Chapter 5
Working with the Soil Food Web

Lecture 23 - The Site Assessment

Working with the Soil Food Web

Key Stages in the Process

- Take Photographs of All Fields
- Conduct the Initial Site Assessment
- Select Application Methods (Equipment)
- Produce the Biological Plan
- Execute the Plan
- Assess Results
- Maintain Biology

The Initial Site Assessment

Step 1: Walk the Land

- Take Pictures
- Surface Compaction
- Puddling
- Weed patches
- Bare soil
- Stressed plants
- Signs of erosion
- Areas where plants are doing well
- Species of plants growing - Succession

- Record Observations

The Initial Site Assessment

Step 2: Things to be assessed

- Soil Biology
- Compaction Depths
- Infiltration Rates
- Root Depths
- Soil Chemistry
- Water quality
- Soil Carbon
- Diseases, Pests, Weeds

- Inorganic fertilizers, pesticide use
- Other problems

The Initial Site Assessment

Step 2: Things to be assessed

Soil Biology

- A simple apple-corer is used to take the sample from the desired area(s)
- Samples are then placed in a sealable-bag and labelled on the outside
- If sending to a lab for analysis, care must be taken to maintain oxygen levels

The Initial Site Assessment

Step 2: Things to be assessed

Infiltration

- The O Horizon is gently removed to reveal the soil surface
- A single drop of water is applied to the surface of the soil at the same time that a stop-watch is started
- The time taken for the drop to be completely absorbed is measured
- This must be repeated a number of times in order to allow for variance

The Initial Site Assessment

Step 2: Things to be assessed
<u>Compaction</u>

- Push the penetrometer down into the soil using constant pressure to do so.
- When the needle on the gauge indicates 150psi, stop pushing, grip the shaft at ground level and remove
- Measuring the distance from your grip to the tip of the shaft will tell you how deep the compaction layer is
- Measurements need to be taken in various spots in an area to be treated, in order allow for variance

The Initial Site Assessment

Step 2: Things to be assessed

Soil Chemistry

- Inorganic salts will form Ionic Bonds with water molecules, rendering the water inaccessible to microorganisms and plants
- This is why humans can't drink sea water
- This is also the cause of fresh manure "burning" plants – the high levels of inorganic salts
- High levels of toxic materials such as heavy metals are also problematic and may require remedial action prior to the application of the Soil Food Web
- This information will appear on a soil chemistry report

The Initial Site Assessment

Step 2: Things to be assessed

Water Quality

- High levels of inorganic salts in water will render the water inaccessible to microorganisms and plants
- Particularly a problem when using well-water
- The water needs to be assessed by a competent laboratory and salt content needs to be below 50ppm
- Anything above this limit will require filtration

The Initial Site Assessment

Step 2: Things to be assessed

Soil Organic Matter

- Without sufficient soil organic matter (min. 3%), microorganisms will struggle to build structure (particularly in sandy soils) and nutrient cycling will be diminished
- The microorganisms need soil organic matter as a food source, to survive when root exudates not being produced
- Soil organic matter also has a very large water holding capacity

The Initial Site Assessment

Step 2: Things to be assessed

Soil Carbon

- Soil Carbon sequestration is, as we have seen, a huge tool in the battle against Climate Change
- Measuring Soil Carbon requires the use of a laboratory with the appropriate equipment
- Assessing the level of Soil Carbon at the outset of a project will help to contribute to the global effort to amass data on this soil ecological function.