Organic soil amendments; the effects on of composts and manures on soil fertility and crop performance

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Garden Organic

garden organic
the national charity for organic growing

Types of amendments

- Farm yard manure (various species and bedding types)
- Slurry
- Composted farm wastes
- Green waste compost (bought in or made on site)
- Digestate (from anaerobic digestion)
- Sewage sludge!

Reasons for using soil amendments

- Addition of organic matter to improve soil structure
- Addition of plant nutrients
- Modifying the availability of nutrients
- Disposal of wastes

Potential problems

- Oversupply of plant nutrients (possible nitrate leaching risk)
- Pest and disease issues
- Issues with regulations
- Contamination issues (heavy metals, inert fragments, gm residues)

Characteristics (can be very variable)

Material	DM (%)	Total (kg/t fresh wt)			Readily available (% of total)		
		N	P_2O_5	K_2O	N	P	K
FYM	25	6.0	3.5	8.0	25	60	60
Cattle slurry	6	3.0	1.2	3.5	30-50	50	90
Sewage sludge	25	7.5	8.7	0.8	15	50	100
Green waste compost	66	7.3	3.0	5.5	<10	15	50

Contamination issues

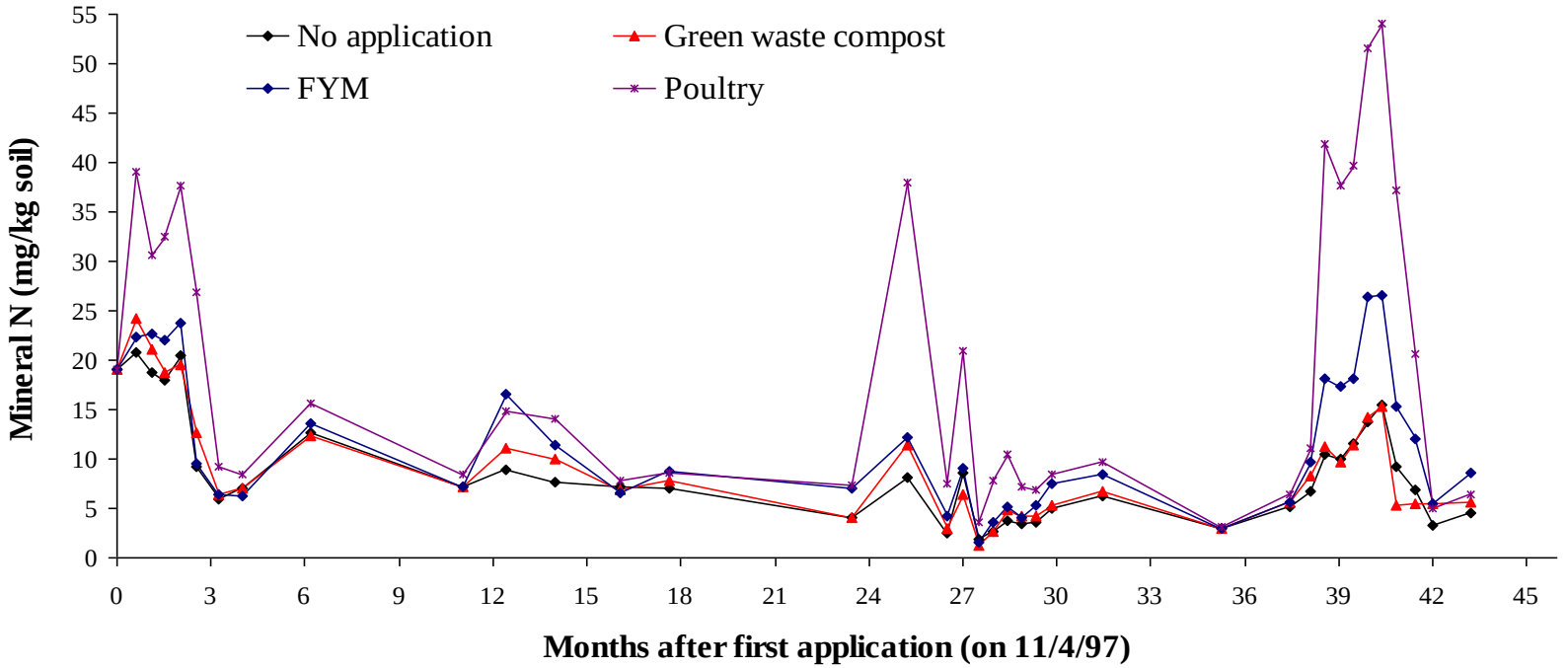
- Compost acceptable for use in organic agriculture must be produced according to PAS 100 specifications
- These lay down maximum limits for heavy metals,glass, metal, plastic and weed seeds
- There are difficulties with using food derived composts because of their potential gmo content

Effects in the field

Many trials have been done over the years but there is a lack of information about the long term effects of repeated applications.

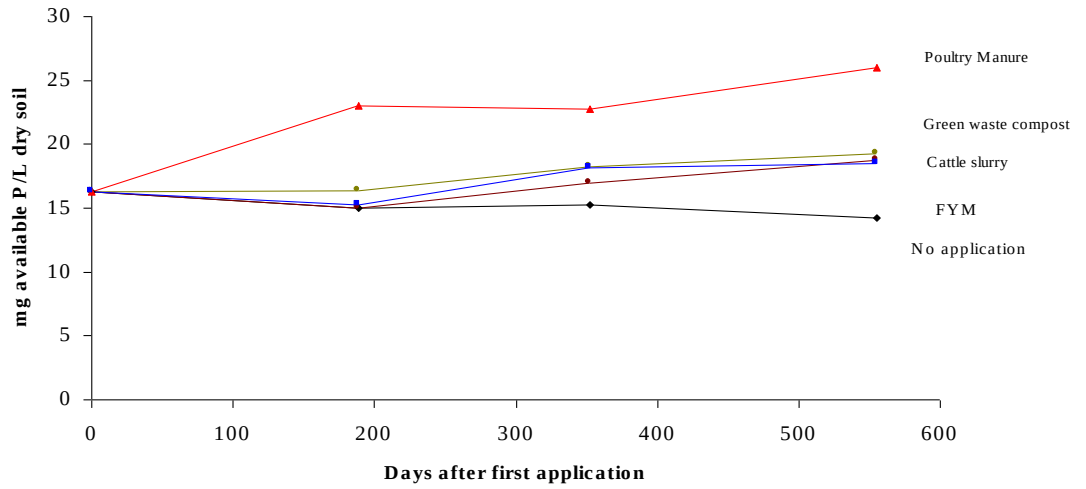
This is particularly the case with regard to organic matter changes and nitrogen supply

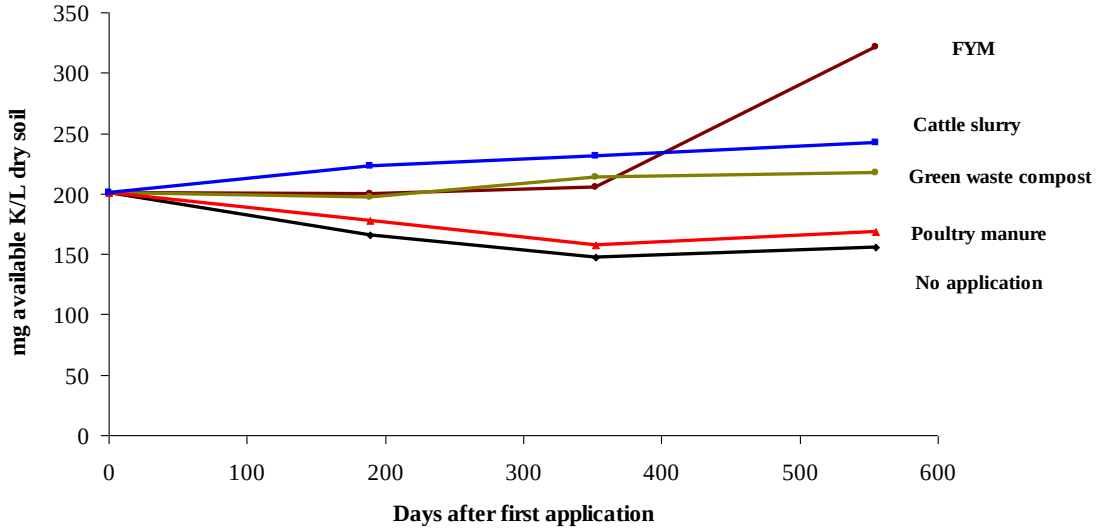
Effects on soil nutrients - nitrogen



- All amendments increased available nitrogen immediately after application
- The increased nitrogen concentrations last for around 5 months
- Poultry manure had the most pronounced effect

Effects on soil nutrients – P and K

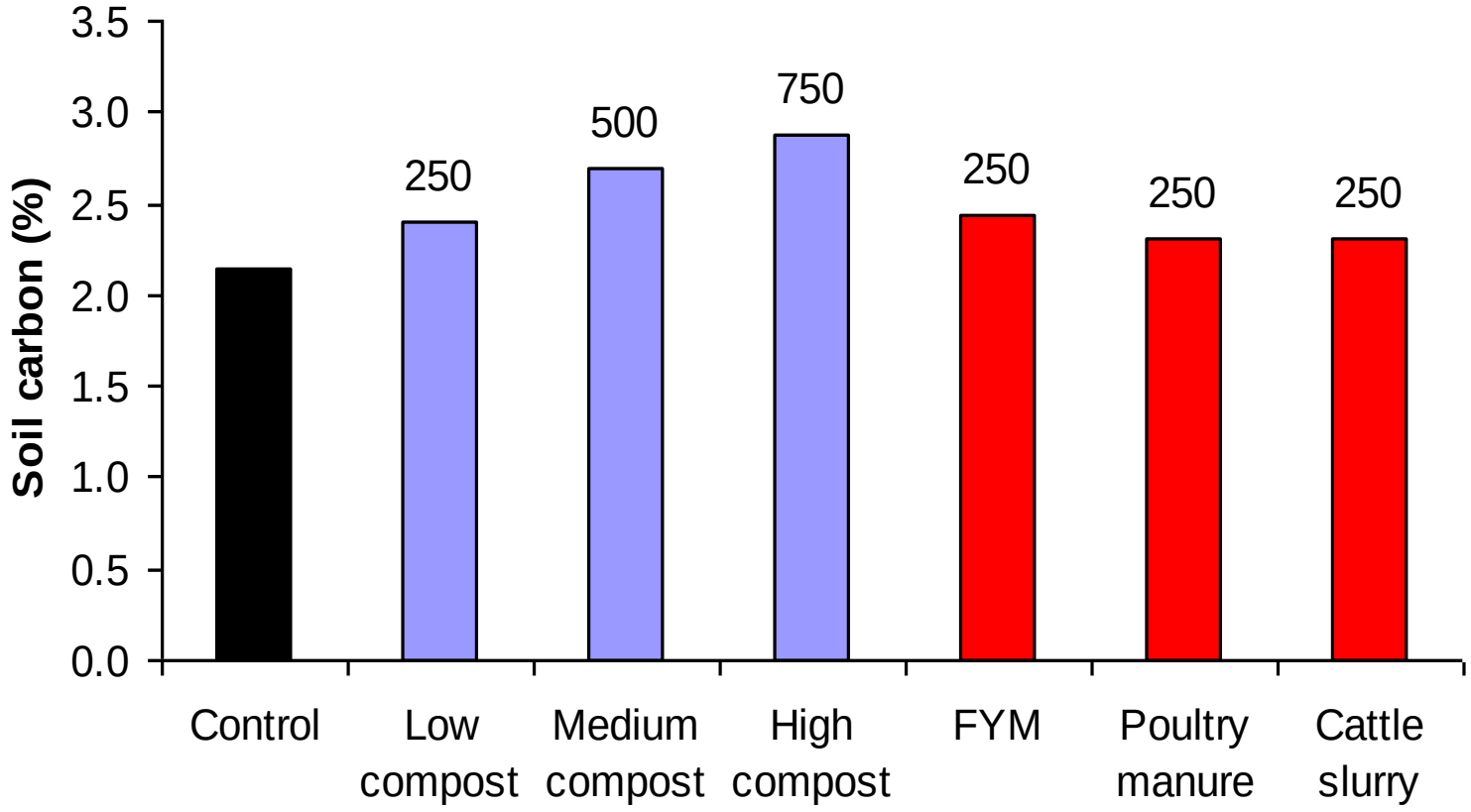




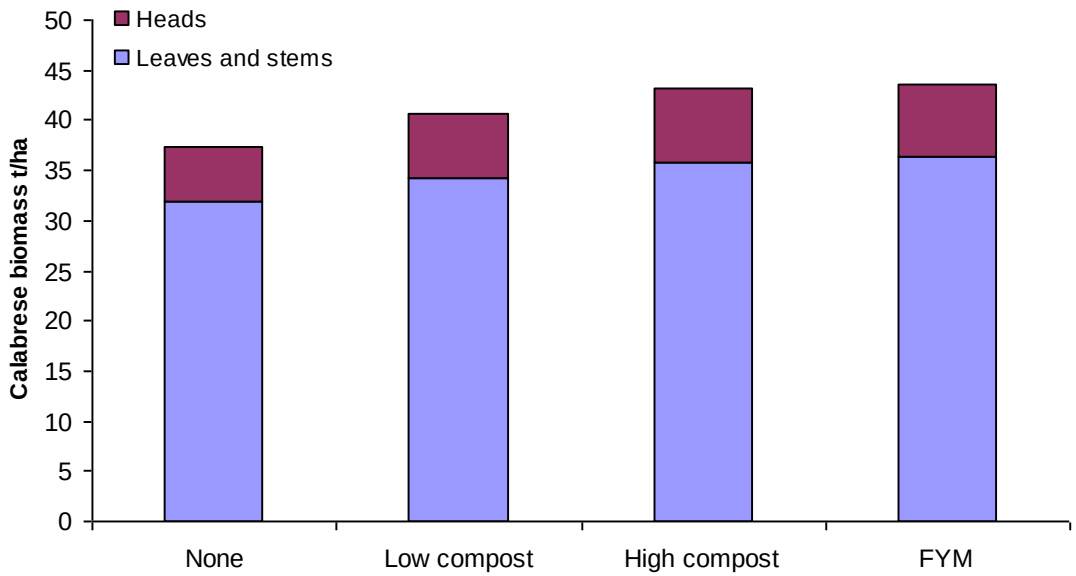
- Poultry manure is a good source of phosphorus
- FYM is a reasonable source of potassium
- Green waste compost is a good source of both P and K

Effects on soil organic matter

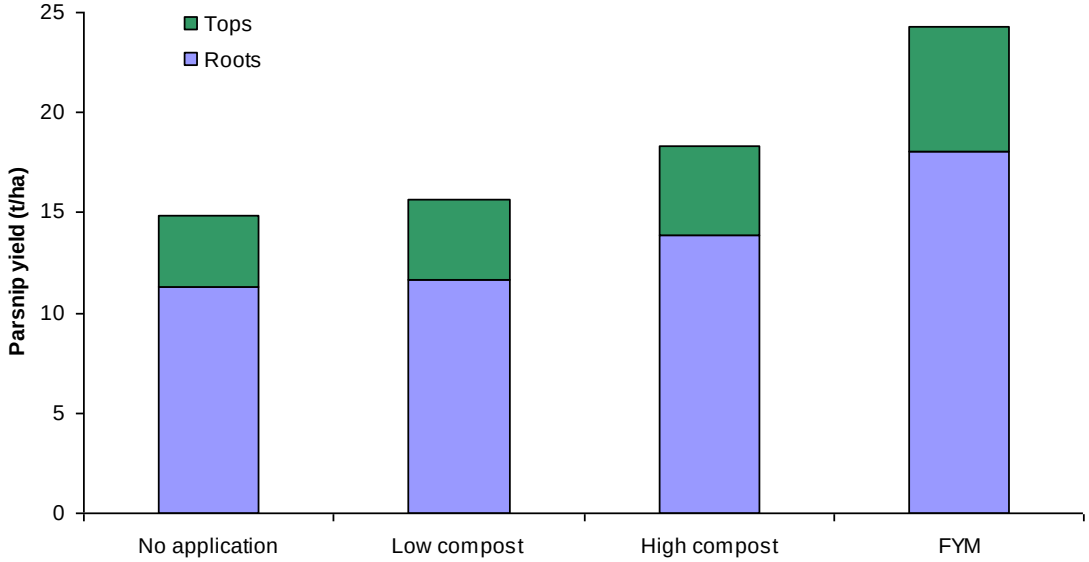
Measurements made after four annual applications which supplied nitrogen at the rates indicated below (kg/ha)



Effects on yield – single applications

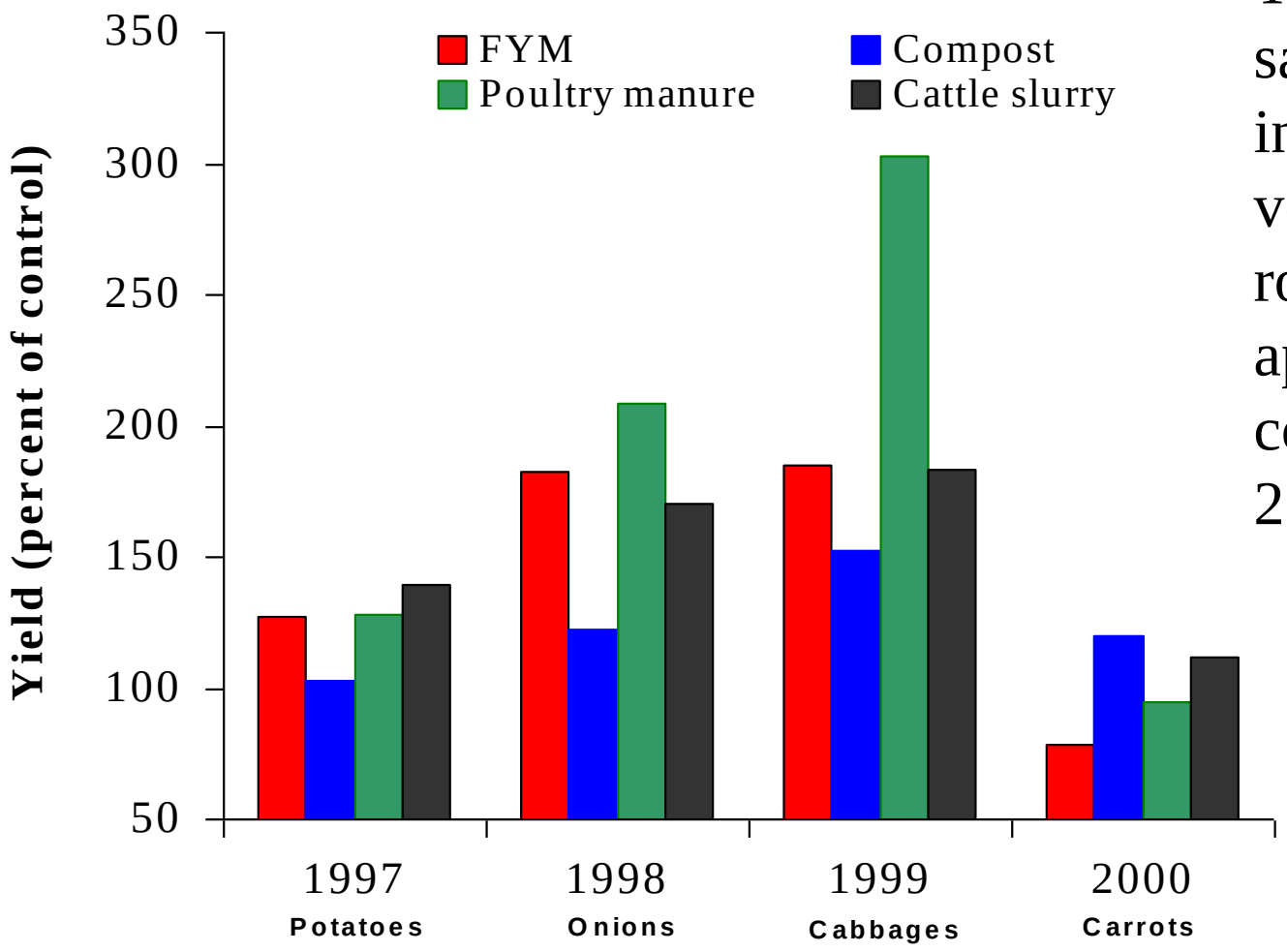


Trial on an organic sandy silt loam



Trial on a sandy loam

Effects on yield – repeated applications



Trial on a sandy loam soil in a field vegetable rotation; annual applications containing 250kgN/ha

Conclusions

- Manures and composts can be a valuable source of organic matter and plant nutrients to help maintain soil fertility
- Overuse can cause problems with environmental pollution
- There can be a range of issues when these materials are brought onto an organic farm from outside
- There may be occasions when similar benefits can be gained from using a fertility building crop

Acknowledgements

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