Effects of LazyMan™ products on the release of sodium and total salts
Report by Dr. Bob Ames, AMS Staff Scientist Ref L07-32, May, 2007.

LazyMan™, also marketed as GrassRoots SuperSoil is manufactured by Houston Brothers Inc. (DBA Soil Restoration Technologies), Bixby, OK. The product is a clear liquid consisting of 11 polymers used for improving soil structure by reducing sodium. The study described below was conducted in the laboratory at Advanced Microbial Solutions, Pilot Point, TX. The purpose of the study was to evaluate the potential for GrassRoots SuperSoil (LazyMan™) to release sodium and total salts from soil exchange sites for subsequent leaching.

Experimental Design:

Sodium and salts extraction: Soil was collected from an irrigated peanut field in west Texas that was experiencing salinity problems (see analysis below). The soil was air-dried, screened through a 2 mm mesh screen, and stored in 30-gallon plastic trash cans.

Soil Nutrient Content (ppm)

NO_3–N	P1[1]	P2	K	Ca	Mg	Na
13	59	68	174	485	217	139
ok	very high	very high	low	very high	very high	very high

[1]P1 and P2 are Bray 1 and Bray 2 phosphorous extraction methods. P1 is readily available P (weak acid extraction). P2 is less available P (strong acid extraction).

One hundred (100) g of air-dry field soil was placed into plastic 100 mL sterile containers. There were five replications for each of the two treatments. Seven (7.0) mL of sterile deionized water was applied to moisten the soil. Then 10.0 mL of sterile deionized water containing either 0.75 mL of LazyMan™, or 10.0 mL of sterile water only for the controls, was applied to the soil surface. The total volume (17.0 mL) of solution brought the soil moisture content to 70% of maximum field capacity. The soil test units were maintained at 70% field capacity for 30 days with the addition of sterile deionized water applied as needed based on weight determinations. After 30 days, the soil was removed from the containers, air dried and thoroughly mixed prior to electrical conductivity (EC) determinations patterned after recommendations by Rhoades (1996) and sodium (Na) extraction based on Helmke and Sparks (1996). From each replication, two 25 g air-dry soil sub-samples were removed; one 25 g sample for each EC and Na measurement.

EC was determined by placing 25 g of air dry soil in a 125 mL Erlenmeyer flask; adding 100 mL of sterile deionized water; shaking for 30 minutes on a rotary shaker at 250 rpm; allowing the solution to settle for 30 minutes; then gravity filtering the solution through a Whatman #2V filter paper. The clear extract solution (25 degree C) received 2 drops of a 0.1% sodium hexametaphosphate solution prior to EC measurement. EC measurements were made using a Hach CO150 Conductivity Meter and reported as µS/cm.

Sodium determinations were made using a 25 g subsample from the original 100 g from each replication. As with the EC measurements, there were 5 replications per treatment. The 25 g soil sample was placed in a 125 mL Erlenmeyer flask; 100 mL of a neutral 1.0 M ammonium acetate solution was added; then the mixture was shaken on a rotary shaker for 30 minutes at 250 rpm; allowed to settle for 60 minutes with the flask at a slight incline; then filtered through a Whatman #40 filter paper under vacuum. Fifty mL of the clear solution from each replication was adjusted to a pH of 9.0 using 0.8 g of a Hach Ionic Strength Adjustor powder (magnesium sulfate and Tris (hydroxymethyl) – aminomethane). Na concentrations were determined while stirring using a Hach, Model 51925 Platinum Series Combination Sodium (ion specific) Electrode, and Hach EC10 pH Meter. Readings were recorded when the meter drift stabilized at < 1 mV/minute. Sodium concentrations in the extract solution were based on a standard curve (mV vs. mg/L Na) prepared from known Na standards and reported as mg Na/L. For both EC and Na measurements, the replicated data were evaluated for statistical significance using a one-way ANOVA. Significant ($P < 0.05$), differences between treatment means were separated using Studentized Range tables and calculated LSD values.

Results:

Soil salinity testing: The ability to extract sodium from the soil was significantly increased in the treatments containing LazyMan™.

Table 3. Sodium extraction and electrical conductivity of extracts from soil treated with LazyMan™, as compared to the untreated control.

Treatment	Sodium in soil extracts (mg Na/L)	Electrical conductivity of soil extracts (µS / cm)
LazyMan™	175.0 a	515.2 a
Control	85.6 b	436.6 b
LSD.05	8.8	36.6
LSD.01	10.8	45.0

Table values are a mean of 5 replications per treatment. Values not sharing the same letter are significantly different.

Conclusions:

LazyMan™™ significantly increased the ability to extract sodium and total salts from treated soil as compared to the untreated control. These data suggest that LazyMan™ (GrassRoots SuperSoil) can aid in the release of sodium and other salts from soil exchange sites thus enabling them to be leached away from plant root systems by irrigation or rain water. This will help to reduce the effects salinity stress on plants and improve soil structure.

References:

Rhodes, J.D. 1996. Salinity: Electrical Conductivity and Total Dissolved Solids. In: Methods of Soil Analysis, Part 3, Chemical Methods. Soil Science Society of America, Inc., Madison, WI USA pp 417-435/

Heimke, P.A. and D.L. Sparks. 1996. Lithium, Sodium, Potassium, Rubidium and Cesium. In: Methods of Soil Analysis, Part 3, Chemical Methods. Soil Science Society of America, Inc., Madison , WI USA . pp 551-574.