Appendix A

Table A1 Total rainfall in mm per month at Tygerhoek over years for the period 2003-2007

	2003	2004	2005	2006	2007
January	58.4	324.4	236.1	77.0	4.3
February	477.7	0	840.9	4.0	13.5
March	0	14.4	22.4	36.0	11.6
April	32.0	29.8	22.4	79.0	21.6
May	36.8	1.8	78.6	44.4	31.2
June	14.6	16.6	2.5	24.2	22.5
July	11.2	17.6	3.3	83.8	36.1
August	16.2	6.6	26.3	83.3	11.7
September	24.0	65.6	0.6	8.4	9.5
October	25.2	73.6	1.4	16.2	28.9
November	4.2	233.2	54.2	18.1	205.7
December	281.0	236.4	7.2	17.3	73.1
Total annual rainfall	981.3	1020.0	1295.9	491.7	469.7

Figure A1 Crop residue plots in the field

Figure A2 Crops grown in residue plots in the field

Figure A3 Petri dishes with seeds to obtain leachates in the incubator

Figure A4 Arrangement of donor pots to obtain leachates in the greenhouse

Figure A5 Arrangement of acceptor pots for treatment with leachates in the greenhouse

Table A2 Genetic and morphological analyses of *Lolium* spp in Area A

	Italian rye grass	Rye grass hybrid type	Perennial rye grass		Rigid rye grass	
	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis
A1	x	x				
A2					x	x
A3					x	x
A4					x	x
A5	x	x				
A6					x	x
A7					x	x
A8					x	x
A9					x	x
A10	x	x				

Table A3 Genetic and morphological analyses of *Lolium* spp in Area B

	Italian rye grass	Rye grass hybrid type	Perennial rye grass		Rigid rye grass	
	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis
B1	x	x				
B2	x	x				
B3	x	x				
B4	x	x				
B5	x	x				
B6					x	x
B7					x	x
B8		x	x			
B9			x	x		
B10	x	x				

Table A4 Genetic and morphological analyses of *Lolium* spp in Area C

	Italian rye grass	Rye grass hybrid type	Perennial rye grass		Rigid rye grass	
	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis
C1					x	x
C2	x	x				
C3	x	x				
C4	x	x				
C5	x	x				

C6	x	x				
C7		x	x			
C8	x	x				
C9					x	x
C10	x	x				

Table A5 Genetic and morphological analyses of *Lolium* spp in Area D

	Italian rye grass	Rye grass hybrid type	Perennial rye grass		Rigid rye grass	
	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis	Genetic analysis	Morphological analysis
D1					x	x
D2					x	x
D3					x	x
D4					x	x
D5	x					x
D6					x	x
D7					x	x
D8					x	x
D9					x	x
D10					x	x

Carbon source	No
Water	C1
ß-Methyl-D-Glucoside	C2
D-Galactonic Acid *y*-Lactone	C3
L-Arginine	C4
Pyruvic Acid Methyl Ester	C5
D-Xylose	C6
D-Galacturonic Acid	C7
L-Asparagine	C8
Tween 40	C9
I-Erythritol	C10
2-Hydroxy-Benzoic Acid	C11
L-Phenylalanine	C12
Tween 80	C13
D-Mannitol	C14
4-Hydroxy Benzoic Acid	C15
L-Serine	C16
α-Cyclodextrin	C17
N-Acetyl-D-Glucosamine	C18
y-Hydroxibutyric Acid	C19
L-Threonine	C20
Glycogen	C21
D-Glucosaminic Acid	C22
Itatonic Acid	C23
Glycyl-L-Glutamic Acid	C24
D-Cellobiose	C25
Glucose-1-Phosphate	C26
α-Ketobutyric Acid	C27
Phenylehthylamine	C28
α-D-Lactose	C29
D,L-α-Glycerol Phosphate	C30
D-Mallic Acid	C31
Putrecine	C32

Table A6 Carbon sources used by the Biolog EcoPlate™ for micro-organism community analysis

Table A7 Soil analyses for soils collected at Langgewens or Tygerhoek

Locality	**Langgewens**		**Tygerhoek**	
Soil properties	Value	Unit	Value	Unit
pH	6.3		5.2	
Resistance	850	Ohms	460	Ohms
Texture	Sandy loam		Loam	
Acidity	0.89	cmol(+)/kg	0.71	cmol(+)/kg
Calcium	3.96	cmol(+)/kg	3.45	cmol(+)/kg
Magnesium	0.75	cmol(+)/kg	1.78	cmol(+)/kg
Potassium	220	mg/kg	305	mg/kg
Sodium	23	mg/kg	63	mg/kg

P (citric acid)	99	mg/kg	40	mg/kg
Total cations	5.38	cmol(+)/kg	6.99	cmol(+)/kg
Copper	1.63	mg/kg	1.26	mg/kg
Zinc	5.59	mg/kg	1.58	mg/kg
Manganese	191.3	mg/kg	120.20	mg/kg
Sulphur	3.61	mg/kg	9.84	mg/kg
Boron	0.32	mg/kg	1.49	mg/kg
Carbon	0.98	%	1.55	%

Table A8 Pearson correlation matrix used for principal component analysis (PCA) to determine the correlation among growth rate and effects of root leachate treatments on physiological profiling of soil micro-organisms for *H. vulgare* and *T. aestivum* for Langgewens and Tygerhoek soils

	H Vulgare		*T. aestivum*	
Carbon source	Langewens	Tygerhoek	Langewens	Tygerhoek
C2_1	-0.639		-0.342	
C3_1	-0.329		0.072	
C4_1	-0.123	-0.144	0.054	0.126
C5_1	-0.099	0.328	-0.388	0.432
C6_1	0.118	0.445		0.636
C7_1	0.405		0.639	
C9_1	-0.099		0.054	
C11_1				0.547
C12_1	0.633			-0.031
C13_1	-0.099		-0.403	
C14_1	0.370		-0.019	
C15_1	-0.477	-0.342	0.054	
C16_1	-0.227		0.375	
C17_1		0.445		-0.461
C18_1	-0.083		-0.446	
C19_1	-0.462	-0.373	0.519	-0.194
C21_1	-0.477	-0.018		0.135
C22_1	-0.246			0.636
C23_1	-0.098	0.322	0.054	0.436
C25_1	-0.639		-0.074	
C26_1	-0.464		0.154	
C28_1		-0.468	0.119	0.336
C29_1		-0.012		0.347
C30_1		0.445		0.547
C31_1	-0.396	-0.274	0.547	
C32_1	0.118	-0.091	0.547	
C2_2		-0.342	0.196	
C4_2		-0.011		-0.547
C5_2		-0.011	-0.457	-0.513
C6_2	-0.350	-0.373	0.794	-0.432
C9_2		0.328		
C10_2			0.119	
C12_2	0.462	-0.325	0.515	0.461
C13_2		0.328		-0.314
C15_2	-0.699	-0.342	0.639	-0.132
C17_2	-0.033	-0.373	0.196	
C18_2	-0.699		-0.256	
C19_2				-0.786
C21_2	-0.033	-0.373	0.196	-0.692
C22_2	-0.478	-0.758	0.688	-0.477
C23_2	-0.633	-0.042	0.074	-0.152
C24_2	0.118	-0.511	0.547	
C25_2			0.519	
C26_2	-0.350		0.196	
C28_2	-0.222	-0.325	0.547	-0.323
C29_2	-0.350	-0.373	0.196	-0.314
C31_2	-0.911	-0.144	0.020	-0.636
C32_2	-0.699	0.328	0.141	

Table A9 Pearson correlation matrix used for principal component analysis (PCA) to determine the correlation among growth rate and the effects of root leachate treatments on physiological profiling of soil micro-organisms for *L. albus* v. Tanjil and *L. albus* v. Quilinock for Langgewens and Tygerhoek soils

	L. albus v. Tanjil		*L. albus* v. Quilnock	
Carbon source	Langgewens	Tygerhoek	Langgewens	Tygerhoek
C2_1	0.502			
C3_1	0.117			
C4_1		0.810	-0.020	0.359
C5_1	0.531			
C6_1	0.762	0.281	0.629	-0.086
C7_1	0.531			
C10_1				0.469
C11_1		-0.255		
C12_1	-0.256	0.037		0.888
C13_1			0.528	
C14_1	0.117		-0.152	
C15_1		-0.552		-0.339
C16_1	0.117			
C17_1	0.502	0.427		-0.045
C18_1	0.531			
C19_1		-0.190		0.120
C20_1		0.179		
C21_1	0.502	0.110		-0.339
C22_1	0.608	0.810	0.359	-0.086
C23_1	0.762	-0.255		-0.086
C24_1	-0.034	0.607		-0.229
C25_1	0.502			
C26_1	0.502	0.584		
C28_1	-0.103	-0.650	0.174	0.560
C29_1	-0.359	0.584	-0.321	-0.086
C31_1	0.430		-0.147	0.229
C32_1			0.174	
C2_2	0.762		0.597	
C3_2	-0.281		0.243	
C4_2	-0.174		-0.443	
C5_2	0.359		0.173	
C6_2		-0.380	0.317	0.229
C7_2	0.430		0.243	
C9_2	-0.793		0.071	
C10_2				-0.216
C12_2		-0.259		0.229
C13_2			0.071	
C14_2	-0.454		-0.443	
C15_2	0.117		0.038	
C16_2	-0.693		0.071	
C17_2	-0.359	0.110	0.261	
C18_2	-0.174		-0.367	
C19_2			0.071	-0.339
C21_2	0.052	-0.442	0.261	
C22_2	0.217	0.179	-0.092	0.359
C23_2	-0.079	-0.441	-0.092	
C24_2				0.339
C25_2	-0.174		0.597	
C26_2	-0.243		0.853	
C28_2	0.247		0.020	-0.085
C29_2		0.110	0.317	0.229
C30_2		-0.255		-0.281
C31_2	-0.161		0.038	
C32_2	0.410	-0.128	0.261	0.212

Table A10 Pearson correlation matrix used for principal component analysis (PCA) to determine the correlation among growth rate and the effects of root leachate treatments on physiological profiling of soil micro-organisms for *L. multiflorum* v. Energa and *L. multiflorum x perenne* for Langgewens and Tygerhoek soils

	L. multiflorum v. Energa		*L. multiflorum x perenne*	
Carbon source	Langgewens	Tygerhoek	Langgewens	Tygerhoek
C2_1	-0.042			-0.178
C4_1		0.618		-0.639
C5_1			-0.690	-0.345
C6_1	-0.422	-0.317	-0.690	-0.655
C9_1		0.453		
C10_1	-0.127	-0.786		
C12_1	-0.127	0.642	-0.186	0.843
C13_1			-0.783	
C15_1			0.304	-0.178
C17_1	-0.042	0.786	-0.483	-0.282
C18_1		0.453	-0.690	-0.178
C19_1		0.326		
C20_1		-0.232		
C21_1	-0.192	0.632	-0.483	-0.657
C22_1	-0.565	-0.317	-0.783	-0.621
C23_1	0.511	0.732	-0.498	-0.324
C24_1		0.153		
C25_1	0.511		-0.690	-0.178
C26-1	-0.783		-0.690	-0.178
C28-1	0.513	0.103	-0.583	0.450
C29_1		0.234	-0.437	-0.630
C30-1		-0.451		
C31-1	-0.142		-0.580	0.225
C32_1		-0.584	-0.362	-0.639
C2_2	-0.162		0.275	-0.450
C3_2	-0.096		0.255	
C4_2	-0.096	-0.142	-0.098	
C5-2	0.321		-0.186	-0.843
C6_2	0.050	0.203		-0.895
C9-2			-0.021	
C10_2		0.775		
C12_2		0.609	0.671	-0.138
C13_2			-0.362	
C14_2	-0.096		0.583	
C15_2	0.260		-0.098	
C16_2	0.260		-0.098	
C17_2	0.445	-0.153		-0.895
C18_2	0.050		-0.783	
C19_2		0.326	-0.321	
C21_2	0.199	-0.153	0.038	-0.895
C22_2	0.445	-0.584		-0.657
C23_2	0.084		0.352	
C24_2		0.624		
C25_2	0.599		-0.030	
C26_2	0.599		-0.186	
C28_2		-0.142		0.133
C29_2	0.050	0.509		-0.895
C30_2				-0.324
C31_2	0.422		-0.304	-0.450
C32_2	0.260	-0.142	-0.570	