Soil moisture is one of the important factors in soil utilization. If the moisture is low, the soil is naturally limited in its crop adaptation and productivity. On the other hand, high moisture may seriously affect crop production and soil utilization. It is very desirable, then, to know the moisture conditions to which our soils are subjected to use them properly. A knowledge of the influence of various crops upon the soil moisture content is also needed. For these reasons, the following study of soil moisture conditions found in pasture, corn, hay, grain, and woods was made. This is an abridged report of such a study.

EXPERIMENTATION

Six water sheds (4) were selected for these studies. These water sheds are within a radius of one-half mile or less of one another on the University of Maryland Plant Research farm. They have been under constant study by the Soil Conservation Service in reference to slope, erosion, crop, tillage, rainfall, and run-off. The average yearly rainfall for College Park, Md., is 40.35 inches. The soils present on the water shed areas vary somewhat in texture; however, their average moisture content: at moisture equivalent level is approximately 21%, and the moisture content at wilting point is approximately 5%. Two soils, not greatly different from each other, are predominantly represented. These are the Beltsville and the Chillum soils. The Beltsville soil is the better drained and the more productive soil of the old Leonardtown classification. The Chillum soil is the older, poorer, and usually gravelly phase of the old Sassafras classification.

Two of the water-shed areas were wooded or had forest coverage, although, they were not virgin forest. Another two areas were used for pasture, and a third pair of areas had a strip crop rotation of corn, hay, and grain. One of each pair of areas represented Chillum soil; the other represented Beltsville soil. In the case of the corn, hay, and grain treatments, several moisture determinations were made in Leonardtown soil, whose moisture response in this case was similar to that of Beltsville. Stations for moisture determinations were selected in straight lines up the slope. The distance between stations varied with crop strip width. In the case of strip cropping, the width was from 40 to 100 feet; and in other instances, the maximum width was 175 feet.

Soil moisture was determined at these stations at intervals throughout the growing season by the resistance block method of Bouyoucos and Mick (2) as modified by Slater (9). These plugs were standardized in situ by taking soil samples at various times in the vicinity of the plugs and determining the soil moisture when dried at 110°C. As these soils contain variable amounts of gravel, it was necessary after drying to pass them through a 2 mm screen and deduct the weight of this gravel from the total dry weight of the sample before moisture calculations were made. Readings were started on these plugs in the spring of 1942 and continued on through the summer months until the fall of 1947. The resistance readings of the plugs were calculated in terms of moisture per cent in the soil.

RESULTS AND DISCUSSION

The data obtained from this material are presented in a graphic form in Fig. 1. This figure shows the monthly average moisture per cent for all soils under various types of vegetation for the years 1942 to 1947, inclusive.

The draft on soil moisture by grain and hay was greater than that by young corn. The draft by corn, relative to grain and hay, was greatest through July and August. As copa, the draft on soil moisture by grain and hay was 17.47% under pasture vegetation, 19.33% under hay, 17.47% under grain, and 13.7% under pasture. The draft on soil moisture by pasture vegetation, throughout the growing season, was produced under relatively low moisture levels. The average percentages shown in Fig. 1 are 21.35% under woods vegetation, 19.33% under hay, 17.47% under grain, and 13.7% under pasture vegetation.

This wide difference in average moisture per cent for all vegetation can be explained by assuming that moisture levels in these forests (at higher levels than those of grass seeding) and pasture, are lower than that by young corn. The draft by young corn was greater than that by young corn. The draft by young corn was greatest during the growing season of 1944 when pasture grasses grew in soil that was drier than than soil which supported the forest vegetation.