

# June Bearing Varieties

The following varieties are listed in their order of ripening. They are believed to be generally suited to the area specified. Discuss the choice of variety with the intended buyer before making a final decision.

**Note:** PARC is the Pacific Agriculture Research Centre, Agriculture and AgriFood Canada.

## *HOOD*

Recommended for plantings in all areas, but is very susceptible to virus and should be grown in isolation from other strawberry fields. Ripens 4-5 days earlier than Totem. Suited for early fresh market and processing. Fruit borne on strong upright clusters, fruit is large, round conic, glossy, flesh bright red, medium firm and one of the sweetest varieties. Tolerant to powdery mildew, produces moderate number of runners.

## *PUGET RELIANCE*

Recommended in all areas. Produces high yields of large, good quality fruit on vigorous, virus-tolerant plants. Well adapted to a wide range of sites and is easy to grow. It is a processing-type variety but has also been successfully fresh marketed. The fruit is softer than Totem but is more resistant to fruit rot. Flavour is not as good as Totem or Rainier. Matures at the same time or slightly earlier than Totem. Plants produce fewer runners than Totem. Highly susceptible to common leaf spot.

## *PINNACLE*

A new release from the USDA-ARS (Corvallis, OR) breeding program. Recommended for trial in all areas. It is high yielding with very large, firm fruit that is mainly suited for the fresh market. Fruit size decreases significantly in the second harvest season. Fruit color is bright glossy red that is very attractive for the fresh market and also acceptable for the processing market. Harvest season is similar to that of Puget Reliance and two days earlier

than Totem. The plants have an open plant habit making it much more efficient to pick.

## *TOTEM*

It is the major variety grown in BC recommended for planting in all locations. In the last few years it has shown more virus and red stele root rot infection than in the past. This suggests that resistance has broken due to new viruses and fungal strains. It is relatively winter hardy and partially resistant to powdery mildew. It is suited to both the processing and fresh market.

## *TILLAMOOK*

A new release from the USDA-ARS (Corvallis, OR) breeding program. Recommended for limited trial in all areas. It is a high yielding, large fruited variety that produces similar or larger second year yields than Puget Reliance. Fruit color is bright glossy red that is very attractive for the fresh market and also acceptable for the processing market. Harvest season is similar to that of Totem. The plants have an open plant habit making it much more efficient to pick.

## *SHUKSAN*

Recommended for all locations. It is relatively winter hardy and shows resistance to red stele. It is more susceptible to virus diseases and powdery mildew than Totem. It is also susceptible to *Verticillium* and common leaf spot. Fruit ripens 2 to 5 days later than Totem and shows a similar level of rot resistance. It is suited to both the processing and fresh markets. Primary fruit may be misshapen.

## *RAINIER*

Recommended for all locations. The high quality fruit ripens 4 to 5 days later than Totem. It is suited to the fresh or processing markets. Plants grown on silty loams seem to produce larger yields than those on sandy soil. Fruit flavour is excellent, but it is softer and more susceptible to fruit rot than Totem. It is very susceptible to the new virus complex in the Fraser Valley.

*BC96-33-4*

A new selection from the PARC breeding program recommended for limited trial planting in all areas. It is a high yielding, large fruit variety that produces firm, excellent quality fruit. Its harvest season starts about five to six days later than Totem making it mainly suited for the late fresh market. Plants are vigorous and healthy with sufficient runner production to make a satisfactory matted row.

*FIRECRACKER*

A variety from the USDA-ARS breeding program. Recommended for trial in the Fraser Valley. It is very late, ripening 10 - 14 days later than Totem. It produces good yields of medium-size fruit which are suitable for the local fresh market. It is too late maturing for the processing market. It is susceptible to powdery mildew.

*INDEPENDENCE*

A variety from the USDA-ARS breeding program. Recommended for trial in the Fraser Valley. It is very late, ripening 10 -14 days later than Totem. Primary fruit are very large and wedge shaped while later fruit are medium-size. Suitable only for the fresh market. Very tolerant of adverse conditions, but susceptible to powdery mildew. May show some variegation (white striping) in leaves, but this condition is not harmful.

*PUGET SUMMER*

A variety from the Washington State University breeding program. Recommended for trial for very late season fresh market. It matures 3 days later than Firecracker and 7 days later than Independence. It is very vigorous and runners readily. Fruit is large, attractive, has good colour, caps well and has moderate firmness. Is suitable for fresh or processing, but may be too late for some processors. It is susceptible to powdery mildew.

**Table 30. Strawberry Variety Traits (5 = Excellent and 1 = Poor)**

Variety	Yield	Fruit Weight	Firmness	Fruit Rot Resistance	Virus Tolerance	Winter Tolerance
Hood	4	4	3	3	2	4
Sumas	5	5	2	1	5	5
Totem	4	4	4	4	3	4
Puget Reliance	5	5	2	5	5	4
Pinnacle	5	5	5	5	-	-
Tillamook	5	5	5	5	-	-
Shuksan	4	4	3	4	3	4
Rainier	3	5	2	1	3	4
BC 96-33-4	5	5	5	4	-	-
Firecracker	5	5	4	4	-	-
Independence	5	5	4	4	-	-
Puget Summer	5	4	3	5	-	-

Source: PARC Agassiz trials

## Dayneutral Varieties

Dayneutral or true everbearing strawberries produce flowers and fruit from July to the first frost in the planting year and June to frost the next year. They are suitable for local fresh market sales. Production of dayneutral strawberries in BC is limited. They are usually grown on raised beds covered in black plastic with trickle irrigation. For this reason, dayneutral strawberries require more management than June bearing strawberries. For further production information, obtain the brochure “Grower’s Manual for Strawberry Season Extension” (1990, BCMAFF and Agriculture Canada) from the Abbotsford BCMAFF office.

### *SELVA*

A California variety. Produces high yields of large, very firm fruit. The internal fruit colour is pale but the skin is bright red and glossy. The flavour is fair in the early summer but improves later in the season. It has good shelflife and shipping qualities. Flowers are produced in flushes giving alternating light and heavy picks, particularly in the second year.

### *SEASCAPE*

A California variety. Similar to Selva, it produces high yields of large, firm fruit. Fruit is bright red and glossy. Fruit flavour and internal red colour are better than Selva. It also withstands rain better than Selva.

### *TRIBUTE*

A Maryland variety. Produces high yields of medium-sized, moderately firm, and medium-dark red fruit. The fruit is heart-shaped, glossy and attractive. Fruit size tends to drop towards the end of the second year. Shows some resistance to powdery mildew and red-stele. Performs best outside the Fraser Valley.

### *TRISTAR*

A Maryland variety. Produces medium yields of elongated, glossy, medium-sized, dark red fruit. The fruit has good flavour and is firm. Good late-season production and good winter hardiness. Fruit size tends to drop towards the

end of the second year. Should only be grown where consumers will pay a premium price for very tasty, high quality fruit. Performs best outside the Fraser Valley.

### *DIAMANTE*

A new California variety which produces large crops of large, firm fruit. Medium flavour when ripe. Fair internal red colour and excellent shelf life. Similar to Selva in that it produces throughout the growing season with distinct production flushes particularly in the second year.

## New Plantings

### Site Selection

The selection of a suitable site is essential for good strawberry production. Consider the following:

#### *SOIL*

The best soil for growing strawberries is a deep, well-drained sandy-loam soil to loamy-silt soil with a good supply of humus (over 4% organic matter). These soils hold moisture well which is important for good yields. Avoid heavy clay soils as they are usually slow to drain even if there is a subsurface drainage system. Strawberries grown in poorly drained soil are more prone to root rot problems. Coarse, sandy soils require careful attention to fertilization and irrigation for successful yields. Strawberries grow best in a slightly acidic soil with pH 5.5 to 6.5.

#### *DRAINAGE*

Strawberry roots are injured if soils are waterlogged or flooded for more than one or two days – especially when the plants are actively growing. The roots will rot and, if damage is severe, the plants may die. A subsurface drainage system is necessary for fields that are not naturally well drained. Surface drainage provided by the slope of fields or raised beds may reduce the risk of root rot. Avoid planting on steep slopes. To prevent soil erosion, install a subsurface drainage system, plant across moderate slopes, seed fall cereal cover crops and plant grassed waterways in areas where water runs in the field.

### *IRRIGATION*

Strawberries are shallow rooted. Most of the roots are in the top 15 cm of soil. Irrigation is essential for consistent high yields.

Strawberries have a low tolerance to salts. Laboratory tests of irrigation water should show a Sodium Adsorption Ratio (SAR) of less than 30 and chloride levels below 110-180 mg/L. If irrigation water has more than 500 ppm total dissolved salts (TDS) or an electrical conductivity of more than 0.7 mS/cm, its use can result in the accumulation of toxic levels of salt. Avoid fields with salt levels above 1.0 mS/cm.

### *ROTATION*

Crop rotation is a sound agricultural principle that should be followed whenever practical. Do not grow strawberries repeatedly in the same field for many years. Insects, diseases and herbicide-resistant weeds tend to increase when strawberries are grown frequently on the same site. When this occurs, strawberry yields decline.

*Verticillium* wilt may be a problem in fields where strawberries, raspberries, potatoes, peppers or tomatoes were grown in the previous four or five years. When planning crops for rotating with strawberries, consider the herbicides used on a crop. For example, the herbicide Sinbar is long-lasting in the soil. Cole crops and other vegetable crops, are a good rotation crop with strawberries. However, cole crops should not be planted within two years of a Sinbar application.

## Site Preparation

Site preparation is a critical first step to successful long-term yields. Begin preparation the year before planting.

### *WEEDS*

Weed control is especially critical. Poor weed control can result in crop failure and financial disaster! Before planting, control established weeds such as quackgrass, clover, sheep sorrel, horsetail, curled dock and Canada thistle. It is also essential to reduce the number of weed seeds in the soil. For more information see “Preplow Clean

Up of Weeds” on page 6 and the weed control chart in this section.

### *NEMATODES*

Fields should be tested for nematodes in the spring or summer the year before planting. If required, the best time to fumigate soils is from late summer to early fall. Refer to “Nematodes” on page 15 for details on soil fumigation.

### *COVER CROPPING*

Plant cereal cover crops the fall before planting to help control winter weeds and add organic matter. Plow down the cover crop in the early spring so the cover crop is decomposed before setting out the strawberry plants. Refer also to “Cover Crops” in the soil management section of this guide. For wireworm control, use treated wheat seed (see “Wireworms” in this section).

### *MANURE*

Broadcast and incorporate composted or aged manure in early spring at least two weeks before planting. Fresh manure can injure young plants. This helps to increase the soil organic matter, improve soil health, and provide crop nutrients. Fresh manure can injure young plants. To reduce the risk of leaching, plant a fall seeded cover crop to trap some of the nitrogen released by the manure or fertilizer.

Apply manure at a rate that does not exceed 50 kg/ha (20 kg/acre) of available nitrogen. Strawberries require low amounts of nitrogen and this rate is nearly the maximum required. Most poultry manure contains up to 12 kg/yard<sup>3</sup> of total nitrogen. Some ammonia nitrogen is lost during application and losses are greater when manure is left on the soil surface for more than 12 hours. Applying and immediately incorporating about 5 yd<sup>3</sup>/ha (2 yd<sup>3</sup>/acre) poultry manure provides most of the nitrogen required by the strawberry crop. A soil test 3 weeks after applying manure will show if more nitrogen is required.

## SOIL pH

If lime is required to increase the soil pH, broadcast after plowing, and incorporate it into the soil at least 2 months before planting. In coastal areas, apply any time during the fall or early spring and incorporate it as soon as the soil conditions are suitable. However, in drier regions, lime should be incorporated in the fall. To lower the pH, refer to the “General Nutrient Management” section in this guide.

## NUTRIENTS

Take soil samples in the fall before planting to plan for spring applications of fertilizer or manure. If the soil is low in potassium, broadcast and incorporate half the amount required in the spring before planting. Refer to “Nutrition” below.

## Planting

Consider these points:

- Purchase plants that are certified free of viruses and other diseases.
- Plant early in the spring when soil can be worked—usually mid-April to mid-May. Avoid planting too early in wet soil as this can result in compaction, lumpy soil, poorly set plants, and more weed problems.
- If plants must be stored before planting and growth has not started, keep at 1°C to 3.5°C for up to two weeks. If growth has started, keep at 4°C to 10°C, for a short time. If no cold storage is available, put plants in a shaded, cool location and cover with wet burlap bags. Set plants as soon as possible once they are removed from the cooler. In all situations, check the plants frequently and remove plants with mould.
- On the day of planting, it is important that the plants do not dry out. Keep the plants in the shade and covered with a tarp until planting. If needed, sprinkle the top layer with water to keep the roots moist.
- Set plants so the middle of the crown is at the soil level. If the crown is buried, runnering will be delayed and reduced or the crown can

**Table 31. Strawberry plants per hectare and acre at various spacings**

Distance between plants	Distance between rows			
	105 cm (42 inches)	110 cm (44 inches)	115 cm (46 inches)	120 cm (48 inches)
30 cm (12 inches)	31,746/ha 12,446/ac	30,303/ha 11,880/ac	28,986/ha 11,363/ac	27,778/ha 10,890/ac
38 cm (15 inches)	25,397/ha 9,957/ac	24,242/ha 9,504/ac	23,188/ha 9,091/ac	22,222/ha 8,712/ac
45 cm (18 inches)	21,164/ha 8,297/ac	20,202/ha 7,920/ac	19,324/ha 7,576/ac	18,519/ha 7,260/ac
50 cm (20 inches)	19,048/ha 7,467/ac	18,182/ha 7,128/ac	17,391/ha 6,818/ac	16,667/ha 6,534/ac
60 cm (24 inches)	15,873/ha 6,223/ac	15,152/ha 5,940/ac	14,493/ha 5,682/ac	13,889/ha 5,445/ac

rot. If the roots are exposed, plants will dry out and could die. Have someone follow the planting machine to reset plants that are not at the correct depth. Also be sure the machine is set so the roots are in a vertical position after planting.

## Spacing

The matted-row system is normally used for growing strawberries in BC. Plants are set out in single rows. Runners produced from these plants are trained to form a solid row of fruiting plants.

The distance between the rows and the spacing between plants varies depending upon soil productivity, plant vigour and equipment used. The outside plants in the matted row produce the most fruit so avoid wide row widths. Row and plant spacings are usually within the range given on Table 31. Generally, the best spacing is about 30 cm (12 in) between plants as this usually ensures the rows are runner-in or matted by the end of the first season. For vigorous varieties, spacings of up to 40 cm (16 in) may be more appropriate.

Dayneutrals do not runner well—runners are generally removed to promote branched crowns. They are usually planted in double rows 20 cm (8 in) apart with 150 cm (5 ft) between rows (57,000 plants/ha; 24,000 plants/acre).

## Care in the First Year

Care in the first year should encourage quick establishment, early runner growth and strong runner plants (“daughter plants”). The number of early runners largely determines the crop size in the second year.

### *PLANT CARE*

In new plantings, the traditional practise is to remove flower stalks starting when blooming begins. This may result in earlier and increased runnering, a more developed root system, more crowns, and thus a larger first-season crop. However, if plants are set at 30 cm (12in) or closer and established well, blossom removal is not necessary.

Vigorous varieties that runner well, like Rainier, can be left to flower and harvested in the first year without seriously affecting establishment.

### *WEED CONTROL*

Apply herbicides as recommended to avoid plant injury. Misapplication of herbicides can severely set back new plants. Refer to the weed control chart in this section for suitable herbicides. Cultivation and hand weeding are usually necessary until the plants are fully established. Shallow cultivation (2.5 to 5 cm) is best to avoid damaging strawberry roots. Always cultivate in the same direction in each row so the roots of the trained runner plants are not disturbed.

### *NUTRITION*

Consider the nutrient contribution of any manure or compost added to the soil before planting, when applying commercial fertilizers. Reduce the amount of commercial fertilizer to compensate for the nutrients available from the manure. Refer to “Table 11. Nutrient Content of Various Manure” to determine manure contribution.

Under normal conditions apply about 20 to 50 kg/ha (8 to 20 kg/acre) or 2/3 of total amount of nitrogen plus all the phosphorus and potassium requirements 5 to 7 days after planting. Apply 15 cm away from the plants on each side of the row and 7 cm below the soil surface. An additional 25 kg/ha (10 kg/acre) or remaining 1/3 of the nitro-

gen can then be applied in mid-summer when the plants are starting to produce runners.

High rates of potassium (over 90 kg/ha or 36 kg/acre) should be split and applied separately about 4 weeks apart. The first application should be broadcast and incorporated prior to planting and the remainder should be banded along the rows in the normal manner with the other fertilizers.

Magnesium and calcium are frequently at low levels on light, coarse, sandy soils. Soil analysis will indicate these levels.

### *SOIL CARE*

Cultivate soon after planting while applying fertilizers. Then cultivate only to control weeds, to keep the soil loose for rooting runner plants, and to train unrooted runners. Avoid frequent rotoavation as it damages the soil and prevents good drainage.

### *RUNNER MANAGEMENT*

From any mother plant, the first runner is the most productive. Potential yields decline with each runner. The fourth runner is usually not rooted by the end of the season.

Runners can be placed to fill large gaps between plants using a hoe during hand weeding or as a separate operation. Also, cultivate to position the runners in the row. Always cultivate in the same direction in the row. After the desired row width is established, by about mid-August, use a rotoavator to cut off runners that extend into the alleys. Irrigate as needed during runnering for good root development.