Establish More Efficient and Biological Practices for Bringing Forest Land into Agricultural Use through Sustainable Development Using Indigenous Species in Alaska

Vickie Talbot – *(Farmer/Rancher Grant)*

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Title: Establish More Efficient and Biological Practices for Bringing Forest Land into Agricultural Use through Sustainable Development Using Indigenous Species in Alaska

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Lingonberries

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Lingonberry plots with an abundance of horsetail.

SARE Grant: $5,000

Situation:

Pursuing agriculture in Alaska often requires clearing birch and spruce stands. The slash is typically windrowed into swathes 50 to 75 feet wide for later burning. This causes several problems:

- The process removes considerable soil and sustaining organic matter
- Windrows burn poorly, even after years of seasoning, because of size, moisture and topsoil
- The windrows occupy 15-20% of the cleared space

Using rotted wood and bark mulch from existing windowed slash piles could provide a basis for sustainable crops of lingonberries and other native berries. This could reclaim a valuable resource and alleviate the costs of conforming soils to non-indigenous crops.

Objectives:

- Reclaim valuable timber resources created from clearing forest land for agricultural use
- Establish a commercial lingonberry stand and other native and indigenous berries using rotted birch and spruce mulch as soil conditioners

Actions:

Site Description

The project site had been cleared of brush and trees as part of the 1982 Land Disposal-Matanuska Susitna Borough Agriculture Sale, designed to bring more land into agriculture. An owner was required to place 75% of land in production within nine years to retain ownership.

This 67-acre operation, Moose Creek Farm at the northern end of the Matanuska Valley, included 45 acres in fields, 12 acres in woodland and the rest in wetland and windrowed slash.

Activities

A chipper capable of shredding trees up to 10 inches in diameter prepared mulch for applications.

Beds were prepared on 1 acre for 12,000 plugs of lingonberries and new starts of currants, highbush cranberries and wild rose. Soil applications at various stages of the project included:

- Local sphagnum bog peat and rotted birch and spruce mulch, fertilized organically with cod bone meal
- Chipped rotted wood from slash rows disked in at rates of 0, 2, 4 and 6 inches per quarter acre
- 5 tons of raw fish waste
- Diluted animal blood (5 gallons blood to 300 gallons of water)

Soil samples were taken for nitrogen, phosphorus and potassium before and after applications.

Results:

Pre-application soil tests found very low levels of nitrogen and phosphorus and high levels of potassium.

The applications of blood and fish emulsion were very effective in raising the nitrogen levels required by lingonberries.

Wood chips were effective in conserving moisture, which reduced irrigation needs, and suppressing weeds and wild grasses, except for horsetail fern (*Equisetum arvense*).

Rows of lingonberries on Moose Creek Farm.

Three-year-old lingonberry plants with horsetail removed.

Talbot applying irrigation water to the plants before her drip irrigation systems was installed.

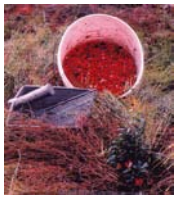
Bed preparation.

Chipping timber from slash piles.

Lingonberry plants in plots with wood chips had a higher rate of rhizome growth, which will increase plant productivity more quickly as the soil continues to improve and become more balanced from decomposing fish and chips.

The project had variable success in starting other new crops:

- Highbush cranberries (*Viburnum edule*) failed to start from cuttings
  - It was later discovered that highbush cranberries could be propagated by layering
- Currant starts (*Ribes triste*) were successful but not sufficiently developed to plant in the field
- Wild roses (*Rosa acicularis*) were successfully started on 2 acres
- Fireweed (*Epilobium angustifolium*) for honey production was developed on 2 acres



Lingonberry harvest.

Benefits or Impacts on Agriculture

The wood chips and fish waste yielded a considerable increase in beneficial soil organisms, including earthworms (a tenfold increase in plots with chips) and beneficial insects (beetles and spiders). The fish waste caused a flush of microbial organisms that will add nitrogen as they die and decompose.

The soils became more sustainable by providing the necessary building blocks for the organisms that build soils, more closely resembling soils on which lingonberries thrive in the forest.

As the project evolved, an objective was added based on evidence that horsetail fern played a role as a potential companion crop in lingonberry production. The findings, though preliminary, suggest several benefits and problems:

- Lingonberries without horsetail fern did not grow better than those with horsetail fern
- Heavy concentrations of horsetail fern restricted growth of young lingonberries; moderate concentrations did not
- Rows with horsetail fern decreased the ability of undesirable species to germinate
- Horsetail fern created a buffer against harsh weather
- Lingonberry leaf color was brighter where horsetail fern was growing suggesting shade may be desirable during the early stages of lingonberry plant development
- Horsetail fern hampered harvest

Three-year-old lingonberries with horsetail pulled back.