IRRIGATION

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1. What are you trying to do?

You are trying to provide the best moisture condition for the growth of plants in soil. This includes both water and air. But the question then arises what is the best moisture condition?

Saturation

This occurs when the soil is full of water. Flooding of low land, intensive rain storms with runoff, all lead to conditions of saturation. We are all familiar with saturated soil.

Field Capacity

This is defined by soil scientists and irrigationists as the moisture retained in a soil 48 hours after wetting when drainage has been allowed to take place. In other words, we are at a point something less than saturation, but that there is still the maximum amount of water present that the soil will hold.

Wilting Point

This point is evidenced by the curling of many plant leaves and the cessation of growth. This is a danger point in that plants often times do not immediately recover when the soil has been allowed to dry to this point.

Thus it can be seen that the best moisture condition is not one specific point, but a range between two points called field capacity and wilting point. We are very fortunate to have a range to contend with when we consider the dynamic situation of growth of plant material in the field.

These points have been determined in the laboratory and have been identified with amazing uniformity in the field, using special soils. In practice, however, soil texture and soil structure have a great influence on these points. Their net effect is to change the moisture level at which these criteria exist, and also they change the band width of optimum moisture condition. The lack of uniformity of soils for a given acreage also will create the difficulty of determining optimum moisture conditions for the total area as compared to any one part of the area.

In Illinois with our excess of rainfall over moisture used by plants, drainage becomes an absolute necessity to reduce the moisture content from saturation, at which

point the plants will be drowned; to field capacity, which is the wet end of the optimum range. Drainage, however, forms a separate topic by itself and will not be discussed during this talk. Suffice it to say that drainage is an obvious necessity for good growth conditions.

So far we have considered the soil and ability to hold moisture. Now let us consider the plant and its need for moisture. Many researchers have gone to great lengths in extremely delicate experiments to determine how much water a growing plant needs per day. Their experiments ranged from Raleigh, North Carolina, to Pullman, Washington. The summation of their results lead us to believe that in the height of the growing season, i.e. in the hot summer months, we can expect plants to use between 0.3 and 0.5 inches of moisture

per day. Young plants or mature growth in the early spring and late fall will use somewhat less than this figure. It should be noted though, that the use of fertilizers in the off-peak season will tend to increase their need for water.

II. How are you going to do it?

There are three methods of irrigation available to us. The first is sub-surface irrigation, which has to date proven rather unsuccessful for general use. The next two methods, surface irrigation and overhead or sprinkler irrigation, have proved successful over many years. Surface methods would consist of general flooding or furrow and soaking-type irrigations. Overhead or sprinkler irrigation is what its name implies.

(Continued next month)