

# Soil Biological Analysis



Client: Sample

Sample Received: 23-Mar-16  
 Plant/Crop: Site 3 Original trees  
 Sample of: Soil

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## Soil Biomass Data

Sample #	Sample ID	Dry Weight of 1 gram Fresh Material	Active Bacterial Biomass (µg/g)	Total Bacterial Biomass (µg/g)	Active Fungal Biomass (µg/g)	Total Fungal Biomass (µg/g)	Hyphal Diameter (µm)
Sample No	Sample ID	0.47	25.10	479.0	0.00	983.0	3.00
Desired Range		0.45 - 0.85	10-50	100-300	1000-5000	1000-10000	>2.5
		Very dry	OK	High	Very low	Low	Good

## General Comments

The biological population present at this site is **strongly bacterial dominant**, however perennial trees need and **prefer fungal dominance**. The total fungal biomass is well below requirement and more serious is the complete lack of fungal activity which may be the result of chemical applications.

Total bacterial biomass is above the ideal range however active bacterial biomass is in line with ideal levels.

The Hyphal diameter of the fungi present (3.0 µm) is above the minimal level (>2.5 µm) and indicates that the fungal population which is present, is made up of generally beneficial species and not pathogens, they are just very inactive at the present time and require supplementation and stimulation.

**Mycorrhizal fungal** - there was no mycorrhizal fungi detected in this sample, which again indicates the possibility of chemical damage, inoculation and food resources will be needed to recover this situation.

**Protozoan** numbers are low and are likely to take some time to develop, Ciliates are high however, Ciliates feed exclusively on anaerobic bacteria, so there high level is an indication that soil conditions are anaerobic - conditions which favour pathogens.

**Nematode** numbers and diversity are extremely low and need building. On the positive side there are no Root Feeders present, however there is a small population of Switchers (Fungal/Root Feeders) who prefer to feed on fungi but can redirect their attention to roots when fungal resources are insufficient which is the situation in this soil.

Remedial activities need to concentrate on encouraging an increase in overall fungal species (both numbers and diversity) as well as stimulating fungal activity to build a reasonable balance of beneficial organisms.

## Soil Foodweb Biomass Data

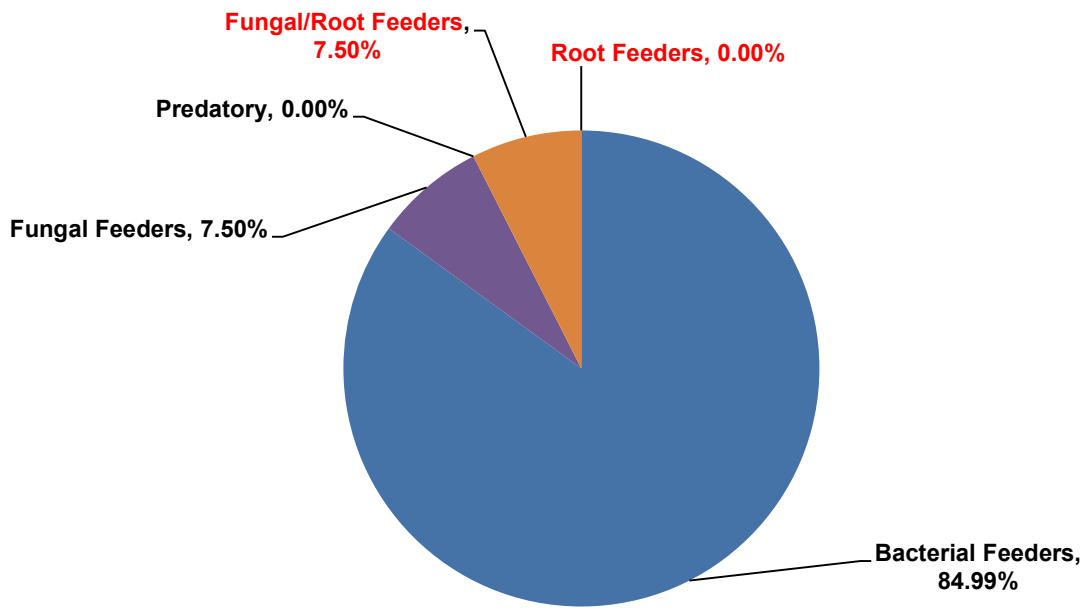
Sample #	Treatment	Flagellates	Protozoa Numbers /g Amoebae	Ciliates	Nematode Numbers (#/g)	Mycorrhizal Colonisation (%)	
Sample No	Sample ID	Red = low	5736	174	174	31	0.0
Desired Range		10000+	10000+	50-100	30-75	40%-80%	
		Low	Low	High	Low	Low	

## Organism Ratios

Sample #	Treatment	Total Fungal to Total Bacterial Biomass	Active to Total Fungal Biomass	Active to Total Bacterial Biomass	Active Fungal to Active Bacterial Biomass	Plant Available N Supply from Predators (kg/ha)	Root-Feeding Nematode Presence	
		1	2	3	4	5	6	
Sample No	Sample ID	Red = low	2.05	0.00	0.05	0.00	75-100	No
Desired Range		10-100	0.10-0.15	0.10-0.15	5	>250		

- 1) Trees prefer a soil dominated by fungi, in terms of total biomass levels this soil is too bacterial at present.
- 2) There are insufficient active fungal resources and these need urgent attention in the shape of inoculation and stimulation.
- 3) Bacterial activity is slightly low in relation to total bacterial levels.
- 4) The absence of active fungi is a serious issue.
- 5) Nutrient availability is at a relatively low level at this stage.

### Nematode balance (**Parasitic & Beneficial**)



6) Nematodes Analysis Numbers per 200 grams of soil	Sample Sample No	6) Nematodes Analysis Numbers per 200 grams of soil	Sample Sample No
<b>Acrobeles</b>	<b>296.00</b>	Aphelenchus	0.00
<b>Acrobeloides</b>	<b>444.00</b>	Bitylenchus	0.00
<b>Alaimus</b>	<b>148.00</b>	Ditylenchus	0.00
Butlerius	0.00	<b>Filenchus</b>	<b>296.00</b>
<b>Caenorhabditis</b>	<b>296.00</b>	Lelenchus	0.00
Cephalobus	0.00		
Cuticularia	0.00		
		Clarkus	0.00
Diplogasteritus	0.00	Mylonchulus	0.00
Diploscapter	0.00		
<b>Eucephalobus</b>	<b>148.00</b>		
		Belonolaimus (Sting)	0.00
Geomonhystera	0.00	Diptherophora	0.00
Mesorhabditis	0.00	Helicotylenchus (Spiral)	0.00
Monhystera	0.00	Heterodora (Cyst)	0.00
Odontoloaimus	0.00	Hoplolaimus (Lance)	0.00
<b>Panagrolaimus</b>	<b>296.00</b>	Meloidogyne (Root Knot)	0.00
Pelodera	0.00	Mesocriconema (Ring)	0.00
Plectus	0.00	Paratylenchus (Pin)	0.00
<b>Prismatolaimus</b>	<b>2,366.00</b>	Pratylenchus (Lession)	0.00
Rhabditidae	0.00	Scutelionema	0.00
Rhabditis	0.00	Trichodorus (Stubby Root)	0.00
<b>Rhabdolaimus</b>	<b>0.00</b>	Hemicycliophora (Sheath)	0.00
Teratocephalus	0.00		
<b>Wilsonema</b>	<b>1,036.00</b>		
Apocelaimus	0.00		
Discolaimus	0.00		

## **Biological Soil Management Program**

### **Biological Inoculant and Stimulant - Soil and Plant Tonic.**

Apply Soil and Plant Tonic monthly at the rate of 60 - 100 litres/hectare for at least 3 applications and then retest to assess soil conditions.

### **Biological Stimulant - BioGrow.**

Apply BioGrow at 20 litres per hectare with Soil and Plant Tonic.

### **Nematode Treatment.**

Nematode numbers and diversity will improve with the inoculation and stimulation of the general biological community.

### **Mycorrhizal Inoculation.**

Mycorrhizal species (AMF) will increase within the framework of the program detailed above. It is recommended however that a AMF examination be undertaken three months from the commencement of the program to assess colonisation.

### **Testing.**

A complete biological assessment is recommended at 6 and 12 months to assess progress.