

Final Report
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Title: Evaluation of Moisture Infiltration in Sod based Rotation Study

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Results

Saturated Infiltration and Bulk Density (Table 1)

Saturated infiltration measurements were made August 4 through 8, 2006 using three double ring Turf-Tech infiltrometer. Six total runs were made per plot only in row middles which had not experienced wheel traffic. The time to infiltrate a 5cm column of water was recorded with a subsequent recording of the time for the same column to infiltrate 8cm. The difference in these two times provided a relative measure of the saturated infiltration. Bulk density samples were taken simultaneously with infiltrations using 6" copper cylinders with a 2" diameter driven into the soil, then removed and sealed with plastic wrap. Samples were weighed for a wet weight and then dried at 105° C for 24 hours then weighed again. These samples in addition to bulk density provided soil moisture contents at the time of the infiltrometer runs. Of all of these measurements (infiltration, soil moisture, and bulk density), there was no statistical difference between treatments.

Resistance to Root Penetration (Figs. 1 and 2)

Resistance to root penetration to a depth of 45cm was measured twice during the season following saturation and adequate drainage of the profile. An SC 900 Field Scout data logging penetrometer was utilized in between rows which had not experienced wheel traffic. Data is presented below. On the June 20 sampling date, rotations 5 (orchardgrass-orchardgrass-cotton-peanut) and 8 (soybean-cotton-cotton-peanut) appear to have the lowest overall resistance while rotation 3 (cotton-peanut-cotton-peanut) has the greatest resistance overall. On the June 28 sampling date, the rotation including 2 years of fescue behaved similarly to the rotation with 2 years of orchardgrass unlike the first sampling date. Interestingly on this sampling day, these are the only two rotations fescue-fescue-cotton-peanut (f-f-ct-p) and o-o-ct-p) that never reached a resistance of 3000 kPa which is thought to be the resistance at which cotton root growth is inhibited.

Treatment	Infiltration in Minutes			Soil Moisture	Bulk Density
	Time to 5cm	Time to 8cm	Time 5cm to 8cm	ml H ₂ O/ g soil	g soil/cc
Ct-Ct-Ct-Ct	4.1	8.1	4	0.065	1.44
Ct-C-Ct-P	6.9	13.7	6.8	0.054	1.45
Ct-P-Ct-P	6	11.8	5.8	0.072	1.52
F-F-Ct-P	5.9	12	6.1	0.08	1.43
O-O-Ct-P	7	13.8	6.9	0.062	1.48
S-Ct-Ct-P	5.5	10.8	5.3	0.071	1.49

Table 1 : Saturated infiltration times, soil moisture at sampling and bulk density.
No statistical difference between treatments for any measurement.

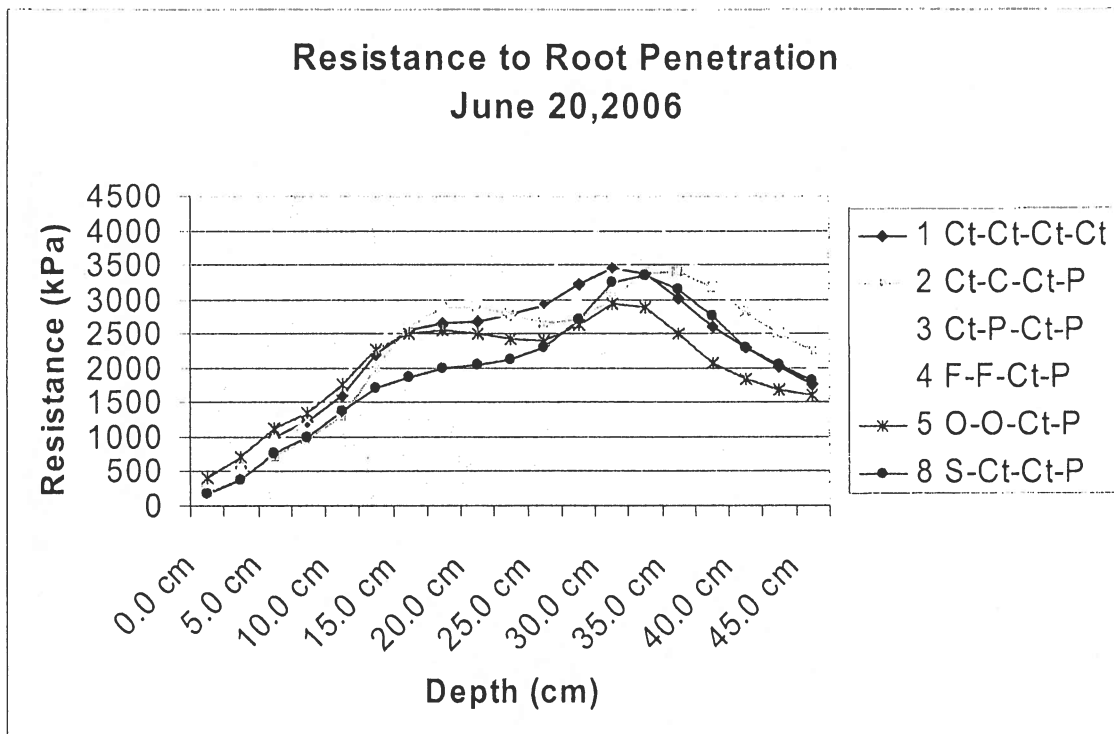


Figure 1: Soil resistance to root penetration as measure by a data logging penetrometer on the 20th of June.

Resistance to Root Penetration June 28, 2006

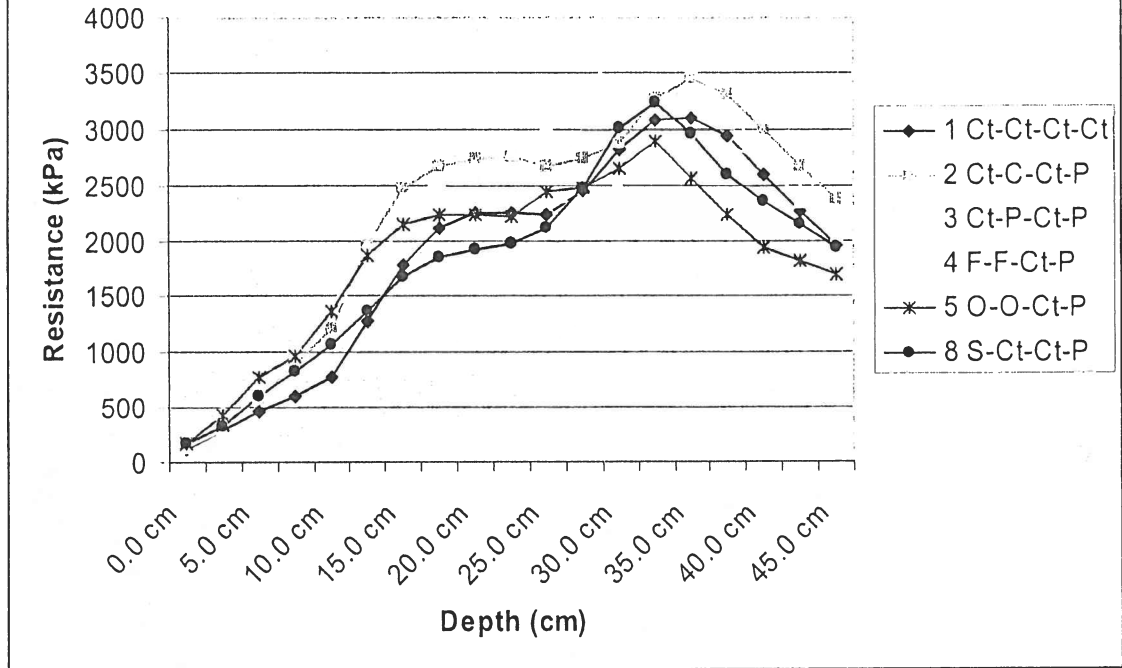


Figure 2: Soil resistance to penetration as measured by a data logging penetrometer on the 28th of June.