

AGRICULTURE @ THE STUDY – TECHNICAL SESSION

FEED THE SOIL:

**INNOVATIONS IN
COMPOSTING FOR SOIL &
CROP HEALTH**

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AGRICULTURE
SUSTAINABLE PRACTICAL FARMING



Feed the Soil

research and knowledge exchange hub for novel organic waste management strategies to build healthy soils and healthy crops

The project

- Building a network of composters
- Virtual hub for research and knowledge exchange
- Targeted field testing to build evidence base



Answering questions about impacts of composting methods on...

Soil
microbiology

Soil physical
health

Greenhouse gas
emissions

Crop yields

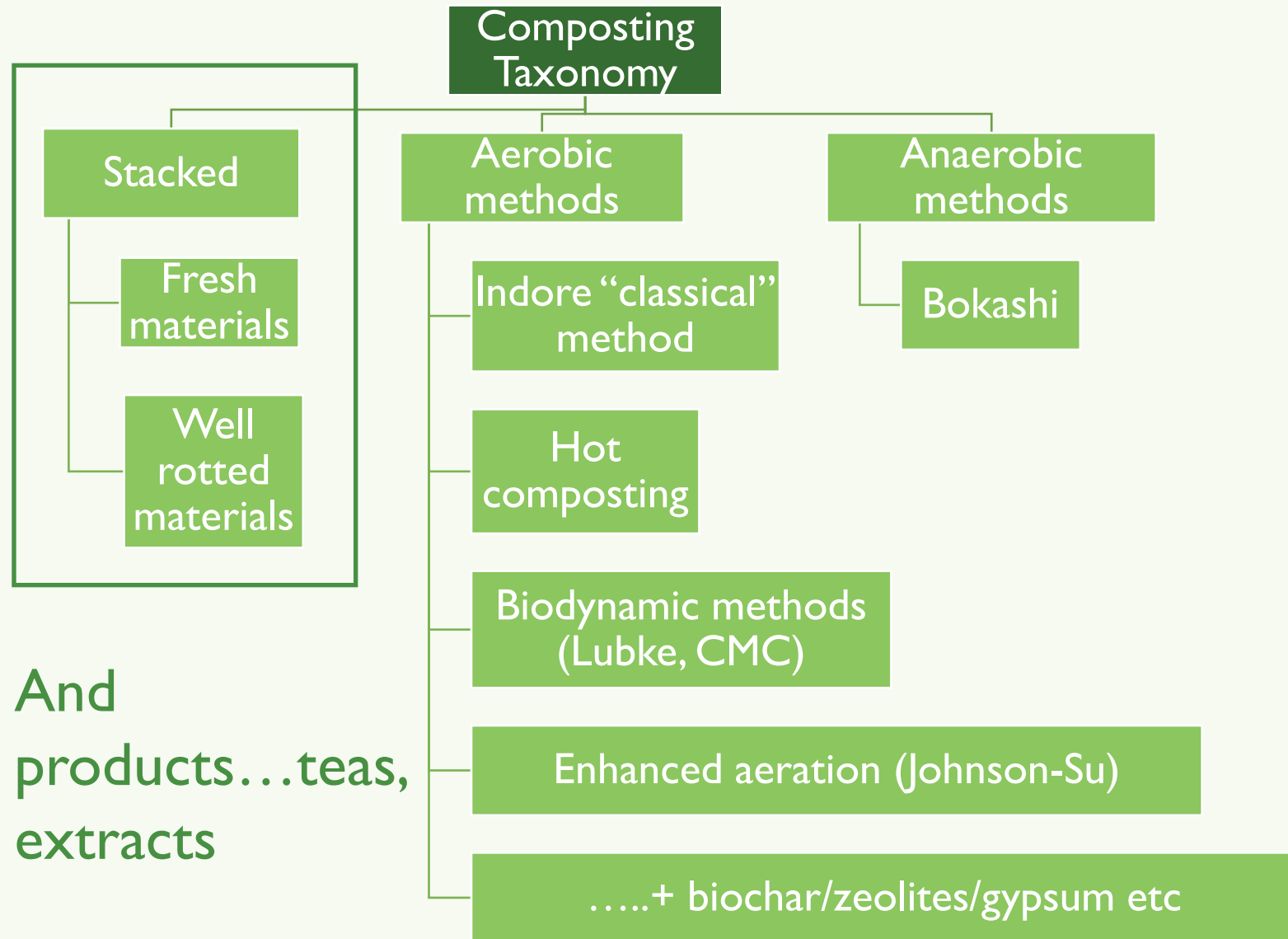
Crop nutritional
quality

Farm
profitability

Phase 1

- Review of peer-reviewed literature and mapping of the landscape in compost methods in the UK
- Build evidence base
- Highlight gaps and questions for the research





And
products...teas,
extracts

Some early patterns

- Biodynamic composting improves soil health and builds stable organic carbon
- Additives like biochar and various chemical compounds (acidic substances, gypsum SSP) can reduce ammonia loss
- Frequent turning increases ammonia loss
- Evidence on teas and extracts (to be compiled)
- And...lots of activity around Bokashi, led by Agriton





Thank you

Any questions?

Feed the Soil Session:

How I make Compost

Several Approaches

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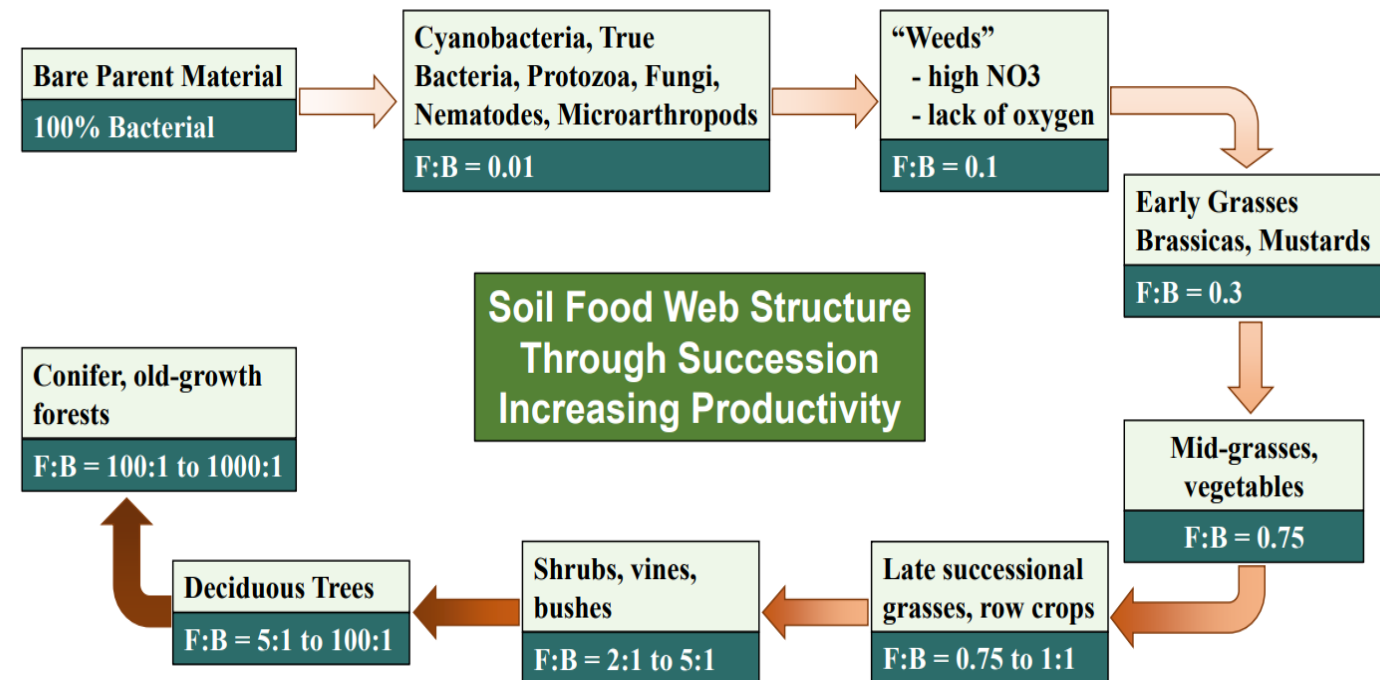
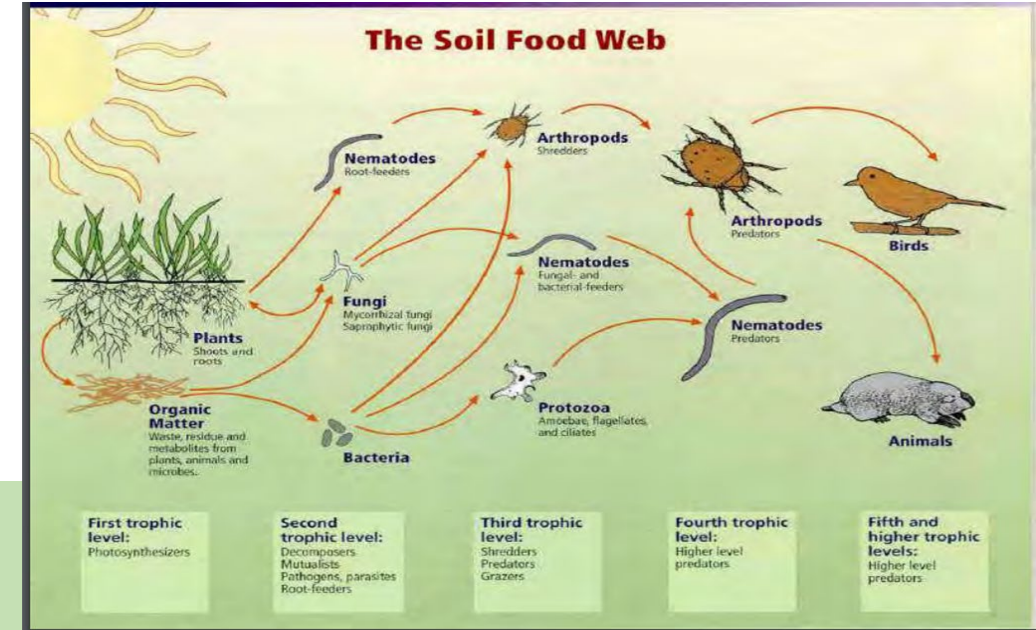
Composting

- What are we trying to achieve?
- Improve land we are using to grow plants – **inoculate**, add humus, improve muck
- Soil Food Web Approach –
 - Marry up the soil microbe community with the desired plant community
- Better soil structure / infiltration
- Boost nutrient cycling
- *“It’s not just about dead organic matter, it is about applying a living matrix”*

Farmarama podcast, 2019

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Composting Plan

- Trials of human-scale methods
- Hot composting
- Vermi-compost
- Johnson-Su bioreactors
- **Compost extracts with brewer**
- SFW microscope testing for microbes
- Trials in our large veg plot
- Making 5t + /yr
- Plan = Bokashi, other amendments

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Kit =

- Make do with what we had
- Readily available, cheap materials where possible
- Bought the tea brewer



Hot Compost

- Aim to make high quality, small batches with diverse inputs
- Leaves, green and woodchip under straw/FYM
- On a pallet, in wire cage
- Ready ~ 1month
- More fungi as it matures
- Re-inoculate new piles with old
- Store next to each other to create a “microbe microclimate”.
- Kit = buckets, pallet, roll of wire, thermometer, tarpaulin

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Vermicompost

- Feed the compost to the worms
- Started with garden sized bin
- Use as seed compost/smear on seeds
- Worms breed rapidly
- Building up with larger containers
- Aim for no leachate

Note:

- Won't get rid of weed seeds

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JS Bioreactors

- Woodchip, muck and grass clipping/weeds
- Keep moist
- 1-2yrs to mature
- Donut shape, air travels 1ft sideways
- Large version 6ft outer ring, 2ft inner



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Compost Extract

- Fill 'tea bag' with compost
- Air pressure 'rolling boil' to remove microbes from compost
- Pump to sprayer
- Spray out

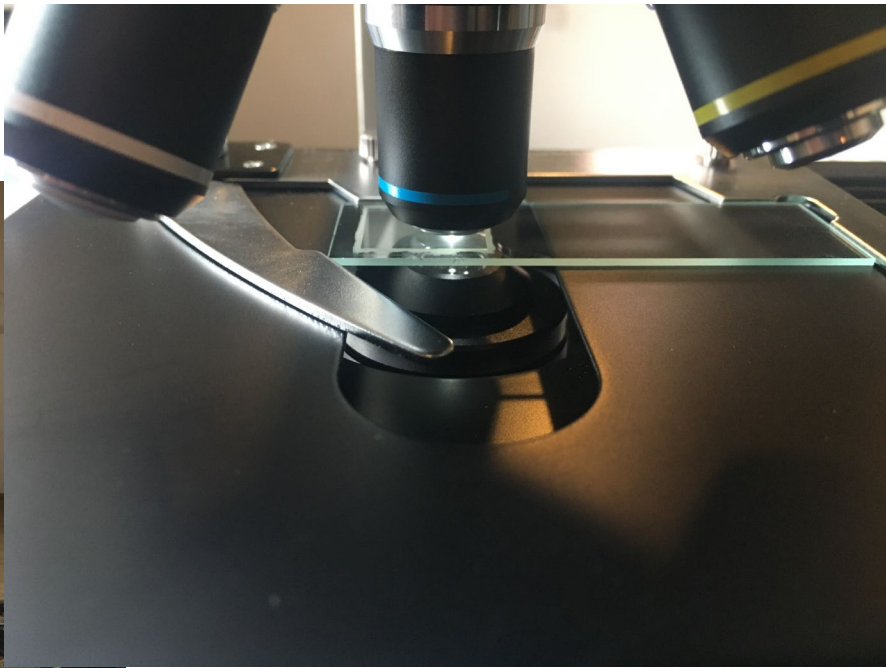


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Compost testing

- Soil Food Web microscope counts.
- Use a microscope to count the microbes – bacteria, fungi, protozoa, nematodes (and larger)
- Improvements noted
- Mixtures of different composts to hit microbe thresholds – esp. fungi



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	Bacteria	Actinobacteria	Fungi	F:B ratio	Oomycetes	Protozoa			Nematodes	
Sample						flagellate	amoeba	ciliates	b,f,p	Root feeders
	µg/mL	µg/mL	µg/mL	ratio	µg/mL	per mL	per mL	per mL	per mL	per mL
Arable	2495	0	0	0	0	0	0	0	0	100
Pasture	1446	0	109	0.08	0	30570	0	0	720	0
Compost	462	0	370	0.8	0	145208	375119	0	6650	0
Desired range	135 to 1350	0	135 to 1350	1	0	>50000	>50000	0	>1	0
Target F:B ratio				1						

Composting – what’s working, challenges, the future?

Working:

- Techniques are sorted – built up to larger scale
- Mix of compost for extracts
- Plenty stored
- Higher Brix v conventional
- Enough N on SAP test,
- Red nodules on legume roots
- Increased water infiltration
- Nutrient cycling
- Links with foliar nutrition

Challenges

- Weather – too dry then too wet
 - Not used the sprayer in poor conditions
 - **Substrate for foliar nutrition**
- Somewhat limited by equipment and cost
 - Getting extract on the seed - liquid applicator
 - Would like to scale up
 - Protein hydrolysates, bokashi (?)

Potential future funding bid –

A “shared” windrow turner that can easily be moved around.





Thank you
&
Any questions?

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