

Supplementary material for

Research paper: bovine urine inhibits microbial function and increases urea turn-over in dairy grazed soils.

S. M. Lambie^{A,B}, N. W. H. Mason^A and P. L. Mudge^A

^AManaaki Whenua – Landcare Research, Private Bag 3127, Hamilton, New Zealand.

^BCorresponding author. Email: lambies@landcareresearch.co.nz

Table S1: Summary of soils used in multi-substrate induced respiration and community level physiological profiling analysis and some of their properties.

Soil Name	Soil Order ^a	Bulk Density (g cm ⁻³)	Total C ^b (%)	Total N ^b (%)	pH ^c	EC ^d (dS m ⁻¹)	MBC ^e (mg kg ⁻¹)	Clay ^f (%)	GPS
Ohaupo	Allophanic	0.67 (0.04)	8.59 (0.23)	0.90 (0.02)	5.8 (0.1)	0.216 (0.019)	309	-	-37°91'S 175°29'E
Tirau	Allophanic	0.68 (0.03)	9.86 (0.32)	0.96 (0.04)	6.4 (0.1)	0.279 (0.022)	273	-	-37°99'S 175°88'E

Egmont	Allophanic	0.72 (0.02)	9.87 (0.28)	0.97 (0.03)	5.6 (0.1)	0.187 (0.014)	247	23	-39°62'S 174°36'E
Stratford	Allophanic	0.76 (0.02)	8.68 (0.34)	0.94 (0.03)	5.6 (0.1)	0.232 (0.021)	296	-	-39°46'S 174.22°E
Lowgarth	Allophanic	0.69 (0.01)	8.56 (0.78)	0.88 (0.08)	5.8 (0.1)	0.268 (0.035)	287	-	-39°39'S 174°22'E
Oaonui	Allophanic	0.51 (0.03)	14.57 (0.27)	1.44 (0.03)	5.7 (0.1)	0.368 (0.040)	325	14	-39°39'S 173°88'E
Awatuna	Allophanic	0.56 (0.02)	12.35 (0.23)	1.17 (0.01)	5.5 (0.04)	0.172 (0.006)	346	16	-39°32'S 173°81'E
Warea	Allophanic	0.54 (0.01)	13.52 (0.84)	1.31 (0.06)	5.3 (0.1)	0.217 (0.011)	230	29	-39°32'S 173°82'E
Waitara	Allophanic	0.71 (0.01)	9.76 (0.41)	1.00 (0.04)	6.1 (0.05)	0.227 (0.031)	318	24	-39°00'S 174°27'E
Hopai 1	Gley	0.78 (0.02)	7.86 (0.49)	0.79 (0.05)	6.4 (0.1)	0.237 (0.041)	352	69	-37°32'S 175°51'E

Hopai 2	Gley	0.63 (0.04)	8.03 (0.42)	0.82 (0.03)	5.6 (0.1)	0.417 (0.022)	174	69	-37°26'S 175°51'E
Elstow	Gley	0.86 (0.02)	6.21 (0.13)	0.64 (0.01)	5.4 (0.1)	0.242 (0.004)	249	58	-37°42'S 175°50'E
Waitoa 1	Gley	0.77 (0.03)	5.18 (0.27)	0.50 (0.03)	6.3 (0.1)	0.213 (0.011)	302	8	-37°65'S 175°67'E
Waitoa 2	Gley	0.74 (0.02)	6.01 (0.48)	0.58 (0.04)	5.1 (0.1)	0.231 (0.012)	225	-	-37°92'S 175°74'E
Wharepiana	Gley	0.61 (0.05)	8.16 (0.58)	0.78 (0.05)	5.3 (0.1)	0.322 (0.027)	247	-	-38°51'S 176°35'E
Rahotu	Gley	0.71 (0.01)	7.80 (0.19)	0.76 (0.01)	5.4 (0.03)	0.200 (0.034)	250	8	-39°37'S 173°80'E
Kairanga	Gley	1.04 (0.03)	4.48 (0.11)	0.44 (0.01)	5.7 (0.1)	0.150 (0.024)	117	37	-40°74'S 175°12'E
Shannon	Gley	0.96 (0.08)	4.37 (0.15)	0.40 (0.01)	5.5 (0.1)	0.152 (0.003)	208	20	-40°77'S 175°18'E

Papamoa	Brown	0.83 (0.01)	5.82 (0.65)	0.51 (0.05)	6.0 (0.1)	0.227 (0.021)	147	7	-37°98'S 177°35'E
Opouriao	Brown	0.95 (0.04)	4.23 (0.34)	0.43 (0.03)	5.7 (0.1)	0.188 (0.032)	285	19	-38°06'S 177°28'E
Silverdale	Brown	0.80 (0.06)	8.02 (0.85)	0.83 (0.09)	5.4 (0.2)	0.245 (0.020)	252	27	-37°78'S 175°32'E
Kukumoa	Recent	0.94 (0.02)	3.72 (0.04)	0.36 (0.004)	6.5 (0.04)	0.181 (0.004)	251	14	-38°00'S 177°27'E
Kopeopeo	Recent	0.83 (0.03)	6.35 (0.19)	0.57 (0.02)	6.8 (0.1)	0.155 (0.021)	274	-	-37°96'S 176°92'E
Motuiti	Recent	1.08 (0.09)	2.40 (0.45)	0.25 (0.04)	4.9 (0.1)	0.281 (0.055)	39	4	-40°78'S 175°09'E
Rangitikei	Recent	1.22 (0.03)	2.53 (0.05)	0.28 (0.01)	6.2 (0.1)	0.109 (0.001)	134	18	-40°79'S 175°18'E
Manawatu	Recent	1.25 (0.03)	2.48 (0.10)	0.26 (0.01)	5.5 (0.1)	0.089 (0.004)	125	11	-40°53'S 175°34'E

Waitatuna	Recent	0.79 (0.01)	5.36 (0.17)	0.58 (0.01)	5.7 (0.1)	0.202 (0.001)	296	-	-37°87'S
Valley									175°83'E

^aNew Zealand soil classification (Hewitt 1993).

^bLECO combustion furnace on air dried (35°C) soils

^c1.25 soil:solution (weight/volume) in water on air dried (35°C) soils

^d1.5 soil:solution (weight volume) in water on air dried (35°C) soils

^eEstimated by substrate-induced respiration (Anderson and Domsch 1978)

^fData from the National Soils Database, clay content determined using X-Ray sedigraph

Table S2: Principle components analysis axis loading values for visual assessment of community level physiological profiles derived from multi-substrate induced respiration (MicroResp™) analysis.

Substrate	PCA Axis 1	PCA Axis 2
Arabinose	0.28	-0.68
Citric acid	-0.54	-0.02
D-Glucose	0.65	0.17
D(-) Fructose	0.70	-0.30
D(+) Galactose	0.69	-0.07
DL-Malic acid	-0.58	0.04
Glycine	0.61	0.03
L-Alanine	0.37	-0.33
L-Arginine	-0.64	-0.40
L-Glutamine	0.50	-0.45
L-Lysine	-0.63	-0.22
Sucrose	0.64	-0.07
Trehalose	0.73	0.25
Urea	-0.05	0.90
Yeast extract	0.26	0.77