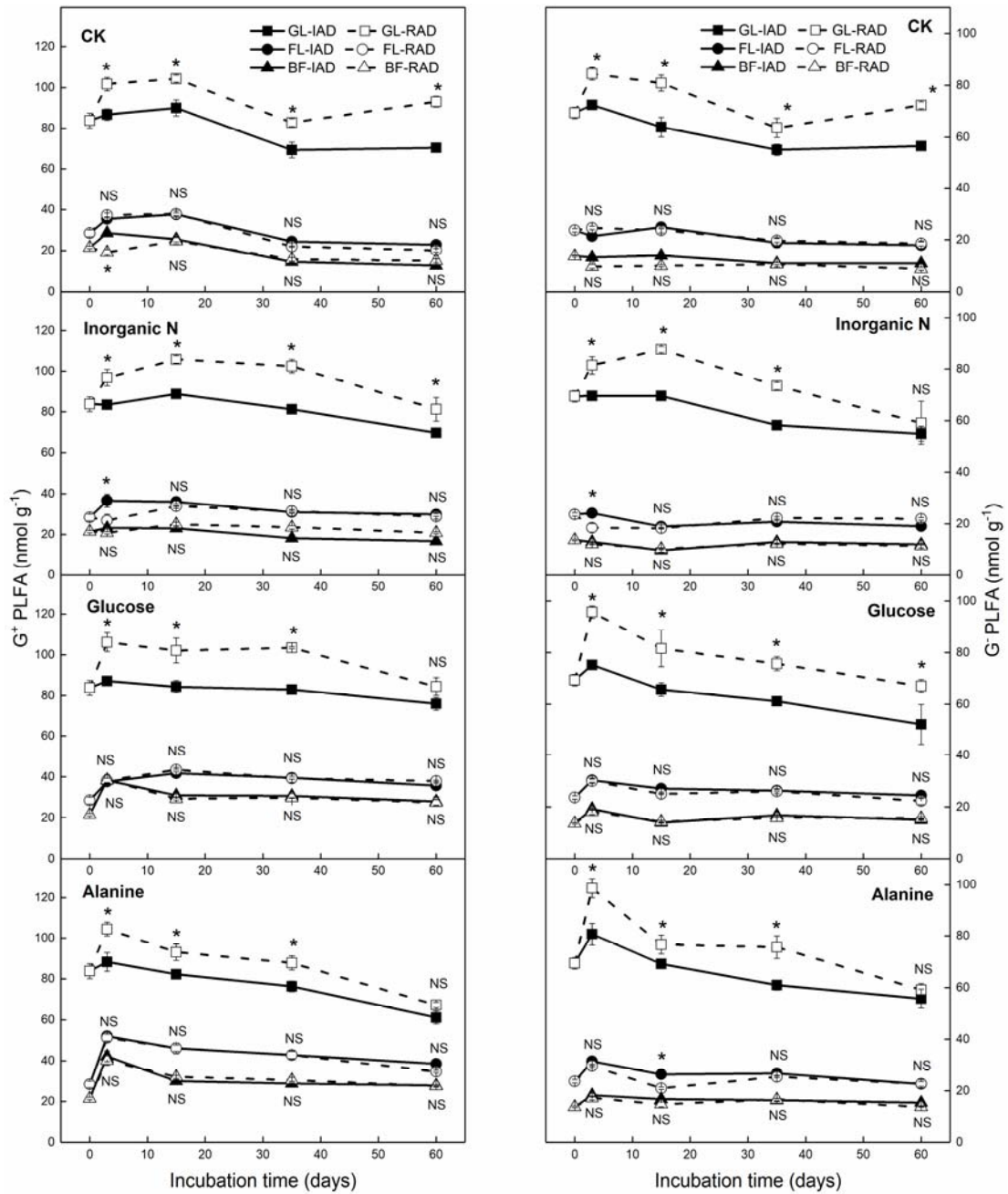


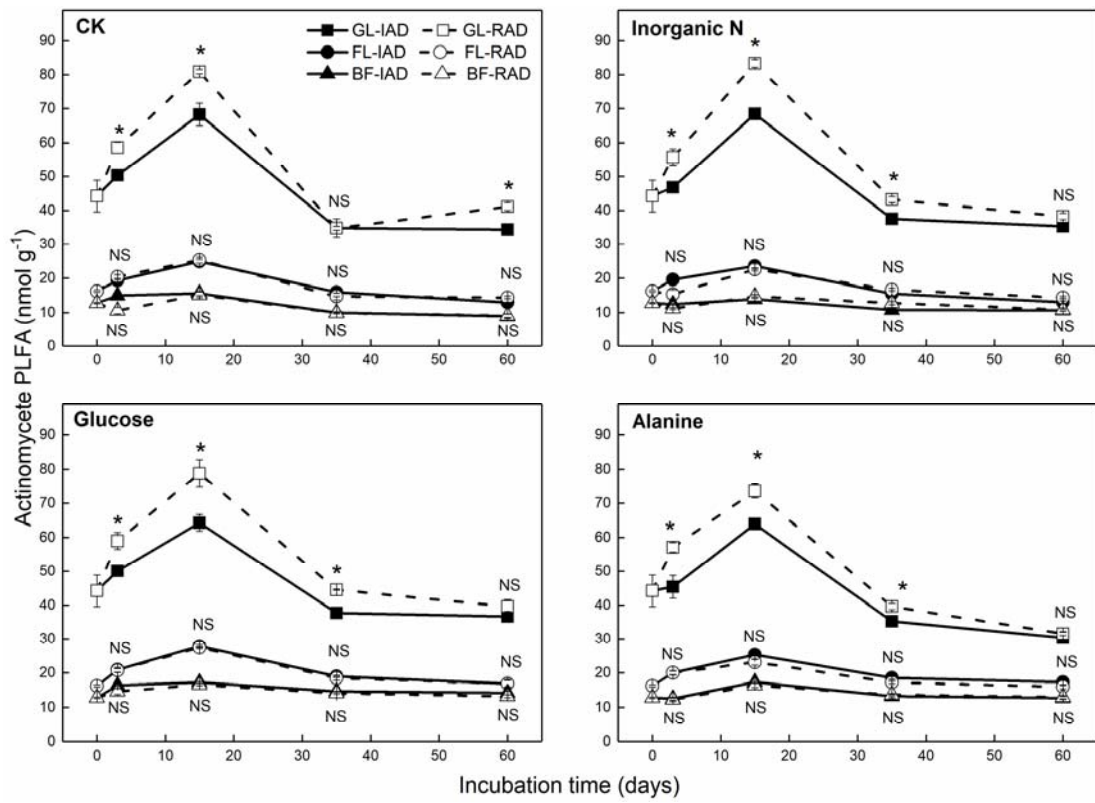
Appendix A. Initial characteristics of the soils used in the incubations.

	SOC (g kg <sup>-1</sup> )	DOC (mg kg <sup>-1</sup> )	MBC (mg kg <sup>-1</sup> )	pH (H <sub>2</sub> O)	Available N (mg kg <sup>-1</sup> )	Available P (mg kg <sup>-1</sup> )	Available K (mg kg <sup>-1</sup> )
Bare fallow	27.2±0.29	187.69±16	217.5±3.5	5.86±0.21	268.75±4.68	22.53±0.40	133.67±4.04
Farmland	32.3±0.72	244.66±34	282.5±21	6.33±0.32	306.85±3.64	17.61±0.34	152.00±1.00
Grassland	50.9±1.49	359.37±45	506.39±50	7.06±0.54	450.03±7.58	44.794±1.81	227.60±10.41

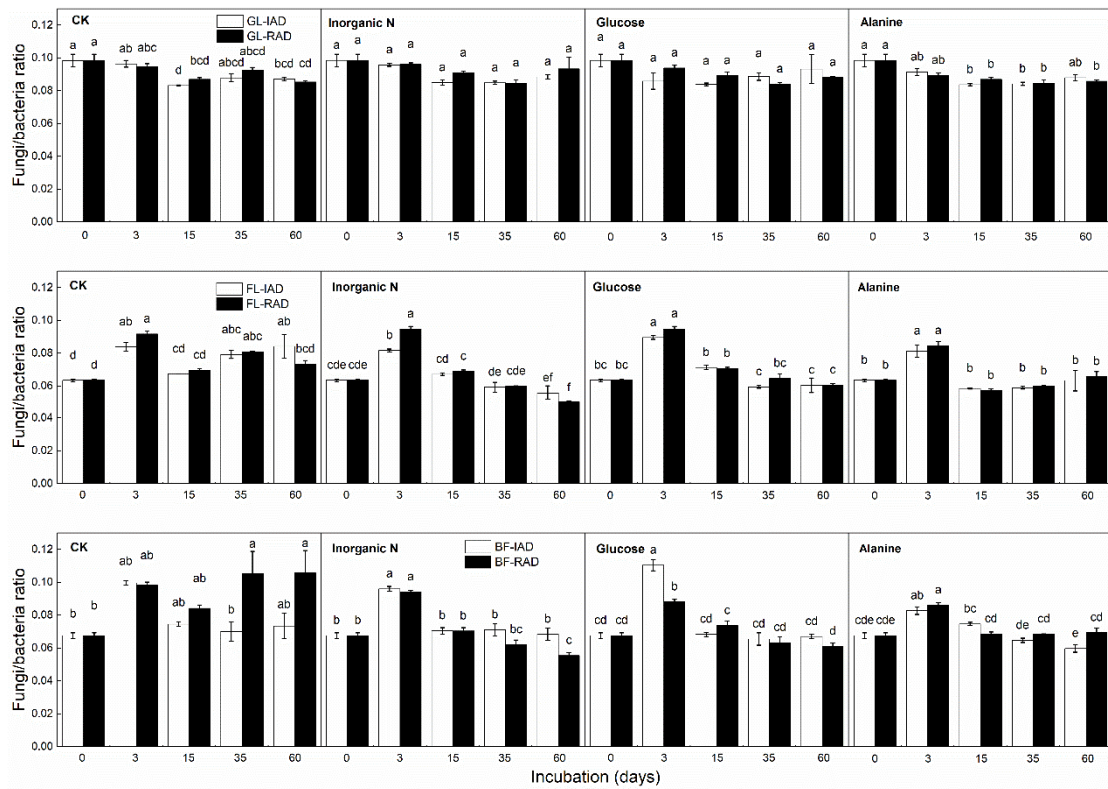
Means ± standard errors (n=3); SOC: soil organic carbon; DOC: dissolved organic C; MBC: microbial biomass C.



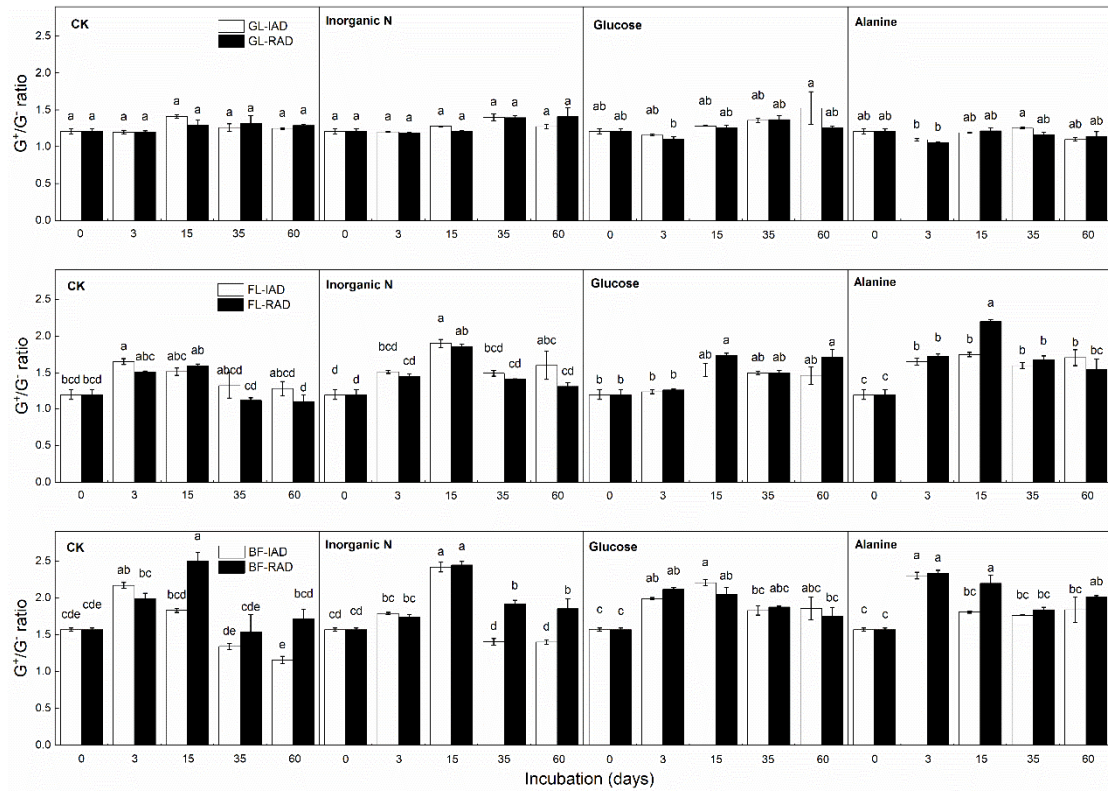
Appendix B. Dynamics of G<sup>+</sup> and G<sup>-</sup> PLFA abundances during the incubation. Means (n=3) and standard errors are shown. Treatments included intact aggregate distribution (IAD) and reduced aggregate distribution (RAD) for grassland (GL), farmland (FL) and bare fallow (BF). The asterisks and NS indicate significant ( $P < 0.05$ ) and non-significant ( $P > 0.05$ ) differences between IAD and RAD.



Appendix C. Dynamics of actinomycete PLFA abundance during the incubation. Means ( $n=3$ ) and standard errors are shown. Treatments included intact aggregate distribution (IAD) and reduced aggregate distribution (RAD) for grassland (GL), farmland (FL) and bare fallow (BF). The asterisks and NS indicate significant ( $P<0.05$ ) and non-significant ( $P>0.05$ ) differences between IAD and RAD.



Appendix D. Dynamics of the fungi/bacteria ratio during the incubation. Means (n=3) and standard errors are shown. Treatments included intact aggregate distribution (IAD) and reduced aggregate distribution (RAD) for grassland (GL), farmland (FL) and bare fallow (BF). Different lowercase letters indicate significant differences among the treatments.



Appendix E. Dynamics of the G<sup>+</sup>/G<sup>-</sup> ratio during the incubation. Means (n=3) and standard errors are shown. Treatments included intact aggregate distribution (IAD) and reduced aggregate distribution (RAD) for grassland (GL), farmland (FL) and bare fallow (BF). Different lowercase letters indicate significant differences among the treatments.

Appendix F. Abundance of individual fungal and actinomycete PLFAs in grassland at days 3 and 60 of incubation.

Treatment		Fungi (nmol g <sup>-1</sup> )		Actinomycetes (nmol g <sup>-1</sup> )			
		18:1 ω9c	18:2 ω6c	10Me 16:0	10Me 17:0	10Me 18:0	10Me 18:1 ω7c
Day 3							
CK	IAD	16.7±0.54c	3.2±0.25a	24.3±0.48abc	2.8±0.27ab	6.1±0.62c	1.9±0.20c
	RAD	19.7±0.53ab	4.1±0.20a	27.0±0.73a	3.5±0.09a	7.4±0.19abc	2.5±0.05a
Inorganic N	IAD	16.0±0.49c	3.4±0.08a	23.4±0.45bc	2.8±0.15b	6.8±0.37abc	1.9±0.02c
	RAD	19.2±0.52ab	4.1±0.20a	25.4±1.05abc	3.3±0.15ab	7.1±0.29abc	2.3±0.09abc
Glucose	IAD	17.3±0.33bc	3.2±0.08a	23.4±0.47bc	3.1±0.04ab	7.5±0.48abc	2.0±0.03bc
	RAD	20.6±0.46a	4.2±0.09a	26.7±0.86ab	3.4±0.12ab	8.2±0.42ab	2.6±0.07a
Alanine	IAD	16.1±0.48c	3.6±0.18a	22.7±0.85c	2.7±0.11b	6.3±0.24bc	2.0±0.12bc
	RAD	20.0±0.41a	4.0±0.22a	25.4±0.78abc	3.1±0.04ab	8.3±0.35a	2.5±0.10ab
Day 60							
CK	IAD	12.6±0.05de	2.2±0.02abc	23.9±0.29bc	2.5±0.01a	6.3±0.03a	1.7±0.02bc
	RAD	16.2±0.38a	2.7±0.15a	28.5±0.76a	3.0±0.14a	7.5±0.30a	2.2±0.03a
Inorganic N	IAD	13.0±0.45cde	2.2±0.08bc	24.5±0.90bc	2.6±0.09a	6.6±0.20a	1.6±0.08c
	RAD	14.9±0.28abc	2.6±0.07ab	26.3±0.58ab	2.7±0.13a	6.9±0.26a	2.3±0.05a
Glucose	IAD	13.6±0.57bcd	2.1±0.05c	24.8±0.94abc	2.9±0.17a	7.2±0.43a	1.8±0.04bc
	RAD	15.2±0.63ab	2.3±0.13abc	27.1±1.32ab	2.8±0.35a	7.7±0.53a	2.0±0.05b
Alanine	IAD	11.5±0.50e	2.1±0.15c	19.1±0.55d	2.7±0.49a	6.6±1.17a	1.9±0.04b
	RAD	12.2±0.09de	2.2±0.03abc	21.2±0.34cd	2.4±0.10a	6.1±0.18a	2.0±0.04b

Means ± standard errors (n=3); IAD, intact aggregate distribution; RAD, reduced aggregate distribution.

Different lowercase letters indicate significant differences among substrate additions for both IAD and RAD.

1 Appendix G. Abundance of individual bacterial PLFAs in grassland at days 3 and 60 of incubation.

Treatment	16:0	i15:0	16:1 ω7c	18:1 ω7c	a15:0	i16:0	cy17:0 ω7c	cy19:0 ω7c	18:1 ω5c	a17:0	Other bacteria	
Day 3												
CK	IAD	30.9±1.31cd	30.3±1.30abc	24.3±1.27cd	21.6±1.58b	21.5±0.65c	10.1±1.11c	9.1±0.49d	6.3±0.63b	7.6±0.48bcd	6.1±0.66b	39.1±3.88c
	RAD	36.1±1.09abc	35.6±1.02ab	28.4±0.91abc	24.8±0.72ab	24.7±0.82abc	13.1±0.38ab	11.1±0.28bcd	8.0±0.23ab	8.8±0.26ab	7.8±0.22a	46.4±0.58abc
Inorganic N	IAD	29.4±0.56d	29.1±0.67c	22.7±0.55d	20.1±0.37b	20.6±0.50c	10.7±0.22bc	9.6±0.16d	8.0±0.13ab	6.3±0.09d	6.7±0.19ab	39.3±0.99c
	RAD	34.6±1.59bcd	34.2±1.47abc	27.23±1.31bcd	23.5±0.91b	23.2±1.04bc	12.5±0.48abc	10.8±0.37bcd	8.7±0.36a	8.0±0.38bc	7.4±0.33ab	45.7±1.94abc
Glucose	IAD	30.8±0.62cd	29.5±0.55bc	24.3±0.59cd	22.7±0.52b	23.2±0.74bc	11.3±0.31abc	10.0±0.25cd	8.2±0.17a	7.0±0.02cd	6.9±0.18ab	40.4±1.14abc
	RAD	38.8±1.10ab	36.1±1.96a	31.5±0.90ab	29.1±0.56a	27.1±1.12ab	13.6±0.38a	12.1±0.35b	9.4±0.25a	9.7±0.25a	8.0±0.20a	48.5±0.69a
Alanine	IAD	33.4±1.64bcd	29.0±1.38c	27.0±1.51bcd	24.1±1.39b	25.4±1.61abc	11.3±0.53abc	12.0±0.65bc	8.0±0.35a	6.8±0.25cd	6.9±0.29ab	39.7±1.54bc
	RAD	41.2±1.45a	34.5±1.11abc	33.6±1.33a	29.1±1.02a	28.6±1.4a	13.6±0.19a	14.7±0.60a	8.7±0.31a	9.1±0.52ab	7.9±0.28a	48.3±1.17ab
Day 60												
CK	IAD	26.4±0.41cd	24.4±0.36c	21.2±0.35a	17.4±0.20cd	17.6±0.30bc	9.2±0.13a	7.9±0.13b	7.8±0.09bc	0.00	5.3±0.02ab	32.7±0.85a
	RAD	34.1±0.59a	32.4±0.94a	28.4±0.78a	22.3±0.19a	22.5±0.33a	12.0±0.48a	9.6±0.17a	9.1±0.08a	0.00	6.6±0.24a	44.1±1.56a
Inorganic N	IAD	25.7±0.26cd	24.6±0.31c	19.9±1.22a	15.8±0.30d	18.3±1.11bc	9.6±0.55a	7.9±0.30b	7.2±0.05c	0.00	5.6±0.21ab	32.2±2.76a
	RAD	31.8±0.26ab	29.5±0.80ab	24.2±1.20a	21.8±0.17a	21.5±0.36ab	10.7±0.36a	9.1±0.11ab	9.1±0.08a	0.00	6.0±0.22ab	34.8±5.47a

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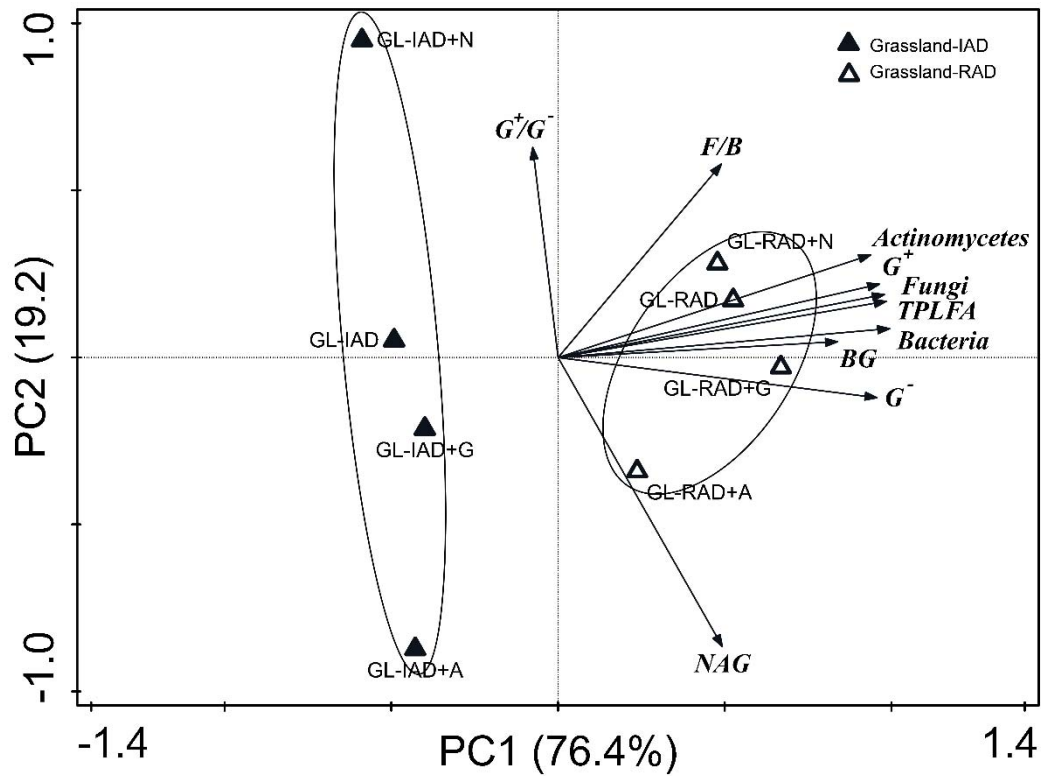
Glucose	IAD	28.6±0.87bc	26.7±1.16bc	22.52±0.81a	18.7±0.47bc	20.9±0.80ab	10.7±0.48a	8.5±0.29ab	7.9±0.12bc	0.00	5.8±0.28ab	26.8±7.34a
	RAD	33.4±1.55a	29.2±1.56ab	27.5±1.01a	20.0±1.20ab	20.1±1.66ab	10.9± 1.17a	8.7±0.57ab	8.1±0.23b	0.00	5.9±0.53ab	35.0±4.34a
Alanine	IAD	24.9±0.66d	19.0±0.97d	18.0±0.78a	18.1±0.39bcd	15.7±0.77c	9.2±0.77a	7.9±0.60b	7.9±0.29bc	0.00	4.9±0.24b	28.8±2.24a
	RAD	27.2±0.15cd	22.5± 0.53cd	20.1±0.79a	18.9± 0.15bc	18.1±0.24bc	9.0± 0.29a	8.3±0.09ab	7.5±0.06bc	0.00	5.0± 0.16b	29.4±0.24a

2 Means ± standard errors (n=3); IAD, intact aggregate distribution; RAD, reduced aggregate distribution.

3 Different lowercase letters indicate significant differences among substrate additions for both IAD and RAD.



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5 Appendix H. Principal components analysis of the microbial parameters in grassland soil with  
 6 various substrate additions. Solid and open symbols represent IAD and RAD. The arrows indicate  
 7 the microbial parameters. IAD, intact aggregate distribution; RAD, reduced aggregate distribution;  
 8 G, glucose; A, alanine; N, inorganic nitrogen; F/B, fungi/bacteria ratio.

9