

**DISTRIBUTION MAPS OF
COMMON
TREE
DISEASES
IN BRITISH COLUMBIA**

J.A. BARANYAY • N.G. BAUMAN
CANADIAN FORESTRY SERVICE

BC-X-71

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BY

J.A. BARANYAY AND N.G. BAUMAN

**PACIFIC FOREST RESEARCH CENTRE
CANADIAN FORESTRY SERVICE
VICTORIA, BRITISH COLUMBIA
INFORMATION REPORT BC-X-71**

**DEPARTMENT OF THE ENVIRONMENT
DECEMBER 1972**

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INTRODUCTION

This report is a summary of forest disease distribution data resulting from disease survey activities to the end of 1972. It attempts to provide a basis for the refinement of disease detection activities in the future, for selection of common tree disease problems for damage appraisal studies, and to provide background information for forest managers as an aid in assessing the importance of certain diseases in their management areas.

Most of the collections contributed by the forest disease survey staff and cooperators are deposited in a herbarium which is part of the Forest Insect and Disease Survey. The herbarium was organized in 1943 and during the past 30 years has become increasingly valuable as a basis of forest pathological studies. From mainly a reference collection of decay fungi at its beginning, the herbarium has become the largest collection of tree-disease-causing fungi in British Columbia (Ziller, Can. Dep. of Forest., Info. Rept., Victoria, B.C.).

PRESENTATION of data

The grouping and selection of diseases is based on the publication "Common tree diseases of British Columbia" (Foster and Wallis, Dept. of Fish. and Forest. Publ. No. 1245). Some additional potentially important diseases are included. Each dot on the maps represents a disease collection within a 10,000-metre universal transverse mercator grid square (6.21 miles square). The number of collections made in the same grid during the years is not indicated. Besides local herbarium records (DAVFP), data published elsewhere are utilized if the exact location of collection is indicated by the authors. Negative records are not indicated on the maps. The lack of records in certain areas could indicate therefore, absence of the disease, or inaccessibility or absence of hosts. To help relate disease occurrence to host distribution, the major host tree range maps updated from A.R. McMinn's (B.C. Forest Serv. 1957 Cont. Forest Inventory of B.C., Dept. Lands and Forest. Victoria, B.C.) or adapted from a map published by the Commission of Conservation Canada in 1918 (Whitford, Forests of B.C.) are included in the Appendix. Where possible, the hosts of organisms are listed in abbreviated form, using the letters of the scientific name (see abbreviations), within the legend of the map. Where the list of hosts is too large to include in the legend, it is printed separately, and indicated by an asterisk after the broad term of hosts (e.g. coniferous*).

Principal and secondary hosts of dwarf mistletoes follow Hawksworth and Wiens (Annu. Rev. Phytopath. 8: 187-208) and in respect to rust fungi, the primary host is the one having the aecial state of the rust and the alternate host having the telial state.

ABBREVIATIONS

Aa	<i>Abies amabilis</i>	Pn	<i>Pinus nigra</i>
Ac	<i>Abies concolor</i>	Po-a	<i>Populus alba</i>
Ac-g	<i>Acer glabrum</i>	Po-b	<i>Populus balsamifera</i>
Ac-m	<i>Acer macrophyllum</i>	Po-X c	<i>Populus X canadensis</i>
Ag	<i>Abies grandis</i>	Po-n	<i>Populus nigra</i>
Al	<i>Abies lasiocarpa</i>	Po-t	<i>Populus tremuloides</i>
Ar	<i>Alnus rubra</i>	Po-tr	<i>Populus trichocarpa</i>
As	<i>Alnus sinuata</i>	Pp	<i>Pinus ponderosa</i>
As-c	<i>Aster ciliolatus</i>	Ppi	<i>Pinus pinaster</i>
As-co	<i>Aster conspicuus</i>	Ppu	<i>Picea pungens</i>
As-e	<i>Aster engelmannii</i>	Pr	<i>Pinus radiata</i>
As-f	<i>Aster foliaceus</i>	Pre	<i>Pinus resinosa</i>
As-s	<i>Aster subspicatus</i>	Ps	<i>Pinus strobus</i>
		Psi	<i>Picea sitchensis</i>
Bo	<i>Betula occidentalis</i>	Psy	<i>Pinus sylvestris</i>
Bp	<i>Betula papyrifera</i>	Py-a	<i>Pyrola aphylla</i>
		Py-as	<i>Pyrola asarifolia</i>
Ca	<i>Cerastium alpinum</i>	Py-d	<i>Pyrola dentata</i>
Car	<i>Cerastium arvense</i>	Py-p	<i>Pyrola picta</i>
Cb	<i>Cerastium beeringianum</i>	Py-r	<i>Pyrola rotundifolia</i>
Cl	<i>Comandra livida</i>	Py-s	<i>Pyrola secunda</i>
Cu	<i>Comandra umbellata</i>	Py-v	<i>Pyrola virens</i>
Cv	<i>Cerastium vulgatum</i>		
		Rb	<i>Ribes bracteosum</i>
Ea	<i>Epilobium alpinum</i>	Rd	<i>Ribes divaricatum</i>
Ean	<i>Epilobium angustifolium</i>	Rg	<i>Ribes grossularia</i>
Eg	<i>Epilobium glandulosum</i>	Rh	<i>Ribes howellii</i>
		Rhu	<i>Ribes hudsonianum</i>
LI	<i>Larix laricina</i>	Ri	<i>Ribes inerme</i>
Lo	<i>Larix occidentalis</i>	RI	<i>Ribes lacustre</i>
		Rla	<i>Ribes laxiflorum</i>
Mp	<i>Malus pumila</i>	Rlo	<i>Ribes lobbii</i>
Ms	<i>Malus sylvestris</i>	Ro	<i>Ribes oxycanthoides</i>
		Rs	<i>Ribes sanguineum</i>
Pa	<i>Pinus albicaulis</i>	Rv	<i>Ribes viscosissimum</i>
Pb	<i>Pinus banksiana</i>		
Pc	<i>Pinus contorta</i>	Sc	<i>Solidago canadensis</i>
Pe	<i>Picea engelmannii</i>	Sl	<i>Solidago lanceolata</i>
Pec X t	<i>Pinus echinata X taeda</i>	Sle	<i>Solidago lepida</i>
Pg	<i>Picea glauca</i>	Sm	<i>Solidago multiradiata</i>
Pj	<i>Pinus jeffreyi</i>	Ss	<i>Solidago spathulata</i>
Pl	<i>Pinus lambertiana</i>	St-c	<i>Stellaria calycantha</i>
Pm	<i>Pinus monticola</i>	St-cr	<i>Stellaria crispa</i>
Pma	<i>Picea mariana</i>	St-l	<i>Stellaria longipes</i>
Pmu	<i>Pinus muricata</i>		
Pmug	<i>Pinus mugo</i>	Th	<i>Tsuga heterophylla</i>
Pmur X b	<i>Pinus murrayana X banksiana</i>	Tm	<i>Tsuga mertensiana</i>

distribution maps

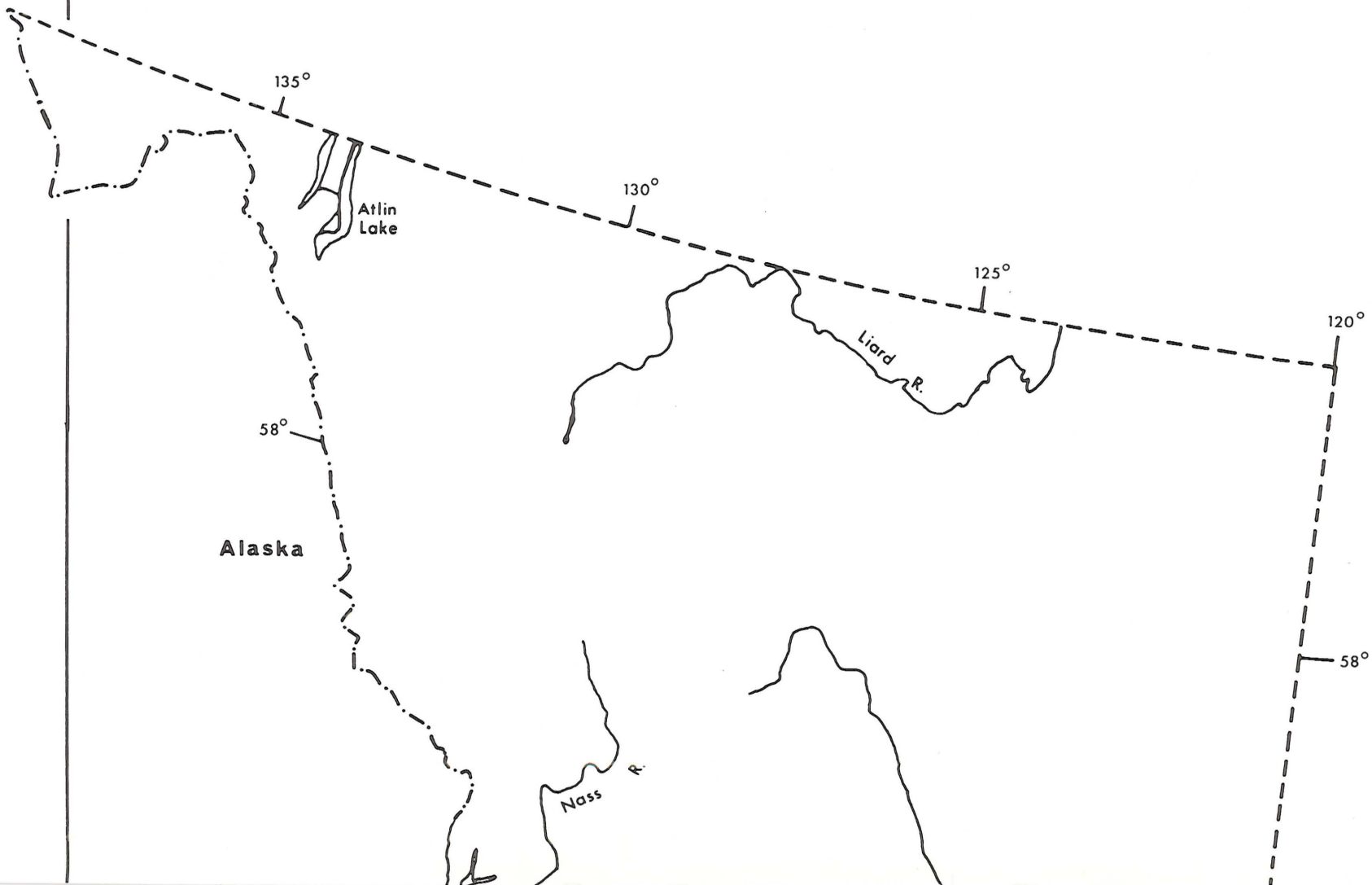
MAP NO. 1

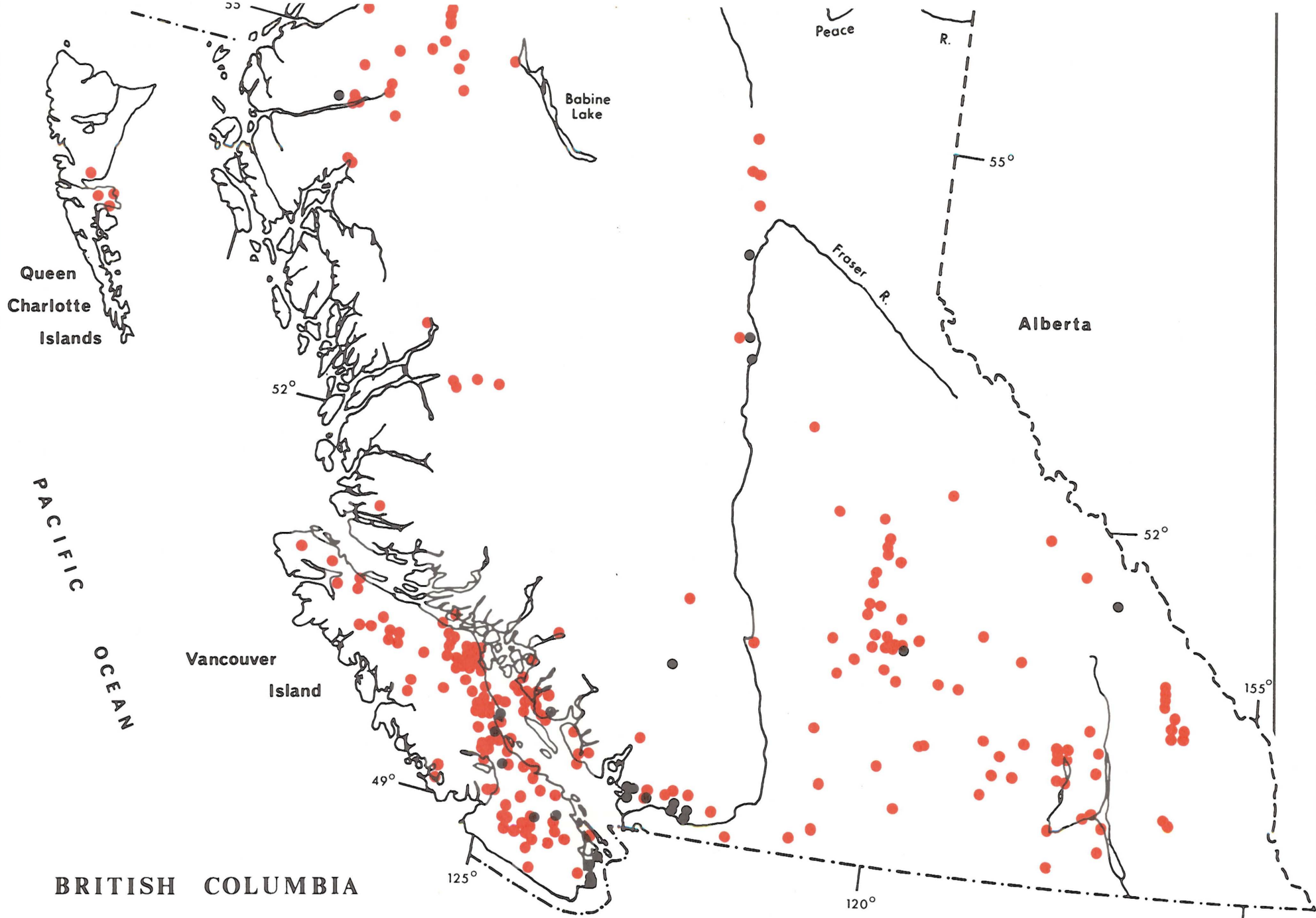
Root & Butt Rot*Armillaria mellea*

HOSTS

● coniferous*

● broadleaved*





Map 1 *Armillaria mellea*

<i>Abies amabilis</i>	<i>Alnus rubra</i>
<i>A. grandis</i>	<i>Betula papyrifera</i>
<i>A. lasiocarpa</i>	<i>Populus X canadensis</i>
<i>Chamaecyparis lawsoniana</i>	<i>P. nigra</i>
<i>Larix decidua</i>	<i>P. tremuloides</i>
<i>L. leptolepis</i>	<i>P. trichocarpa</i>
<i>L. occidentalis</i>	<i>Quercus garryana</i>
<i>Picea abies</i>	<i>Salix</i> sp.
<i>P. engelmannii</i>	
<i>P. glauca</i>	
<i>P. sitchensis</i>	
<i>Pinus contorta</i>	
<i>P. monticola</i>	
<i>P. muricata</i>	
<i>P. nigra</i>	
<i>P. pinaster</i>	
<i>P. ponderosa</i>	
<i>P. radiata</i>	
<i>P. resinosa</i>	
<i>P. sylvestris</i>	
<i>Pseudotsuga menziesii</i>	
<i>Taxus brevifolia</i>	
<i>Thuja plicata</i>	
<i>Tsuga heterophylla</i>	

Map 2 *Fomes annosus*

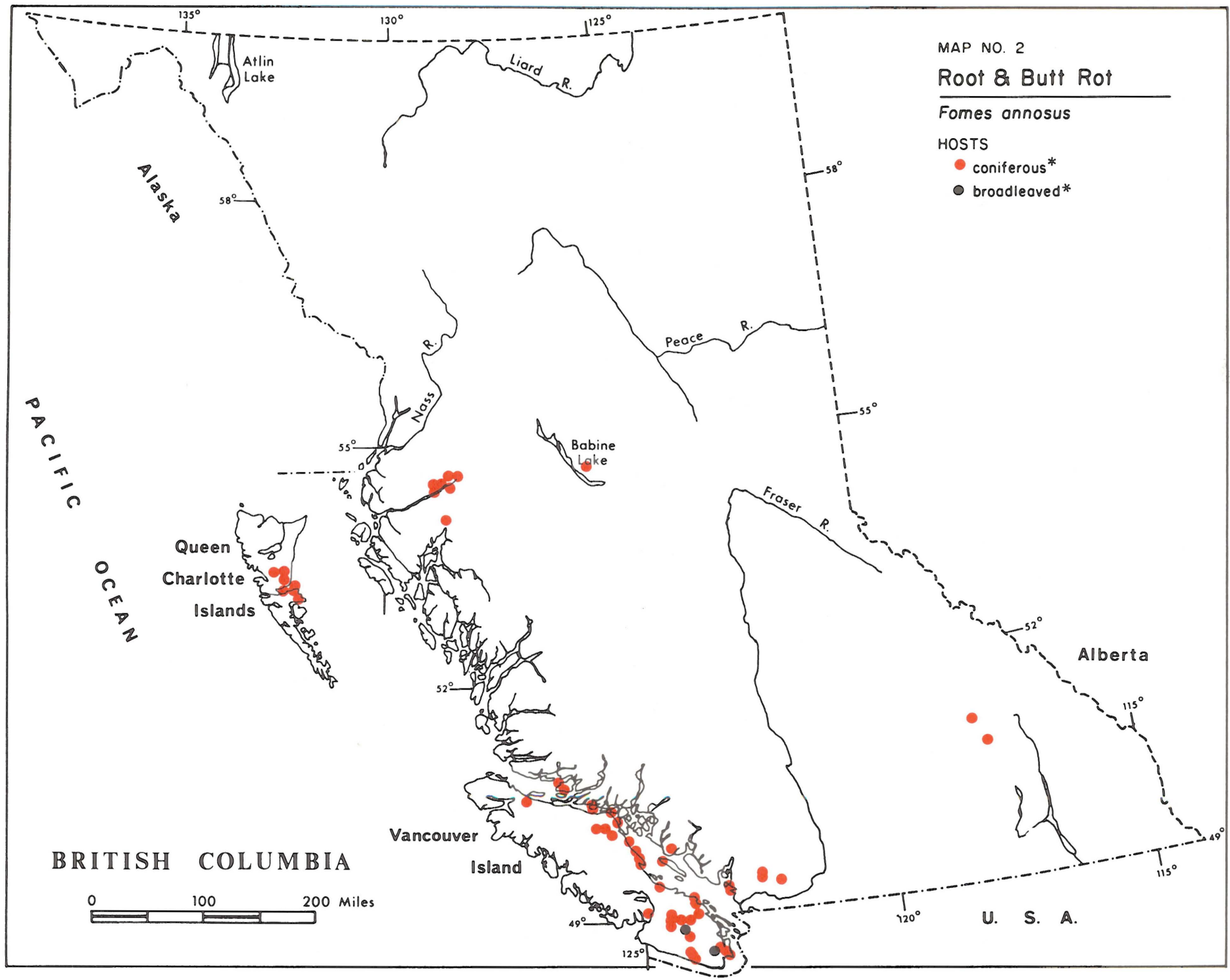
<i>Abies amabilis</i>	<i>Acer macrophyllum</i>
<i>A. grandis</i>	<i>Alnus rubra</i>
<i>Picea glauca</i>	
<i>P. sitchensis</i>	
<i>Pseudotsuga menziesii</i>	
<i>Thuja plicata</i>	
<i>Tsuga heterophylla</i>	

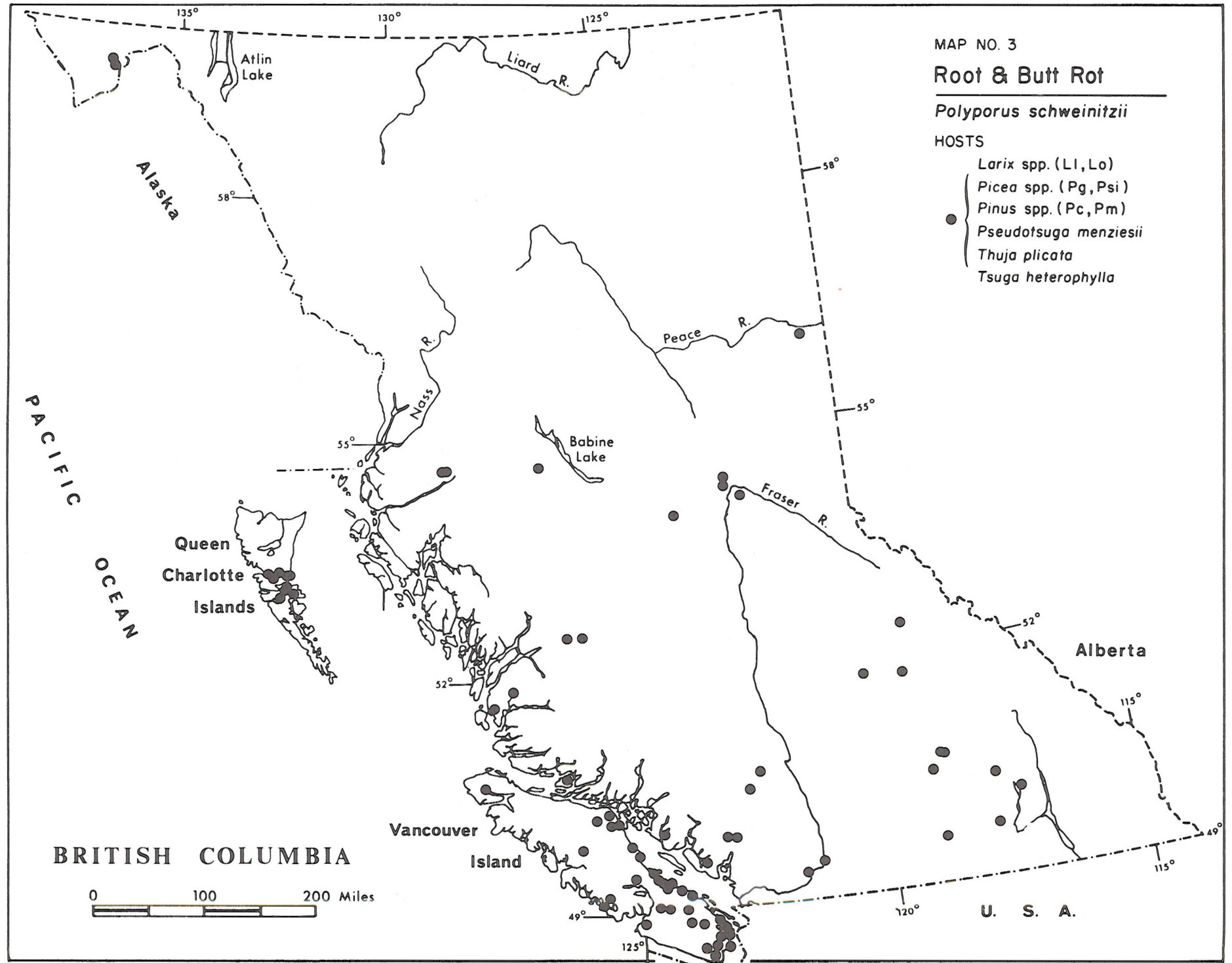
MAP NO. 2
Root & Butt Rot

Fomes annosus

HOSTS

- coniferous*
- broadleaved*





MAP NO. 4

Root & Butt Rots

Polyporus tomentosus

HOSTS

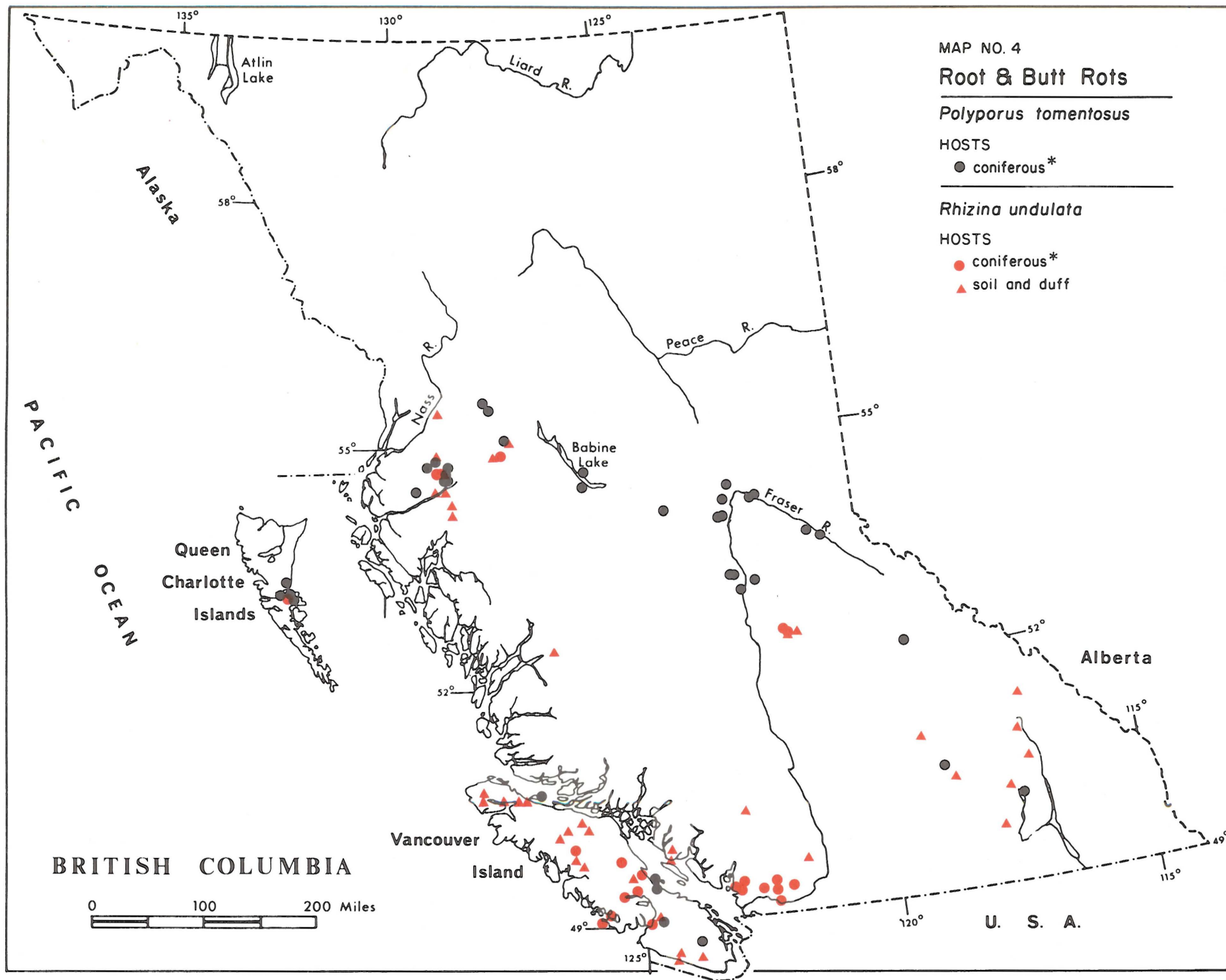
● coniferous*

Rhizina undulata

HOSTS

● coniferous*

▲ soil and duff



Map 4 *Polyporus tomentosus*

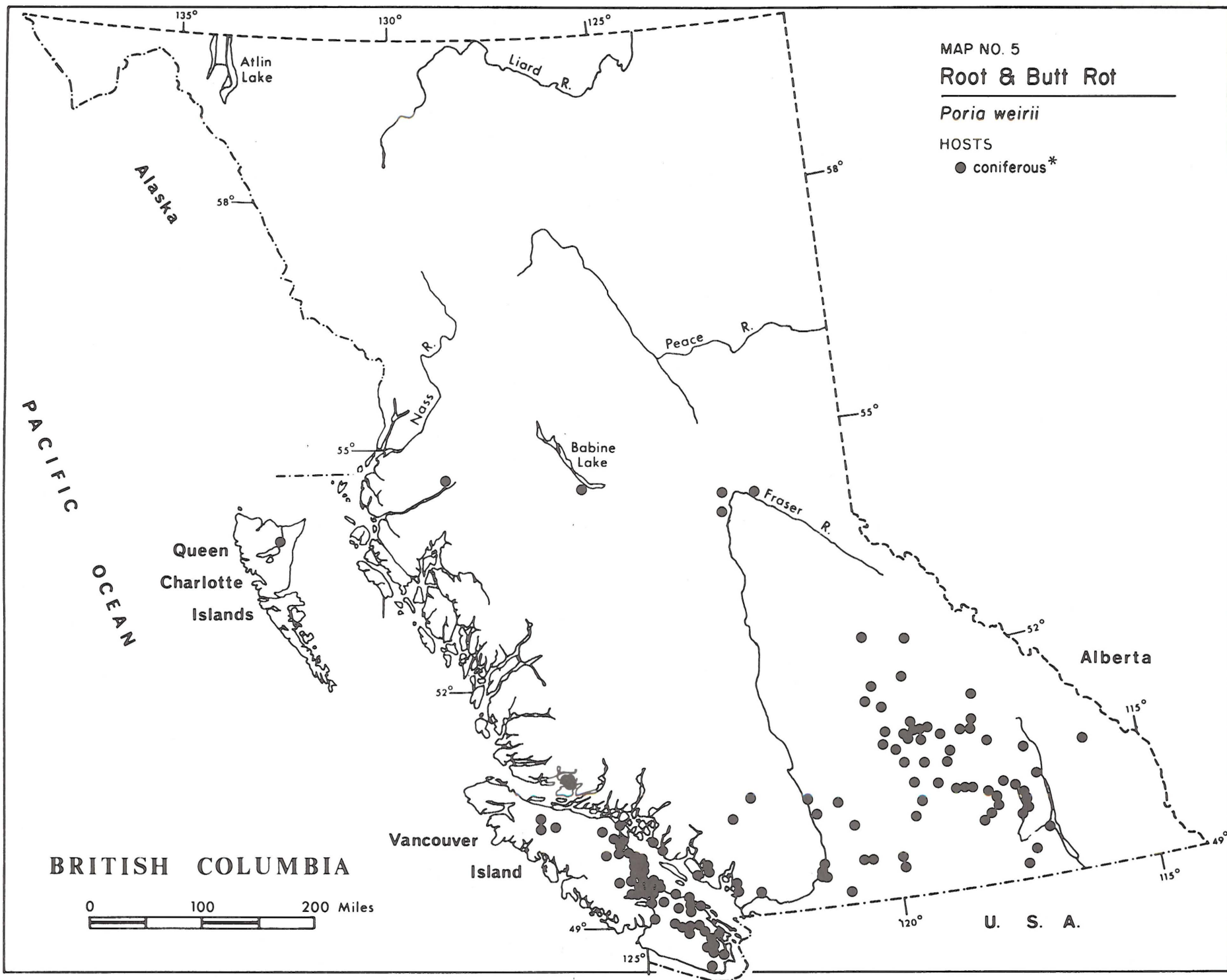
Abies amabilis
Picea engelmannii
P. glauca
P. sitchensis
Pinus contorta
P. monticola
Tsuga heterophylla

Rhizina undulata

Larix occidentalis
Picea engelmannii
P. glauca
P. sitchensis
Pinus contorta
Pseudotsuga menziesii
Tsuga heterophylla

Map 5 *Poria weirii*

Abies amabilis
A. grandis
A. lasiocarpa
Chamaecyparis nootkatensis
Larix occidentalis
Picea sitchensis
Pinus contorta
P. monticola
P. ponderosa
Pseudotsuga menziesii
Thuja plicata
Tsuga heterophylla



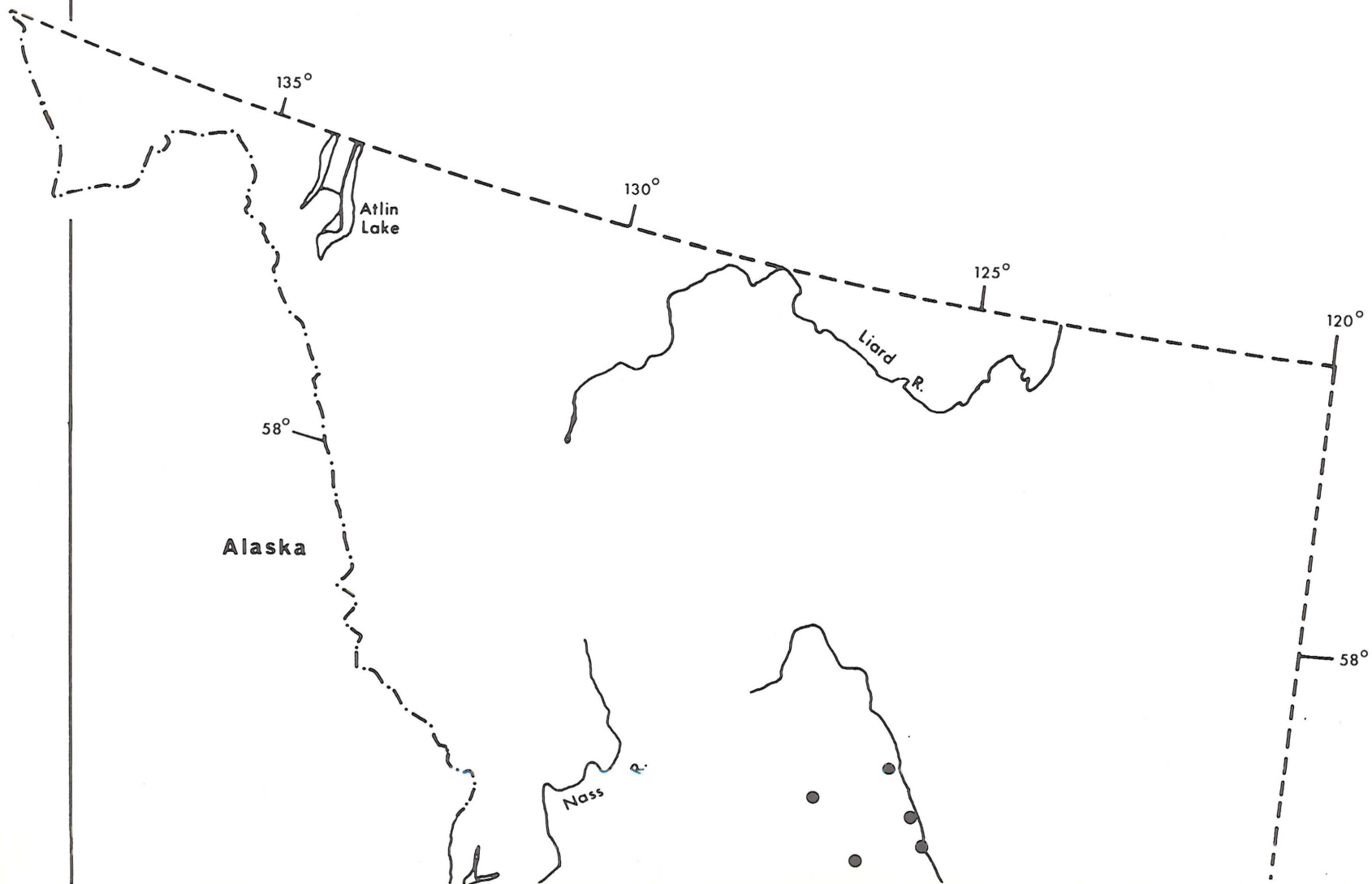
MAP NO. 6

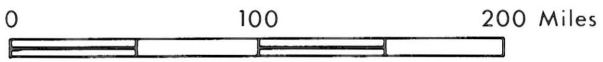
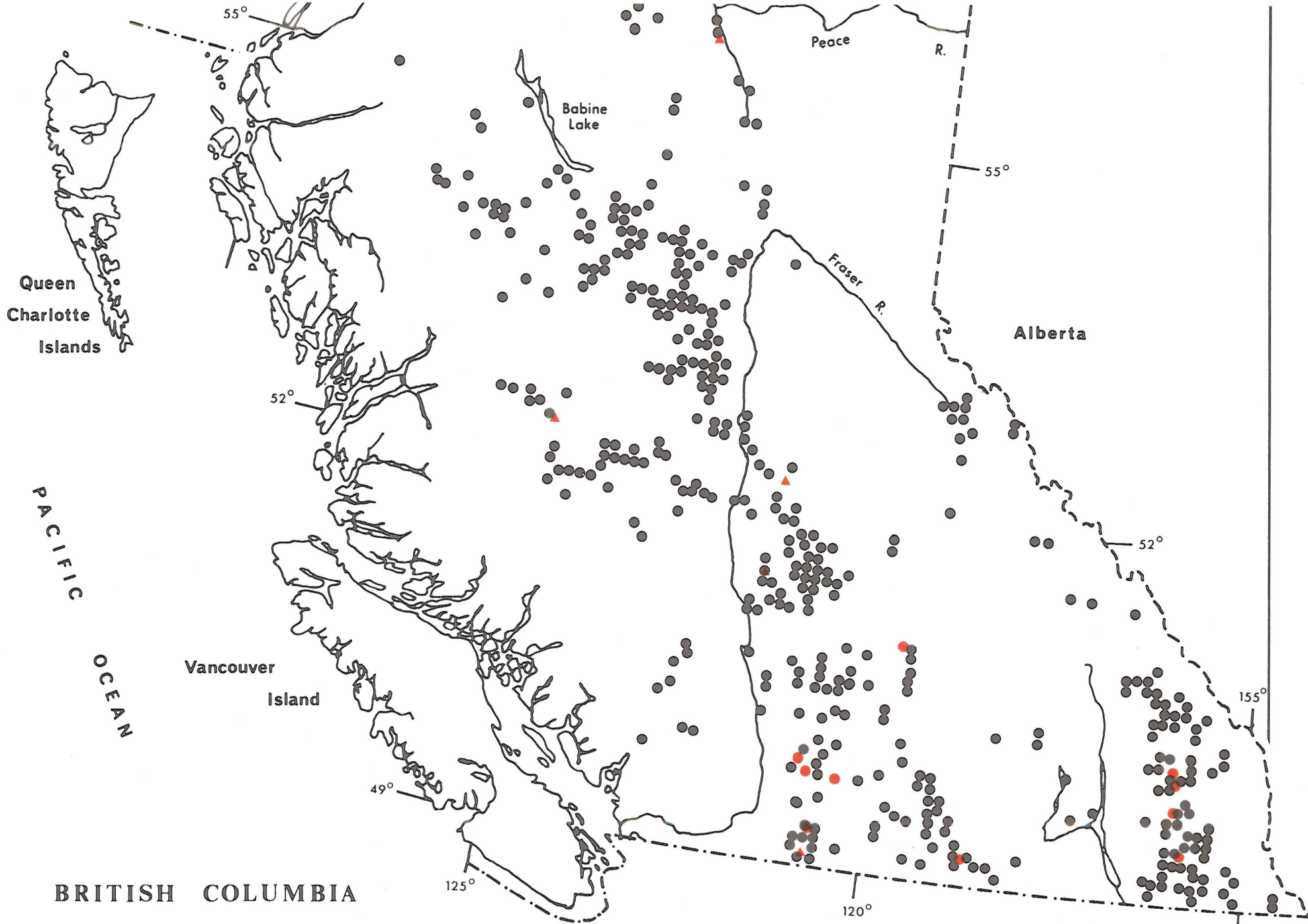
Dwarf Mistletoe*Arceuthobium americanum*

PRINCIPAL HOSTS

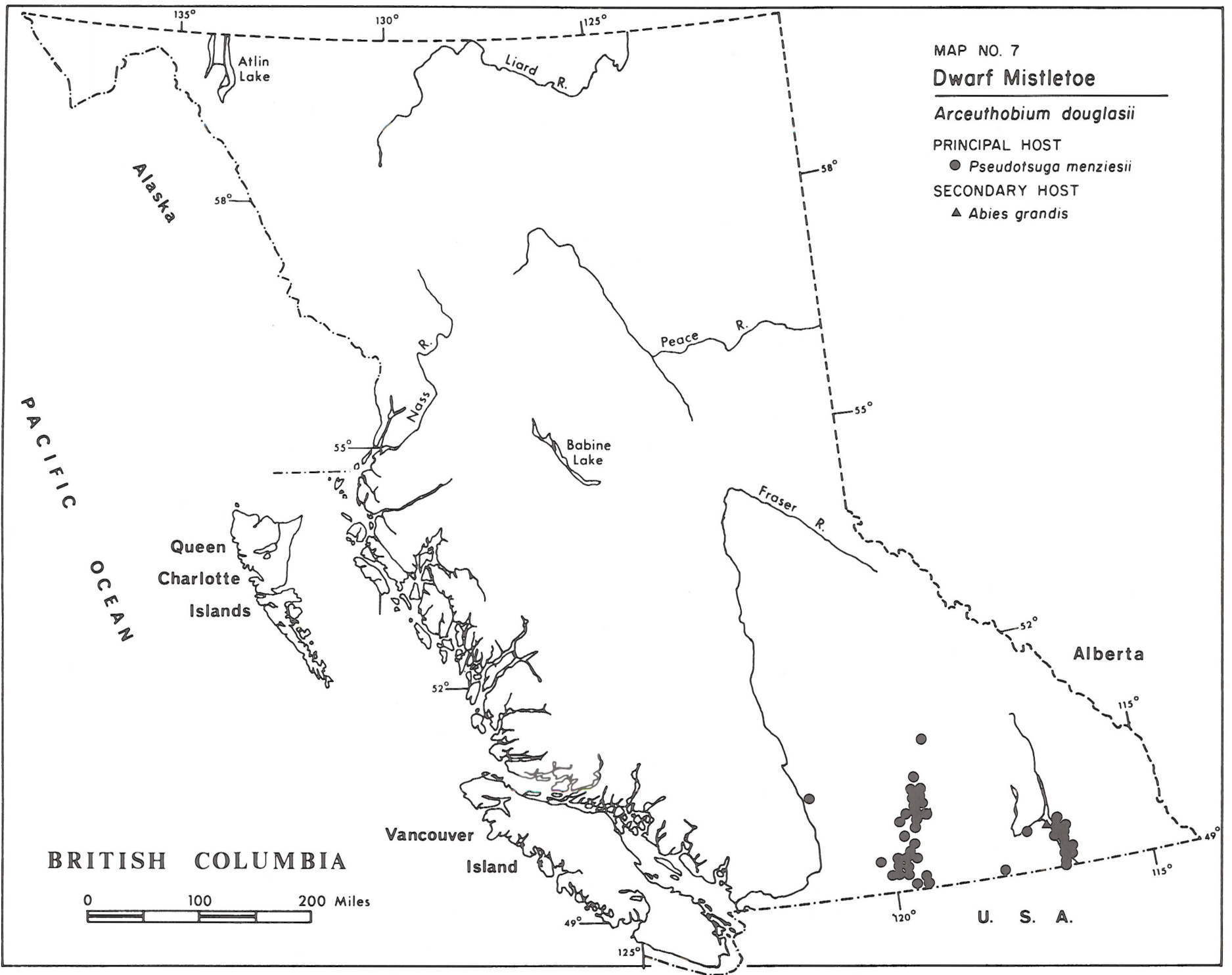
● *Pinus contorta*● *Pinus ponderosa*

SECONDARY HOSTS

▲ *Picea* spp. (Pe, Pg)



U. S. A.



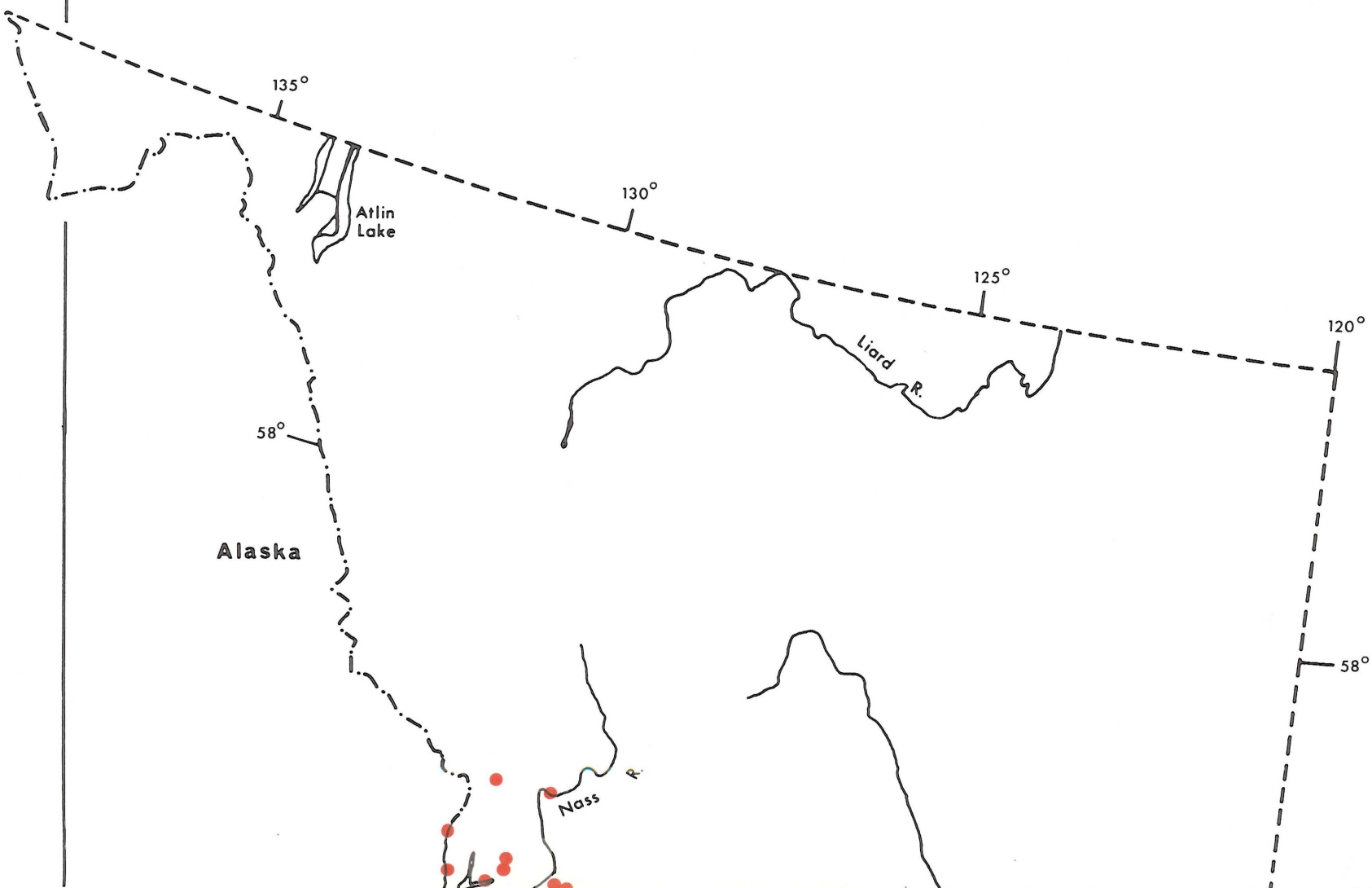
MAP NO. 8

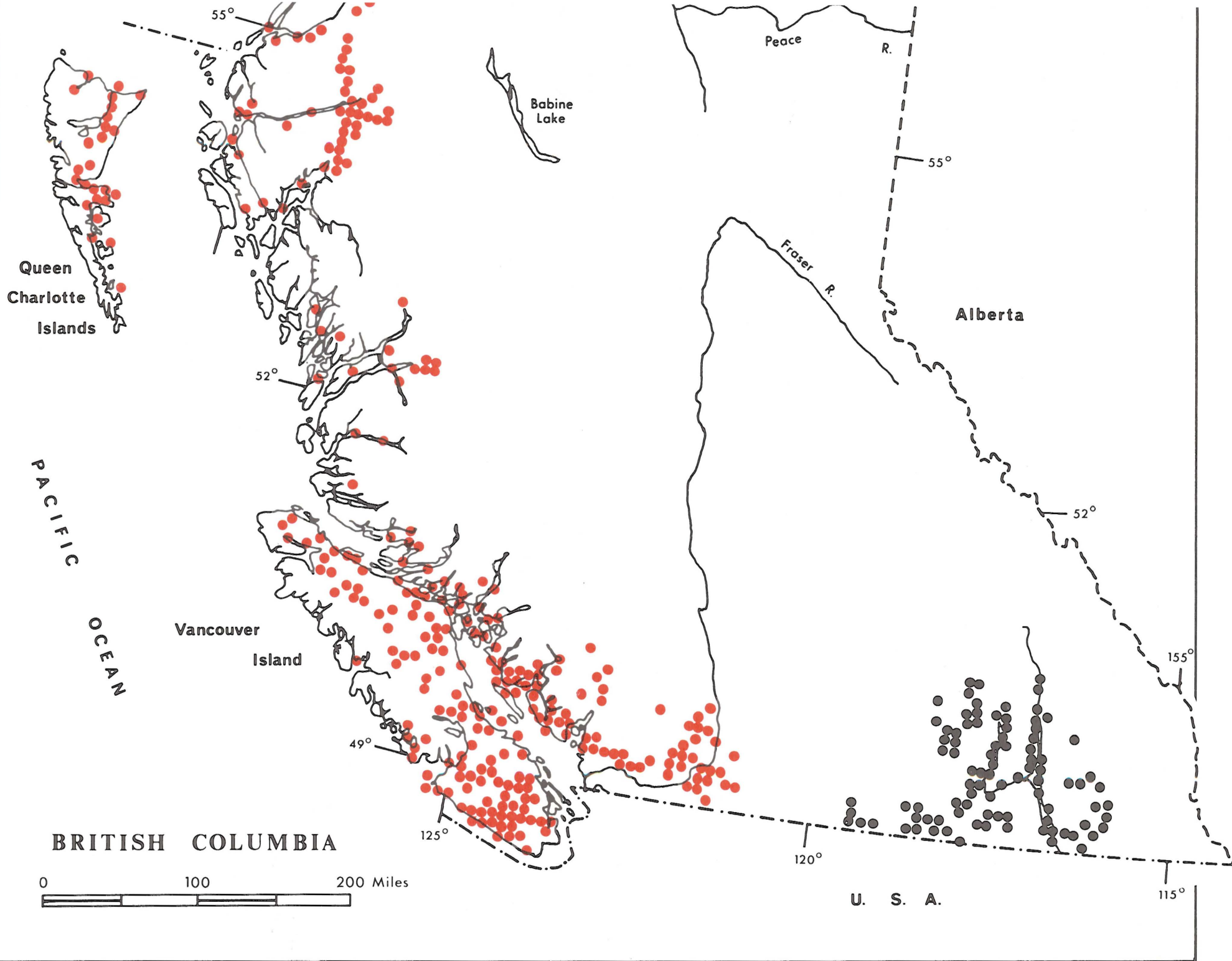
Dwarf Mistletoes*Arceuthobium laricis*

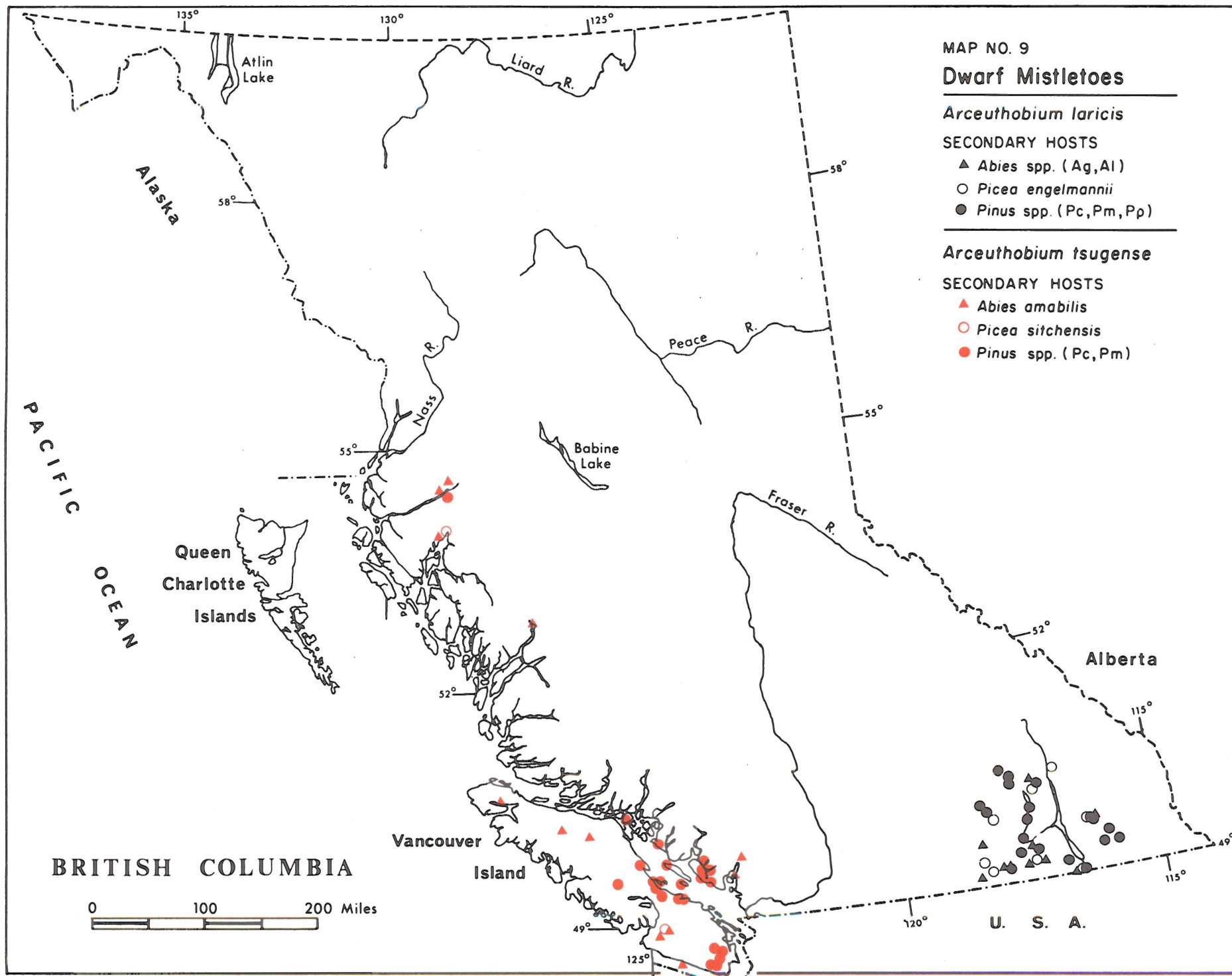
PRINCIPAL HOST

● *Larix occidentalis**Arceuthobium tsugense*

PRINCIPAL HOST

● *Tsuga heterophylla*





MAP NO. 10

Stem Rust

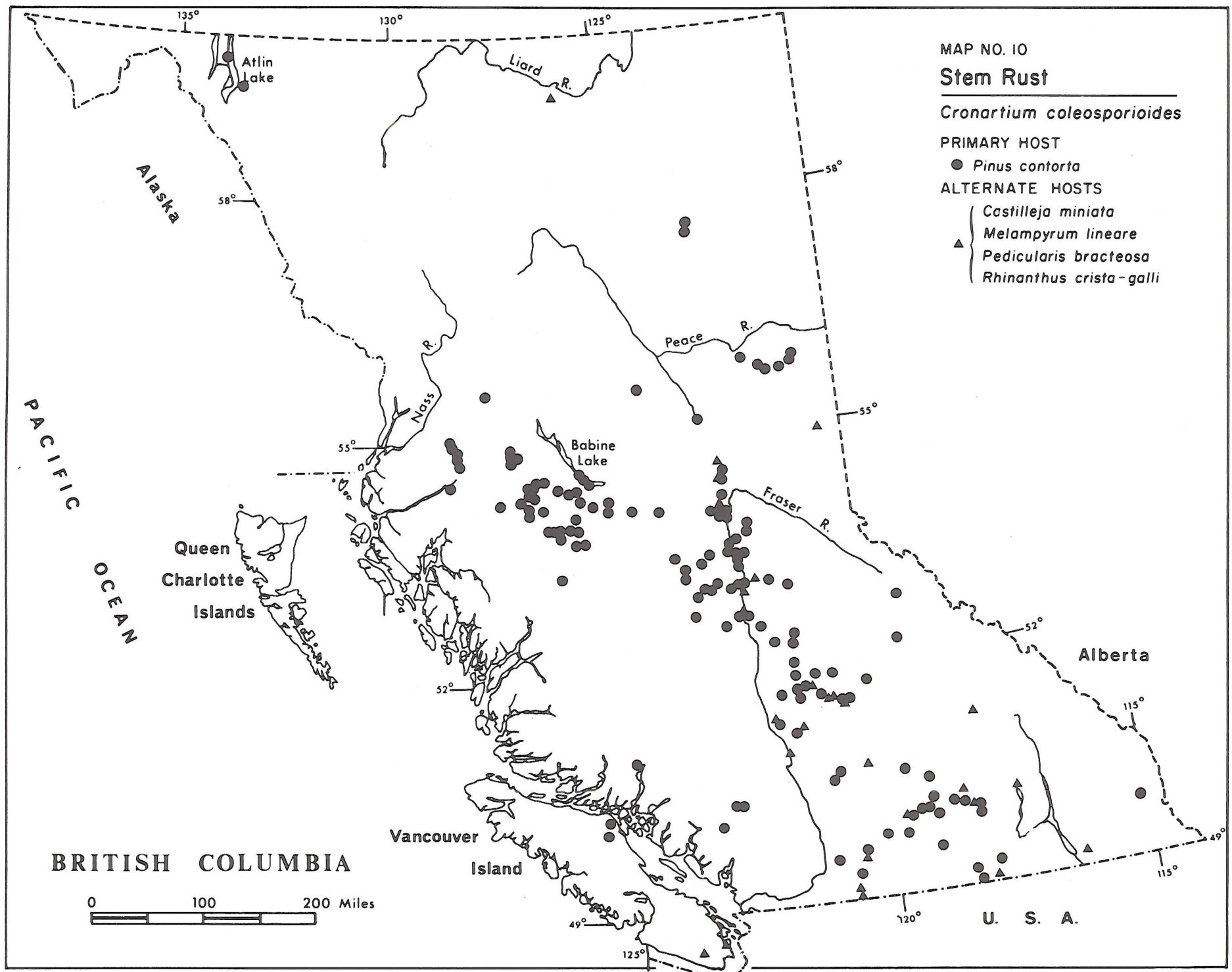
Cronartium coleosporioides

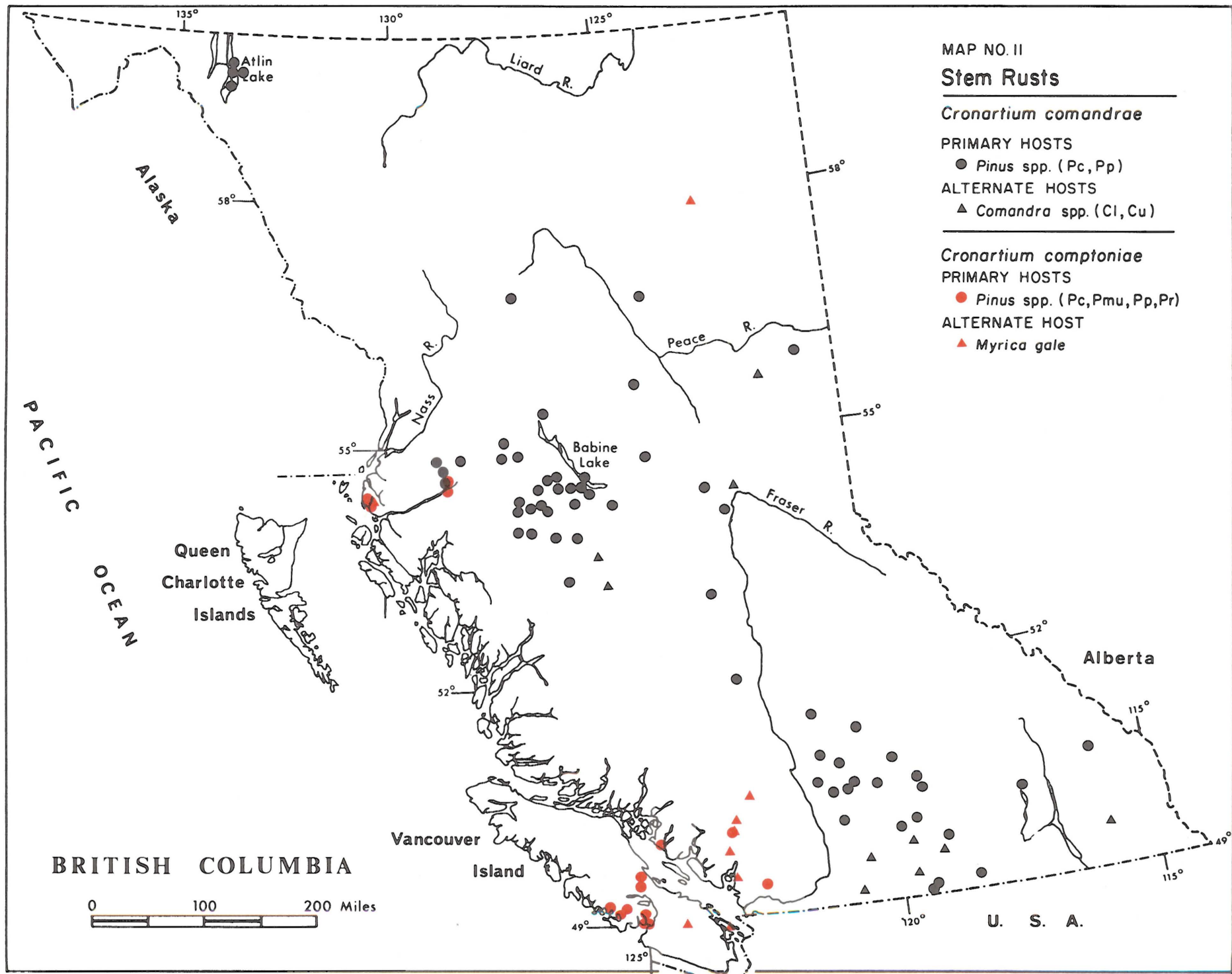
PRIMARY HOST

● *Pinus contorta*

ALTERNATE HOSTS

- ▲ *Castilleja miniata*
- ▲ *Melampyrum lineare*
- ▲ *Pedicularis bracteosa*
- ▲ *Rhinanthus crista-galli*





MAP NO. 12
Stem Rust

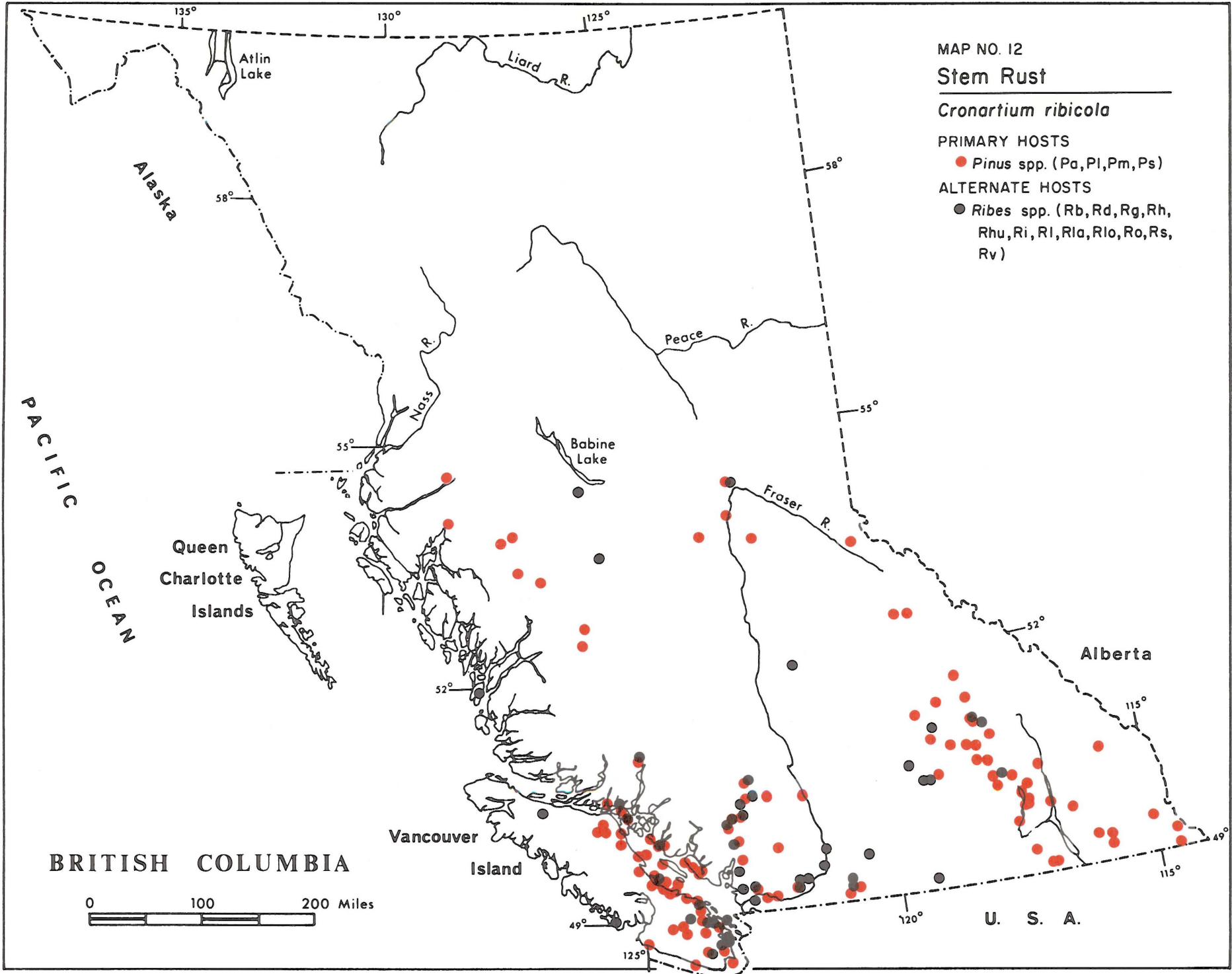
Cronartium ribicola

PRIMARY HOSTS

- *Pinus* spp. (Pa, Pl, Pm, Ps)

ALTERNATE HOSTS

- *Ribes* spp. (Rb, Rd, Rg, Rh, Rhu, Ri, Rl, Rla, Rlo, Ro, Rs, Rv)



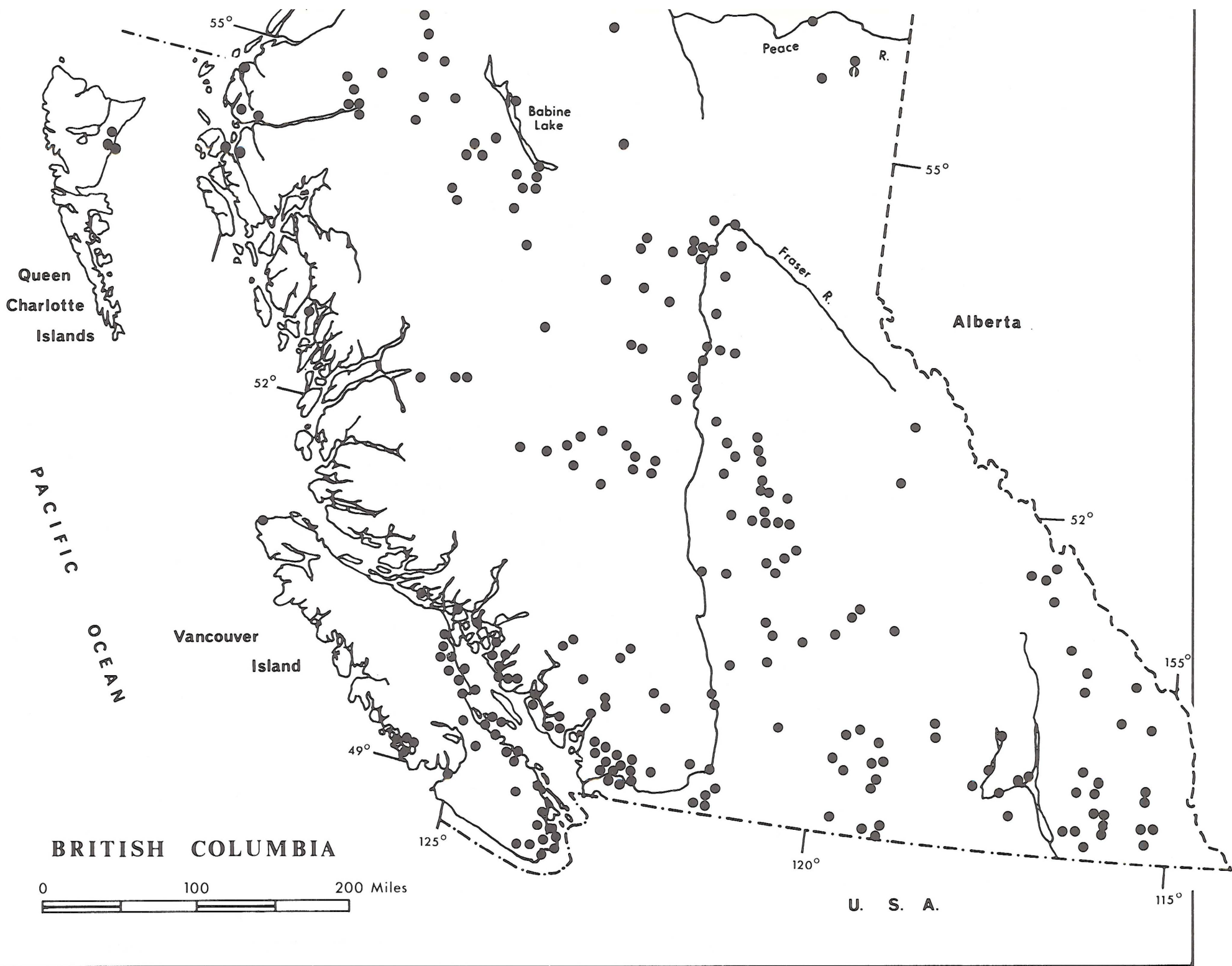
MAP NO. 13
Stem Rust

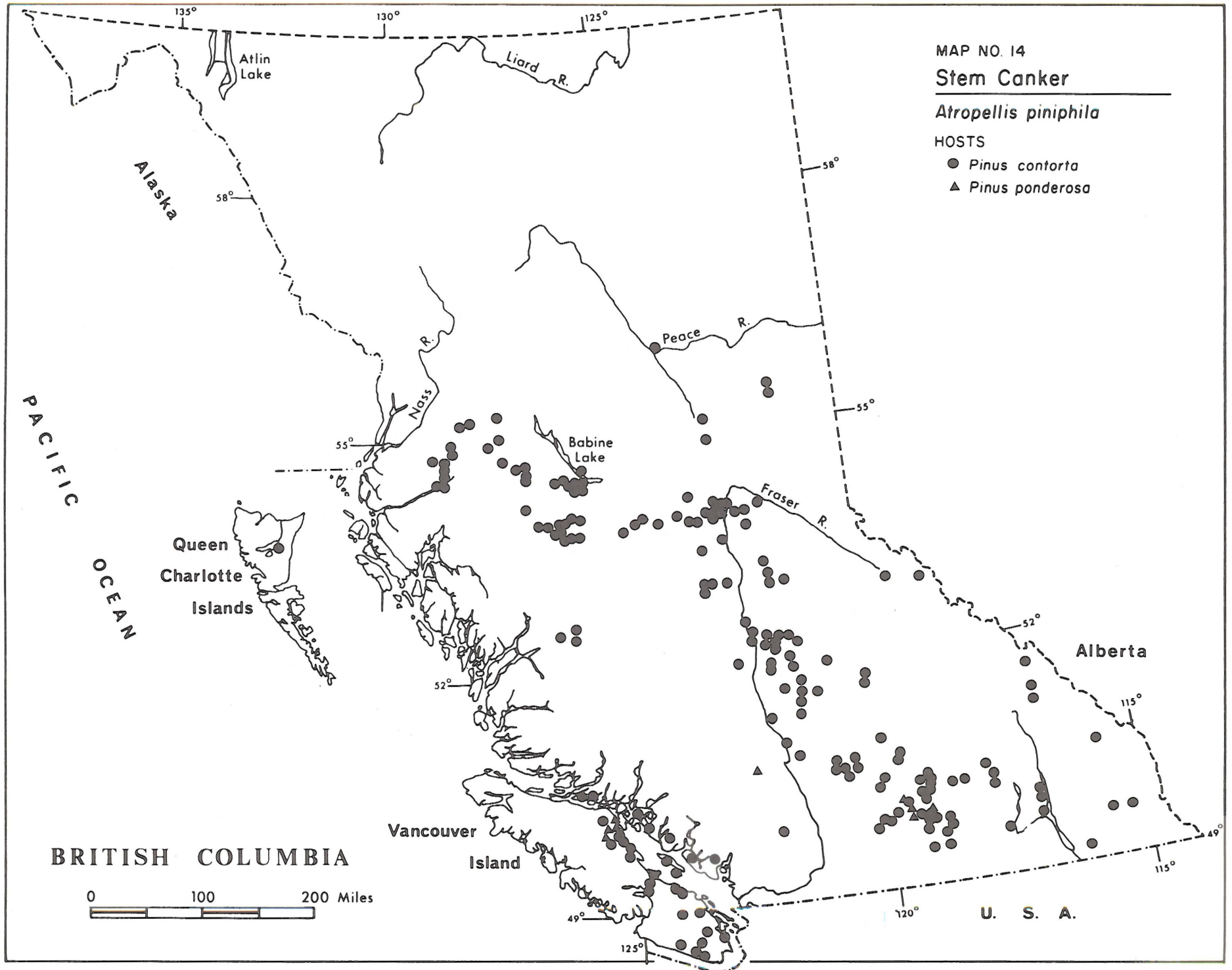
Endocronartium harknessii

HOSTS

- *Pinus* spp. (Pc, Pmu, Pmug,
Pn, Pp, Ppi, Pr, Psy)







MAP NO. 15

Stem Cankers

Botryosphaeria tsugae

HOST

- *Tsuga heterophylla*

Sydowia polyspora

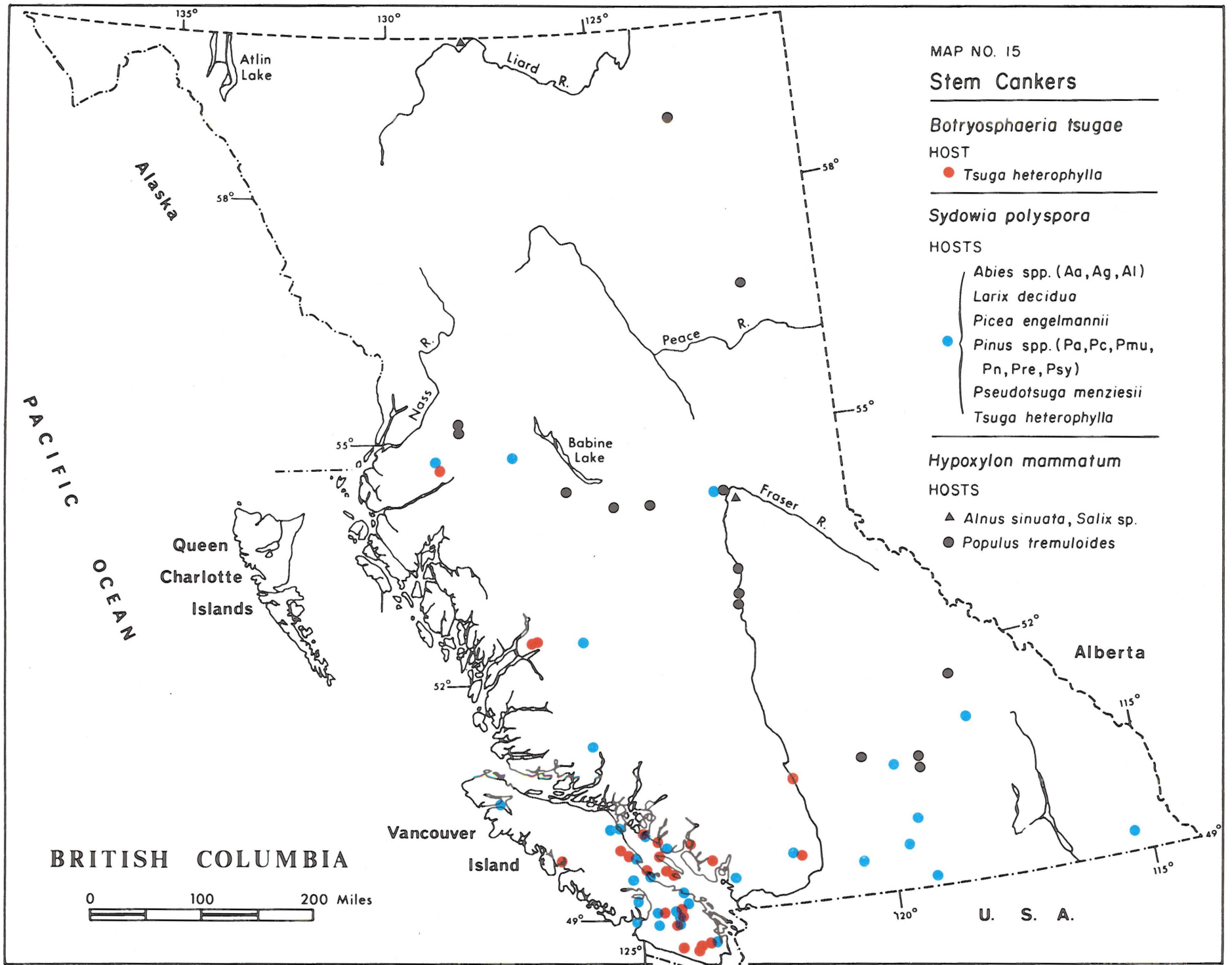
HOSTS

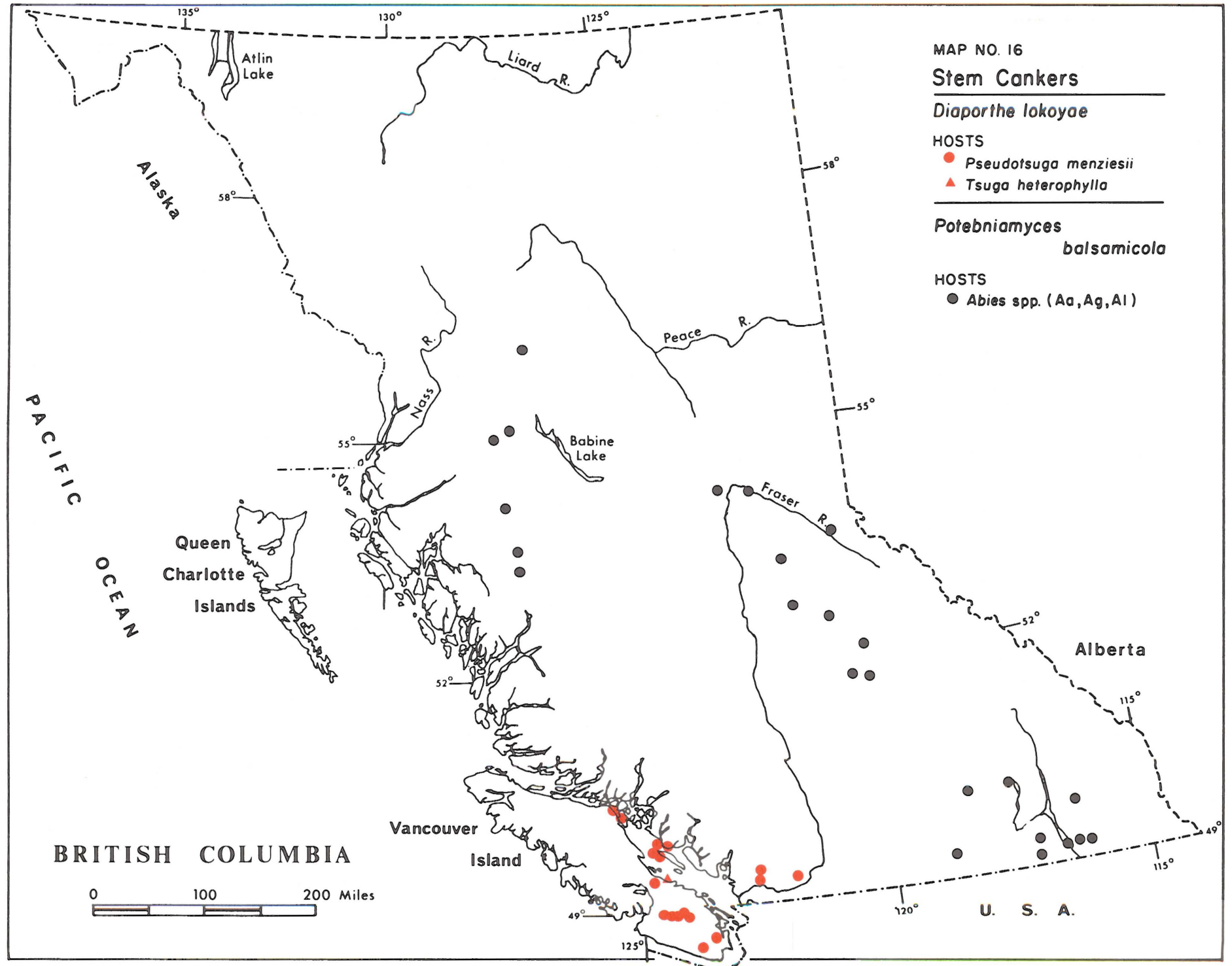
- Abies spp. (Aa, Ag, Al)
- Larix decidua
- Picea engelmannii
- Pinus spp. (Pa, Pc, Pmu, Pn, Pre, Psy)
- Pseudotsuga menziesii
- Tsuga heterophylla*

Hypoxylon mammatum

HOSTS

- ▲ *Alnus sinuata*, *Salix* sp.
- *Populus tremuloides*



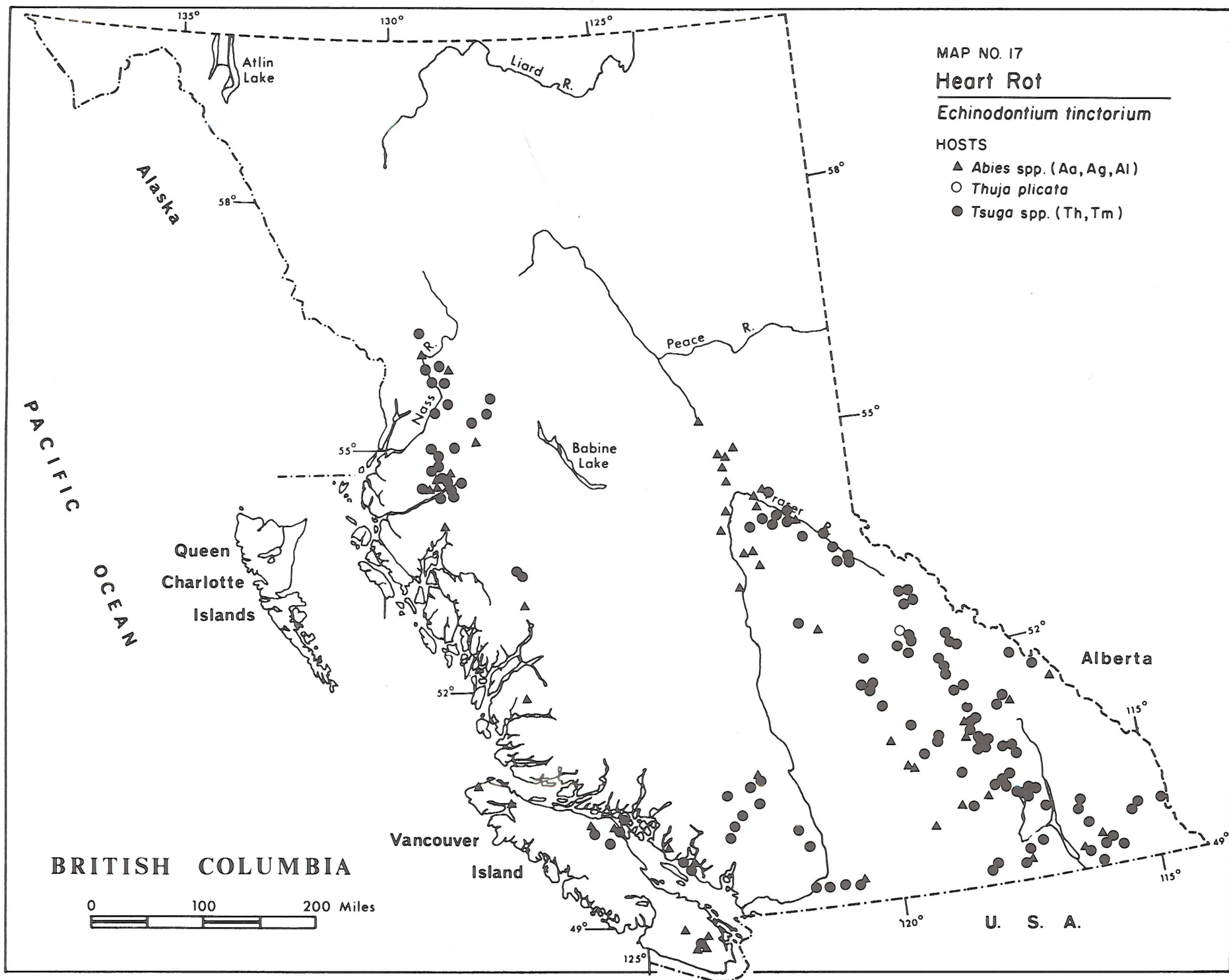


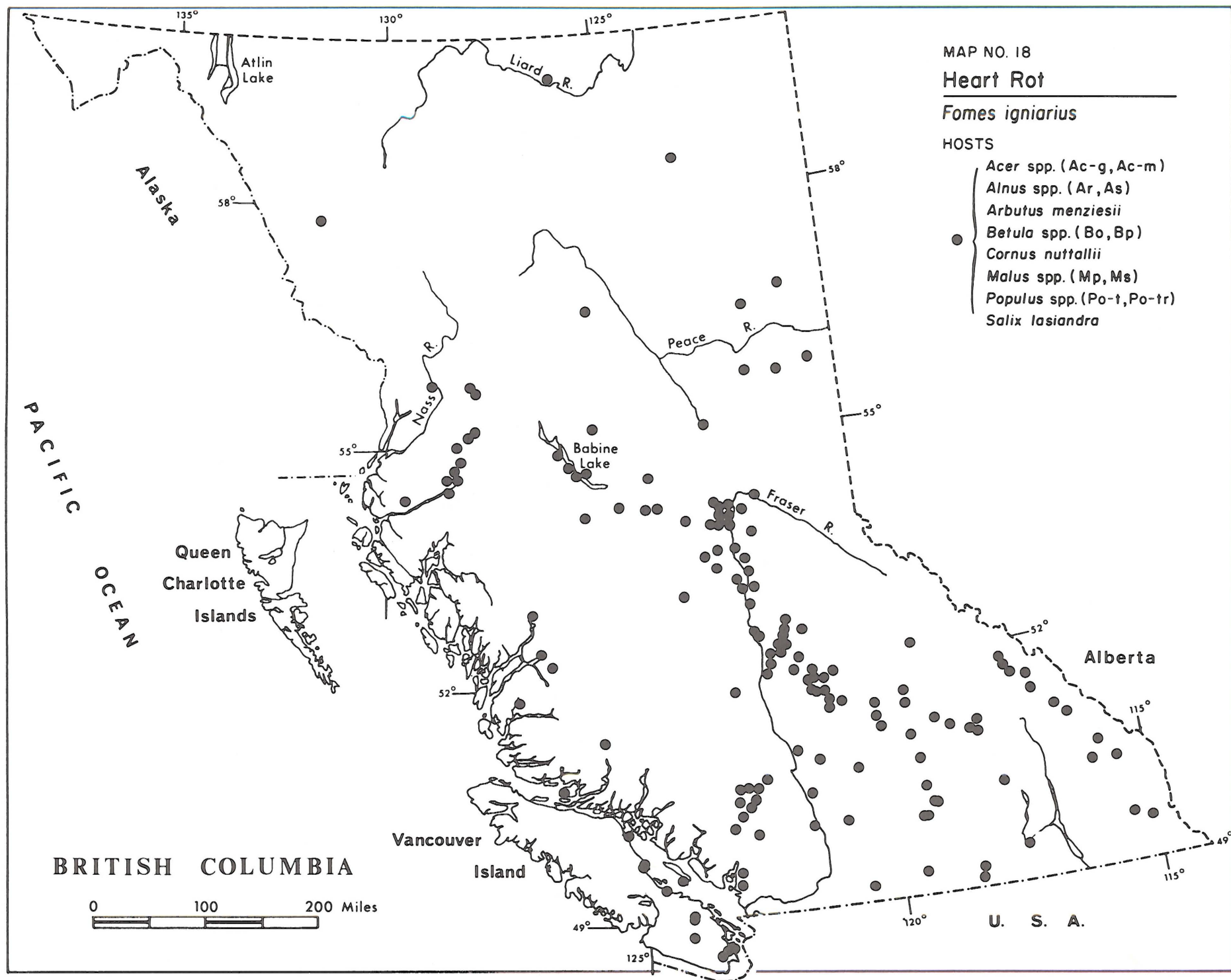
MAP NO. 17
Heart Rot

Echinodontium tinctorium

HOSTS

- ▲ *Abies* spp. (Aa, Ag, Al)
- *Thuja plicata*
- *Tsuga* spp. (Th, Tm)



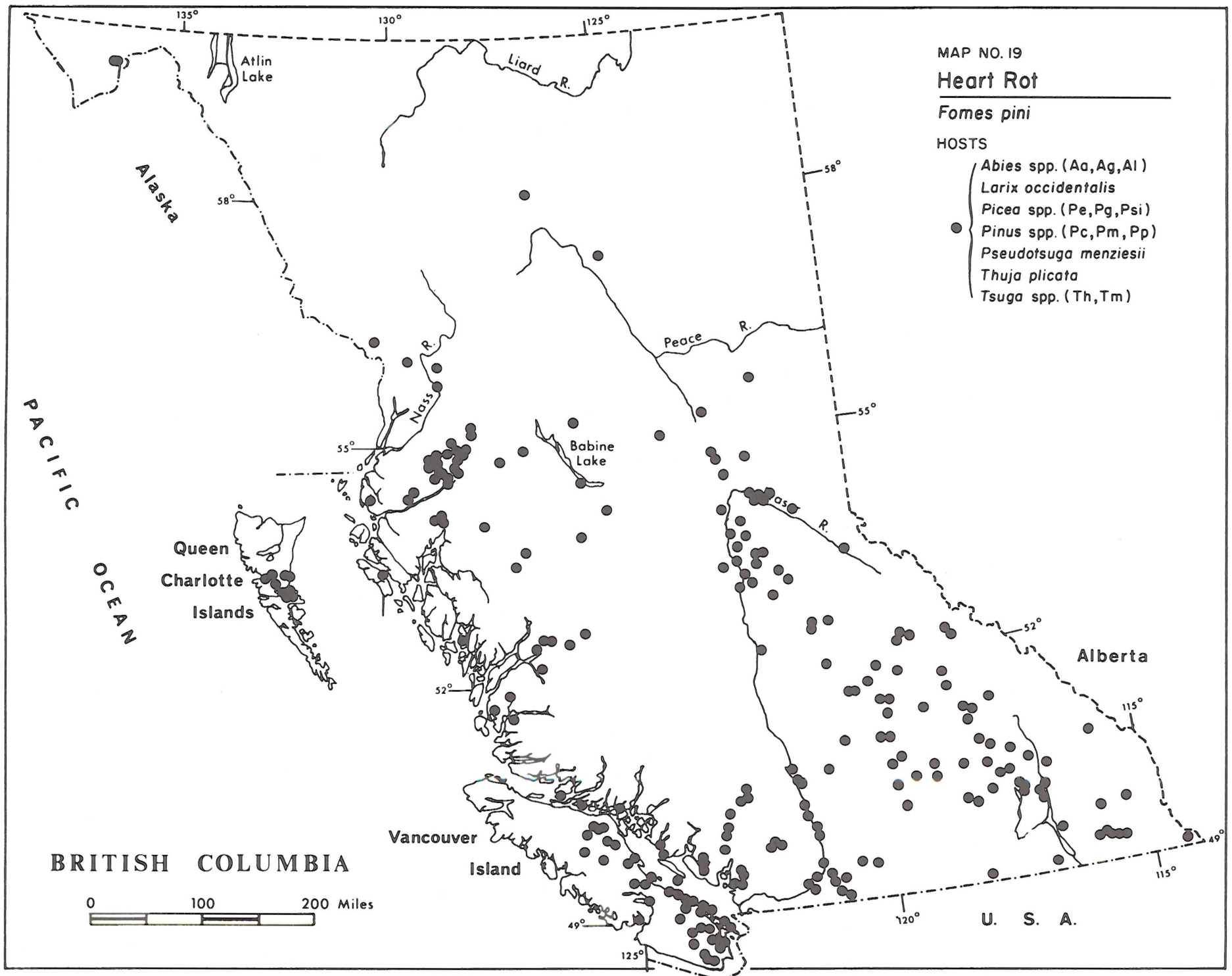


MAP NO. 19
Heart Rot

Fomes pini

HOSTS

- Abies spp. (Aa, Ag, Al)
- Larix occidentalis
- Picea spp. (Pe, Pg, Psi)
- Pinus spp. (Pc, Pm, Pp)
- Pseudotsuga menziesii
- Thuja plicata
- Tsuga spp. (Th, Tm)



Map 20 *Haematostereum sanguinolentum*

Abies amabilis

A. grandis

A. lasiocarpa

Larix occidentalis

Picea glauca

P. sitchensis

Pinus contorta

P. monticola

P. ponderosa

Pseudotsuga menziesii

Thuja plicata

Tsuga heterophylla

T. mertensiana

Polyporus sericeomollis

Abies lasiocarpa

Picea glauca

P. sitchensis

Pseudotsuga menziesii

Thuja plicata

MAP NO. 20
Heart Rot

Haematostereum sanguinolentum

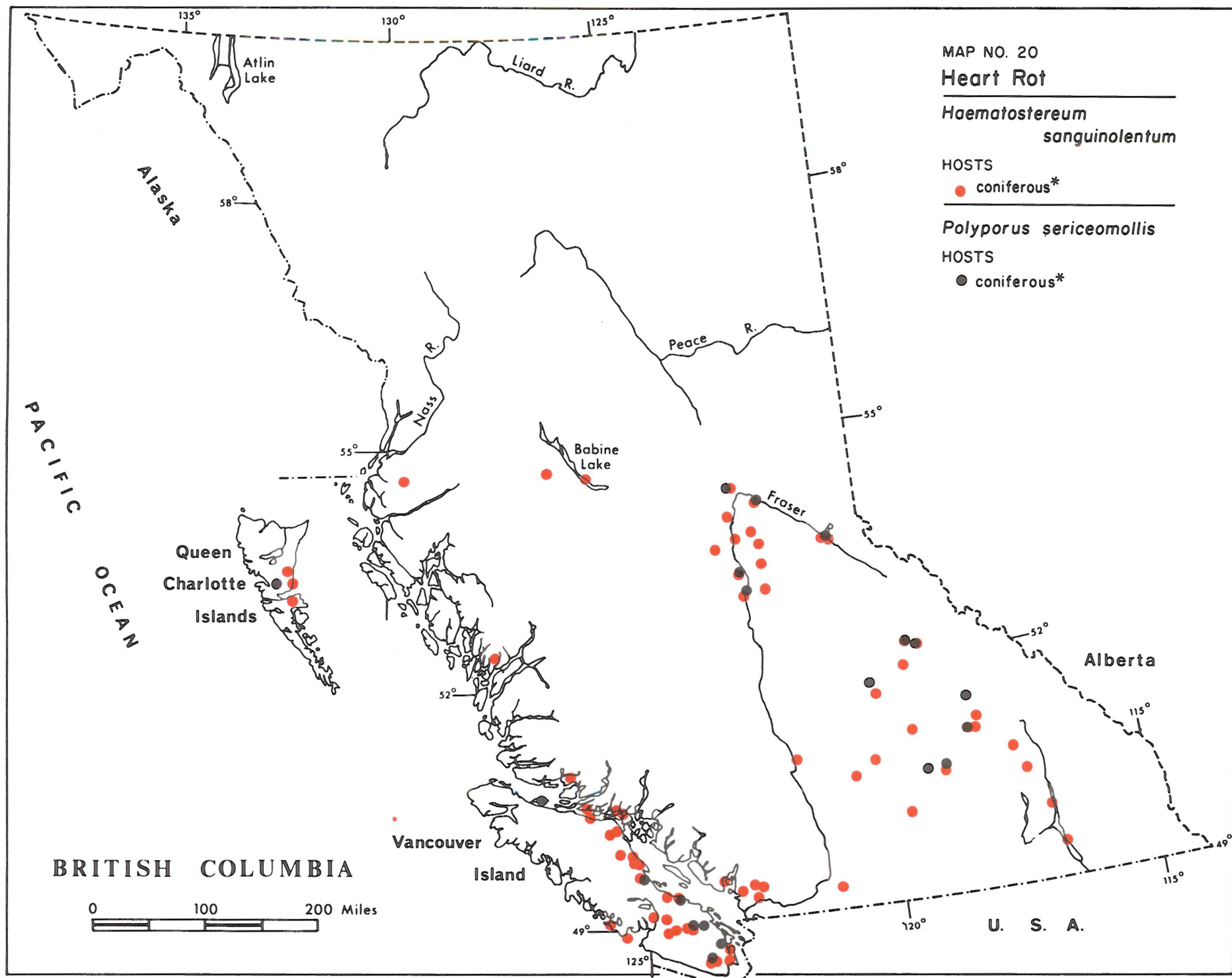
HOSTS

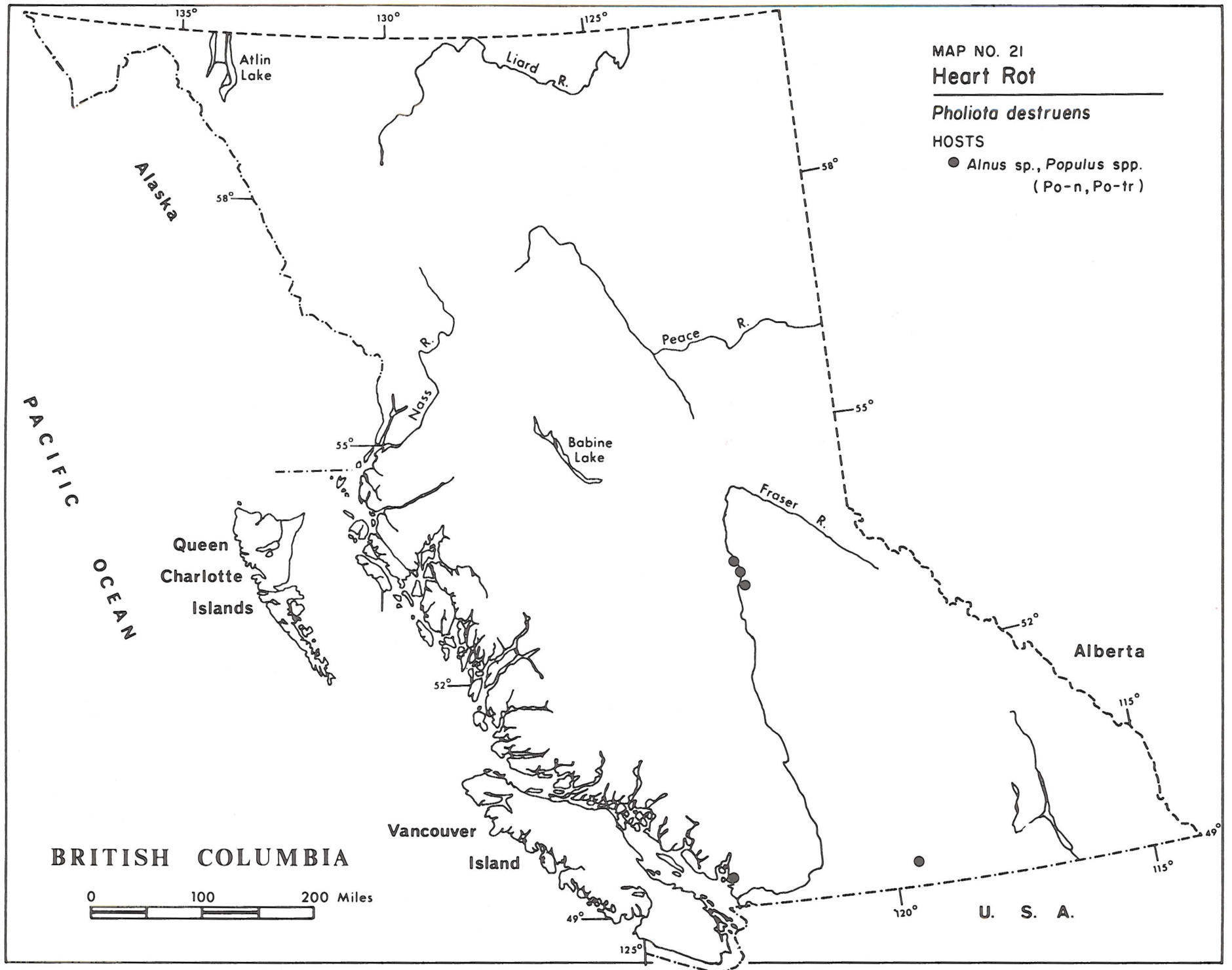
● coniferous*

Polyporus sericeomollis

HOSTS

● coniferous*





MAP NO. 22
Needle Blight

Delphinella spp.

HOST

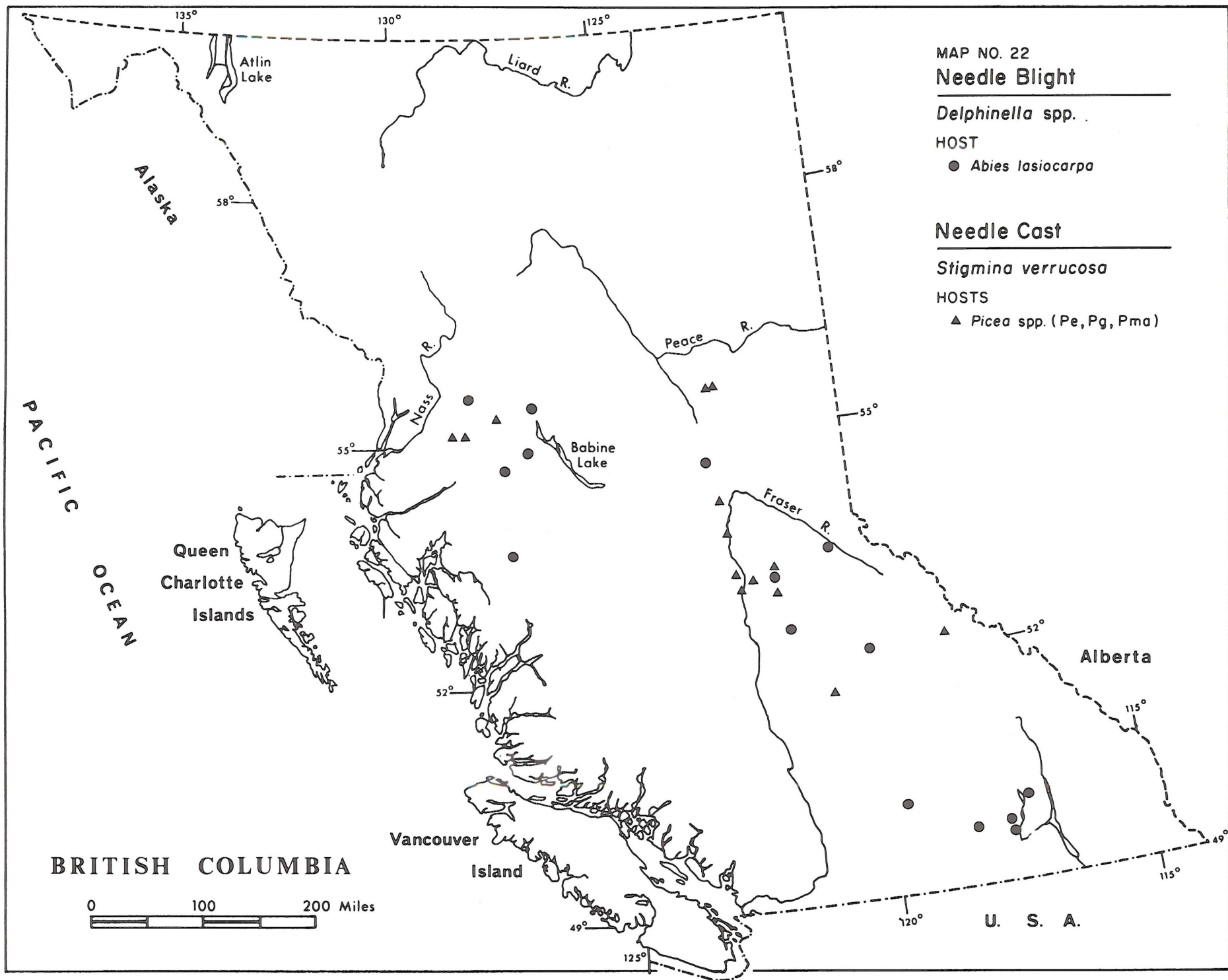
● *Abies lasiocarpa*

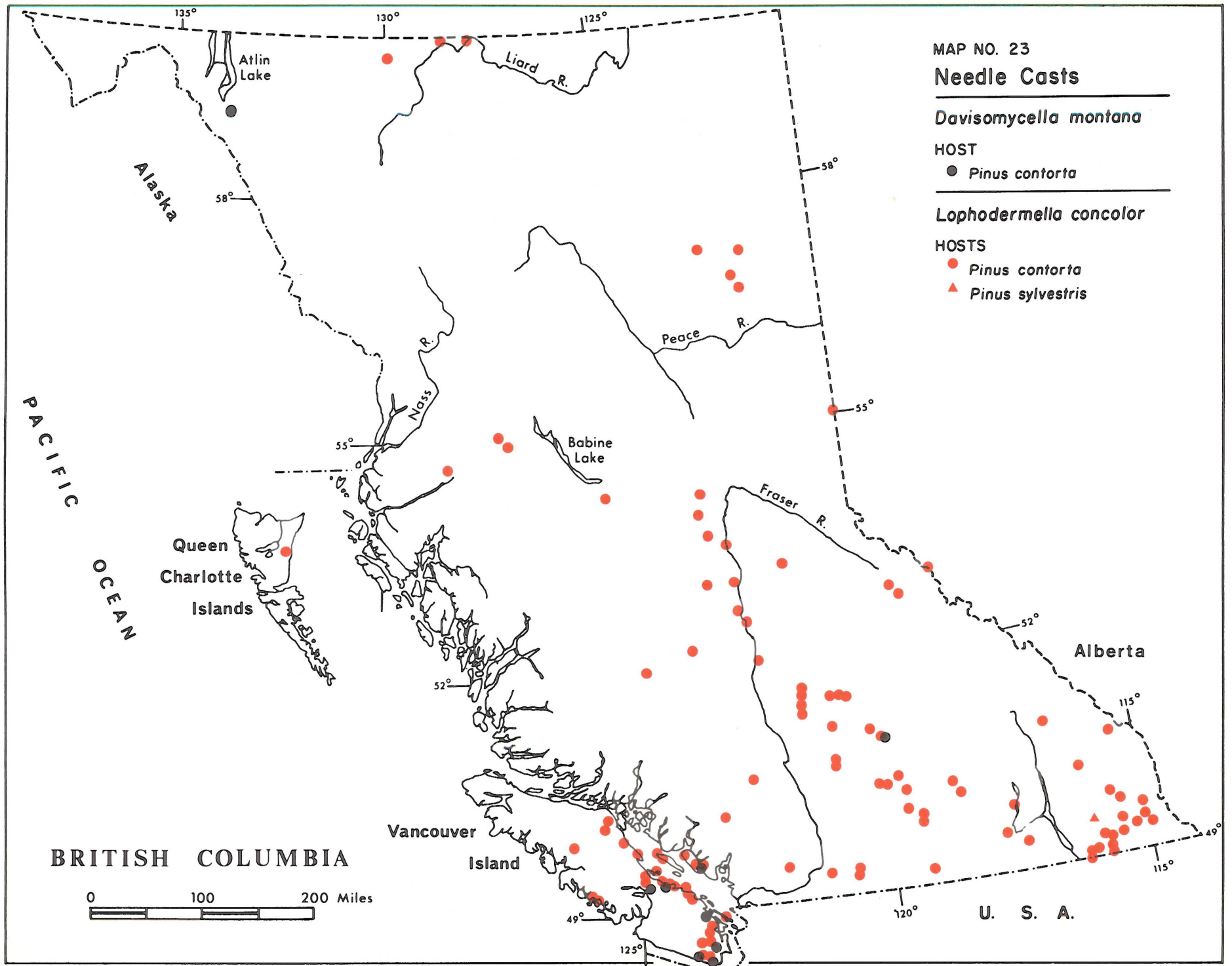
Needle Cast

Stigmina verrucosa

HOSTS

▲ *Picea* spp. (Pe, Pg, Pma)





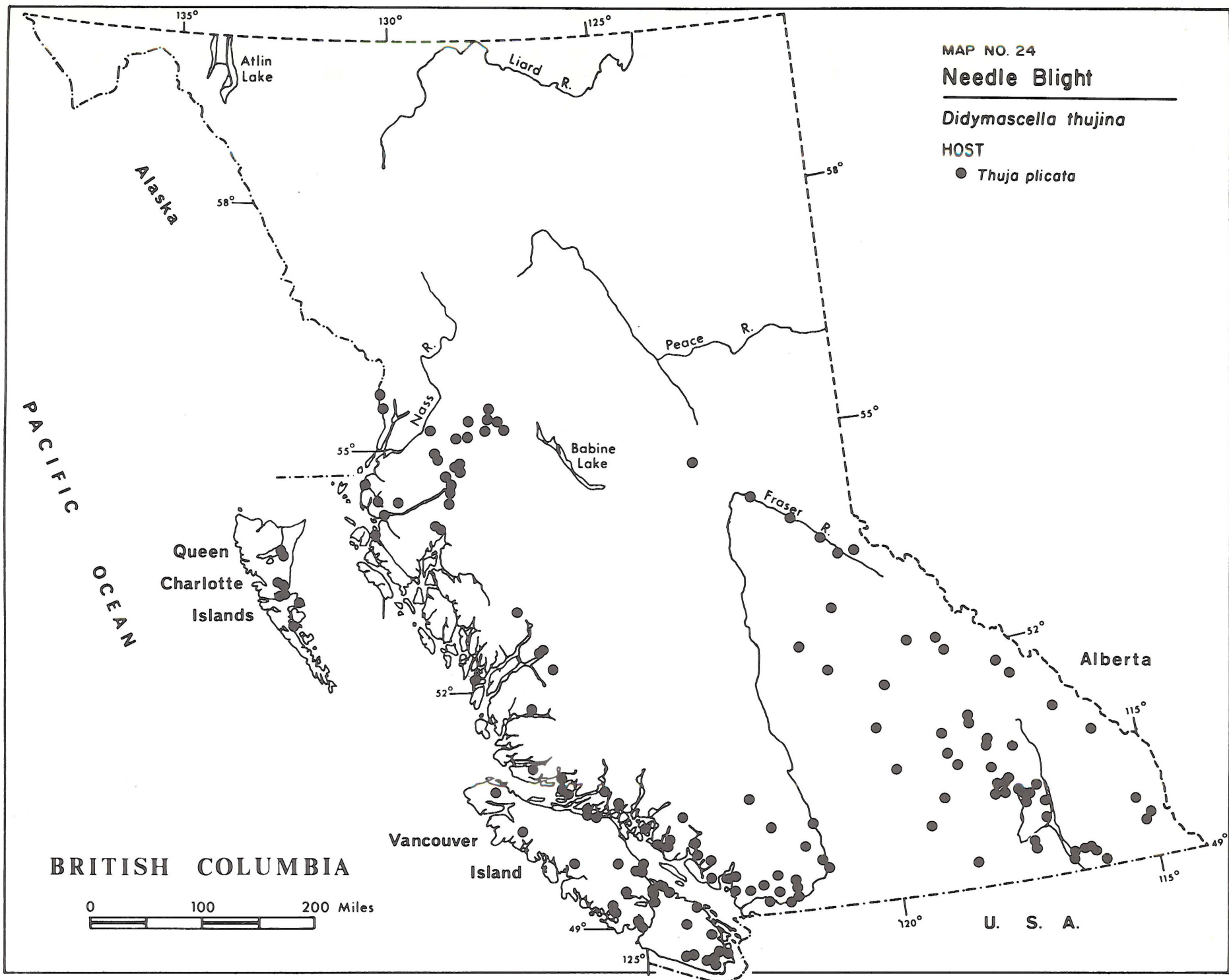
MAP NO. 24

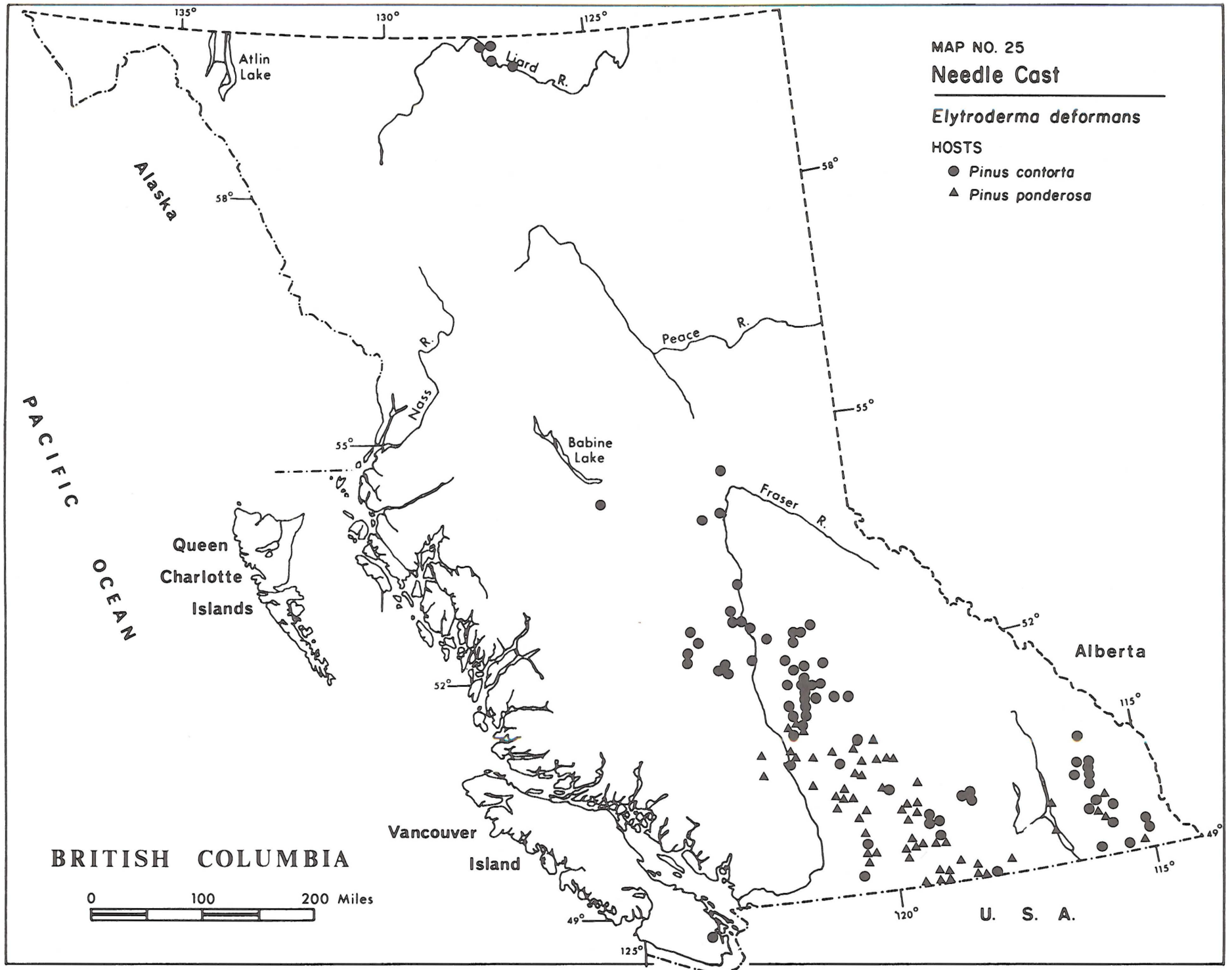
Needle Blight

Didymascella thujina

HOST

● *Thuja plicata*





MAP NO. 26

Needle Blight

Hypodermella laricis

HOST

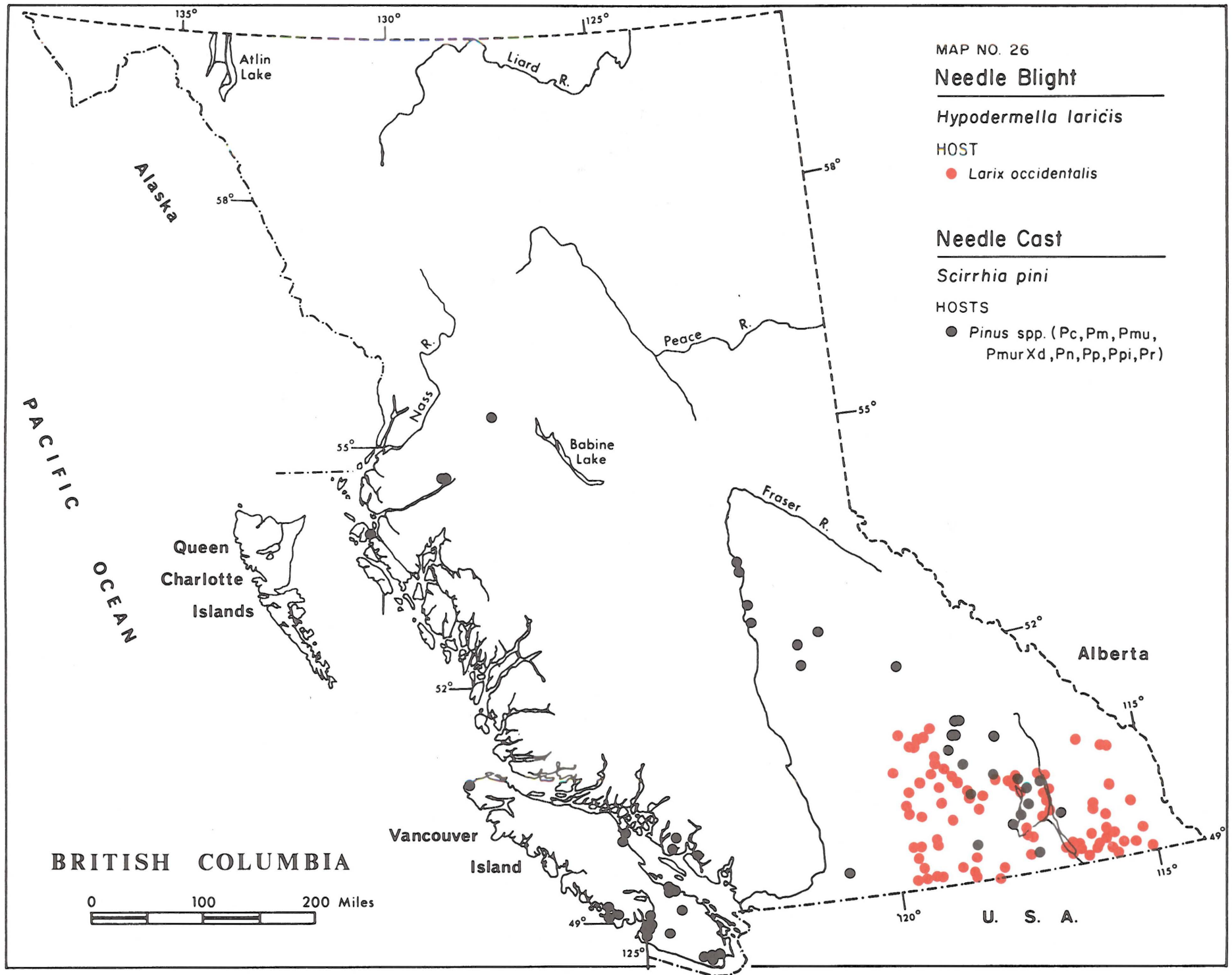
● *Larix occidentalis*

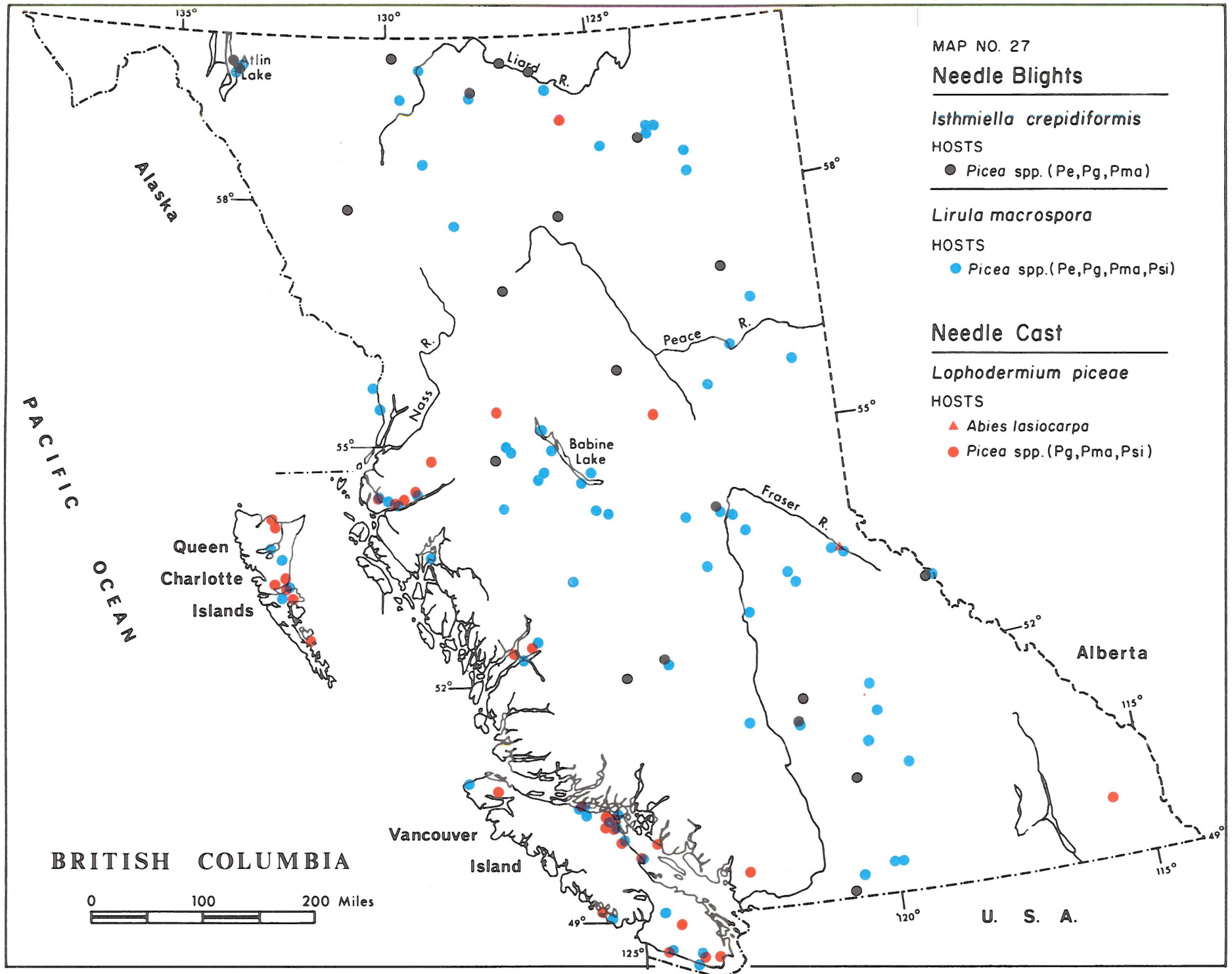
Needle Cast

Scirrhia pini

HOSTS

● *Pinus* spp. (Pc, Pm, Pmu, PmurXd, Pn, Pp, Ppi, Pr)





MAP NO. 28

Needle Blights

Isthmiella quadrispora

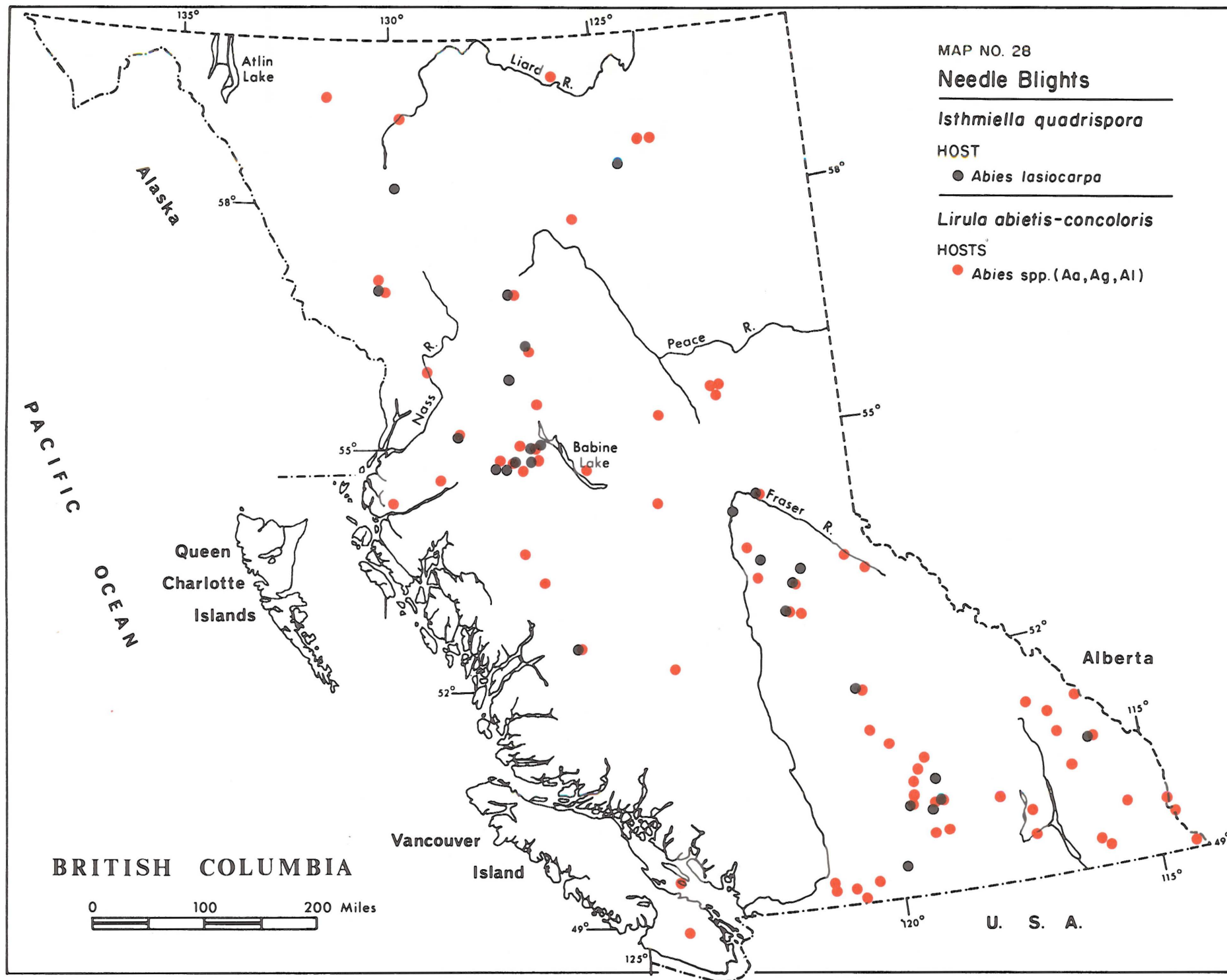
HOST

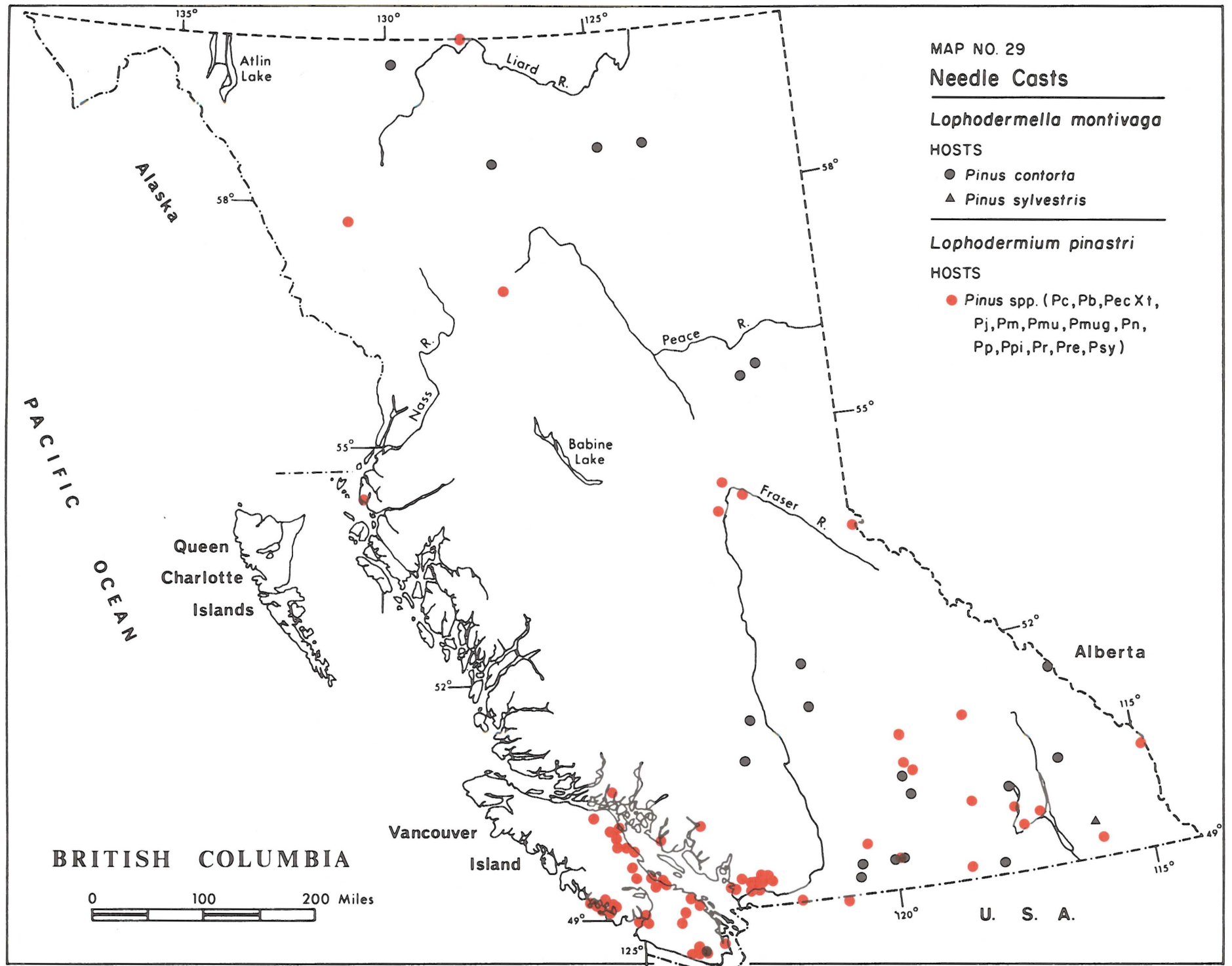
● *Abies lasiocarpa*

Lirula abietis-concoloris

HOSTS

● *Abies* spp. (Aa, Ag, Al)





MAP NO. 30

Needle Casts

Rhabdocline pseudotsugae

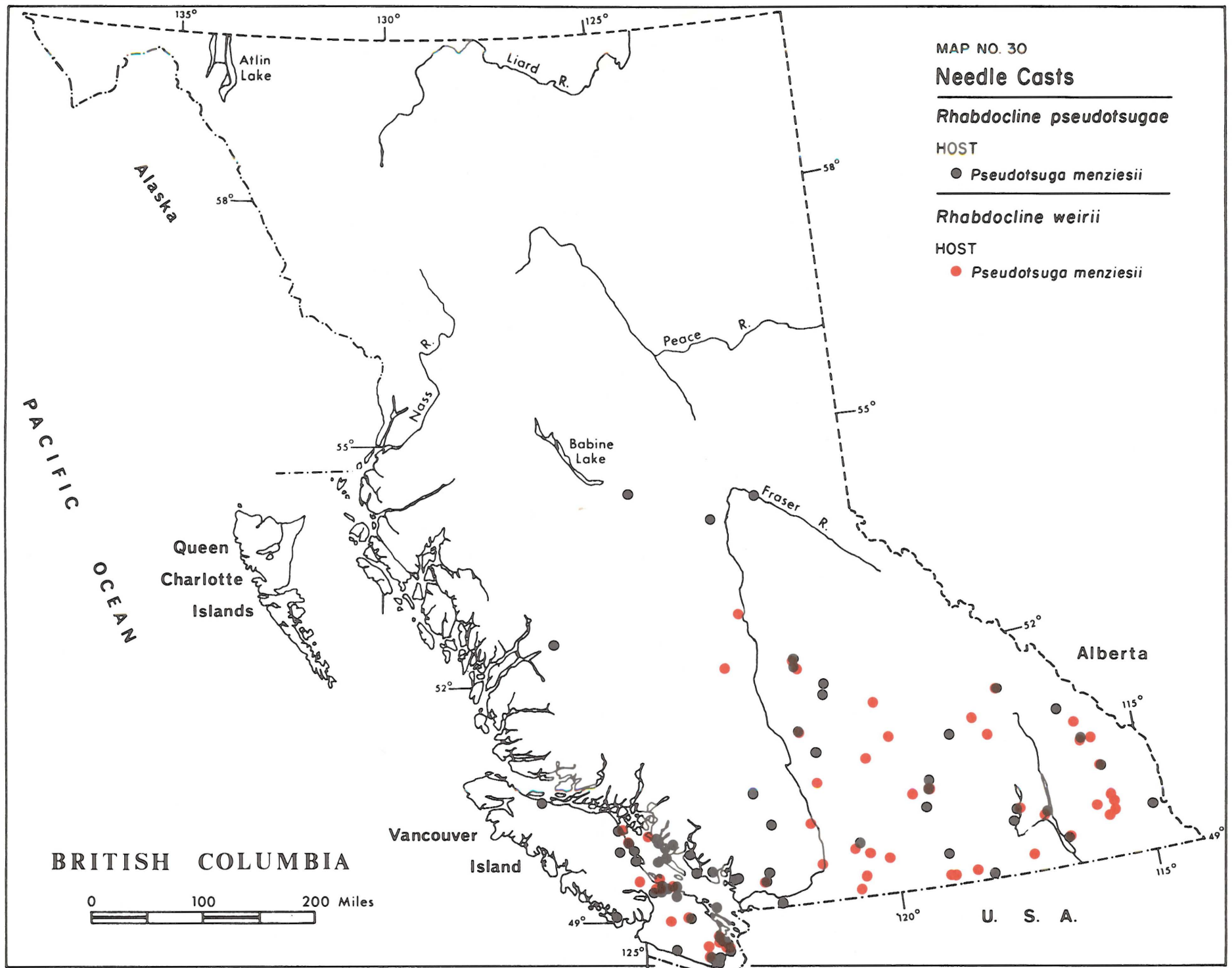
HOST

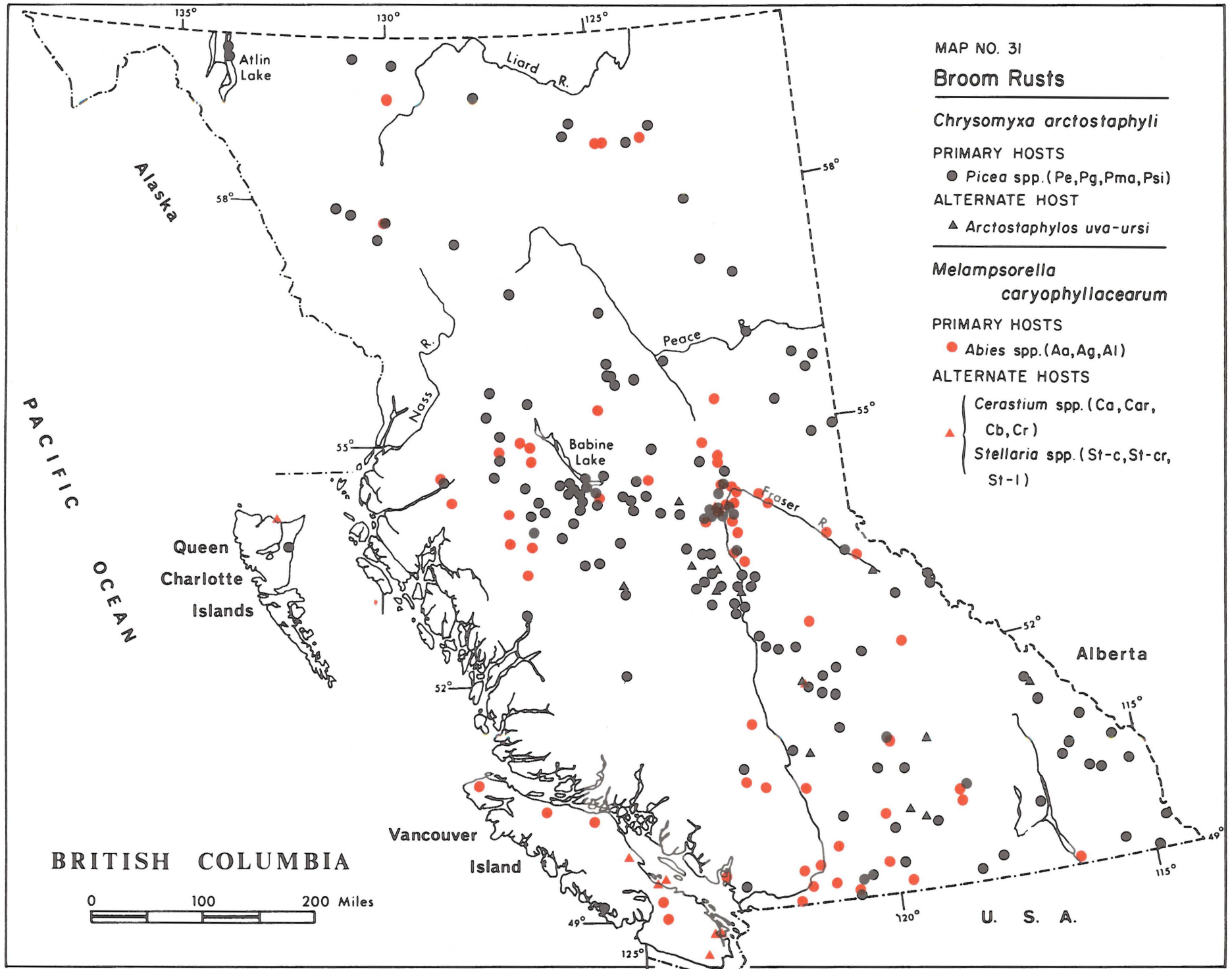
● *Pseudotsuga menziesii*

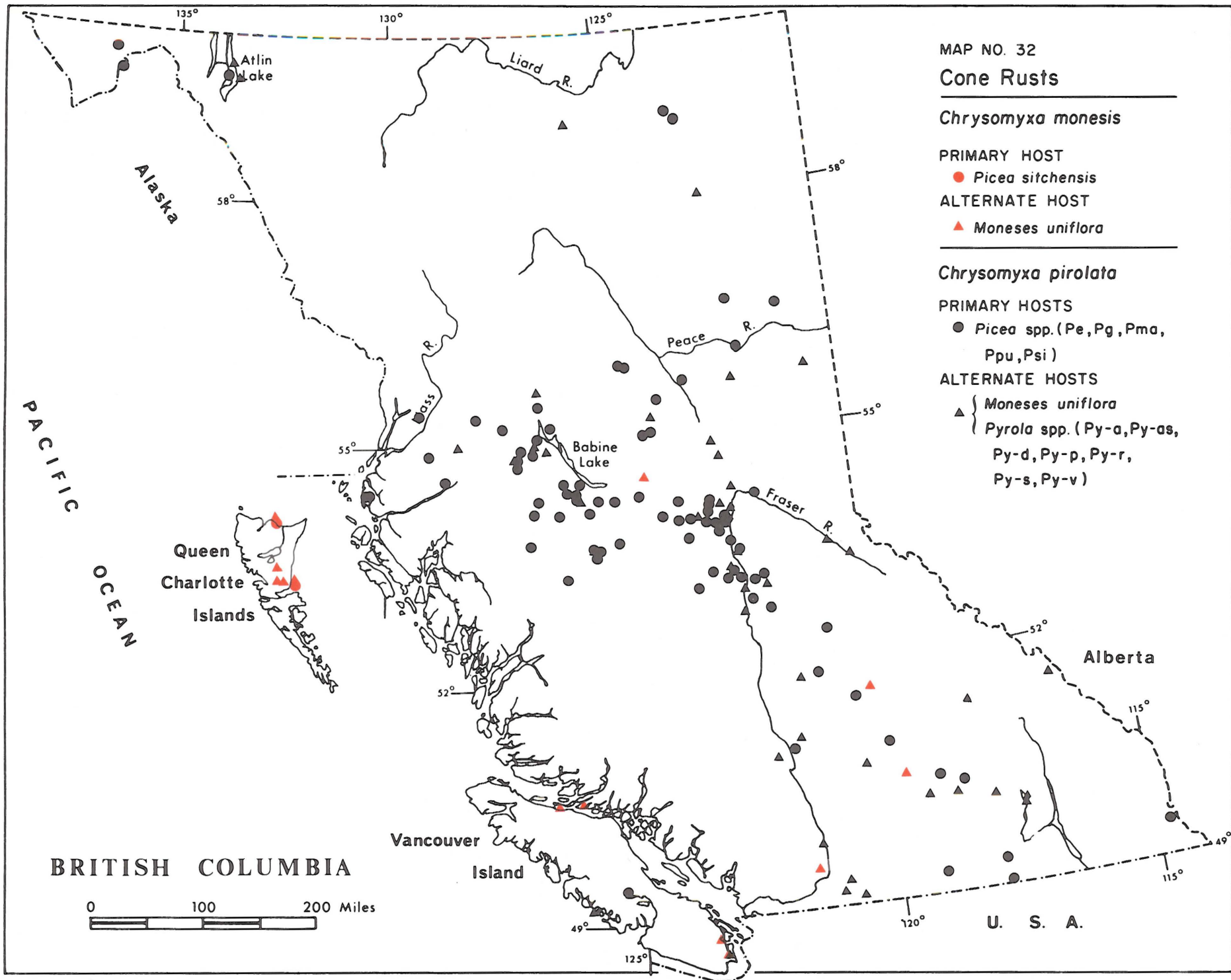
Rhabdocline weirii

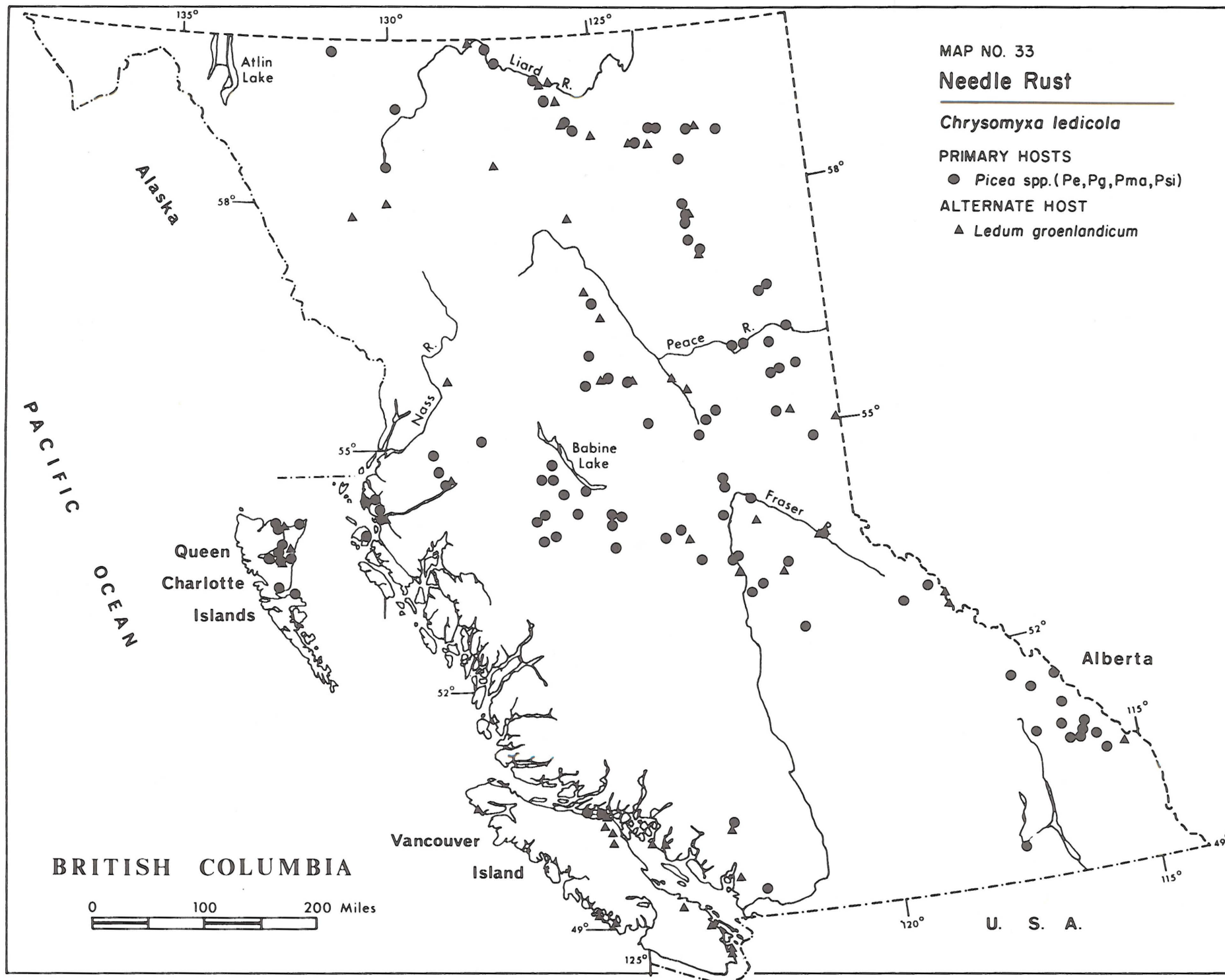
HOST

● *Pseudotsuga menziesii*









MAP NO. 34
Needle Rust

Chrysomyxa weirii

HOSTS

- *Picea* spp. (Pe, Pg, Pma, Psi)

Shoot Rust

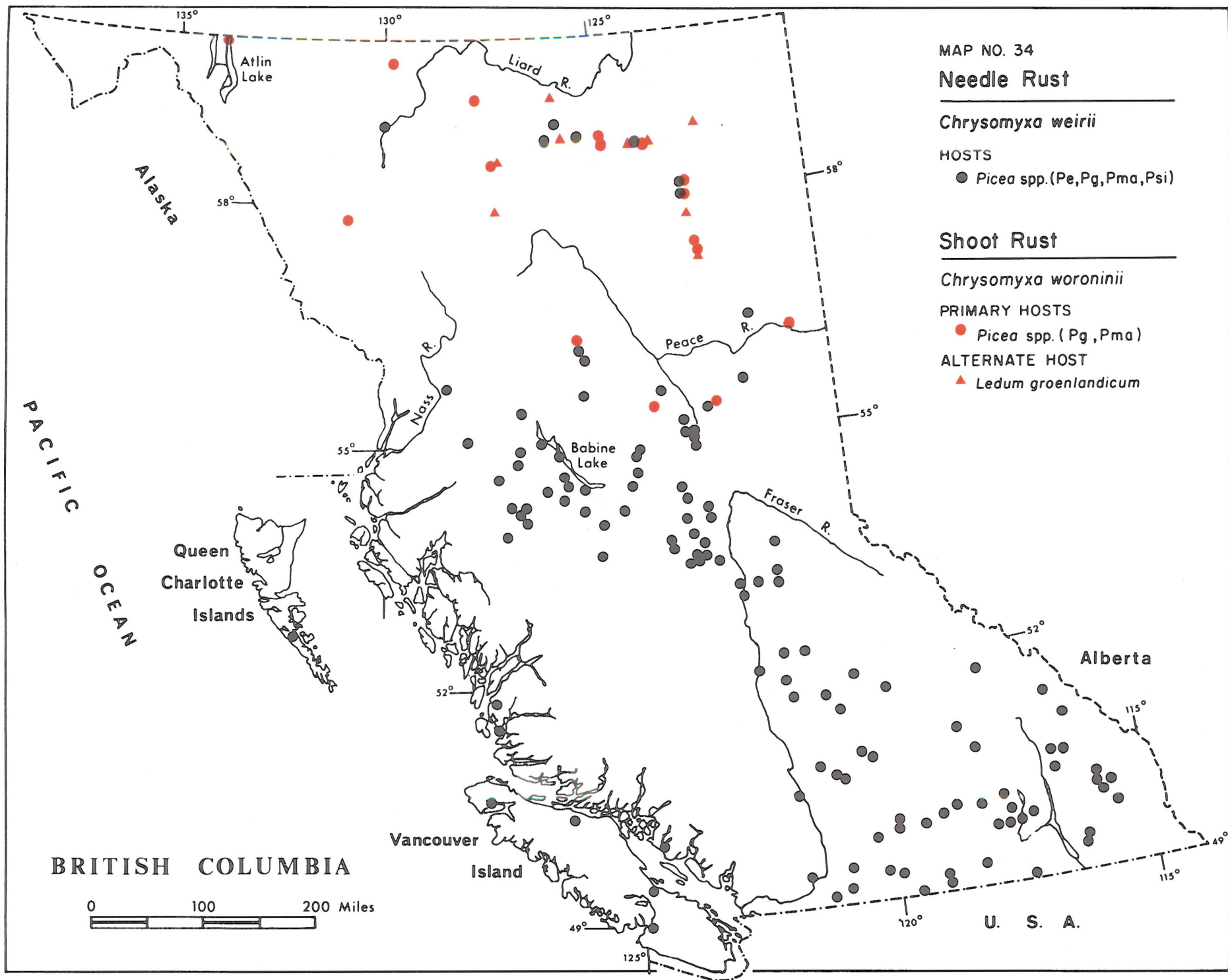
Chrysomyxa woroninii

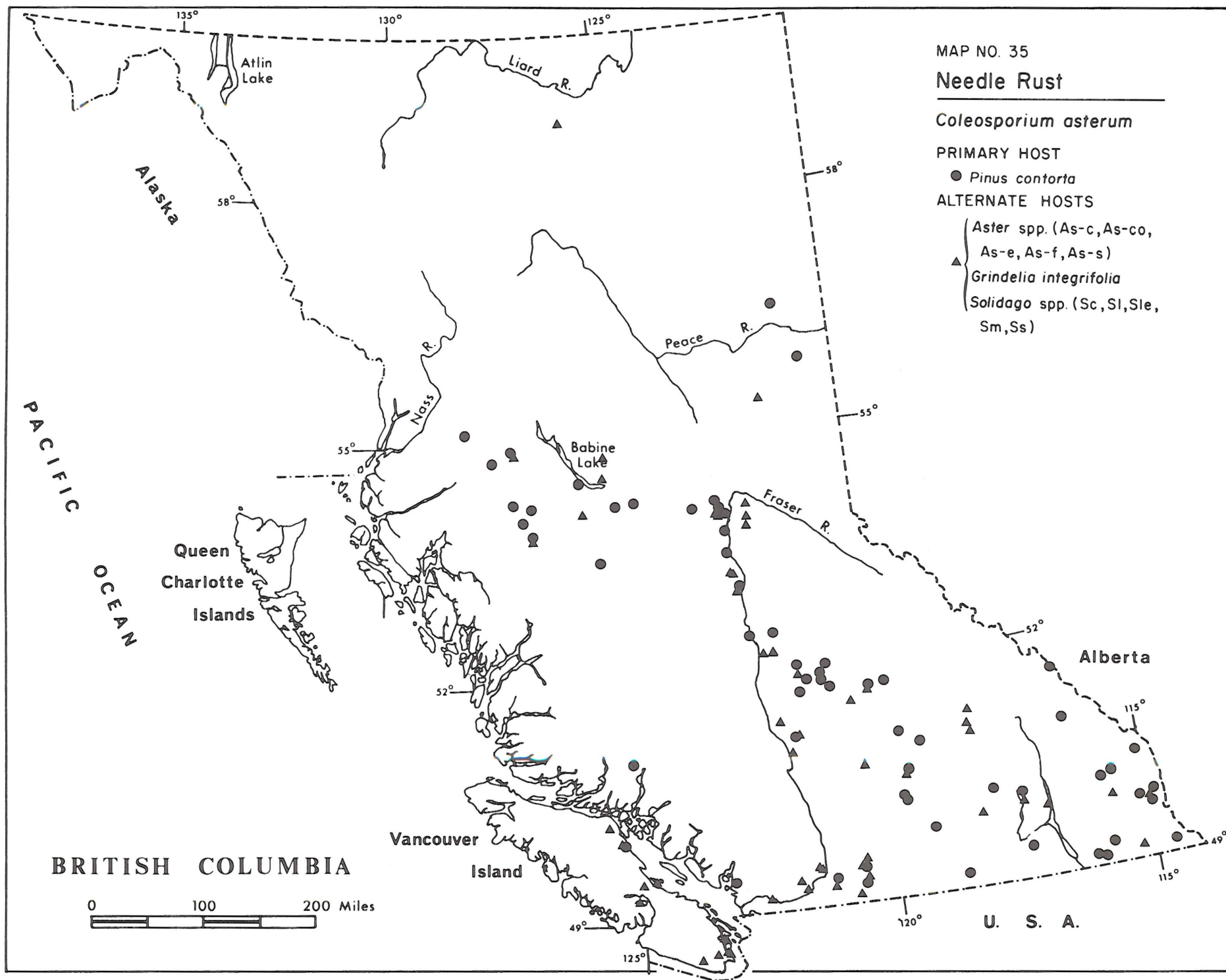
PRIMARY HOSTS

- *Picea* spp. (Pg, Pma)

ALTERNATE HOST

- ▲ *Ledum groenlandicum*





MAP NO. 36

Needle Rust

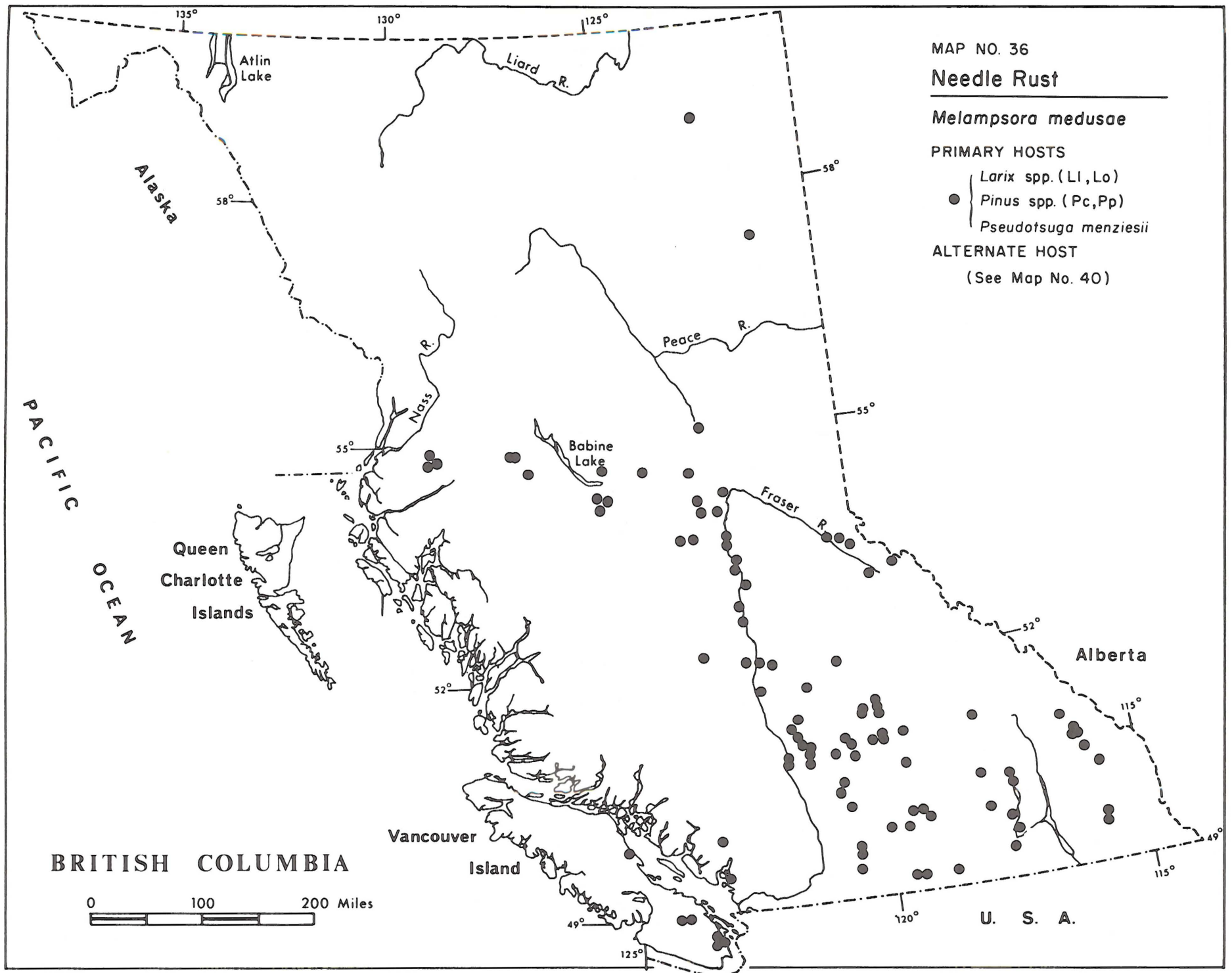
Melampsora medusae

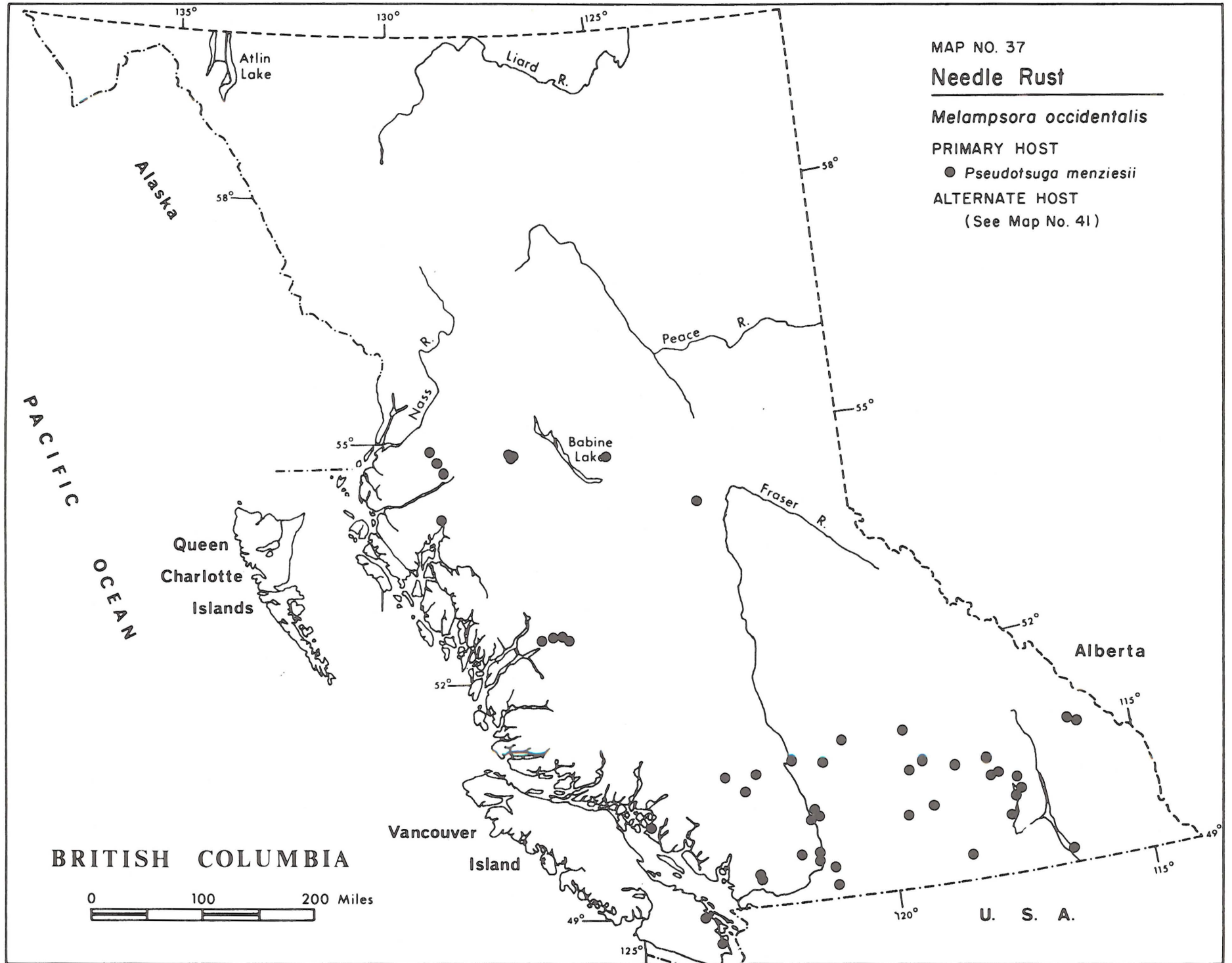
PRIMARY HOSTS

- Larix spp. (Ll, Lo)
- Pinus spp. (Pc, Pp)
- Pseudotsuga menziesii

ALTERNATE HOST

(See Map No. 40)





MAP NO. 38

Needle Rust

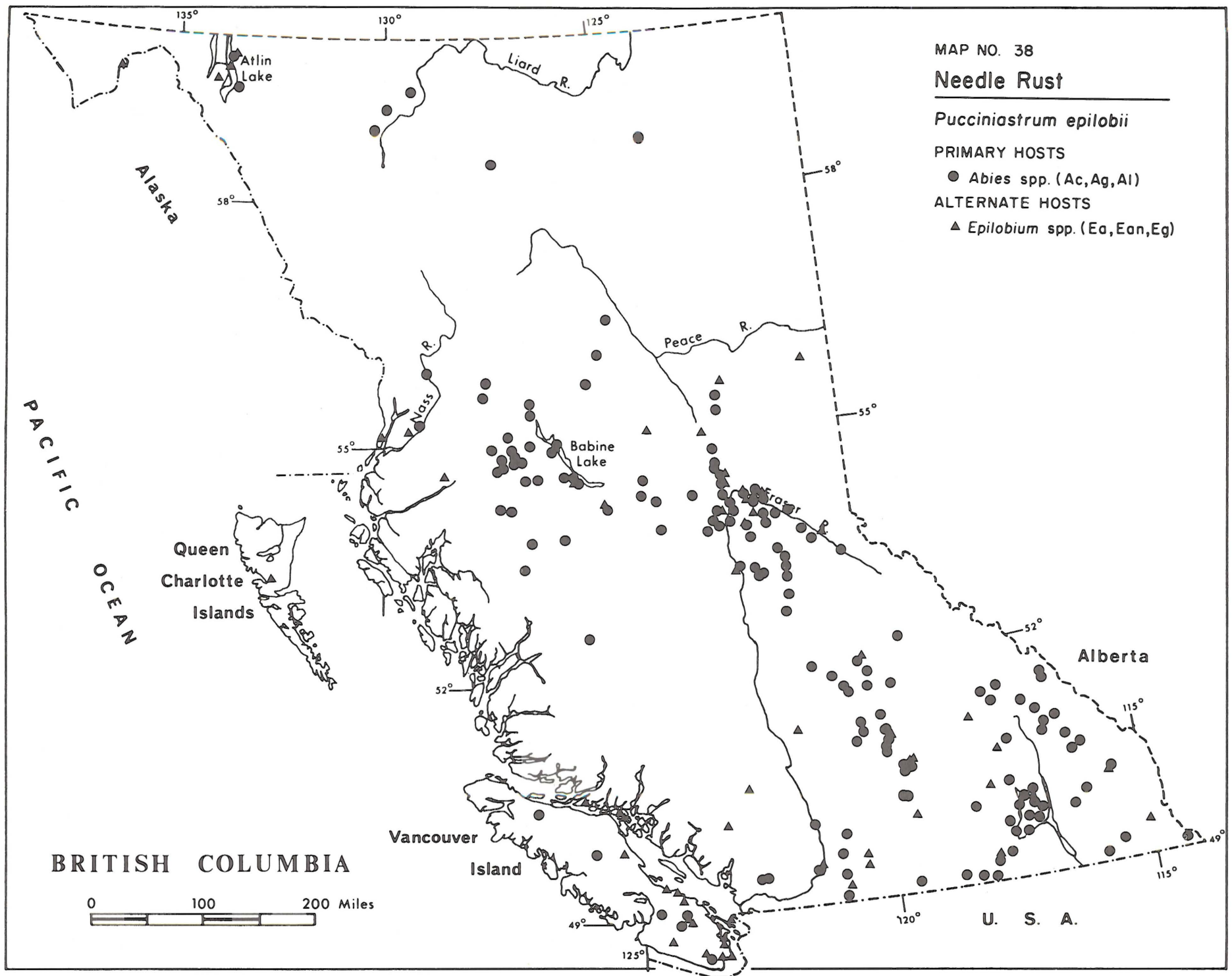
Pucciniastrum epilobii

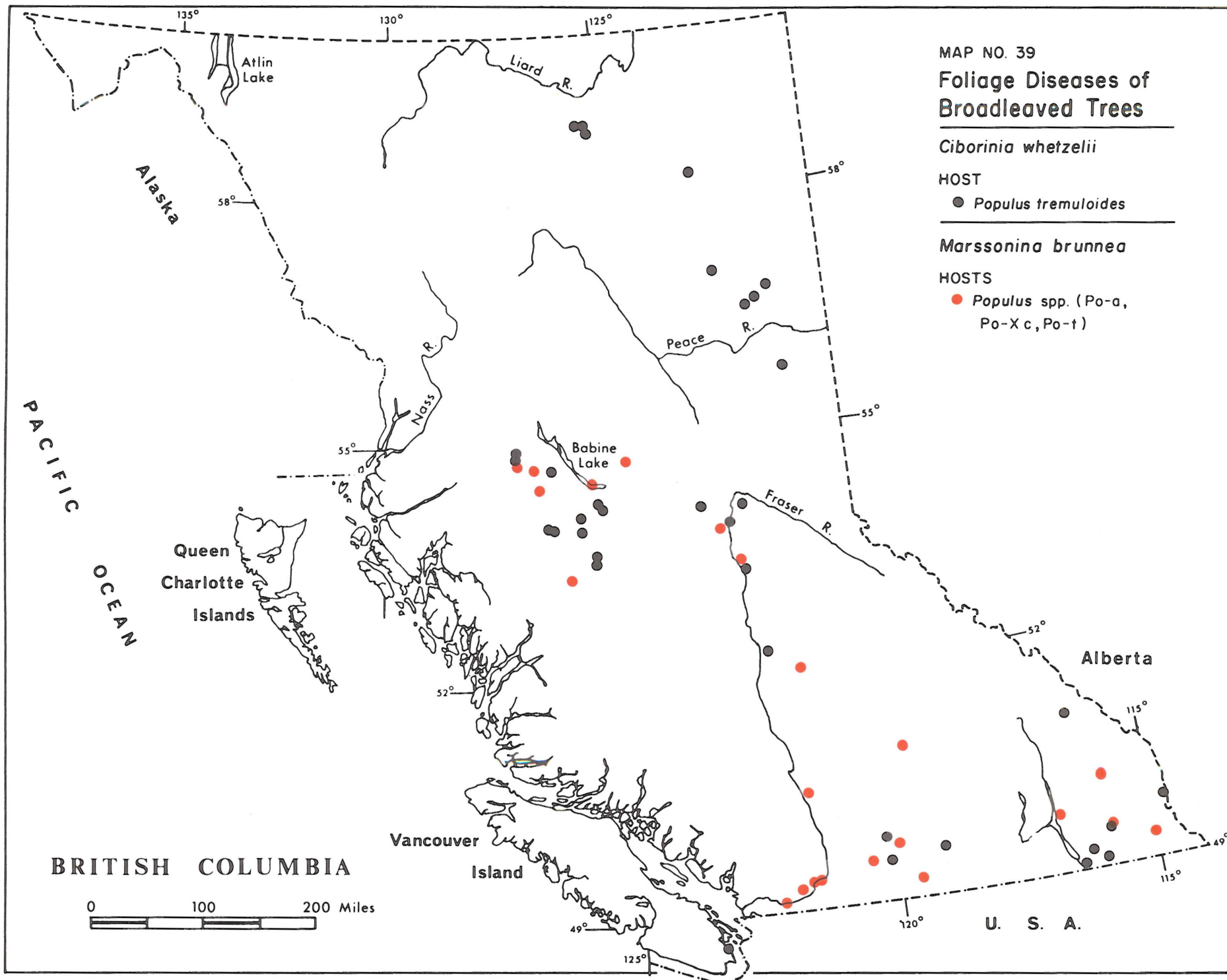
PRIMARY HOSTS

● *Abies* spp. (Ac, Ag, Al)

ALTERNATE HOSTS

▲ *Epilobium* spp. (Ea, Ean, Eg)





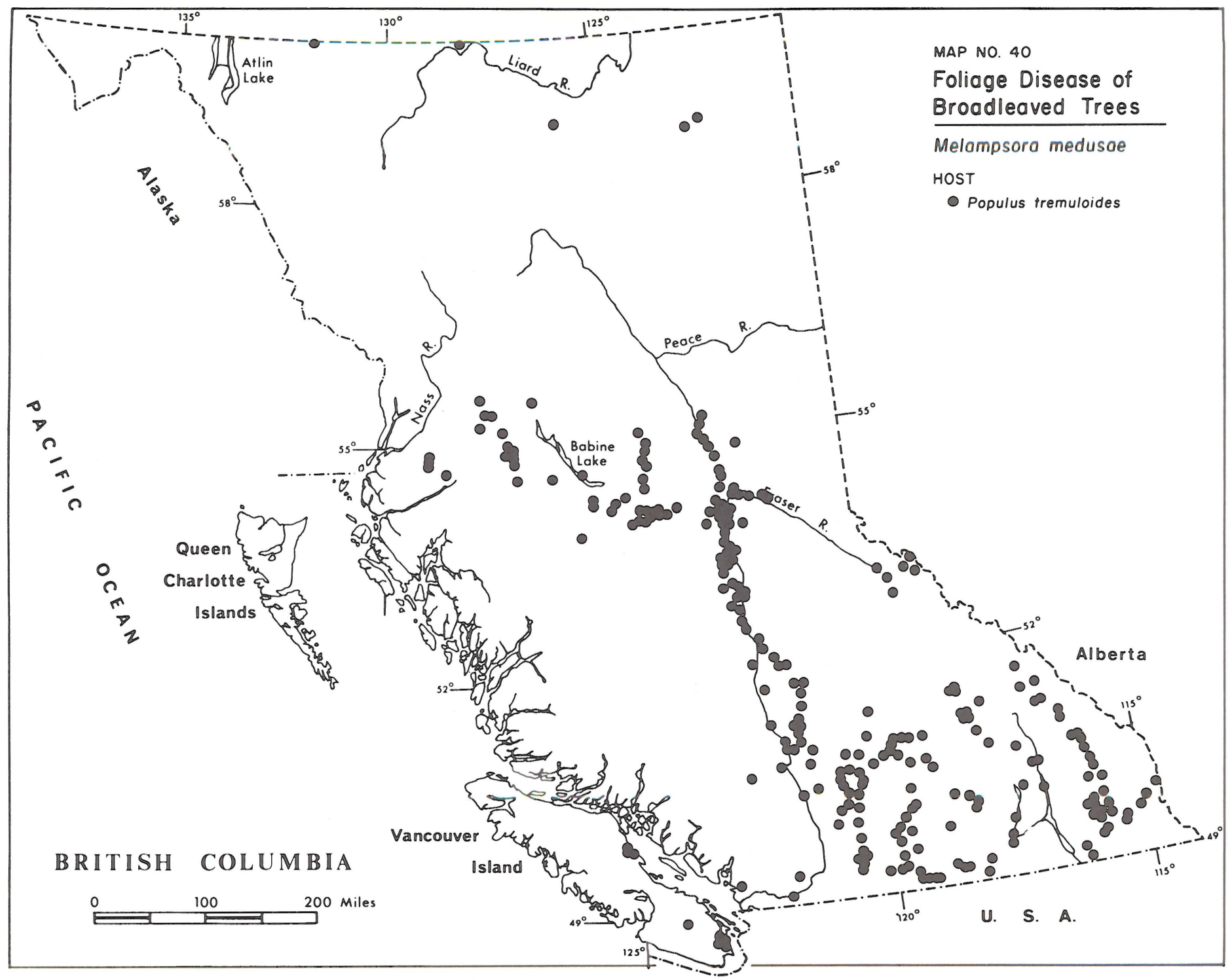
MAP NO. 40

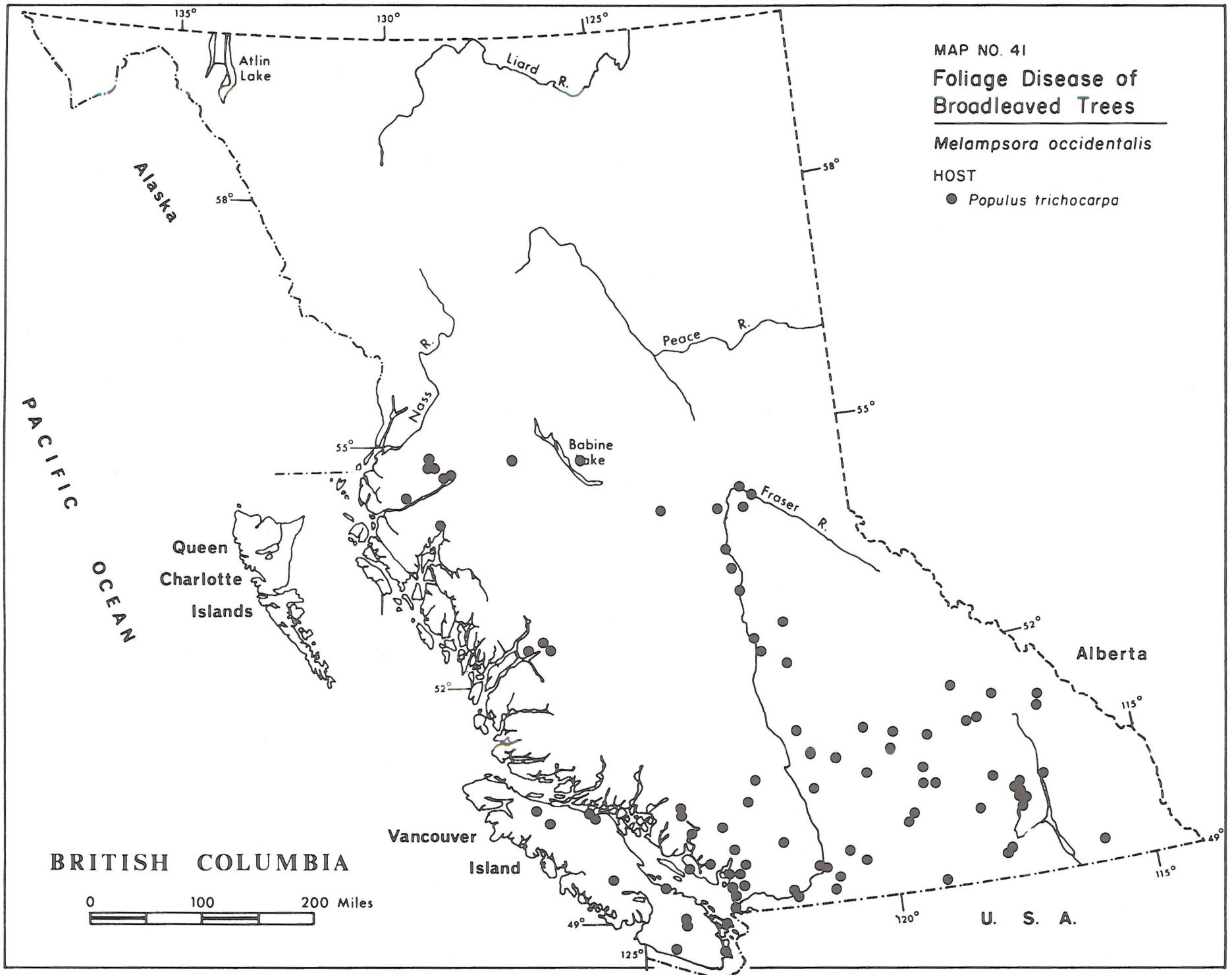
Foliage Disease of Broadleaved Trees

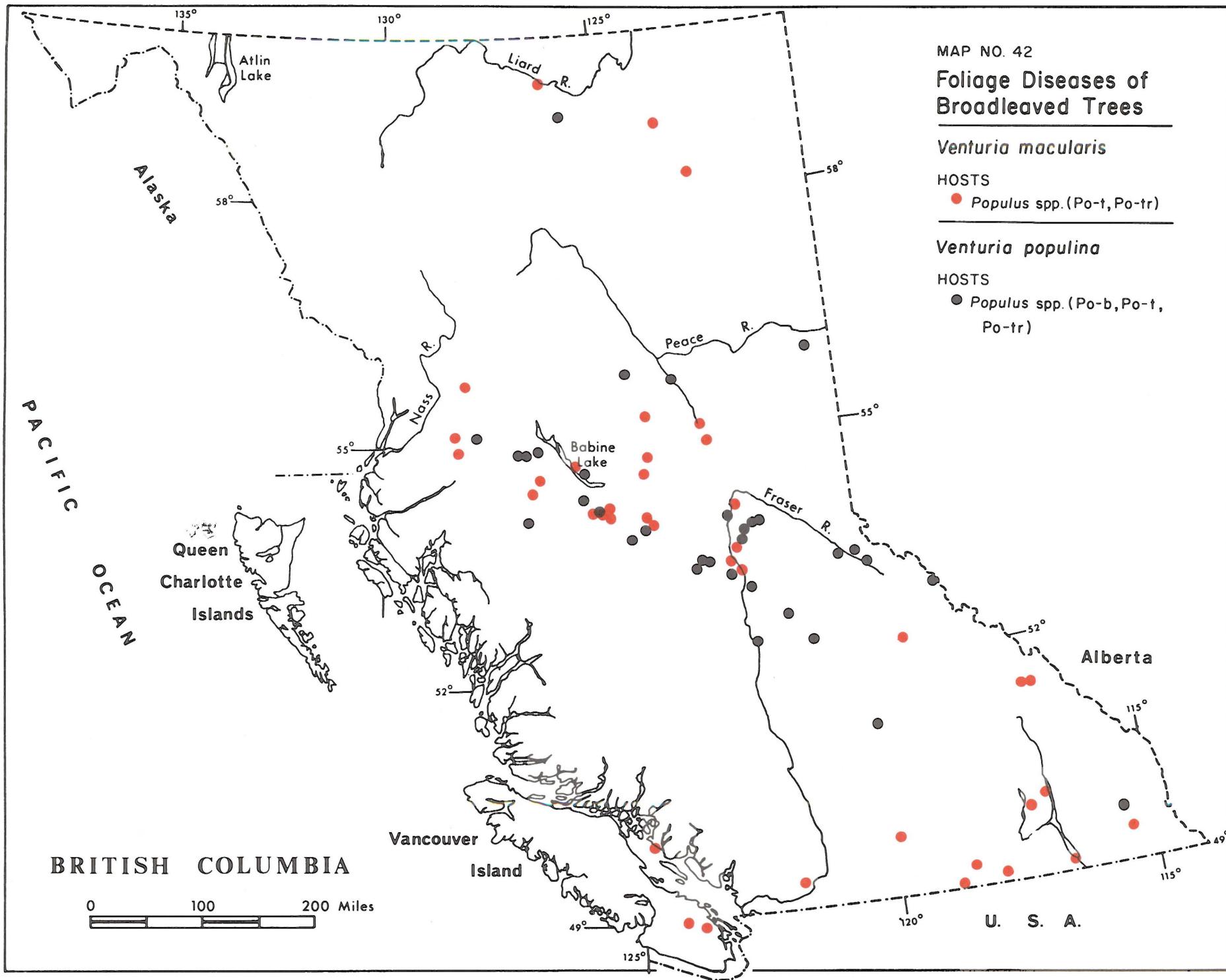
Melampsora medusae

HOST

● *Populus tremuloides*

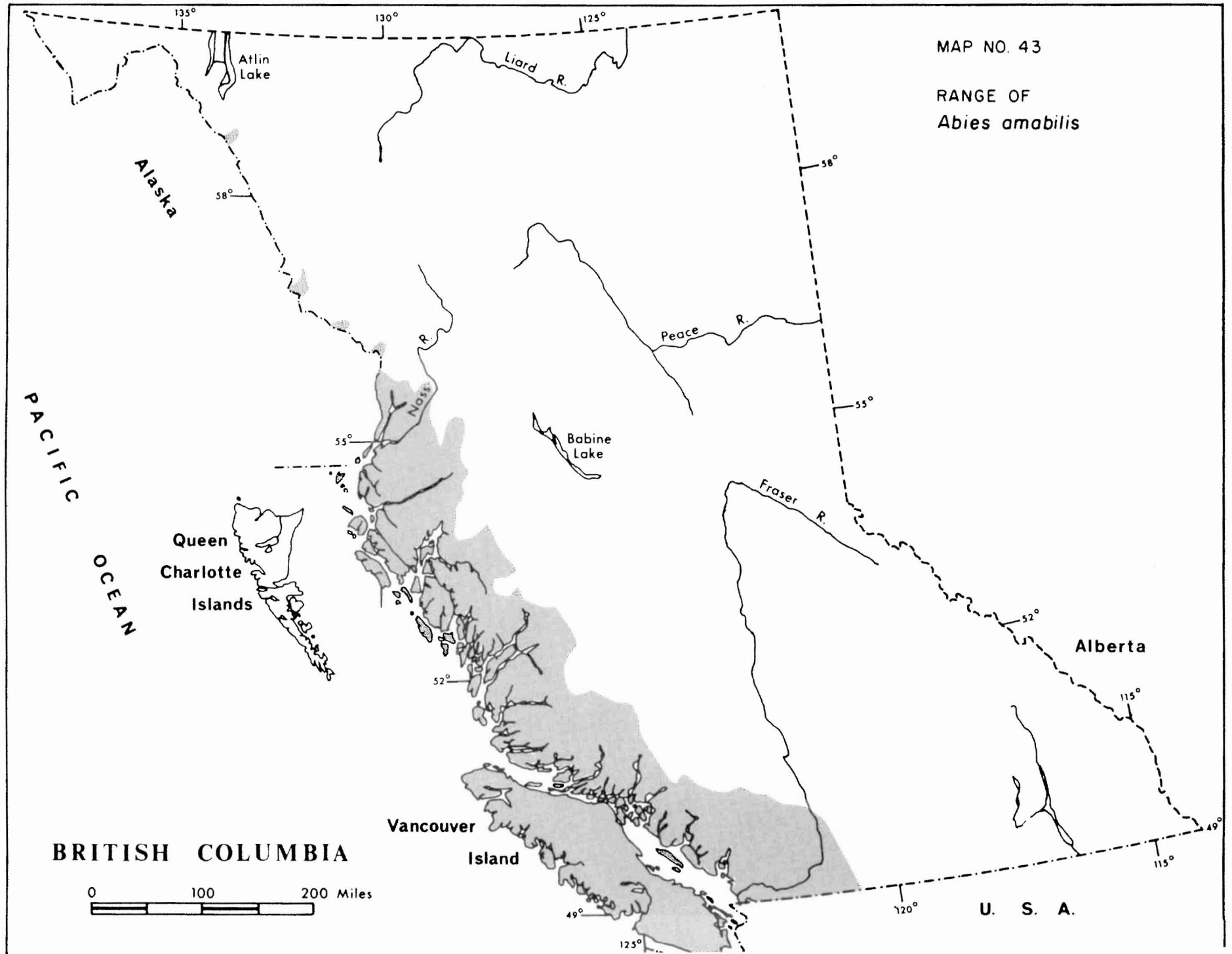






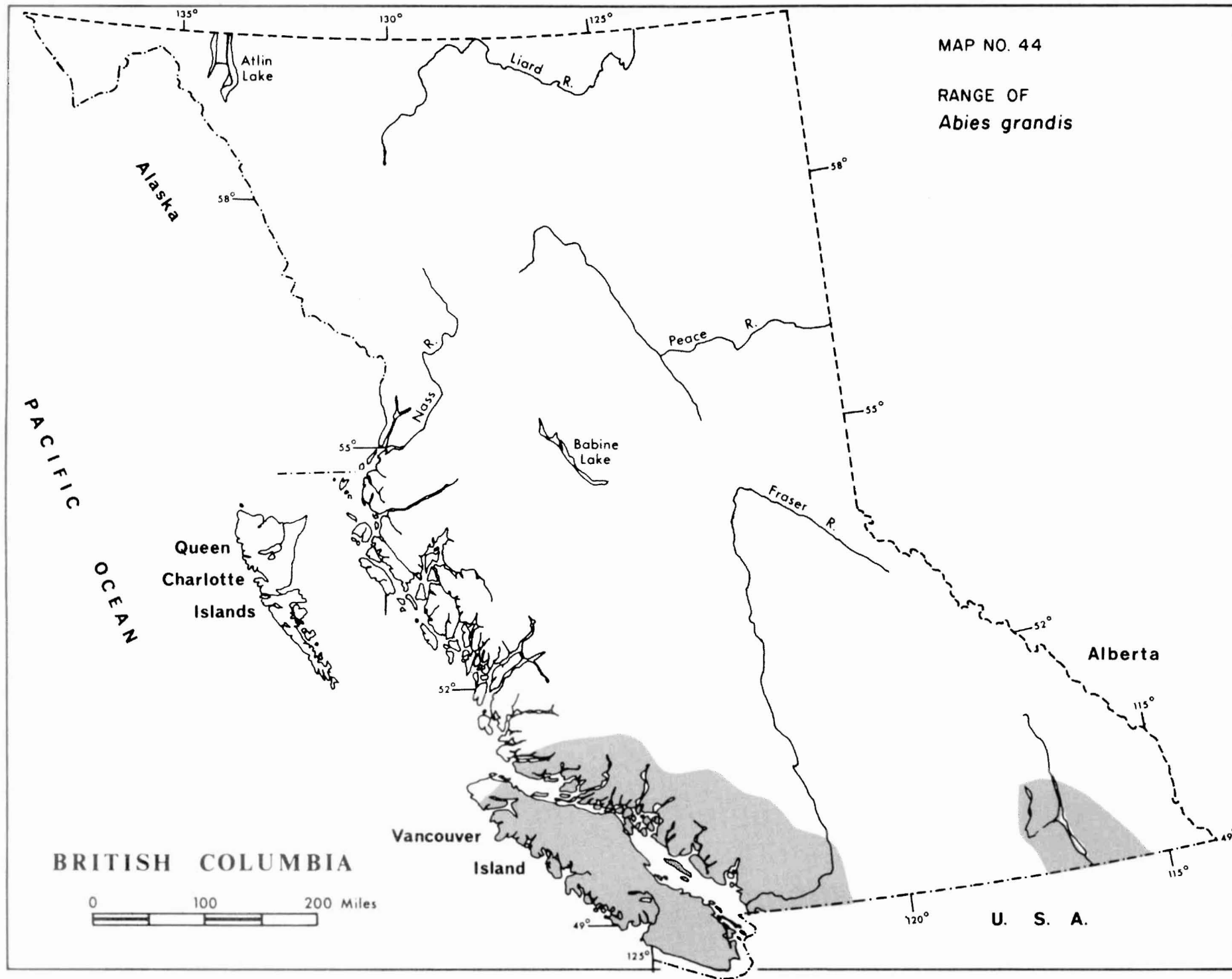
APPENDIX

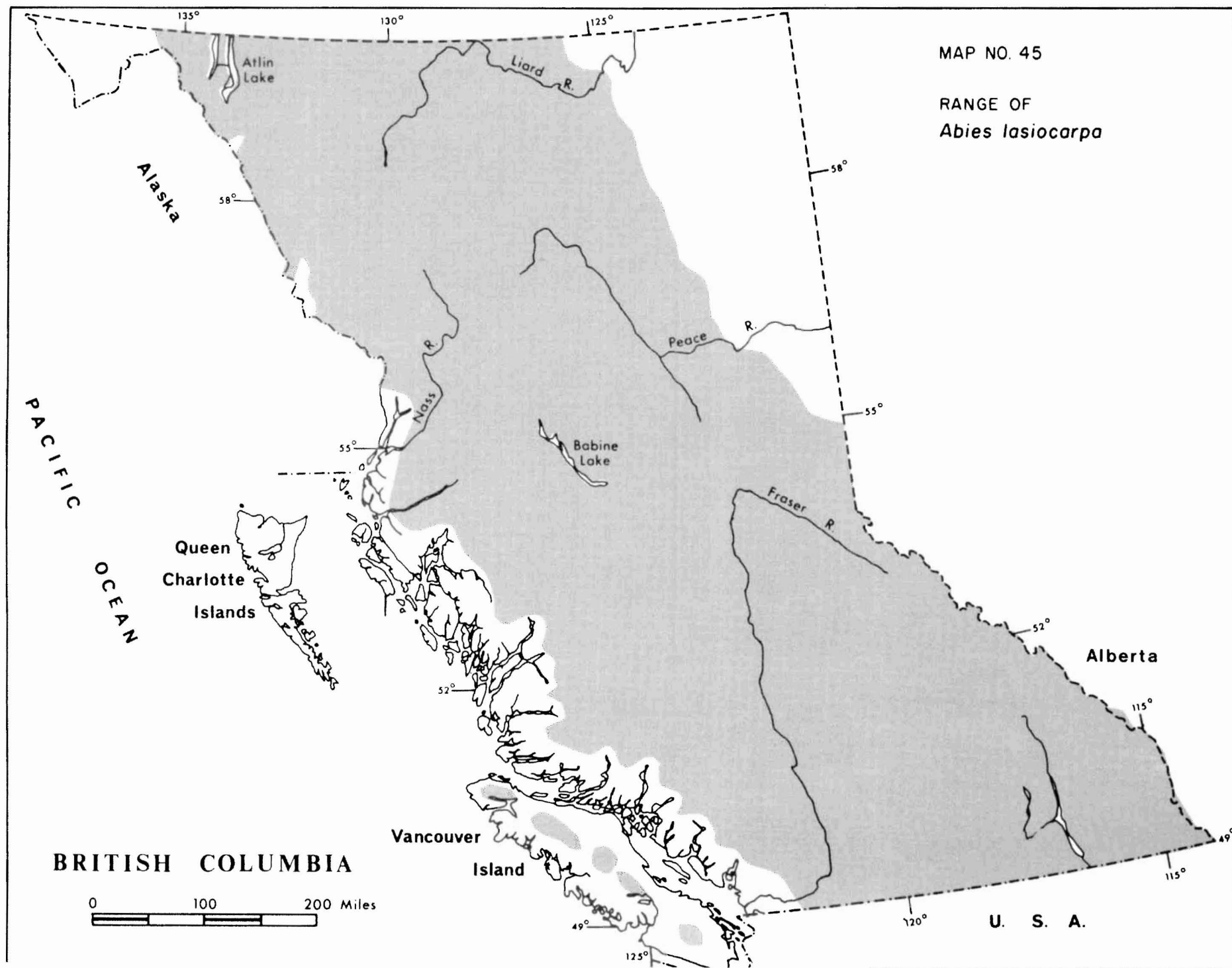
I. Range of Tree Hosts in British Columbia

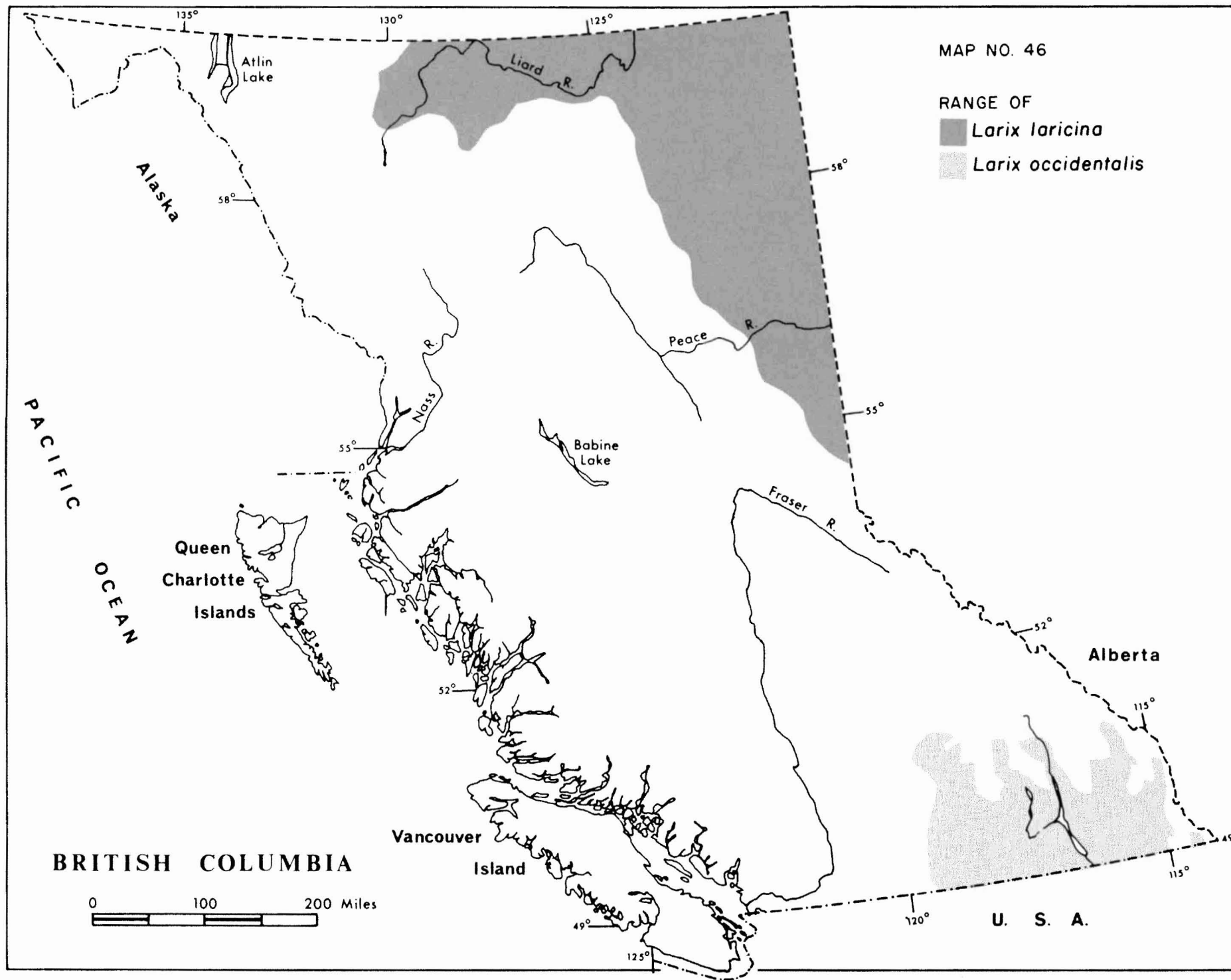


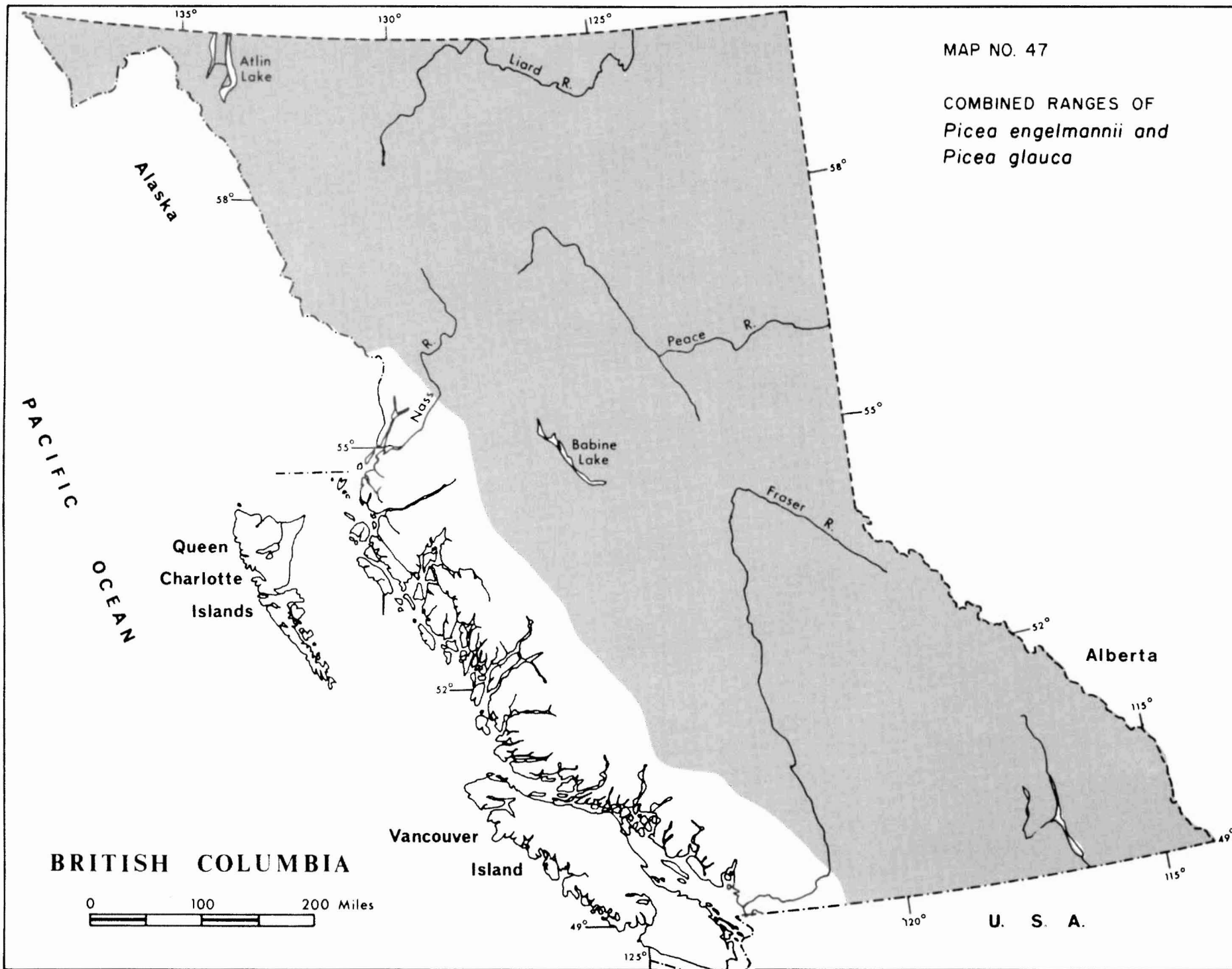
MAP NO. 44

RANGE OF
Abies grandis



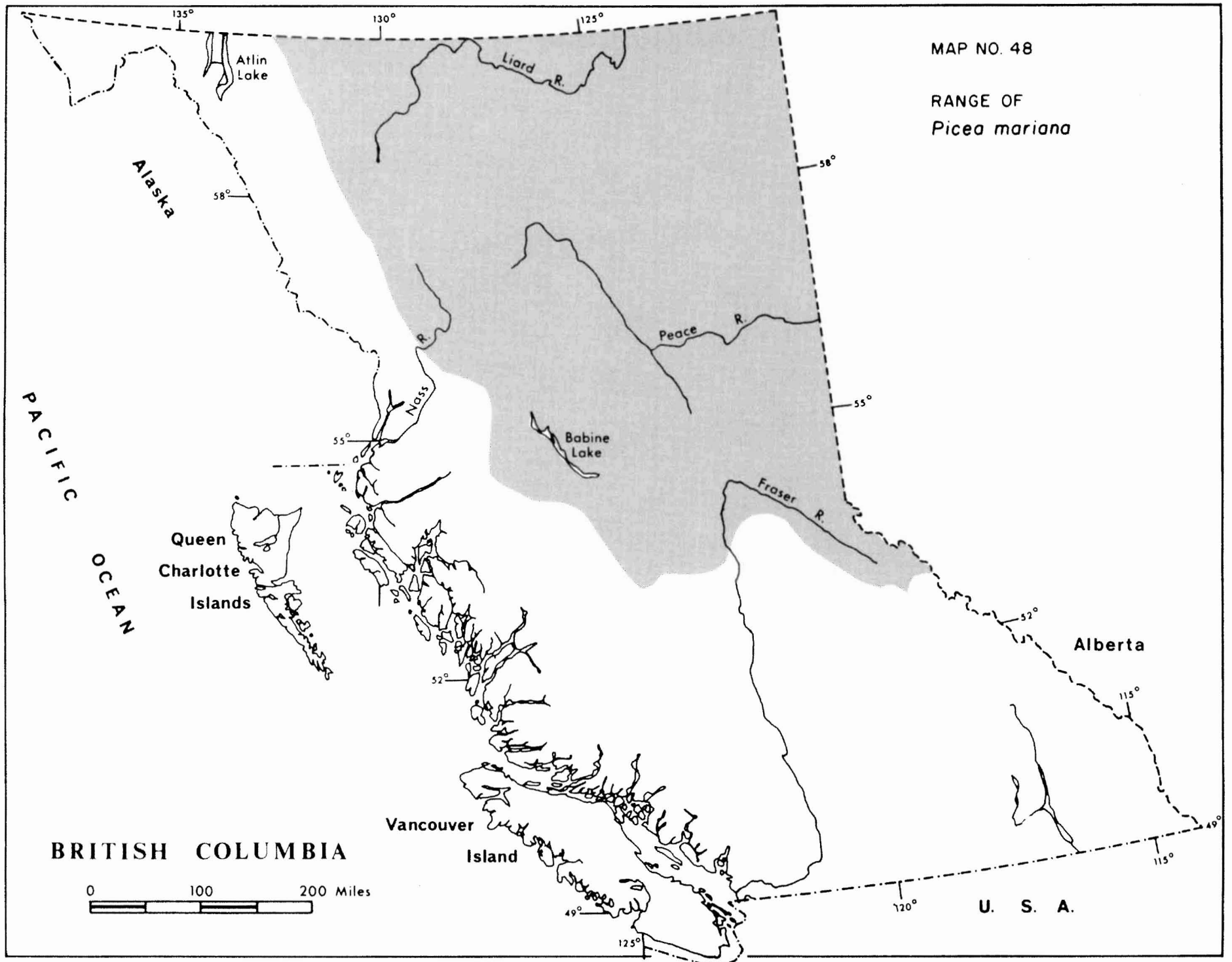


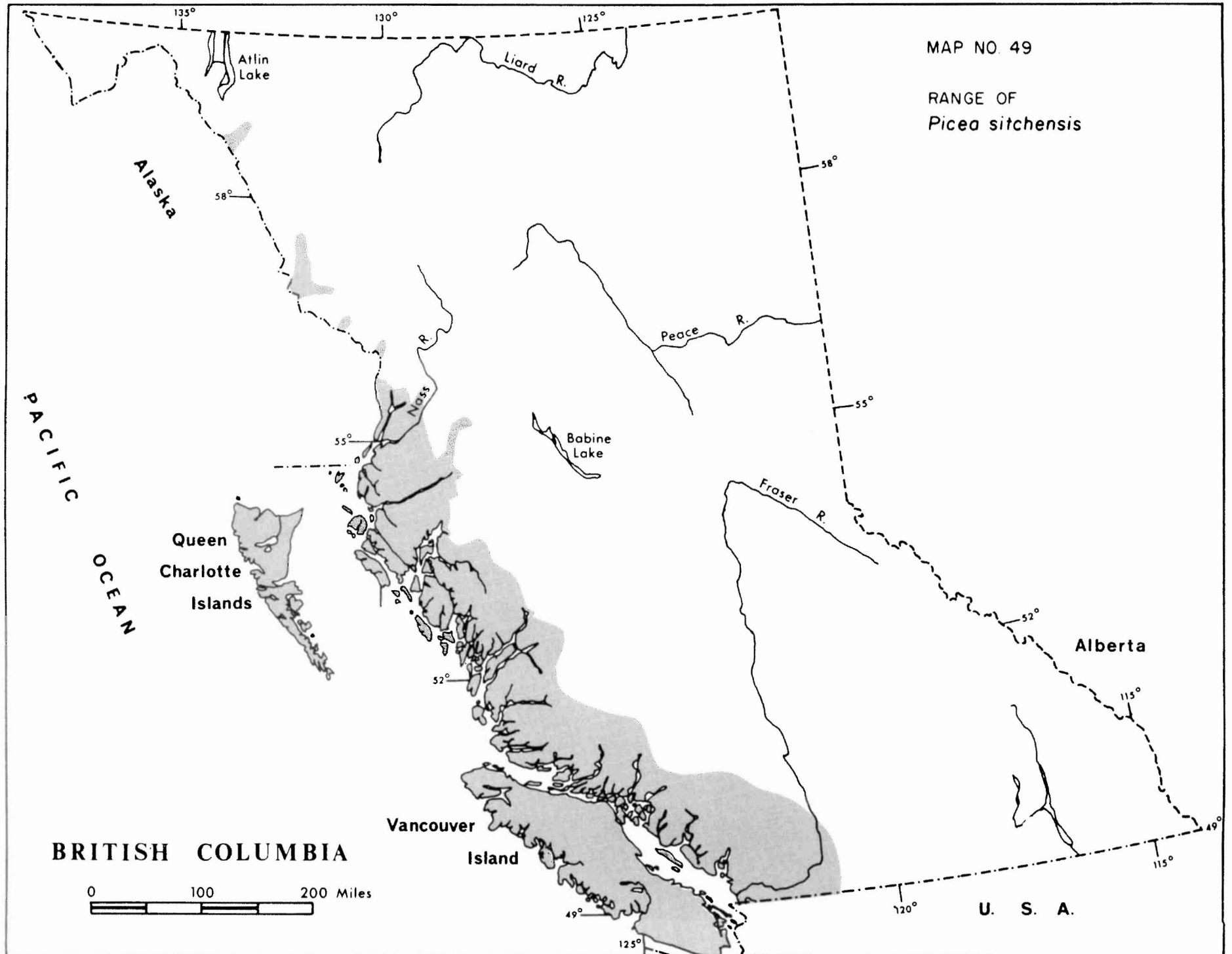


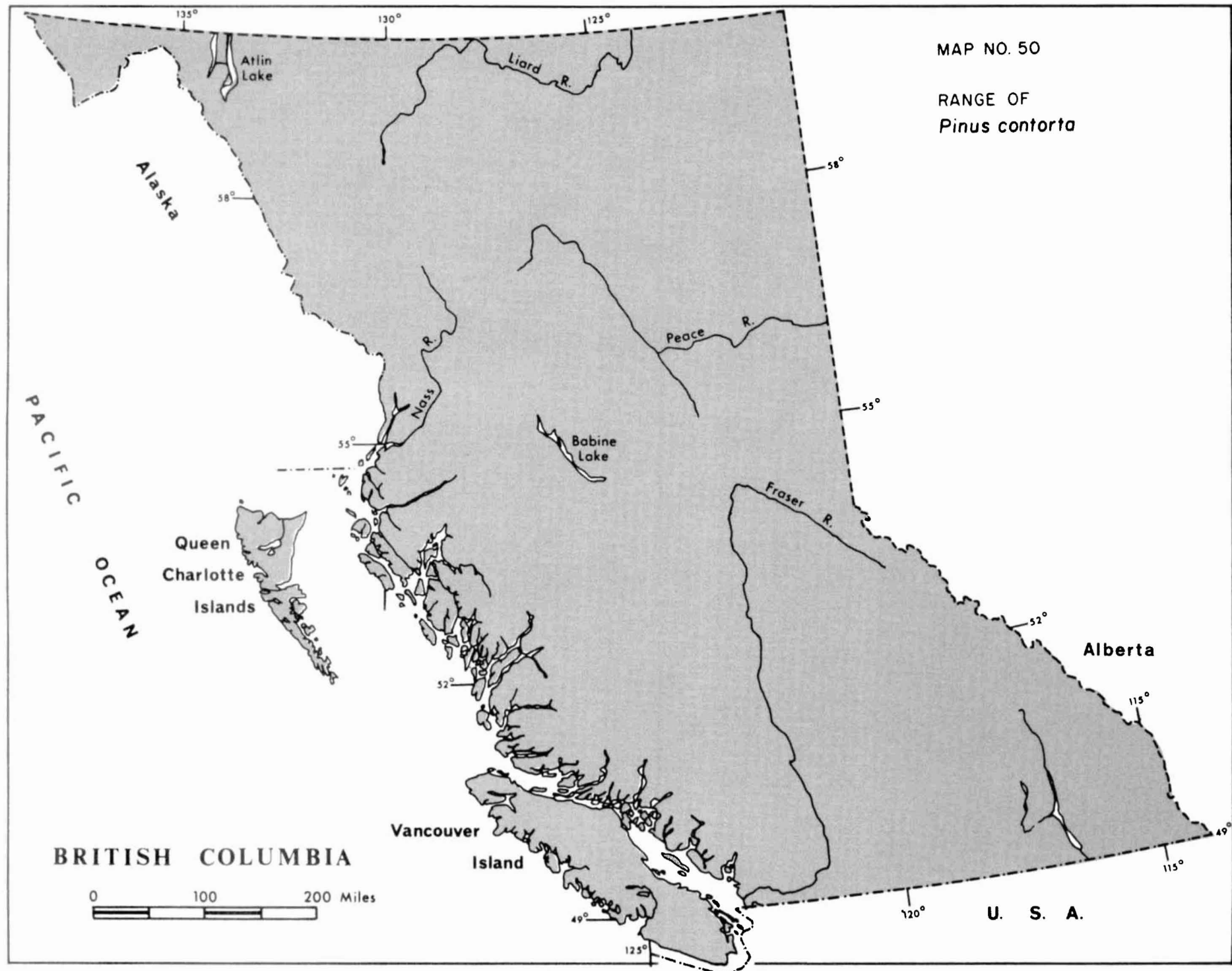


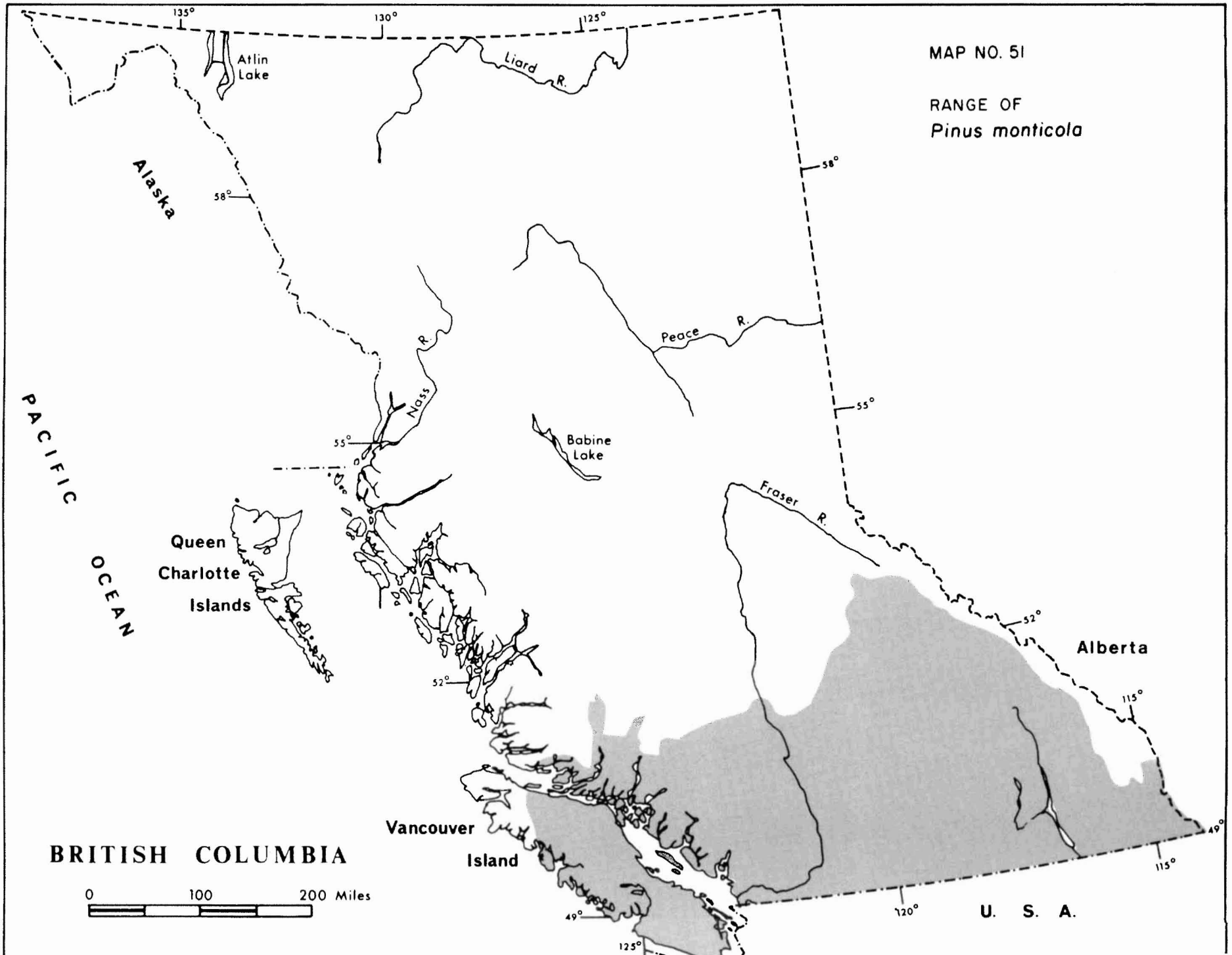
MAP NO. 48

RANGE OF
Picea mariana



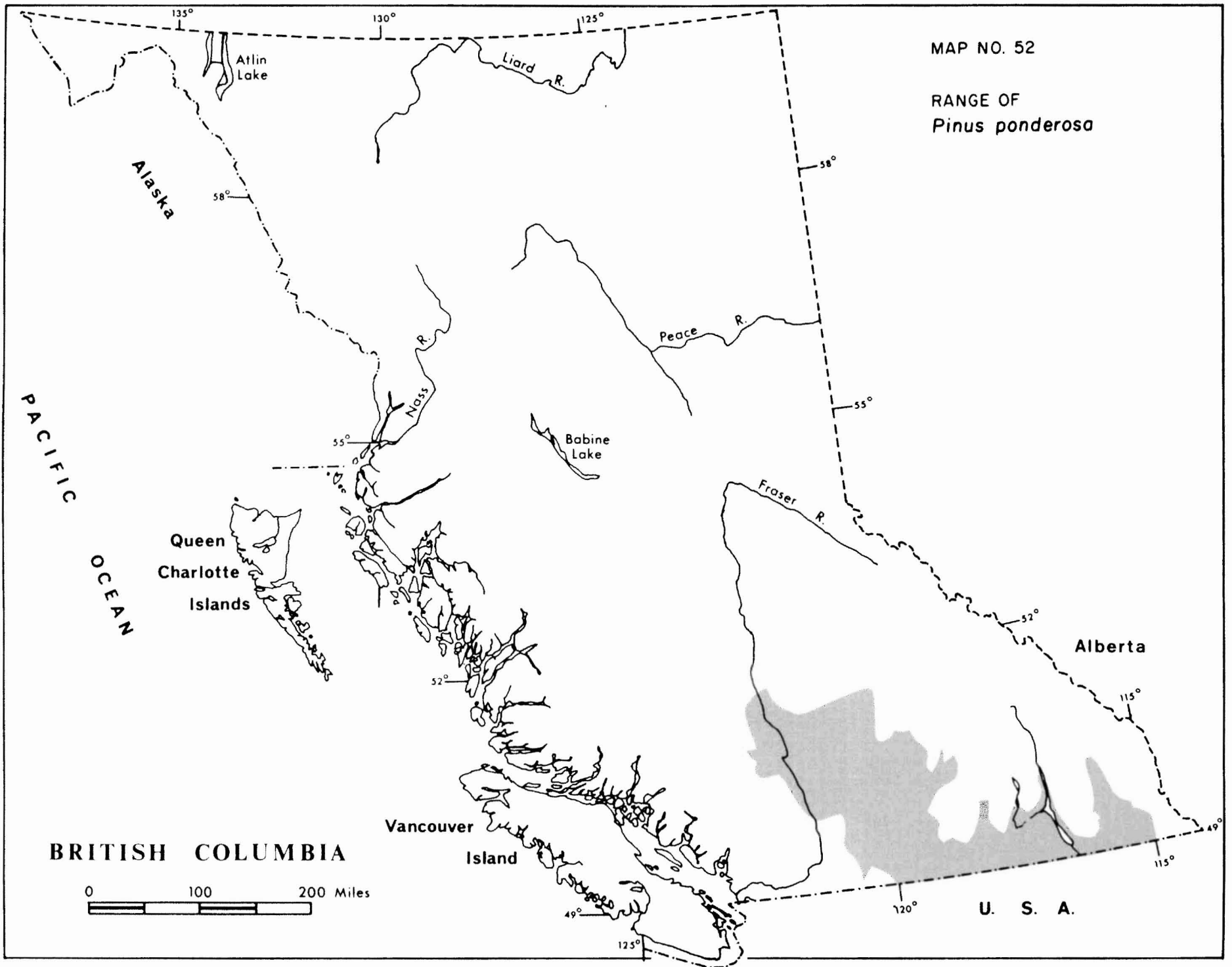


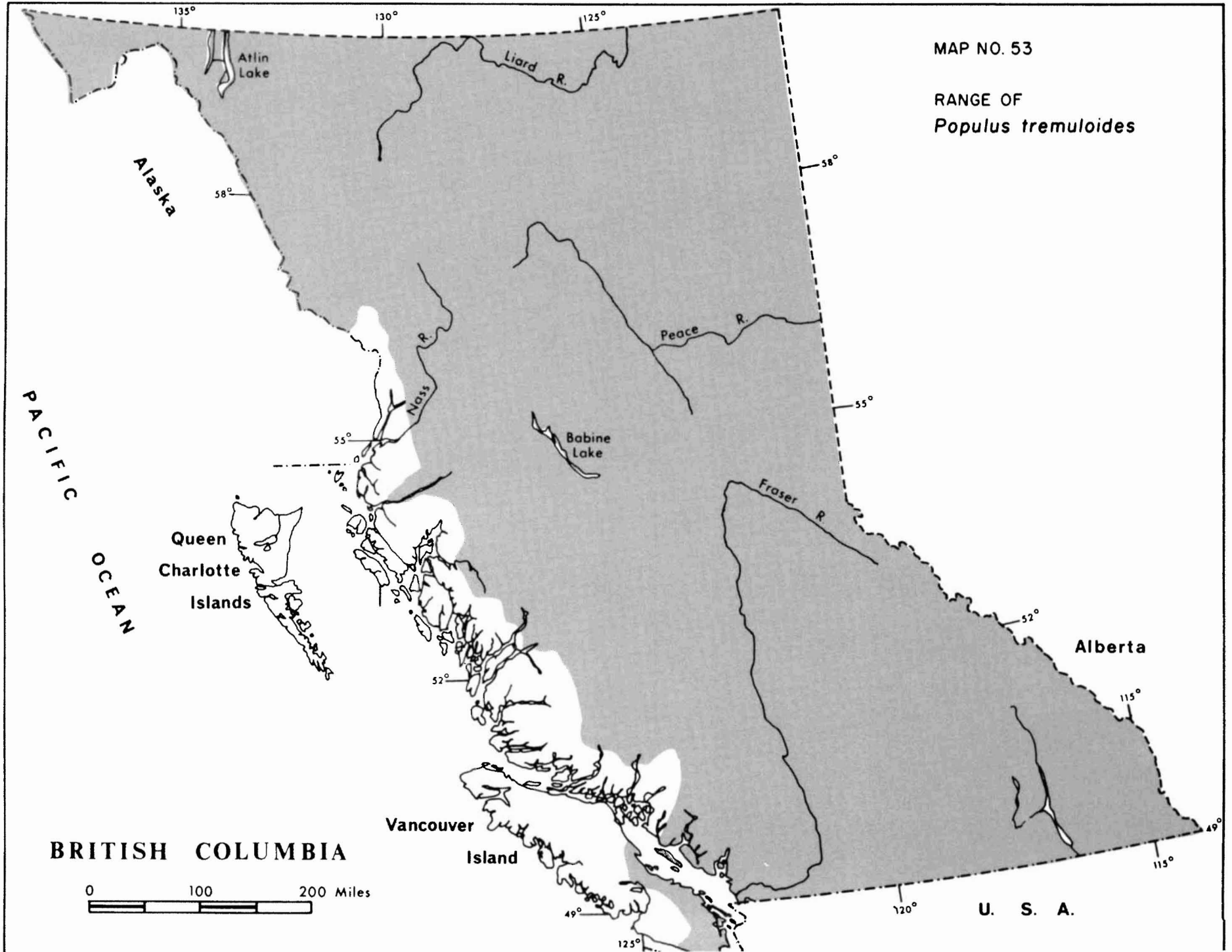




MAP NO. 52

RANGE OF
Pinus ponderosa



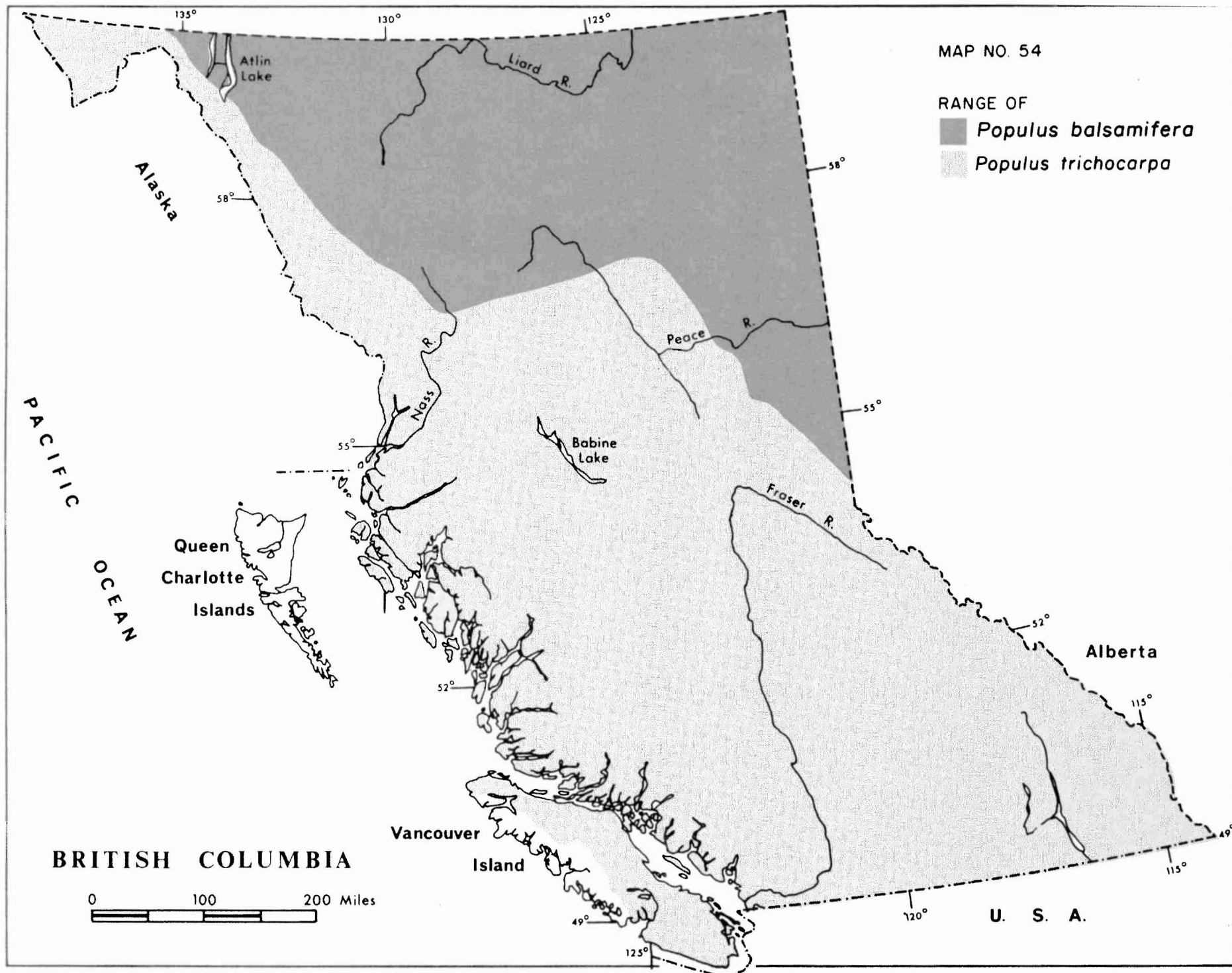


MAP NO. 54

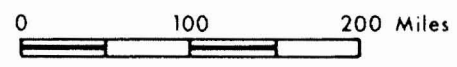
RANGE OF

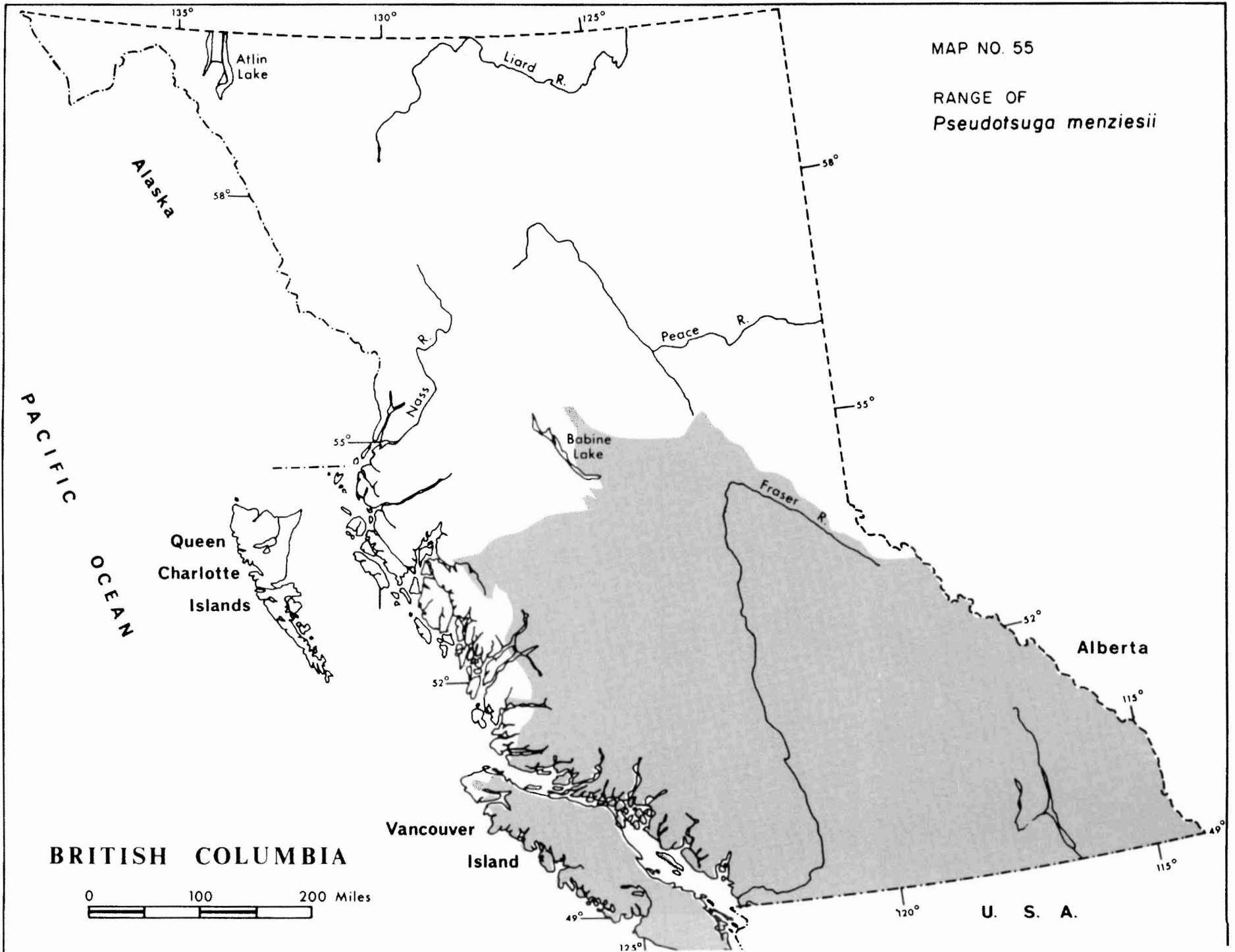
■ *Populus balsamifera*

▨ *Populus trichocarpa*



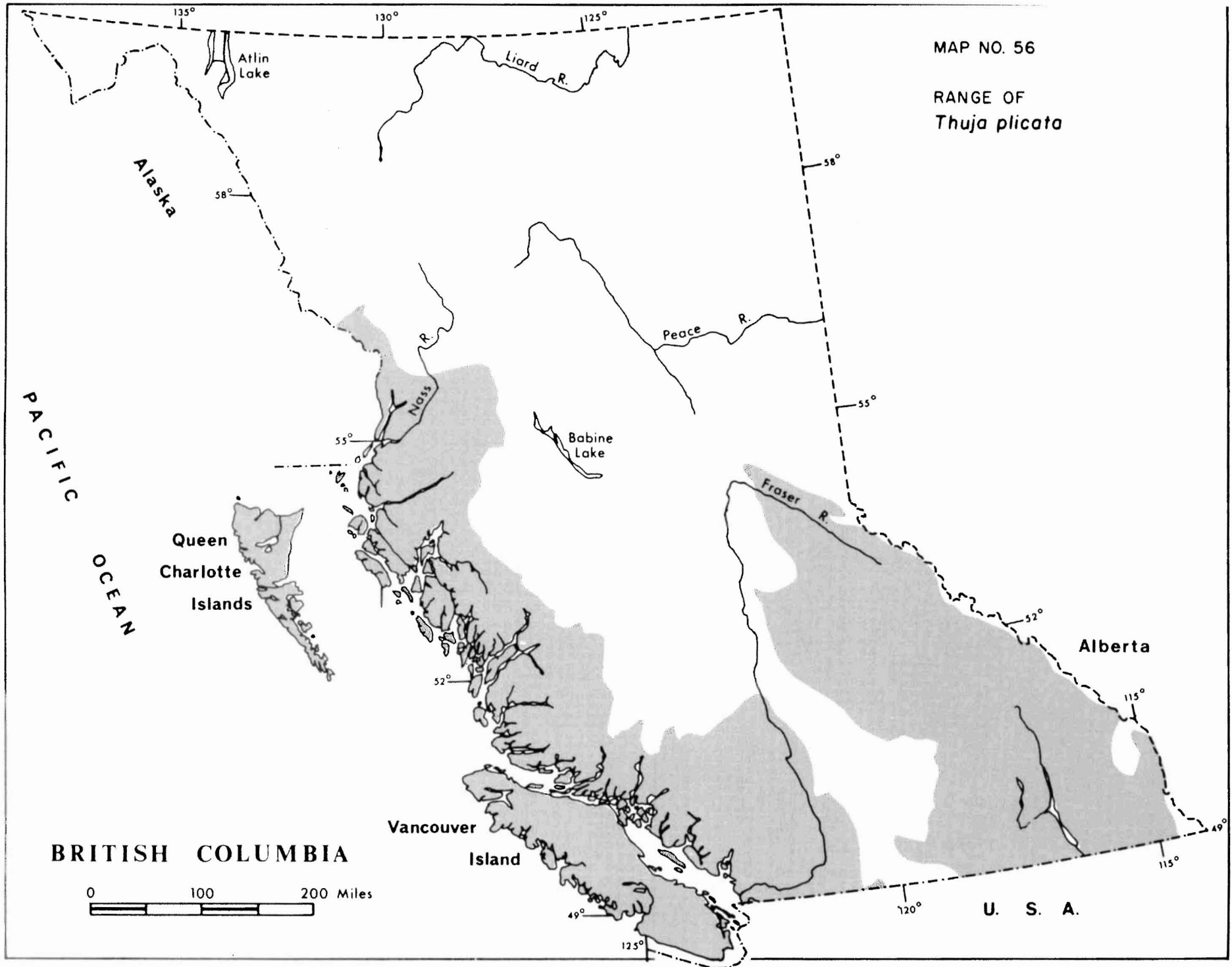
BRITISH COLUMBIA

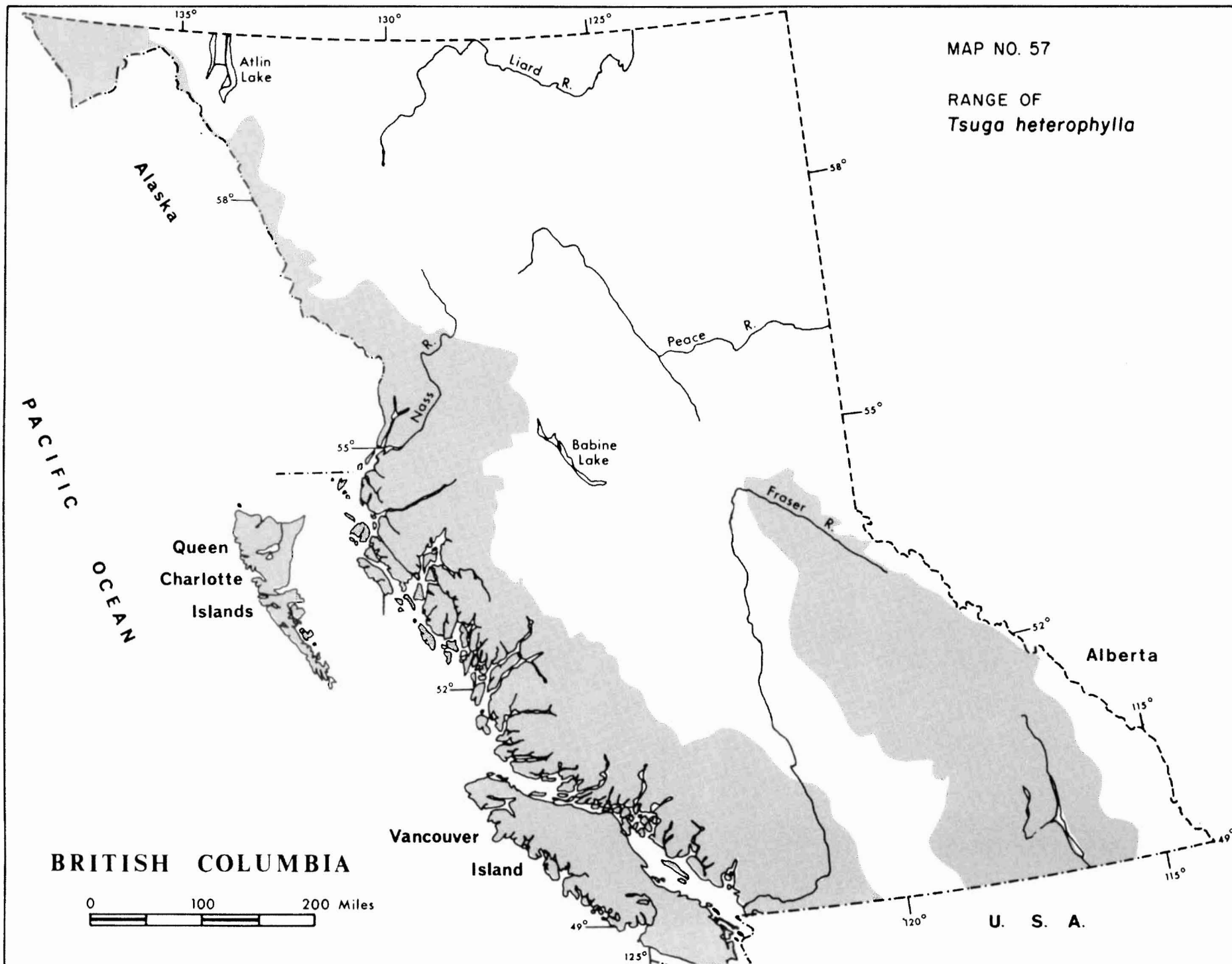




MAP NO. 56

RANGE OF
Thuja plicata





II. Recommended Reading Material

For all classes of diseases:

1. Forest Insect and Disease Surv., Forest. Br., Annual Reports 1951-1971. Queens Printer for Canada, Ottawa.
2. Foster, R.E. and G.W. Wallis. 1969. Common Tree Diseases of British Columbia. Can. Dep. Fish. and Forest., Forest. Branch, Ottawa.

Root and Butt Rots:

3. Foster, A.T. and J.A. Baranyay. 1971. Armillaria Root Rot. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 35.
4. Ginns, J.H. 1970. Rhizina Root Rot of Douglas-fir in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 4.
5. Wallis, G.W. and J.H. Ginns. 1968. Annosus Root Rot in Douglas-fir and Western Hemlock in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 15.
6. Wallis, G.W. and G. Reynolds. 1970. Poria Root Rot in Douglas-fir in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 3.

Dwarf Mistletoes:

7. Baranyay, J.A. 1972. Dwarf Mistletoes in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 44.

Stem Rusts:

8. Bauman, N.G. 1970. White Pine Blister Rust in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 26.
9. Lowe, D.P. and W.G. Ziller. 1971. Stem Rusts of Pine in Western Canada. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 37.

Stem Cankers:

10. Anderson, R.L. 1956. Hypoxylon Canker of Aspen. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 6.
11. Baranyay, J.A. 1967. Notes on Hypoxylon Canker of Aspen in Alberta. Forest. Chron. 43: 372-380.
12. Weir, L.C. 1970. Atropellis Canker of Lodgepole Pine in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 25.

Heart Rots:

13. Harvey, G.M. 1962. Heart Rots of Douglas-fir. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 73.
14. Kimmey, J.W. 1964. Heart Rots of Western Hemlock. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 90.
15. Kimmey, J.W. 1965. Rust-Red Stringy Rot. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 93.
16. Mook, P.V. 1966. Heart Rots of Balsam Fir. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 100.
17. Ohman, J.H. and K.J. Kessler. 1964. White Trunk Rot of Hardwoods. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 88.

Needle Blights:

18. Collis, D.G. 1971. Rhabdocline Needle Cast of Douglas-fir in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 32.
19. Collis, D.G. 1972. Pine Needle Casts in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 43.
20. Foster, A.T. 1970. Elytroderma Disease of Pines. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 27.
21. Foster, A.T. 1972. Needle Diseases of Abies Species. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 46.
22. Unger, L.S. 1972. Common Needle Diseases of Spruce in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 39.

23. Vanderwal, H. 1970. Needle Blight on Western Larch in British Columbia. Can. Dep. Fish. and Forest., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 28.

Broom Rusts:

24. Baranyay, J.A. and W.G. Ziller. 1972. Broom Rusts of Conifers in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 48.
25. Peterson, R.S. 1964. Fir Broom Rust. U.S. Dep. of Agriculture, Forest Service, Forest Pest Leaflet No. 87.

Cone Rusts:

26. Baranyay, J.A. and W.G. Ziller. 1972. Spruce Cone Rusts in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 50.

Needle Rusts:

27. Bauman, N.G. and E. Wegwitz. 1972. Needle Rusts of True Firs in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 45.
28. Lowe, D.P. 1972. Needle Rust of Lodgepole Pine. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 41.
29. Ziller, W.G. and J.A. Baranyay. 1972. Needle Rusts of Spruce in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 47.

Foliage Diseases:

30. Baranyay, J.A. and Y. Hiratsuka. 1967. Identification and Distribution of *Ciborinia whetzeli* (Seaver) Seaver in Western Canada. Can. J. Bot. 45: 189-191.
31. Dance, B.W. 1961. Leaf and Shoot Blight of Poplars (Section *Tacamahaca* Spach) caused by *Venturia populina* (Vuill.) Fabric. Can. J. Bot. 39: 875-890.

Foliage Rusts:

32. Ziller, W.G. and J.A. Baranyay. 1972. Melampsora Foliage Rusts in British Columbia. Can. Dep. of Environ., Can. Forest. Serv., Forest Insect and Disease Surv., Forest Pest Leaflet No. 49.

