

Research Note

SOIL MOISTURE POTENTIAL DISTRIBUTION AROUND AN EMITTER¹

Soil moisture is described either according to the amount present or by energy level. In describing plant stress or moisture movement, the potential is preferred.² The terms soil moisture potential, soil moisture

suction and soil moisture tension are often used synonymously to cover the entire range of moisture. Soil moisture potential is a measure of the tenacity with which water is retained in the soil and is the force per

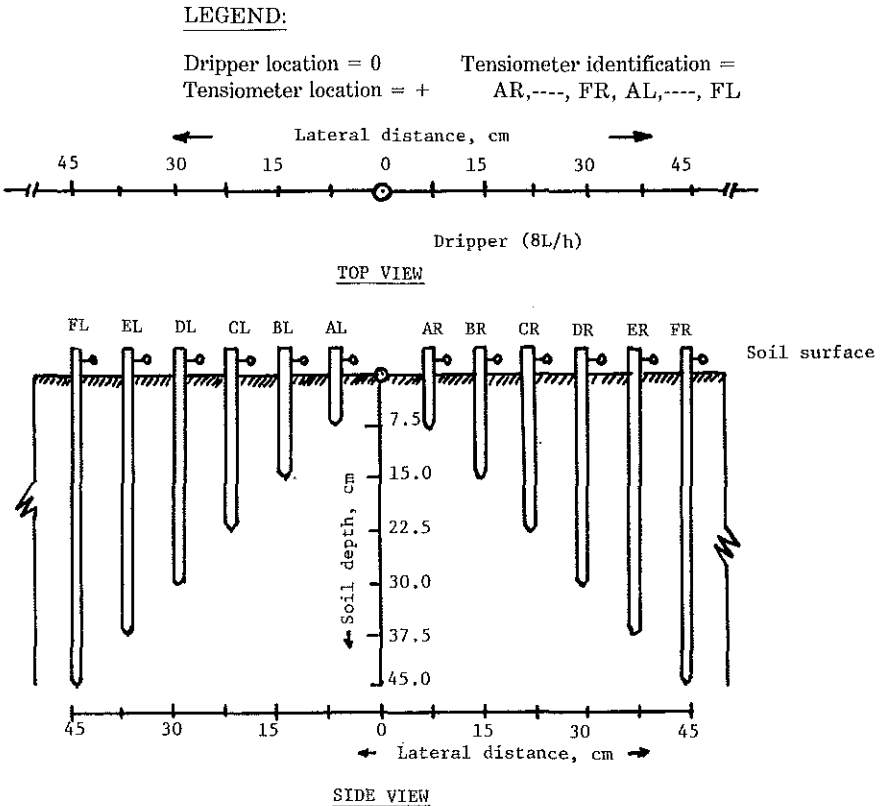


FIG. 1.—Location of tensiometers around an emitter.

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²Warrick, A. W., 1986. Soil water distribution, *In: Trickle Irrigation for Crop Production*. Elsevier Science Publ. The Netherlands. Pages 98-99.

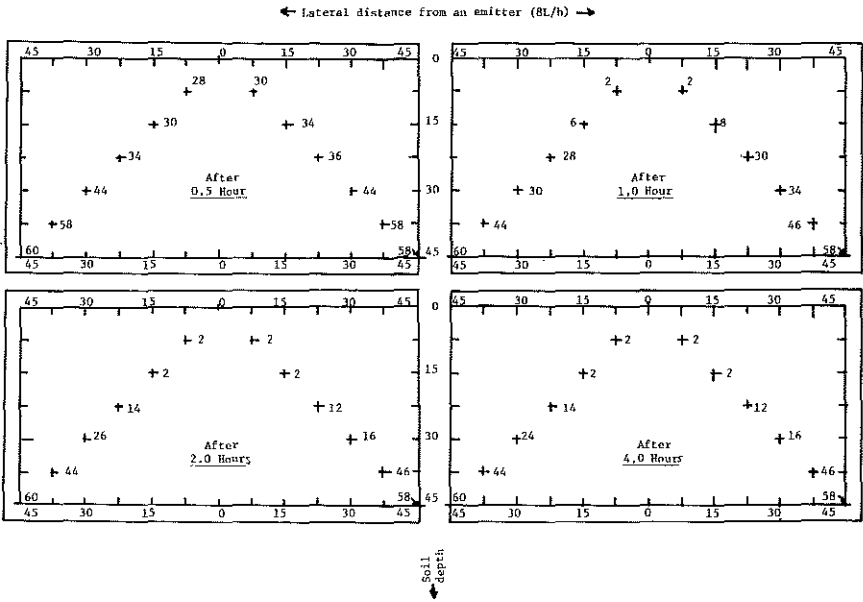


FIG. 1.—Soil moisture tension variations around an emitter at 0.5, 1.0, 2.0 and 4.0 hours after irrigation.

unit area that must be exerted to remove water from a soil. Tensiometers indicate soil moisture tension, and are most widely used for irrigation scheduling in vegetables.¹ Most vegetables perform better with soil moisture tension of 2 to 60 cbars.

The objective of this study was to evaluate soil moisture tension distribution under an emitter in a silt-loam soil at the Fortuna Substation, Juana Díaz, P. R. The soil belongs to the San Antón series (fine-loamy, mixed, isohyperthermic Cumulic Haplustolls, Mollisols) with a pH of 7.9.

The button dripper (8 L/h at 1 bar) was installed on a 16 mm poly tubing connected to a water source and the tube was laid on the soil surface. Figure 1 shows the installation pattern of twelve tensiometers (0–85 cbars) installed along the drip line according to tensiometer installation guide.² On the

third day, 8 liters of irrigation water was applied for 1 hour to the soil, and the tension readings were read at 0.5, 1.0, 2.0, 4.0 hours after irrigation.

Figure 2 shows tensiometer readings at different locations and depths. Soil moisture tension directly under the dripper approached field capacity within 1 hour after irrigation. The tensiometers next to the dripper indicated lower tension values compared to tensiometers at 30 and 45 cm away from the dripper. Soil water did not reach up to the tensiometer tips at 45-cm soil depth. The changes in soil moisture were slow at 37.5 cm deep and 37.5 cm away from the dripper.

This study supports that soil moisture distribution under an emitter is onion-shaped.² The radius of this wetted hemisphere was found to be 40 cm. It implies that

¹Goyal, M. R., J. A. Santaella-Pons and L. E. Rivera, 1984. El tensiómetro: su uso, instalación y mantenimiento. Bol. No. I A59, Servicio de Extensión Agrícola, UPR-RUM, Río Riedras. Pages 1–18.

a dripper spacing of 50 cm will allow enough wetted surface to keep the soil near field capacity. It also supports recommendation of installing tensiometers³ at 15-30 cm soil

depth for irrigation scheduling in shallow-rooted crops such as vegetables.

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