Effect of Liquid Soil Aerator on Garden Yields and Plant Seed Germination by Bob Richardson / Restoration Biologist

The application of Liquid Soil Aerator should allow the use of garden tillers to break up soil easier when gardening flowers, plants and vegetables. Plant seed germination increases which makes planting grass seed along with flowers, plants and vegetables more productive.

Radishes, carrots, and kidney beans were grown in a greenhouse under controlled conditions. The results recorded in Tables 1, 2, and 3 demonstrate the observed improvements in plant seed germination and yields from the use of Liquid Soil Aerator.

Table 1 - Growth of Radishes on Bixby Sandy Loam Soil

Treatment	% Soil Aerator	% Germination	Yield Factor	Size Factor
Control	None	67	N/A	N/A
Soil Aerator	2.00	84	3.2	2.4
Soil Aerator	10.00	79	3.9	3.3

Table 2 - Effect on Plant Seed Germination for Carrots and Kidney Beans

Treatment	% Soil Aerator	Crop Growth	Hills Planted	% Germination
Control	None	Carrots	100	49
Soil Aerator	2.00	Carrots	100	66
Control	None	Kidney Beans	100	42
Soil Aerator	2.00	Kidney Beans	100	71

Table 3 - Growth of Carrots on Oklahoma Chandler Clay Soil

Treatment	% Germ.	Total Yield (g)	Yield Improve.	Ave. Carrot Weight	Weight Improve. Factor
Control	48	2476	N/A	23	N/A
2% Soil Aerator	71	6739	2.72	54	2.4

Liquid Soil Aerator has been particularly useful in treating fields under cultivation in which plants are growing, newly transplanted, or freshly seeded soils. By treating the areas immediately around the growing plants or planted seeds, effective aggregation of these critical areas can be accomplished without using Liquid Soil Aerator on the non-productive areas.

Users of Liquid Soil Aerator consistently report that flowers are brighter and garden vegetables such as onions, carrots, squash, beans, corn, tomatoes, potatoes and peppers are healthier, larger, and taste better.

This test supports the claim that Liquid Soil Aerator increases plant seed germination which aids in planting grass seed along with gardening, flowers, and plants. Liquid Soil Aerator should allow the use of garden tillers to be easier, requiring less time and effort.

The Effects of Liquid Soil Aerator on Oklahoma Red Clay Soil

At Belmar Golf Club, Norman, Oklahoma

The following data is the result of a field test performed in 2005 at Belmar Golf Club in Norman, Oklahoma to determine the effect that Liquid Soil Aerator has on the heavy red clay found on the golf course.

Brett Proctor, Golf Course Superintendent at Belmar had used the Liquid Soil Aerator product as a test on some heavily compacted gumbo clay soil at his previous golf course in 2004 and had seen positive results in turf quality and soil compaction. As the new Superintendent at Belmar, Brett decided to apply the product to his red clay fairways because of the improvements he had seen previously. Prior to the application, a 2" diameter core was taken 4" deep in an area on the # 10 fairway. That core sample was sent to I.S.T.R.C., the International Sports Turf Research Center in Olathe, Kansas. I.S.T.R.C. is an independent and well-respected soil physical properties lab that does work on thousands of golf courses in the world.

Ninety days after the application of Liquid Soil Aerator, another core was taken within 3 feet of the previous sample. That core was also sent to I.S.T.R.C. so the results could be compared to the sample taken prior to application of Liquid Soil Aerator. Following is a summary of those lab results.

Sample	Infiltration Rate	Bulk Density	Total orosity	Capillary Pores	Non Capillary Pores
Control	0.02 in/hr	1.64 g/cc	35.01%	30.08%	4.93%
Treated	0.12 in/hr	1.34 g/cc	47.26%	39.84%	7.42%

Note the following results:

- Infiltration Rate increased 600.0 %
- Bulk density decreased 18.3 %
- Total Porosity increased 35.0 %
- Capillary Pore (water pore) space increased 32.4 %
- Non-Capillary Pore (air pore) space increased 50.1 %

The Effect of Liquid Soil Aerator on Root Growth and Turf Density on Arizona Bermuda Grass

by Bob Richardson / Restoration Biologist

Question
Does the application of Liquid Soil Aerator improve grass shoot density, root depth, and blade color in Bermuda grass, in Oklahoma clay soil conditions?

Purpose
To compare and determine the effectiveness of Liquid Soil Aerator with the standard chemical fertilizers being used on Arizona Bermuda Grass in clay soil conditions.

Test Site
Three (3) 200 square feet test sites were selected in a full sun exposure.

Control
Three applications of 20-5-10 (N-P-K) fertilizer applied. First application on May 1st, 1999; second application on July 1st, 1999; and third application on September 1st, 1999 and the grass was irrigated on each of the test sites with an equal quantity of water throughout the testing period on a regular basis.

Application
On May 1st, 1999 Liquid Soil Aerator was applied at the dilution rate of 2oz Liquid Soil Aerator per 1 gallon of water at a coverage rate of 4oz. Liquid Soil Aerator per 1000 square feet to test sites #2 and #3. The first fertilizer application as described above was applied on all three sites. Nothing else was added except ¼ inch of water to all three-test sites. On May 10th, 1999 a second application of Liquid Soil Aerator was applied to test site #3 at the same rate as above. All three sites were watered ¼ inch.

Tests Performed
On April 25th, 1999 the following tests for each plot was conducted:

Grass Root Depth - It is generally assumed that by observing grass root depth by length and by growth pattern can indicate if there is a compacted soil challenge. A two (2) foot hole was dug leaving one side free of shovel marks. Masses of roots, running horizontal and the absence of roots below certain depths were observed.

Grass Shoot Density - It is assumed that turf density can be affected by compacted clay soils. Measurement of number of turf shoots per square inch was counted. Twenty random samples within each plot were counted to give an average result.

Grass Blade Color - Observation of grass blade coloration is observed to help assess the general health of the turf.

Test Results For Root Depth:

- Site 1: Average Root Depth Increase 28%
- Site 2: Average Root Depth Increase 278%
- Site 3: Average Root Depth Increase 264%

Test Results For Shoot Density:

- Site 1: Average Shoot Density Increase 18%
- Site 2: Average Shoot Density Increase 250%
- Site 3: Average Shoot Density Increase 263%

Test Results For Grass Blade Color:

- Site 1: Grass Blade Color: It is quite apparent at first glance the difference in coloration between Site #1 and the other two sites. The coloration varies from a light yellow to a light green with a few areas of moderate green hue. The shoots are light yellow in appearance to a light green. The turf has a stressed appearance and the blades are finer in appearance. A few small bare areas are present, and several areas of thin turf density.
- Site 2: Grass Blade Color: This site is adjacent to Site #1 and the difference is remarkable. The coloration is dark green with little variation in color. The shoots are thicker than in Site #1 and are moderately green to dark green. The turf is noticeably thicker and healthier in appearance. No bare ground is seen anywhere in Site #2.
- Site 3: Grass Blade Color: This site is indistinguishable from Site #2 in appearance. It is adjacent to Site #2 and only the marker between them separates the two.

Interpretation
The three tests performed for this project support the effectiveness of Liquid Soil Aerator on clay soils. These tests indicate substantial increase in grass shoot density and root depth. It is widely believed that “as the root goes- so does the plant”. The root mass was not measured in this test project, however visual examination of the roots show that Site #1 had considerably less root mass than either Site #2 or Site #3. Rhizome development was considerably more prominent in the two sites treated with Liquid Soil Aerator. As noted above, the general health of the turf between Site #1 vs. Site #2 and Site #3 is obvious by visual examination.

Conclusion
The application of Liquid Soil Aerator on clay soil conditions in Oklahoma has substantially improved grass shoot density, root depth, and blade color on Arizona Bermuda Grass.