

Agron© Soil Conditioner Study
Dec. 19, 2014

Objective:

Soil treated with Agron© Soil Conditioner was compared to non-treated soil for water runoff and sediment loss as a result of two 1 inch applications of water.

Material and Methods

Soil was collected from the C-cut of the USDA, ARS, Sugarcane Research Unit, Ardoyne Research Farm, Schriever, Louisiana and placed in soil erosion troughs on Oct. 28, 2014. Eight soil erosion troughs (55.5 inches x 22 inches) were set up in 4 sets of 2 troughs. Each set of 2 troughs to represent a replication. The soil was placed in the troughs and allowed to settle for two days. On Oct. 30, 2014, soil within each trough was leveled off at 2 inches below the top of each trough. The troughs were arranged to provide a 2° slope. The Agron Soil Conditioner was prepared as instructed to produce a 1500 gpa application rate. Representative soil samples (0-6 inches) were collected from each of the four replications to determine soil moisture prior to treatment. Troughs (plots) were selected randomly within replication to receive the 1500 gpa application rate of soil conditioner. The material was uniformly applied to the soil surface of the “Treated” plots. The untreated plots (troughs) became the “Control” plots.

Test #1

On Oct. 31, 2014, a rainfall simulator was station above each replication of 2 plots (troughs). The rainfall nozzle was position approximately 85 inches above the trough sides, which placed the bottom of the nozzle 86 inches above the soil surface. A rain gauge was place in the center between the two troughs to measure water applied. Water was turned on and applied through the above rainfall nozzle until 1 inch of water was applied to each replication of troughs. The application of 1 inch took approximately 12 minutes, proving approximately 5 inches of simulated rainfall per hour. The runoff water from each trough was collected at the lowest end of the soil erosion troughs. The runoff water volume from each trough was measured and the standard Imhoff sediment tests was conducted on the runoff water. Average soil moisture prior to Test #1 was 10.65%.

Test #2

On Dec. 5, 2014, a 1 inch application of water was reapplied to the soil erosion troughs. The soil troughs had been left undisturbed since Test #1 (no new soil conditional material had been applied) with exception of soil moisture samples removed just prior to the water application. The same procedures were followed as in Test #1.

Results and Discussion

Test #1

The runoff for Test#1 averaged 3805 ml for the control and 1553 ml for the Agron Soil Conditioner, 2.45 times more runoff when untreated or 59.7% less water (2252 ml) was runoff when the soil conditioner was applied. The Imhoff sediment test averaged 13.375 ml/L of sediment for the control compared to 0.625 ml/L of sediment for the soil treated with Agron, a 21.4 times greater amount of soil sediment loss per liter than the control vs. the Agron treated soil.

Test#2

Average soil moisture prior to Test #2 was slightly higher for the treated soil (17.72%) compared to the untreated soil (17.13%). As in Test #1, the average water runoff for the Agron treated soil was less (2579 ml, 47% less) than the untreated soil. Likewise, the Imhoff sediment test determined that the Agron soil treated soil averaged less sediment (0.8 ml/L) than the untreated soil (4.925 ml/L), a 6.16 times difference per liter. The lower sediment levels for the untreated were perhaps due to greater crusting on the soil surface compared to the fresh soil surface in Test #1.

Summary

In each of the simulated rainfall tests [Test #1 (Oct. 31, 2014, 1 inch) and Test #2 (Test #2, Dec. 5, 2014), 1 inch], the soil treated with the Agron[©] soil conditioner had less water and sediment runoff. The rainfall application on Test #1 occurred 1 day after the application of the Agron[©] soil conditioner at the rate of 1500 gpa, to freshly disturbed soil that was on a 2° slope. The 1 inch application of simulated rainfall for Test #2 was applied on Dec. 5, 2014, 35 days after the original application of the soil conditioner on Oct. 30, 2014. The soil for Test #2 was undisturbed since before Test #1. In Test #1, there was 2.45 times more runoff and 21.4 times sediment per liter of runoff for the untreated soil compared to the Agron[©] treated soil. The additional runoff water for the untreated soil resulted in 52.43 times more sediment loss in the 1 inch simulated rainfall event (2.45x water runoff X 21.4x sediment loss/liter = 52.43 times more sediment loss in 1 inch simulated rainfall event). In Test #2, there was 1.89 times more runoff for the untreated soil and 6.16 times more sediment loss per liter of runoff. The additional runoff for the untreated soil (1.89 times more) resulted in 11.63 times more sediment loss (1.89 times more runoff X 6.16 times more sediment per liter of runoff water = 11.63 times more total soil sediment loss per 1 inch water application) for the second simulated 1 inch rainfall event 35 days after the originally Agron[©] application.

Table 1. Runoff and Imhoff values for Test #1 and Test #2 after applications of 1 inch of water at a rate of 5 inches/hr.

PLOT	Treatment	REP	Oct. 31, 2014		Dec. 5, 2014		TEST#2 Soil Moisture ^c (%)
			TEST#1 RUNOFF (ml)	TEST#1 IMHOFF (ml/L)	TEST#2 RUNOFF (ml)	TEST#2 IMHOFF (ml/L)	
1	CONTROL ^a	1	4500	35	7940	12	16.84
2	AGRON ^b	1	285	0	6000	1.5	16.57
3	AGRON	2	2072	0.9	95	0.5	19.38
4	CONTROL	2	2030	7	5310	2.7	17.43
5	CONTROL	3	4960	6	4440	2.7	17.11
6	AGRON	3	1095	1	700	0.5	17.59
7	AGRON	4	2760	0.6	4760	0.7	17.34
8	CONTROL	4	3730	5.5	4180	2.3	17.13

^aUntreated Control

^bAgron Soil Conditioner

^cSoil Moisture just prior to Test #2.

Table 2. Average values across replications comparing 1500 gpa application of Agron Soil Conditioner vs. untreated soil with 1 inch rainfall simulation at a rate of 5 inches/hr.

Averages	Oct. 31, 2014	Oct. 31, 2014	Dec. 5, 2014	Dec. 5, 2014	Dec. 5, 2014
	Runoff (ml)	IMHOFF (ml/L)	Runoff (ml)	IMHOFF (ml/L)	Soil Moist. ^c (%)
Control ^a	3805	13.375	5468	4.925	17.1275
Agron ^b	1553	0.625	2889	0.8	17.72

^aUntreated Control

^bAgron Soil Conditioner

^cSoil Moisture just prior to Test #2.