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AFTER HARVEST CARE OF  
STRAWBERRY PLANTS

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O. T. McWhorter

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## AFTER HARVEST CARE OF STRAWBERRY PLANTS

By

O. T. McWhorter, Extension Horticulturist

Investigation has established that fruit bud formation in the single crop strawberry takes place in late summer and until late fall. Strawberry plantings which are to be cropped the next year should receive the care necessary to promote favorable growing conditions for fruit bud formation during late summer and early fall. Such care includes cultivation, fertilizer application, disease and insect control, ample moisture supply, and runner removal.

### Topping Strawberry Plants

Cutting the tops off the strawberry plants following harvest is practiced when there are destructive insects to control or when foliage diseases such as strawberry leaf spot must be kept under control by destroying the affected foliage. Otherwise there is no proved advantage from topping. Topping, when practiced at all, should be done immediately after berry harvest. Delaying the topping for a period of time following berry harvest has resulted in decreased fruit yields in such fields the next year. The tops may be cut off with hand scythes, knives, sickles, or a mowing machine. Careless handling of the mowing machine has resulted in damage to the crowns of strawberry plants. Another objection to the mowing machine is that it does not cut off all the tops. The mowing machine is not regarded as suitable for strawberry top removal by many who have used it for this purpose.

### Topping Leaf Spot Affected Plants

The Plant Pathology Department at the Oregon State College recommends the topping of strawberry plants after harvest when strawberry leaf spot, a fungous disease, seriously affects a planting. The foliage is raked to the center of the rows and burned after it becomes dry. Burning of this affected foliage destroys the leaf spot disease source which would have held over in the old foliage.

### Destroy Strawberry Crown Moth

"Old strawberry fields infested with the strawberry crown moth should be plowed under immediately after harvest before moths emerge and lay eggs," states Oregon Station Bulletin 357 on Insect Pests and Diseases of the Strawberry in Oregon.

### Destroy Crown Moth Infested Plants in New Fields

When strawberry plantings early in the life of the field become lightly infested with crown borers, the plants which are affected can often be detected in the late fall by their dwarfed appearance, dark-colored foliage, and a tendency to wilt. Examination of such plants if affected with the crown borer will often show the crown borer larva working in the crown just below the ground level.

A pull on the top of the plant will usually cause it to break where the borer is working and this break often exposes the larva. Such plants if removed from the field at the time and destroyed along with the borer larvae will lessen the number of adult moths to deposit eggs the following season. There are growers who follow this procedure in an attempt to lessen the number of crown borers when the infestation is not heavy in newly planted fields.

#### Topping Plants as an Aid to Crown Moth Control

The Oregon Experiment Station (1) reports partial to good control of the crown moth when plants are topped immediately after harvest. The bulletin states: "Seven-eighths of the patch may be topped and one-eighth of the patch left untopped. The position of the untopped rows in the field does not appear to be important and may be left where most convenient, probably at the edges of the field." The moths prefer to deposit eggs on the untopped plants.

After the egg-laying season the trap rows are destroyed. Growers in Oregon have often reported satisfactory control of crown borers resulting from topping plants immediately following harvest. This method of control is not always completely effective, but it does afford a measure of protection against a strawberry pest that is difficult to control.

#### Cultivation

Cultivation of strawberry fields following harvest should be shallow and frequent enough to remove weeds which use soil moisture. Experimental work with the cultivation of strawberries does not support the contention that deep cultivation of strawberry plants is necessary. Deep cultivation is often quite damaging when it cuts off feeder roots of strawberry plants.

#### Fertilizers on Strawberries Give Varying Results

Commercial fertilizer applications to strawberry fields in climates similar to that of western Oregon show variable results. The fruit yields have varied greatly from year to year as between spring and fall applications, and have varied as to the fertilizers used. Because of these variations, set rules for the use of commercial fertilizers on strawberry plantings cannot be given with assurance that they will give the increased yields sought on any particular soil type or location.

#### Build Soil Fertility Before Planting Strawberries

Strawberry soils should contain a maximum supply of organic matter. Generally, wherever strawberries are grown, thorough fertilizing of the soils with barnyard manures, cover crops, and commercial fertilizers previous to planting strawberries is the necessary course of action. The use of commercial fertilizers on soils depleted of organic matter usually gives disappointing returns.

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(1) "The Strawberry Crown Moth" by J. Wilcox, K. W. Gray and D. C. Mote, Station Bulletin 296, 1932; State Agricultural College, Corvallis, Oregon.

Claims that a particular fertilizer formula can be used on a given soil with assurance of a profitable return at harvest are based on assumption unless trials have definitely established the value of that formula. Based on information at hand, suggestions are made herein for fertilizer use on strawberry plantings and they should be accepted as such.

Findings of the Oregon Experiment Station show that nitrogen and phosphorus are more often the elements needed by crops grown on Oregon soils.

#### Early Fall vs. Spring Fertilizer Applications

Fruit yields from spring fertilizer applications to strawberry fields in Oregon have been variable. Heavy applications of nitrogen-bearing fertilizers are not generally recommended for nonirrigated strawberry fields in the spring of a fruiting year. Such applications may promote excessive growth and in absence of adequate moisture may result in decreased yields. Under favorable conditions of sufficient moisture supply, spring applications of commercial fertilizers have at times shown increased fruit yields. Late summer or early fall applications of fertilizer have given increased yields of fruit in some areas.

Considering that fruit bud formation in our leading commercial strawberry variety takes place in late summer and early fall it would appear to be good practice to apply commercial fertilizers to bearing fields following berry harvest. The fertilizers should supply plant food to aid fruit bud formation.

#### Suggested Fertilizer Combinations for Established Strawberry Plantings

For many Oregon soils 200 to 250 pounds of 16-20-0 ammoniated phosphate may be used per acre as an early August application to irrigated strawberry fields and in early September on nonirrigated fields. The 16-20-0 ammoniated phosphate carries 16 percent nitrogen and 20 percent phosphorus.

In the place of 16-20 ammoniated phosphate as mentioned above, 150 to 250 pounds of 11-48 ammoniated phosphate may be suited to some soils.

For red upland soils applications of 300 pounds of 11-48-0 ammoniated phosphate per acre are looked upon with favor.

Instead of ammoniated phosphate the grower can use 150 to 200 pounds of sulphate of ammonia and 200 to 300 pounds of 18 percent superphosphate per acre. Treble phosphate 100 pounds per acre may be used instead of superphosphate with the sulphate of ammonia. Other fertilizers carrying approximately the same amounts of nitrogen and phosphorus can be used.

There are fertilizer combinations that may be purchased ready mixed if the grower prefers them that way. Such fertilizers should carry the fertilizing elements needed for strawberries and in the proper amounts per 100 pounds of fertilizer.

Strawberry growers may choose to use commercial fertilizer mixes carrying potash. As a suggestion 600 pounds of 6-10-4 fertilizer mixture can be used per acre or instead 900 pounds of a 4-12-4 commercial mix. The 6-10-4 fertilizer carries 6 percent nitrogen, 10 percent phosphoric acid and 4 percent potash.

Or use 100 pounds per acre of sulphate of potash with any of the ammoniated phosphates, or with the sulphate of ammonia and superphosphate.

### Placing Fertilizers

Fertilizers when applied to nonirrigated strawberry plants in early September, may be broadcast, but preferably they should be placed under the soil surface alongside of the rows. Soils should be moist for quick results from fertilizer applications. When irrigation does not follow fertilizer applications, it is desirable to place the fertilizers deep enough to reach the moisture. In dry seasons this may not be possible. It is suggested that fertilizers be applied to strawberry plantings in early September so they will be in place for the plants to use when the first fall rains supply the necessary moisture.

When fertilizers are broadcast between the rows, a light cultivation should follow to incorporate them into the soil.

### Caution About Broadcasting Fertilizers

Commercial fertilizers should not be broadcast over strawberry plants when the leaves or crowns are wet or damp because severe burning can result from the contact of fertilizers with the plants. Broadcast fertilizers when the plants are dry and then brush the plants to dislodge and work the fertilizer to the ground. Under-surface application along the side of the rows is preferable to broadcasting.

### Top Dressing with Farmyard Manures

Farmyard manures are seldom used to top dress established strawberry fields because of the weeds that follow such applications. Farmyard manures are excellent sources of fertility and should be mixed into the soil previous to planting of the strawberries.

### Removing Runners

The Marshall variety of strawberries will produce more fruit as a general rule if the runners are cut frequently from June into late September, during the period when new plants are being formed. These runners should be cut every two or three weeks if runner removal is to be effective. It is easy to allow the runner plants to grow and then later cultivate them out. When the runners are allowed to grow without restriction the new plants which are formed draw so heavily on the mother plants that the mother plants do not develop fully. Less fruit is produced the following season.

The above comments apply to strawberry plantings which are grown in hills and where the runner plants formed each year are cultivated out. These comments do not apply where Marshall strawberries are grown in wide or narrow matted rows.

### Fall Irrigation of Strawberry Fields

Usually those strawberry fields in the Willamette Valley which have been irrigated should receive sufficient water after harvest to keep them growing until about August 15, at which time they should be given a thorough irrigation to carry

them through the balance of the season. When there is not sufficient rain in September and October to keep the soil moist another irrigation may be necessary.

Light cultivation should be given after each irrigation except where matted rows make cultivation impossible.

The Oregon Experiment Station (2) reports: "Irrigation was profitable with the Marshall variety, but with the Ettersburg 121 variety it was not. Irrigation doubled the average net income of the Marshall variety and decreased the net income of the Ettersburg 121 variety 50 percent."

Oregon Experiment Station Bulletin 347, "Influences of Irrigation Upon Important Small Fruits," states that experiments of irrigating Ettersburg 121, Narcissa, Marshall, and Corvallis varieties all showed an increase in yields under irrigation except Ettersburg 121.

Irrigated strawberries were superior in attractive red color, size and smoothness.

#### Other States Report on Care of Strawberry Plantings

##### Value of Topping Plants

A West Virginia (3) recommendation for renewing the crop is to proceed immediately after the last picking to cut off the tops of the plants for the control of foliage diseases and insect pests.

The recommended treatment for strawberry fields after harvest in Minnesota (4) is to destroy the old foliage to control insects and diseases.

##### Concerning Cultivation

An English (5) publication on strawberry culture states that investigations on the root systems and crown formation in strawberries have clearly indicated that during August root development recommences and continues at a rapid rate, slowing down as the temperature falls in December....In the early spring the next period of growth takes place when shoot and leaf development are much more pronounced than root production....After treatment of strawberry plantings consists of breaking up the land between the rows with a horse cultivator or hand hoe, or by the use of a small tractor. Weeds should be cleaned out and a suitable tilth produced. It is important at this stage to refrain from deep cultivation, which would disturb the new rooting system that is developing.

- (2) "Preliminary Report on Effect of Irrigation on Major Berry Crops in the Willamette Valley" by C. E. Schuster, R. S. Besse, G. L. Rygg, and W. L. Powers, Station Bulletin 277, May 1931; State Agricultural College, Corvallis, Oregon.
- (3) "Strawberries for West Virginia Farms" by W. H. Childs, Circular 64, May 1933; College of Agriculture, Morgantown, West Virginia.
- (4) "Modern Strawberry Growing" by Franc P. Daniels, Special Bulletin 72, April 1932; University of Minnesota, St. Paul, Minnesota.
- (5) "Strawberries" by C. H. Oldham, Bulletin 95; Ministry of Agriculture and Fisheries of Great Britain.

A statement from Connecticut (6) reads: "Shallow cultivation should begin immediately after setting and should be continued at frequent intervals until the end of the season....Thorough hoeing during the first of the season before the runners have begun to form will save much labor later."

#### Other States and Countries Discuss Fertilizers

Strawberry production suggestions and recommendations from eleven states and Great Britain and Canada all support the recommendation that previous to planting, preparation of strawberry soils by use of barnyard manures or by cover crops and fertilizers is essential for successful yields of quality fruit. These states and countries are in accord favoring late summer or early fall application of commercial fertilizers where such are to be used, and a majority caution against spring fertilizer applications to bearing fields where such applications are made for the purpose of increasing strawberry fruit yields.

Reports from Great Britain (5) state that experience shows that it is impossible to grow strawberries without adequate applications of farmyard manure worked into the ground before planting. Neglect to prepare the ground suitably, and omitting farmyard manures is to insure failure....In wet seasons ordinary balanced mineral manures give good returns, but such mineral fertilizers cannot maintain a vigorous stock indefinitely.

A Michigan State College bulletin (7) makes the following statement regarding the fertilization of strawberries: "Fertilization is of doubtful value on good soils. The application of nitrogen is profitable at the time of renovation following harvest, and possibly on poor soils when applied at the time of setting. Spring applications of nitrogen before harvest are often not profitable."

A Virginia recommendation (8) is: "Repeated tests have demonstrated that a fall application (in late August or early September) is more suitable than a spring application. The crop produced the next year is better, the berries are firmer, and the danger of soft berries, due to excessive amount of nitrogenous fertilizer, is eliminated."

A report from Missouri (9) states: "In general, fertilizers are applied to strawberries with little knowledge of the results that may follow. Moreover, a study of the results of fertilization throughout the country shows that the effects are very variable and that the strawberry does not respond the same under all conditions to fertilizer treatments."

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- (5) "Strawberries" by C. H. Oldham, Bulletin 95; Ministry of Agriculture and Fisheries of Great Britain.
  - (6) "Strawberry Culture in Connecticut" by H. A. Rollins, Bulletin 263, 1938; State College Extension Service, Storrs, Connecticut.
  - (7) Technical Bulletin 162, February 1939; State College Agricultural Experiment Station, East Lansing, Michigan.
  - (8) "Strawberry Growing in Virginia" by D. A. Tucker, Bulletin 129, June 1932; Agricultural College, Blacksburg, Virginia.
  - (9) "Growing Strawberries in Missouri" by T. J. Talbert, Circular 198, May 1938; College of Agriculture, Columbia, Missouri.

"There is some very good evidence pointing to the fact that highest yields are often obtained when fertilizers are applied as late as the first half of September of the first year and as late as the middle of August of the fruiting year. This is significant in that these dates are near the time of fruit bud differentiation or when some of the buds of the strawberry change over from leaf or shoot buds to fruit buds."

Quantities of 250 to 300 pounds per acre of 4-12-4 fertilizer are suggested for use when renewing fields and beds of strawberries.

In reports from Tennessee and Ohio, 100 pounds of nitrate of soda or sulphate of ammonia per acre, side-dressed in August, increased the yield 20 to 50 crates per acre. It is thought that nitrogen stimulated the formation of fruit buds. Spring applications of nitrogen applied during the harvest year are not recommended in these states because of resulting soft berries.

Kentucky reports that either phosphorus or a high phosphorous complete fertilizer may be applied just before plantings are made, but it is preferable to use a green manure crop just preceding strawberry planting to insure a volume of organic matter in the soil.

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