

## Online supplemental material

**Table S1**

Field trial characteristics

Location	Foulum	Aarslev
Region in Denmark	Central Jutland	Funen
Coordinates	09°34'E. 56°30'N	10°27'E. 55°18'N
Plot size (m <sup>2</sup> )	216	125
Soil type	Loamy sand	Sandy loam
Clay (%)	9	13
Silt (%)	13	15
Sand (%)	74	70
pH (in 0.01 M CaCl <sub>2</sub> ) <sup>a</sup>	5.6	6.2
P (mg/100 g soil) <sup>a</sup>	4.4	2.8
K (mg/100 g soil) <sup>a</sup>	12	13
Mg (mg/100 g soil) <sup>a</sup>	4.2	4.4

<sup>a</sup> Mean for plough layer soil samples taken in March across all plots in the  
growing seasons 2006-2007 and 2007-2008<sup>[1]</sup>

**Table S2**

Mean temperature and precipitation for different periods of the growing seasons 2006-2007 and 2007-2008 at the 2 locations

Location	Period	Temperature (°C)		Precipitation (mm)	
		2006-07	2007-08	2006-07	2007-08
Foulum <sup>a</sup>	Oct-Mar	6.2	4.4	447	325
	Apr-Jun	11.8	11.1	123	100
	Jul-Aug	15.6	16.4	144	190
Aarslev <sup>b</sup>	Apr-Jun	12.6	11.7	228	107
	Jul-Aug	16.7	17.1	180	179
	Sep-Oct	11.0	11.2	93	140

<sup>a</sup> Foulum, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>b</sup> Aarslev, The Faculty of Science and Technology, Aarhus University, Denmark.

**Table S3**

Sowing and harvest time and irrigation for the growing seasons 2006-2007 and 2007-2008 at the 2 locations

Crop	Sowing date		Harvest date		Irrigation (mm)	
	2006-07	2007-08	2006-07	2008-09	2006-07	2008-09
Barley <sup>a</sup>	12 Apr 07	22 Apr 08	07 Aug 07	18 Aug 08	25	94
Faba bean <sup>a</sup>	12 Apr 07	22 Apr 08	28 Aug 07	01 Sep 08	25	94
Potato <sup>a</sup>	24 Apr 07	05 May 08	04 Sep 07	17 Sep 08	25	94
Wheat <sup>a</sup>	25 Sep 06	24 Sep 07	07 Aug 07	18 Aug 08	25	94
Rape seed <sup>a</sup>	18 Aug 06	22 Aug 07	19 Jul 07	29 Jul 08	-	-
White cabbage <sup>b</sup>	2 Apr 07	2 Apr 08	31 Oct 07	20 Oct 08	15	140
Oat <sup>b</sup>	12 Apr 07	15 Apr 08	8 Aug 07	15 Aug 08	8	-
Carrot <sup>b</sup>	23 May 07	30 May 08	2 Oct 07	6 Oct 08	30	108
Onion <sup>b</sup>	21 Mar 07	4 Mar 08	27 Aug 07	18 Aug 08	30	140

<sup>a</sup> Location: Foulum, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>b</sup> Location: Aarslev, The Faculty of Science and Technology, Aarhus University, Denmark.

**Table S4**

Fertilizer application rate in the 3 different growth systems<sup>a</sup> in the growing seasons 2006-2007 and 2007-2008 at the 2 locations

Crop	C		OA		OB	
	N/P/K (Kg ha <sup>-1</sup> ) <sup>b</sup>		N/P/K (Kg ha <sup>-1</sup> ) <sup>c</sup>		N/P/K (Kg ha <sup>-1</sup> ) <sup>d,e</sup>	
	2006-07	2007-08	2006-07	2008-09	2006-07	2008-09
Barley <sup>f</sup>	130/20/95	130/20/95	55/10/70	55/10/65	0/0/50	0/0/40
Faba bean <sup>f</sup>	0/25/125	0/25/125	0/0/75	0/0/60	0/0/75	0/0/60
Potato <sup>f</sup>	140/30/205	140/30/150	115/25/125	110/20/160	0/0/100	5/0/80
Wheat <sup>f</sup>	165/20/105	165/20/105	105/20/130	110/25/110	0/0/75	0/0/60
Rape seed <sup>f</sup>	190/25/90	185/25/85	95/25/135	95/25/90	0/0/90	0/0/90
White cabbage <sup>g</sup>	310/45/145	310/45/145	240/20/80	210/15/85	145/10/50	125/10/50
Oat <sup>g</sup>	90/15/45	90/15/45	50/5/15	40/5/15	-	-
Carrot <sup>g</sup>	120/20/60	120/20/60	60/5/20	50/5/20	-	-
Onion <sup>g</sup>	170/80/65	170/80/65	115/10/40	100/5/40	70/5/25	65/5/25

<sup>a</sup> C: conventional growth system; OA: organic growth system with animal manure; and OB: organic growth system with cover crops.

<sup>b</sup> Applied as inorganic fertiliser.

<sup>c</sup> Applied as animal manure. K was supplemented as vinasse for all crops from Foulum.

<sup>d</sup> K was applied as vinasse for all crops from Foulum.

<sup>e</sup> Animal manure was also applied to white cabbage and onion in the OB system.

<sup>f</sup> Location: Foulum, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>g</sup> Location: Aarslev, The Faculty of Science and Technology, Aarhus University, Denmark.

**Table S5**

Pesticides used in the conventional system in the growing seasons 2006-2007 and 2007-2008 at the 2 locations

Crop	2006-07	2007-08
Barley <sup>a</sup>	OxitrilCM. Amistar. Unix	OxitrilCM. Amistar. Unix
Faba bean <sup>a</sup>	Cypermethrin	Cypermethrin. Pirimor G
Potato <sup>a</sup>	Fenix. Titus. SweDane Contact. Shirlan. DithaneNT. Cypermethrin. Reglone	Fenix. Titus. SweDane Contact. Shirlan. DithaneNT. Cypermethrin. Reglone
Wheat <sup>a</sup>	Starane. Express. Opus. ProlineEC250. Amistar. Cypermethrin	Starane. Express. Opus. ProlineEC250. Amistar. Cypermethrin
Rape seed <sup>a</sup>	Kerb 500SC. Matrigon. IT-Cypermethrin	Command CS. Loncid. IT-Cypermethrin
White cabbage <sup>b</sup>	Dipel ES 1.5. Fastac 50. Pirimor	Dipel ES 1.5. Fastac 50. Pirimor. Amistar
Oat <sup>b</sup>	Express ST. Starane 180S. MCPA 750. Stereo 312.5 EC. Amistar	Express ST. Starane 180S. MCPA 750. Stereo 312.5 EC. Amistar
Carrot <sup>b</sup>	Afalon. glyphosate	Afalon. Fenix. glyphosate. Amistar. Signum WG. Fastac 50
Onion <sup>b</sup>	Stomp. Totril. Acrobat WG. Dithane NT	Stomp. Totril. Fenix. Acrobat WG. Dithane NT. Signum WG. Fastac 50

<sup>a</sup> Location: Foulum, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>b</sup> Location: Aarslev, The Faculty of Science and Technology, Aarhus University, Denmark.

**Table S6**

Harvest yields<sup>a</sup> for all crops in the 3 different growth systems<sup>b</sup> in the growing seasons 2006-2007 and 2007-2008 at the 2 locations

Crop	Season	C	P <sup>e</sup>	OA	P <sup>e</sup>	OB	P <sup>e</sup>	P <sup>f</sup>
Barley <sup>c</sup>	2006-07	4.75 ± 0.51 <sup>#</sup>	NS	3.20 ± 0.08 <sup>§</sup>	NS	3.65 ± 0.07 <sup>§</sup>	0.003	0.03
	2007-08	5.48 ± 0.19 <sup>#</sup>		3.29 ± 0.5b <sup>§</sup>		4.53 ± 0.02 <sup>&amp;</sup>		0.02
Faba bean <sup>c</sup>	2006-07	2.26 ± 0.04	0.02	1.95 ± 0.17	NS	2.11 ± 0.05	0.03	NS
	2007-08	3.57 ± 0.26		2.50 ± 1.01		3.45 ± 0.35		NS
Potato <sup>c</sup>	2006-07	43.5 ± 3.75 <sup>#</sup>	0.02	29.3 ± 1.44 <sup>§</sup>	0.03	27.2 ± 2.24 <sup>§</sup>	NS	0.02
	2007-08	61.5 ± 0.55 <sup>#</sup>		46.4 ± 3.66 <sup>§</sup>		38.9 ± 3.95 <sup>§</sup>		0.01
Wheat <sup>c</sup>	2006-07	7.01 ± 0.33 <sup>#</sup>	0.02	3.58 ± 0.27 <sup>§</sup>	0.04	1.81 ± 0.16 <sup>&amp;</sup>	0.04	0.0006
	2007-08	9.47 ± 0.39 <sup>#</sup>		5.03 ± 0.32 <sup>§</sup>		2.75 ± 0.22 <sup>&amp;</sup>		0.0005
White cabbage <sup>d</sup>	2006-07	83.2 ± 4.57	0.02	62.8 ± 1.41	0.009	68.1 ± 7.63	NS	NS
	2007-08	106 ± 1.58		91.9 ± 3.58		91.3 ± 12.7		NS
Oat <sup>d</sup>	2006-07	5.00 ± 0.03 <sup>#</sup>	0.007	4.62 ± 0.14 <sup>#§</sup>	0.02	4.23 ± 0.28 <sup>§</sup>	NS	0.049
	2007-08	3.06 ± 0.07		3.59 ± 0.13		3.84 ± 1.17		NS
Carrot <sup>d</sup>	2006-07	95.9 ± 3.37	0.04	83.9 ± 7.56	NS	90.5 ± 6.54	NS	NS
	2007-08	108 ± 0.99 <sup>§&amp;</sup>		102 ± 2.74 <sup>#&amp;</sup>		94.5 ± 2.69 <sup>#</sup>		0.02
Onion <sup>d</sup>	2006-07	73.8 ± 0.26 <sup>#</sup>	0.02	47.5 ± 10.1 <sup>§</sup>	NS	50.3 ± 4.03 <sup>§</sup>	NS	0.04
	2007-08	95.7 ± 3.80 <sup>#</sup>		64.0 ± 0.99 <sup>§</sup>		61.7 ± 9.07 <sup>§</sup>		0.02

<sup>a</sup> Values are means ± SD (n = 2) expressed as ton fresh weight/hectare.

<sup>b</sup> C: conventional growth system; OA: organic growth system with animal manure; and OB: organic growth system with cover crops.

<sup>c</sup> Location: Foulum, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>d</sup> Location: Aarslev, The Faculty of Science and Technology, Aarhus University, Denmark.

<sup>e</sup> P-value for the effect of the growing season on the harvest yields of the crops from each growth system (Student's *t*-test).

<sup>f</sup> P-value for the effect of growth system on the harvest yields of the crops. Values not sharing the common superscript within each row are different at given P-value (ANOVA).

## References

1. S. Husted, B. F. Mikkelsen, J. Jensen and N. E. Nielsen, Elemental fingerprint analysis of barley (*Hordeum vulgare*) using inductively coupled plasma mass spectrometry, isotope-ratio mass spectrometry, and multivariate statistics, *Anal Bioanal Chem*, 2004, **378**(1), 171-182.