

moisture blocks, what was the comparison? Compared to the fertilized cultures, the unfertilized produced only one-half as much clippings, three-fourths as much roots and yet, required the application of 85% as much water. Thus a low fertility level gave only a slight saving in the amount of water applied.

Field Plot Tests

We had found in the greenhouse that the soil moisture blocks were satisfactory for indicating available soil moisture. Therefore, a series of five rates of supplemental irrigation was conducted on bluegrass and fescue in field plots. The amount and number of irrigations depended on the soil moisture content maintained in the individual plot. In 1949 one plot received 20 irrigations, another four, another two heavy, another two light, and finally no supplemental irrigation. In Michigan during that year there were two drought periods when irrigation was badly needed. At one time the unirrigated turf turned dormant only two or three days before a rain came, but it took several weeks for it to produce a satisfactory turf after going dormant. In contrast the plots that received only two light applications of water but at times when the grass would have gone dormant otherwise, were able to remain green until a rain came.

In turf research one of the most difficult problems is to find a satisfactory measure of the response to a treatment. The percent of bare ground, yield of clippings, ball support, turf composition and turf rating were all used. This paper summarizes them as affected by the available soil moisture and number of irrigations applied.

The percent of bare ground was estimated with the aid of a grid. Particularly where the available soil moisture approached zero percent, no irrigation, there was a large amount of bare ground. This was most obvious where the fescue made a clumpy-type of growth. High-cut fescue that was unirrigated had 22% bare ground in September. At this same time similar plots maintained with above 20% available soil moisture averaged only 2% bare ground.

The yield of clipping increased as the available soil moisture increased. Plots maintained above 50% available soil moisture had a very vigorous growth. However, the very high yields produced under high available soil moisture did not reflect improvement in the turf rating.

Another measure of the effect of controlling soil moisture was the distance between the ball and the ground level. With both bluegrass and fescue, all plots which were maintained above 20% available moisture had little difference in ball support. However, where the soil moisture

was not maintained above 20% available moisture, the turf became open and pitted during drouth and lies were very poor.

Rating Turf

Ratings of the turf produced under different soil moisture levels were made during August, September and October 1949. In August the drouth had just started; in September fall rains had begun; and by October the fall growth of the grass had been made. These ratings were based on ground cover, density, uniformity of ball lies, color and vigor. All plots which were maintained with above 20% available soil moisture had rather close rating. Thus, the more the water applied the more the yield. However, heavy water application did not improve the turf ratings above that of plots receiving only two good irrigations.

The questions of how to judge irrigation needs and how to save labor are old ones. And the problem of water conservation is becoming very important.

The Bouyoucos plaster of paris soil moisture block and the Bouyoucos soil moisture meter offer a quick accurate method of measuring the available moisture in the soil. They are not expensive at all if they can reduce the man hours spent in watering. The moisture blocks are installed from 3-6 inches under the sod. I suggest 4 inches. The wire leads may be fastened to a stake at ground level. Then you can tell two things:

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