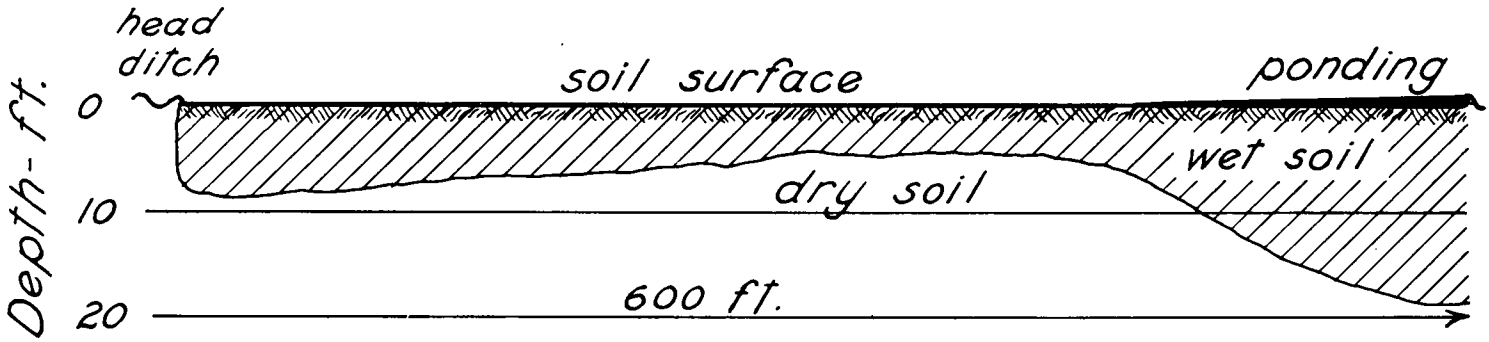

Deep percolation from ponding at the end of the run. Too large a flow was used with resultant ponding and wasting of water.

Water for Field and Truck Crops

L. D. Doneen

questionable whether the increase in sugar percentage will occur.

If a shortage of water occurs in the summer months, it would be better to lay aside a portion of the poorer and less fertile parts of the field and not irrigate them, than to have intermittent wilting with death of the older leaves in the whole field.

Once it has been decided to withhold water on part of the field, irrigation should not be done until after the beets are seriously wilted. An increase in sugar percentage will result from wilting, but with irrigation this high percentage will drop and a resumption in growth of the beet is slow.

Tomatoes

Tomatoes will root to a depth of nine to 12 feet and require about 18 inches of water at Davis, provided the surface six feet of soil is wet at the time of transplanting.

If the soil is not wet to this depth at the time of transplanting, two furrows should be used for the irrigation immediately following transplanting—one next to the plant and another between the rows. Even later in the season, where practicable, it would be economical to irrigate with two furrows between rows.

Tomatoes need not be irrigated until June on good deep soil. In July and August the water requirements are greater than in June and the depth of application should be greater.

By the end of August, all of the soil should be wet to a depth of seven to nine feet in order to carry the plant through the September and October picking season without additional irrigations.

If this cannot be accomplished it would be advisable to irrigate after the first or second picking, for if the plants do not have available water during this period, the fruit will not reach sufficient size to make a commercial picking and yields will be reduced greatly.

Water cannot be withheld during the latter part of the tomato season without losing a large percentage of the crop. In case of a water shortage, growers who have beets and tomatoes can sacrifice the beets in August with only a small loss in growth and apply the extra water to the tomatoes.

Cotton

Cotton will root and use water to a depth of four to five feet. Although considered a long-season crop, water requirements are relatively low in late fall and early winter. Months of highest water requirements are July and August. On sandy or shallow soils it may be necessary to irrigate in June.

A successful cotton crop may be grown with 18 inches of water not including the preirrigation. If a shortage of water occurs during the latter part of the growing season, vegetative growth may be checked, but yields may not be materially reduced unless the drouth is prolonged and severe.

Slowing of growth due to water shortage usually causes a high percentage of bolls to mature and yields are fairly well maintained. Cotton may be considered a low-water-requirement crop for the area in which it is grown and is a good one with which to gamble in case of a water shortage.

Lima Beans

This and other vining-type crops are relatively deep-rooted—four to five feet—and in the inland areas require about 12 inches or less water if the soil is wet to four feet at the time of planting.

Good yields have been obtained from two irrigations. The bulk of the crop is produced on the basal set and if the plant is short of water after the set is made, yields will not be severely reduced.

Milo

Milo has been grown successfully on medium to heavy soils in northern California without irrigation when the soil is wet to six feet or more.

One irrigation will assure good yields on deep soil. On sandy soil and in the warm climate of the San Joaquin Valley, several irrigations are necessary, but the water requirement is 12 inches or under. Milo is a good crop to plant in late spring or early summer because of its low water use.

Melons

Whether planted early or late, melons have a low water requirement due to the short time the vines cover the ground.

Watermelons root to six feet or deeper and cantaloupes to about four feet. In either case, an acre-foot or less of water is all that is necessary to produce a crop provided the soil is wet to a depth of four feet or more at the time of planting.

Shallow or Weak-rooted Crops

Such plants as onions, lettuce, potatoes, corn, bush beans, and ladino clover usually require frequent irrigations and generally considerable water is lost through deep percolation. A good potato crop, for instance, may be grown with 18 inches of water where hardpan or poor penetration prevents deep percolation. On the more open soils, two or three times this quantity is required.

Most potatoes are grown on light sandy soils, but when grown on loam or clay loam soils, they need not be irrigated as frequently as on sandy soils.

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MOLYBDENUM

Continued from page 6

why so much molybdenum is taken up by the plants growing in the affected areas. Ordinarily, molybdenum is one of the most insoluble constituents of the soil. In certain unaffected localities in California, the total molybdenum content of the soil is fully as great as in some of these affected areas, but it is extremely insoluble.

It would appear from observations in the affected areas that new pastures are likely to be more toxic than those that have been in existence for several years. No satisfactory explanation is available for this.

It has been quite well established that providing hay in the pastures will prevent the disease. As the season progresses the animals will consume more hay, and in September are likely to be using three times the amount they would take in May. A group of heifers supplemented with oat hay in an affected pasture did not develop symptoms, whereas comparable animals on pasture alone showed symptoms of molybdenum poisoning.

The addition of copper in the form of bluestone to the feed or water has been advocated as a preventive. The work in England, and in California, supports this.

There is nothing new in the giving of copper to livestock, although it was not considered as an antidote for a toxic substance. It really was placed in water troughs to destroy growth of algae that were considered harmful. This may be the source of the belief in the beneficial action of copper, whereas in reality it was counteracting molybdenum.

Copper sulfate may be administered preferably in the drinking water, but may also be given in the feed. Care should be exercised as to the amount consumed. The substance is poisonous if too much is given. Only a small amount is necessary to counteract molybdenum.

The animal does not need more than one gram per day—one ounce equals thirty grams—and since that is well below the toxic dose there should be little danger of poisoning.

Copper need be given only during the summer when pasture growth is luxuriant.

The mode of action of copper is not clear, but according to work in Australia an excess of molybdenum interferes with copper utilization.

An excess of copper over an extended period may result in a chronic copper poisoning that may end fatally. A prominent symptom of copper poisoning is red colored urine produced by the breaking down of red cells and resultant passage of hemoglobin into the urine.

1. When possible provide dry roughage for stock on permanent pastures in areas where molybdenum poisoning has been shown to exist.

2. If dry roughage is insufficient to prevent the condition, use bluestone in the water or feed during the summer months at a dose not to exceed one gram per day per animal.

3. Check for parasites when the foregoing symptoms appear. If negative, have feces of affected animals tested for molybdenum.

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TRUCK CROPS

Continued from page 9

Ladino clover or irrigated pastures require water over a long growing period and the average requirement is generally considered to be 4½ to five acre-feet. On extremely heavy soils or shallow hardpan soils which prevent deep percolation, successful pastures have been maintained using only three acre-feet.

Many of these shallow-rooted crops are short-seasoned and when grown on heavy soil or hardpan land, the water requirements may be relatively low—usually around an acre-foot of water per acre—if the soil is moist at time of planting. The bush bean is a good example of this crop type.

When seeds are planted on beds during dry seasons, it is necessary to germinate them by irrigation.

This requires large quantities of water and in some cases, two or more acre-feet have been applied to sprout crops such as lettuce. This is several times the quantity of water necessary to grow the crop after seedling stage.

Water can be saved by keeping the beds low, as far as practicable, so that it will be unecessary to maintain water in the furrows for long periods to wet the surface.

Planting the seeds close to the edge of the bed will place the seed nearer the water and germination will require less subbing.

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For additional information concerning irrigation and water requirements of crops consult your local farm advisor.

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COMMERCIAL HEAD LETTUCE ECONOMIC STATUS 1947, by Sidney Hoos and H. Fisk Phelps. Cir. 378, February, 1948. (18 pages.)

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