



Lingonberry Production Guide for the Pacific Northwest

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Lingonberries are in the genus *Vaccinium* and are closely related to highbush blueberries (*Vaccinium corymbosum* L.) and cranberries (*V. macrocarpum* L.). Lingonberries are well suited to cooler climates and can be expected to do well in regions where blueberries and cranberries are productive.

Lingonberries are native to Scandinavia, Europe, Alaska, the U.S., Canadian Pacific Northwest, and northeastern Canada, but are not widely cultivated. Known commercial lingonberry acreage is only 71 acres worldwide. Lingonberry production is a relatively new endeavor in the Pacific Northwest.

Plant names

The lingonberry is known by many names throughout the world: lingberry, lingen, lingonberry, lingon, and puolukka (Finland); alpine cranberry, airelle d'Ida, and airelle rouge (France); mirtillo rosso (Italy); dry-ground cranberry, foxberry, fox berry, graines rouges (Quebec); moss cranberry, mountain cranberry, northern mountain cranberry, and partridgeberry (elsewhere in Canada); preiselbeern,

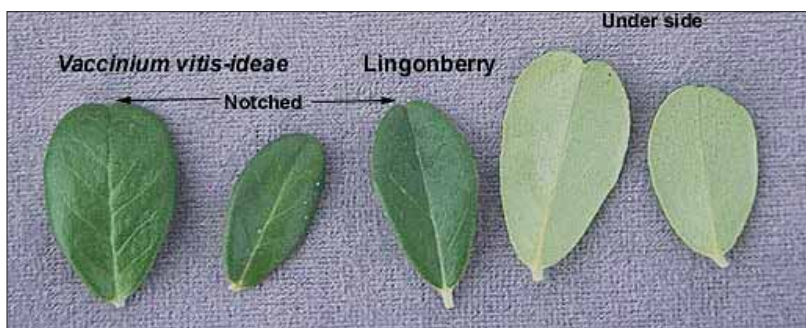


Figure 1. Dark green upper surfaces and light green lower leaf surfaces of lingonberry (*Vaccinium vitis-idaea*).

shore cranberry, and Tylebaer (Germany); berris and cowberry (England); Kokemomo (Japan); and linberry, lowbush cranberry, red berry, red whortleberry, and rock cranberry (Alaska).

Botanical description

The genus *Vaccinium* consists of 450 species, including lingonberry, blueberry, and cranberry. Lingonberry is a perennial, woody, evergreen, acid-loving shrub. It is low growing and spreads by below-ground stems called rhizomes. The fruit are relatively small (0.17 to 0.45 gram per fruit), bright red to dark red, strong flavored, and tart. They are nutritious and rich in antioxidants, anthocyanins, and flavonoids.

There are two general types of lingonberries: wild and European. The wild lingonberry is *Vaccinium vitis-idaea* Linnaeus var. minus (Lodd) Hulten. These plants are short (less than 7 inches, or 18 cm, tall) and have single blooms. The leaves are ovate, 0.4 to 1 inch (1 to 2.5 cm) long, alternate, leathery, and evergreen. They have a dark green upper surface and a light green under-surface (Figure 1).

The European, or cultivated, lingonberry is *Vaccinium vitis-idaea* Linnaeus (Hulten). These plants are 2 to 16 inches (5 to 40 cm) tall and have white or light pink bell-shaped flowers (Figure 2, page 2). There are five to nine glossy evergreen leaves per branch, and leaves can be

either light or dark green. The branches are 1 to 2 inches (3 to 4 cm) long (Figure 3).

Kinnikinnick (*Arctostaphylos uva-ursi*) and lingonberries are easily confused due to their similar leaf structure and berry size (Figure 4). Both plants are native in the Pacific Northwest. Kinnikinnick has red berries, 5 to 8 mm, while lingonberry fruits are bright red and 7 to 11 mm. Huckleberries, another similar plant, have blue-purple fruit, 8 to 11 mm, while cranberries have bright red fruit, 8 to 12 mm.

Production areas

Wild lingonberries are found in more than 24 countries and are indigenous to the sandy, northern, temperate, boreal forests of Alaska, Canada, Scandinavia, Sweden, Finland, and Russia. Currently, Oregon, Washington, and British Columbia have more than 17 acres in commercial production, which is approximately

one-quarter of the commercial acreage worldwide. Other areas of North America, such as Wisconsin, Vermont, and Maine, also have very small areas in production.

Climate

Lingonberries are hardy plants and can survive freezing temperatures. However, when freezing temperatures or frost occur during flowering or fruiting, berry loss can be up to 50 percent. In Europe, plants with ripe fruit have been noted to survive temperatures as low as 28°F (-2°C). Those with green fruit have survived at 27°F (-3°C).

Plants perform well in maritime climates, and in Oregon and Washington they have survived temperatures as low as 2°F (-17°C). If there is no snow cover and temperatures drop below 10°F (-12°C), protect plants with straw mulch, overhead irrigation, or floating row covers.



Figure 2. Lingonberry flowers are bell shaped and white or light pink in color. Fruit weigh from 0.17 to 0.45 gram and are bright red to dark red.



Figure 3. European (cultivated) lingonberry plants are 2 to 16 inches (5 to 40 cm) tall with five to nine glossy, evergreen leaves per branch. Branches are 1 to 2 inches (3 to 4 cm) long.

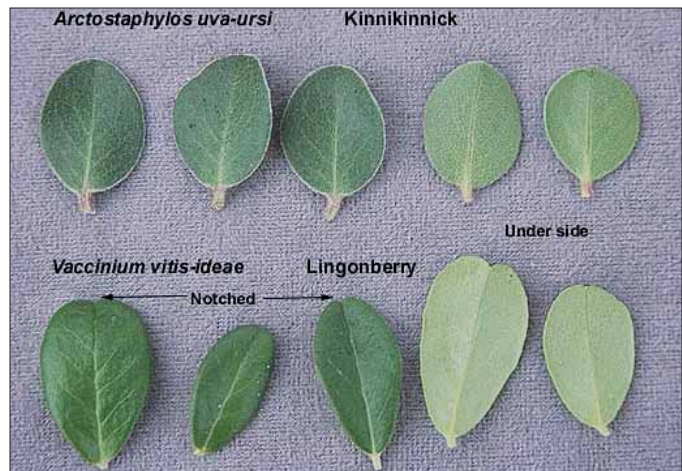


Figure 4. Kinnikinnick (*Arctostaphylos uva-ursi*) and wild lingonberry (*Vaccinium vitis-idaea*). Lingonberry leaves are notched at their tip and are slightly longer than those of kinnikinnick. Both species are native in the Pacific Northwest, and they look very similar in the wild.

Bloom

Lingonberries flower on 1-year-old growth (the previous year's growth). They are known as branch tip bloomers. There are two bloom periods—March to April and July to August. The fruit ripens in mid-August and mid-October, respectively.

Pollination

Lingonberries need pollination from a pollinizer cultivar to produce good-size berries. Pollinizer cultivars tend to be lower yielding, but they enable high-yielding cultivars to be very productive. Pollinizer cultivars are needed for both spring and summer bloom periods. Plant 10 percent of the field with pollinizer cultivars to achieve the best pollination and highest yield (Figure 5). Red Pearl and Sussi are two commonly used pollinizer cultivars.

Bees, flies, bumblebees, butterflies, and other flying insects are important pollinators. Fields should be kept open and in full sun for optimal fruit set. Wind does little to pollinate lingonberry flowers, and high winds or heavy rain can hamper pollination. Frost during the blossom period can damage flowers and prevent pollination and fruit set, even with temperatures as mild as 28°F (-2°C).

Common uses

Food items/products.

Lingonberries can be eaten fresh but are more commonly processed into sweet food products such as jams, jellies, syrups, purées, sauces, fruit juices, and beverage concentrates. Lingonberries are used to make liqueurs, wine, fruit



Figure 5. Lingonberry field in Washington. Dark-colored rows of plants are pollinizer cultivars, and light-colored rows are high-yielding cultivars.

leather, and dried fruit. They often are added to mixes with raisins, pickled, or added to chocolates, muffins, pies, pancakes, rolls, tarts, cookies, ice cream, and yogurt. Lingonberries are mixed with other berries, especially cranberries.

Food coloring. Lingonberries have a relatively high anthocyanin content. Anthocyanin is a source of the purple, blue, and red colors in many horticultural crops. With the reduced availability of artificial food colors, there is interest in using water-soluble plant pigments such as anthocyanin for food colors.

Medicinal. Many species of *Vaccinium* (Ericaceae family), including lingonberry, bilberry, and blueberry, are being studied for their rich flavonoid content (anthocyanins, flavonols, and proanthocyanidins). These compounds are being studied for their possible anticarcinogenic and antioxidant activities and other nutraceutical properties.

Lingonberries also are very high in vitamin C. Leaves and stems contain arbutin, which is used by pharmaceutical companies for skin care products. Lingonberries also are used to make infusions and herbal teas.

Cultivars

Currently, there are 16 cultivars (14 high-yielding producers and 2 pollinizers) and 5 numbered selections planted in the Pacific Northwest.

- **Ammerland.** Vigorous and high-yielding. One of the oldest available cultivars, but very little commercial acreage has been planted with this cultivar. Plants grow 12 to 14 inches (30 to 36 cm) tall. Berries are medium-size to large (0.28 gram). Country of origin: Holland.
- **Erntedank.** High-yielding; produces a good summer and fall crop. Moderate growth habit, and plants begin to spread in the third year. Plants

- are 14 to 16 inches (36 to 41 cm) tall with dark green leaves. Berries are small to medium-size (0.17 gram) and bright red. Fruit is produced on the branch tip. Country of origin: Germany.
- **Erntekrone.** High-yielding, with good summer and fall yields. Upright, vigorous growth. Medium-tall, 8 to 12 inches (20 to 31 cm) in height. Leaves are dark green and more rounded than the characteristic oval shape found in other cultivars. Berries are medium-size to large (0.32 gram) and bright red. An older cultivar, developed in 1981. Country of origin: Germany.
 - **Erntesegen.** High-yielding, with vigorous, upright growth. Plants grow 12 to 15 inches (31 to 38 cm) tall, and leaves are dark green. Berries are very large (0.41 gram) and are a bright dark red. The berries grow on the branch tips. This variety is doing very well in trials in Oregon and Washington. Country of origin: Germany.
 - **European Red.** Low to moderate yields and spreads quickly. One of the original cultivars developed in 1981 and widely planted in commercial production. Plants are 5 to 8 inches (13 to 20 cm) tall. Leaves are light green and oval. Berries are small (0.19 gram) and light red. A very nice ornamental plant. Country of origin: U.S.
 - **Ida.** Pronounced Eeda. High-yielding and blooms very vigorously after the first 2 years. Plants are 5 to 7 inches (13 to 18 cm) tall, and leaves are dark green. Berries are very large (0.45 gram) and dark red. By mid-November, the berries are overripe. Country of origin: Sweden.
 - **Koralle.** Moderate to high-yielding but slow spreading. A popular, vigorous, bushy plant with an upright growth habit that is very easy to harvest. Plants are 12 to 14 inches (31 to 36 cm) tall, and leaves are light green. Berries are medium-size to large (0.23 gram) and pale to medium red. The berries grow on the branch tips and have a tangy flavor. Country of origin: Holland.
 - **Koralle/German.** Moderate yields in both summer and fall. Plants are 12 to 15 inches (31 to 38 cm) tall with medium green leaves. Berries are very bright red, uniform in color, and large (0.32 gram). Fruit are produced high on the bush. German-developed cultivar of Koralle. Country of origin: Germany.
 - **Linnae.** Pronounced Ly-nay-ah. A new cultivar with insufficient time in production for yield evaluations. Plants are 5 to 9 inches (13 to 23 cm) tall, and the leaves are light green. Berries are medium-size (0.24 gram) and very dark red. Very ripe by November. Country of origin: Sweden (Balsgard Institute).
 - **Masovia.** A high-yielding cultivar. Vigorous and medium-high plant, 8 to 12 inches (20 to 31 cm) tall. Foliage is dark green, and plants spread quickly through new rhizome growth. Berries are medium-size (0.26 gram), bright red, and grow on the branch tip. Not much acreage has been planted. Country of origin: Poland.
 - **Regal.** A low-yielding plant used mainly as an ornamental. Moderate vigor and some frost resistance. Average plant height is 2 to 4 inches (5 to 10 cm), with very dark green foliage. Berries are small (0.18 gram) and dull red. One of the oldest plants used in the United States, Regal was developed by Elden Stang from Finnish material. Country of origin: U.S.
 - **Sanna** (Patent Number VF 829.940525). Plants produce a good summer crop but a poor fall crop. An upright, compact plant, ranging in height from 6 to 9 inches (15 to 23 cm) and slow to spread. The foliage is dark green. The berries are medium-size to large (0.26 gram), dark red, and uniform in ripening. They generally are overripe by November. Country of origin: Sweden.
 - **Scarlet.** A moderate-yielding but vigorous plant. An older cultivar that produces lots of pollen and commonly is used in ornamental gardening. The plants are 4 to 8 inches (10 to 20 cm) tall with medium green leaves. The berries are medium in size (0.27 gram), light red, and grow on the branch tip. Country of origin: Norway.
 - **Splendor.** Plants yield moderately after the second year and heavily after the third year. A precocious, moderately vigorous cultivar that has somewhat frost-tolerant flowers and fruit buds. Average plant height is 6 to 10 inches (15 to 25 cm), and foliage is medium green. The berries are small (0.24 gram) and grow on the branch tip. High in anthocyanins. Country of origin: U.S.

Pollinizer cultivars

Pollinizer cultivars tend to have moderate yields and average fruit quality. Fields generally are planted to include 10 percent of a pollinizer variety to ensure good pollination for the higher yielding varieties.

- **Red Pearl.** Low-yielding but heavily planted due to its suitability as a pollinizer. Plants have an upright, vigorous growth habit, are 13 to 15 inches (33 to 38 cm) tall, spread nicely, and have dark green foliage. Berries are small to medium-size (0.18 gram), bright red, and grow on the branch tip. Introduced to the U.S. by Elden Stang in 1983. Country of origin: Holland.
- **Sussi** (Patent Number VF 846.941220). Moderate yielding in mid-October. A vigorous plant with a spreading habit. Plants are of medium height, 7 to 10 inches (18 to 25 cm), with dark green foliage. Fruit ripening is

uniform. Berries are small to medium-size (0.26 gram) and grow on the branch tip. A nice ornamental plant with some resistance to Phytophthora root rot. Country of origin: Sweden.

Numbered cultivars

Five numbered cultivars were developed in Balsgard, Sweden, and planted in test plots in Oregon in 2002. Average berry weights for these cultivars are: 8726-8 (0.31 gram), 8739-8 (0.24 gram), 87102-3 (0.22 gram), 8723-10 (0.34 gram), and 8724-49 (0.25 gram). Country of origin: Sweden.

Yield

A healthy lingonberry planting can be expected to be productive for 20 years or more. Yields from commercial fields (5- to 8-year-old plants) in the U.S. range from 2 to 15 tons per acre (Table 1). These yields are greater than in Germany (0.5 to 6 tons per acre) or Sweden (1 to 3.6 tons per acre). In cultivar trials in Fall Creek, Oregon, the average cultivar yield was 6.6 tons per acre, and yields ranged from 2 tons per acre for Red Pearl to 15 tons per acre for Erntesegen (Figure 6). With good

Table 1. Yield of lingonberries produced in Europe and Oregon (U.S. tons per acre and tons per hectare).

Country	U.S. tons/acre	Tons/hectare
Germany (range)	0.5–6.0	1.2–14.8
Sweden (range)	1.0–3.6	2.5–8.9
United States		
Low yield	2.3	5.8
Medium	6.6	16.4
High	15	35.7

Source: R. Penhallegon, ISVC 2004.

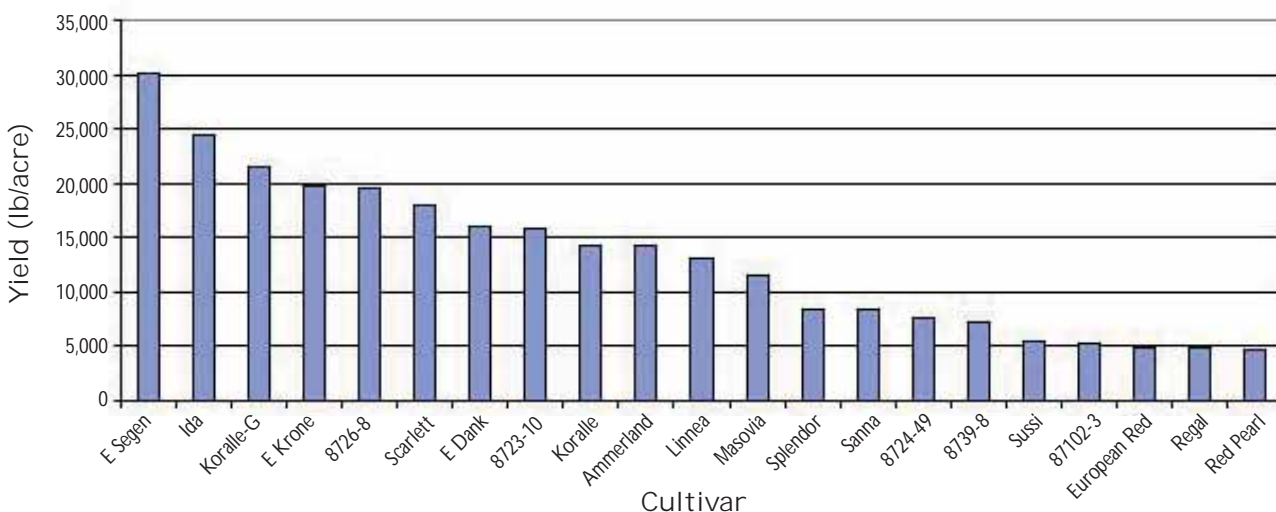


Figure 6. Summer and fall fruit yield of 21 lingonberry cultivars grown in preliminary trials in Fall Creek, Oregon, from 1999 to 2003. Source: R. Penhallegon, ISVC 2004.

management, lingonberry yields in the Pacific Northwest should be comparable to or better than many small fruit yields. In comparison, blueberries average 4.5 to 6 tons per acre, strawberries 3.5 to 4.5 tons per acre, and cranberries 7 to 8 tons per acre.

Weights of individual berries range from 0.17 to 0.45 gram for varieties grown in Fall Creek, Oregon (Figure 7). Most

cultivars produce larger berries in the fall than in the summer (Figure 8). Ernteseugen, Koralle, Linnea, and Sanna are exceptions; they produced larger berries in the summer than in the fall. Brix, a measure of the amount of soluble sugars in the fruit, was highest for the cultivar Ernteseugen (13.9 °Brix) and lowest for Erntekrone (10.2 °Brix) (Figure 9).

Cultural management

Soil type

Lingonberries prefer a light, well-drained soil such as a sandy loam, a well-drained loam, or a silty loam. Determine the type of soil in your field by referring to the county soil survey or send a sample to a soil lab for analysis.

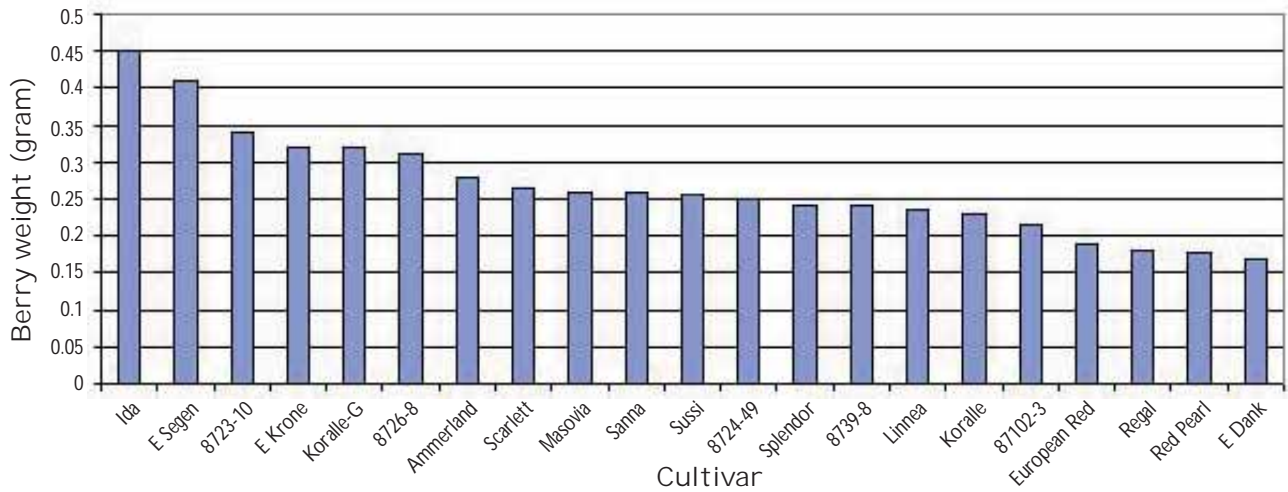


Figure 7. Weights of individual berries of cultivars grown in Fall Creek, Oregon, from 1999 to 2003. Weights range from 0.17 gram (Erntedank) to 0.45 gram (Ida). Source: R. Penhallegon, ISVC 2004.

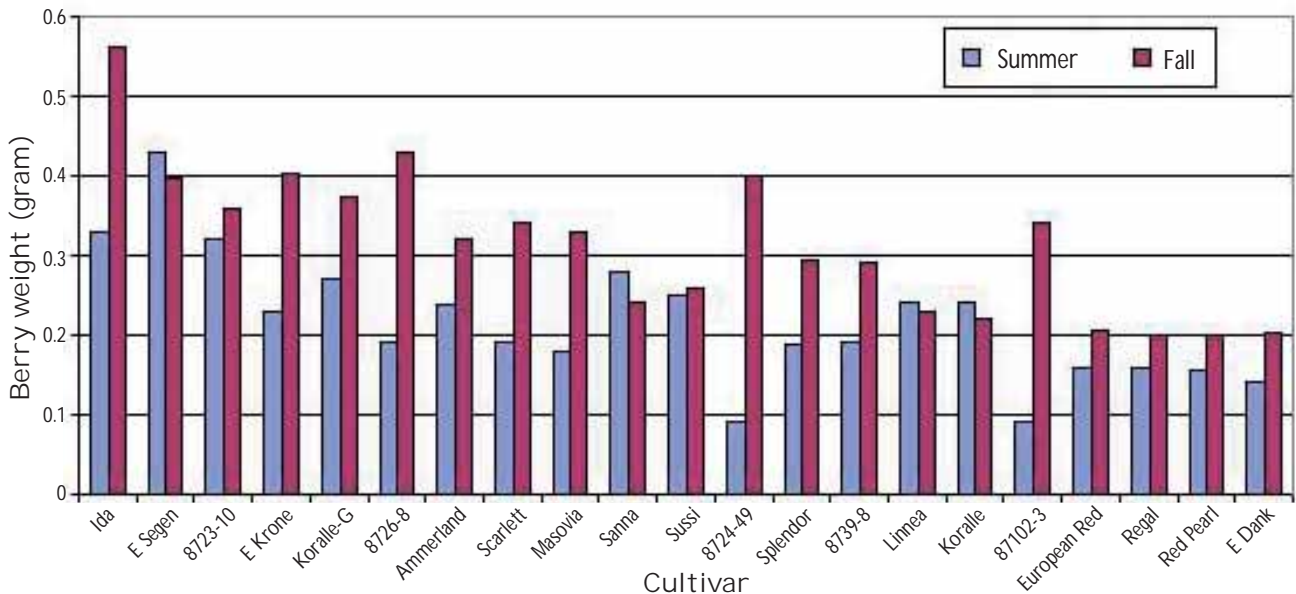


Figure 8. Average weights of individual berries of cultivars grown in the summer (light blue) and fall (dark red) in Fall Creek, Oregon, from 1999 to 2003. Source: R. Penhallegon, ISVC 2004.

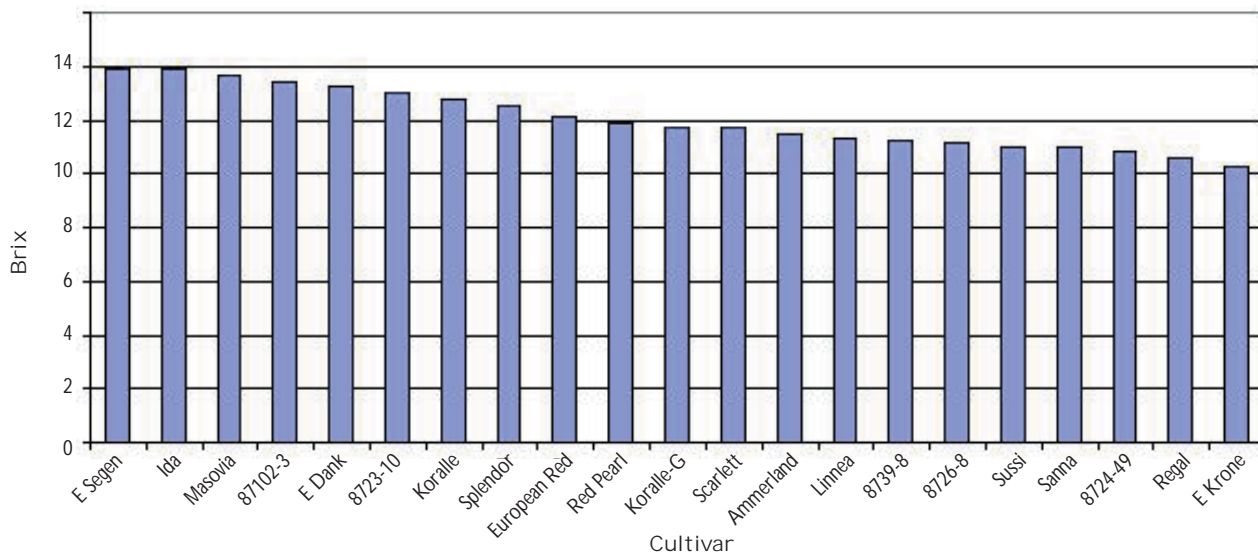


Figure 9. Average summer and fall soluble solids of lingonberries harvested in trials in Fall Creek, Oregon, from 1999 to 2003 (measured by Brix meter). Source: R. Penhallegon, ISVC 2004.

Oregon and Washington growers have planted lingonberries on raised beds to improve water drainage and decrease the risk of root rot. Raised beds should be 4 to 8 inches (10 to 20 cm) high. If necessary, install field tiles or rip the soil to improve drainage prior to planting. For heavier soils such as deep clay, incorporate organic matter such as compost or a cover crop prior to planting to help improve drainage and to increase the organic matter content.

Lingonberries are most productive in soil with an organic matter level of 2 to 6 percent in the top 3 to 6 inches and with a soil pH of 4.3 to 5.5. If the soil pH is too high, use elemental sulfur to lower it. (See *Acidifying Soil for Crop Production West of the Cascade Mountains*, EM 8857-E).

Lingonberries are very sensitive to high salt concentrations, especially sodium (Na) and

chloride (Cl). High levels of calcium (Ca) also can have a toxic effect on the plants.

Propagation

Lingonberries are most commonly propagated by micro-propagation (also known as tissue culture) and stem cuttings. As production needs increase, rhizome divisions and seedlings also are becoming more available for commercial planting. Stem cuttings and rhizome divisions can be rooted during the spring or late summer and transplanted into the field the following spring or fall. Seeds can be sown in a greenhouse. Transplant 1- or 2-year-old seedlings to the field in the spring or fall.

Each of these techniques has limitations. For example, plants started from stem cuttings may not develop vigorous rhizome growth and may have limited plant spread and yield. Plants

started by rhizome division can spread pathogens, and seedlings may not be true to parent stock.

Two- to 3-year-old lingonberry plants (propagated by one of the methods described above) also can be purchased. These older plants cost more, but can reduce total plant establishment costs and the time between planting and first harvest. The cost of rooted, field-ready 1- to 2-year-old plants is \$1 to \$3 per plant, and the cost of 2- to 3-year-old plants is \$3 to \$7 per plant.

Planting

Plant lingonberries in the spring or fall. Plant roots 2 to 3 inches deep. If planting seedlings, set the plant root system just below the top of the soil surface.

Set plants in a single row down the center of the raised bed. Space bed centers 24 to 36 inches (61 to 91 cm) apart and space plants

8 to 18 inches (20 to 46 cm) apart within the row (Figure 10). Plants spread through rhizome growth and will cover the bed by the fourth or fifth year. At planting, populations are 5,800 to 10,900 plants per acre, and the average recommended planting density is 8,700 plants per acre.

Mulches

Various organic mulches can be used with lingonberries, including sawdust, compost,

chipped yard debris, composted or fresh grass seed straw, leaf or bark mulch, wood chips, manure, mint compost, and pine forest duff (Figures 11 and 12). Add about 10 tons (4 inches) of organic material per acre to be incorporated into the soil as a soil amendment before planting. After planting, add an additional 4 to 6 inches of organic-based mulch around the base of the plants. Replenish the mulch every 3 to 6 years or as needed.



Figure 10. Plant and row spacing, Sweden.



Figure 11. Compost mulching, Sweden.



Figure 12. Heavy sawdust mulching of lingonberries, Estonia.

Fertility

Do not apply high rates of fertilizer to lingonberries. Overapplying fertilizers reduces yield and can cause plant dieback. Plant dieback symptoms are similar to those caused by fungal disease (*Phytophthora cinnamomi* or root rot); the leaves turn brown or black. Use only chloride-free fertilizers, as chloride salts severely damage plants.

Use nitrogen in the ammonium form such as urea (less acidifying) or ammonium sulfate (acidifying). In years 1 to 5, apply 20 to 40 pounds (10 to 20 kg) of nitrogen per acre each year. After the fifth year, apply 40 pounds (20 kg) of nitrogen per acre each year. Nitrogen rates above 60 pounds (27 kg) per acre can cause excess vegetative growth and reduce flowering and yield. Varieties seem to differ in sensitivity to fertilizer applications. Koralle and Red Pearl were more sensitive to high fertilizer application rates than other varieties.

Irrigation

Overhead sprinklers or drip (trickle) irrigation can be used in lingonberry production. Drip irrigation is the preferred method. Bury drip lines in the raised beds before planting. Apply irrigation throughout the first summer to improve plant establishment and reduce sunburn. Test irrigation water for pH, chloride (Cl), sodium (Na), and calcium (Ca). Lingonberries are sensitive to chloride and sodium.

Irrigate plants at a rate of about 0.5 to 0.75 inch (1 to 2 cm) of water every week. Plants thrive when irrigation practices are correctly targeted to the soil

environment. In heavier soils, avoid over-watering, which increases the risk of *Phytophthora* (root rot) or *Pythium* (damping off). In new field plantings in Oregon, the variety Koralle showed moderate to severe dieback due to root rot when it was planted in heavy soils and irrigated at high rates, while in other fields this variety died during the first 2 years due to lack of irrigation.

Do not allow the soil to dry out completely between irrigations. Dry soil increases the salt concentration in the soil water, and lingonberries are very sensitive to even modest salt concentrations.

Pruning

No pruning is recommended in the first 4 or 5 years after field planting. After the plants are 5 years or older, you can mow alternate rows to a height of 2 inches (5 cm). Mow alternate rows every 3 to 6 years to increase shoot density and stimulate vigorous, unbranched, 1-year-old growth, which will increase the number of fruiting stems. There is no information at present on the best way to prune lingonberries.

Pests and pest management

Weeds

Weed control is critical during the first 3 years of field establishment. Weed control methods include hand weeding and mechanical cultivation. Lingonberries form roots very near the soil surface and therefore are susceptible to damage from deep cultivation.

To control weeds between rows, plant a grass sod between the rows, and mow periodically to prevent grasses from seeding. Within the row, apply 4 to 8 inches (10 to 20 cm) of mulch to help prevent weed growth. Lingonberries produce an allelopathic compound that helps reduce germination of annual weeds in the rows. Currently, there are only a few herbicides labeled for use in lingonberries.

Insects

Few major pests have been observed in lingonberry fields. In Oregon and Washington, the Western spotted cucumber beetle (*Diabrotica undecimpunctata* Fabr.), the Western striped cucumber beetle (*Diabrotica trivittata* Mann.), and the oblique-banded leafroller (*Choristoneura rosaceana* Harris.) have been found feeding lightly on lingonberry leaves after grass seed fields were harvested. The obscure root weevil (*Sciopithes obscurus* Horn.), a very common pest that feeds on blueberry leaves, has not been seen in any lingonberry fields. In Newfoundland, lingonberry fruitworm (*Grapholita libertina* Heinrich.) burrows into the lingonberry fruit, but the larvae are not observed until the fruit is processed. See the *Pacific Northwest Insect Management Handbook* for information on insect control.

Diseases

Lingonberries are very susceptible to several diseases, including various pathogenic fungi that have been found in association with leaf spots and twig blights in Oregon. *Allantophomopsis*

lycopodina (Hohn.) Carris, or black rot, has been found on the cultivars Erntesegen, Erntekrone, and Koralle. *Phomopsis columnaris*, or upright dieback, has been found on Koralle and can result in plant death. *Coleophoma empetri* (Rostrup) Petrik, or ripe rot, has been found on Red Pearl. *Rhizoctonia* sp. has been found on Koralle. *Phytophthora citricola* Sawara, or root rots, also have been found in lingonberries.

In 2000, lingonberry twig dieback *Phomopsis columnaris* (also known as lingonberry twig blight) was identified as a new disease in Oregon (Farr et al., 2000). The symptoms of this fungal pathogen include soft, light brown rot or “sunburned” berries and premature fruit drop.

Because several pathogens affect lingonberries, and because their symptoms are somewhat similar, laboratory analysis is necessary to confirm which pathogen is present. Due to susceptibility of lingonberries to fungal infection, it is important to start with disease-free plants in the field. See the *Pacific Northwest Plant Disease Management Handbook* for information on disease control.

Sudden oak death (*Phytophthora ramorum*, or SOD) has been tested on lingonberries and was positive. However, no SOD has been found in any lingonberry plant materials in growers’ fields.

Additional potential problems

Lingonberries are closely related to blueberries and cranberries, and there is some concern that pests in these two common

crops also may appear in lingonberries. Such potential problems include blueberry scorch and shock. These pests have not been found on lingonberries, but growers are advised to watch for symptoms and send potentially infected plants to a laboratory for disease diagnosis.

Vertebrate pests

Moles are attracted to worms feeding in high organic matter soil. Moles do not damage plants directly, but tunneling beneath and around plants causes roots to dry out and dislodges plants. Traps are the most effective method of controlling moles. Gophers also can be a problem in lingonberry fields if gopher and weed populations are high. Voles (field mice) commonly are found in the grass area between beds. Regular mowing between beds will suppress vole populations.

At harvest time, mice feed on ripe berries, causing fruit losses. Birds, especially robins and finches, can also be a nuisance as they feed on ripening berries. Bird damage occurs more frequently in the fall crop than in the summer crop. In the summer, birds have a larger selection of food sources than in the fall, including ripe blackberries, blueberries, and raspberries. To discourage birds, use netting, “bird-eye” balloons, scare and distress recordings, and mylar flash tape.

Deer, bear, and moose browsing can substantially damage new plantings and reduce plant establishment. Fencing will help prevent animals from entering the field. Contact your local Extension office for

more information and current techniques for controlling vertebrate pests.

Harvesting

Berries can be harvested when they are light red to dark red. If berries are harvested too early, when they are still somewhat green, they can be bitter. However, lingonberries ripen to a dark red color after being stored for several weeks under refrigeration. Research is underway to use soluble solids as a way to determine the best time to harvest lingonberries.

Summer-crop berries will fall off the plant by the fall harvest period. If harvested in the fall, they will be overripe and will not store well.

Frost just prior to lingonberry harvest does not harm fruit on the plants, but a prolonged period of freezing temperatures prior to harvest will cause crop loss.

Lingonberries are most commonly harvested by hand with berry rakes, similar to those used for lowbush blueberries or dryland cranberries (Figure 13). Mechanical harvesters used for lowbush blueberries and cranberries can be converted into lingonberry harvesters. A mechanical harvesting device was developed by C. von Zabeltitz, at the Institute of Horticulture Engineering at the University in Hannover, Germany. In Minnesota, mechanical dryland cranberry pickers are available through the Furford Picker Company. In Nova Scotia, Douglas Briggs developed a lowbush blueberry picker, and

the Maine Blueberry Equipment Company has developed a low-bush blueberry mechanical harvester.

For fresh-pack markets, the stem must be removed from the lingonberry. Stems can be removed with a blueberry stemmer.

Postharvest

Lingonberries contain high levels of benzoic acid, which naturally provides a long shelf life. Picked and cleaned berries for the fresh market can be kept up to 3 to 5 weeks prior to shipping. Store fresh berries under refrigeration at temperatures of 32 to 45°F (0 to 7°C). Refrigeration will maintain the “fresh” quality of the berries as long as the berries were not overly ripe when they entered storage. Overripe berries do not store well and should be marketed or processed immediately.



Figure 13. A hand rake commonly used to harvest lowbush blueberries and dryland cranberries can be used for lingonberries.

Berries can be stored in a freezer for many months. Individually quick frozen (IQF) berries commonly are used in value-added products such as jams, jellies, and juice concentrates.

Marketing

Fresh berries packed in baskets sell on the retail market at a price of \$2.50 to \$7.00 per pound. In 2002, berries for jam sold for \$0.77 to \$1.25 per pound (\$0.35 to \$0.57 per kg) in Poland, Russia, and Finland, and \$2.00 per pound (\$0.91 per kg) in Oregon.

Worldwide, 10 percent of the crop is sold for juice concentrate. Lingonberries contain about 30 percent less water than cranberries and therefore produce a more concentrated juice. This characteristic makes lingonberries very attractive to processors.

Currently, lingonberries are imported into the U.S. (146,827 pounds in 2003), demonstrating the demand for this fruit and the market potential.

For more information

Oregon State University Extension publications

Acidifying Soil for Crop

Production West of the Cascade Mountains (Western Oregon and Washington), EM 8857-E (March 2004), 11 pages.

Economic Evaluation of

Lingonberry Production in Oregon, EM 8847 (December 2003), 24 pages.

Pacific Northwest Plant Disease Management Handbook (revised annually).

Pacific Northwest Weed Management Handbook (revised annually).

Many OSU Extension Service publications may be viewed or downloaded from the Web. Visit the online Publications and Videos catalog at <http://extension.oregonstate.edu> or <http://oregonstate.edu/extension/lane>

Other publications

L. Burt and R. Penhallegon.

Lingonberries: Exploring Enterprise Opportunities.

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Nursery list: For a list of current lingonberry nurseries, contact Ross Penhallegon, OSU Extension Service, 950 West 13 Avenue, Eugene, OR 97402. Phone: 541-682-4243. Email: ross.penthallegon@oregonstate.edu

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