

Table 1S. Results of the SIMPER analysis showing the average squared Euclidean distance (SED) and contribution (%) of the first eight soil variables, that contribute the most to the dissimilarity between pairs of crop rotation treatments

Black fallow and Faba bean rotation		Black fallow and Wheat rotation		Faba bean rotation and Wheat rotation	
SED	69.17	SED	71.67	SED	20.69
Total hydrolysable N	6.28	¹⁵ N Easily hydrolysable N	6.25	Soluble mineral and organic N	11.75
Soil organic matter	6.21	¹⁵ N All hydrolysable N	5.89	Hydrolysable unidentified N	11.31
Total C	6.16	¹⁵ N Mean weighted for all fractions	5.83	Soil organic matter	6.51
¹⁵ N No hydrolysable N	6.09	¹⁵ N No hydrolysable N	5.31	Serine+threonine N	5.51
¹⁵ N Easily hydrolysable N	5.19	¹⁵ N Soluble mineral and organic N	5.3	C in Easily soluble fraction	5.5
¹⁵ N Mean weighted for all fractions	5.09	¹⁵ N Difficult hydrolysable N	5.2	Soluble organic C	5.34
¹⁵ N Difficult hydrolysable N	5.03	Total C	5.19	Difficult hydrolysable N	5.07
¹⁵ N All hydrolysable N	4.66	Easily hydrolysable C	4.85	Total hydrolysable N	3.62

Table 2S. Results of the SIMPER analysis showing the average squared Euclidean distance (SED) and contribution (%) of the first five soil variables, that contribute the most to the dissimilarity between pairs of the term treatments

Nov 2018 and May 2019		Nov 2018 and Jun 2019		May 2019 and Jun 2019	
SED	61.77	SED	65.74	SED	24.58
C in Fulvic acids	12.43	C in Fulvic acids	12.12	Soluble mineral and organic N	16.78
C in Humic compounds	9.48	C in Humic compounds	9.31	Serine+threonine N	11.76
N in Humic acids	8.27	Soluble mineral and organic N	8.86	Difficult hydrolysable N	5.95
C in Humin	6.64	N in Humic acids	8.74	Hydrolysable unidentified N	4.94
Amino sugar N	5.79	Serine+threonine N	4.95	Soluble organic C	4.59

Nov 2018 and Jul 2019		May 2019 and Jul 2019		Jun 2019 and Jul 2019	
SED	70.79	SED	64.18	SED	62.64
Amino sugar N	12.69	Soluble organic C	9.91	Difficult hydrolysable C	8.7
N in Humin	9.02	No hydrolysable N	8.77	Soluble mineral and organic N	7.76
N in Humic compounds	8.02	Difficult hydrolysable C	7.27	No hydrolysable C	7.27
C in Humic acids	7.06	Serine+threonine N	7.25	Soluble organic C	6.93
C in Humic compounds	6.32	N in Humin	7.05	Soil organic matter	6.84

Nov 2018 and Nov 2019		May 2019 and Nov 2019		Jun 2019 and Nov 2019	
SED	64.18	SED	58.45	SED	59.02
N in Humin	9.19	Difficult hydrolysable C	9.05	Difficult hydrolysable C	10.44
N in Humic compounds	7.66	No hydrolysable N	8.78	Soluble mineral and organic N	9.57
Amino sugar N	6.83	Acid insoluble N	8.25	No hydrolysable C	9.57
C in Humic acids	6.67	N in Humin	6.92	N in Humin	6.24
Amino acid N	6.1	Serine+threonine N	6.41	Acid insoluble N	5.44

Jul 2019 and Nov 2019		Nov 2018 and May 2020		May 2019 and May 2020	
SED	27.43	SED	45.57	SED	59.25
Soluble organic C	10.82	N in Easily soluble fraction	14.3	Acid insoluble N	10.01
Soil organic matter	9.91	Amino sugar N	6.95	Total N	7.86
Difficult hydrolysable N	9.25	C in Humic compounds	6.21	N in Easily soluble fraction	6.96
Hydrolysable unidentified N	8.76	C in Humic acids	6.02	No hydrolysable N	6.59
Amino acid N	8.61	Ammonium N	5.5	Ammonium N	6.51
Jun 2019 and May 2020		Jul 2019 and May 2020		Nov 2019 and May 2020	
SED	62.24	SED	42.46	SED	35.7
Soluble mineral and organic N	8.87	N in Fulvic acids	13.78	N in Fulvic acids	16.38
Easily hydrolysable N	7.56	Soil organic matter	11.62	N in Humic compounds	11.5
No hydrolysable C	7.39	N in Humic compounds	10.83	Amino acid N	10.63
Difficult hydrolysable C	6.78	Easily hydrolysable N	5.74	C in Easily soluble fraction	9.51
Acid insoluble N	6.69	N in Humin	5.72	Easily hydrolysable N	8.69
Nov 2018 and Jul 2020		May 2019 and Jul 2020		Jun 2019 and Jul 2020	
SED	53.86	SED	57.77	SED	59.73
N in Easily soluble fraction	12.17	Acid insoluble N	10.9	No hydrolysable C	10.4
C in Humic acids	6.57	Total N	9.09	Soluble mineral and organic N	10.14
C in Humic compounds	6.32	No hydrolysable N	8.25	Acid insoluble N	7.45
N in Humic acids	6.24	N in Easily soluble fraction	7.46	Difficult hydrolysable C	7.27
C in Humin	5.82	No hydrolysable C	6.73	Easily hydrolysable N	6.98

Jul 2019 and Jul 2020	
SED	41.6
N in Fulvic acids	14.24
Soil organic matter	11.36
N in Humic compounds	7.56
Amino sugar N	5.99
Easily hydrolysable N	5.25

Nov 2019 and Jul 2020	
SED	29.59
N in Fulvic acids	19.82
Easily hydrolysable N	10.18
C in Easily soluble fraction	9.21
N in Humic compounds	8.75
Soil organic matter	7.14

May 2020 and Jul 2020	
SED	14.94
Hydrolysable unidentified N	14.86
C in Easily soluble fraction	9.28
Ammonium N	6.22
Amino acid N	5.62
C in Humic acids	4.8