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Data Article

Soil microbial biomass and enzyme data after six years of cover crop and compost treatments in organic vegetable production

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ABSTRACT

Cover crops and compost are organic matter inputs that can impact soil health in tillage-intensive, high-input, organic vegetable production systems in the central coast region of California. Data are presented on soil microbial biomass (carbon and nitrogen) and soil enzymes (β-glucosidase, β-glucosaminidase, alkaline phosphatase, aspartase and L-asparaginase and dehydrogenase) from a relatively long-term organic systems experiment in Salinas, California that was focused on lettuce and broccoli production and included eight different certified organic systems. These systems differed in compost inputs, cover cropping frequency, cover crop type, and cover cropping seeding rate. The compost was made from urban yard waste, and the cover crops included rye, a legume-rye mixture, and a mustard mixture planted at two seeding rates (standard rate 1 × versus high rate 3 ×). There were three legume-rye 3 × systems that differed in compost inputs (0 versus 15 Mg ha^{-1} year^{-1} and cover cropping frequency (every winter versus every fourth winter). The data in this article support and augment information presented in the research articles "Cover cropping frequency is the main driver of soil microbial changes during six years of organic vegetable production" (Brennan and Acosta-Martinez, 2017) and "Cover crops and compost influence soil enzymes during 6 years of tillage-intensive, organic vegetable production" (Brennan and Acosta-Martinez, 2018).

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Specifications table

Subject area	*Agriculture*
More specific subject area	*Soil microbiology, nutrient management, vegetable production, long-term organic systems research*
Type of data	*Tables, figures*
How data was acquired	The activities of β-glucosidase, β-glucosaminidase, alkaline phosphatase, and dehydrogenase were determined by incubating soil in appropriate substrates, extracting the reaction product, and colorimetric determination of the reaction product using a spectrophotometer (Beckman Coulter DU640, Brea, CA). The activities of aspartase, L-asparaginase were determined by steam distillation with a Foss Kjeltec 2200 Auto Distillation Unit (Foss North America, Eden Prairie, MN) to collect the product of reaction into the distillate (release of amide and converted into ammonia/ammonium) and titration with a Mettler Toledo DL 50 titrator (Mettler-Toledo Inc., Columbus, OH). Microbial biomass (C and N) were measured with the chloroform fumigation extraction method.
Data format	*Raw, descriptive and inferential*
Experimental factors	*Cover cropping frequency, cover crop type, cover crop seeding rate, compost application rate.*
Experimental features	*The soil was collected in October, 2003 (Time 0, before the treatments began) and October, 2009 (after 6 years the experimental treatments) from 6 to 8 core samples per plot from a depth of 0 to 6.5 cm. The cores were mixed to produce a composite sample for each experimental plot. The soil was stored frozen at -25 C prior to determination of soil enzyme activities and microbial biomass that were conducted in 2009 and 2010.*
Data source location	*Salinas, California, United States of America. lat. 36.622658, long. -121.549172, elevation 37 m above sea level.*
Data accessibility	*The data on soil enzymes and microbial biomass (carbon and nitrogen) are in the tables and figures in this article. The bacterial sequence data summarized in our related article from 2017 is available in the public repository National Center for Biotechnology Information under Bioproject PRJNA344674* https://www.ncbi.nlm.nih.gov/bioproject/PRJNA344674 *with accession numbers: SRR4300068, SRR4300077, SRR4300078, SRR4300079, SRR4300080, SRR4300081, SRR4300086, SRR4300087, SRR4300089, SRR4300094, SRR4300095, SRR4300138, SRR4300139, SRR4300140, SRR4300145, SRR4300149, SRR4300150, SRR4300151, SRR4300152, SRR4300153, SRR4300154, SRR4300155, SRR4300156, SRR4300242, SRR4300243, SRR4300244, SRR4300264, SRR4300272, SRR4300284, SRR4300294.*
Related research article	– Brennan, E.B. and V. Acosta-Martinez, 2018. Cover crops and compost influence soil enzymes during 6 years of tillage-intensive, organic vegetable production. Soil Sci. Soc. Am. J. 82. *In Press*. – Brennan, E.B. and V. Acosta-Martinez, 2017. Cover cropping frequency is the main driver of soil microbial changes during six years of organic vegetable production. Soil Biol. Biochem. 109:188–204.

Value of the data

- The data is from the first six years of the longest running organic systems study in the U.S. that is focused on high-value, high-input, tillage-intensive, organic vegetable production. This is the most important region of the U.S. for high-value, cool season vegetable production.

- Soil enzymes and soil microbial biomass (carbon and nitrogen) are sensitive, early indicators of changes in soil health, but are not well-understood in tillage-intensive production systems. This data could be valuable in future meta-analyses that seek to understand the complex effects of compost and cover crops in vegetable systems. The data augment our related publications that only included data from 5 of the 8 systems in the long-term study.
- The data may serve as a benchmark for future studies of soil enzymes and microbial biomass in a loamy sand soil in California and other regions with a Mediterranean climate.
- This data may be useful to develop more sustainable organic and conventional vegetable systems in many regions of the world. For example, it may serve as a benchmark in the development of reduced tillage systems for vegetable production in this region and elsewhere.
- This data enables others to independently evaluate or extend the statistical analyses presented in the related articles. This may be useful to help researchers and students to understand the statistical analysis approach that was focused on point and interval estimates in the related articles. This statistical analysis approach used the software known as the Exploratory Software for Confidence Intervals (ESCI) that is freely available online.

1. Data

This article includes the raw data, descriptive data (means) and inferential statistics (95% confidence intervals) on the effects of compost and cover cropping on changes in microbial biomass carbon, microbial biomass nitrogen, and soil enzymes activities over a 6 years period in the Salinas Organic Cropping Systems (SOCS) experiment (Tables 1 and 2, Figs. 1–8). This important long-term study is located at the USDA-ARS (United States Department of Agriculture – Agricultural Research Service) organic research farm in Salinas, California and is approximately 24 km inland from Monterey Bay in a region commonly referred to as the ‘Salad Bowl of America’. This ongoing systems study was designed to provide information on the impact of yard waste compost and cover crops (type, frequency, and seeding rate) on a variety of aspects (ex., soil health, yields, weeds) of vegetable production.

2. Experimental design, materials, and methods

The ongoing SOCS experiment began in 2003 and occurs in a 0.9 ha field that includes 32 plots, organized in 4 blocks of 8 system plots per block. The first eight years of this study were focused on vegetable production (lettuce followed by broccoli most years) in 8 systems that differed in compost inputs and cover crop (type, seeding rate and frequency) (Table 1). The annual rotation began in October or November each year and included either a winter fallow or winter cover crop that grew until February or March and was usually followed by the two vegetable crops. Winter weed growth in system 1 and 2 that were fallow most winters were managed with shallow tillage as needed, to minimize weed growth and prevent weed seed production, but otherwise, tillage was consistent across all systems. Other than the differences in cover crop and compost inputs between systems, all management (i.e., pest control, tillage, harvest schedules) and inputs (i.e., irrigation, fertilizers) were equivalent across all systems during the vegetables crops [3,5,1].

Soil samples for analysis of microbial biomass carbon and nitrogen, and enzyme activities were collected to a depth of 0 to 6.5 cm from 6 to 8 cores in each plot and were bulked and archived in a freezer at -25 °C until they were analyzed. Microbial biomass carbon and nitrogen were determined using the chloroform fumigation–extraction method [4,9] and soil enzyme activities were determined using colorimetric and titration methods [8,6,7] as described in detail in our related articles [1,2]. To evaluate changes in microbial biomass and enzyme activities over time, the analyses were done on soil collected at time 0 (October 2003 just prior to the application of the treatments) and after six years of management. The data presented here include the raw data for all eight systems in the experiment (Table 2), whereas the data for only five systems were used in the analyses in the related articles [1,2]. Figs. 1–8 illustrate major patterns in the data with the some of the raw data plotted with means and 95% confidence intervals. We refer readers to our most recent related article [2] for an

Table 1
Descriptions of systems in the Salinas Organic Cropping Systems experiment in Salinas California.

System ID used in this *Data in Brief* article	System ID in SBB & SSSJA articles[a]	Cover crop			Compost input[e] (Mg ha^{-1} 6 yr^{-1})	Total organic matter input[f] (i.e., Cover crop + compost) (Mg ha^{-1} 6 yr^{-1})
		Type[b]	Frequency[c]	Seeding rate[d]		
1*	1	Legume-rye	4^{th} Winter	3 ×	0	7.4
2*	2	Legume-rye	4^{th} Winter	3 ×	91.2	99.2
3*		Legume-rye	Every Winter	1 ×	91.2	136.8
4*	3	Legume-rye	Every Winter	3 ×	91.2	136.8
5*	4	Mustard	Every Winter	1 ×	91.2	122.1
6*		Mustard	Every Winter	3 ×	91.2	123.6
7*	5	Rye	Every Winter	1 ×	91.2	134.3
8*		Rye	Every Winter	3 ×	91.2	135.2

[a] System ID code used in the related articles on microbial biomass in Soil Biology and Biochemistry (SBB) [1], and the Soil Science Society of America Journal (SSSJA) [2].

[b] By seed weight, the legume-rye mixture included 10% Rye ('Merced' *Secale cereale* L.), 35% Faba bean, (*Vicia faba* L.; small-seeded type known as 'bell bean'), 25% Pea, 'Magnus' *Pisum sativum* L., 15% common vetch, *V. sativa* L., and 15% purple vetch, *V. benghalensis* L. By seed weight mustard included 61% white mustard, 'IdaGold' *Sinapis alba* L., and 39% India mustard, 'Pacific Gold' *Brassica juncea* Czern.

[c] During the first 6 years of the study, Systems 1 and 2 were fallow all winters except the winter of year 4. All other systems were cover cropped every winter.

[d] Seeding rates are referred to as 1 × and 3 ×, where 3 × is 3 times greater than 1 ×. The 1 × and 3 × rates in kg ha^{-1} were 11 and 33 for mustard, 90 and 270 for rye, and 140 and 420 for the legume-rye mixture.

[e] The compost was made from urban yard waste and the annual application (oven dry basis) was 15.2 Mg ha^{-1}. It was applied in a split application annually with half before each of the two vegetable crops.

[f] Total, cumulative organic matter input (oven dry basis) from cover crop shoots + compost over the 6 years.

Table 2
Raw data of soil enzyme activities and microbial biomass in the beginning of the study, 6 years later, and the change over 6 years in the Salinas Organic Cropping Systems experiment in Salinas, California. This includes data from all eight systems in the experiment. The related articles in *Soil Biology and Biochemistry* (SSB) [1] and the *Soil Science Society of America Journal* (SSSJA) [2] only included data from five of the eight systems with optimal seeding rates for weed suppression. A Microsoft Excel version of the table in available in the supplementary material (Supplementary Table 1).

Overview of the data[1]										Enzyme activity[2]						Microbial Biomass	
Block (i.e. replicate)	Time[3]	Symbol color & shape in SBB and SSSAJ article figures[4]	System ID in *Data in Brief article*[5]	System ID & description used in associated articles in ***Soil Biology & Biochemistry* (SBB), and *Soil Science Society of America Journal* (SSSAJ)**[6]	Short ID used in *SSSAJ* article Suppl. Info analysis in ESCI[7]	Compost added[8]	Winer cover cropping frequency[9]	Cover crop type[10]	Cover crop seeding rate[10]	Alkaline Phosphatase	B-Glucosidase	B-Glucosaminidase	Aspartase	L-Asparaginase	Dehydrogenase	Carbon	Nitrogen
										mg p-nitrophenol/kg soil/h					µg INT/g dry soil/h	mg/kg soil	
1	Time 0	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	127	74	19				106	12
2	Time 0	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	121	56	17				80	10
3	Time 0	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	104	56	15				118	12
4	Time 0	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	121	69	14				51	9
1	Time 0	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	135	70	14				48	5
2	Time 0	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	149	82	20				92	11
3	Time 0	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	149	78	17				101	12
4	Time 0	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	122	75	18				115	10
1	Time 0	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	162	74	18				105	14
2	Time 0	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	108	52	10				38	3
3	Time 0	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	103	51	12				19	4
4	Time 0	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	138	70	17				90	12
1	Time 0	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	124	77	13				70	6
2	Time 0	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	101	37	13				79	10
3	Time 0	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	141	78	13				93	11
4	Time 0	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	155	70	19				84	4
1	Time 0	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	103	49	12				47	5
2	Time 0	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	115	53	9				56	4
3	Time 0	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	101	71	11				112	10
4	Time 0	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	121	70	20				80	8
1	Time 0	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	138	68	18				63	8
2	Time 0	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	108	41	12				56	3
3	Time 0	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	128	74	13				35	5
4	Time 0	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	127	86	16				18	3
1	Time 0	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	152	69	14				71	8
2	Time 0	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	102	45	9				51	5
3	Time 0	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	140	52	16				122	15
4	Time 0	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	137	65	15				123	14
1	Time 0	NA	8*	NA	NA	Yes	Every winter	Rye	3x	103	43	9				66	6
2	Time 0	NA	8*	NA	NA	Yes	Every winter	Rye	3x	140	53	11				69	7
3	Time 0	NA	8*	NA	NA	Yes	Every winter	Rye	3x	91	48	10				68	6

Table 2 (*continued*)

4	Time 0	NA	8*	NA	NA	Yes	Every winter	Rye	3x	103	59	12				83	9
1	Time 6 years	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	98	56	13	204	6	4	62	6
2	Time 6 years	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	138	67	13	189	7	6	75	12
3	Time 6 years	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	142	39	17	144	8	7	80	14
4	Time 6 years	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	101	59	14	169	5	3	66	9
1	Time 6 years	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	175	80	22	302	12	8	95	10
2	Time 6 years	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	170	71	21	304	10	5	112	15
3	Time 6 years	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	182	78	19	200	9	6	120	14
4	Time 6 years	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	191	98	26	239	12	7	187	22
1	Time 6 years	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	200	136	30	302	19	8	206	37
2	Time 6 years	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	252	150	29	294	12	9	209	23
3	Time 6 years	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	254	116	29	213	15	7	244	39
4	Time 6 years	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	244	103	24	256	18	8	218	29
1	Time 6 years	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	213	122	29	314	17	10	202	37
2	Time 6 years	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	235	98	20	227	18	8	215	17
3	Time 6 years	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	234	99	24	248	12	8	249	39
4	Time 6 years	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	241	80	30	252	10	7	248	27
1	Time 6 years	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	154	118	26	298	12	7	158	19
2	Time 6 years	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	184	121	22	238	20	8	197	31
3	Time 6 years	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	222	130	22	202	13	6	165	30
4	Time 6 years	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	213	103	28	254	18	7	248	40
1	Time 6 years	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	221	144	28	297	21	8	174	39
2	Time 6 years	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	156	103	30	231	15	7	162	32
3	Time 6 years	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	228	100	29	216	12	7	167	23
4	Time 6 years	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	193	85	27	264	12	8	186	36
1	Time 6 years	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	167	88	23	193	11	8	220	28
2	Time 6 years	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	265	115	31	222	15	9	182	31
3	Time 6 years	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	243	83	28	228	18	9	179	21
4	Time 6 years	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	233	98	21	191	18	13	133	24
1	Time 6 years	NA	8*	NA	NA	Yes	Every winter	Rye	3x	225	123	24	298	20	8	209	31
2	Time 6 years	NA	8*	NA	NA	Yes	Every winter	Rye	3x	229	120	28	296	16	8	244	38
3	Time 6 years	NA	8*	NA	NA	Yes	Every winter	Rye	3x	213	82	23	224	22	9	206	32
4	Time 6 years	NA	8*	NA	NA	Yes	Every winter	Rye	3x	224	89	30	237	15	8	182	27
1	Change over 6 yrs	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	-29	-18	-6				-44	-5
2	Change over 6 yrs	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	17	11	-4				-5	3
3	Change over 6 yrs	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	38	-17	2				-38	3
4	Change over 6 yrs	▲	1*	1-No Compost + Legume-rye 4th Year	Syst. 1 Yr 0	No	Every 4th winter	Leg-rye	3x	-20	-10	0				14	0
1	Change over 6 yrs	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	41	10	8				47	5
2	Change over 6 yrs	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	21	-11	1				20	4
3	Change over 6 yrs	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	34	1	3				18	1
4	Change over 6 yrs	●	2*	2-Compost + Legume-rye 4th Year	Syst. 2 Yr 0	Yes	Every 4th winter	Leg-rye	3x	69	23	8				72	13

Table 2 (*continued*)

1	Change over 6 yrs	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	38	63	12				100	23
2	Change over 6 yrs	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	145	98	19				171	20
3	Change over 6 yrs	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	152	65	17				225	35
4	Change over 6 yrs	NA	3*	NA	NA	Yes	Every winter	Leg-rye	1x	106	34	7				128	17
1	Change over 6 yrs	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	89	45	16				132	31
2	Change over 6 yrs	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	134	61	7				136	7
3	Change over 6 yrs	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	94	21	12				157	29
4	Change over 6 yrs	■	4*	3-Compost + Legume-rye annually	Syst. 3 Yr 0	Yes	Every winter	Leg-rye	3x	86	10	11				164	23
1	Change over 6 yrs	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	51	70	13				111	14
2	Change over 6 yrs	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	69	67	13				141	26
3	Change over 6 yrs	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	121	59	11				53	20
4	Change over 6 yrs	◆	5*	4-Compost + Mustard annually	Syst. 4 Yr 0	Yes	Every winter	Mustard	1x	92	33	8				168	32
1	Change over 6 yrs	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	82	76	10				112	31
2	Change over 6 yrs	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	47	62	18				106	29
3	Change over 6 yrs	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	100	26	16				132	18
4	Change over 6 yrs	NA	6*	NA	NA	Yes	Every winter	Mustard	3x	66	-1	11				167	32
1	Change over 6 yrs	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	15	19	9				149	21
2	Change over 6 yrs	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	163	71	22				131	26
3	Change over 6 yrs	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	103	31	12				57	6
4	Change over 6 yrs	▼	7*	5-Compost + Rye annually	Syst. 5 Yr 0	Yes	Every winter	Rye	1x	96	33	6				11	11
1	Change over 6 yrs	NA	8*	NA	NA	Yes	Every winter	Rye	3x	122	80	15				143	25
2	Change over 6 yrs	NA	8*	NA	NA	Yes	Every winter	Rye	3x	89	67	17				175	31
3	Change over 6 yrs	NA	8*	NA	NA	Yes	Every winter	Rye	3x	122	34	13				138	26
4	Change over 6 yrs	NA	8*	NA	NA	Yes	Every winter	Rye	3x	121	29	17				100	19

[1] The data provided in this table is from the Salinas Organic Cropping Systems (SOCS) study in Salinas, California. This includes soil enzyme activity and microbial biomass data for all 8 systems in the SOCS study. However, the analysis for only 5 systems with optimal seeding rates for weed suppression were included in the related articles in SBB (*Soil Biology & Biochemistry*) and SSSAJ (*Soil Science Society of America Journal*); see reference list for these full citations. The experimental design was a randomized complete block with 4 blocks (i.e., replicates). These data are provided to give readers an opportunity use the data for future meta-analyses, or analysis of confidence intervals, effect sizes, etc. in the Explanatory Software for Confidence Intervals (ESCI) produced by Geoff Cumming. ESCI is freely available at https://thenewstatistics.com/itns/esci/

[2] The activities of the enzymes Aspartase, L-Aparaginase and Dehydrogenase were measured only after 6 years. Enzyme activities are in units of mg p-nitrophenol kg^{-1} soil $hour^{-1}$ or µg 2-(4-iodophenyl)3-(4-nitrophenyl)-5-phenyl-2H-tetrazolium chloride (INT) g^{-1} dry soil $hour^{-1}$.

[3] Time 0 was at the beginning of the study in 2003. Time 6yr was at 2009 after 6 years of the study. **Note** that the 'Change over 6 years' is the paired difference (i.e., within a replicate the measurement at year 6 minus the measurement at time 0).

[4] The symbols, shapes, and colors used in the SBB (*Soil Biology & Biochemistry*) and SSSAJ (*Soil Science Society of America Journal*) articles. Note that in the SBB and SSSAJ articles the data for only 5 systems were included, but in the Data in Brief article, the data for all 8 systems is included. NA= not applicable because the system was not included in the SBB or SSSAJ articles.

[5] In the *Data in Brief* article, these numbers (1* to 8*) were uses for the 8 systems.

[6] In the SBB and SSSJA articles only 5 systems with seeding rates that provided optimal weed suppression were included. NA= not applicable because these 3 systems were not included in the SBB and SSSJA articles.

[7] Shortened ID or abbreviation that was used in ESCI software for the supplimental information in the SSSAJ article.

[8] The annual compost rate where it was added was 15.2 Mg/ha on an oven dry weight basis. The compost was made from urban yard waste.

[9] Winter cover cropping period occurred from October or November and February or March.

[10] See table 1 for details on the cover crops types and seeding rates.

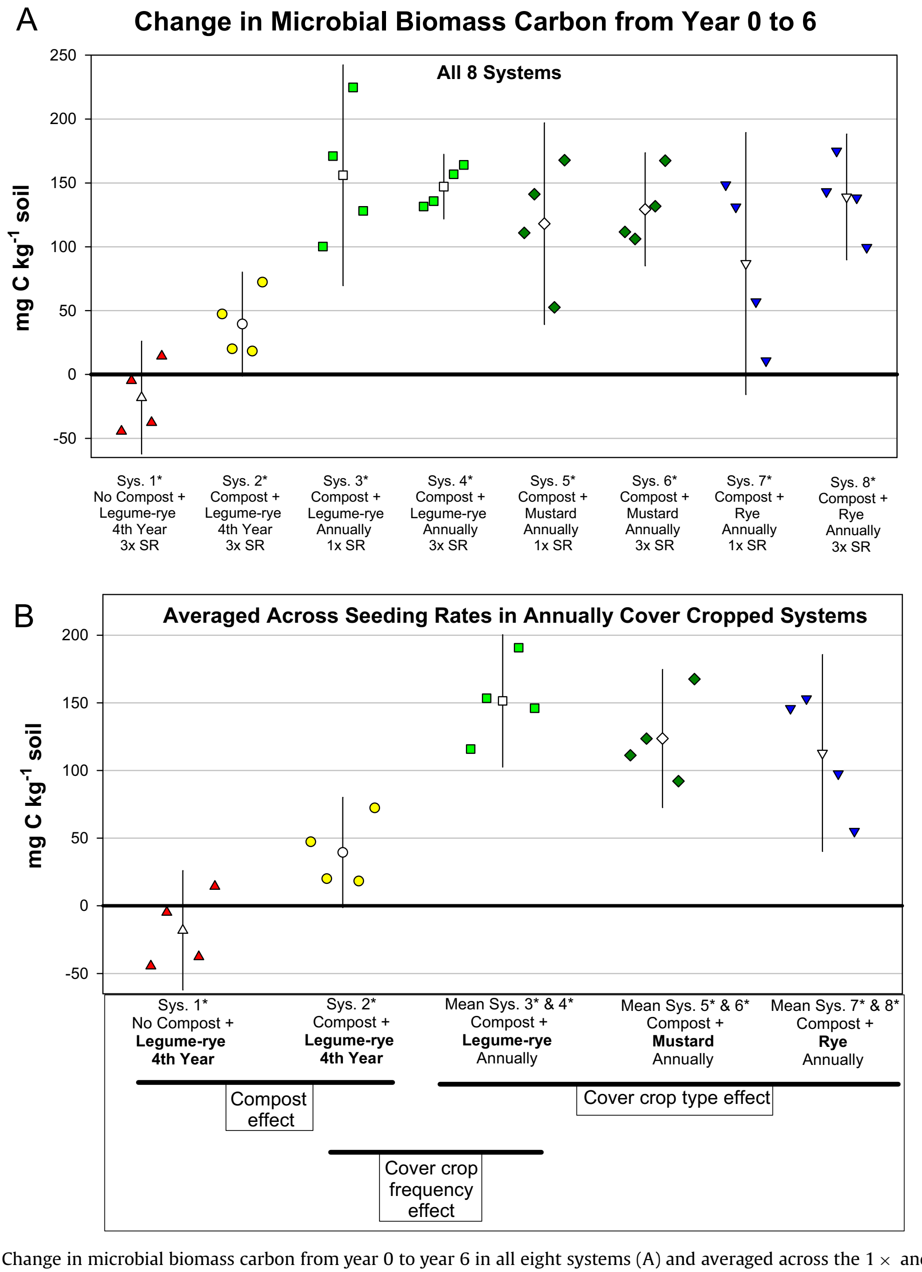

Fig. 1. Change in microbial biomass carbon from year 0 to year 6 in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 2B in the related article [1] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

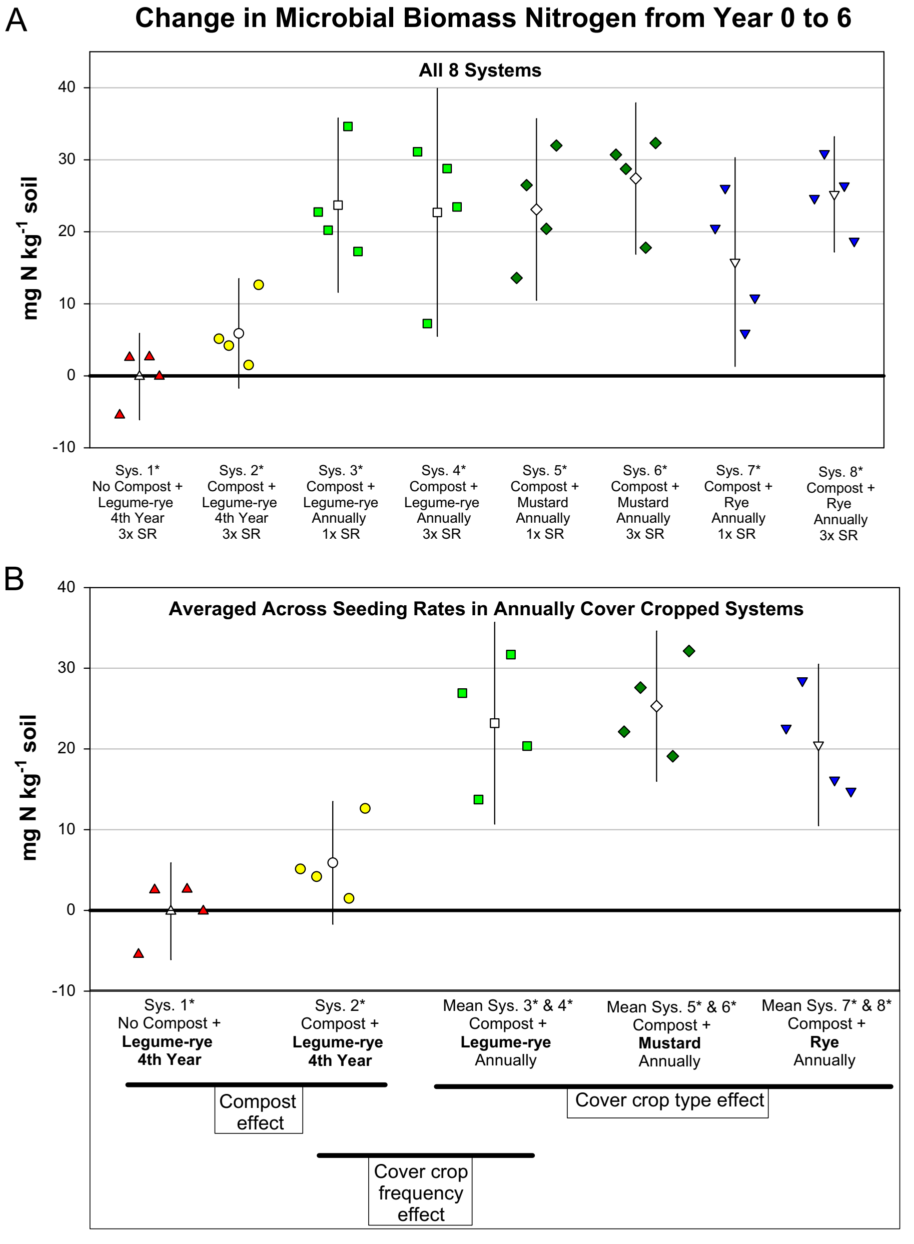

Fig. 2. Change in microbial biomass nitrogen from year 0 to year 6 in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 3B in the related article [1] included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

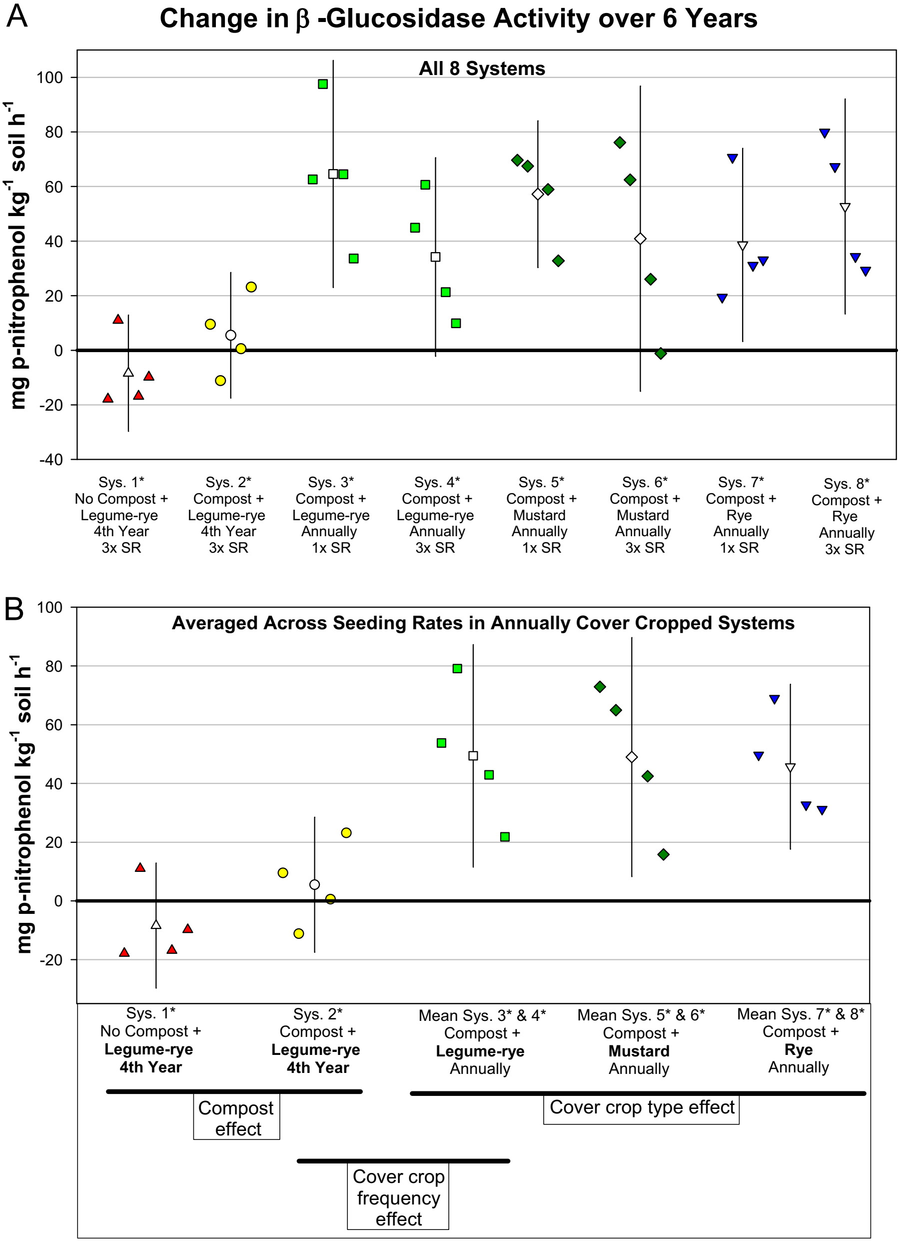

Fig. 3. Change in β-glucosidase activity from year 0 to year 6 in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 1B in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

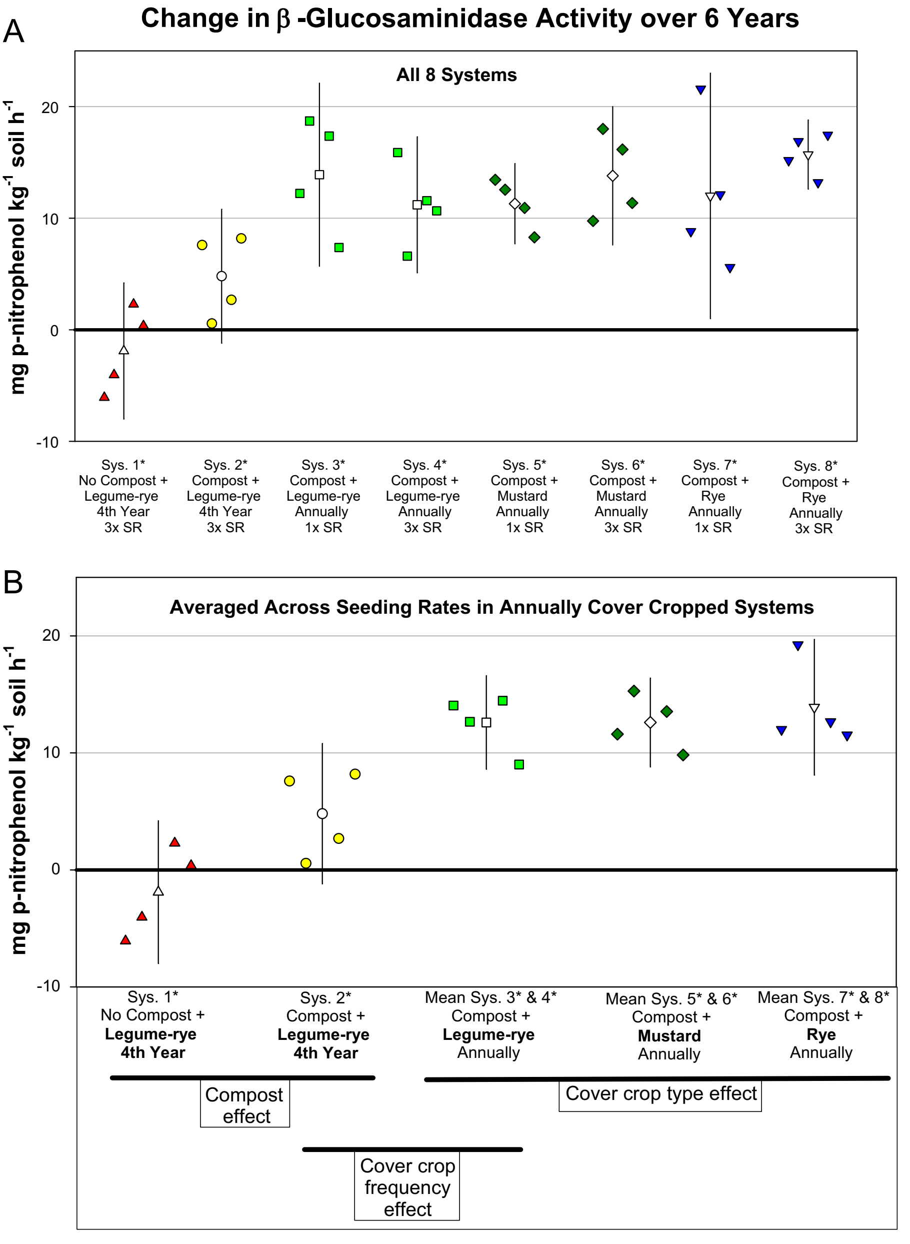

Fig. 4. Change in β-glucosaminidase activity from year 0 to year 6 in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 2B in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

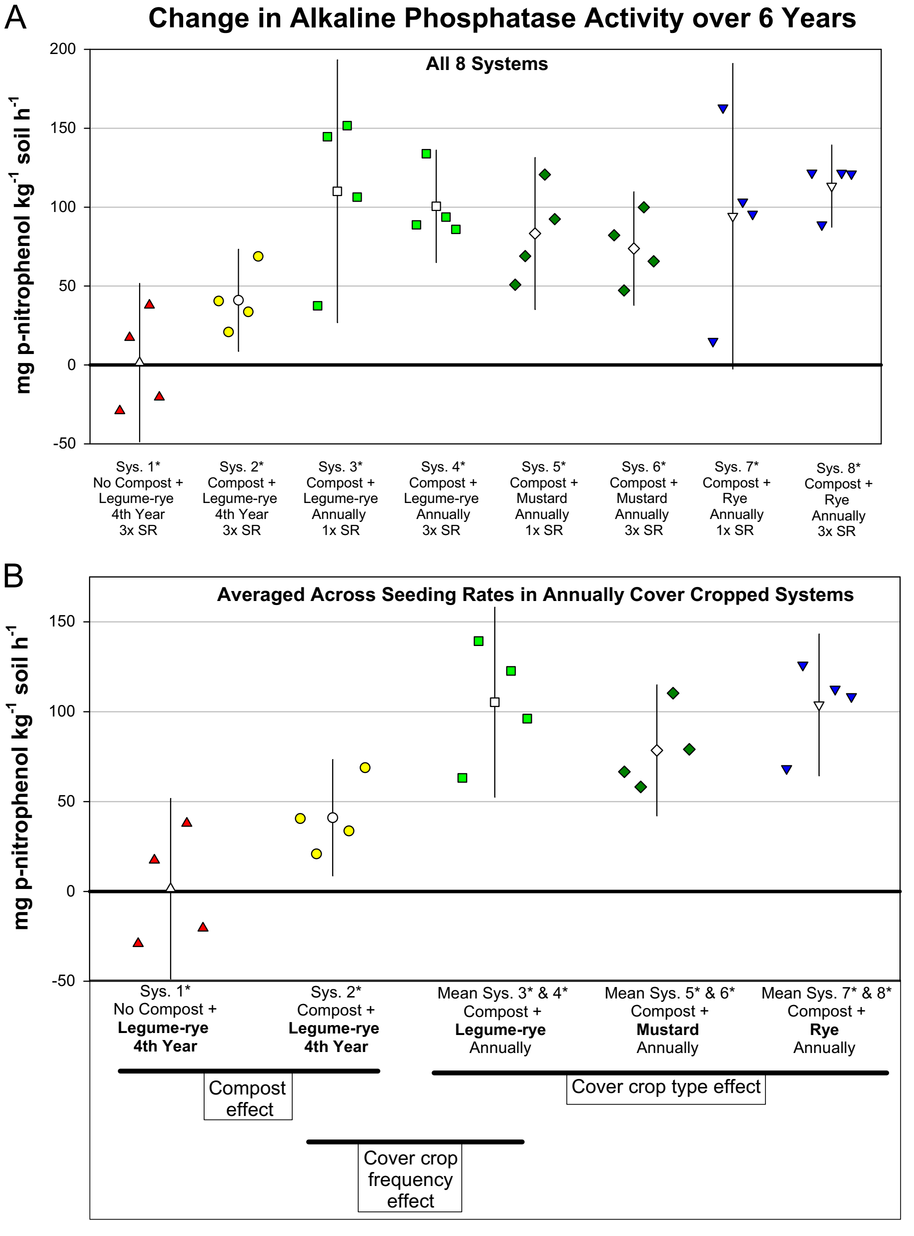

Fig. 5. Change in alkaline phosphatase activity from year 0 to year 6 in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 3B in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

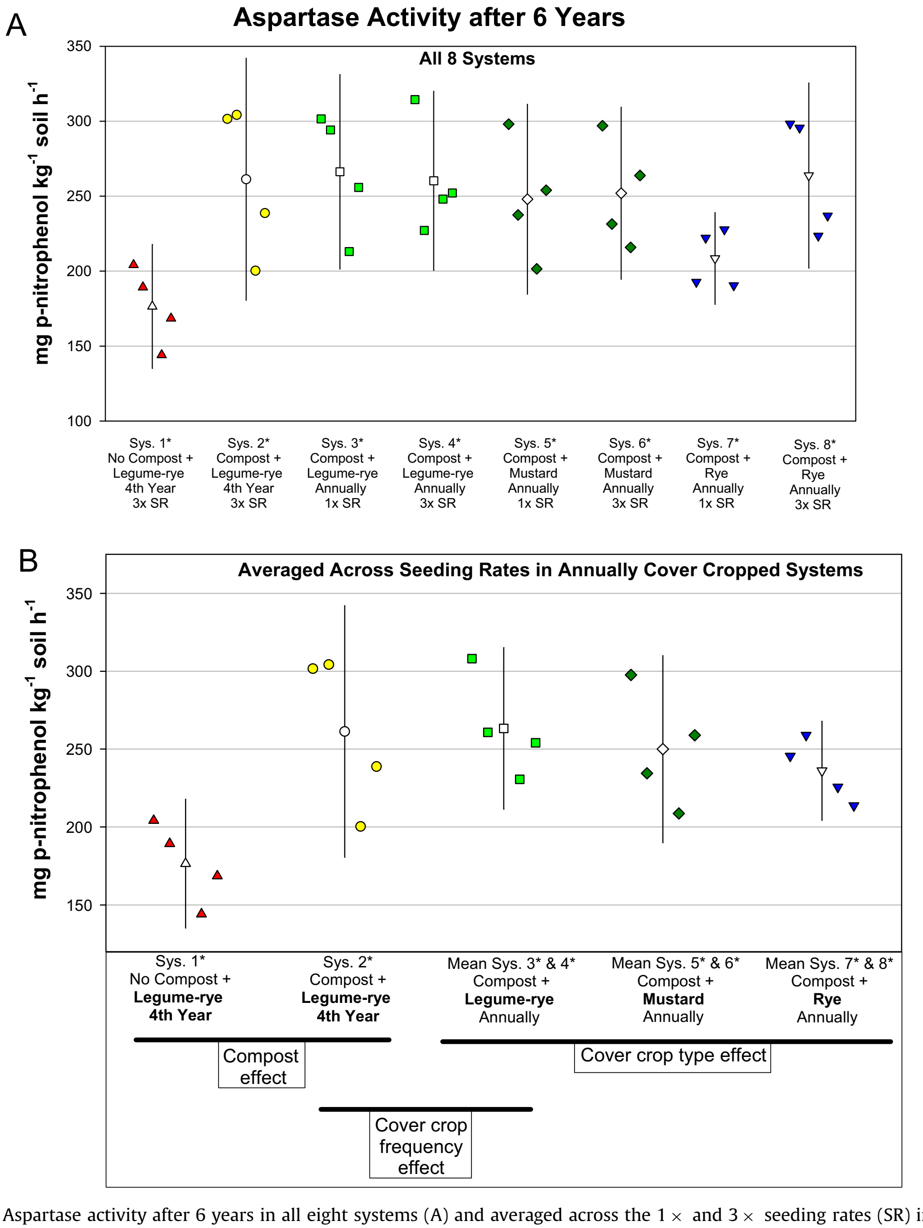

Fig. 6. Aspartase activity after 6 years in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 4A in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

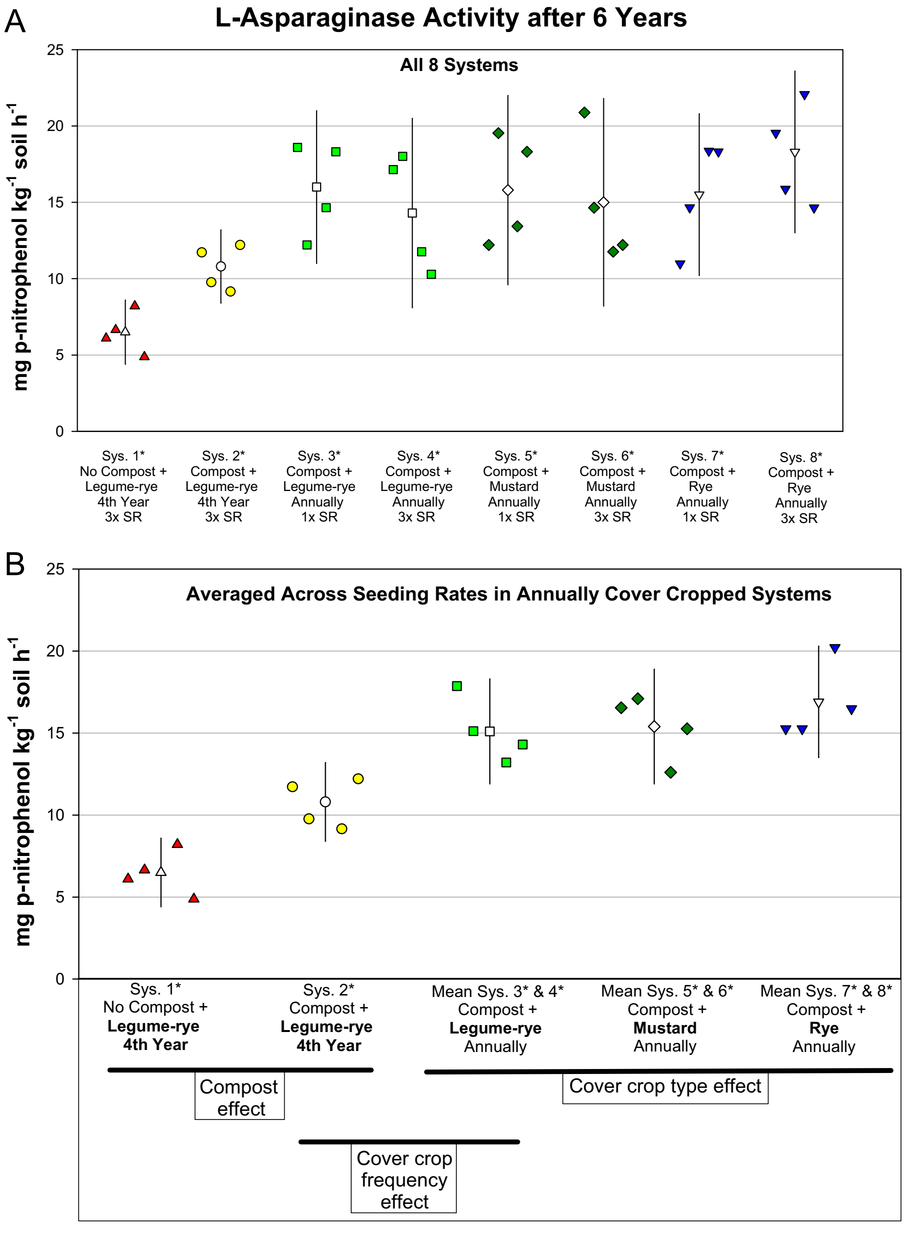

Fig. 7. L-Asparaginase activity after 6 years in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 4B in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

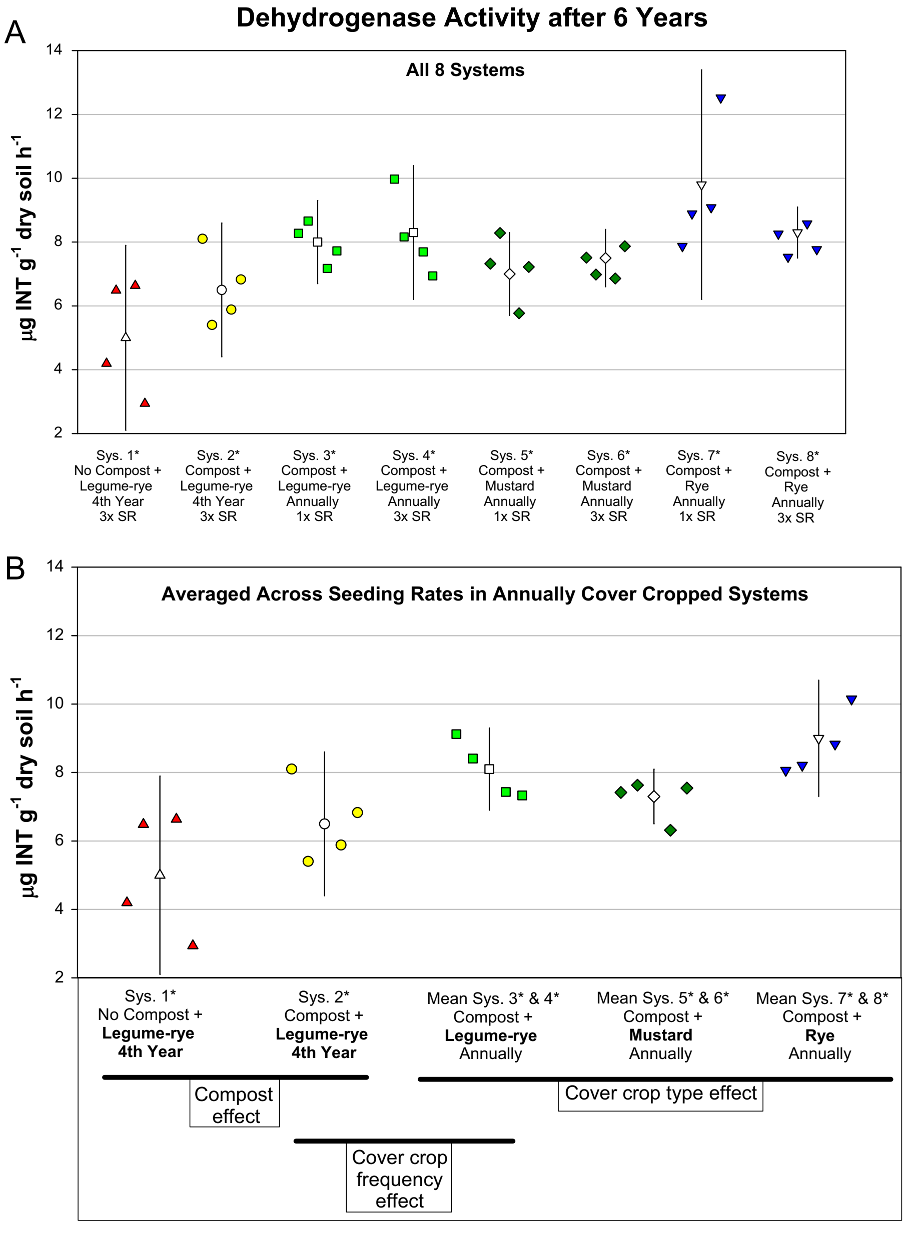

Fig. 8. Dehydrogenase activity after 6 years in all eight systems (A) and averaged across the 1 × and 3 × seeding rates (SR) in the annually cover cropped systems (B) in the Salinas Organic Cropping Systems experiment in Salinas, California. The systems differed in compost additions (none versus 15.2 Mg ha^{-1} annually), cover crop type (legume-rye, mustard, or rye), cover cropping frequency (every 4th winter versus annually) and cover crop seeding rate (1 × = standard rate versus 3 × = high rate); see Table 1 for more seeding rate details. Symbols are raw data in order of replicates 1 to 4 with mean and 95% confidence interval (CI) in the center of each data cluster. The horizontal lines below the system labels on the x-axis in plot B show the systems that can be compared to evaluate the effects of compost, cover crop frequency, and cover crop type. Plot B that is averaged across both seeding rates in the annually cover cropped systems is similar and complementary to Fig. 4C in the related article [2] that included only 5 systems (1*, 2*, 4*, 5*, 7*); see Table 1 in the present article for more details.

explanation of how in compare systems using 95% confidence intervals in this study and how the ESCI software (available at https://thenewstatistics.com/itns/esci/) can help with these comparisons.

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Transparency document. Supporting information

Transparency data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.09.013.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.09.013.

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