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Orchard Management

Cultivation and Irrigation of the Orchard

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Cultivation and Irrigation of the Orchard

With the great variation in types of soil found in our fruit-growing sections, it is impossible to lay down any definite rules for the application of water or cultivation of the orchard. Each grower has a problem of his own and he alone can best solve it. However, a few important principles may be suggested which will aid the observing orchardist in the proper handling of his particular soil. Careful observation and common sense will do much to overcome difficulties now commonly experienced in irrigation fruit growing.

Many of our soils are too heavy to be easily handled under irrigation as commonly practiced. With frequent irrigations and meager cultivation they become hard and refuse to take water properly. Careful irrigation and more rigorous cultivation will do much to overcome this difficulty. Heavy soils should be plowed from six to eight inches deep at least once each year. The destruction of small roots by the plow will do no damage, while the breaking of larger roots may be avoided by shallow plowing near the tree. The plowing should be done preferably in the fall or early winter. This gives an opportunity to settle the soil by winter and early spring cultivations. The rain and snowfall of winter also do much to settle the plowed land. Orchards plowed in late winter or spring are generally watered with difficulty. The loose condition of the soil allows the water to escape freely from the ditch. When once outside the confines of the ditch, the lateral movements of the water are much more rapid than the downward, and as a result, the surface soil is saturated to the extent that the benefits generally derived from plowing are lost. The soil is run together, and before it is in shape to cultivate, it is hard and baked. This is especially true of the soil at the upper end of the orchard, when an attempt is made to water long rows in newly plowed land. This is also a suggestion to those who have a crop to plow under in the old orchard or land to prepare
for the young orchard. The earlier this crop can be turned under the better. The young orchard on late plowed alfalfa land often makes a poor start on account of the excessive amount of water taken by these loose soils.

In the practice of irrigation many growers fail to take into consideration the condition of the subsoil. Only irrigators of long experience with the particular piece of land can properly water it by examination of the surface soil alone. The careful irrigator relies upon frequent examination of the subsoil to guide him in the application of water. With the possible exception of very sandy soils, the matter of proper cultivation is greatly simplified by watering in deep ditches. The surface soil is saved from a thorough wetting, and the ditches may be floated full within twenty-four or forty-eight hours after turning off the water. Too often watering in shallow ditches makes it impossible to get a team upon the ground before the bottom of the ditches is baked like brick. The ditches should always be filled before the surface begins to crust. Not a word can be said in defense of the too common practice of leaving the ditches open during the entire season. The distance or length of rows through which water can be successfully run will depend much on the character of the soil and the grade. It is safe to say, however, the shorter the run the better. Though it necessitates additional head ditches, better results will come from breaking the long rows up into shorter runs. Where long rows cannot be avoided, it is always best to start the furrows with a large head of water. By rushing the water through the rows and then shutting it down to just enough to carry through, it is possible to do more uniform watering. Heavy watering at greater intervals is always preferable to light and frequent waterings. Heavy waterings, however, should be followed by prompt and frequent cultivations. Frequent waterings are detrimental to proper soil aeration, and without air, roots cannot grow. This explains why over-watering is especially detrimental to young trees. The young orchard which receives a
thorough watering once a month, supplemented by careful cultivation, makes a better growth than one watered every ten days and given no cultivation.

Some growers are beginning to realize that the old orchard needs some form of fertilizer, and from previous experience in eastern states, at once think of commercial fertilizers. However, the use of commercial fertilizers would probably prove discouraging under Colorado soil conditions. Many fail to realize that comparatively few commercial fertilizers are soluble in water. They must be decomposed by other elements in the soil. To facilitate this decomposition the soil should be abundantly supplied with decaying organic matter. Soils of the arid regions are very deficient in vegetable matter, and until it is supplied, applications of commercial fertilizers cannot be expected to give satisfactory or profitable returns. Not only this, but our Colorado soils contain an abundance of mineral matter, and if supplied with organic matter to aid in dissolving the minerals, become abundantly fertile. Growers will soon come to the plan of sowing crops in the orchard in spring or early summer to be turned under the following winter. This incorporation of organic matter will not only enhance the fertility of the soil, but render the heavy soils more friable and increase the water-holding capacity of some of our sandy mesa land.

O. B. WHIPPLE, Field Horticulturist, State Fruit Investigations, Agricultural Experiment Station, Grand Junction, Colorado.

Orchard Irrigation

Trees and plants are as easily injured by too much water as by the lack of it, and observations made by careful orchardists, the county horticultural inspectors, as well as by the workers at the Agricultural College, go to show that more permanent damage is done to orchards in this state by over-watering than by any other one cause. The writer was present at a fruit growers' meeting several years ago when this
subject was discussed, and all were unanimously of the opinion that they could not get along with less water than they were then using. But at that very time, land in that vicinity was becoming seeped, and the area involved has steadily increased. Subsequent investigations have shown that the main source of the surplus water has been from the excess used by the owners of the land. This goes to show that it is easy to be deceived in regard to the condition of the soil. External appearances will not suffice, so the careful irrigator will be continually testing the condition of his land by digging down into the subsoil in various portions of his orchard. It is true that one man cannot tell another how to irrigate his land, but the cumulative effect of bad management is soon apparent.

There are many reasons why it is easy to over-irrigate. One of the most common seems to be that the average person likes to think he is getting the worth of his money by using as much water as possible. It sometimes happens that there is danger of a ditch going dry early in the season. When such a situation arises, most persons will use as much water on their orchard as they can get, no matter whether it is needed or not.

Then there is also the tendency to let irrigation take the place of cultivation, particularly in heavy soils. It is easier and cheaper simply to let water run than it is to cultivate. Unless the ground is stirred at the proper time after it has been watered, many soils become hard, and it is difficult to work them at all.

When properly handled, any soil which is suitable for orchard purposes is always mellow and easy to work. But when a soil becomes puddled by over-irrigation and lack of cultivation, it is difficult to bring it back to its normal condition.

This subject is one to which too much thought cannot be given, and the better orchardists now strive to use as little water as possible.

W. Paddock,
Horticulturist and Botanist, Agricultural Experiment Station.
Shade Crops

All intelligent fruit growers know that Colorado soil is deficient in decaying organic matter. The effects of this condition are seen in the compact puddled soils which are almost universally present in the orchard districts, except where sandy land is found. Then, too, we find in some of the older orchards that the fruit is running small in size so that it is getting more and more difficult to get satisfactory prices for the product.

The question of maintaining fertility in our orchard soils for a considerable time at least seems to be largely a question of maintaining the soil in a proper physical condition. The effects of our climate are such that when vegetable matter of any description is plowed into the land it is soon exhausted. It seems to be burned out by the intense sun and dry air. It is upon organic matter that we are dependent for the degree of tilth and fiber in our soils that is desirable. Without decaying matter the soil is lifeless. We need this material to aid in setting plant food free, to provide a home for the various forms of germ life which perform many important functions, and to give tilth and fiber to the soil which is essential for various reasons.

Since organic matter seems to be dissipated by the action of the sun, it stands to reason that if the soil could be shaded during the heat of the summer, much of this valuable material could be saved. We are therefore advocating the use of a crop in the orchard during the growing season, thus shading and protecting the land from the sun. As this is a somewhat different use from the cover crop of the East, we have coined the phrase "shade crop," to distinguish it from the former. It performs all the functions of a cover crop, but has the added use in that it shades and protects the land during the heat of the summer.

The system of shade crop management and the plants to use have not been thoroughly worked out, but a good many orchard men are giving it a trial, so it is probable that within a few years we will have a definite Colorado
system of orchard culture. In the meantime it is permissible to predict that the management will be somewhat as follows:

Plant the seed in the spring of the year and plow the crop under the following fall, or in some instances, allow it to remain two years before plowing, depending upon the condition of the land and of the trees. Fruit growers have now generally come to the conclusion that orchard land should be plowed frequently and preferably in the fall of the year, for the reason, if plowed in the spring, particularly if a large amount of green manure or stable manure is to be turned under, difficulty will be experienced in irrigating. This mass of material turned under in the spring prevents the spreading of water to such an extent that the trees nearest the main ditch are often injured before the water can be forced to the lower end of the row.

The kind of crops to grow will depend upon the condition of the orchard. Usually a leguminous plant, such as red clover, may be used to start with, for the reason that it is able to take nitrogen from the air. If, after plowing under one or two years, it is found that the trees are making a too vigorous growth, some other plant may be used, such as rye, oats, or buckwheat.

W. Paddock, Horticulturist and Botanist, Agricultural Experiment Station.

Preparation of the Orchard for Winter

The general practice of discontinuing the watering of the orchard in midsummer, for the purpose of allowing the trees to mature wood growth and color the fruit, generally calls for a late fall irrigation. This may be applied any time after the middle of October, if the trees have ripened the young wood growth; otherwise the watering had best be delayed until the first of November. In the bearing orchard, this water is applied after the last fruit is picked. In our dry climate care must be exercised to see that the orchard goes into winter with plenty of moisture in the soil. Evaporation from the twigs continues, even through the dormant
period, and unless the roots have access to more moisture the tops of the trees may freeze dry during severe winters.

The amount of water to be used for this irrigation will depend much upon the character of the soil. No doubt many orchards on heavy soils will not require the fall watering. Still some of the heavy soils are deceiving and an examination will show a very dry subsoil. A good fall watering is one of the most satisfactory means of wetting such a soil. Evaporation from the surface is slow, and during the winter the water slowly sinks to the dry subsoil. The soil should be examined and supplied with enough moisture to make it cling together when pressed in the hand and still crumble when broken up.

As soon as most of the leaves have fallen, the orchard should be plowed or cultivated to catch these leaves. The leaves will help to improve the soil, if plowed under before the late winds sweep them into the fence corners. Some growers still question the wisdom of plowing the orchard, but many growers who have tried it pronounce it not only a success, but a necessary step in the proper cultivation of the orchard. While many growers fear that the destruction of roots in plowing will injure the tree, this is not necessarily true. As a matter of fact, a little root pruning by plowing stimulates root growth and keeps the roots down where they belong. Some of our heavy soils really must be plowed, and the fall of the year is an excellent season in which to do the work. The plow should run deep enough to break up the hard under layer formed by continual shallow cultivation during the growing season.

A light float or harrow should follow the plow to put the surface in good condition. If left too open there is a tendency to dry out. A good smooth and well-broken surface tends to hold the moisture. It is not an uncommon practice to give one surface cultivation about midwinter, and for this work a disc or Planet Junior cultivator is used. Orchard soils properly cultivated before going into winter are much more easily tilled the following summer.

O. B. WHIPPLE.