	3	2	40	1	7

Jack Pine Sawfly, *Neodiprion pratti paradoxicus* Ross

Population levels of this sawfly continued to increase for the third consecutive year in a 12-ha jack pine (*Pinus banksiana* Lamb.) plantation in Elizabethtown Township in the Brockville District. Surveys to determine the average number of colonies per tree proved fruitless because of the high number of larvae encountered. Perhaps as many as 10 to 12 colonies per tree originally existed; however, they very quickly merged into one large colony covering the entire tree. This population soon denuded the trees of virtually all old foliage, and in many instances started feeding on the new foliage.

Maple Leafcutter, *Paraclemensia acerifoliella* (Fitch)

Distribution of this maple defoliator increased in the central portion of the Region in 1982; however, the intensity of the population levels decreased. The 1300 km² of severe defoliation recorded in 1981 declined sharply to very small, scattered pockets ranging in size from two or three trees to one hectare.

Various levels of defoliation were encountered in the city of Kingston and the village of Sydenham in the southeastern portion of the Napanee District, northward to the Big Rideau Lake area of Carleton Place District and the Parham area of Tweed District. At numerous locations throughout the above area, understory trees and regeneration were heavily infested, with little or no damage occurring on the over-story trees.

Minor Insects

Solitary Oak Leafminer, *Cameraria hamadryadella* (Clem.)

For the third consecutive year populations of this leafblotch miner remained quite high throughout the entire Region. Samples and observations made at numerous locations on bur oak (*Quercus macrocarpa* Michx.) across the Region revealed an average of six to eight mines per leaf. This heavy mining activity, caused by the several generations per year, resulted in severe browning of the foliage by mid-August as the individual mines coalesced, and premature leaf drop was common.

The heaviest browning was most often encountered on fringe and open-grown ornamental trees in many towns and cities.

Walnut Caterpillar, *Datana integerrima* G. & R.

There was an apparent decline in populations of this caterpillar in the southwestern portion of the Region where it has been commonly detected for the past two seasons. Heavy defoliation, nearing 100%, was encountered on a few open-grown fencerow shagbark hickory (*Carya ovata* [Mill.] K. Koch) on Wolfe Island in the Napanee District, and on a single bitternut hickory (*C. cordiformis* [Wang.] K. Koch) in the Toledo area of the Brockville District.

Light defoliation was encountered on ornamental black walnut (*Juglans nigra* L.) in Montague and North Burgess townships, Carleton Place District, and on butternut (*J. cinerea* L.) in Richmond and Cramahe townships, Napanee District.

Yellownecked Caterpillar, *Datana ministra* (Dru.)

Population levels of this hardwood defoliator increased for the second consecutive year across the southern portion of the Region. The heaviest and most frequently encountered defoliation occurred on open-grown fence-line trees in the Napanee District (Fig. 2). Basswood (*Tilia americana* L.) was the most commonly infested tree and at numerous locations was completely denuded of foliage by mid-August.

Light defoliation was detected on fringe basswood trees as far north as the Dunrobin area of Torbolton Township in Carleton Place District.

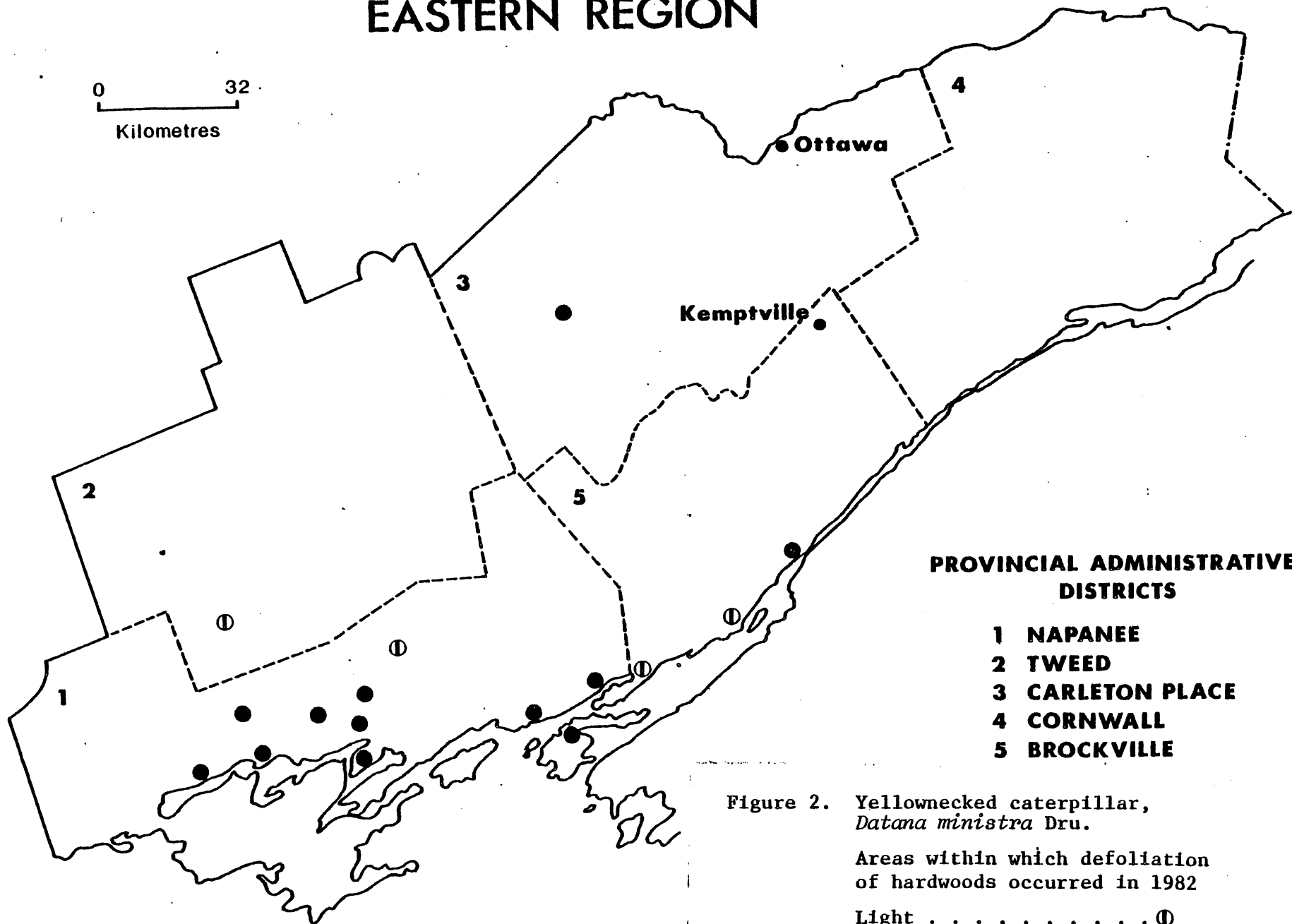
Table 2. Other forest insects.

Insect	Host(s)	Remarks
<i>Anisota finlaysoni</i> Riotte Shorthorned oakworm	wO,bO	heavy defoliation in Front of Leeds and Front of Escott twps, Brockville District and Camden Twp, Napanee District; light damage on fencerow trees on Wolfe Island, Napanee District
<i>Arge pectoralis</i> (Leach) Birch sawfly	wB	low populations at numerous locations on fringe roadside trees throughout Fitzroy Twp, Carleton Place District
<i>Argyresthia freyella</i> Wlsh. m. Red juniper leafminer	rJ	40 ha severely browned in Sophiasburgh Twp, Napanee District
<i>Caulocampus acericaulis</i> MacG. Maple petiole borer	sM	high populations on ornamental trees throughout Tweed and Carleton Place districts
<i>Croesia semipurpurana</i> (Kft.) Oak leaf shredder	rO	trace populations throughout the southwest portion of Abinger Twp, Tweed District

(continued)

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PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 NAPANEE
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Figure 2. Yellownecked caterpillar, *Datana ministra* Dru.

Areas within which defoliation of hardwoods occurred in 1982

Light ⊙

Moderate-to-severe . . . ●

Table 2. Other forest insects (continued).

Insect	Host(s)	Remarks
<i>Diprion similis</i> (Htg.) Introduced pine sawfly	rP	trace numbers in a 3-ha plantation in Marlborough Twp, Carleton Place District
<i>Fenusa pusilla</i> (Lep.) Birch leafminer	wB	high populations, especially on ornamentals, throughout the entire Region
<i>Halysidota caryae</i> (Harr.) Hickory tussock moth	deciduous	trace populations easily detected in numerous hardwood bushes throughout Tweed and Napanee districts, and in the southwestern portion of the Brockville District
<i>Hyllobius pales</i> (Hbst.) Pales weevil	scP	trace populations found on fringe trees in Christmas tree plantations in South Gower Twp, Brockville District, and in South Plantagenet Twp, Cornwall District
<i>Leucoma salicis</i> (Linn.) Satin moth	sPo	heavy defoliation of four ornamental trees in Thurlow Twp, Napanee District (This is a westerly extension of the known range of this insect.)
<i>Malacosoma disstria</i> Hbn. Forest tent caterpillar	rO	trace populations detected throughout the two oak mortality plots in Lavant Twp, Carleton Place District
<i>Neodiprion sertifer</i> (Geoff.) European pine sawfly	rP	trace populations found in a 2 ha plantation in Percy Twp, Napanee District

(continued)

Table 2. Other forest insects (concluded).

Insect	Host(s)	Remarks
<i>Plagioderia versicolora</i> (Laich). Imported willow leaf beetle	W	heavy defoliation of ornamentals in Sharbot Lake Provincial Park, Tweed District, along the Raisin River in Charlottenburgh Twp, Cornwall District, and along the Mississippi River in Ramsay and Pakenham twps, Carleton Place District
<i>Pristiphora erichsonii</i> (Htg.) Larch sawfly	tL	trace numbers detected in a 4-ha seed orchard in Clarence Twp, Cornwall District
<i>Pristiphora geniculata</i> (Htg.) Mountain-ash sawfly	mA	very common on ornamentals throughout the Region
<i>Symmerista canicosta</i> Francf. Redhumped oakworm	rO	trace population found in a 10-ha mixed hardwood bush in Hungerford Twp, Tweed District
<i>Tetralopha robustella</i> Zell. Pine webworm	jP	Occasional webmass found in a 10-ha plantation in Marlborough Twp, Carleton Place District

TREE DISEASES

Major Diseases

Scleroderris Canker, *Gremmeniella abietina* (Lagerb.) Morelet

The annual aerial and ground survey for the European race of Scleroderris canker was conducted throughout the Region. As in the four previously conducted surveys, no evidence of the disease was detected.

Annually, at 10 of the 20 semipermanent sample plot locations, 500+ randomly selected trees are examined. In addition, a similar number of trees are examined at the nine locations at which seedlings from the Saratoga Tree Nursery in New York State were planted across the Region in 1976 (Fig. 3). All pine encountered during routine travel within the Region are visually examined throughout the entire season for any symptoms of the disease.

For the second consecutive year, OMNR, Cornwall District, issued a contract to KBM Forestry Consultants Inc., Thunder Bay to have plantations throughout the District examined for the disease. This season a total of 246 planted areas were examined with 29 samples being taken from 18 suspected areas and submitted to the Great Lakes Forest Research Centre in Sault Ste. Marie for examination. No evidence of the disease was detected.

Tip Blight, *Sphaeropsis* sp.

A general survey conducted in a hybrid larch (*Larix* spp.) planting trial in Oxford on Rideau Township, Brockville District, revealed a 9% mortality rate. The mortality, which was caused by an unidentified species of *Sphaeropsis*, was confined to a low-lying, wet edge of the plantation where the trees were obviously weakened by unfavorable environmental conditions. This particular organism usually causes necrosis of the current year's shoots and needles of conifers; however, cankers on branches and main stems are occasionally produced, and mortality of the branch or entire tree results.

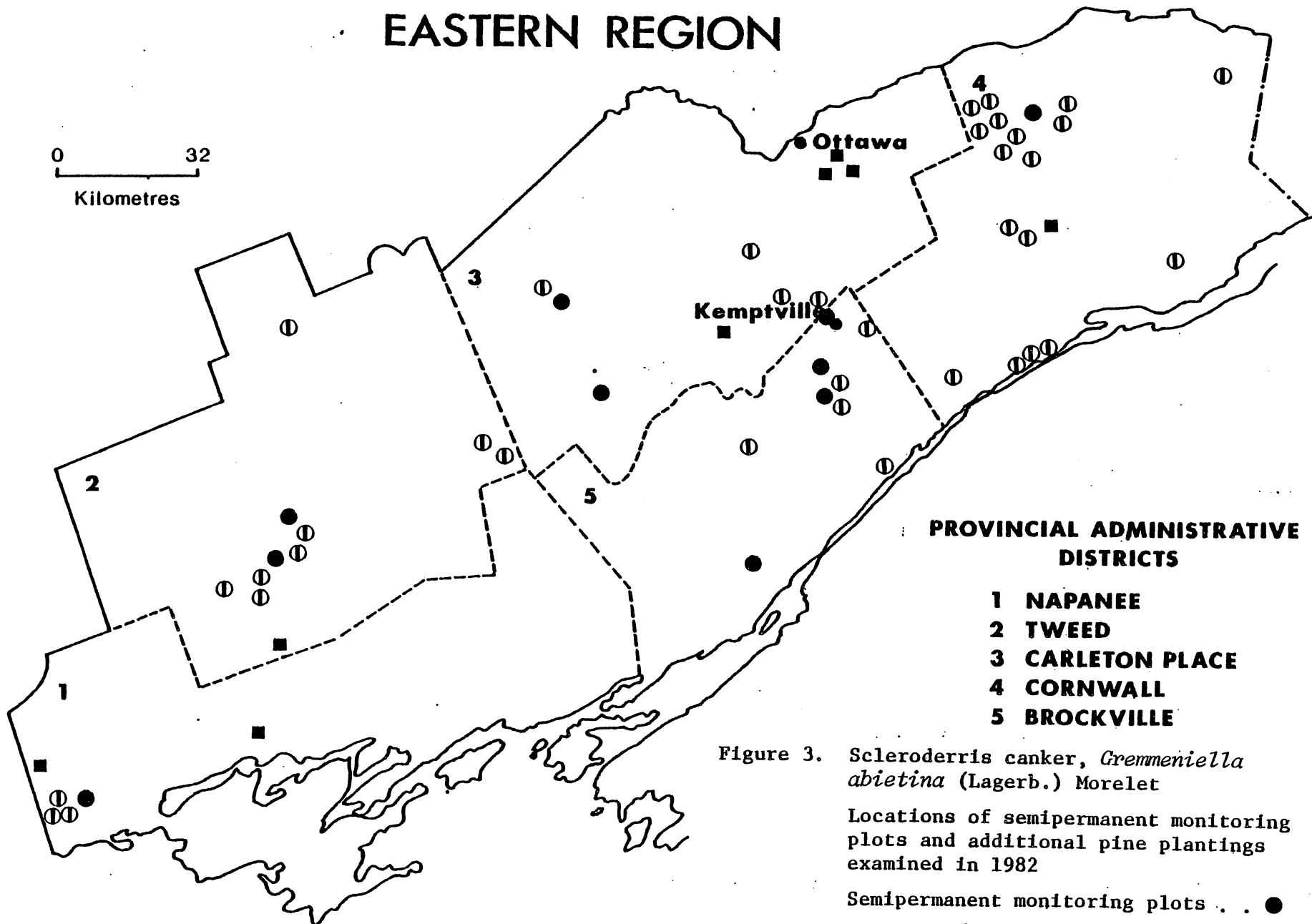
Minor Diseases

Anthracnose, *Gnomonia leptostyla* (Fr.) Ces and de N.

Open-grown ornamentals and roadside butternut trees were once again heavily defoliated at numerous locations throughout the Region. By mid-August, 80 to 90% defoliation was observed at numerous sites.

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Figure 3. Scleroderris canker, *Gremmeniella abietina* (Lagerb.) Morelet

Locations of semipermanent monitoring plots and additional pine plantings examined in 1982

- Semipermanent monitoring plots . . ●
- 1976 Saratoga Nursery stock plantings ■
- Additional areas checked ⊙

Leaf diseases are considered to be of major consequence only when heavy defoliation occurs for several consecutive years. This degree of damage is required to cause branch or tree mortality. Heavy defoliation in late August, over an extended period of time, usually results in vigor loss which causes the trees to become more susceptible to attack by other fungi and insects.

Leaf Spot, *Mycosphaerella populicola* G.E. Thomps.

The distribution of this leaf spot increased across the Region; however, the intensity of foliar damage decreased. In 1981, 90 to 100% defoliation was recorded at numerous locations by mid-August, whereas this season, defoliation levels exceeding 75% were not encountered.

The highest damage levels occurred in Matilda Township, Cornwall District; in Augusta and Wolford townships, Brockville District; and in Torbolton, Fitzroy and Darling townships, Carleton Place District.

Elsewhere throughout the Region light-to-moderate defoliation was observed wherever the host, balsam poplar (*Populus balsamifera* L.), occurred.

Table 3. Other forest diseases.

Organism	Host(s)	Remarks
<i>Apiognomonia quercina</i> (Klbe.) Hoehn. Anthracnose	rO	moderate damage levels on roadside trees across the eastern portion of Wolfe Island, Napanee District
<i>Coleosporium asterum</i> (Diet.) Syd. Pine needle rust	rP	trace levels detected in a 20-ha plantation in Front of Yonge Twp, Brockville District, and in a 10-ha plantation in Percy Twp, Napanee District
<i>Endocronartium harknessii</i> (J.P. Moore) Y. Hirat. Globose gall rust	scP	trace incidence throughout a Christmas tree plantation in South Plantagenet Twp, Cornwall District

(continued)

Table 3. Other forest diseases (concluded).

Organism	Host(s)	Remarks
<i>Leucostoma kunzei</i> (Fr.) Munk ex Kern Cytospora canker	WS	trace damage on two fringe trees in Rideau River Provincial Park, Carleton Place District
<i>Leucostoma nivea</i> (Fr.) Hoehn. Cytospora canker of poplar	Hybrid poplar	2% mortality in a 2-ha plantation in Augusta Twp, Brockville District
<i>Marssonina brunnea</i> (Ell. & Ev.) Magn. Leaf spot of poplar	Hybrid	trace defoliation throughout plantings in Augusta and North Crosby twps, Brockville District
<i>Polyporus tulipiferus</i> (Schw.) Overh.	Hybrid poplar	found fruiting on several dead trees in a 3-ha planting in Augusta Twp, Brockville District
<i>Schizophyllum commune</i> Fr. White spongy rot	sM	observed commonly fruiting at numerous locations where maple decline occurred in 1980 and 1981

Diebacks and Declines

Maple Decline

The widespread maple decline that has occurred throughout the Region for the past two years causing whole-tree mortality, did not recur this season. In a special survey, trace levels of branch mortality only were detected occasionally at widely scattered points.

The special survey consisted of the visual examination of 200+ maple trees at six locations in the Region. Since the problem has been detected mainly in urban and roadside areas, the survey was conducted in these situations and maple woodlots were excluded. Branch mortality was encountered in the towns of Perth and Smiths Falls in the Carleton Place District, but in each case only 1% of the trees examined were affected,

with approximately 5% of the crowns estimated to be dead or dying. In comparison, these two areas were estimated to have an accumulated branch mortality level of 58 and 55%, respectively, and a 1% current mortality rate for 1980 and 1981.

At the remaining four areas, two in the Brockville District and one each in both the Cornwall and Carleton Place districts, no evidence of the decline was detected.

Oak Decline

The two oak decline impact plots in Lavant Township, Carleton Place District, were tallied again this season. As in the five previous years, the annual tally has shown a steady decline in overall vigor throughout the stands (Table 4). The two plots have averaged an annual reduction of 8% in the total number of trees estimated to be healthy, that is, with less than 40% branch mortality.

Table 4. Summary of data collected from the oak decline impact plots in Carleton Place District, from 1977 to 1982 (based on the annual examination of 100 tagged trees at each location).

Location (Twp)	Avg DBH of trees (cm)	Year	Percent of crown dead				Trees dead
			0-20	21-40	41-60	>60	
Carleton Place District							
Lavant - Plot I	24	1977	46	38	12	4	0
	24	1978	21	59	13	7	0
	24	1979	5	51	32	8	4
	24	1980	7	41	36	11	5
	24	1981	11	33	37	12	7
	24	1982	6	32	40	15	7
Lavant - Plot 2	19	1977	28	50	11	1	0
	19	1978	14	72	10	4	0
	19	1979	5	73	18	2	2
	19	1980	2	53	33	7	5
	19	1981	2	41	40	8	9
	20	1982	0	40	41	10	9

Abiotic Damage

Unusually Heavy Seed Crop

In the spring of 1982 soft maples (*Acer* sp.), especially the silver maples (*A. saccharinum* L.), produced a very prolific seed crop. At numerous locations across the Region foliage production was very sparse, or, in a few areas, did not occur. The actual cause of this phenomenon was undetermined; however, areas will be re-examined in the 1983 field season to determine if this periodic phenomenon has any permanent harmful effect.

Special Surveys

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

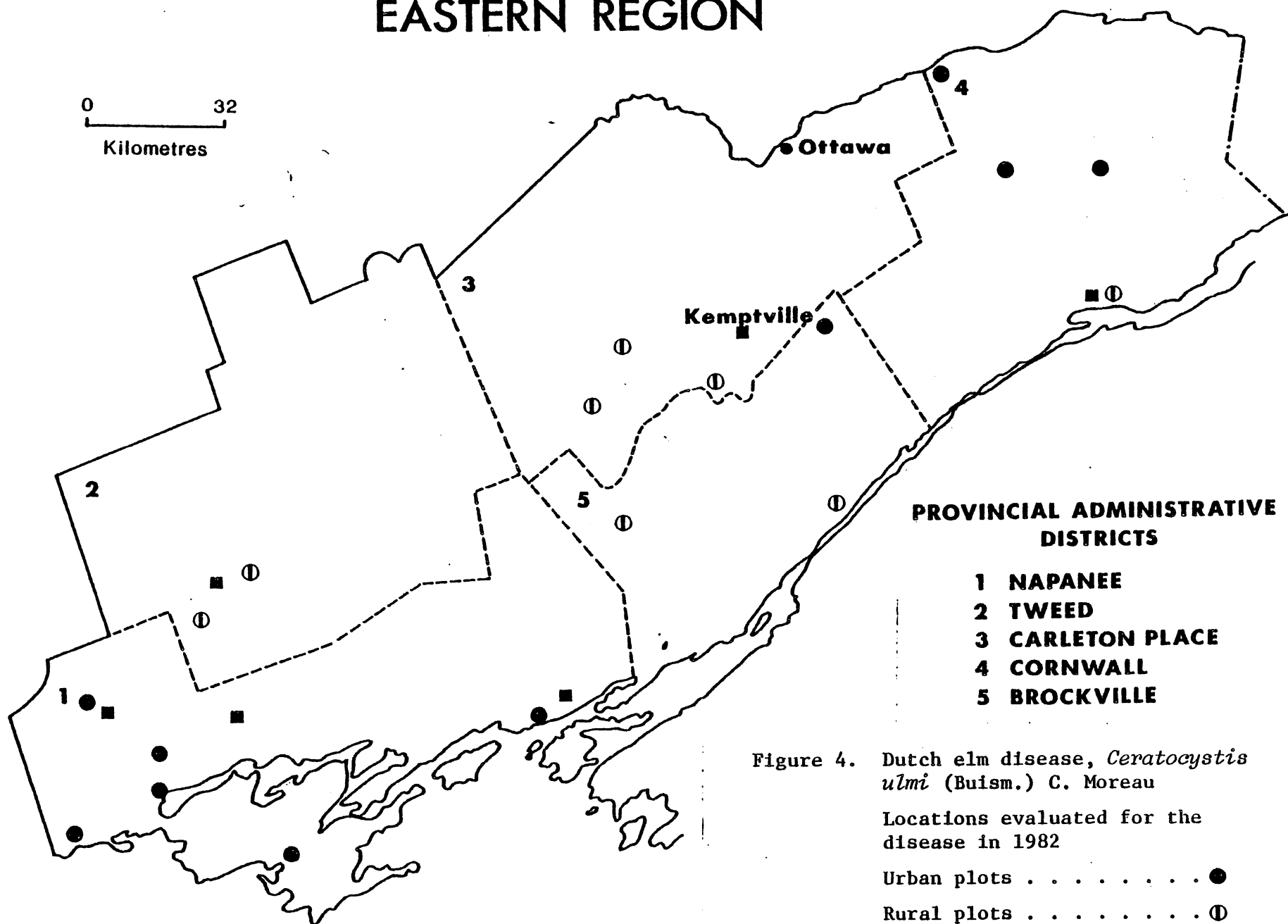
In conjunction with a national program a comprehensive survey to determine the current incidence level of Dutch elm disease and distribution and population levels of the two insect vectors, the native elm bark beetle, *Hylurgopinus rufipes* (Eich.), and the smaller European elm bark beetle, *Scolytus multistriatus* (Marsh.); was conducted in the Region.

A total of 24 areas were evaluated to determine the incidence of the disease: 10 were urban and 14 were rural. At each location a maximum of 100 trees, if sufficient numbers of elm were present, were evaluated (Fig. 4). Six of the 14 rural areas involved juvenile trees, that is, trees under 10 cm in diameter and over 2 m in height.

The 10 urban areas averaged 7.6% incidence, with a current mortality rate of 2%. The eight rural areas where trees greater than 10 cm DBH were examined averaged 22.6% incidence and 5% current mortality. The six juvenile tree areas averaged 1.4% incidence with no mortality. These data are summarized in tables 5, 6 and 7. The lower urban figures possibly reflect the continual program of removal of dead and dying elm practised by most towns and cities.

To determine distribution and population levels of the two insect vectors, two elm trap logs, each 200 cm in length, were set out at five locations (Fig. 5). The first logs were set out in late May; they were later examined for brood galleries and were replaced in early July. This second set was examined in mid-September. The logs set out in Thurlow Township in the Napanee District produced significantly higher numbers of brood galleries for both the native and the smaller European elm bark beetle than did those in the other four trapping areas in the Region during the first trapping period. However, the second set of logs was removed from this sample location (i.e., in Thurlow Township) and therefore no comparison could be made with the results from the second sampling period at the other locations. Table 8 summarizes the

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PROVINCIAL ADMINISTRATIVE DISTRICTS

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- 4 CORNWALL
- 5 BROCKVILLE

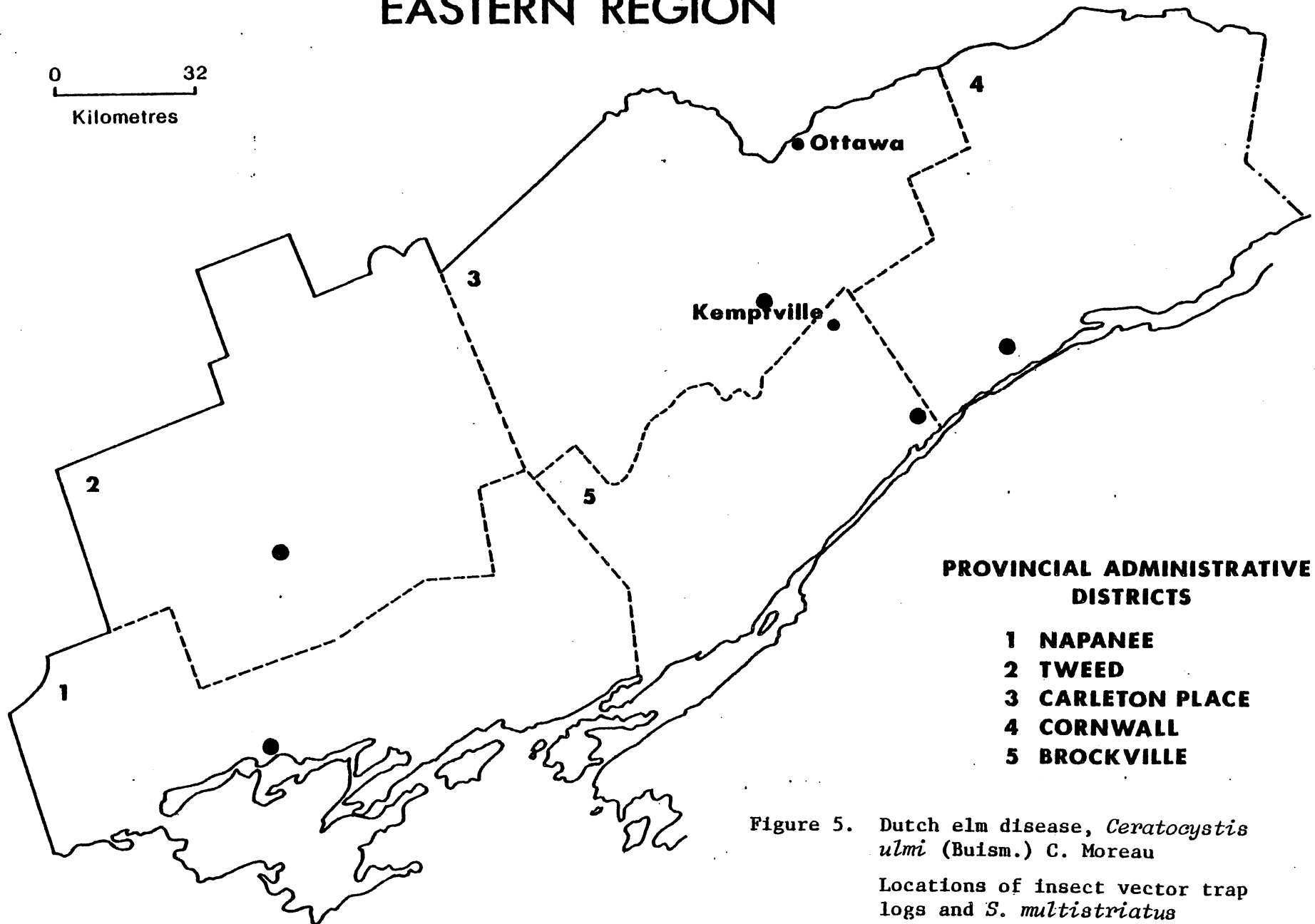
Figure 4. Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Locations evaluated for the disease in 1982

- Urban plots ●
- Rural plots ○
- Juvenile rural plots ■

EASTERN REGION

0 32
Kilometres



PROVINCIAL ADMINISTRATIVE DISTRICTS

- 1 NAPANEE
- 2 TWEED
- 3 CARLETON PLACE
- 4 CORNWALL
- 5 BROCKVILLE

Figure 5. Dutch elm disease, *Ceratocystis ulmi* (Buism.) C. Moreau

Locations of insect vector trap logs and *S. multistriatus* pheromone traps in 1982 . . . ●

data collected from each trapping location. This particular trapping method indicates that populations of these two insect vectors are present in a given area only, and does not forecast population levels.

In addition one smaller European elm bark beetle pheromone trap was set out at each of the five random locations in early July. Pheromone traps are used primarily to determine if populations of a particular species are present in a given area. In this exercise two of the traps produced very low numbers of adult males, four in Elzevir Township, Tweed District, and two in Edwardsburgh Township, Brockville District.

Table 5. Summary of Dutch elm disease survey at 10 urban locations in the Eastern Region in 1982.

Location (municipality)	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Brockville District					
Kemptville	20	14	0	0	0
Cornwall District					
Maxville	10	69	7	1	10.4
Rockland	13	39	4	1	11.4
Casselman	-	0	0	0	0
Napanee District					
Bloomfield	15	22	0	0	0
Campbellford	12	80	4	2	7.0
Colborne	-	0	0	0	0
Frankford	8	62	4	2	8.8
Kingston	13	16	0	0	0
Trenton	13	3	0	0	0
Total		305	19	6	7.6

Table 6. Summary of Dutch elm disease survey at eight rural locations in the Eastern Region in 1982.

Location (Twp)	Avg ht of trees (m)	Trees sampled			Trees affected (%)
		unaffected	diseased	dead	
Brockville District					
Augusta	12	84	11	5	16.0
South Crosby	14	70	23	7	30.0
Carleton Place District					
Bathurst	13	81	17	2	19.0
Drummond	10	77	17	6	23.0
Montague	10	58	32	10	42.0
Cornwall District					
Cornwall	12	83	15	2	17.0
Tweed District					
Elzevir	12	117	18	5	16.4
Huntingdon	13	80	16	4	20.0
Total		650	149	41	22.6

Table 7. Summary of Dutch elm disease survey of six juvenile elm stands in the Eastern Region in 1982.

Location (Twp)	Avg ht of trees (m)	unaffected	diseased	dead	Trees affected (%)
Carleton Place District					
Marlborough	3	92	9	0	8.0
Cornwall District					
Cornwall	4	83	0	0	0
Napane District					
Pittsburgh	3	100	0	0	0
Seymour	4	100	0	0	0
Thurlow	5	100	0	0	0
Tweed District					
Madoc	4	100	0	0	0
Total		575	8	0	1.4

Table 8. Summary of data collected from elm trap logs set out in May and July at five locations in the Eastern Region (based on the examination of two 200-cm-long elm logs at each location).

Location (Twp)	Avg log diam (cm)		Trap log no.	May - July				July - September			
				1st set				2nd set			
				Total no. of galleries				Total no. of galleries			
				N.E.B.B. ^a		S.E.E.B.B. ^a		N.E.B.B.		S.E.E.B.B.	
	1st set	2nd set		successful/aborted	successful/aborted	successful/aborted	successful/aborted	successful/aborted	successful/aborted		
Brockville District											
Edwardsburgh	18.0	14.2	1	0	0	0	0	19	21	4	0
			2	0	0	0	0	14	13	0	0
Cornwall District											
Williamsburgh	20.8	16.9	1	0	0	0	0	2	27	1	0
			2	0	0	0	0	1	48	0	0
Carleton Place District											
Marlborough	15.7	17.2	1	0	1	0	0	22	30	0	0
			2	0	0	0	0	24	19	0	0
Napanee District											
Thurlow	18.6	*	1	42	15	11	4	*		*	
			2	22	6	21	3				
Tweed District											
Elzevir	18.0	17.5	1	0	0	0	0	0	0	0	0
			2	0	0	0	0	0	0	0	0

^a native elm bark beetle

^b smaller European elm bark beetle

* log removed from sample area

Nursery Report

Insects: Low populations of the cedar leafminer complex, *Argyresthia* spp. and *Pulicalvaria* sp., persisted, causing trace defoliation on the cedar windbreaks throughout the G. Howard Ferguson Forest Station. For the second consecutive year the imported willow leaf beetle, *Plagiodera versicolora* (Laich.), was found to be causing serious defoliation of a wide range of the hybrid poplars (*Populus* spp.). The insecticide Furadan was applied in soil trenches 10 cm deep at a rate of 8.96 kg/ha, and very effectively controlled this beetle. Approximately 60% of the rising 2-0 white spruce (*Picea glauca* [Moench] Voss) in compartment 63 were heavily infested with a spruce aphid, *Adelges* sp.

Diseases: The poplar leaf rust, *Melampsora medusae* Thuem., was very common throughout the hybrid poplars, causing a wide range of defoliation. The amount of infection caused 80-90% defoliation of the following clones: JAC-N5, DN 17, 19, 20, 36, 70, 106, 134 and DTAC 4 and 32. A second leaf rust, *Marssonina brunnea* (Ell. & Ev.) Magn., was found to be causing damage at similar levels to clones 32 and 48. In the DN 132 clone several stools were killed by a stem canker, *Cryptodiaporthe* sp., and upon confirmation of the organism, all dead or dying stools were removed. An unidentified stem canker caused 2% mortality through clone DN 149. Micro-nutrient deficiencies were observed causing discoloration and leaf curl in many of the hybrid poplar compartments.

Red Pine Cone Collection

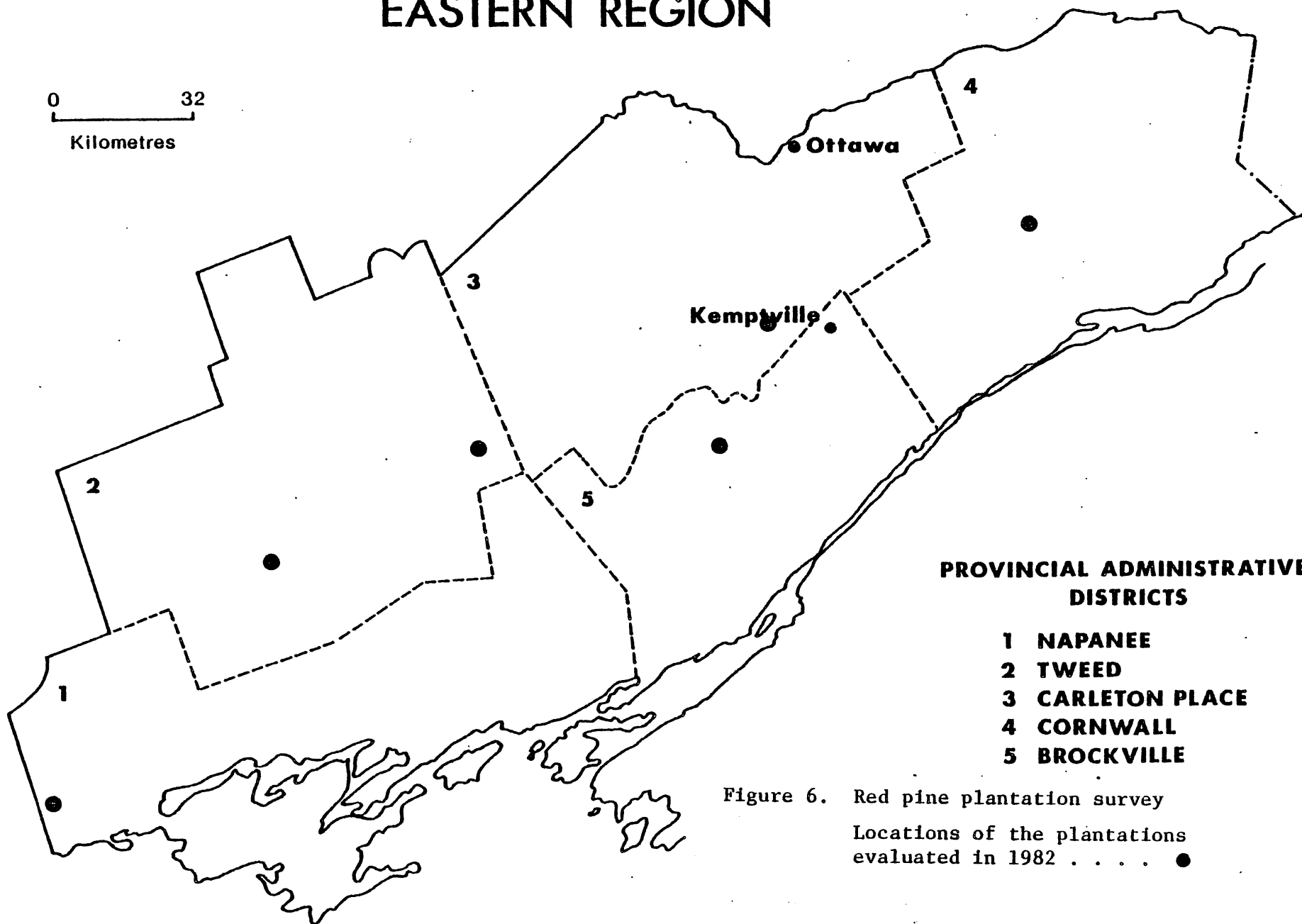
A special collection of red pine cones was taken from a 2-ha plantation within the Limerick County Forest of the Brockville District. One hundred green second-year cones were collected during the first week of July, with the emphasis on determining the insects associated with cones at this particular stage of development. It was estimated that 38% of the cones sustained varying degrees of damage, with an average of 59% seed loss within the damaged cones. The principal causes of seed loss were the following insects: the webbing coneworm, *Dioryctria disclusa* Heinr., the red pine coneworm, *Eucosma monitorana* Heinr., and a midge, *Asynapta* sp.

Red Pine Plantation Survey

A special survey consisting of the examination of six randomly selected high-value red pine plantations was conducted in the Region in 1982 (Fig. 6). The plantations were stratified in the following three height classes: <2 m, 2-6 m, and >6 m. Each plantation was inspected and evaluated at two different periods during the season, early June and

EASTERN REGION

0 32
Kilometres



PROVINCIAL ADMINISTRATIVE DISTRICTS

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Figure 6. Red pine plantation survey
Locations of the plantations
evaluated in 1982 ●

late July, to determine the impact of damage caused by various insects and diseases.

Needle rust was found in a plantation in Marlborough Township, Carleton Place District, where 17% of the pine were affected at the trace damage level. The pine false webworm was found infesting 63% of the trees, causing less than 1% defoliation in the same plantation, and on 9% of the trees, again causing only 1% defoliation in Kitley Township, Brockville District.

Expected, but not found, were such pests as the European pine sawfly, root collar weevil, Scleroderris canker, Verticicladiella root rot, redheaded pine sawfly, European pine shoot moth, needle cast and Armillaria root rot.

The findings of this survey are very similar to those of the 1979 red pine survey. At that time the pine false webworm was detected in two of the six plantations causing similar levels of damage, and there were no major problems attributable to any disease organisms.

Additional information concerning redheaded pine sawfly and pine false webworm in the Region may be found in the preceding text.

Light Trap

The annual operation of a light trap at the G. Howard Ferguson Forest Station in the Brockville District was carried out for a three-week period from late June to mid-July. The primary purpose of the operation is to monitor the flight of the adult spruce budworm. Table 9 presents the data collected.

A light trap can be used to indicate that populations are present in an area; however, the distance from which an insect is attracted to the light trap is undetermined, and therefore the numbers trapped may not be reliable for forecasting populations. The total number trapped each year may indicate changes in population levels.

Table 9. Summary of data collected from a light trap operated at the G. Howard Ferguson Forest Station in the Brockville District.

Insects (year)	Operating dates											
	June	27-28	29-30	July	1-2	3-4	5-6	7	8-9	10-12	13-14	15-16
----- No. of insects collected -----												
Spruce budworm, <i>Choristoneura fumiferana</i>												
1979		81	81		25	-	-	30	40	145	-	-
1980		9	22		20	30	6	80	30	30	140	104
1981		5	6		8	11	4	1	35	121	37	14
1982		3	10		2	3	-	2	17	27	1	-
Obliquebanded leafroller, <i>Choristoneura rosaceana</i>												
1979		75	68		18	-	-	7	15	15	-	-
1980		4	31		30	50	18	24	16	-	-	-
1981		5	12		2	13	10	3	9	5	-	-
1982		-	7		-	-	-	-	2	10	6	-
Forest tent caterpillar, <i>Malacosma disstria</i>												
1979		8	-		-	-	-	1	-	1	-	-
1980		-	-		-	-	-	1	-	13	-	3
1981		-	-		-	-	-	-	-	-	-	-
1982		-	-		-	-	-	-	-	-	-	-
Spotted cutworm, <i>Amathes c-nigrum</i>												
1979		565	560		118	-	3	11	-	31	-	-
1980		28	24		210	163	74	83	80	21	-	-
1981		62	59		22	18	15	3	-	4	-	-
1982		129	160		21	3	19	14	31	14	13	-