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'Ida' and 'Linnea' — Novel Lingonberry Cultivars with Commercial Potential

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Abstract

'Ida' and 'Linnea' lingonberry have been named and released by the Swedish University of Agricultural Sciences for use in commercial production. Seeds were originally obtained from the province of Småland, Sweden, and gave rise to the new cultivars through open pollination. 'Ida' is characterized by very large berries and repeated flowering and early ripening berries. 'Linnea' is vigorous, high yielding and produces berries with good storage capacity. Both cultivars are very winter hardy and relatively resistant to fungal diseases.

Introduction

Lingonberry (*Vaccinium vitis-idaea* L.) is a small fruit crop species of great economic importance in Northern Europe. Commercial cultivation was originally introduced in Germany in the 1980s with the cultivar 'Koralle' (1). After the release of two Swedish cultivars 'Sussi' and 'Sanna,' commercial field cultivation was also initiated in Sweden (2, 6). 'Splendor' and 'Regal,' selected in Wisconsin, were named and released by Stang et al. (5) and the first lingonberry operations have recently been established in USA. However, the supply of cultivated lingonberries is still insignificant compared to wild picked berries.

Origin and testing

The lingonberry project was initiated at Balsgård-Department of Horticultural Plant Breeding, Sweden, at the end of the 1970s. Seeds were obtained from the late Danish professor Sven Dahlbro's plant collection derived from open pollination in the province of Småland (in the south of Sweden) (Fig. 1). From this germplasm the first Swedish cultivars 'Sussi' and 'Sanna' were selected and released. A second generation of 2000 seedlings were derived

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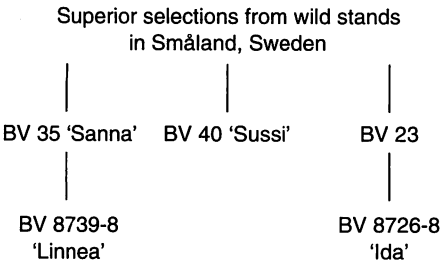


Figure 1. Pedigree of three generations of lingonberries derived by open pollination.

from open pollination of superior selections of the first plant generation (4). Within these populations, twenty-four outstanding selections were identified, including 'Ida' (BV8726-8) and 'Linnea' BV8739-8, based on precocity, berry yield, berry size, berry quality, plant vigor and freedom from visible leaf diseases. The selections were subsequently propagated by cuttings for testing (two replicates of 10 plants each) along with other named cultivars at Balsgård (56°7'N, 14°10'E) on an experimental field consisting of a sandy moraine with a pH of 5.6 (Table 1).

Bloom trait and ripening time were scored whereas average berry weight was measured by weighing 100 berries per bush and divide the weight by 100. The total acidity as malic acid was measured by titration to pH 8.1 by use of an ABU 91 Autoburette titrator. Juice was produced from thawed berries with a garlic press for measuring the content of soluble solids and anthocyanins. Soluble solids were determined by using a digital refractometer, Palette 100. The anthocyanin (Acy) content was measured by the pH differential method (3, 7) and expressed as cyanidin-3-galactoside using the molar absorbance of e = 30 200 and molecular weight of 445. Absorbances were recorded with a Shimadzu UV-2101 PC spectrophotometer.



Figure 2. 'Ida' with distinct veins on the leaf upper side and very large berries.

Descriptions

'Ida.' Vigorously growing, round-shaped, compact bush (mature plant height: 10–20 cm) with moderate plant spread (rhizome production). Leaves are rather large with distinct veins on the upper side (Fig. 2). Plants are precocious

Table. 1. Harvest data from 'Ida' and 'Linnea' and three older cultivars of lingonberry (mean for 1995-97). Amount of second bloom period, average berry weight (g), ripening time, total acidity (g acid expressed as malic acid/100 g fresh fruit), soluble solids (°Brix) and content of anthocyanins in ml/l (expressed as cyanidin-3-galactoside).

Cultivar	2nd bloom period	berry weight	ripening time	acidity	soluble solids	anthocyanins
Ida	profuse	0.62	early	1.66	12.0	1.3
Linnea	sparse	0.37	late	1.81	13.3	2.0
Erntesegen	profuse	0.65	late	1.54	11.8	1.9
Koralle	profuse	0.25	medium	1.68	12.5	2.2
Sanna	no	0.40	late	1.48	14.0	1.6

and early blooming, the average first bloom date in southern Scandinavia is May 20–25. The flowers are set in sparse clusters. Fruits are very large (0.5–0.8 g/berry), bright red, ripening in mid August (Table 1). The cultivar has a pronounced capacity for a second blossoming period, approximately starting at the end of July. In southern Scandinavia the second crop ripens satisfactorily in October. Fruit yield of mature plants averages 140 g/plant per year.

'Linnea.' Vigorous, upright growing, rather compact bush (mature plant height: 15–25 cm) with sparse plant spread (rhizome production). Leaves are rather large. Plants are precocious and early blooming. Flowers and fruits are set in large, dense clusters and the average first bloom date in southern Scandinavia is a few days later than 'Ida' (Fig. 3). Fruits are medium to large (0.35–0.45 g/berry), bright red, slightly darker than 'Ida.' Berries ripen evenly in the cluster and the time of ripening occurs in late August. The total acidity is high, allowing a good storage capacity and minimal susceptibility to fruit rot (Table 1). As with 'Ida,' 'Linnea' has two blossoming periods, but the second is sparse and not worth harvesting. Fruit yield on mature plants averages 150 g/plant.



Figure 3. 'Linnea' with large berry cluster.

Discussion

'Ida' with its two blossoming periods, should complement or perhaps replace 'Koralle' due to larger berry size, earlier ripening and better winter hardiness. Return bloom is very desirable in climatic zones where frosts during the spring flowering period are frequent. However, there are three major disadvantages associated with this trait: a) it is of little value to growers in regions where the season is not long enough to mature the second fruit crop; b) if heavy, the autumn fruit crop can limit the extent of spring bloom in the following year; and c) developing flowers or green fruits from the second bloom cycle can be damaged when mature fruits from the first bloom cycle are mechanically harvested using a hand-held comb or machine. If the first crop is slight, it is therefore better to leave it on the plants, and focus harvesting on the second crop instead. Besides its potential as a cropping cultivar, 'Ida' also has a pronounced ornamental value due to shiny leaves with distinct veins on the upper side, and is recommended for landscaping.

'Linnea,' as well as our previous cultivar 'Sanna,' is more adapted for northern conditions with short summers since it has only one pronounced blossoming period. We have, however, no experience of blooming and fruiting performance of this cultivar in regions with longer summers. The major assets of 'Linnea' are its upright growth, large fruit clusters and better fruit quality (high acidity and anthocyanin content) than 'Ida.' 'Linnea' produces few rhizomes which facilitates weeding but also decreases the propagation (by rhizomes) capacity .

Availability

'Ida' and 'Linnea' are propagated under a royalty agreement with Fall Creek Farm & Nursery, Inc., 39318 Jasper-Lowell Rd. Lowell OR 97452,

USA and The Foundation of the Swedish Horticultural Eliteplantstation, S-291 94 Kristianstad, Sweden.

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Performance of Two Apple Cultivars Grafted on 10 New Polish-bred Rootstocks During 6-year-experiment

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Abstract

Growth and fruiting of 'Gloster' and 'Melrouge' apple trees grafted on 10 Polish-bred rootstocks (P series) were studied during a 6-year-experiment (1991-1996). The most vigorous were trees on semi-dwarfing rootstocks P 1, P 14 and on M.26. The trees of both cultivars on P 16 and P 59 dwarfing rootstocks were similar in size and smaller than those grafted on standard M 9. Size of the trees on P 22 was between those on P 59 and M.9.

Trees of both cultivar on dwarfing rootstocks started to bear fruit in the second year and semi-dwarfing trees (on M.26, P 1, P 14 and P 60) started fruiting in the third year after planting. A cumulative yield over 6 years was the highest for trees of both cultivars on P 14. Of the dwarf trees, the highest cumulative yield was from those on P 2 and M.9. Yield efficiency, expressed as a yield per square cm of TCA, was the highest for both cultivars on P 16, P 2, P 22 and P 59 rootstocks and for 'Melrouge' also for the trees on P 14. Of the tested semi-dwarfing rootstocks the most valuable are P 14 and P 60. In the dwarfing group trees on P 2, P 16 and P 59 performed well. Pomological value of P 16 rootstock is similar to M.9 and it should be planted in a milder climate. Also promising is the very dwarfing rootstock P 59 but it requires future studies on winter hardiness.

Introduction

Modern apple orchards are planted almost exclusively with dwarf and semi-dwarf trees (1, 2, 5, 11, 12). However, despite wide selection of apple rootstocks available for tree production, there still is a lack of dwarfing rootstocks promoting early bearing and well adapted to Polish soil and climatic conditions (3, 4, 7).

Especially an important factor taken into account during evaluation of a new rootstock is their potential to promote early bearing (1, 6, 8, 12). The aim of the work presented was to evaluate 8 Polish-bred apple rootstocks, with special attention paid to promotion of early bearing in late-bearing cultivars.

Materials and Methods

One-year-old apple trees cvs 'Gloster' and 'Melrouge'[1] grafted on 10 dwarfing and semi-dwarfing rootstocks (Table 1)

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[1]Red sport of Melrose cv.