

Propagation of Northern Bog Blueberry (*Vaccinium uliginosum*) by Seeds and Stem Cuttings[®]

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INTRODUCTION

The northern bog blueberry is the most harvested wild berry in all of Alaska. The plant grows from the northern tundra to the coastal mountains. It has been a traditional food of indigenous people for thousands of years and is commercially harvested for farmers market sales and for small cottage jam and jelly industries. The berries are extremely high in antioxidants even when frozen or processed into juices, fruit leather, and other products (Leiner et al., 2006; Holloway et al., 2006).

Because of increased demand for this northern berry, Alaskans are interested in managing wild stands and field cultivation for improved fruit production (Holloway, 2006). Any attempt at cultivation requires a rapid and consistent method of propagation that is feasible in Alaska with limited propagation facilities. Although micropropagation with this species is possible, it is not practical in Alaska where tissue culture labs do not exist, and custom contract propagation is expensive. In this study, we identified methods of seed and vegetative propagation for field establishment, wild stand enhancement, selection of superior strains, and eventual breeding.

PROPAGATION

Stem Cuttings. We harvested softwood and semi-hardwood stem cuttings collected from wild stands approximately every 2 weeks beginning 20 June through August. Prior to this date, cuttings were too small to handle easily. We were interested in learning if rooting would be rapid enough to allow for fall planting of rooted cuttings to avoid the need for storage facilities for over wintering.

Cuttings were propagated under mist in an unheated greenhouse with 77 °F (25 °C) bottom heat in perlite and vermiculite (1 : 1, v/v) (4 replicates, 25 cuttings per replication). All cuttings were treated with 0.3% IBA powder. At 6 weeks, we recorded rooting percentages and evaluated roots for quantity according to the following scale:

- 1) 1–2 roots per cutting, propagation medium falling off with gentle shaking
- 2) 3–4 roots per cutting, propagation medium removed with vigorous shaking
- 3) >4 roots per cutting, propagation medium difficult to remove without washing roots

In late July 2008, we also collected cuttings from 30 different wild locations near Fairbanks, Alaska (64° 51'N, 147° 52'W) and from three individual plants per location (25 cuttings per plant) to learn the extent of differences in rooting percentages among plants and locations. These cuttings were rooted and rated the same as the first experiment.

Stem cuttings rooted equally well with percentages averaging 50% to 65% for all collection dates throughout the harvest period. We found no “best time” to collect

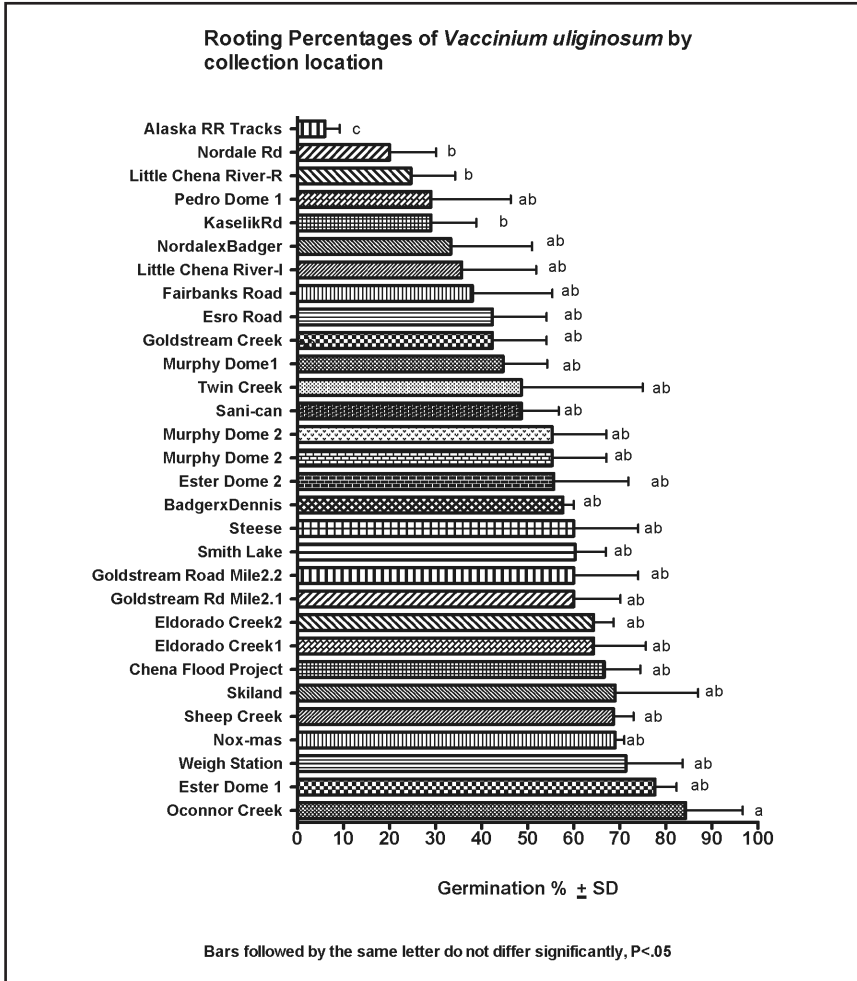


Figure 1. Rooting percentages from wild-harvested stem cuttings of northern bog blueberry collected at 30 locations near Fairbanks, Alaska.

for optimum rooting, but root quantity barely met the minimum for cutting survival at the end of 6 weeks. A root quantity rating of 2 or greater is required for cutting survival following transplanting, and no harvest date exceeded that rating. Root production in most cuttings consisted of one or two very fine, hair-like roots usually emerging from a single location. These roots were fragile, easily torn from the cutting, and required special transplant care for cutting survival.

Rooting percentages ranged from 0% to 100% for semi-hardwood cuttings collected from 90 different plants from throughout the Fairbanks area (Fig. 1). Rooting percentages were similar for 26 of the 30 collection sites. Seventeen locations averaged 50% or better for rooting per plant. We could not distinguish any common characteristic among sites for best or worst rooting, although cutting location differences did exist. Lowland, boggy sites and upland tundra sites were just as likely

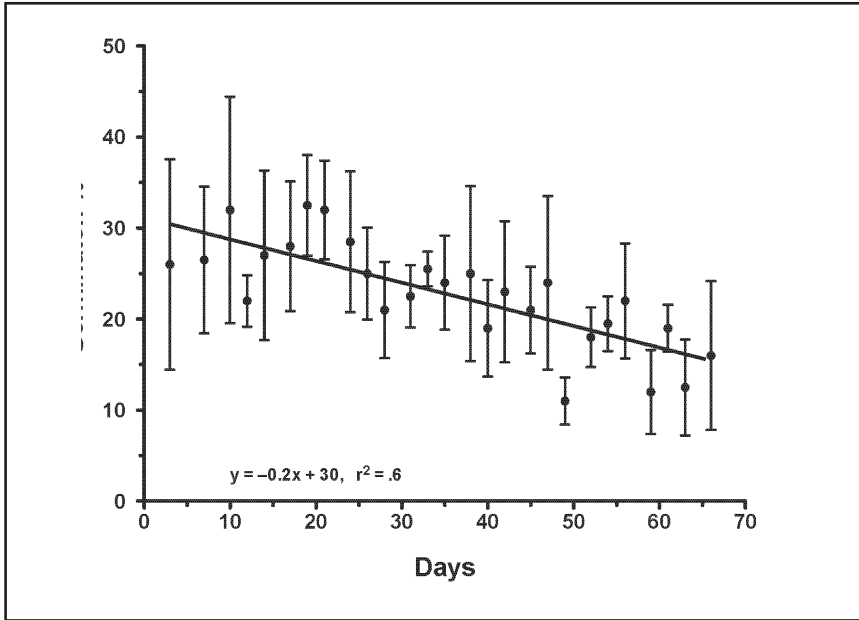


Figure 2. Germination of northern bog blueberry seeds air dried (21 °C) for up to 66 days.

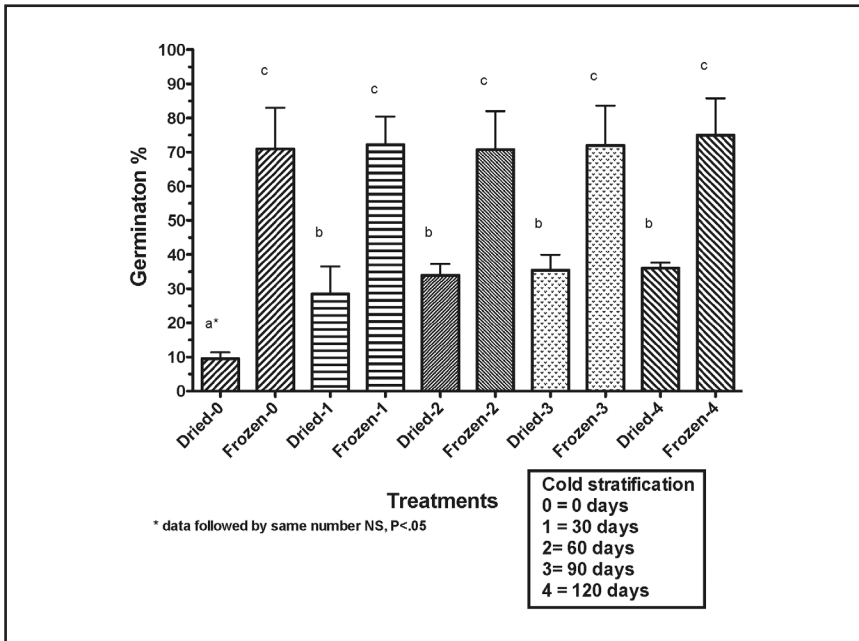


Figure 3. Cold stratification (4 °C) and germination of air dried northern bog blueberry seeds compared to seeds from frozen berries.

to produce good rooting percentages. Collection of cuttings from a variety of wild sites will most often yield good rooting percentages. However, for field improvement and cultivation, selection of individual plants for good rooting percentages should be possible.

Seed Germination. We harvested berries in August and refrigerated them for 8 days. Half the berries were frozen 23 °F (-5 °C), and 400 seeds were extracted at 2- to 3-day intervals up to 66 days. Seeds were sown without drying onto filter paper and germinated in light at 70 °F (21 °C) (4 replicates of 100 seeds). The remainder of the fresh berries was macerated immediately and seeds were removed. Air-dried seeds (21 °C) were sown at 2- to 3-day intervals for up to 2 months onto filter paper and germinated as above. Seeds air dried for 60 days were cold stratified 40 °F (4 °C) up to 4 months.

Germination of seeds from frozen berries ranged from 50% to 86% and did not differ significantly based on the length of the freezing duration. All seeds from frozen berries germinated the same as fresh, unfrozen seeds. Seeds dried as little as 3 days showed at least a 50% drop in germination percentages, and they decreased linearly the longer the seeds were dried (Fig. 2). Cold stratification up to 4 months increased germination percentages of air dried seeds, but even after 4 months, germination did not exceed 30% (Fig. 3). Cold stratification did not improve germination of seeds from frozen berries.

RECOMMENDED METHODS

Two methods for propagating northern bog blueberry include softwood or semi-hardwood stem cuttings collected in late June, treated with 0.3% IBA and propagated under mist with bottom heat in perlite and vermiculite (1 : 1, v/v). Cuttings root well all summer but earlier dates are better to allow for more than 6 weeks establishing good root systems. Seeds germinate well without pretreatment as long as seeds are not permitted to dry out following extraction from the berry and before sowing. Extract seeds from fresh or frozen berries and sow immediately. Seeds begin to germinate in 7–10 days at 70 °F (21 °C).

LITERATURE CITED

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