

INCREASING BIOMASS & NUTRIENTS IN SOIL

THE SOIL FOODWEB

Port Jefferson, NY



The Soil Foodweb, through a biological assay, examined the effect APEX-10 had on soil microorganism reproduction and activity when soils were treated with APEX-10 alone. Fertilizer was not added nor was any vegetation grown on the soil during the study.

TRIAL STANDARDS

A base soil was mixed and tested to determine the baseline levels of total and active bacteria and fungi.

Hyphal diameters, protozoa and nematodes were also measured prior to the study along with the total available nitrogen retained in the soil by the existing biomass present in the soil prior to the start of the testing.

Three different test sites were selected with each site consisting of three individual plots per site as follows:

Site #1 Control Water Only

Site #2 APEX-10 at 3 oz.
per 1000 sq. ft. & water

Site #3 APEX-10 at 6 oz.
per 1000 sq. ft. & water

Soils were assayed for total and active bacteria and fungi on three different intervals - Day 7, Day 30, and at the completion of the study on Day 60.

Three samples and a control were taken from each site during each interval.

Concluding the 60-day trial, samples from all three sites were taken and measured as previously described.

A composite was then made of all three sites.

Protozoa, nematodes, and total available nitrogen were then measured from the three samples taken from the composite.

RESULTS

At the 7-day interval, increases in fungal activity were detected in both low and high rate sites, with a more significant increase in the high rate site. Total fungal biomass showed very little change at the 7-day interval. Total bacterial biomass had increased nicely during the same interval, and again a more significant increase was detected at the high rate.

At the 30-day interval, bacterial activity and fungal activity had increased in the low rate trials while both had slowed in the high rate trials, while total fungal biomass increased during the high rate trial.

Concluding the 60-day trial, active fungal biomass increased at the low rate. The total fungal biomass increased at the high rate as well as the low rate. Total bacterial biomass had significantly higher percentages with both the low and high rate. All of this was due to the treatment of APEX-10.

These increases are likely a result of the higher population of protozoa and nematodes which feed on bacteria and fungi that grew in the soils treated with APEX-10.

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SUMMARY

APEX-10 provided resources for bacteria and fungi growth as well as bacteria and fungi activity from the start, indicating that APEX-10 is a quick colonizing resource for fungi and bacteria growth.

Increase in predatory microbes such as protozoa and nematodes was significant at the end of the project, likely due to increases in bacterial and fungal biomass as a result of good growing attributed to APEX-10.

This increase of predatory microbes led to a very nice increase in nutrient cycling and is also demonstrated by the available nitrogen retained in the soil by soil predators.

Results from the chemical analysis conducted at Rutgers University lower extractable micronutrients and yielded lower extractable macronutrients in both low-treated soils and high-treated soils.

This coincides with the increase in soil biology, indicating that microorganisms in the soil are retaining higher levels of nutrients in the presence of APEX-10.

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INCREASES IN BIOMASS AFTER 60 DAYS

	LOW RATE	HIGH RATE
Active Bacterial Biomass	39%	-6%
Total Bacterial Biomass	46%	67%
Active Fungal Biomass	32%	32%
Total Fungal Biomass	55%	78%
Flagellates	395%	504%
Amoebae	2,480%	3,091%
Ciliates	350%	650%
Beneficial Nematodes	2%	15%
Root Feeding Nematodes	0%	0%
Available Nitrogen lbs/acre	400%	667%

ORGANISM RATIOS AFTER 60 DAYS

	CONTROL	LOW RATE	HIGH RATE	DESIRED RANGE
Total Fungal to Total Bacterial Biomass	1.81	1.92	1.91	(1)
Active Fungal to Total Fungal Biomass	0.08	0.07	0.06	(2)
Active Bacterial to Total Bacterial Biomass	0.20	0.19	0.11	(2)
Active Fungal to Active Bacterial Biomass	0.75	0.71	1.05	(3)

- (1) Bluegrass & Poa: 0.5 – 0.75/ Bentgrass: 0.09 – 1.5/ Corn Wheat Tomato: 0.08 – 1.0/ Berries Grapes: 3.0 – 5.0
- (2) Active organisms in mature compost should be 0.10
- (3) For Annual Plants Ration should be 1.0 or less