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## Overview: Investigate soil health specifically measurements of soil biology under different land uses and with different management practices

### Datasets:

- 48 grassland experimental plots
- 54 grassland fields
- 3 agroforestry + 3 goodland
- 40 arable experimental plots
- 20 arable fields

**Table 1. Soil Measurements taken**

<b>Soil Biology</b>	β-Glucosidase	Solvita soil burst test	Ergosterol	Phospholipid fatty acid analysis	Earthworms
<b>Soil Structure</b>	Penetrologger	Bulk density			
<b>Soil Chemistry</b>	Total N	Total C	Olsen P	Total P	K Mg S

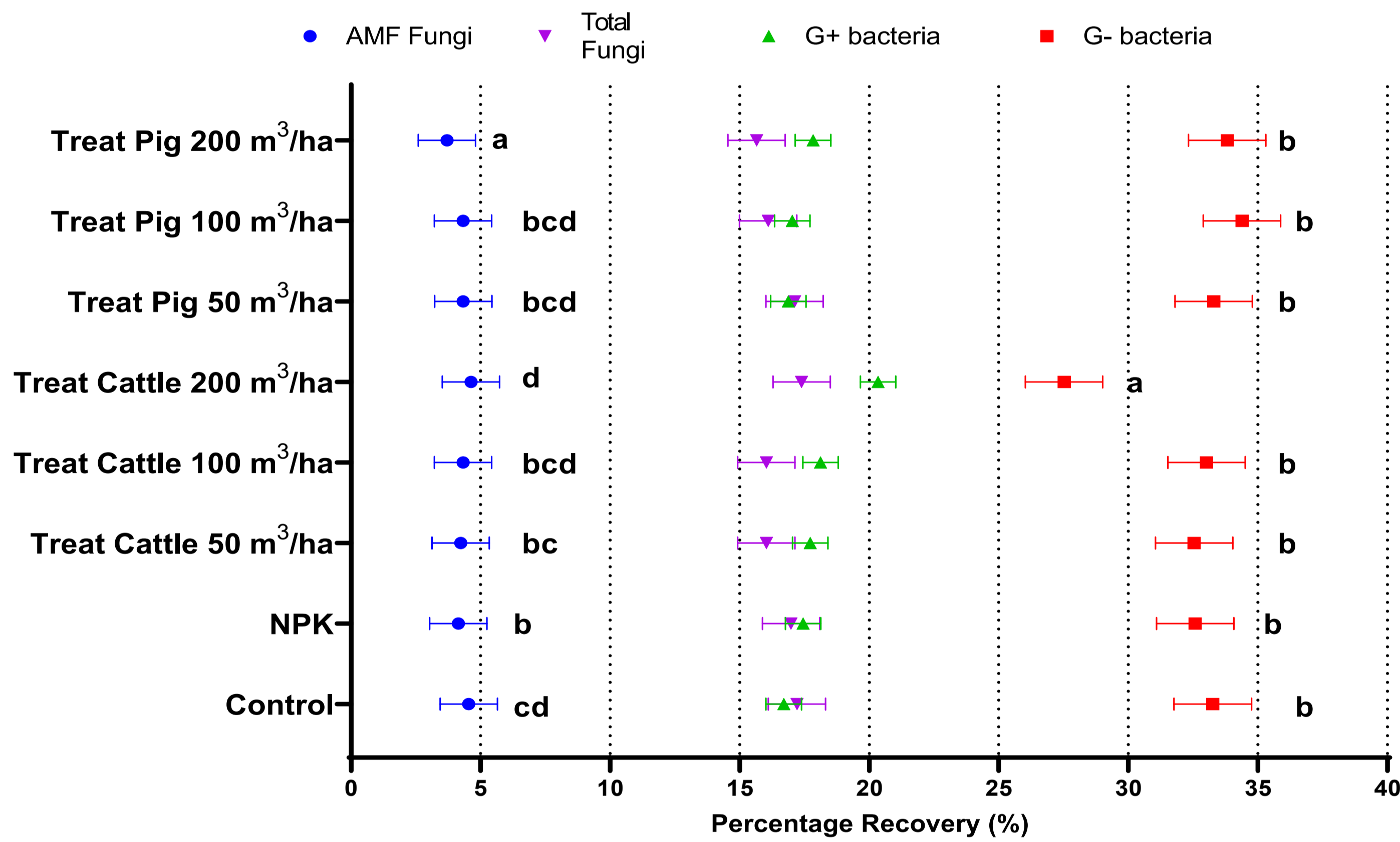
### Emerging results:

- ✓ Solvita soil burst measurement better suited to grassland versus arable
- ✓ In general, microbial biomass is high under grassland but is low in arable situations

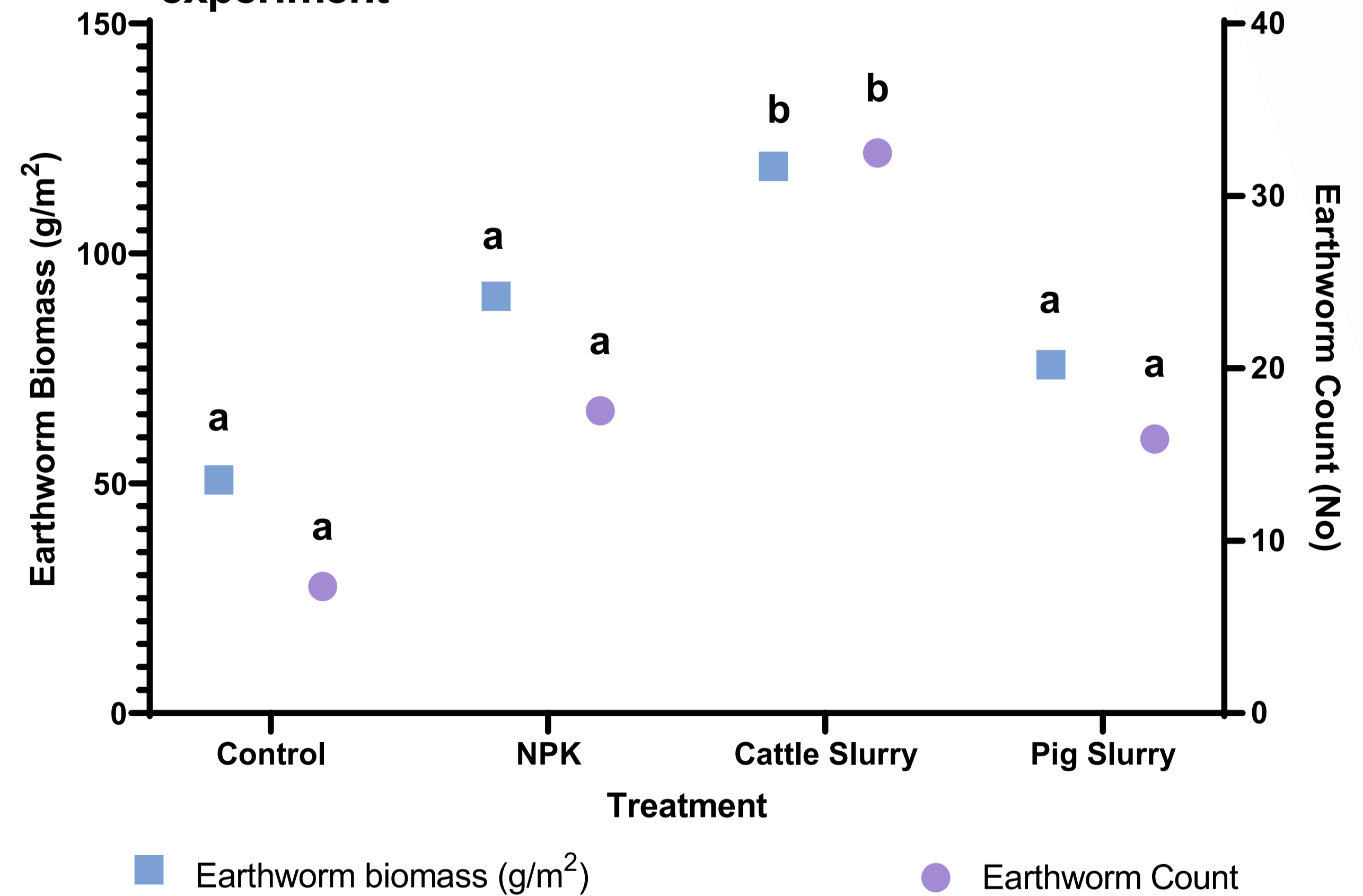
**Table 2. Average measurements per land use**

Parameter	Soil Microbial biomass (mg C kg <sup>-1</sup> )	Solvita Mean DCR Reading (ppm)	B-Glucosidase (μmol g <sup>-1</sup> h <sup>-1</sup> )	N =
<b>Arable</b>	1522	104	0.11	60
<b>Grassland</b>	2891	152	0.17	105
<b>Woodland</b>	2931	172	0.20	3
<b>Agroforestry</b>	2941	119	0.13	3
<b>Average</b>	2412	135	0.15	

**Phospholipid fatty acid analysis from a long term grassland experiment**



**Earthworm biomass (g/m<sup>2</sup>) and earthworm numbers for various manures applied to a long term grassland experiment**



Treatments were applied at the rates indicated since 1970 and were measured in 2021 for microbial community structure  
Gram - bacteria rely on plant carbon sources  
Gram + bacteria rely on soil organic matter

**Table 3. Effect of different organic amendments on arable soil microbial biomass and Solvita values**

Parameter	Organic amendment					Statistical Analysis	
	Control	Dairy	Digestate	Fertiliser	Pig	Prob	SED
<b>Solvita Mean DCR Reading (ppm)</b>	70.90a	92.58b	91.88b	69.30a	92.44b	<b>P&lt;0.05</b>	7.279
<b>Soil Microbial biomass (mg C kg<sup>-1</sup>)</b>	1526	1650	1759	1650	1748	0.574	155.2



### Benefits for industry:

- Provide recommendations on useable soil biological measurements at farm level
- Provide recommendations for good, average and poor levels of the various measurements
- Provide recommendations on areas for improvement
- Feed into the AHDB Soil Health Score Card for Northern Ireland**

