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Strawberry Culture In Northern Idaho

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Strawberries are attractive, flavorful small fruits that are popular with everyone and relatively easy to grow. They are a nutritious dietary supplement that can be eaten fresh or after processing. The strawberry is not a true fruit but is considered as a raceme with seeds or achenes embedded on the surface of the swollen receptacle.

Strawberries generally will grow quite well in northern Idaho, and home gardeners usually grow enough strawberries to satisfy their own needs. Commercial production is limited to a few acres of "pick-your-own" (PYO) berries that serve local demand. Markets outside the region have not been developed, so northern Idaho growers should be cautious about increasing acreage for commercial uses.

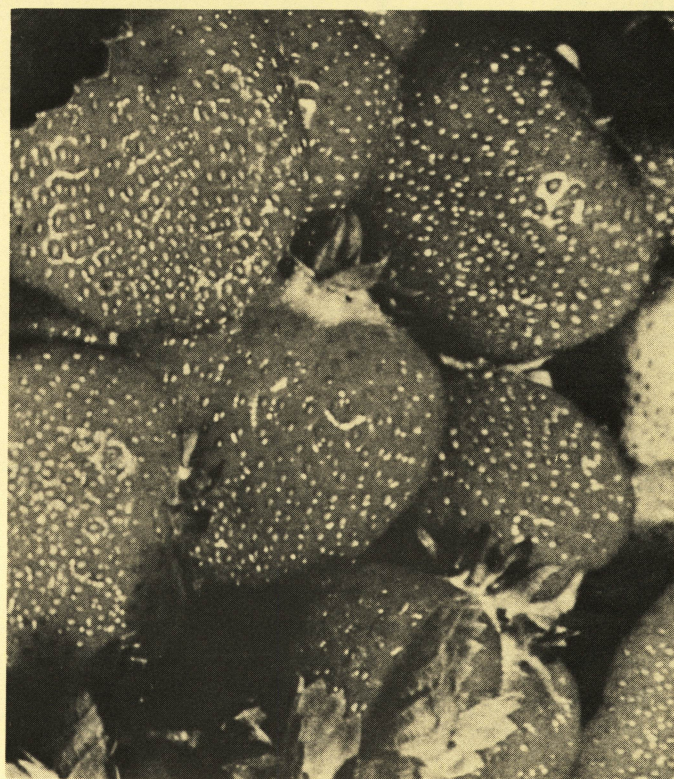
This publication discusses the performance and characteristics of varieties tested at the University of Idaho Research and Extension Center in Sandpoint and presents cultural guidelines for home garden and commercial strawberries.

Varities

Varieties for almost any situation are available from commercial nurseries, retail garden centers and farm suppliers. Most of these varieties have not been grown in the Northwest because they were developed for use elsewhere in the United States and eastern Canada. Growers should buy only certified virus-free plants that have been inspected for pests and bred for disease resistance.

More than 50 varieties of strawberries have been tested at the Sandpoint R&E Center to determine varietal adaptation to northern Idaho. The tested varieties included both June-bearing and everbearing types, representing a wide range in hardiness, disease tolerance, flavor and ripening date.

Based on our tests of June-bearing varieties, we recommend Benton, Micmac, Shuksan and Totem for northern Idaho production. Micmac transplants may be available only from midwestern and eastern sources, but the other three varieties are available in the Northwest. Benton may be best suited to jams and quick freezing while Shuksan has an excellent flavor for fresh consumption. Totem can



be used fresh or processed. Micmac seems ideal for home gardeners and PYO plantings. Principal characteristics of these four recommended varieties are shown in Table 1.

Table 1. Characteristics of June-bearing strawberry varieties tested in 1982 and 1983 at Sandpoint, Idaho, and recommended for home gardens and commercial plantings.

Variety	Characteristics
Benton	Developed in Oregon and released in 1983. Ripens mid-to-late season. Moderately hardy. Berries are large, medium red. Texture of skin and flesh is medium firm. Used primarily for jams and quick freezing. Is tolerant to viruses, fruit rot and some root diseases.
Micmac	Released in 1983 after development in Nova Scotia, Canada. Produces large, firm, bright berries. Is winter hardy for northern areas. Aroma and taste are ideal for fresh use. Ripens during midseason. Tolerant to leaf diseases and viruses but is susceptible to red stele and verticillium wilt.
Shuksan	From Washington program, released in 1971. Ripens in latter part of midseason after Totem. Berries are bright red, very large, flavorful and firm. Has winter hardiness. Used fresh or processed. Some disease tolerance but not as much as Totem.
Totem	A 1971 release of the Canadian Department of Agriculture in British Columbia. Large, very firm dark red berries, suitable fresh or processed. Hardy. Ripens in midseason. Has improved tolerance to viruses, red stele, root rot, powdery mildew and soft rot.

Table 2. Characteristics of June-bearing strawberry varieties tested in 1982 and 1983 at Sandpoint, Idaho, recommended for trial plantings in home gardens and commercially.

Variety	Use	Maturity	Berry characteristics				Disease resistance				
			Size	Firmness	Dessert	Freezer	Scorch	Spot	Mildew	Red stele	Wilt
Atlas	PYO	Midseason	Large	Firm	Good	V.good	Susc.	Res.	Res.	Susc.	Susc.
Dunlap	HG	Early	Med.	Soft	V.good	Fair	Unk.	Susc.	Unk.	Susc.	Unk.
Earliglow	All	Early	Med.	Firm	V.good	V.good	Res.	Susc.	Res.	Res.	Res.
Guardian	All	Midseason	V.large	Firm	Good	Fair-good	Res.	Res.	Res.	Res.	V.res.
Jewel	All	Midseason	Large	V.firm	V.good	V.good	Res.	Res.	Unk.	Susc.	Susc.
Midway	All	Midseason	Large	Firm	Good	V.good	Susc.	V.susc.	Unk.	Res.	Inter.
Redcoat	HG	Midseason	M.large	Firm	V.good	V.good	Res.	Res.	Unk.	Res.	Inter.
Redglow	HG	Early	Large	M.firm	V.good	Good	Inter.	Susc.	Unk.	Res.	Susc.
Scott	All	Midseason	Large	Firm	V.good	V.good	Res.	Res.	Res.	Res.	Inter.
Sparkle	All	Late	Med.	Soft	V.good	V.good	Inter.	Susc.	Unk.	Res.	Susc.
Vesper	All	V.late	Large	Med.	Fair	Fair-good	Susc.	Susc.	Unk.	Susc.	Susc.

Our tests also indicated that several other varieties may be worthy of trial. These include Atlas, Dunlap, Earliglow, Guardian, Jewel, Midway, Redcoat, Redglow, Scott, Sparkle and Vesper. The main characteristics of these varieties are shown in Table 2. Most are considered to be suitable for home gardens and commercial production for PYO operations or the processing industry. All of these varieties can be grown where winter hardiness is needed. Growers are advised to cautiously test these varieties before planting them on a large scale.

Everbearing varieties blossom and bear fruit throughout the entire frost-free growing season. While everbearers are popular among home gardeners because they provide a continuous fruit supply, they have no commercial importance. Fort Laramie was the best everbearing variety we grew. Ozark Beauty and Quinault suffered extensively from heaving. They may survive better where soil drainage is improved and surface mulches are used. Garnet may be suitable but should be tried on a small scale initially.

Winterkill due to heaving of soil was the principal environmental stress encountered in these nursery trials. Plant survival and vigor were the main criteria we used to develop recommendations.

Site Selection

Selection of the right place to plant strawberries is most important for success. A well-drained, sandy loam is ideal because wet soils can lead to the development of root diseases, frost heaving and fruit rots. Raised rows or other practices that will improve drainage should be used if berries are to be grown on heavier soils that contain silt or clay. Incorporation of organic matter by plowing down cover crops, manures or other plant residues and selection of root-disease tolerant varieties also are encouraged for heavier soil. Supplemental irrigation will be necessary if berries are grown on drouthy soils.

If berries are to be sold to PYO buyers, the site must be convenient and accessible. Proximity to highways and traffic flow in the field are important considerations for PYO operations.

Noxious perennial weeds must be eliminated during site preparation to help berry transplants become established. Quackgrass, tansy and Canada thistle are the perennial weeds most likely to be encountered. Chemical and mechanical means or a combination of both can be used for control. If the site chosen has been planted to hay or pasture, a year of oat cropping and summer fallow should help control weeds, since they will sprout and be destroyed with repeated tillage.

Air drainage and slope aspect also are important in choosing a strawberry site. Growers should avoid known frost pockets because of the risk of damage to blossoms. Berries grown on a south-facing slope may suffer from drouth while berries grown on a north-facing slope may be damaged by cold winter winds. Growers should try to minimize extremes.

Planting

Soil should be thoroughly worked up by disking or rototilling and firmed down by compacting as for any row-type crop. Plants stored below freezing should be completely thawed and free of ice before separating. Otherwise ice attached to roots may cause damage when plants are pulled apart. Prune roots to a 4- or 5-inch length.

Matted rows and hills are the most common planting systems used in the Northwest. In the matted row system, transplants are set 18 to 24 inches apart in rows separated by 42 inches. Runners are allowed to fill in the empty spaces until the rows become 12 to 14 inches wide. In the hill system, strawberries are planted in hills 15 to 18 inches apart and in rows spaced at 36 to 42 inches. Runners are removed with this system. Spacing in either system can be modified to suit the grower's planting and cultivating equipment. Hill-cultured berries are generally larger than matted-row berries. Total yields will be lower, however, and runner control costs must be considered.

Planting depth is important. The crown of the plant — the area where the shoot and roots meet — must be level with the firmed soil surface. Machine-planted berries require careful adjustment of the transplanter to obtain the correct depth. Berries also can be planted with hand tools.

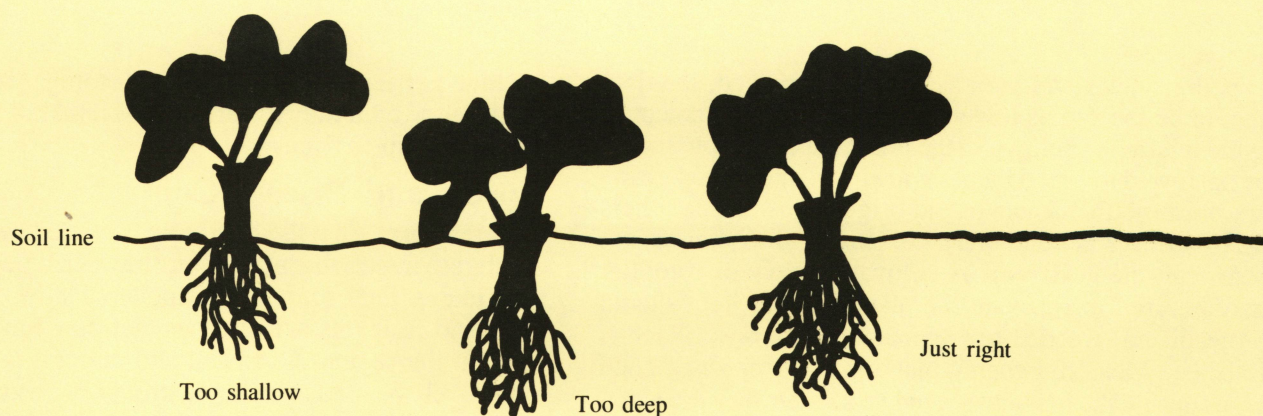


Fig. 1. Plant strawberries with the roots spread in a fan shape. Keep the crown above the soil line.

Two people can do the job best when one handles the spade while the other handles, sets and firms the plants. Planting too deep or too shallow will result in poor stands of plants.

Plants should be set in the spring as soon as the soil has adequately drained. Early planting offers the best chance to promote runner formation and highest yields, although freezing temperatures just after planting can severely injure plants. Fall planting is not recommended because many of the soils in northern Idaho are subject to frost heaving. Blossoms should be removed during the first summer.

In summary, establishing strawberry plants requires early planting in well-prepared soil. Healthy plants must be planted at the correct depth, and soil must be firmed around the roots. And finally, soil moisture must be adequate. For further information about planting procedures, see UI Extension Bulletin 440, *Strawberry Growing in Idaho*.

Fertilization

Supplemental fertilizer applications will be required to establish and maintain good strawberry production in northern Idaho. Soil fertility status should be determined before planting by collecting and testing soil samples. The ideal time to measure the availability of N, P, K, Ca, Mg, S and B is before the land is plowed. Strawberries require a slightly acid soil (pH 6.2 to 6.5). Excess acidity may be corrected with lime that is broadcast and incorporated by disking well before planting.

Nitrogen (N) should be provided in split applications of 35 to 50 pounds per acre around planting time and 30 to 40 pounds during the last 2 weeks of August. For smaller plots, spread the fertilizer over the surface at rates of 3/4 to 1 pound N per 1,000 square feet at planting time and again during the last half of August. These applications will supply enough N to promote early development of roots and runners and formation of flower buds in the fall. The early fertilization can be banded beside and below the row of plants while the second can be broadcast over the plants if water is available.

Established strawberries should be fertilized just after harvest when plantings are renovated. The rate should be 35 to 50 pounds N per acre (3/4 to 1 pound per 1,000 square feet for small plots). Do not fertilize late because

tender growth will be stimulated and plants may winter-kill. Berries should not be fertilized in the spring during fruiting years because plants may become too leafy. The berries then become soft and are more likely to rot.

Phosphorus (P) must be available in adequate amounts to assure the early development of roots and runners in new plantings. Volcanic soils that contain less than 3 ppm of available P should be fertilized with 90 to 100 pounds of superphosphate (P_2O_5) per acre, or about 2 pounds per 1,000 square feet. Soils of the Bonner, Avonville, Mission and Pend O'Reille mapping units found mostly in Bonner County contain volcanic overlays and generally will require more P than soils that are not of volcanic origin. Phosphorus may be banded with N at planting time to improve the efficiency of P uptake.

Potassium (K) is supplied as potash (K_2O) and is commercially available as either potassium sulfate or muriate of potash. Sulfur (S) is the fourth component of 16-20-0-14 fertilizer, a formulation used in northern Idaho. It is also available in gypsum (calcium sulfate) and potassium sulfate. If boron (B) is needed, borated gypsum is a recommended source. Additional information about strawberry fertilization may be found in UI Current Information Series 815, *Northern Idaho Fertilizer Guide: Blueberries, Raspberries and Strawberries*.

Cultivation and Renovation

The best approach to weed control is to keep the planting weed-free. In the matted-row system, new plantings should be cultivated in one direction along the row to help runners become established. Two-way cultivation will drag runners back and forth and interfere with their rooting. Established plants should be cultivated in the spring to keep the row middles clean. Poorly drained soils may prevent early tillage and interfere with weed control. Weeds can be effectively controlled with herbicides approved for use with strawberries. Plastic or straw mulches can be used to control weeds and to prevent fruit rot when berries touch the soil. Mulches will also help protect plants from cold winter temperatures and frost heaving.

Renovation or renewal of the strawberry plants is necessary after the first regular year of harvest because competition between plants and weeds reduces vigor and leads

to poorer yields. As soon as berries are picked, the field should be mowed as low as possible but high enough to avoid injuring the crown of the plant. Next, the row should be narrowed to 5 or 6 inches wide by tillage. Some growers preserve the center of the original row while others destroy the center and one side, leaving the other side to bear fruit the next year. A cultivator, plow or rototiller may be used to renovate the planting. The field should be fertilized, weeded and irrigated as soon as tillage is finished. Most strawberry plantings will produce good crops during the first and second years after they are planted if proper care is used. Vigor and yield usually decline after the second year of production, and plantings should be rotated with grain or grasses and legumes to maintain soil tilth and pest control.

Irrigation

Sandy soils may require additional moisture to secure the best yields. In many areas of northern Idaho, natural precipitation during spring months is adequate to achieve good yields. Too much rain during ripening may lead to soft rot of berries. Precipitation normally becomes less after plants are finished bearing, and a lack of soil moisture may restrict runner development and bud formation. Yields of the next crop could be suppressed unless plantings are irrigated.

If a source of water is available, growers should seriously consider applying water by overhead sprinklers, drip irrigation, furrows or other delivery systems. Each system has advantages and disadvantages. Drip systems are permanently placed above or below ground. They conserve water, offer a convenient means of supplying nutrients, minimize weed competition and can lead to better fruit quality. They may be expensive to buy and install. Overhead sprinklers also may be costly and may stimulate weed germination and promote disease problems. Berry quality also may decline because of the humid and wet conditions inherent with this method. Regardless of irrigation method, growers should use enough water to promote good vigor and berry size but should avoid overwatering.

Harvesting

Berries should be picked during cool hours to prolong shelf life. Berries picked in the morning have been cooled naturally overnight while those picked later will require cooling. Surface moisture may increase fruit rot, so berries should be dry when picked. If berries are to be shipped, they should be picked when about three-fourths of the fruit surface is red. Those picked for local markets and home use should be fully ripe. Fresh market berries are picked with the caps attached to the fruit.

Berries should be cooled to 38° to 40°F as soon as they are picked unless they are used or marketed immediately. Firmness differs among varieties and affects the amount

of time berries can be kept in cold storage. At 32°F and high relative humidity, berries will remain in good condition for up to 7 days.

Insect and Disease Control

Strawberry weevils, lygus bugs, spittle bugs and white grubs are insects that may infest strawberry fields in northern Idaho. Leaf scorch, leaf spot, red stele, verticillium wilt and fruit rots are diseases that may hinder production in the region. Chemical and cultural measures can effectively be used to either control or prevent pests. Sanitation through removal or burial of infested crop residues and crop rotation to avoid pest buildup are alternatives to chemicals. Growers should be careful to buy disease-resistant varieties from sources inspected for insect and diseases. The Extension agricultural agent in your county has information about specific pests of strawberries and can assist growers with cultural questions.

Conclusions

Residents of northern Idaho should find enjoyment in growing strawberries for home and possible commercial use. June-bearing varieties Benton, Micmac, Shuksan and Totem are relatively recent releases that appear to be well suited to the Sandpoint area. Eleven other varieties representing early to late ripening traits are tentatively recommended for public use. Fort Laramie is an everbearer worthy of trial.

Growers should plant strawberries on weed-free, well-drained soils away from frost pockets. Soils should be tested before planting to determine the need for fertilization. Growers should buy from sources certified to be free of diseases and insects. Berries should be picked when conditions are as cool and dry as possible to avoid fruit spoilage. Pests can be controlled by proper sanitation, chemicals or workable combinations of the two.

Recommended Reading

Strawberry Growing in Idaho. UI Bulletin 440.

All About Growing Fruits and Berries. West edition. Ortho Books.

PNW Insect Control Handbook for current year.

PNW Plant Disease Control Handbook for current year.

PNW Weed Control Handbook for current year.

Western Fruit, Berries and Nuts — How To Select, Grow and Enjoy. 1981. R. Stebbins and L. Walheim. H. P. Books.

The Authors

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