

Composting for Field Crops with Roger Henry

- result is not always good compost, can result in weeds
- mainstay of organic farming
- no one way to do it,
- step 1: what do you have to work with? What will you need? What scale are you going for?
- materials, tools,
- animal manure, 40-60% solid, can be static pile or windrow,
- liquid manure: 5% solid, need aeration and treatment
- slurry: 20% solid, prefers feedstock to make more solid
- Animal manure composting: manure, carbon source (straw), cover for winter composting, capture leachate for liquid treatments
- Snow stops composting because adds so much water
- Even in -15C can compost well because of heat given off (65-70C in 2 days), -20 too cold outside
- Layering in windrows (manure, straw) but not too much volume too not get too much heat, pile up to chest height, 8ft wide at base, each layer about 1ft deep (depends on heating potential of manure, mink manure very strong), too much at once will get too waterlogged and will stop composting. Turn for oxygenation
- Too hot, it turns grey, doesn't need to be turned for more oxygen
- Liquid manure, nothing grows on it, but with aeration, will grow grass on top, can spread it with no smell

Carbon

- Required my microbes to use up nitrogen, as well as water and oxygen
- Ratio of carbon: nitrogen is key, 25-40:1 ratio in initial mix
- Straw = 80:1, Hay= 25:1 (which is why it rots -3x quicker in the field once wet)
- Some source more available than other:
 - o Meat = 4:1 (fish wastes heat up quickly, can be used to fired up a stagnant pile)
 - o Molasses in liquid manure for stimulation
 - o Potatoes = 8:1
 - o Hay, 25:1
 - o Leaves/straw, 80:1 (more structure in final product than wood)
 - o Peat: nice texture to final product, 200:1
 - o Wood materials, like sawdust (250:1), also absorbs and smothers odour (like carcasses), takes longer to break down, need to make sure it is all composted before using it or will rob N from crop, but not available much anymore
 - o Paper mill sludge:250:1, but no structure so needs wood chips to add air circulation
- Different characteristics
- Straw is one of only sources of carbon, or leaves from municipality, or sea grass from sea
- Manure spreaders good for mixing, give different shapes, some better than others

- Sawdust and potato (or apple) mix, layer of sawdust with V filled with potatoes, need to add more potatoes 6 weeks later to break down all sawdust carbon
- Sugary materials (apples, potatoes): alcohol > vinegar, if pH below 5.3, microbes die, so need buffer in mix at 30:1 to counteract acid (wood ashes, manure, limestone)
- For getting a kick on land from compost, need 15:1, but for long term carbon building, can use 20:1 but kick will be next year and crops this year will be robbed of manure
- Lobster shells can be spread directly on land (beside potatoes, not on top), no need to crush them even, or mix with straw, sawdust,

Turning:

- Adds air, chopping, mixing
- Method: turners, loaders, manure spreaders, moving pile
- Bottom will be wetter, can be anaerobic and smelly and varmint
- Don't need to clean turner after

Water:

- 45-60% is ideal
- Want about 50% water below 40% or over 65% moisture the composting stops (smells like septic if too much water)
- If too much, see leachate around edge of pile, smell anaerobic smell, like 60+%
- Can cone up almost ready piles if lots of rain is coming
- Squeeze test about 1 month in can identify moisture level, want a small bead of water forming at end, means 55% moisture
- Too hot, can water with cold water to manage temperature
- Want to set up compost where can add water if needed
- Like baking a cake
- Mushrooms on top are a good sign
- Need space between windrows for drainage
- If pile dries out, make them bigger so less surface area, or add water

Temperatures:

- 30C is slow process, nothing happening below that (except vermicomposting)
- low temps lose the least amount of carbon
- 40C kills all weed seeds, must be whole pile for 4 hours, not just edge, f
- tomato seeds are hardest to kill
- 55C is very active composting, potential for high amount of carbon and nitrogen loss, usually halves the volume, can even catch fire! For 3 days is pathogen kill
- he aims for 50C
- can lose 70% of nitrogen if not done properly
- carbon lost in CO₂, inevitable, nitrogen absorbed in bugs bodies so want them to die in pile but can be lost as ammonia when turned over
- 55C for 3 days was considered safe for pathogen kill

Compost Maturity

- depends on colour, odour, texture, C:N ratio
- field crops do not need lost of compost
- aged manure has nitrogen tied up so will add N over season, not right away
- smell is minimal, texture is fairly consistent

- should be spread before weeds start to grow but shows that compost is ready for use
- mushrooms growing is fine

Application Rates:

- can spread with spreader over tarp then weigh (more precise), or calibrate spreader per area spread
- Average values:
- N=.35-1%
- P= (will leach out)
- K= (not lost in air or leach)
- Need 100 units of nitrogen for corn, 50 for barley (but only half available in first year)

Summary:

- Contain manure, collect liquids
- Add P to manure (ex. rock P)
- Select system that fit far and schedule
- Monitor how much putting on
- Put compost pile in poor part of field

Organic Standards:

- must be 55C for 3 days to be compost, takes monitoring and bookkeeping
- can call it aged manure instead so don't need record but do need to keep track of application time instead
- but they may not ask
- Covers not usually worth the money and wasted after 2-3 times used and air not able to get under, straw is better if no weeds in it because on top seeds will not be killed
- Piles with woodchips make not even need to be turned, but screen out chips at the end
- Ammonium nitrate and leaves made beautiful compost, not organic
- Small scale can get away with almost anything