WILTING COEFFICIENT STUDIES
A. V. CAPALUNGAN AND H. F. MURPHY

The amount of available moisture present in a soil is of great importance, particularly when it is considered in connection with the critical moisture periods for the growth and development of a given crop. The limit to which a plant can remove moisture from a soil depends on the crop, soil, and climate. Various relationships have been used for this lower limit of available moisture, but perhaps that of wilting coefficient receives greatest consideration.

Briggs and Shantz (3) have done considerable work studying the wilting coefficient of soils. Their publications are well known and the formula offered by them that the wilting coefficient equals the hygroscopic coefficient divided by 0.68 ± 0.012 is found in texts treating on this subject.

Many other investigators, a few of whom are Loughridge (6), Powers (7), Alway (1), Batchelor and Reed (2), Brown (4), Caldwell (5), and Shive and Livingston (8), have likewise contributed to the list of publications on available moisture studies.

The writers studied the wilting coefficient for a number of Oklahoma soils using several crops common to the section. The method used in determining the wilting coefficient was essentially that described by Briggs and Shantz (3). In all cases at least three tumblers were used and in most cases at least five and often many more were used in securing the data on any particular soil for a given crop. The tabulated results are given in Table 1.

The well-known effect of soil texture on the lower available moisture limits is shown in the table. The table also shows that different crops vary somewhat in their ability to reduce soil moisture. This is better understood from Table 2. The third column of Table 2 shows the relative ability of the various crops to reduce the moisture content of the soil. If the mean ratio is less than unity, it means that that crop was more efficient in reducing the moisture content than where the mean ratio was unity or greater.

It is interesting to note that oats which require more water per pound of dry matter than the other crops reduces the soil moisture to the lowest level of any of the small grains. Rice which is more of a water plant in its wild state comes next. Of the grain sorghums,