

# **The Wild Partridgeberry (*Vaccinium vitis-idaea* L. var. *minus* lodd) Industry in Newfoundland and Labrador and the Potential for Expansion Utilizing European Cultivars**

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## **Abstract**

*Vaccinium vitis-idaea* L. var. *minus* Lodd, known in Newfoundland and Labrador as partridgeberry, is an economically important native fruit that is harvested from unmanaged natural stands. Annual production varies, but a mean annual harvest of 96,500 kilograms makes Newfoundland and Labrador the largest North American producer. Most fruit is exported frozen, but there is local secondary processing. There is a limited local market for fresh fruit, but the potential for sales outside Newfoundland holds considerable promise. Following the development of commercial partridgeberry farms in Germany it was decided to evaluate the potential of European cultivars as an alternative crop for small fruit producers in Newfoundland. The European partridgeberry was chosen for study because it is a taller and more bush-type plant than the local variety and would presumably be higher yielding and easier to harvest. Results with rooted cuttings of the cultivars 'Korafle', 'Ammeriand' and 'Red Pearl' field-planted at Pynn's Brook and St. John's in 1992 indicate that 'Red Pearl' spreads more rapidly, but yields less fruit than the others. Total production at Pynn's Brook in 1995 for 'Koralle', 'Ammeriand' and 'Red Pearl' was 306, 147 and 101 g/M<sup>2</sup> row, respectively. Vegetative growth was good in all cultivars, but heaving was a problem with mother plants. More testing is required to determine the suitability of these and other cultivars for commercial production, especially with respect to establishment, crop yield and maturity.

## **Introduction**

*Vaccinium vitis-idaea* L. var. *minus* Lodd is a low (2 - 12 cm) evergreen shrub which occurs throughout Newfoundland and Labrador on rocky and dry peaty acid soils, barrens, and coastal headlands. This species is widely known as lingonberry, but in Newfoundland and Labrador it is called partridgeberry. Plants flower mid-June to mid-July and produce dark red berries that ripen mid-September (Ryan, 1995). The fruit has a high tannin and anthocyanin content; is very acid (pH of 2.5); and has a tart flavour (Stark et al., 1978). One difference between the European and the local type is that while the former has two "flushes" of flowers (Dierking and Dierking, 1993) with the potential for two harvests annually, the local type flowers only once.

This economically important native fruit is harvested from unmanaged natural stands. Annual production varies, but a mean annual harvest of 96,500 kg (Handbook of Selected Agricultural Statistics, 1994) makes Newfoundland and Labrador the largest North American producer. Prices paid for unprocessed fresh fruit fluctuate annually, but the average price paid by processors from 1986 to 1995 was \$1.69/kg (Cdn.). Total unprocessed crop value during that period averaged \$243,000 (Cdn.).

Most fruit is exported frozen, but there is some local processing into jams, sauces, condiments, bakery products and wine. Recently, a niche market for "wild" fresh partridgeberries packed in half-pint and pint clamshell containers has been developed for the local and Toronto, Ontario markets.

The recent development of commercial partridgeberry farms in Germany (Bläsing, 1989; Dierking and Dierking, 1993) has led to efforts to evaluate the potential of European cultivars as an alternative crop for small fruit producers in Newfoundland, especially those engaged in "pick-your-own" operations. The European partridgeberry was chosen for study because it is a taller and more bush-type plant than the local variety and would presumably be higher yielding and easier to harvest.

### **Materials, methods, experiments**

Rooted cuttings of 'Koralle', 'Ammerland' and 'Red Pearl' imported from Germany on November 27, 1991, were planted December 5 in "806 cell packs" (six cells, each 6 x 4 x 6 cm) filled with local virgin sphagnum peat and placed in a glasshouse. On March 25, 1992, they were transplanted to "1801 cell packs" (eighteen cells, each 8 x 8 x 7 cm) containing local virgin sphagnum peat. Plants were fertilized on January 22 and again on April 8 with a solution containing 20-20-20 + micronutrients at a concentration of 0.25 g/l. Day length was extended 14 h/d using supplemental lighting and air temperature maintained at approximately 16° C.

In 1992, field trials were established on mineral soil (amended with 10 to 15 cm of virgin sphagnum peat) at Pynn's Brook on July 22 and at St. John's on July 29. Soil at both sites was an orthic humo-ferric podsol, but was derived from different parent materials. At St. John's, the soil was derived mainly from slate and siltstone (Heringa, 1981), whereas at Pynn's Brook it was derived from sandstone, siltstone and granite rock, (Kirby, 1988). The experimental design for both trials was a randomized complete block with six replications. Each plot consisted of a 6 m long double row with 20 plants of each cultivar per row. Plants were staggered between rows. Distance between the double rows and between plants within rows was 30 cm in each plot. Pairs of double rows were spaced 1 m apart.

Weeds were controlled by hand-weeding and mechanical means. At the St. John's site, plants were covered with coniferous tree branches to a depth of approximately 15 cm in the late fall of 1992 to prevent heaving. In subsequent years, plants were covered by straw. Plants were not covered for winter protection at Pynn's Brook, due to normally heavy snowfall in the area.

Flowers were removed on a continuing basis from 1992 to 1994 to promote vegetative growth. In 1995, berries were harvested September 12, October 4 and November 10 at Pynn's Brook. Ripe berry weight (September 12 harvest) for each plot was determined by counting the number of berries in 100-g samples. Fruit production was not sufficient to warrant harvesting at the St. John's site in 1995.

### **Results**

#### St. John's trial

Plant heaving during the first winter (1992/93) was a major problem despite mulching with tree branches. This necessitated replanting of most plants and replacement of others. Subsequent recovery and growth varied with cultivar. When plants were evaluated on October 20, 1993, rhizome growth was observed in 18% of the 'Red Pearl' plants, 2.9% of 'Ammerland' and 0.4% of 'Koralle'. In subsequent years, straw mulch provided near adequate protection, but there was still some heaving, which probably adversely affected growth. Furthermore, a constant hand weeding program to control a serious dandelion (*Taraxacum officinale* Webber) infestation, may have damaged (injured) rhizomes.

Of the three cultivars evaluated, 'Red Pearl' had the most growth with respect to rhizome development, but the plants did not spread sufficiently to fill spaces between plants or between the double rows by the fall of 1995.

## Pynn's brook trial

All three cultivars grew significantly following planting in 1992. Plant heaving, with the exception of the winter 1995/96, was not a problem due to adequate snow cover. Following the winter of 1995/96, heaving was observed in all cultivars, but only in the original mother plants. Although 'Koralle' and 'Ammerland' grew significantly with respect to the increased size of the mother plants, rhizome spread and the production of new shoots from these rhizomes were minor in comparison to those of 'Red Pearl'. Consequently, heaving was a much greater problem with these cultivars than with 'Red Pearl'.

Following the winters of 1994/95 and 1995/96 severe defoliation was observed, but plants produced new leaves during subsequent growing seasons. At these times, a leaf spot problem of unknown origin was prevalent.

Another problem during the first two years was the "pulling out" of plants by crows (*Corvus brachyrhynchos*). Since plants were left at the site, crows may have been attracted to the shiny foliage. As a result, a total of 56 (7%) plants had to be replaced. This problem was solved by installing an electronic bird-scaring device (Phoenix Wailer Mark II, Phoenix Agritech Canada Ltd., Truro, NS, Canada).

Fruit was harvested for the first time in 1995. Total ripe fruit production in g/m<sup>2</sup> was 306, 147 and 101 for 'Koralle', 'Ammerland' and 'Red Pearl' respectively (Table 1). Yields were based on plot area (1.3 x 6 m) rather than area occupied by plants and consequently are much lower than if actual ground cover had been used in the calculations. Fruit weight in grams was 0.35, 0.31 and 0.30 for 'Red Pearl', 'Koralle' and 'Ammerland' respectively. For comparison, yields from natural stands in Newfoundland ranged from 37 to 130 g/m<sup>2</sup> with a berry weight range of 0.22 to 0.41 g depending on site and year (Penney et al., 1985).

## Discussion

### Establishment

Due to inadequate snow cover, winter heaving of plants was a more serious problem at St. John's than at Pynn's Brook. Although snow cover was adequate at Pynn's Brook during the first three years, results showed that the original plants had not established sufficiently to prevent some heaving during the fourth winter when snow cover was minimal. In contrast, heaving did not occur in new rhizome growth. Since rhizome spread was minor in 'Koralle' and 'Ammerland' compared to 'Red Pearl', heaving was more of a problem with the former cultivars. It is concluded that winter protection is necessary in Newfoundland, but the duration required for mother plants to become established is as yet still unknown.

### Production

Of the three cultivars tested, 'Koralle' produced the highest yield. However, the trial has not been in progress long enough to determine the full yield potential of these cultivars or to determine whether it would be economically feasible to produce this crop commercially.

Future studies will include the evaluation of other cultivars focusing on establishment, production, dates of maturity, pest problems and use of floating row covers to enhance fruit bud production and hasten fruit maturity in the fall.

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**Table 1 - Ripe fruit yields from partridgeberry trial in Pynn's Brook.**

	Date of Harvest (1995)			Total Yield Berry Wt.	
	Sept. 12	Oct. 4 (g/m <sup>2</sup> )	Nov.10	(g/m <sup>2</sup> )	(g)
<b>Koralle</b>	120		186	306	0.31
<b>Ammerland</b>	41		106	147	0.3
<b>Red Pearl</b>	36	41	23	100	0.35