

# Propagation of Indigenous Lingonberries for Sustainable Development

Vickie Talbot – (*Farmer/Rancher Grant*)

**Project Number:** FW98-064

**Title:** Propagation of Indigenous Lingonberries for Sustainable Development

## Principal Investigator

Vickie Talbot  
Former Owner  
Moose Creek Farm  
Trapper Creek, Alaska  
Current address:  
11675 E Soapstone Rd.  
Palmer, AK 99645



Vickie Talbot with a flat of lingonberries.

## Technical Advisor

Patricia Holloway  
Professor of Agriculture  
College of Natural Resources  
University of Alaska  
Fairbanks, AK 99708  
907.474.5651  
[psholloway@alaska.edu](mailto:psholloway@alaska.edu)

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## Situation:

Lingonberry, also known as mountain cranberry, partridge berry and lowbush cranberry, is a small shrub that bears edible fruit, commonly collected in the wild and used in jams, jellies and candies.

Most lingonberry cultivars are available commercially from Europe and flower twice in a season. In Alaska, the first flowering results in small yields; the second flowering occurs too late in the season to produce mature fruit.

Using wild Alaska lingonberries could provide stem cuttings for cultivars adapted to regional conditions. Alaska stem cuttings root readily, but several problems arise:

- Large amounts of stock plants are needed to provide enough stem cuttings for commercial production
- Plants propagated from stem cuttings rarely produce rhizomes and fail to form productive matted rows
- Research from Sweden suggests plants from stem cuttings have short life spans, necessitating replacement of entire fields

Tissue culture provides an alternative for rapid propagation, but no commercial tissue culture labs exist in Alaska.

## Objectives:

Develop an on-farm tissue culture facility for rapid propagation of selected Alaska strains of lingonberries.

## Actions:

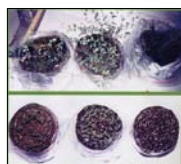
A farmhouse storage area (4.3 m by 3.7 m) was converted to a lab with:

- Four tiers of shelves to accommodate nursery flats
- Workbench, large sink and dishwasher
- Transfer room with a portable sterile hood originally used for mushroom culture
- Growth cabinet with a shelving unit in clear plastic sheeting and circulating fan, heater and air conditioner to maintain temperature between 21-24°C
- Other equipment: 1/1000-gram scale, hotplate, pH meter, refrigerator, dissecting microscope, large-capacity pressure cooker, various lab glassware

Plants for cuttings were collected from two sites:

1. Plants with large fruit and an upright growth habit were collected 440 km north of Anchorage
2. Plants with small berries but large clusters were collected from Moose Creek Farm 185 km north of Anchorage

The selections were transplanted to flats of peat and grown under fluorescent lights in the lab. Unreplicated trials were conducted using the most recent experimental research on lingonberries.



Routed microshoots in propagation rolls at various stages of development.



Propagation rolls enclosed in plastic bags.



Construction of propagation rolls.



Culture chamber for microshoot production.

## Results:

The most significant challenges for the lab were:

- minimizing culture contamination
- providing adequate ventilation and cooling
- determining the best light and temperature
- developing a space-minimizing rooting system
- maintaining the root cuttings for several months during the winter before planting

The project succeeded in developing a culture tissue lab that maintained the jars of growing shoots at fairly constant temperature and humidity at a fraction of the cost of a commercial unit.

The lab supported 150 jars (baby food size) of mature cultures and 150 jars of developing cultures, with around 3,000 shoots harvested per transfer from mature jars. For rooting, thin layers of peat-based medium were rolled like jellyrolls in plastic film.

Several materials were tested for rooting the microshoots – perlite, vermiculite, peat moss and coconut husks. All worked well except coconut husks. Rolls covered in plastic, rather than enclosed in a bag, had up to 95% rooting success.

A cold room provided a space to house the plants through the dormant phase. An additional year's growth was achieved by bringing the plants back into the lab for a second time, then returning them to the cold room once before spring.

Although microshoot production was successful, rooting failures were unacceptably high. Additional research is suggested.



Young microshoots under high light intensity.



Young microshoots under low light.

## Impacts or Benefits on Agriculture:

The project made meaningful progress toward understanding how to commercially propagate lingonberries, providing a model that others could mimic for on-farm tissue culture.

"I believe that it is possible for an on-farm laboratory to be successful," said Vickie Talbot in the project's final report. "Our major area of difficulty was the amount of time the lab required to fully develop. Although we sought our information on tissue culture from several sources, much of the knowledge and information we gained was through trial and error."

Newly developed plants were planted in spring 2001. Talbot reported in February 2010 that lingonberries from the trial continued to thrive:

"They exceeded my expectations for development. The lingonberries have created a solid mat over the acreage where they were planted. I believe they can be a viable and sustainable field crop, but as with any new cultivated crop, it takes 20-30 years to fully develop their potential."



The lab supported 150 jars of developing cultures.