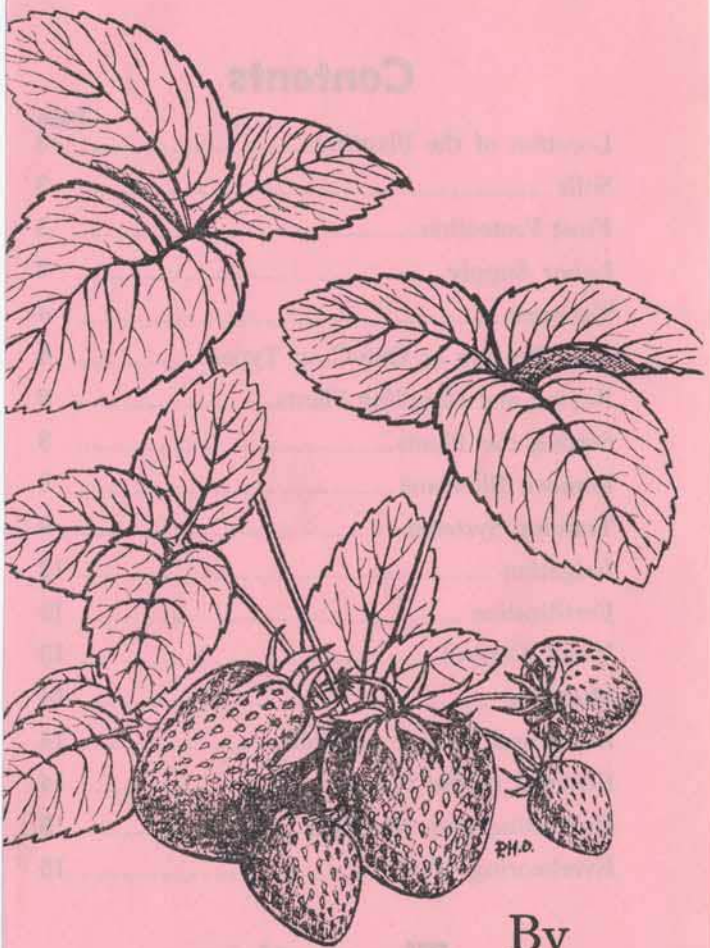
d 4.3
#448
GREGG M. SINCLAIR LIBRARY
UNIVERSITY OF HAWAII

UNIVERSITY OF IDAHO
College of Agriculture

STRAWBERRY GROWING in Idaho



By
Anton S. Horn

IDAHO Agricultural Extension Service

Bulletin No. 440
April 1965

This bulletin can help anyone grow better strawberries. It lists the most suitable strawberry varieties, tells how to plant these to best advantage and gives suggestions for growing and harvesting the most satisfactory fruit.

Idaho growers who have special problems in strawberry production are urged to consult their county agent or the author of this bulletin, Mr. Horn.

Contents

The Author

Anton S. Horn is Horticulturist, University of Idaho Agricultural Extension Service. He is located at Boise.

Strawberry Growing in Idaho

by Anton S. Horn

In home garden plantings, there may be little choice of location for the strawberry bed. A slope affording air drainage is preferred. Spring frosts often reduce yields by killing blossoms or damaging young fruits. Later blooming varieties may escape a frost that would damage early-blooming varieties. On south slopes, strawberries will bloom earlier and thus are more likely to be nipped by frost. However, the fruit that survive will ripen sooner. Frost damage is most likely to occur in low spots, valleys and at the bottoms of slopes.

Soils

Strawberries thrive on the wide range of soil types but do best on deep, well-drained, loam soils.

Heavy clay soils should be avoided. They are hard to work and plants grown in them suffer from root diseases, and the planting is short-lived.

Sandy soils require more frequent watering and greater attention to organic matter content and fertility.

You need at least 2 feet of good top soil to grow strawberries. Avoid planting strawberries in soil that was formerly planted in tomatoes, potatoes, peppers, eggplant, or other crops that can infect the soil with verticillium wilt.

Frost Protection

Frost damage to blossoms and young fruit may be prevented by covering the plants with a very light layer of mulch. Use enough straw to barely cover the plants. Running water down the irrigation rills will aid in frost protection.

Strawberries may also be protected from frost by turning on sprinkler systems when the temperature at ground level reaches 34 F. The sprinklers should be left running until the temperature rises above 32 F. and the ice melts.

Even though plants may be covered with ice, if there is free water on the outside of the ice, the heat released as the water cools and freezes will keep the temperature of the plant tissues around 32 F. and there should be no injury.

Another means of frost protection is artificial heating. The lard-pail type of orchard heater that burns fuel oil is satisfactory. Many small heaters rather than a few large ones are most effective. Tires, straw and wood may also be burned to supply heat. Heating adds to the cost of production.

Labor Supply

If you are planning a commercial planting you must consider the availability of pickers when you need them.

Varieties

Selection of the proper varieties for soil, climate and market often makes the difference between success and failure for a strawberry venture. Spread your picking over as long a period as possible. It is best to plant an early, a mid-season and a late variety.

The purpose of the variety is also important. Do you want berries for freezing, preserving or for the fresh market? A careful study of the variety descriptions should provide information as to what varieties best suit your needs.

June-Bearing or One-Crop Types

In June-bearing varieties, the first crop is produced the year after planting. All of these varieties are self-fruitful and will produce when planted alone. To extend the picking season, plant several varieties.

MARSHALL (Banner, Oregon) – Massachusetts, 1890.

Berry shape is round-conic to conic. Crimson color with a good red internal color. Mildly

subacid. Midseason harvest. Excellent dessert berry, also used for freezing and canning and preferred by ice cream industry. Runners freely. Many plants are infected with virus, so buy certified virus-free stock. Foliage is susceptible to leaf spots. Does well on a wide range of soils.

NORTHWEST—Washington, 1941.

Berry shape is long blunt conic. Good red berry color throughout. Subacid. Late season harvest. It blooms and ripens a week after Marshall. Therefore, it will escape frost some years when Marshall wont. Out yields Marshall. Adapted to matted row or hill system of planting. Good dessert and preserving berry. Somewhat resistant to virus. Susceptible to cyclamen mites, red-stele and root rots. Prefers medium-light, well-drained, irrigated soil.

SHASTA—California, 1945.

Berry shape is round, conic and very large. Midseason harvest. Good dessert quality. Light red skin, pale flesh and yellow seeds. Mild subacid. Runners freely. Tolerant of virus diseases. In California it bears from April to November. In Idaho it has only one crop. Foliage is subject to leaf spots. Processing quality not high. A fresh market berry.

SILETZ—Oregon, 1947.

Berry shape is blunt-conic, color is dark red with good internal red berry color. Runners freely. Plants are hardier than Northwest. Core pulls out when picked ripe. Red-stele resistant. Somewhat resistant to virus. Very productive. Winter hardy.

PUGET BEAUTY—Washington, 1956.

Berry shape medium-large to large, mostly long-conic and slightly necked, easily picked, medium red, glossy, fairly firm. Sweet and aromatic when fresh. Pick frequently to avoid over-ripe fruit. A good freezer as well as excellent for fresh use and preserves. Not high yielder. Quality so good it brings two cents a cup more than Northwest on fresh market. It blooms after Marshall but ripens at same time. Adapted to moderate heavy soils with or without irrigation.

COLUMBIA—Washington, 1961.

Berry shape irregularly conic. Bright red. Late harvest. Comes on a week later than North-

west. Yield compares with Northwest and sometimes outyields it and is hardier than Northwest. Berry size is not as good as Northwest. Has a large hull or calyx that makes picking for processing fairly easy and adds to the appearance of fresh market berries. Surface of ripe berries soft and easily bruised. Special care needed in harvesting and handling for fresh market. Resistant to red-stele disease. Good grower. Size good. Good freezing berry. Resistant to mildew and fruit rot. Needs good soil moisture to hold size to end of harvest.

MIDWAY—USDA and Maryland, 1960.

Berry shape medium-long, conic. Fruit bright red. Medium-large and firm fleshed, glossy, tough skin and somewhat tart. Suitable for freezing. Good flavor. Productive on fertile soil; not good on sandy soils, irrigation essential for satisfactory yields. Has outyielded Robinson and Howard in tests in the east. Larger than Howard but not as large as Robinson. Ripens about two days after Howard. Flavor subacid, heavy cropper, tough skin and firm flesh. Liked by buyers. Does well under conditions similar to Boise Valley.

HOWARD (Howard 17, Premier, Polar Queen, Golden Bell)—Masachusetts, 1918.

Berry shape conic. An old variety that produces large berries. A poor freezing berry. Subacid. Fair in quality. Early. Long season. Productive. Runners freely. Both skin and flesh are red.

CATSKILL—New York, 1933.

Berry shape roundish-wedge and somewhat irregular. Berries large. Bright medium red, fairly firm, good quality. High in vitamin C. Good for freezing. Midseason.

FAIRLAND—Maryland, 1936.

Berry shape wedge-conic to blunt wedge-conic. Berries large. A red-stele resistant variety that yields high. Glossy medium red, tough skin, good quality.

ROBINSON (Kardinal King, Scarlet Beauty)—Michigan, 1932.

Berry shape very conic, conic to wedge-conic, furrowed and green tipped. A heavy

yielder of large attractive berries. The skin bruises and the berries are of fair quality. Not adapted to freezing. Late.

FAIRFAX (Grandview, Cummerbund)—USDA, 1923.

Berry shape roundish wedge-conical, large, dark but firm if not overripe, do not bruise, sweet and of good quality. Good for home garden. Midseason. Grown to a large extent in northern Idaho.

NARCISSA—USDA, 1923.

Berries attractive and early for local market. Grown to some extent in northern Idaho.

DORSETT—USDA, 1923.

A high-yielding red berry with fine dessert quality that does equally well in northern and southern Idaho. Cap does not come off in picking. Be sure to buy virus-free plants.

EARLIDAWN—Maryland, 1947.

Berry shape large conic, somewhat irregular, medium firm. Fair dessert quality, very early, bright light red skin, bright red flesh. Plants blossom early and are blossom hardy. Productive but makes fewer runners than most varieties. An early fresh market variety. Good for freezing. Plants bloom early so susceptible to late spring frosts even though blossoms are somewhat frost-hardy. Need site with good air drainage. Very early. Be sure to buy virus-free plants.

POCAHONTAS—Maryland, 1946.

Berry shape large and blunt-conic. Skin bright medium red. The flesh is red. It is subacid. Dessert quality good. Good freezer. High yielder. Vigorous and makes runners freely. Early.

TIOGA—California, 1963.

Berry shape is long and conical with a tendency toward wedginess. Calyx separates easily from fruit on picking. Larger than Shasta. As attractive as Shasta. Ripens before Shasta. Highly susceptible to verticillium. We don't know how it would do in Idaho, but believe it would perform similar to Shasta. It is listed for trial until more is known about it.

Buying and Handling Plants

Buy plants certified free of virus diseases, red-stele disease and other diseases. Make sure your plants are free of cyclamen mite.

Plants are generally packed in bundles of 25 each and placed in cartons of 1,000. These are kept in cold storage until planting time.

When your shipment arrives, open the package immediately. Water the roots if they show need. The leaves should have a fresh, green appearance and there should be an abundance of light-colored, fleshy roots. If the plants have dry or blackened roots, or appear otherwise weak and unhealthy, they are not worth planting and should be returned.

If the plants cannot be set soon after they arrive, they can be stored for 2 or 3 weeks in a fairly damp cellar, at a temperature of 30 to 40 F. Keep the roots moist but not wet. Leave the tops exposed to the air, but do not wet them.

Plants may be held for longer periods by cutting the bundles and separating the plants and then planting them temporarily, close together, in moist sand or soil. The roots must be covered and the soil firmed around them. Plant them in shade or on the north side of a building. By "heeling" them in you can keep them 6 weeks or more.

Setting the Plants

Strawberries are generally planted in early spring. However, it has been found that June planting is possible if dormant plants are dug in winter months, bundled in crates lined with polyethylene and stored at 30 F. Strawberry plants handled in this way retain their bright green foliage and vigorous roots for as long as 10 months in cold storage.

Fall planting is not justified in the light of the extra expense of keeping the planting free of weeds in late fall and early spring. Furthermore, one must still wait a year following planting for a crop on one-crop or June-bearing varieties. Thus, spring planting is preferred.

Plants do best when set out during cool, cloudy weather. Keep roots moist and plants

shaded until they are set. Keep the plants out of the wind.

Plants should be set in the ground so that the soil just covers the tops of the roots. Spread the roots in a fan so that the soil comes in contact with as many roots as possible. Press the soil firmly around the roots so there are no air pockets. Water the newly set plants.

A spade is used for planting. The spade is pushed into the ground about 6 inches and moved back and forth to open a hole. The plant is then inserted with the roots spread fan-like and well down in the hole, with the crown at the right level. The spade is then withdrawn without disturbing the roots. Then with a few short strokes the soil is worked against the roots and the dirt pressed down firmly. A cupful of water should be poured around the roots of each plant as it is brought into final position by the plant setter.

Remove Blossoms

Blossom clusters should be removed as soon as they appear. Do not allow plants of one-crop varieties to set fruit the first season. All the vigor produced in the first year is best directed toward making a strong mother plant and numerous runner plants, resulting in more berries in succeeding years.

Training Systems

On rich soil with ample water, most varieties of strawberries produce a large number of runners in a single season. Up to a certain point the production of runner plants will increase yields, but if too many runners are allowed to root they compete with each other to the point where both yields and quality are reduced. The training system that gives the heaviest yields is one that allows the rooting of the largest number of runners without serious crowding, as in the matted row system. The hill system, in which no runners are allowed to root, gives the lowest yield but the best berries. The hedgerow system is a compromise between these two. In it, a small number of runners, carefully spaced, are allowed to root. For illustrations of the several training systems see Figure 1.

The Matted Row System

Set the plants in rows 36 to 42 inches apart, with the plants 18 to 30 inches apart in the row. Let the runners root where they will, or space them 6 to 12 inches apart. The latter method—sometimes called the "spaced row" system—takes extra labor, but will often pay in higher yields and better quality berries. When the row is filled with plants to a width of 12 to 15 inches, cut off all additional runners as they form.

Encourage early production of runners. Runners rooted in June will produce from 10 to 15 times as much fruit as runners rooted in October. Varieties that are low in runner production should be fertilized with nitrogen in the spring and irrigated, if possible, to increase the number of early runners.

The Hedgerow System

With rows 30 to 36 inches apart, space the plants 18 to 24 inches in the row. Allow only a small number of the first runners to root. Space these so that they form one, two or three rows of plants. (Fig. 1B). Yields per plant are greater than in the matted row system because stronger crowns are formed, but total yield per acre is less because a smaller number of plants are allowed to root.

The Hill System

Set the plants 18 inches apart in rows 24 to 36 inches apart, or set them 24 to 30 inches apart each way for cross cultivation. Remove all runner plants as they form. This system yields large, high-quality berries, but total production is lower than with the other systems described. The hill system is best adapted to small-scale production of berries for home use where large yields are less important than high quality. It requires least hand labor for weeding.

Training Systems

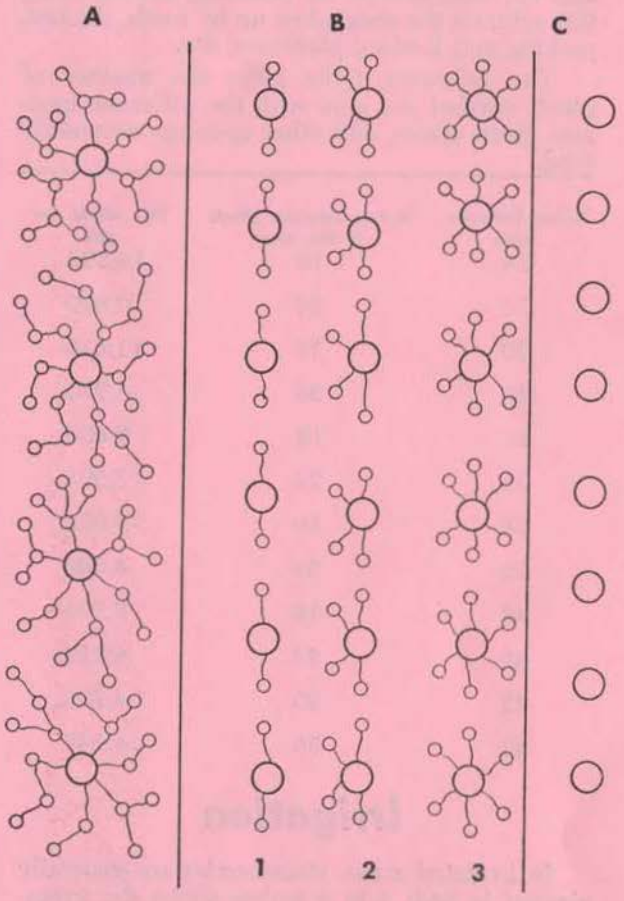


Figure 1:

Systems of training strawberry plants. Large circles represent mother plants, small circles represent runner plants. **A**—matted row system with spaced plants. **B**—different forms of hedgerow system, including, (1) single hedgerow, (2) double hedgerow, and (3) triple hedgerow. **C**—hill system, in which all runner plants are removed as they form.

It is easy to determine the number of plants needed per acre by dividing the square feet for each plant into the square feet per acre—43,560. Determine the number of plants needed in a patch by dividing the square feet for each plant into the total area of the planting. Before doing this subtract the area taken up by roads, ditches, parking and loading platforms, etc.

The following table gives the number of plants needed per acre with the different spacings given above, and other spacings commonly used.

Inches between rows	Inches between plants in the rows	No. plants per acre
24	18	14,520
24	24	10,890
30	18	11,616
30	30	6,970
36	18	9,680
36	24	7,591
36	30	5,808
36	36	4,840
42	18	8,296
42	24	6,223
42	30	4,986
42	36	4,149

Irrigation

In irrigated areas, strawberries are generally planted in beds 4 to 8 inches above the irrigation furrows. It is necessary to irrigate only enough to keep the plants in good vigor and to encourage early rooting of runners. During the fruiting period it is necessary to irrigate every 4 to 6 days on light soil and every 7 to 10 days on heavy soil, or alternate rows may be irrigated after each picking so there will always be firm soil on one side of the row for the pickers. Irrigation is not necessary as often after harvest, but the plants must not be allowed to suffer from lack of water at any time, inasmuch as this may result in reduced yields the next year.

Fertilization

The soil may be built up by green manure crops and fertilizer before strawberries are planted. Barnyard manure may be applied at the rate of 10 to 20 tons per acre in the spring before the soil is worked. Commercial fertilizer, such as ammonium sulfate or its equivalent, may be applied at a rate of 200 to 400 pounds per acre when the soil is first prepared in the spring. In fruiting years (second and third growing seasons) a good plan is to split the nitrogen application, applying half as a side dressing soon after growth has begun in the spring, but before bloom, and the other half as a side dressing about the first of August.

Excessive nitrogen applications result in production of heavy foliage, soft berries and an increase in fruit rot.

If alfalfa on your soils has benefited from applications of phosphate, or if a soil test indicates its need for field crops, then strawberries may benefit from its application. In that case apply 200 to 300 pounds of superphosphate per acre in early spring.

Weed Control

Weed control is probably the biggest expense in growing strawberries. Unless chemical weed control is used hoeing and cultivation must be done. All hoeing and cultivation should be shallow to avoid damage to the roots. Hoe and cultivate only when needed to control weeds.

Because chemical weed-control measures change rapidly they will not be discussed here. See your county agent for the latest control measures.

Geese are used successfully by some growers for control of chickweed, grasses and some other weeds. They will not keep the strawberry patch free of all weeds. Generally 2 to 4 geese (preferably young) are used per acre. They will need a little feed and water to supplement their diet of weeds. They may eat some foliage and buds if not given supplemental food. Geese should be removed before the berries start to ripen.

Mulching

Mulches are not considered necessary to protect strawberries from cold in southwestern Idaho. In the colder parts of the state strawberries will benefit from a mulch. Two to 3 inches of coarse hay or straw may be placed over the entire planting when the ground begins to freeze. The mulch should be removed in the spring. The mulch may be raked between the rows to keep the berries clean, keep down weeds and conserve moisture.

Insect and Disease Control

Information concerning these problems is contained in other bulletins available at the county agent's office.

Renewal of the Planting

Strawberries usually produce most heavily the second year after planting. After the second year yields generally drop quite sharply. Cost of operation increases because of a buildup of weeds, crowding of runners, and increases in diseases and insect pests. This raises the question of how long it will be profitable to keep a planting.

Growers in many commercial strawberry districts destroy their plantings after a single year of fruiting. Growers in other areas keep them for 2 or 3 successive crops. Under most Idaho conditions a two-year period of fruiting is generally most profitable.

If the planting is to be kept for more than one fruiting year, plan some form of renewal as soon as a crop is harvested. The objects of renewal are to destroy the less productive plants, keep the better ones and eliminate competition from excess runners. With the matted-row system there are two common methods of renewal. One method is to plow out all the plants from the middle and one side of each row, leaving the plants on the opposite side for fruiting the next year. The plants that are plowed out must

be removed by cultivation, or in some other way. This may prove troublesome and expensive. Another method is to narrow the row from both sides, leaving a 5-inch strip of plants in the center.

If a training system other than the matted-row is used, any method of renewal that will save the most vigorous, well-rooted plants and reduce crowding of runners will help to increase the yield and improve the quality of berries the next year.

Any system of renewal should include nitrogen fertilization and thorough cultivation and weeding.

Harvesting and Handling

Care must be exercised in harvesting and handling strawberries. They are soft and highly perishable fruits. It is best to pick only during the cooler hours of the day, but not while the berries are wet. Picking early in the day not only keeps the berries firm but gets them to the packer in time to be packed in the day's run. For shipping, pick all the berries that are red on three-fourths or more of their surface. For local market or home use, pick berries that are colored completely. Berries are picked with caps or hulls on for fresh market. Pickers should be instructed to break the stem without squeezing the berry. Assign each picker to a separate row. This makes it easier to supervise the crew and to single out poor pickers. Strawberries should be harvested every 2 or 3 days at the peak of the season in warm weather, and at least every 4 or 5 days when the weather is cool.

For processing, pick the berries with the caps off. This is done by holding the stem and cap with the finger tips of one hand and grasping the berry lightly with the fingers of the other hand and pulling the berry off with a slight twist. Berries for processing should be picked only when they are ripe and at the peak of flavor.

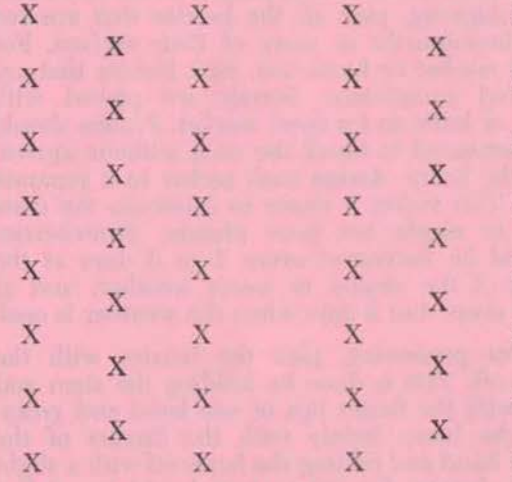
Everbearing Varieties

The fruiting habit of the everbearing varieties (also called fall-bearers) differs from the so-called one crop of June-bearing varieties in

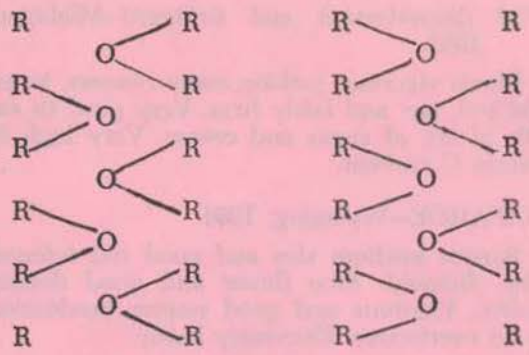
that, while June-bearers form buds only during the short, cool days of the fall preceding harvest, the everbearers form fruit buds all through the long, hot days of midsummer. The buds of the standard varieties that develop flower parts in the fall do not grow into fruiting stalks until the following spring. Because of this difference, the everbearers fruit more or less continuously throughout the summer and fall instead of maturing their entire crop within a short period of 3 or 4 weeks during May and June.

Everbearers produce fewer runners than do one-crop varieties. The highest yields are obtained when the hill system is used and plants are set 12 inches apart on the square. Prune the runners so as to stimulate formation of branch crowns. This causes the food made by the leaves to be channeled to the crowns.

Everbearing plants may be spaced 1 foot apart in beds of 3 rows spaced 4 feet between centers. This leaves about 2 feet between the beds. Plants may be staggered as indicated in the sketch below. Four-row beds may also be used.



A modified 3-row bed system may also be used. Plant single rows 4 feet apart with 1 foot spacing between plants. Then train the first and second runners produced from each plant as shown below to positions that will form rows on each side of the original row of parent plants. By using this system fewer plants are needed than for the 3-row plantings of spring-planted plants. However, first year yields will be lower.



O = Original plants
R = First and second runner plants formed

Remove all flowers from everbearers until the middle of July of first season to enable the plants to build a strong crown for fall fruiting. It takes 5 or 6 weeks for flower buds to develop into mature fruits, so those buds that appear after mid-July should start to ripen in late August and September.

Everbearers, as a rule, produce their best crop in the fall of the year they are planted. A spring and fall crop will be obtained the second year. It is generally best to destroy the planting after the second fall crop because yields will decrease.

Everbearers do better in a soil that is naturally richer than is suitable for June bearers. Everbearers are not recommended for large commercial plantings because growing and harvesting costs are greater. Cultural requirements are more exacting than on June berries. They may be grown in the home garden and on a limited scale for local sales to nearby cities.

Everbearing varieties that runner freely can be trained on trellises and fences as climbing strawberries. Remember that the runner plants are all fed from the root system of the parent plant and you must expect lower yields and smaller berries. A strawberry pyramid may also be used where space is at a premium.

A sawdust mulch during the summer may be used to keep down weeds, conserve moisture and keep berries clean. Other mulching materials include straw and polyethylene. Everbearers should always be mulched during the winter period.

GEM (Superfection and Brilliant)—Michigan, 1933.

Plants vigorous, making many runners, large, light red, tart and fairly firm. Very good to eat with plenty of sugar and cream. Very high in vitamin C content.

ARAPAHOE—Wyoming, 1954.

Berries medium size and good red internal color. Subacid. Fine flavor and good dessert quality. Vigorous and good runner production for an everbearer. Extremely hardy.

RED RICH (Red-glo, Hagerstrom's Everbearing)—Minnesota, 1949.

Berry shape irregular and short-conic, large to small, subacid, excellent flavor, flesh red, firm, good for freezing. Hardy. Good runner formation. Productive.

TWENTIETH CENTURY (Utah Centennial)—Utah, 1932.

A high-yielding, everbearing variety for Idaho. The berries are bright red. This variety does especially well in southern Idaho. High flavored. Yields heavy and runners freely. Resembles Rockhill. Good shipper.

OZARK BEAUTY—Arkansas, 1955.

A large, wedge-shaped berry with a bright red color with prominent yellow seeds. Vigorous and productive. Hardy. A high yielder. Flavor mild, sweet. Prolific plant maker. Blooms late.

ROCKHILL (Wayzata)—Iowa, 1918.

Berry shape irregular-conic to short wedge. Medium in firmness. Large size, attractive appearance and excellent flavor, plants make few runners so must be propagated by crown divisions. Skin bright red, flesh is light red.

OGALLALA—USDA and Nebraska, 1958.

Berries deep red throughout and excellent flavor, does well in eastern Idaho, overripe berries develop off flavor in hot weather. Hardy, yields high. Flesh bright red. Processes well.

GENEVA—New York, 1961.

Fruit large, dark red, superior in quality to Gem, tender, ripens midseason with lull period before recropping in the fall. Runner produc-

tion satisfactory, everbearing, vigorous, hill culture preferred, for home gardens and local use.

STREAMLINER—Oregon, 1944.

Larger and sweeter than Gem. Fruit firm, hardy, heavy spring cropper, runners freely.

LEE TEAGUE—A seedling of Red Rich developed at Logan, Iowa.

Berry shape oval, dark red and of excellent flavor. Plants are vigorous.

EVERMORE—Minnesota, 1945.

A good-quality everbearing variety. Productive, hardy and drought resistant.

PO 6616-5M-465

Other Horticultural Bulletins

by

The University of Idaho

College of Agriculture

Vegetable Varieties for Idaho Gardens
Bulletin 282

Idaho Fruit Varieties
Bulletin 300

Pruning
Bulletin 372

Payette Tomato
Bulletin 387

Raspberry Growing in Idaho
Bulletin 419

Published and distributed in furtherance of the Acts of May 8 and June 30, 1914, by the University of Idaho Agricultural Extension Service, James E. Kraus, Director; and the U.S. Department of Agriculture, cooperating.