

# Bringing Soil to Life

# Commercialized Co-composting

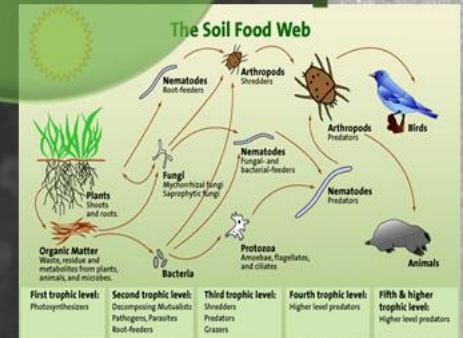


Common  
Compost

Optimize  
Nutrient Uptake  
BioChar



Ingham Horizon  
Soil Food  
Web



# The Use of Biochar in Composting

Marta Camps, Massey University; and Thayer Tomlinson, IBI February 2015

The number of studies is still very limited.

There is not a significant industry for compost amended with biochar

Increasing the use of biochar in compost operations requires education on the benefits of biochar to producers



January 28-31 Charleston, SC  
**COMPOST** 2020  
USCC Conference & Tradeshow

**Main Session Topic Suggestions:**  
**Biochar**  
**\*Synergies with compost**  
**\*Case Studies**

## **CALL FOR SPEAKERS!**

***The USCC is seeking presenters with recent research or case studies on organics collection, processing or use.***

**Submit now for the 28th Annual  
USCC Conference and Trade Show  
January 28-31, 2020 in Charleston, SC!**



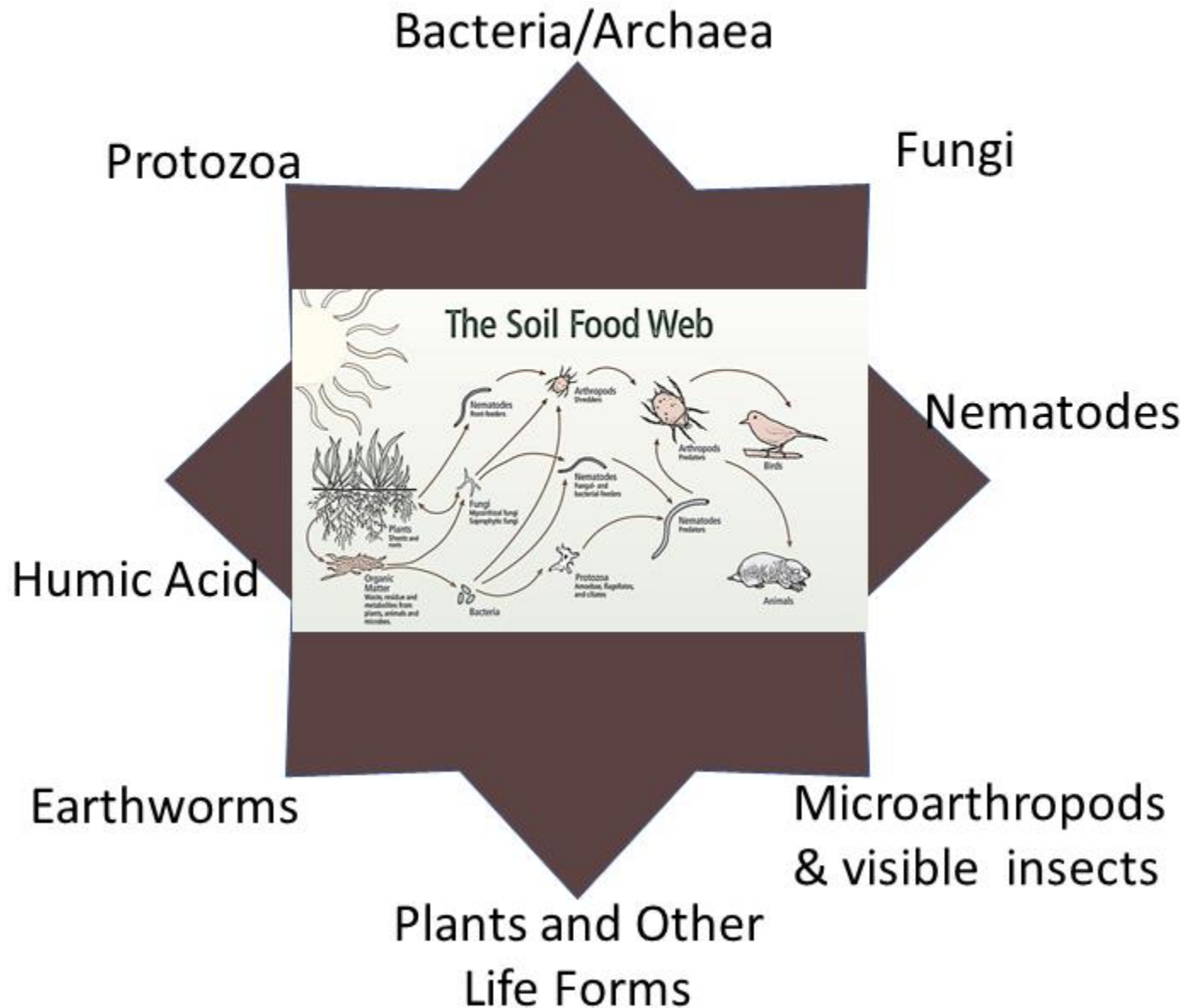
## Bringing Soil to Life

Our Soil Ecosystem became severely damaged with chemical fertilizers and pesticides since the end of World War II.

Microbes that kept soil health in balance have been killed, causing continuous degradation resulting in free reign pathogens.

Organic farmers have worked for decades to produce quality crops while eliminating agrichemicals. Without intervention, nature takes decades to restore the full Soil Biome.

# Healthy Soil has 8 components









# THE SOIL FOODWEB

Our soil teams with a multitude of organisms which provide the necessary work for healthy plants to grow free from disease, pests, and infertility. These interconnected interactions and feeding relationships (quite literally "who eats who") help determine the types of nutrients present in soil, its depth, and pH, and even the types of plants which can grow.







**This method successfully recreates nature's biodiversity. It constructs aggregate amounts of each life form, for unmatched quality control, tailored to specific farm needs.**

Bacteria

Archaea

Fungi

Nematodes

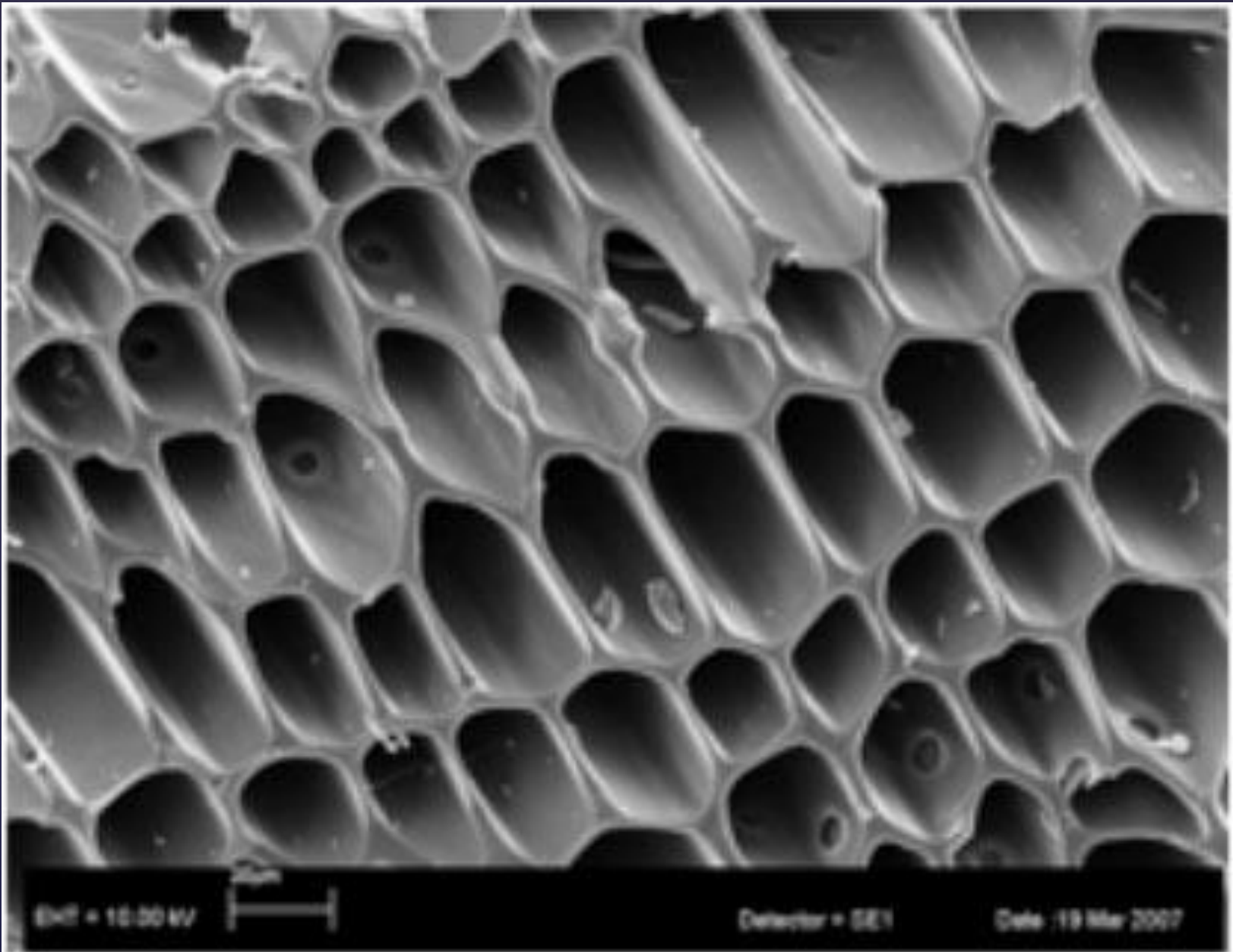
Flagellates

Amoebas

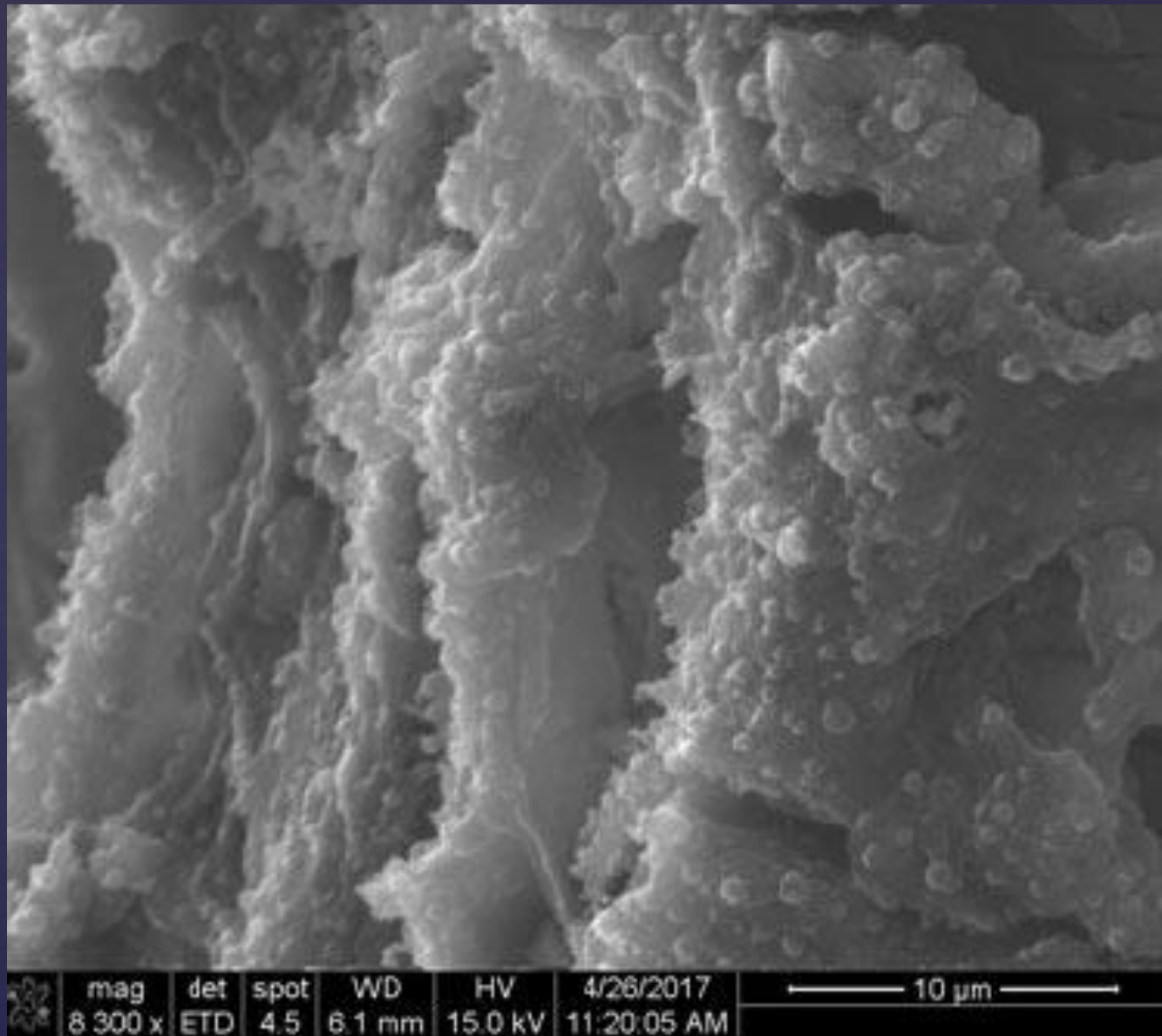
And microarthropods  
desired by the growers

“The 2010 data collected for the biochar experiment confirm the results of previous years.

“It confirms literature findings (Lehmann 2003) that **biochar treatments shift plant nutrient uptakes to their particular optimum ranges**. For some elements, this means an increasing uptake while for others a decrease .” (Schmidt 2010)



Fresh wood biochar



Surface of aged wood biochar



Evaluating the rates of nitrate removal for a nitrate containing, low organic carbon wastewater interacting with carbon-containing solid substrates

- Hart, Jeffrey L. PE, MA

Master's Thesis – Oregon State University, 2012

[https://ir.library.oregonstate.edu/concern/graduate\\_thesis\\_or\\_dissertations/h702q9321](https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/h702q9321)

- Composted wood chips: moderate removal
- Biochar alone: moderate removal
- Composted chips and biochar: 20x removal

DIVALENT CATION BRIDGE?

















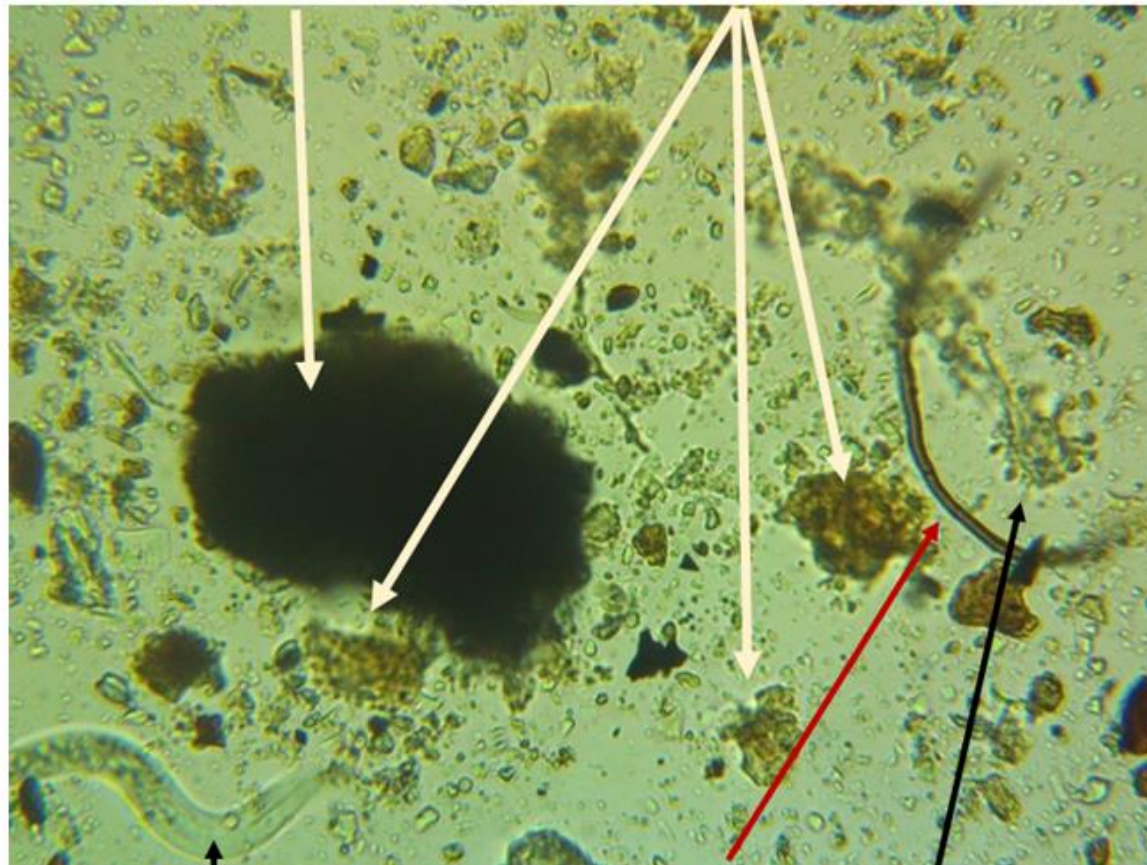






Organic Materials

Humic Acid



Nematode

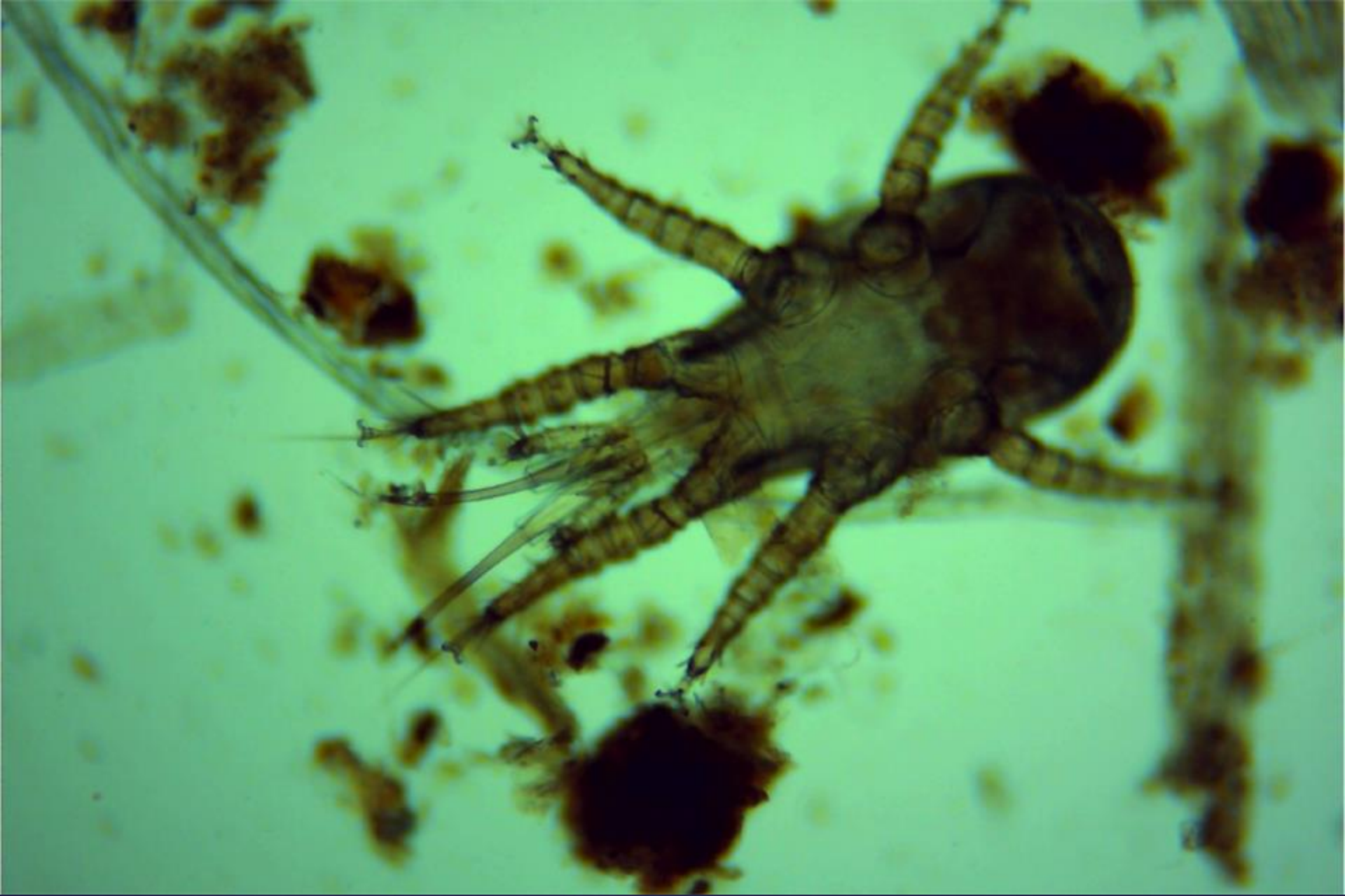
Fungal Hyphae

Amoeba

<http://symsoil.com/soil-food-web>

Info@SymSoil.com

**Robust Compost (#Robust Compost) is a complex community of soil microbes in a solid transportation medium.**







# **Black Swans**

Water measurement

Unintended Consequences

Carbon Measurement

Diatoms in the Food Web?

Correlated with Biochar?

## FIRST PRINCIPLES:

RAW BIOCHAR      High fixed Carbon, Low ash, Low volatiles

DRY BIOCHAR      <20% moisture

EARLY IN THE PROCESS:      early in the subroutine for each component

CORRECT PROPORTION      for each component : <1% - 99+%

ADJUST APPROACH TO MOISTURE CONTENT

ADJUST APPROACH TO CARBON MEASUREMENT

EASY ON THE THROTTLE: Small, slow adjustments







**5 Gallon Sample**  
**Batch One**  
*A Robust Compost*

Blend with Soil in a 1:2 to 1:10  
ratio before planting

We hesitate to refer to this as compost because it doesn't begin to describe what this material does. We have struggled to come up with a better word for this biologically enhanced, specially cultivated, material with organic acids and nutrients. We have considered a number of words, but we have concluded that nothing better than the word compost describes what this product is.

For more information, please visit [www.symsoil.com](#)

Or contact us at [1-800-888-8888](#)



# Carbo Culture







**Microbe Enriched Soil –  
Working for You, Your Business,  
Our Planet**

