OPTIMIZING SOIL & PLANT HEALTH IN AGRI-FOOD PRODUCTION

Module 6

Regenerative Agriculture - its benefits and innovations

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

PRESENTATION BY :
Eric & Ines Batterton
Owners & Founders 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 6:

ORGANIC SOIL AMENDMENTS & ALTERNATIVES

- Organic Soil Amendments
- Types of Organic Soil Amendments
- The No-Till Method
- Alternatives to No-Till
- Other Applications of Organic Amendments
- Alternative Amendments

1) ORGANIC SOIL AMENDMENTS

natural materials to improve:

- physical (structure, water retention)
- chemical (nutrient availability, water retention)
- biological properties (microbial activity)

> > supporting plant growth & ecosystem health

MULCH

in nature soil is almost always covered
'living mulch' - weeds, cover crops
compost, leaves
wood chips, coconut coir
straw, grass clippings..

ORGANIC FERTILIZERS

green manure/cover crops
well aged animal manure
mulching
compost tea, worm castings
rock dust, biochar
leaf mould, kelp
teas & slurries

COMPOSTING

fermentation (bokashi)
trench composting
keyhole gardens
tumblers
static pile composting

vermicomposting

2) TYPES OF ORGANIC SOIL AMENDMENTS

Mulch

- moisture retention
- temperature control
- weed suppression
- soil structure improvement (reduce of compaction)
- erosion control

Compost

- slow release fertilizer
- balanced nutrients
- improves soil structure & soil life
- adds organic matter

2) TYPES OF ORGANIC SOIL AMENDMENTS

Organic Fertilizer

- adds organic matter
- improves soil structure, chemistry & life
- ‘plant food’
- support plant health short- and long-term

Manure

- nutrient rich animal waste
- well-composted
- adds organic matter
- part of the natural nutrient cycle

2) TYPES OF ORGANIC SOIL AMENDMENTS

Cover Crops

- grown during off-season
- protects & enrich soil
- legumes (clover, beans..) as N-fixing crops
- chop & drop, let them die off

Green Manure

- crops grown to be tilled back into soil

3) THE NO-TILL METHOD

Goals:

- increase organic matter
- improve soil health
- moisture conservation (drought resistance)
- reduced labor & fuel costs
- weed management
- carbon sequestration (keep C in the ground)
- increased yield stability
- fewer pests & diseases
- add compost/mulch on soil surface

3) THE NO-TILL METHOD

HOW does it work?:

- let a field go wild (no tilling or seeding)
- no-till drills for seeding & planting
- plan crop rotation
- leave crop residue (decomposes, protects soil, water retention)
- implement IPM (integrated pest management)
- monitor soil health
- keep records, observe
- use organic materials as soil amendments

3) THE NO-TILL METHOD

WHY is tilling detrimental to soil health?:

- strong degradation of soil
- top 6-10" turned over, exposed to air
- disrupts life of soil organisms
- kills earthworms
- damages soil structure & mycelium connections
- exposes soil > erosion
- kills living roots in the soil
- reduces water retention capability > drought, floods
- nutrient loss, loss of organic matter
- chemical fertilizers used to supplement nutrient loss

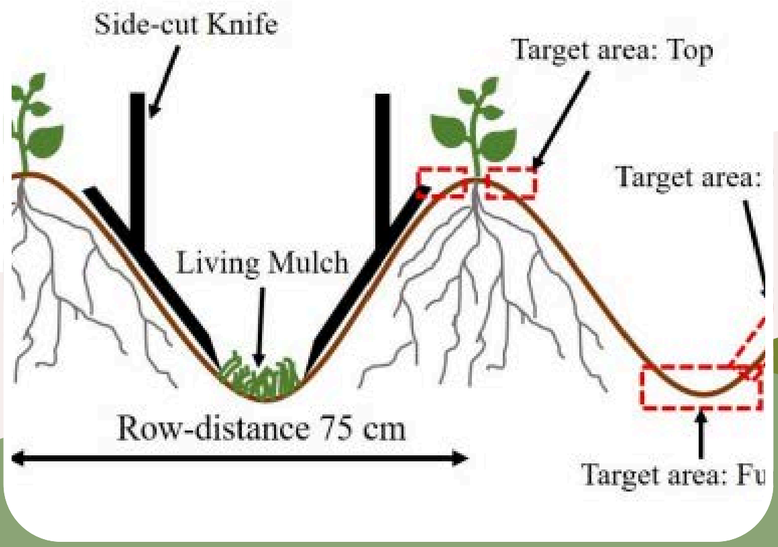
4) ALTERNATIVES TO NO-TILL

Mulch-Till

- parts or all of green manure tilled into soil
- good alternative for poorly drained soil

Ridge-Till

- building raised ridges to plant
- tillage in between ridges
- ideal for furrow irrigation



Strip-Till

- only areas which will get planted tilled in strips
- reduced tilling

5) OTHER APPLICATIONS OF ORGANIC AMENDMENTS

Soil Injection

- water soluble fertilizer injected right into soil close to roots
- includes application through irrigation systems
- manure, liquid fertilizers

www.topcropmanager.com/the-nature-and-role-of-manure-soil-plant-animal-nutrient-linkages/, photo by: Rick Taillieu

Broadcasting

- uniformly spreading of manure or compost over a whole field
- usually at sowing/ planting or during growth period

Compost Tea Application

- leachate or brewed teas
- as foliar spray or onto soil close to plants
- nutrients immediately available to plants

6) ALTERNATIVE AMENDMENTS

BIOCHAR

charred organic material
enhances soil fertility &
sequesters carbon

supports:

- nutrient retention
- soil structure
- microbial communities

VERMICOMPOST

product of the decomposition
process by worms

- rich in nutrient & microbes
- improves soil health
- supports plant growth

LIQUID FERTILIZER

nutrient-rich liquids derived from
organic material
e.g. liquid kelp, fish emulsion

- quick feed
- improves microbial activity

7) CONCLUSUION

ENHANCED LONG-TERM SOIL HEALTH

enriches soil with organic matter through composting and crop rotation; regenerates healthy soil ecosystems; improved water retention & soil structure

BIODIVERSITY CONSERVATION

greater diversity of plants, animals, and insects; creating a balanced and resilient ecosystem; working with nature and following her example

REDUCES RELIANCE ON SYNTHETIC FERTILIZERS

building soil by application of organic matter > a little or no extra nutrient input required; improved plant health; economically better long-term

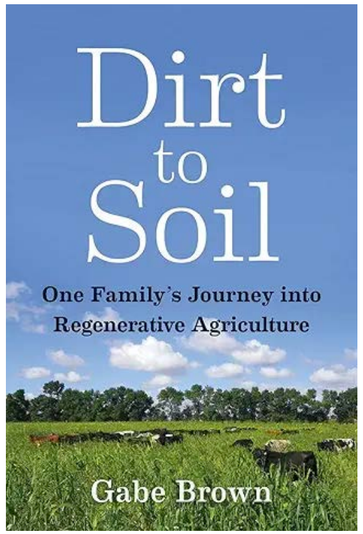
YOUR TURN!

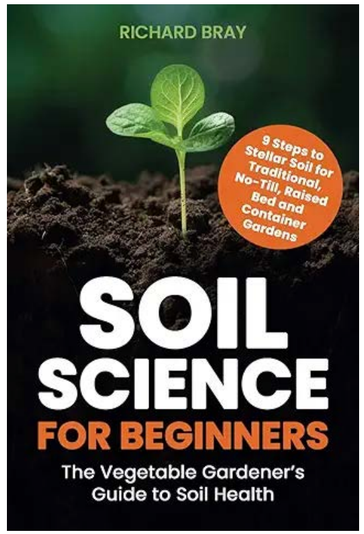
Make your own COMPOST TEA!

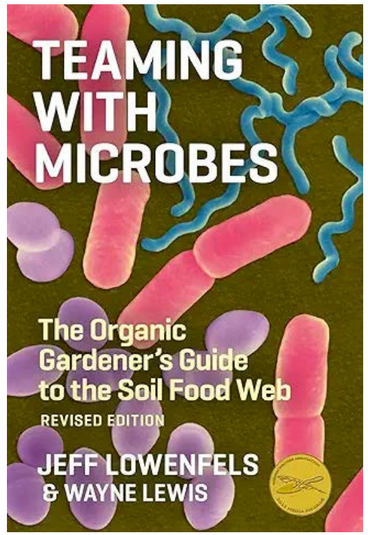
Search online for the recipe that suits you best and create your own homemade organic fertilizer.

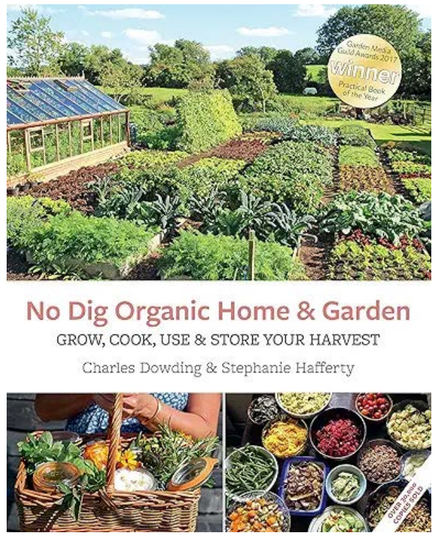
Recommended resource pages:
www.treehugger.com
www.healthy-juice.co

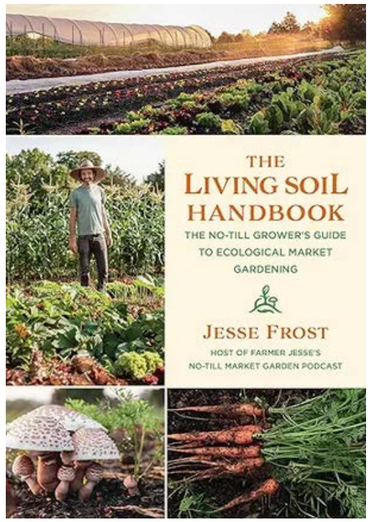
RESOURCES











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Agriculture.canada.ca

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https://agriculture.canada.ca/en/agricultural-production/soil-and-land/soil-management/flexibility-no-till-and-reduced-till-systems-ensures-success-long-term

THANK YOU