A RAPID INDIRECT METHOD FOR DETERMINING THE
WILTING COEFFICIENT OF SOILS

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ONE of the most important and significant characteristics of soils is their wilting coefficient, or the moisture content at which plants wilt. Because this characteristic is important and significant from both the scientific and practical standpoint, and because its direct determination is time consuming and rather difficult, considerable study has been made to discover an indirect, simple, and rapid method for its determination. Many schemes have been proposed and tried, but apparently they have proved unsuccessful. There seems to be one promising method, however, which was proposed by the author as far back as 1916, but which never received the attention and consideration it deserved until recently. This method is the freezing point method.

In an intensive investigation of the freezing point depression of soil, it was discovered that when the moisture content of soil was reduced to a certain point the water would refuse to freeze or solidify when supercooled, whereas, before this minimum moisture content was reached, the water would very readily solidify when supercooled. The moisture content at which the water would refuse to solidify was different but quite definite for each type of soil. The idea was at once suggested that this critical water content at which solidification fails to take place may be the same as the water content at which plants wilt or the wilting coefficient of soils.

In order to obtain information upon this point, the wilting coefficient of several soils was determined at that time by following the method described by Briggs and Shantz and using wheat as an indicator. Table 1 contains a comparison of the results obtained in 1916 between the moisture content at which solidification failed to take place and the moisture content at which plants wilted.

It will be seen from the results in Table 1 that there is a very close agreement between the moisture content at which solidification fails to take place and the wilting point. It was concluded at that time that, "We confidently believe that the point where solidification refuses to take place marks an important transition in the state of the soil moisture and that this point is very close to the wilting coefficient of soils. Hence, we further believe that the freezing point method can be used to determine the wilting coefficient of soils and that such determinations will be more accurate and of course infinitely more convenient and rapid."

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581