

**Soil Health**

**Dr. Heather Darby, UVM Extension**

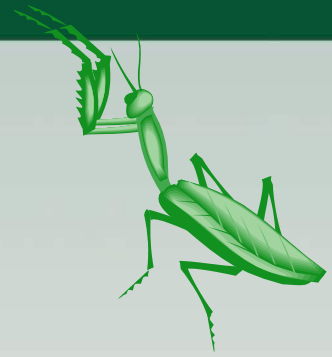


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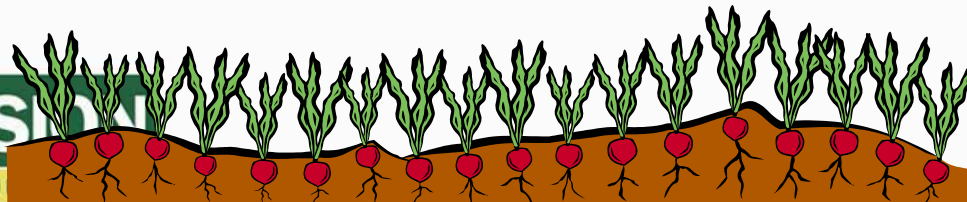
# Soil Health is



The ability of a soil to provide a **physical**, **chemical**, and **biological** environment for the plant that is health sustaining.



This is a long-term ecosystem based or agroecological perspective!

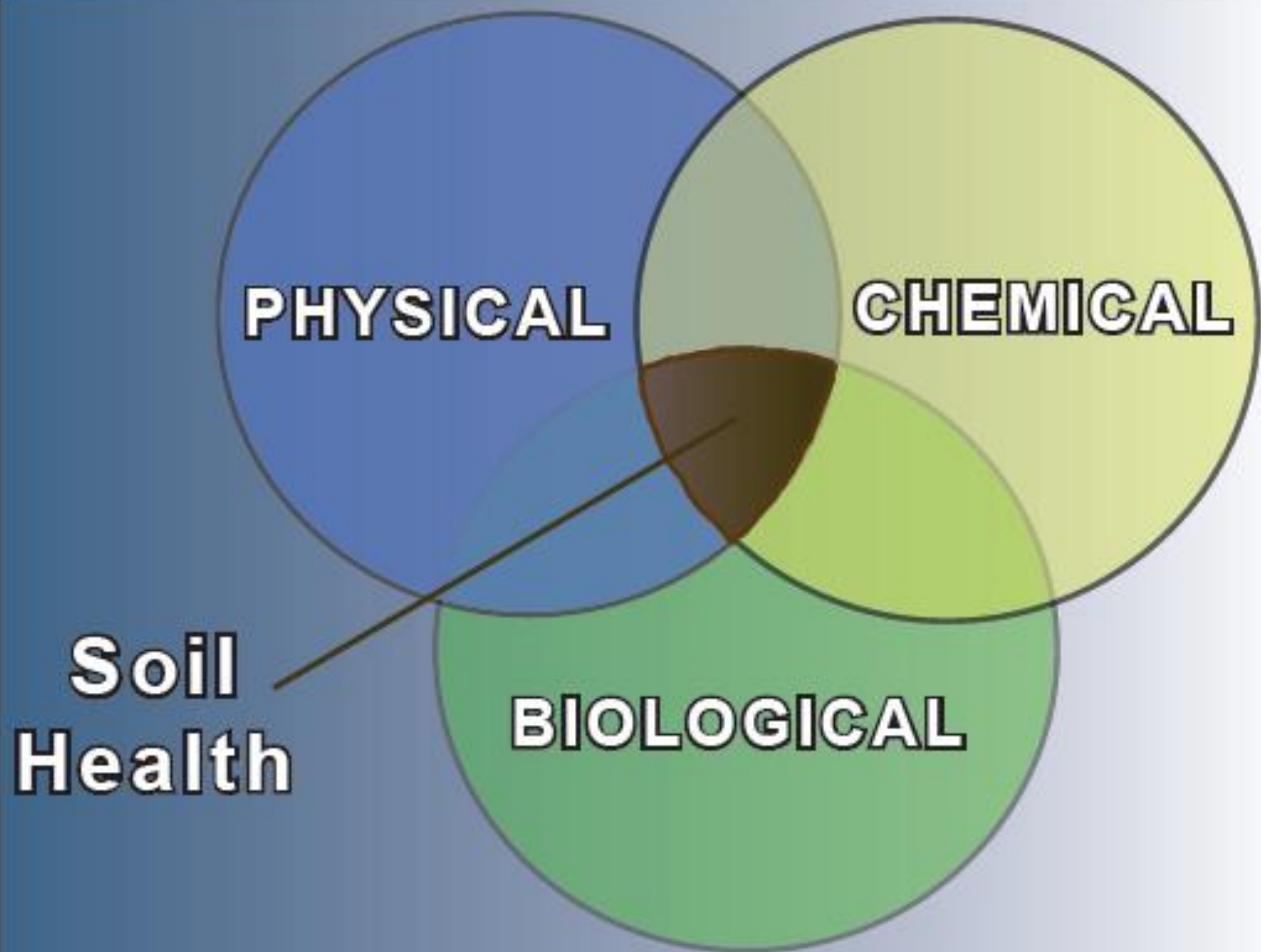


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# Characteristics of Healthy Soils

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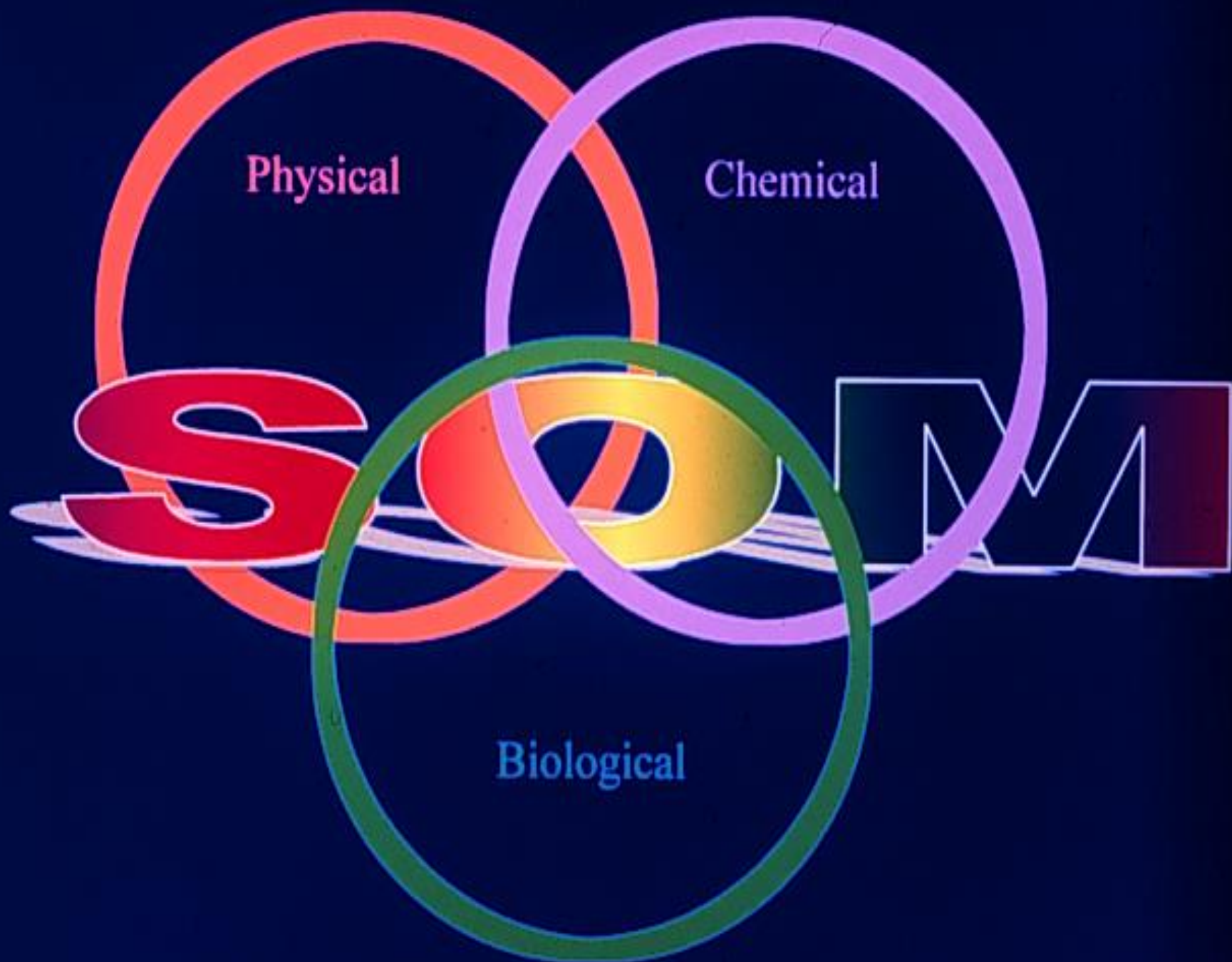
- Sufficient (but not excess) nutrients
- Good tilth
- Sufficient depth
- Good water storage and drainage
- Free of chemicals that might harm plants



# Characteristics of Healthy Soils

- Low populations of plant disease and parasitic organisms
- High populations of organisms that help plant growth
- Low weed pressure
- Resistance to being degraded
- Resilience





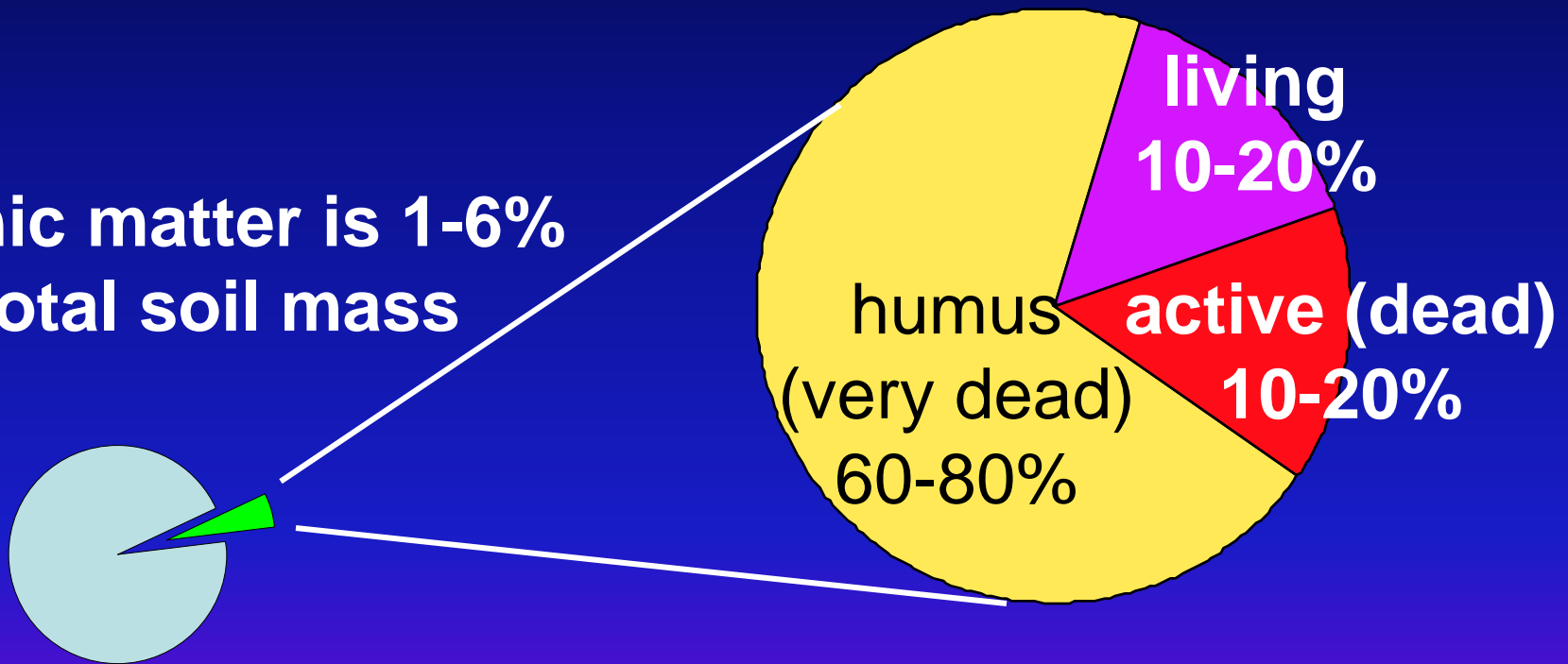
There are three general  
"types" of organic matter in soils

- ✓ Living
- ✓ Dead
- ✓ Very Dead

# Soil organic matter

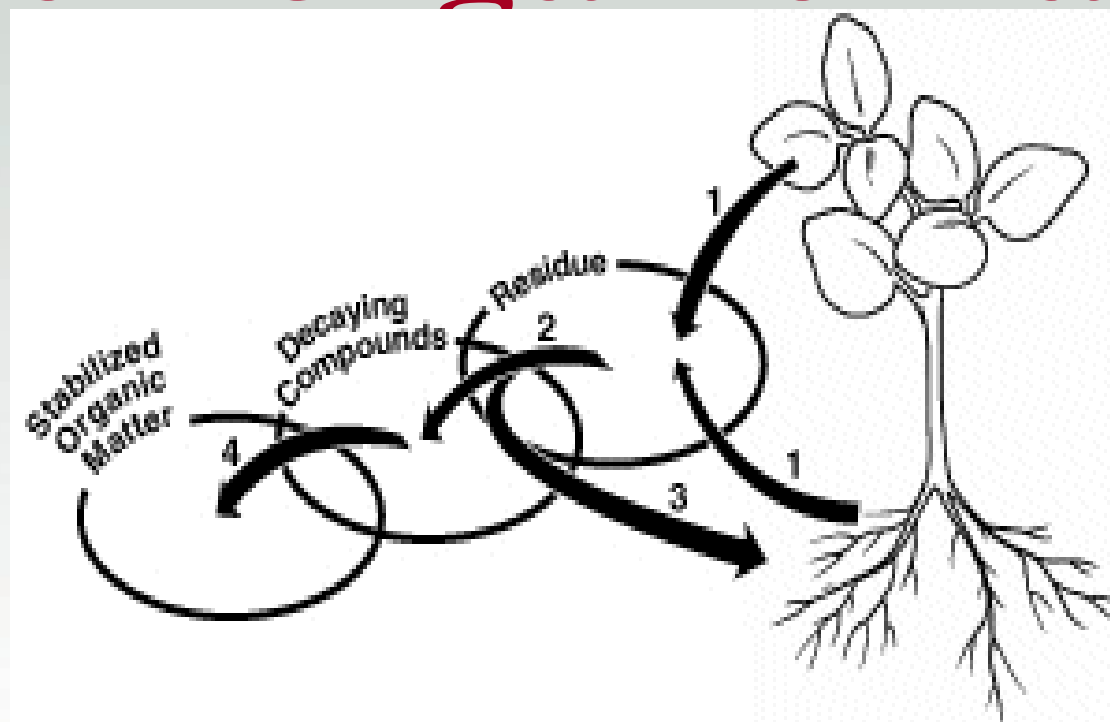
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Organic matter is 1-6%  
of total soil mass

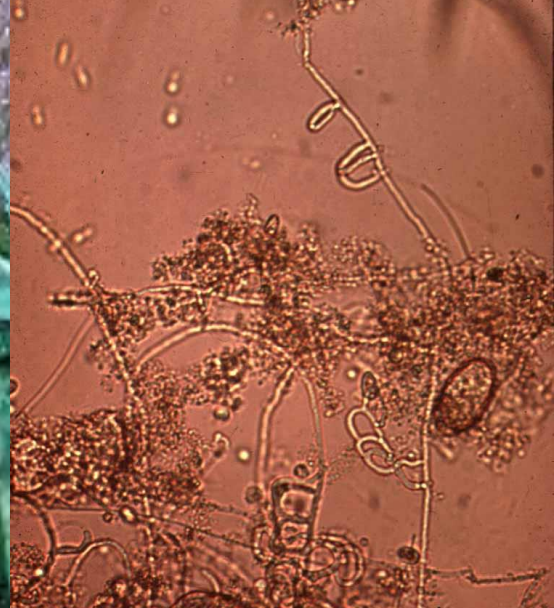




# Changing Forms of Soil Organic Matter



# The Living





## —Dead —

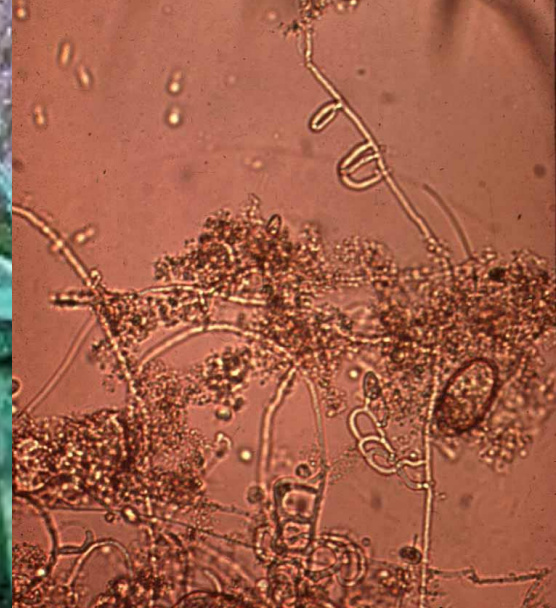
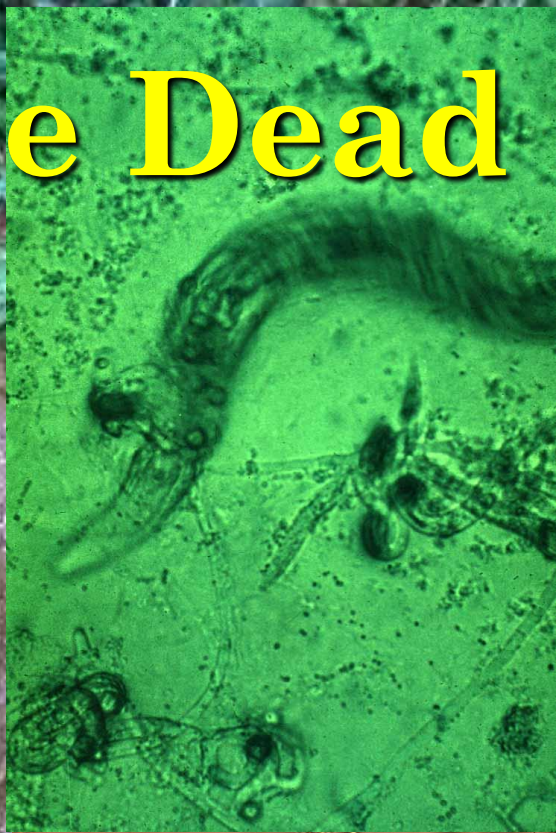
Recently dead soil organisms and crop residues provide the food (energy and nutrients) for soil organisms to live and function. Also called "active" or "particulate" organic matter.

# Active OM





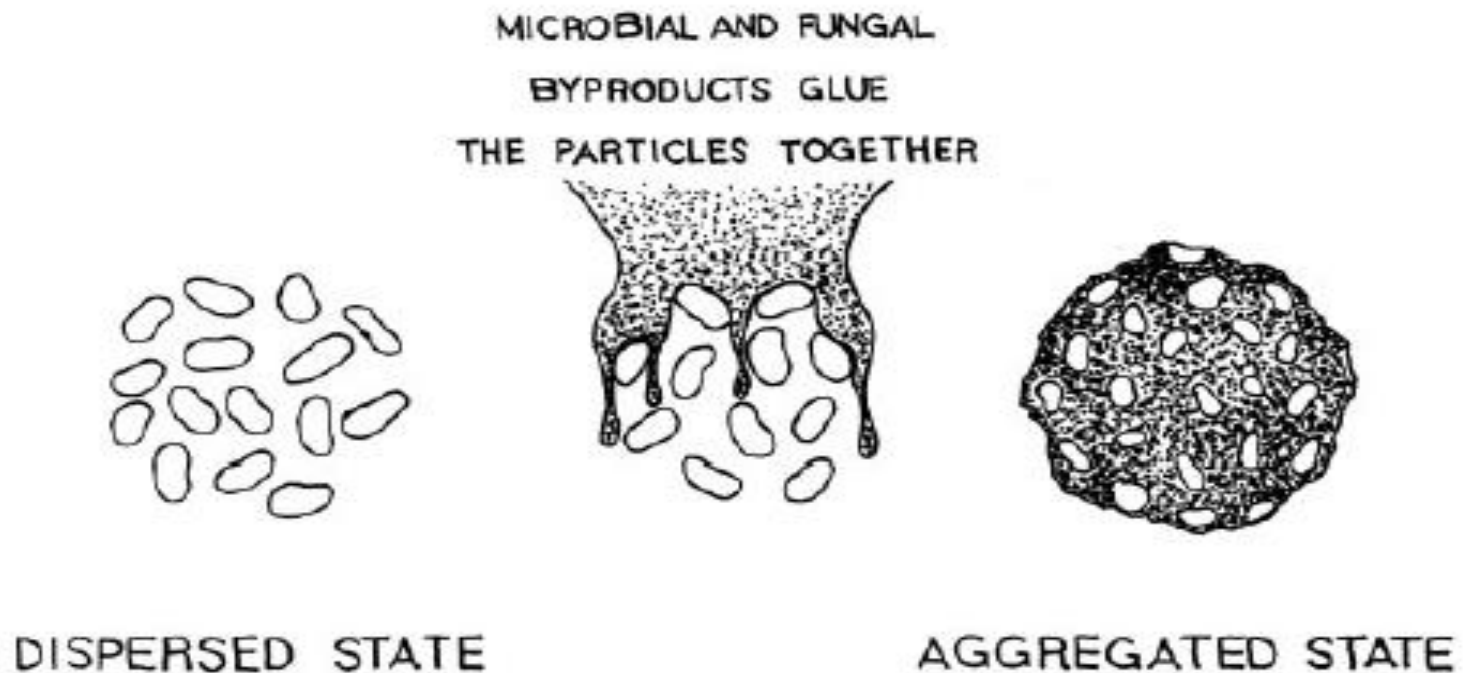
# The Living Eat the Dead



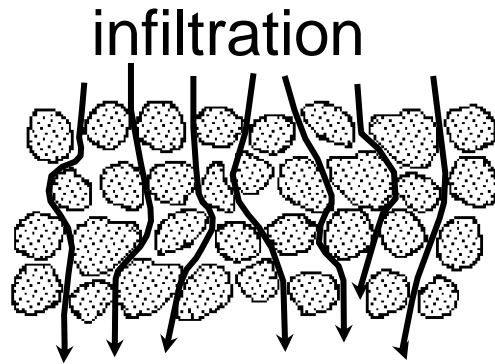


# Living and Dead Form Aggregates

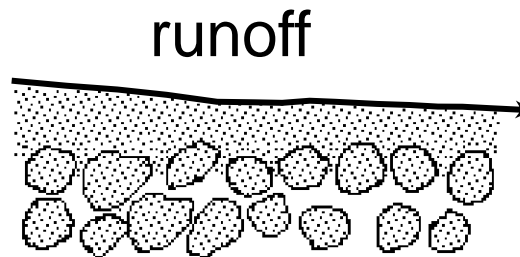
Humus, partially broken down organic matter, plant roots, fungal threads, bacterial gels, and earth worm feces, form glues that hold soil particles together creating a good soil structure



# Environmental Health

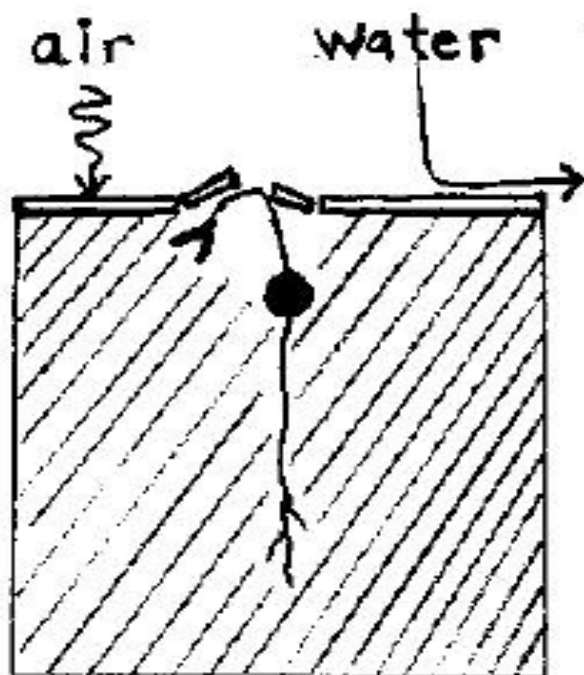


a) aggregated soil

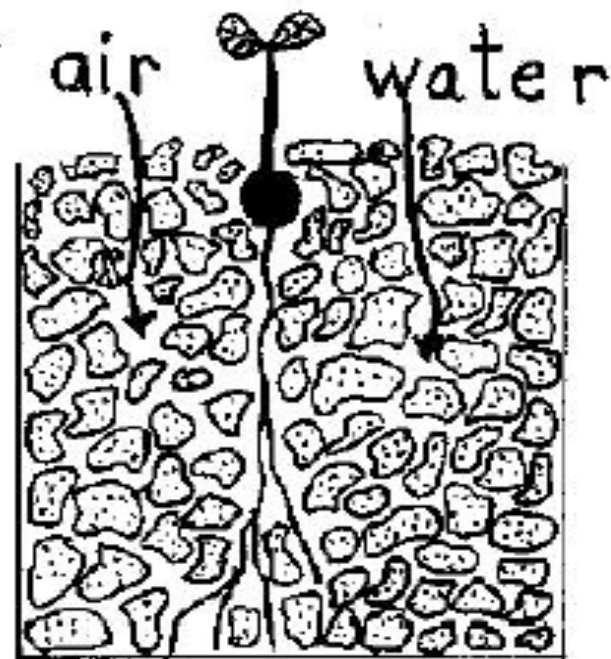


b) soil crusts after  
aggregates break down

# Microbe and Plant Health



Crusted



Well-Aggregated

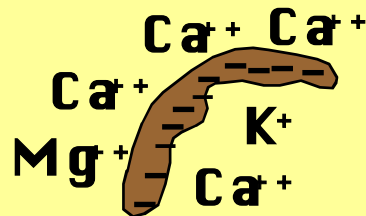




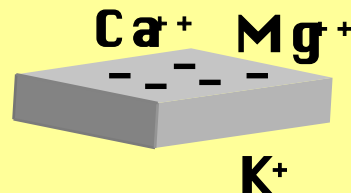
## —Very Dead —

Well decomposed organic materials, also called humus. **Humus** contains very high amounts of negative charge.

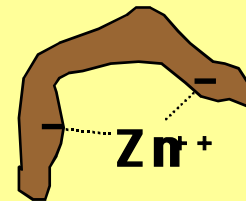
# Very Dead Organic Matter



**a) cations  
held on  
humus**



**b) cations  
held on  
clay  
particle**



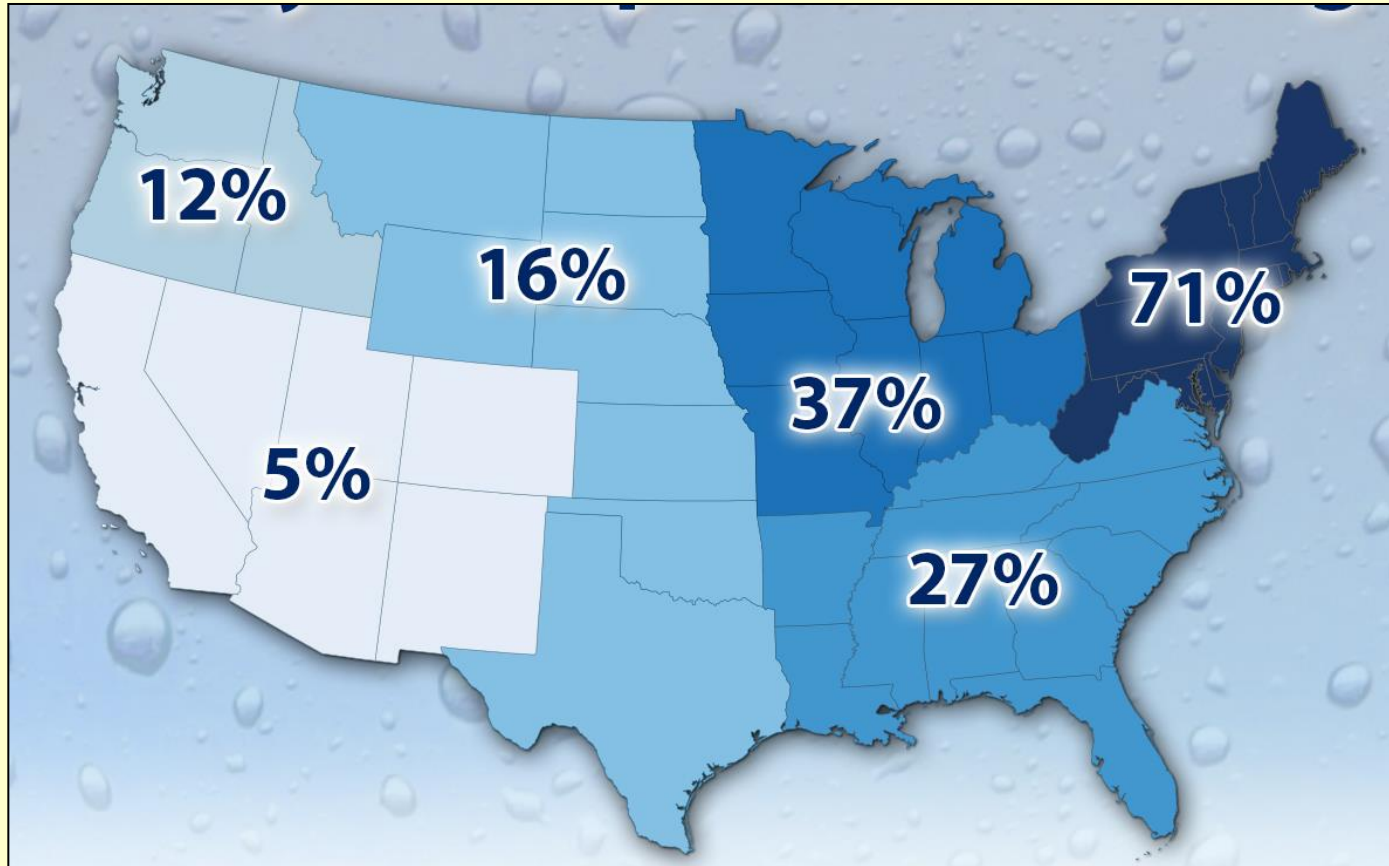
**c) cations  
held by  
organic  
chelate**

**Cation Exchange Capacity  
and Chelation**

**ely  
y.**



# Trends in Extreme Precipitation



Increase in the number of 2" rainfalls per year from 1958 to 2011

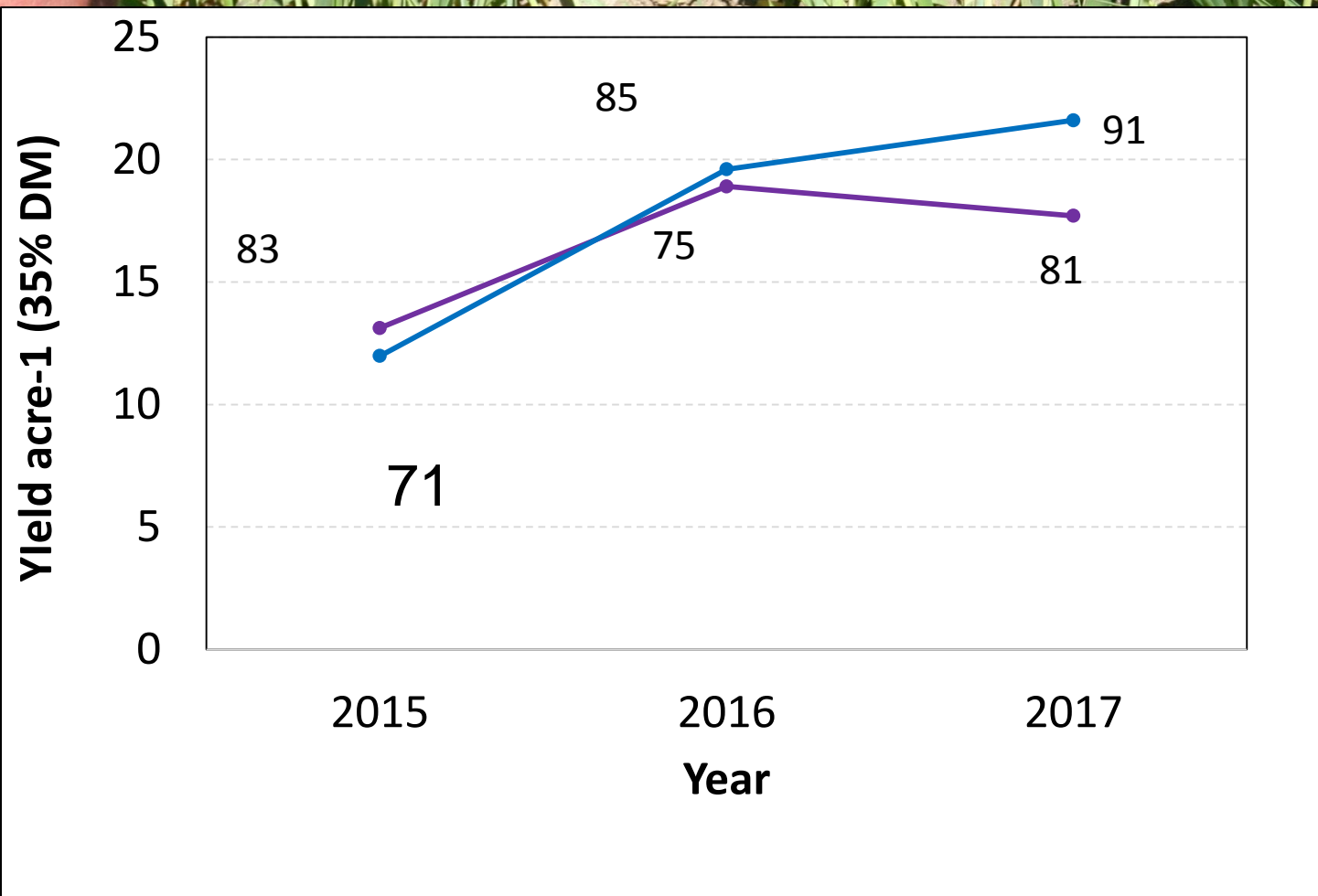


# Resilancy





Corn cropping system	Yield at 35 DM t ac <sup>-1</sup>
CC	16.98
NC	22.72*
NT	16.54
WCCC	20.40*
LSD (0.10)	2.5
Trial mean	16.16





# www.uvm.edu/extension/cropsoil/



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The mission of the UVM Extension Northwest Crops and Soils Team is to provide the best and relevant cropping information, both research-based and experiential, delivered in the most practical and understandable ways to Vermont farmers.

### OUT CROPPINGS: Important crop news from the field!

**Northern Corn Leaf Blight** Once again, We have seen increased Northern Corn Leaf Blight in the Green Mountains. Northern leaf blight is a fungal disease found in humid climates wherever corn is grown. Click [here](#) to download a pdf flyer of the entire article.

**Cereal Grain Testing** comes to the Green Mountains! UVM Extension Northwest Crops and Soils Laboratory is up and running! Our lab is currently accepting samples and will continue to accept samples through the end of the year. Click [here](#) to download a Cereal Grain Test Submission Form.

**Northeast Hop Alliance** Presents Hops 101 and 201 Courses, Saturday-Sunday, October 10-11, 2014, Fenimore Art Museum Cooperstown, NY 13326. Click [here](#) to download a pdf flyer of the event.

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Dr. Heather Darby  
UVM Extension Agronomist

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