



VERITERRA LAB

Soil Biology Report Performed By:

VERITERRA LAB

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Assessment Name: Apple Tree baseline

Plant Present/Desired: Apple tree

Client:

Date Observed: August 01, 2023

Sample Type: Soil

Plant Succession: Deciduous Trees

Beneficial Microorganisms

	Recommended Range		Sample	
Fungi (µg/g)	675	9,000	151.72	Low: The fungal biomass is below the recommended minimum level for your plant's stage in succession. Please contact your Soil Biology Consultant.
Standard Deviation			203.49	Few target organism were present and variability was very high. Precision is very low.
Bacteria (µg/g)	135	900	1,642.78	The bacterial biomass is significantly greater than the maximum recommended level. Please contact your Soil Biology Consultant.
Standard Deviation			501.71	Distribution of organisms was somewhat uneven, resulting in an acceptable degree of variation.
Actinobacteria (µg/g)	1	4	0.6	Low: The actinobacterial biomass is below the expected range. This is not a problem.
Standard Deviation			0.82	Few target organism were present and variability was very high. Precision is very low.
F:B Ratio	2	5	0.09	The F:B ratio is low. Increase fungal biomass or reduce bacterial biomass, and check predators to assess balance. Please contact your Soil Biology Consultant.
	Minimum Value			
<u>Protozoa (Total)</u>	> 10,000		81,487.33	Good: The number of beneficial protozoa is above the minimum requirement.
Standard Deviation			81,487.33	Few target organism were present and variability was very high. Precision is very low.
Flagellate (#/g)	(See Total)		32,594.93	
Standard Deviation			44,632.45	
Amoebae (#/g)	(See Total)		48,892.4	
Standard Deviation			44,632.45	
<u>Nematodes</u>				
Bacterial-feeding (#/g)	200		400	Good: Minimum numbers met.

Fungal-feeding (#/g)	300	0	None detected: Fungal-feeding nematodes help to release nutrients from fungal hyphae to the plants.
Predatory (#/g)	200	0	None detected: Predatory nematodes help reduce root-feeding nematode numbers.

Detrimental Microorganisms

<u>Disease-Causing Fungi</u>	Maximum Value	Sample	
Oomycetes (µg/g)	0	73.68	Some oomycetes detected. Beneficial fungi should be more than double the disease-causer's biomass to outcompete them and hold the disease fungi in check.
Standard Deviation		66.54	Few target organism were present and variability was very high. Precision is very low.
<u>Anaerobic Protozoa</u>			
Ciliate (#/g)	0	146,677.2	Unless this is worm cast, ciliates indicate anaerobic conditions. Please contact your Soil Biology Consultant.
Standard Deviation		166,999.33	Few target organism were present and variability was very high. Precision is very low.
<u>Nematode</u>			
Root-feeding (#/g)	0	0	None detected: No root-feeding nematodes were observed. Great!

Additional Notes

Free moisture of the sample was around 45%.

Diverse bacteria, but a bit too high for a tree when not balanced by high fungal biomass. No anaerobic bacteria, no signs of human pathogens. Even though the amount of fungi was low, fungal hyphae of different colors and diameters were observed - some diversity is present, good sign!

Fungal to Bacterial biomass ratio (F:B) - should be shifted to fungal dominance because trees do best in certain conditions present in high fungal soils (ratio between nitrate and ammonium, pH etc).

Predators of bacteria and fungi: Protozoa - Good amount of testate amoebae of different shapes and sizes and flagellates of mostly identical morphology. High amount of ciliates indicates compacted soil and therefore fluctuating oxygen conditions. Overall protozoa help keep bacterial populations in balance and enhance nutrient cycling. Nematodes - Good amount of bacterial-feeding nematodes. Results derived from 2 nematodes of different morphology (mouth parts etc) detected at 1:10 dilution. Lack of fungal-feeding nematodes reflects low amount of fungi. Bacterial- and fungal-feeding nematodes excrete plant-available nutrients after consuming bacteria and fungi.

Plant pathogens and pests: no root feeding nematodes, however the biomass of oomycetes is a bit high relatively to fungal biomass. Not all oomycetes are pathogens, but some can cause disease when conditions are right.

Overall the microbial community indicates bacterial dominated soil and more suitable for early-successional plants like weeds, brassicas. For best apple tree production and health fungal biomass and predators should be increased and compaction reduced by using bio-complete compost/extract/tea, protozoa infusion or other available methods.