OPTIMIZING SOIL & PLANT HEALTH IN AGRI-FOOD PRODUCTION

Regenerative Agriculture - its benefits and innovations

Réseau Agroalimentaire de l'Est ontarien
Eastern Ontario Agri-Food Network

PRESENTATION BY :
Eric & Ines Batterton
Owner & Founder of My Nordic Garden

My NORDIC Garden
Natural & Sustainable Kitchen Gardens

MODULES

1. INTRODUCTION TO SOIL HEALTH
2. SOIL TESTING & ANALYSIS
3. BUILDING HEALTHY SOIL WITH COMPOSTING
4. PREVENTING MOLD & FUNGAL DESEASES
5. NUTRIENT MANAGEMENT & FERTILIZATION
6. ORGANIC SOIL AMENDMENTS & ALTERNATIVES
7. CROP ROTATION & PLANT PAIRING
8. WATER MANAGEMENT & IRRIGATION PRACTICES
9. INTEGRATED PEST MANAGEMENT (IPM)
10. SOIL CONSERVATION & SUSTAINABLE PRACTICES

MODULE 3:

BUILDING HEALTHY SOIL WITH COMPOSTING

- What is composting?
- Benefits of Composting for Soil Health
- Composting Materials
- Composting Processes
- Practical Applications

1) WHAT IS COMPOSTING?

- the natural process of recycling organic matter
- involves decomposition of organic materials (food scraps, yard trimmings, manure..)
- microorganisms & insects play a crucial role
- break down of organic matter makes nutrients available to plants
- two main processes: HOT (rapid) & COLD (slower) composting

COMPOST =
“partly decayed organic matter that feeds plants, feeds soil biology, and improves soil”

Robert Pavlis, Compost Science for Gardeners

2)BENEFITS OF COMPOSTING FOR SOIL HEALTH

- improves **soil structure**: enhances aeration & drainage, improves sandy & clay soil
- **retains water** & improves water quality: keeps water near the surface, right moisture level for plants, less run-off & erosion
- best **mulch**: keeps soil & roots cool, reduces evaporation
- **fertilizer**: increase nutrient content > essential nutrients for plant growth & health
- promotes **microbial activity** > food for microbes, soil food web
- reduces **erosion** > strengthening soil cohesion
- removes **toxins** > holds on to heavy metals, pesticides
- buffers **pH** > neutralizes acidic & alkaline soils
- incorporation old vegetation into the soil > **waste reduction**
- contributes to **carbon sequestration** > storing carbon in soil, balancing climate change

3) COMPOSTING MATERIALS

‘GREEN’ MATERIALS

nitrogen-rich items
e.g. kitchen scraps, fresh plant materials like grass or garden clippings; manure, coffee grounds

‘fresh & moist’

‘BROWN’ MATERIALS

carbon-rich items
e.g. dried leaves, cardboard, saw dust, dry branches, straw, wood chips

‘dry’

C/N-ratio ≠ Brown to Green-ratio

C/N - ratio

ideal ratio: **24:1 (microbe diet)**
> microbes digest carbon (energy source)
> nitrogen necessary to build digestive enzymes

Practical: aim for **30:1** ratio
> loss of carbon throughout composting process as CO2

Brown to Green - ratio

2:1

- all plant material contains varied amounts of C & N
- all browns contain N & all Greens contain C too
- 2:1 ratio important for the home gardener & growers for composting

3) COMPOSTING MATERIALS

Meat products/
animal parts

Diseased &
infected plant material

Dairy products

MATERIALS TO AVOID

Pet waste

Oils & Fats

heavily processed & cooked
food

4) COMPOSTING PROCESSES

Aerobic Composting

bacteria that thrive in environments with high level of oxygen

hot composting
‘earthy’ smell
compost pile

small & big scale

Anaerobic Composting

bacteria that thrive in environments with very low oxygen levels

cold composting
fermenting
‘unpleasant’ smell

small & big scale
e.g.: ‘Bokashi’ - small scale at home

‘Vermicomposting’

- earthworm & aerobic composting
- at room temperature
- not real composting (worm breaks food waste down, prepares it for aerobic process)
- goal: worm castings ‘poop’ with lots of microbes
- ideal for food scraps
- regular feeding of worms important

AEROBIC COMPOSTING

HOT Composting

- high T 54°-71°C (temperature monitoring), bacteria activity generated heat (thermophilic bacteria)
- activity & multiplication of microorganisms depend on ideal T
- aerate compost pile regularly (flipping)
- moisture control (moisture meter), ideal: 45-60%
- aim for 30:1 C/N ratio

- pros: fast, pathogens & weed seed reduction
- cons: labor intensive, regular monitoring, seasonal: very labor intensive in cold winters

ANAEROBIC COMPOSTING

COLD Composting

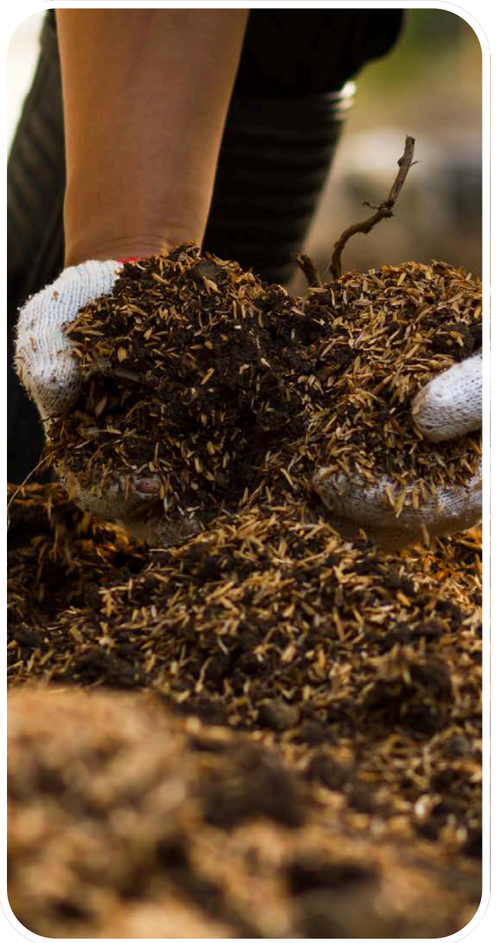
- T 10°-40°C, psychrophilic & mesophilic bacteria
- activity & multiplication of microorganisms depend on ideal T
- no flipping, rather layering of organic material
- ratio 2:1 of brown to green materials, layer them alternating with max. thickness of 6-8" per layer to ensure some airflow
- monitor moisture: water if it feels dry

- pros: passive, less labor intensive, less monitoring needed
- cons: takes longer, pathogens & weed seeds may survive

EXTRA: Resources on Composting Methods

Hot composting in winter	www.youtube.com/watch?v=4ms2hyfU1CU&t=339s
No turn composting	www.youtube.com/watch?v=t39WfhyOc60&t=243s www.youtube.com/watch?v=vbDyGd93SwY
Keyhole Garden	www.youtube.com/watch?v=WhUqyebBDeU
Vermicomposting	rodaleinstitute.org/science/articles/vermicomposting-for-beginners/
Compost Tumblers	www.youtube.com/watch?v=PWrxXkE_s3M
Electric Composting	www.youtube.com/watch?v=9s2WSct6nbw

5) SOIL HEALTH THROUGH COMPOST



Main Applications of compost:

MIXING INTO THE TOP FEW INCHES OF SOIL

- careful tilling

TOP DRESSING (MULCH)

- add compost as mulch on soil surface

CREATE OWN POTTING MIXES

- mix sand, soil & compost

COMPOST TEA

- natural fertilizer for garden beds

ENHANCE OTHER ACTIVE COMPOSTING PILES

- active microorganisms speed up composting process

CONCLUSION

EVERYONE SHOULD COMPOST

Not just an act of recycling, but it can help regenerates soil health. Can help reduce organic waste in landfills.

COMPOSTING IS SIMPLE

‘As simple or complex as you want to make it. [..] You decide on how much effort you want to put into the process.” (Pavlis, R., 2024. Compost Science for Gardeners. New Society Publishers. p.4)

EVERYONE CAN COMPOST

Is a natural process everyone can do in every space.

BUILD A HEALTHY FOUNDATION

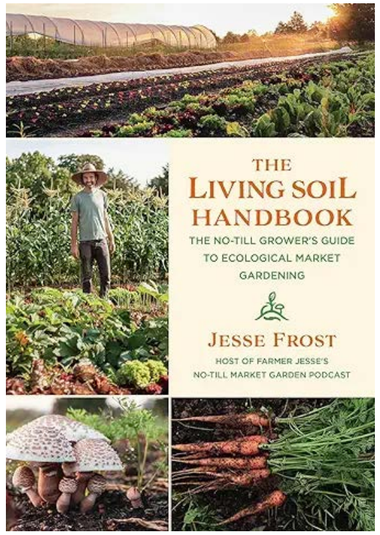
Healthy soil means healthy plants. Soil is the foundation & most important aspect when you want to grow successfully.

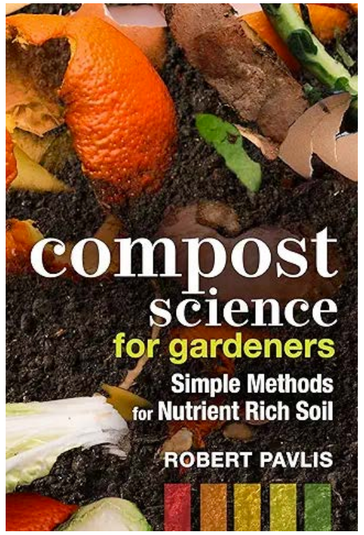
YOUR TURN!

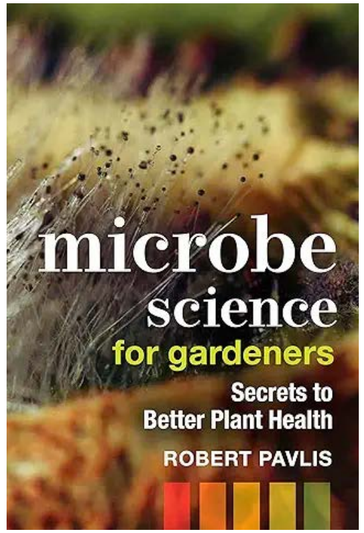
Make your own COMPOST!

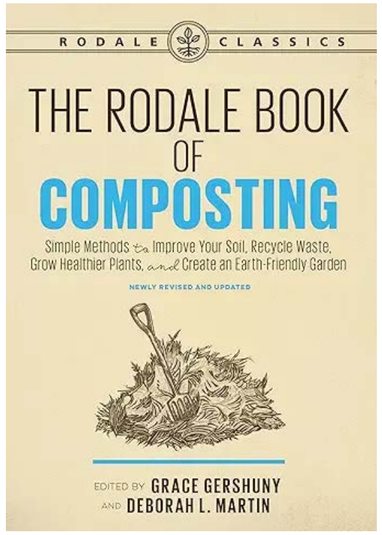
Chose your preferred composting method and start today!
(Tip: the easiest for beginners is a simple compost heap)

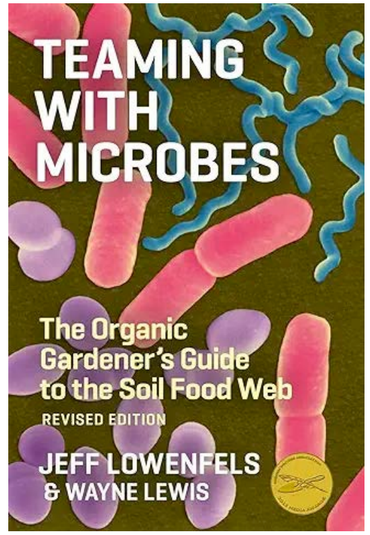
RESOURCES

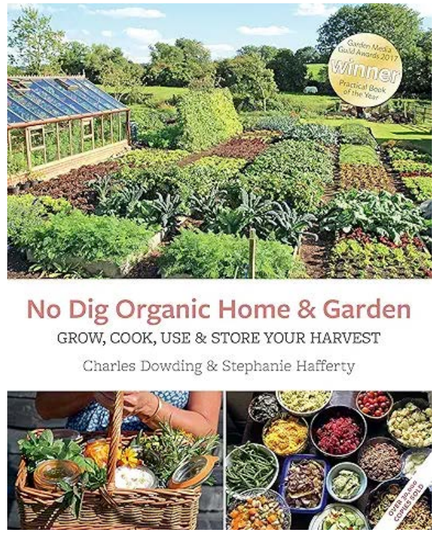












Adugna, Getinet. (2018). A review on impact of compost on soil properties, water use and crop productivity. Agricultural Science Research Journal. Vol. 4(3). 93-104. 10.14662/ARJASR2016.010.

Manna, Madhab & Ghosh, Avijit & Subbarao, A.. (2023). Composting: A Green Technology for Soil Health Management.

Wright, Jerome & Kenner, Scott & Lingwall, Bret. (2022). Utilization of Compost as a Soil Amendment to Increase Soil Health and to Improve Crop Yields. Open Journal of Soil Science. 12. 216-224. 10.4236/ojss.2022.126009.

THANK YOU