Practical Worm Counts to Monitor Soil Health

Producers Conference Organic Research Centre
January 2017

Tolhurst Organic Partnership CIC

The farm business

- Established organic 1976
- Present site 24 years stockfree
- Produce over 70 crops-100tonnes pa
- Self sufficient system
- Local sales

The trial

- Testing and comparing soil assessment for specific horticultural systems

Focus on:

- Soil organic matter
- Increased soil life
- NRM soil health test
- Visual assessment
- Earthworms

The Trials site

Trials site cropping

The field rotation

Year 1+2

Undersown long term GM

Year 3

O.winter green manure

Year7

O.W G M

Year6

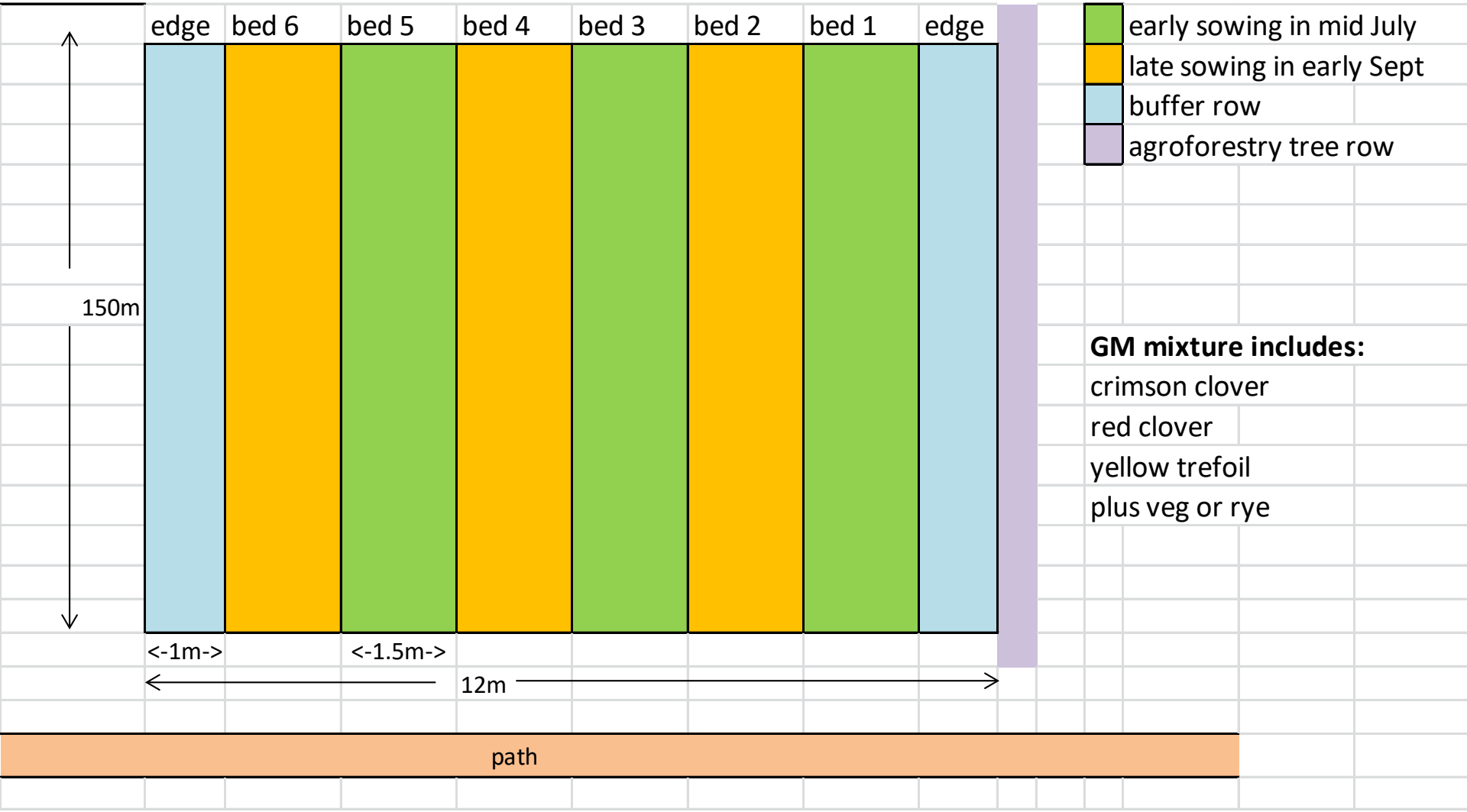
Year 5

O.W Gm

Green manure: grazing rye/crimson red clover/yellow trefoil

First GM sown mid July, second sown early September

Trial layout



SOIL HEALTH

REPORT

nrm laboratories

2015 International Year of Soils

Report No. 25531	**Cropping:**	**Farm Details:**	**Client:** L703
Sample No. 312550	*No cropping details given*	A VIEWEGER ORC ELM FARM RG20 0HR SOIL	RESEARCH DEPARTMENT ELM FARM RESEARCH CENTR HAMSTEAD MARSHALL NEWBURY BERKSHIRE RG20 0HR
Sample Ref. TOL 1	**Field Area:** .5 Ha		
Date Received: 22/07/2016	**Date Reported:** 29/07/2016		

Soil Chemical Analysis

	Index	Result	Low	Marginal	Target	Marginal	High
P	3	32.0 mg/l					
K	2-	149 mg/l					
Mg	2	82.7 mg/l					
Organic Matter (LOI)		6.1%	*Level data not available for this crop*				

			Very Acid	Acid	Neutral	Alkali	Very Alkali
Soil pH		6.6					

Where no future crop code has been given, levels are calculated assuming an arable crop. If general fertiliser and lime recommendations have been requested, these are given on the following sheets. The analytical methods used are as described in DEFRA Reference Book 427. The index values are determined from the DEFRA Fertiliser Recommendations RD209 8th Edition (Appendix 4).

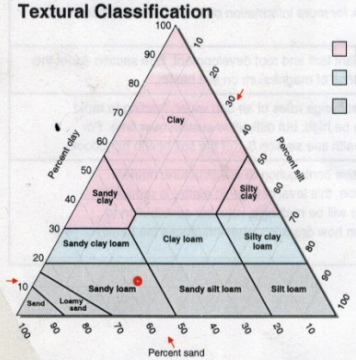
Microbial Activity

	Index	Result	Very Low	Low	Moderate-Low	Moderate	High
CO_2 Burst	5.0	> 162 mg/kg					

Potential N Mineralisation (kg/ha/yr) - Based on CO_2 Burst

Very Low (<15) | Low (15-25) | Moderate-Low (25-45) | Moderate (45-75) | **High (75-105)**

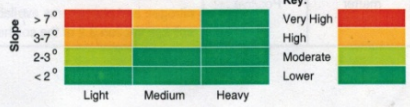
Textural Classification



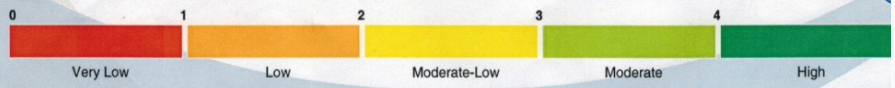
Heavy Soil
Medium Soil
Light Soil

Breakdown:	Sand **56%**	Silt **32%**	Clay **12%**
Soil Textural Class:	Sandy Loam		
Major Soil Classification:	Medium		
Slope:	0°		

Water Erosion Risk



Soil Health Index - Based on soil chemical, physical and biological results.



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SOIL HEALTH

REPORT

nrm laboratories

Report No. 35386	**Cropping:**	**Farm Details:**	**Client:** L703
Sample No. 322808	*No cropping details given*	ORC HAMSTEAD MARSHALL ELM FARM RG20 0HR SOIL	RESEARCH DEPARTMENT ELM FARM RESEARCH CENTR HAMSTEAD MARSHALL NEWBURY BERKSHIRE RG20 0HR
Sample Ref. TOLLY CONTROL	**Field Area:** .5 Ac		
Date Received: 11/10/2016	**Date Reported:** 14/10/2016		

Soil Chemical Analysis

	Index	Result	Low	Marginal	Target	Marginal	High
P	2	25.2 mg/l					
K	1	93.5 mg/l					
Mg	2	80.8 mg/l					
Organic Matter (LOI)		5.7%	*Level data not available for this crop*				

			Very Acid	Acid	Neutral	Alkali	Very Alkali
Soil pH		6.8					

Where no future crop code has been given, levels are calculated assuming an arable crop. If general fertiliser and lime recommendations have been requested, these are given on the following sheets. The analytical methods used are as described in DEFRA Reference Book 427. The index values are determined from the DEFRA Fertiliser Recommendations RD209 8th Edition (Appendix 4).

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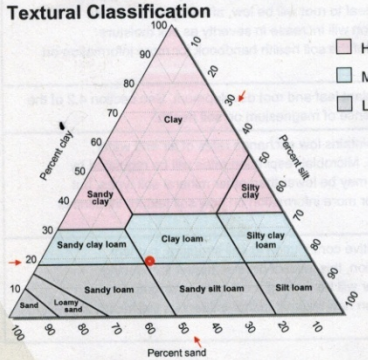
Textural Classification

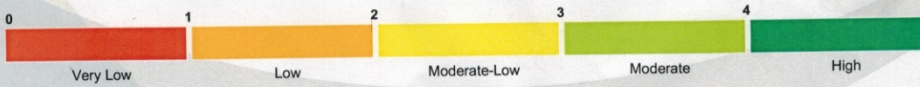


Heavy Soil
Medium Soil
Light Soil

Breakdown:	Sand **48%**	Silt **33%**	Clay **19%**
Soil Textural Class:	Clay Loam		
Major Soil Classification:	Medium		
Slope:	0°		

Water Erosion Risk

Soil Health Index - Based on soil chemical, physical and biological results.



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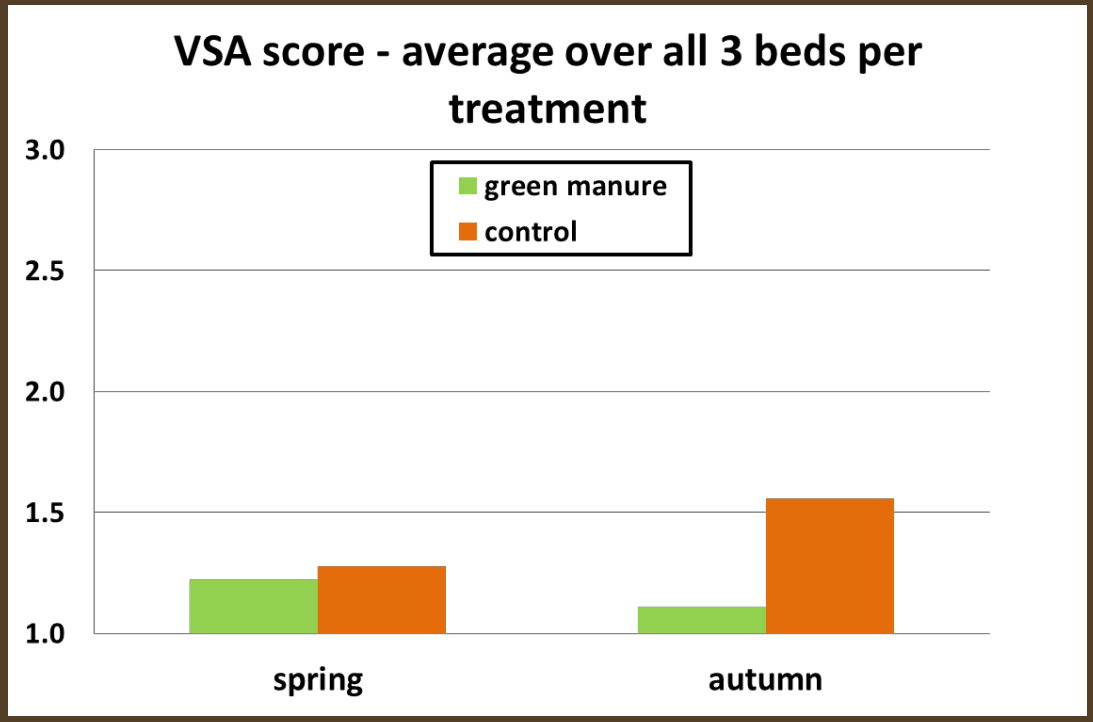
Soil Health Report

	First Sampling - Spring 2016			Autumn 2016		
Location	**Tolly**					
Sample Ref.	TOL Cont.	TOL Green		TOL Cont.	TOL Green	
			AVERAGE			AVERAGE
Soil Chemical Analysis						
P (mg/l)	32	35.6	33.8	25.2	25.4	25.3
K (mg/l)	149	115	132	93.5	72.9	83.2
Mg (mg/l)	82.7	73.7	78.2	80.8	75.9	78.35
Organic Matter (LOI) (%)	6.10	6.20	6.15	5.7	5.8	5.75
Soil pH	6.6	7.2	6.9	6.8	7	6.9
Microbal Activity						
CO2 Burst (mg/kg)	> 162	134	134	162	155	158.5
Pot. N Mineralisation (kg/ha/yr)	75-105	75-105		75-105	75-105	
Textural Classification						
Sand (%)	56	52	54	48	53	50.5
Silt (%)	32	35	33.5	33	30	31.5
Clay (%)	12	13	12.5	19	17	18
Soil Textural Class	Sandy Loam	Sandy Loam		Clay Loam	Sandy Loam	
Major Soil Classification	Medium	Medium		Medium	Medium	
Soil Health Index	5	4.9	4.95	5	4.9	4.95

Visual Soil Assessment

Bed	Score spring	Score autumn
1a	1	1
1b	2	1
1c	1	1
2a	1	1
2b	1.5	1
2c	1	1
3a	1	1
3b	1	1
3c	1	1
4a	1	2
4b	2	2
4c	1	1
5a	1	1
5b	1.5	1
5c	1.5	2
6a	1	2
6b	2	2
6c	1	2

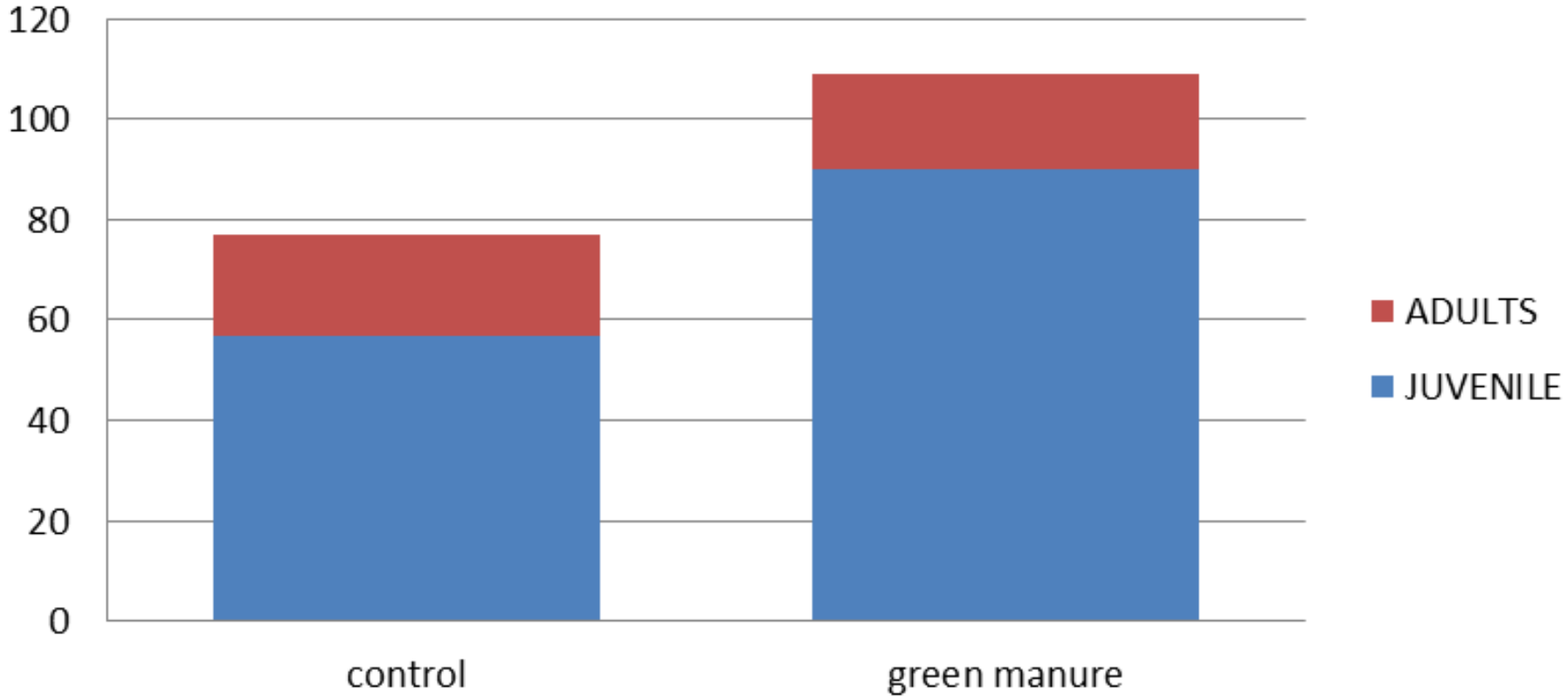


VSA Eblex-DairyCo method:
1=friable; 5=very compact

The earthworm populations

Total earthworm numbers per treatment

Tolhurst, October 2016



Total earthworm numbers per bed

Tolhurst, October 2016