Seasonal Collection Date of Lingonberry [*Vaccinium vitis-idaea* L. subsp. *minus* (Lodd.) Hultén] Stem Cuttings Influences Rooting and Rootball Size©

Bradly Libby and John M. Smagula
Department of Plant, Soil, and Environmental Science, 5722 Deering Hall University of Maine, Orono, ME 04469 U.S.A.
Email: blibby@maine.edu

INTRODUCTION

Aficionados of muffins, pancakes, and pies are very familiar with Maine's lowbush blueberry (*Vaccinium angustifolium* Aiton). However, Maine can boast another outstanding *Vaccinium*, the lingonberry. Lingonberry, *Vaccinium vitis-idaea* L. subsp. *minus* (Lodd.) Hultén, also known as mountain cranberry, is found growing in North America from northwestern Greenland, south to Connecticut, and west across Canada to the Aleutian Islands (Vander Kloet, 1988). It has somewhat smaller morphological features than its European counterpart *V. vitis-idaea* subsp. *vitis-idaea* (Ritchie, 1955). Lingonberry grows as a prostrate shrub, spreading by rhizomes. It bears densely arranged small waxy evergreen leaves. Its attractive white to pink bell shaped flowers often appear twice during the year in Maine, late spring and again in the summer. Lingonberry fruit is a bright red tart edible berry, which also provides attractive late season color. These attributes validate its use as a native groundcover.

Holloway (1985) conducted an excellent study assessing the seasonal pattern of rooting of lingonberry stem cuttings of three stages of growth: current season's growth, 1-year wood, and 2-year wood collected from native stands near Fairbanks, Alaska. Interestingly, September cuttings generally rooted at higher percentages after 8 weeks than spring and summer cuttings (with the exceptions of late May 1-year wood, late August 1-year wood, and late June 2-year wood). Holloway cites a study conducted in Finland (Lehmushovi, 1975), which also indicates that early spring and fall cuttings rooted better than summer cuttings for lingonberry in Finland.

The objective of this study was to determine the optimum time to propagate native Maine clones of lingonberry by stem cuttings for optimum rooting and rootball size.

MATERIALS AND METHODS

Greater than 25 terminal cuttings, at least 2.5 cm in length, were collected from a single stand of lingonberry growing in Washington County, Maine, on six dates from mid June 2008 to the end of October 2008. Cuttings were collected and put in sealed plastic bags with moist paper towels and kept in an insulated cooler with ice during transit. Cuttings were stored in the same sealed bags in a refrigerated cooler kept at 7 °C until sticking within 72 h of collection.

Each of the 25 cuttings per treatment date was stuck in its predetermined randomized location within three 50 round cell propagation trays (T.O. Plastics, Clearwater, Minnesota) filled with a moistened peat, vermiculite, and perlite (3 : 2 : 1, by vol.) rooting medium. The six sticking dates were 13 June, 9 July, 7 Aug., 5 Sep., 2 Oct., and 31 Oct., 2008. At each sticking date, the 25 single cuttings (replicates)

were arranged in completely randomized design. Cuttings were selected for uniformity and cut with a single-edged razor to 2.5 cm in length with a single 3 mm wound at the base of each cutting before sticking. The leaves were removed from the lower half of the stem and the cutting was buried to half its height (1.25 cm) in the rooting medium. Each of the propagation trays was set in a 1020 tray and covered by a clear plastic propagation dome designed to fit securely over the tray. Each tray and dome was also covered with a 2 mil plastic bag sealed with tape. The sealed propagation trays with stuck cuttings were kept in a culture room maintained at 23 °C with a 16-h photoperiod. Light was provided by a 60 watt fluorescent cool white bulb (Philips, F96T12/CW/EW, Somerset, New Jersey) located approximately 23 cm above the tips of the cuttings. The covered trays were removed from the culture room for each treatment date and returned after sticking of cuttings and resealing the outer plastic bag.

Cuttings from each treatment date were evaluated for rooting and rootball dimensions 8 weeks after sticking. Rootballs were measured in millimeters by the length of the rootball (longest root) and the greatest width of the rootball. Rooting percentage was statistically analyzed using logistic regression (SAS 9.1, SAS Institute Inc., Cary, North Carolina). Rootball dimensions were statistically analyzed using analysis of variance (ANOVA) and mean separation via LSD ($P \leq 0.05$) (SAS 9.1, SAS Institute Inc., Cary, North Carolina).

RESULTS AND DISCUSSION

The rooting percentages for cuttings stuck on 13 June, 5 Sept., 2 Oct., and 31 Oct. were the highest and statistically equivalent (96%, 84%, 92%, and 92% respectively) as shown in Figure 1. The cuttings stuck on 9 July and 7 Aug. had lower rooting percentages than those stuck on the other four treatment dates and were not different from each other (48% and 32%, respectively). The cuttings stuck on the 2 Oct. and 31 Oct. dates had the greatest mean rootball area values and were statistically equivalent (15.3 cm^2 and 16.7 cm^2, respectively) as shown in Figure 2. The cuttings stuck on 13 June, 9 July, 7 Aug., and 5 Sept. had lower mean rootball area values (6.7 cm^2, 2.0 cm^2, 8.9 cm^2, and 9.3 cm^2, respectively) than those stuck on 2 or 31 Oct.

These results support the findings of Holloway (1985), which indicated that fall (24 September) cuttings of current season and 1-year-old wood rooted at greater percentages than summer cuttings. These data also show a spring period of higher rooting potential preceding the summer decline. In Holloway's study, late May 1-year wood rooted at a percentage (80%) statistically equivalent to early and late September (94% and 100%, respectively). In our study, 13-June cuttings rooted at a percentage (96%) statistically equivalent to September, early October, and late October (84%, 92%, and 92%, respectively). Although the calendar dates do not correspond between our two studies, the seasonal rooting trend is similar. Cuttings from spring growth appear to have a high rooting potential followed by a significant decline in rooting potential during the late spring and summer months. Late summer and fall stem cuttings appear to regain higher rooting potential. Holloway also describes a similar seasonal rooting pattern in a study conducted by Lehmushovi (1975), although some variability existed between years. Gustavsson (2000) reports variable seasonal rooting with *V. vitis-idaea* subsp. *vitis-idaea* between 2 years. The author attributed this variability to differences in temperature and precipitation leading to observable differences in the quality of cutting material. Gustavs-

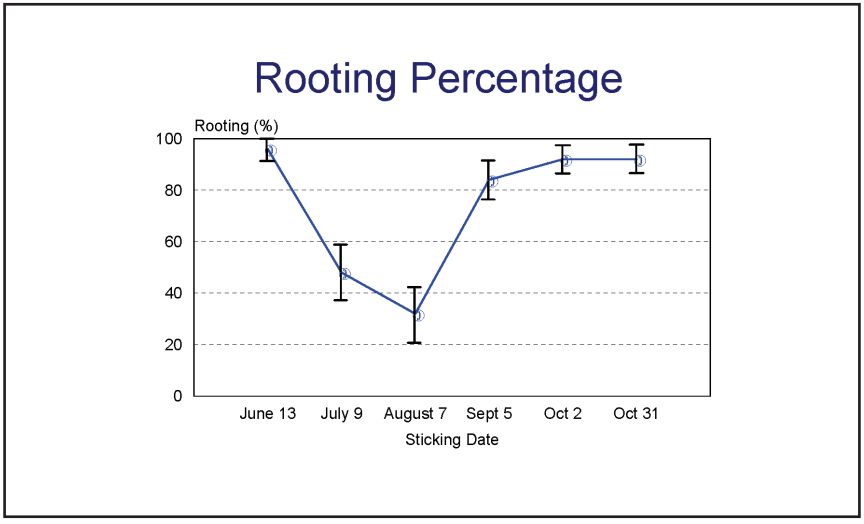

Figure 1. Rooting percentages of a *Vaccinium vitis-idaea* subsp. *minus* clone from Washington County, Maine. Rooting percentage was evaluated 8 weeks after sticking. Error bars represent standard error of the mean (n = 25) of each treatment date.

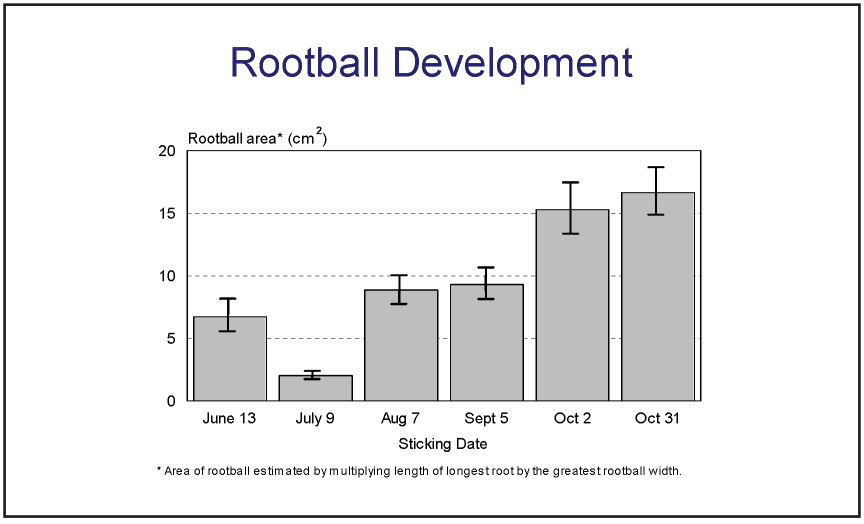

Figure 2. Rootball area estimate of a *Vaccinium vitis-idaea* subsp. *minus* clone from Washington County, Maine. Rootball area was evaluated 8 weeks after sticking. Error bars represent standard error of the mean (n = 25) of each treatment date.

son's study did not include stem cuttings collected later than 25 Aug., and therefore didn't include results of comparable late season stem cuttings.

Holloway also indicated that cuttings produced few but well-branched roots. Root development was reported as average number of roots per cutting. Values ranged from 1.0 to 2.5 and did not differ significantly among collection dates. Actual root or rootball dimensions were not reported. In our study, the quality of the cutting rootballs was determined by estimating the rootball area. Although the cuttings from the 13 June sticking date had a high rooting percentage equivalent to the October dates, the cuttings from the two October dates produced rootballs greater than twice the size of the 13-June cuttings.

These results indicate that the highest rooting percentage and largest rootballs would be obtained from lingonberry stem cuttings of current season's growth collected in the fall.

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