POSTER SUMMARY

ESTIMATION OF CRITICAL SOIL WATER VALUES FROM SOIL TEXTURE DATA

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Abstract

Growers and extension staff frequently request critical soil water values from soil samples submitted for urgent attention in order to plan irrigation scheduling or to determine plant available water. Normally at least four weeks are required to determine field water capacity (FC) and permanent wilting point (PWP) in the laboratory and to calculate plant available water capacity (AWC). The purpose of this paper is to report on the development of various pedo-transfer functions (PTFs, critical soil water values related to soil textural data) that can be used to estimate a range of critical soil water values. Soil textural data (clay and silt content) and critical soil water values (FC, PWP and sample density (SD)) were determined in the laboratory using standard methods. A total of 372 samples were analysed from various locations within and outside the sugar industry. The data set used for this work contained no samples with strong swell-shrink properties, as the number of samples in this category was too few to be representative and the data too variable. From the available data, stress point (SP), AWC and porosity at FC (pFC) were calculated. These parameters, including FC, PWP and SD, were all regressed to clay content and silt plus clay content. All relationships with clay content had coefficient of determination (r^2) values greater than 0.9 and silt plus clay relationships had r^2 values greater than 0.8. Novel functions from this work are soil textural relationships with SP, SD and pFC. Estimating critical soil water values using PTFs takes only three days compared to at least four weeks with the conventional laboratory method.

Keywords: pedo-transfer functions, sugarcane, critical soil water values, water retention