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Station Circular of
Information No. 392

October
1946

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**STRAWBERRY ROOT-ROT AND A PLAN
OF CROP ROTATION FOR ITS CONTROL**

Prepared by Departments of Horticulture,
Plant Pathology and Soils

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AGRICULTURAL EXPERIMENT STATION
Oregon State College
Wm. A. Schoenfeld, Director
Corvallis

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STRAWBERRY ROOT-ROT AND A PLAN
OF CROP ROTATION FOR ITS CONTROL

Prepared by Departments of Horticulture,
Plant Pathology and Soils

Strawberry growers and processors throughout the state have been showing increasing concern over the spread of root-rot among their plantings. This disease, one of the oldest and most studied of the diseases of strawberries, is potentially serious in some of its forms.

Causes and Symptoms of Root-Rot

Root-rot usually cannot be attributed to any single organism or set of conditions. Certain fungi constitute a part of the disease complex. Several fungi from black roots of strawberry have been isolated, but parasitism was proved on only three, Rhizoctonia, Romularia and Verticillium. Root-rot may also be caused by physiological conditions such as poor handling or storage of young plants or poor cultural practices prior to digging the plants.

Causes of
Root-Rot
Vary

The symptoms of the disease are as follows:

1. Root-rot caused by fungus-
 - A. Outer leaves of certain plants show signs of wilting on warm days prior to cropping time of second year.
 - B. Recovery from wilting may occur in evenings for a short time, but later plants curl up and die.
 - C. Disease spreads from center of row outward, and up and down row.
2. Root-rot caused by physiological factors (plants poorly handled) -
 - A. Plants remain inactive after being set out. The plant does not grow and new runners and roots do not develop.
 - B. Leaves turn red early in summer and autumn.
 - C. Soil moulds may be found in the black roots of such plants. Some of these organisms may be parasitic under the right conditions, but are usually secondary invaders.

No real control measures have been developed to date, but there are several methods of reducing the hazard.

Hazard Can
Be Reduced

1. Insist on clean planting stock. Weaklings and all runner plants showing black or brown lesions on the roots should be discarded.
2. Plant as soon after digging as possible.
3. Use crop rotation system alternating other crops with strawberries.

Crop Rotation Practices
to Reduce Hazard of Root-Rot

In "sick" soil where 97% of the strawberry plants were killed by Rhizoctonia, infection was reduced to 3% in three years by seeding the land to grains and legumes (other than alfalfa or sweet clover).

Rotation has
Advantages

Where the soil is badly infected, four to six seasons should elapse from one planting of strawberries until the next. During this interval the land should be occupied by cover crops and such cash crops as fit into the general scheme.

Plowing under of cover crops or crop residue material is important in the rotation as it will aid in ridding the soil of parasitic fungi. As this plant material decays, the beneficial organisms of the soil increase until they exceed the harmful parasites. Thus the soil will soon reach the state it was in prior to the planting of strawberries. The soil fertility and soil building phase of the rotation depends on the cover crop system employed. The regular practice of growing a legume (vetch or Austrian field peas) with a grain (rye, oats or Sudan grass for example) during the winter months appears to be the best practice. To obtain the maximum organic matter and nitrification, commercial or barnyard fertilizer may also be used. (See your County Agent for suggestions.)

Cover Crops in
Rotation Helps

Cover crops alone will not supply sufficient organic matter to maintain the productive capacity of the soil over a period of years. Therefore, at least once in every four years, a green manure crop should be plowed under. A legume or mixture containing a legume is advised.

Green Manure
Crops Aid Too

By a system known as double cover cropping, a crop (oats and vetch for example) is allowed to grow to maturity and after the seed has shattered, is disced into the soil. The following spring the crop is plowed under as a green manure crop. Sufficient seed may be allowed to shatter so that reseeding is not necessary. This double cover crop system is preferable for the season preceding the planting of strawberries.

Double Cover
Cropping Used

Certain crops are known to complicate the root-rot problem. On the basis of present knowledge, the following crops should be avoided in the rotation: sweet clover, alfalfa, tomatoes, potatoes and eggplant. Also strawberries should not immediately follow cane fruits.

Avoid Certain
Crops

The following cash crops appear safe for the rotation: sweet corn, broccoli, cauliflower, cabbage, squash, carrots, beets, beans, cucumbers and peas. It is unwise to grow the same crop in succeeding years, however. Corn should not follow corn, legumes another legume, or one member of the cabbage family should not be grown immediately after another.

Cash Crops
Can Be Grown

An example of a satisfactory rotation is as follows:

<u>Example of Rotation Given</u>	1946 - Plant strawberries
	1947 and 1948 - Strawberry crops
	1948 - Plow out strawberries after picking. Plant cover crop of vetch and rye in late summer.
	1949 - Sweet corn. Broadcast cover crop in late summer and let pickers tramp in cover crop.
	1950 - Green broccoli. Broadcast cover crop as in 1949.
	1951 - Peas, Beans or Carrots. Cover crop if possible in autumn.
	1952 - Double cover crop.
	1953 - Strawberries again.

Pasture Straw-
berry Rotation
Satisfactory

Strawberries can be alternated with pasture or grass crops. The berries are planted and left until they begin to die out. Then the land is reseeded to pasture again and left for three to five years after which time it can again be put into strawberries.

Dispersion of
Fields Recom-
mended

The disease and pest problems in strawberries tend to become more serious when the fields are concentrated in a given area. Scattering or dispersal of the fields is a wise practice and new plantings should not be made adjacent to old ones.