What is qualitative soil food web analysis?

Qualitative Analysis (QA) determines the active microbial life in various media such as soil, Compost, Compost extract and Compost teas. However, QA can be done on just about anything with living microorganisms in it such as kraut, pond water, lagoon waste and so on. Identifying the presence of "fertilizer bags," like bacteria and fungi indicate the nutrient *retention* capabilities of a soil or soil product. Likewise, identifying "fertilizer bag openers and spreaders" such as protozoa, nematodes and microarthropods indicates if nutrient *cycling* is able to take place in a soil or soil product. The predator-prey relationship between these organisms is the soil food web in action. While nutrient cycling and retention constitute as two benefits, the dynamic and ever changing interaction of these organisms also assist in plant productivity, disease resistance, water retention, carbon sequestration and toxin breakdown in soil systems.

The foundation of this work lies in the scientific findings that diversity allows for resilience and flexibility in a multitude of environmental changes.

What you get

The QA represents the *active* microorganism presence in the sample. This means that you will have an idea of what nutrients are being retained and cycled based on the organism presence in the sample. In a QA you will receive information targeting the functional groups of the soil food web. Species will not be offered, as the type of microscopy used does not allow for identification of species. Information in the data sheet will include:

- Microgram per gram/presence of bacteria, fungi, oomycetes and fungal spores
- Individual numbers per gram of protozoa and nematodes
- Protozoan functional groups of flagellates, amoebae, ciliates
- Nematode functional groups of bacterial feeding, fungal feeding, predatory and root feeding
- Microarthropod presence
- Potential for activity from protozoan cysts or fungal spores
- Comments on fulvic and humic acid development in aggregation
- Comments on aggregation complexity
- Comments on diversity of all functional groups
- Indication of what the product is best suited to grow in plant succession. Is it weeds, vegetables, fruit trees or old growth conifers that will thrive in your soil or soil product?

The QA with Haviland Earth Regeneration will also include photos and videos of the organisms that are in the sample as well as a 15 minute phone consult summary about the analysis. Depending on your current knowledge of the soil food web, a number of things can be discussed regarding the sample(s). If you don't know what the organisms do or are, that will be discussed. If you want action steps on how to improve your soil or soil product, that will be offered. Molly will keep the time and inform you when the 15 minutes is reached. After 15 minutes,

consultation fees begin at $25/15 min. * *The consult is not 15 minutes per sample, it is a summary of the collective samples.*

Determining Sample Locations

Look at your land in terms of micro-environments. Where are the dry spots? Weed areas? Soggy areas? Compaction areas? Where are the most productive and least productive areas? Each area of concern will be called a "zone". Consider printing a map of your property and write on it what and where the issues are. *The number of zones you collect samples from will depend on your land and resources of time and funding. At the very least, it is recommend to sample separately from the most productive zone on your land for a productivity baseline sample.*

Equipment Needed:

- 5 gallon bucket(s)
- Soil core (preferred), apple core or shovel
- 1 gallon size ziplock bags
- Permanent marker

Collecting Samples

The number of sample sites to take from a zone depends on the zone size and your resources of time. The more samples you take from the zone, the more accurate the average will be. Take at *least* 3 samples from a zone, 5 is better, 20 is best. **Separate buckets are required for separate* **zones**. *Indicate on the bucket what zone you have gathered from so you don't forget where it came from.*

- Remove significant plant debris from soil surface
- Use a soil core (1/2" to 2" diameter wide) or shovel to collect from the soil surface to 3 inches below soil surface
- Place the top three inches of the soil in zone bucket

Same Day Soil Collection and Shipping

If you are shipping the samples on the *same day they were gathered*, mix them all together very well.

- Take 2 cups of this mixture and place it in a 1 gallon ziplock bag
- Label the bag with the *date collected, location (sample name) and your name*. Each bag must be labeled with this information

Next Day Shipping After Sample Collection

It is ideal to send the samples on the same day you gathered them. If you won't be sending the soil the same day you gathered it:

- Leave the *unmixed* soil in an *uncovered* bucket, store in a cool dark place until your ready to ship
- On the shipment day, mix the soil contents of each, separate zone bucket thoroughly
- Place 2 cups of this mixture in a 1 gallon ziplock bag
- Label the bag with the *date collected, location (sample name) and your name*

Sampling Single Plants of Concern

It matters if you're gathering samples from a specific plants of concern like in an orchard or vineyard system versus sampling a pasture or annual field. In the case of specific plants, samples should be taken from between the drip line and stem or trunk (*See Figure A*). The larger the plant, the more samples are needed. When sampling for an orchard or vineyard gather samples using a combination of *Figure A,B, and C*. The more samples you gather, the more information will be given for your location. Remember, at least 3 samples from 3 sites in a zone. * *In these types of systems, it is helpful to know what biology is present in the driving rows, as plant roots go out and down unless something is inhibiting them. Roots will go in the driving rows if there is food there and compaction is not an issue. In this case, an additional zone could include the driving row.*

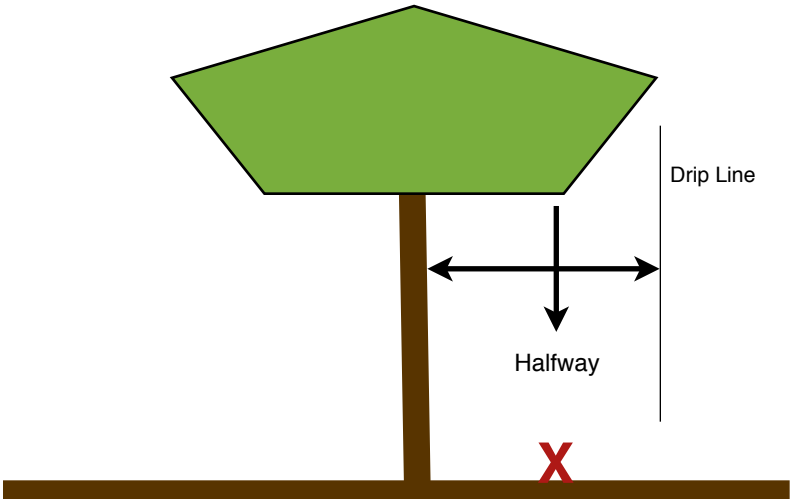

Figure A: Side view of tree

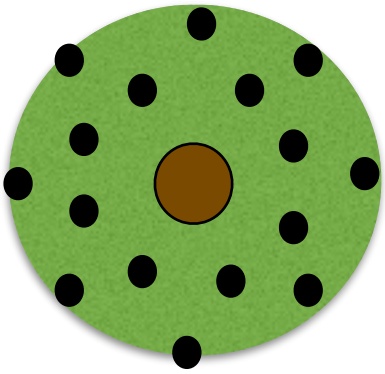

Figure B: Bird's eye view of a tree . The black dots are sample sites that begin between the drip line and trunk and move out towards the drip line.

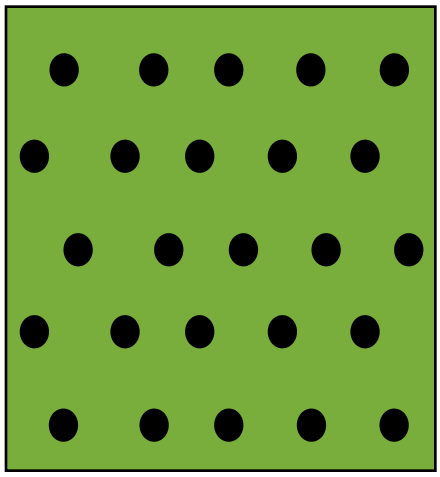

Figure C: Sampling tracts of land. The black dots are sample sites.

Sampling Tracts of Land

You can look at the land as a whole grid. This works well for land that has even plant growth, soil types and elevations. *See Figure C*

1. Pick 20 random sites throughout the designated area
2. Number the site points
3. Randomly draw 3-20 numbers out of a hat
4. Sample from those points
5. Combine all samples, mix, package and label

To Sample For Topography - preferred method

See Figure D

Consider the various habitat zone options below:

- Wet areas
- Dry areas
- Weed patch
- Ridge line
- Productive areas
- Non-productive areas

1. Split field into habitat zones
2. Grid each area
3. Number each grid section
4. Pick 3-20 numbers
5. Sample from each point, mix, package, label

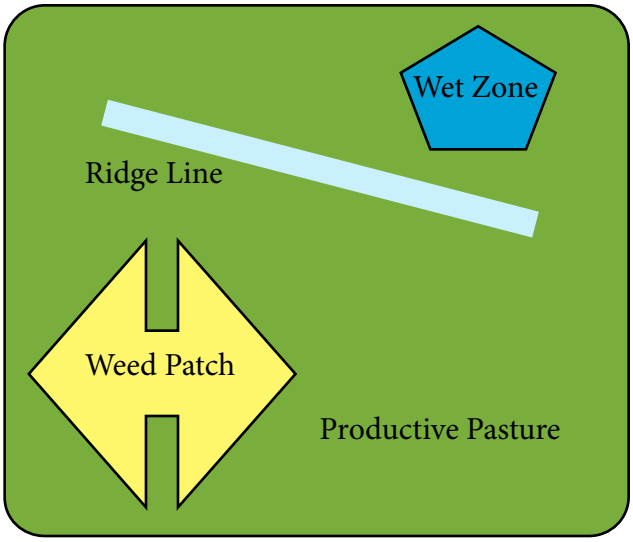

Figure D: Sampling for topography - habitat zones

Labeling the Samples

Every sample sent must be labeled with the site/product name, the company or individual name and the date it was packaged.

Sending Liquids - Compost Tea - Compost Extract - Other

Liquids must be shipped same day and overnight. Fill a clean container 1/2-2/3 full with 1 cup liquid and seal tightly. If you are sending the tea from a warm climate, place a freezer bag in the box with the sample.

Sending Compost

- Place 1 handful or cup from various areas through the core of a pile/windrow in a bucket
- Mix well
- Place 2 cups of this mixture in a 1 gallon ziplock bag
- Label the bag with the *date collected, location (sample name) and your name*

Shipping the Samples

Do not ship the sample to arrive on a Friday unless prior arrangements have been made. It's best to ship samples on a Monday. Contact Molly C. Haviland at molly.lscl@gmail.com or call 303.999.5935 for the mailing address and to make an appointment *every time* you send samples. Ship the two day rate for the best price. Overnight is ideal.

Payment

All assessments are $60. Data will be released upon payment. Checks, money transfer or credit cards are accepted. Credit cards with be charged an additional 3.5% to cover credit company costs. Checks are sent separately on the same day the samples are sent, or tape it to the outside of the box. *Make checks payable to Haviland Earth Regeneration, L.L.C.*. Data is released upon payment of sample(s).