Day-neutral Strawberry Production in Minnesota

Department of Horticultural Science

University of Minnesota
Driven to Discover℠

Dr. Emily Hoover, Dr. Jim Luby, Dr. Carl Rosen, Suzanne Wold-Burkness

About Day-neutral Strawberries

In Minnesota, most of the strawberry cultivars grown are June-bearing; however, day-neutral cultivars can also be grown, and in some instances are used as an effort to extend the strawberry season. Day-neutral strawberries differ from traditional June-bearing types in that they flower and fruit continuously when temperatures are moderate because they are insensitive to day length. In northern climates, June-bearing strawberries form flower buds during the short days of fall, and these buds complete their development and bloom the following spring. While cultivars differ in their ideal climate requirements, most day-neutral strawberries will grow well in the temperature range between 45°F and 85°F. Temperatures lower or higher than these limits will cause the plants to stop growing. Since day-neutral strawberries have shallow root systems, and are sensitive to extreme heat, our hot summers in Minnesota may be a limiting factor. However, overhead irrigation can be used to cool the plants during high heat periods.

Cultivar Selection

In general, there are fewer day-neutral cultivars accessible to Minnesota growers as compared to June-bearing cultivars. However there are a growing number of day-neutral cultivars that are suitable to production in Minnesota.

Table 1. Characteristics of day-neutral strawberry cultivars in Minnesota.

Cultivar	Yield	Hardiness	Vigor	Fruit size	Attractive-ness	Firmness	Texture	Flavor	Comments
Fern	M-H	Good	Low	M	Good	Excellent	Very good	Good	--
Salvia	L-M	Poor	High	XL	Excellent	Excellent	Fair	Poor	Sensitive to alkaline soils
Tribute	H	Very good	Med	M-L	Good	Very good	Very good	Good	Resistant to red stele
Tristar	M	Very good	Med	M	Very good	Very good	Very good	Very good	Resistant to red stele
Ft. Laramie	H	Excellent	High	L	Good	Poor	Fair	Fair	Susceptible to powdery mildew
Ogallala	M-H	Excellent	High	S	Fair	Poor	Good	Good	--

Care of Day-neutral Cultivars

Day-neutral strawberries prefer the same soil and sites as June-bearing cultivars. Plant them in the early spring, at the same time as June-bearing cultivars. See Commercial Strawberry Production in Minnesota publication for more information.

Plant day-neutral cultivars in the same way as June-bearing cultivars, or, if suitable equipment is available, on a 6-to 8-inch raised bed. The raised bed provides higher spring soil temperatures and better drainage, allowing faster establishment and earlier harvest. Day-neutral cultivars can be planted in single rows 3 feet apart with plants 6 to 9 inches apart in the row, or double or triple rows 8 to 12 inches apart with plants 8 to 12 inches apart within the rows (Figure 1). Multiple rows are usually more productive than single rows. Leave 18 to 24 inches between each series of double or triple rows to allow for movement of pickers and equipment. Apply 1 to 2 inches of straw mulch shortly after planting to keep the berries clean, conserve water, and control weeds. Plastic mulches also may be applied either before or after planting. Black plastic will help warm the soil and encourage growth; in warmer areas, white plastic may be more suitable to avoid high soil temperatures in midsummer.

Figure 1. Spacing of day-neutral strawberry transplants.

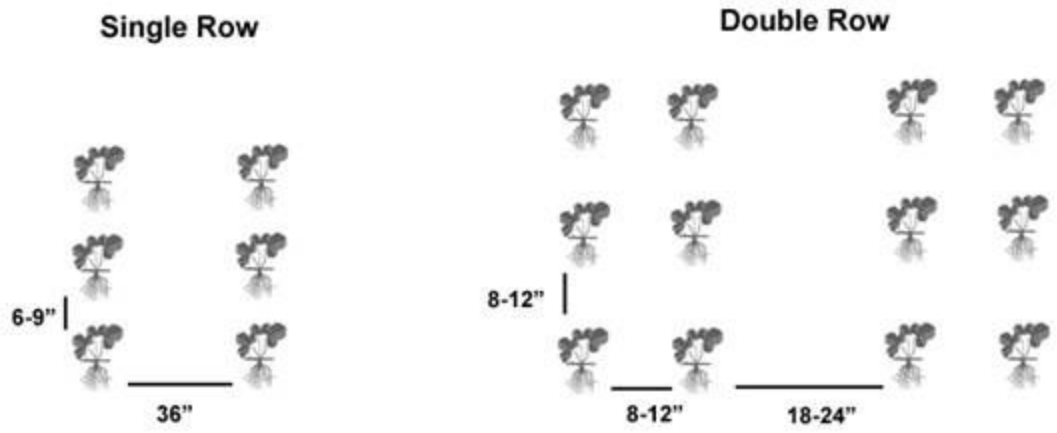

Table 2 provides a timetable for day-neutral plantings. Remove flowers from day-neutral plants for four to six weeks after planting to encourage vegetative growth. When plants have developed five or six expanded leaves, they should be allowed to flower. In general, day-neutral cultivars do not runner as profusely as Junebearing cultivars; therefore, they require a completely different cultural system. Runner removal is not necessary, especially on cultivars such as Fern and Aptos which produce few runners, but may be desirable through the first six or eight weeks of the season to encourage greater productivity.

Table 2. Quick reference guide for timing of activities in establishment season.

Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Plan planting												
Order plants												
Prepare site, till												
Fertilize if needed												
Plant dormant transplants												
Apply mulch												
Water as needed												
Remove flowers												
Remove runners												
Control weeds												
Monitor, manage insect pests												
Monitor, manage diseases												
Harvest												

Nutrient Management

The day-neutral strawberry has a high demand for certain nutrients because it is fruiting throughout the season while also growing vegetatively. Fertilizer suggestions are provided in Tables 3-5. Make certain to base your phosphorus and potassium application on soil test results. Nitrogen should be split into four to six applications at intervals throughout the season. Soil test and foliar analysis can be used to determine whether micronutrient applications are necessary. See the Nutrient Management section of Commercial Strawberry Production in Minnesota for more information.

Table 3. Nitrogen (N) recommendations for day-neutral strawberries.[1]

	Soil organic matter (O.M.) level[2]				
	Low	Medium	High	Organic soil[3]	Method/Timing[4]
	Nitrogen to apply (lbs/acre)				
First year	80	70	60	25	Split application. Apply every 3 to 4 weeks after planting.
Subsequent years	80	70	60	25	Split application. Apply every 3 to 4 weeks.

1. Leaf analysis should also be used to help determine nitrogen needs
2. Low = less than 3.1% O.M., medium = 3.1-4.5% O.M., high = 4.6-19% O.M.
3. Organic soil = greater than 19% O.M.
4. Suggested methods of application are a general guide and can be modified when appropriate; if nitrogen is applied in the spring, do not apply more than 15-20 lbs/acre.

Table 4. Phosphorus (P) recommendations for day-neutral strawberries.[1]

	Soil test P level (ppm)					
Bray-P1 Olsen-P	0-10 0-7	11-20 8-15	21-30 16-25	31-40 26-33	41-50 34-41	51+ 42+
	P_2O_5 to apply (lbs/acre) based on soil test reports[2]					
Establishment year	150	125	100	75	50	25
Subsequent years[3]	150	125	100	75	50	25

1. Application rates are listed below test results.
2. Apply and incorporate before planting. If needed during subsequent years, apply immediately after renovation.
3. Leaf analysis should also be used to help determine phosphorus needs.

Table 5. Potassium (K) recommendations for day-neutral strawberries.[1]

	Soil test K level (ppm)					
	0-40	41-80	81-120	121-160	161-200	201+
	K_2O to apply (lbs/acre) based on soil test reports[2]					
Establishment year	200	150	100	50	25	0
Subsequent years[3]	200	150	100	50	25	0

1. Application rates are listed below test results.
2. Apply and incorporate before planting. If needed during subsequent years, apply immediately after renovation.
3. Leaf analysis should also be used to help determine potassium needs.

Weed Management

Weed control can be a problem because herbicides, in general, cannot be applied within 60 days prior to fruit harvest. In addition, day-neutral cultivars have been found to be more sensitive to herbicides than June-bearing cultivars. Therefore hand weeding, hoeing, mulching, and cultivation are weed management options. More information on weed control can be found in

Insect and Disease Management

Day-neutral strawberries are affected by many of the same insects and diseases as listed in the Commercial Strawberry Production in Minnesota publication. However, because day-neutral strawberries flower during peak tarnished plant bug season, this insect is extremely damaging to day-neutral strawberries. Preventing damage caused by tarnished plant bug is difficult, and control measures should be taken to manage this insect.

Overwintering Day-neutral Plantings

Although day-neutral strawberries do not seem to be as productive during the second year, some growers may wish to over-winter a planting. Irrigation, fertilizer application, and pest control during the second year are similar to the first year. Spring frost protection may be necessary. Additional straw mulch may be needed during the middle of the summer as the old mulch decomposes. Additional herbicide applications may be needed during the fall of the first year (just prior to mulching) or during the early spring of the second year.