Armillaria mellea: Distribution and hosts in Newfoundland and Labrador

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This note provides the list and distribution of host species for Armillaria mellea in Newfoundland and Labrador. Many of the species are commercially important to the forest industry of the Region. The list includes names, latitudes and longitudes of the localities from where the fungus has been recorded; species marked with asterisks are new records for Newfoundland and Labrador.

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Cette note presente la liste et la distribution des especes hôtes du champignon Armillaria mellea à Terre-Neuve et au Labrador. Beaucoup de ces espece sont importantes commercialement pour l'industrie forestiere de la region. La liste comprend les noms ainsi que les latitudes et longitudes des localites où le champignon a été identifie. Les asterisques accompagnant certains noms d'especes indiquent que celles-ci sont mentionnees pour la premiere fois; dans cette region ou, en tant qu'hôte d'*A.* mellea.

Armillaria mellea (Vahl ex Fr.) Kummer is widely distributed in temperate and tropical regions of the world (Commonwealth Mycological Institute, 1969). The pathogen has a wide host range and causes a serious disease, Armillaria or shoe-string root rot, of commercial tree species.

In Newfoundland and Labrador the first record of the disease in natural stands dates back to 1958 when it was observed in young regenerating stands of black spruce, ***Picea mariana*** (Mill.) B.S.P., on a few old burned-over areas in western Newfoundland (Carroll and Parrott, 1958; Davidson and Newell, 1958). Since then the disease has been recorded in black spruce and balsam fir, ***Abies balsamea*** (L.) Mill., stands of all ages, and on scattered trees of several other softwood and hardwood species. The first record of the disease in plantations was made in 1970 (Singh, 1970).

Over the years ***A. mellea*** has been conspicuous and severely damaging in softwood plantations (Hall, Singh and Schooley, 1971; Singh, 1970, 1975, 1980; Singh and Richardson, 1973; Warren and Singh, 1970) and in natural stands which have been damaged by balsam woolly aphid (Hudak and Singh, 1970; Hudak and Wells, 1974). The root rot is now considered as the most important disease of living forest trees in Newfoundland. It causes loss of merchantable volume of commercially important softwood species through outright mortality of apparently healthy or insect-damaged trees, and of trees predisposed by site disturbances or inclement weather conditions. It also affects the yield through a reduction in growth, weakening of trees and windthrow (Singh and Bhure, 1974; Singh, 1980).

During the past 23 years numerous surveys have been conclucted to examine the root rot in the forests of Newfoundland and Labrador. These forests belong to the boreal forest region (Rowe, 1972) and consist mainly of balsam fir, black spruce and white birch, ***Betula papyrifera*** Marsh. Balsam fir comprises 49 and 25%, black spruce 34 and 70%, and white birch 11 and less than 1% of the total volume of merchantable standing timber on the Island and in Labrador, respectively (Page *et al.* 1974). No attempt has so far been made to compile a list of host species for ***A. mellea*** and their geographic distribution in the region. This article attempts to bring together all the information on the distribution and hosts of this pathogen.

The disease has been found to be endemic and Island-wide in distribution in Newfoundland (46°37′N to 52'0 1"N, 52°37′W to 59°25′W); it has also been recorded from a few locations in Labrador (51°25′N to 60°30′N, 55°38′W to 67°49′W). The root rot has been observed on a variety of sites: dry - 1, well-drained - 2, somewhat moist - 3, moist - 4, somewhat wet - 5, wet - 6, although it was most abundant on dry, well-drained and moist sites (Damman, 1964; Singh, 1975). It was never found on extremely wet sites, or on peat- or heathland. Although the disease occurred on cutover, burned, burned-cutover, farmland and pastureland sites, it was conspicuously abundant and damaging on cutovers or burned-cutovers (Singh, 1975).

Armillaria mellea has been found both as a parasite and a saprophyte on a range of indigenous and introduced tree species. The disease has been observed on trees of all age and height classes. In all situations the diseased trees were distributed irregularly among healthy trees and where patches of more severe disease occurred, boundaries were not well defined. The sporophores of the fungus were found, usually in the months of August and September but occurred only at a few locations.

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To date 72 isolates of the pathogen have been obtained from 66 host Provenances belonging to 22 species of softwoods and hardwoods growing in different localities. The fungal cultures are maintained on 2% malt agar in the Newfoundland Forest Research Centre Culture Collection.

The list of hosts, along with their geographic locations in Newfoundland and Labrador, is given in Table 1; a few species in the list (marked with an asterisk) are new records for Newfoundland and Labrador. Figure 1 shows the localities where the disease was observed.

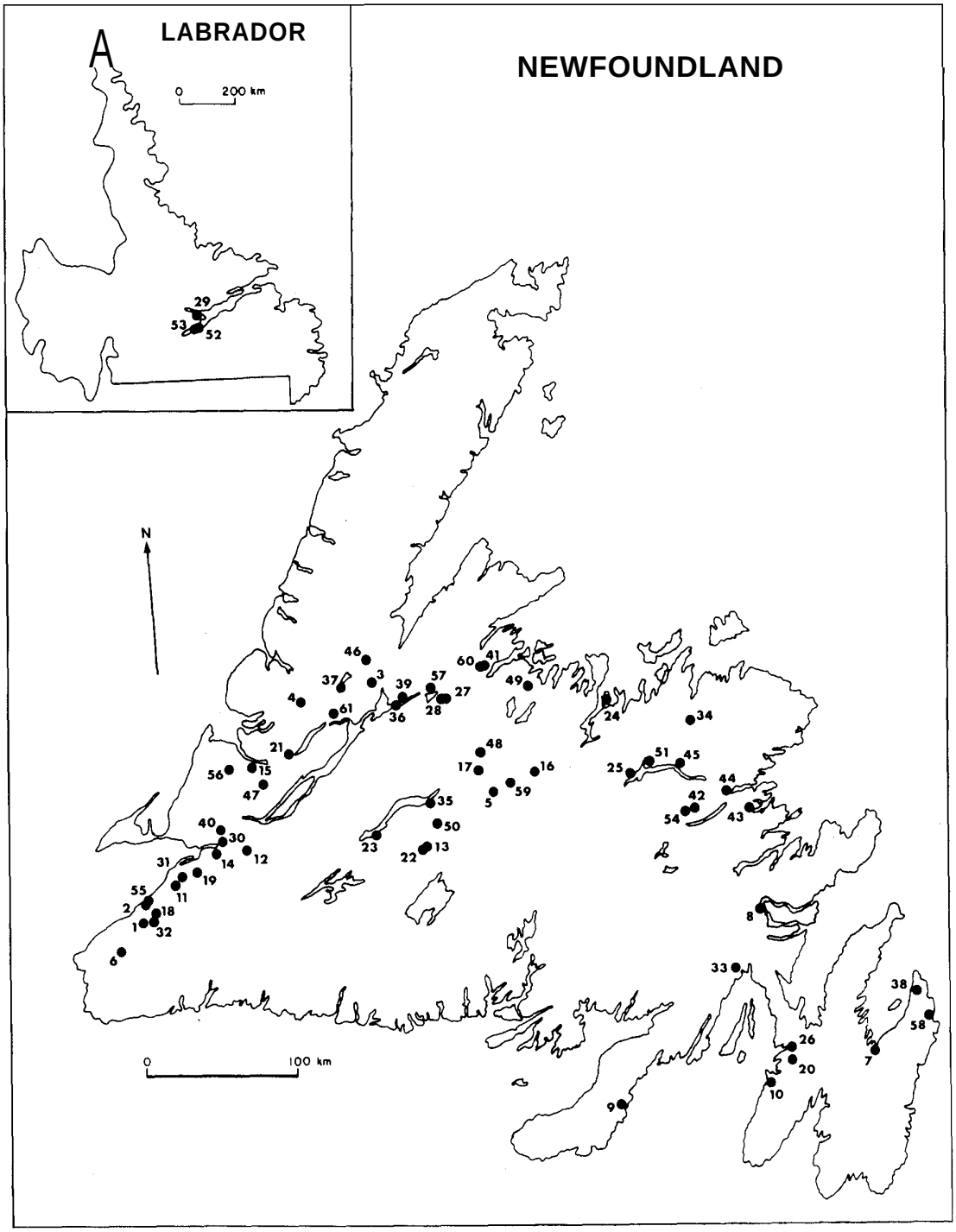

Fig. 1. Distribution of *Armillaria mellea* in Newfoundland and Labrador

Table 1 List of host species and their locations in Newfoundland and Labrador.

Map no.	Host species & its source	Establishment*	Locality		
			Name	Latitude	Longitude
	Abies Mill.				
1–28.	*A. balsamea* (L.) Mill., balsam fir – Nfld.	Natural stands	Twenty-eight localities scattered across the Island	46°37′N to 52°01′N	52°37′W to 59°25′W
29, 53.	*A. balsamea* – Labrador	Natural stands	29. Along Northwest River Road	53°30′N	60°14′W
			53. Happy Valley–Goose River	53°17′N	60°22′W
30–32.	*A. balsamea* – Nfld.	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–31.	*A. balsamea* – Acadia For. Expt. Sta., N.B.	Plantations	30. Bottom Brook 31. Middle Brook	48°32′N 48°20′N	58°14′W 58°30′W
30–32.	*A, holophylla* Maxim., Nikko fir – Korea	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–32.	*A. homolepis* Sieb. & Zucc. –Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–32.	*A. mariesii* Mast., Maries fir – Mt. Hakkoda, Aomori, Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–31.	*A. mariesii* – Arakawa Nat. For., Aomori Prefecture, Japan	Plantations	30. Bottom Brook 31. Middle Brook	40°32′N 48°20′N	58°14′W 58°30′W
30–32.	*A. mayriana* Myiabe & Kudo – Atsuta, Ishikari, Hokkaido, Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–32.	*A. sachalinensis* Mast., Saghalin fir – Tokyo Univers. Forest, Yamabe, Sorachi, Hokkaido, Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–32.	*A. veitchii* Lindl., Veitch fir –Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W
30–32.	*A. veitchii*– Mt. Kyogatake, Hishiminowa, Kamiina, Nagano, Japan	Plantations	30. Bottom Brook 31. Middle Brook 32. Highlands River	48°32′N 48°20′N 48°05′N	58°14′W 58°30′W 58°46′W

*Plantations were only located on the island of Newfoundland.

Table 1 Continued

Map no.	Host species & its source	Establishment	Locality		
			Name	Latitude	Longitude
31–32.	*A. veitchii* – Usuda, Nagano Prefecture, Japan	Plantations	31. Middle Brook 32. Highlands River	48°20′N 48°05′N	58°30′W 58°46′W
	Alnus B. Ehr.				
30.	**A. rugosa* (Du Roi) Spreng., speckled alder – Nfld.	Natural regeneration	Bottom Brook	48°32′N	58°14′W
	Betula L.				
33–34.	** *B. papyrifera* Marsh., white birch – Nfld.	Natural stands	33. Swift Current 34. Gander Bay Road	47°53′N 49°10′N	54°13′W 54°29′W
	Larix Mill.				
5,35–37.	L. *laricina* (Du Roi) K. Koch, tamarack – Nfld.	Natural stands	35. Millertown 36. Sandy Lake 5. Badger–Sandy Lake Road 37. Cormack	48°46′N 49°17′N 48°49′N 49°22′N	56°35′W 56°52′W 55°57′W 57°19′W
37.	*L. laricina* – Nfld.	Plantation	Cormack	49°22′N	57°19′W
37.	*L. leptolepis* (Sieb. & Zucc.) Gourd., Japanese larch – Holland	Plantation	Cormack	49°22′N	57°19′W
	Picea A. Dietr				
38.	*P. abies* L., Norway spruce – Unknown	Plantation	Bauline Line	47°40′′	52°48′W
37.	*P. abies* – Norway	Plantation	Cormack	49°22′N	57°19′W
39.	*P. abies* – *Nord*, Norway	Plantation	Birchy Lake	49°20′N	56°49′W
37.	*P. glauca* (Moench.) Voss, white spruce – Nfld.	Plantation Natural stands	Cormack Newfoundland	49°22′N 46°37′N to 52°01′N	57°19′W 52°37′W to 59°25′W
37.	*P. glauca* – Sewert, Alaska	Plantation	Cormack	49°22′N	57°19′W
40.	Twenty-seven more provenances of *P. glauca* from Québec, Ontario, New Brunswick & Michigan	Plantation	Stephenville	48°36′N	58°15′W

** New record for host or location in Newfoundland & Labrador

Table 1 Continued

Map no.	Host species & its source	Establishment	Locality: Name	Locality: Latitude	Locality: Longitude
1, 3–5, 21, 23, 34, 41–51.	*P. mariana* (Mill.) B.S.P., black spruce – Nfld.	Natural stands	Eighteen localities scattered across the Island	46°37′N to 52°01′N	52°37′W to 59°25′W
29, 52–53.	*P. mariana* – Nfld.	Natural stands	Three localities in eastern Labrador:		
			52. Mud Lake,	53°18′N	60°15′W
			53. Happy Valley–Goose River	53°17′N	60°22′W
			29. Along Northwest River Road	53°30′N	60°14′W
37, 39, 54–55.	*P. mariana* – Nfld.	Plantations	37. Cormack	49°22′N	57°19′W
			39. Birchy Lake	49°20′N	56°49′W
			54. North Pond	48°41′N	54°33′W
			55. Jefferys	48°12′N	58°49′W
56.	*P. rubens* Sarg., red spruce – Unknown	Plantation	Serpentine Lake	48°54′N	58°09′W
39.	*P. rubens* – Digby, N.S.	Plantation	Birchy Lake	49°20′N	56°49′W
38, 54, 57.	*P. sitchensis* (Bong.) Carr., Sitka spruce – Unknown	Plantation	38. Bauline Line	47°40″	52°48′W
			54. North Pond	48°41′N	54°33′W
			57. Sheffield Lake	49°21′N	56°33′W
56.	*P. sitchensis* – Terrace, B.C.	Plantation	Serpentine Lake	48°54′N	58°09′W
37.	*P. sitchensis* – Fisk Bay, Alaska	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Krozow, Alaska	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Lillisnoo, Alaska	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Old Sitka, Alaska	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Petersburg, Alaska	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Queen Charlotte Island, B.C.	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* – Unknown	Plantation	Cormack	49°22′N	57°19′W
37.	*P. sitchensis* x *glauca* – Denmark	Plantation	Cormack	49°22′N	57°19′W
	Pinus L.				
38.	*P. resinosa* Ait., red pine – Argus, Ontario	Plantation	Bauline Line	47°40″	52°48′W

Table 1 Continued

Map no.	Host species & its source	Establishment	Locality		
			Name	Latitude	Longitude
34.	**P. strobus* L., eastern white pine – Nfld.	Natural stands	Gander Bay Road	49°10′N	54°29′W
38.	*P. sylvestris* L., Scots pine – Unknown	Plantation	Bauline Line	47°40′N	52°48′W
58.	** *P. sylvestris* Scots pine – Tanar, Scotland	Ornamental	St. John's	47°37′N	52°40′W
54.	*P. sylvestris* – Unknown	Plantation	North Pond	48°41′N	54°33′W
	Populus L.				
59.	**P. tremuloides* Michx., trembling aspen – Nfld.	Regeneration	2% miles west of Lemotte's Lake	48°53′N	55°49′W
60.	**P. tremuloides* – Nfld.	Regeneration	6 miles west of Springdale	49°29′N	56"12′W
61.	**P. tremuloides* – Nfld.	Regeneration	North of Jct. Brook, Deer Lake area	49°13′N	57°22′W
	Pseudotsuga Carr.				
37.	*P. menziesii* (Mirb.) Franco, Douglas fir – Vancouver Island, B.C.	Plantation	Cormack	49°22′N	57°19′W

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