Maize Growers Association

Maize Conference 2017

23rd February 2017

My Farming System with a Focus on Catchment Management

Poul J Hovesen

Director of Farming - Holkham Farming Company – 3000 Ha

Farms & Estate Manager - Salle Farms Company – 2000 Ha

Rotation and Soil Management - 2000ha

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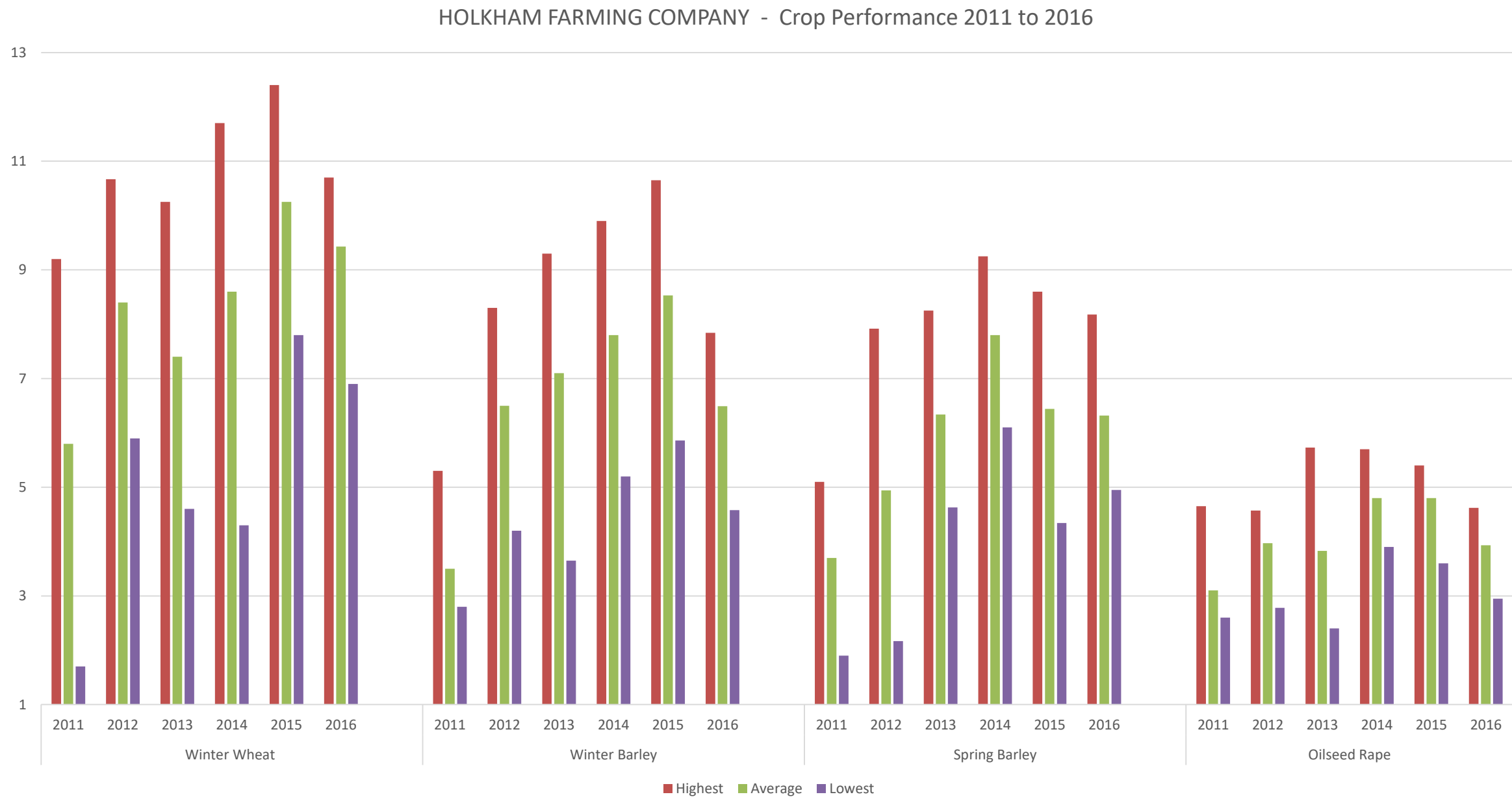
	Crop 1	Crop 2	Crop 3	Crop 4	Crop 5	Crop 6	Crop 7
Organic Manure		Limex 70 + Turkey Manure		Turkey Manure		Limex 70	
Cover Crop Drilling				Opus / Bio-Drill 50mm Points		Opus / Bio-Drill 50mm Points	
Cover Crop Control				Glyphosate		Glyphosate	
First Preparation	Carrier Straw Harrow	Opus 50mm Points	Carrier CrossCutter	Carrier CrossCutter	Opus 50mm Points	Carrier CrossCutter	
Weed Control	Glyphosate						
Second Preparation	Opus 50mm Points		Opus 50mm Points	Opus 50mm Points	Opus 50mm Points	Opus 50mm Points	Opus 50mm Points
Drilling	Rapid	Opus / Bio-Drill 50mm Points	Rapid	Compactor / Precision Drill	Rapid	Rapid	Rapid
Planted Crop	**Winter Barley**	**Winter Oilseed Rape**	**Winter Wheat**	**Sugar Beet**	**Winter Wheat / Spring Barley**	**Spring Beans**	**Winter Wheat**

NIAB TAG VÄDERSTAD The University of Nottingham BBRO UEA University of East Anglia


HOLKHAM FARMING COMPANY - Crop Performance 2011 to 2016
13
11
9
7
5
3
1
2011
2012
2013
2014
2015
2016
Winter Wheat
Winter Barley
Spring Barley
Oilseed Rape
Highest
Average
Lowest

Comparison against National & Regional Data
Winter Wheat

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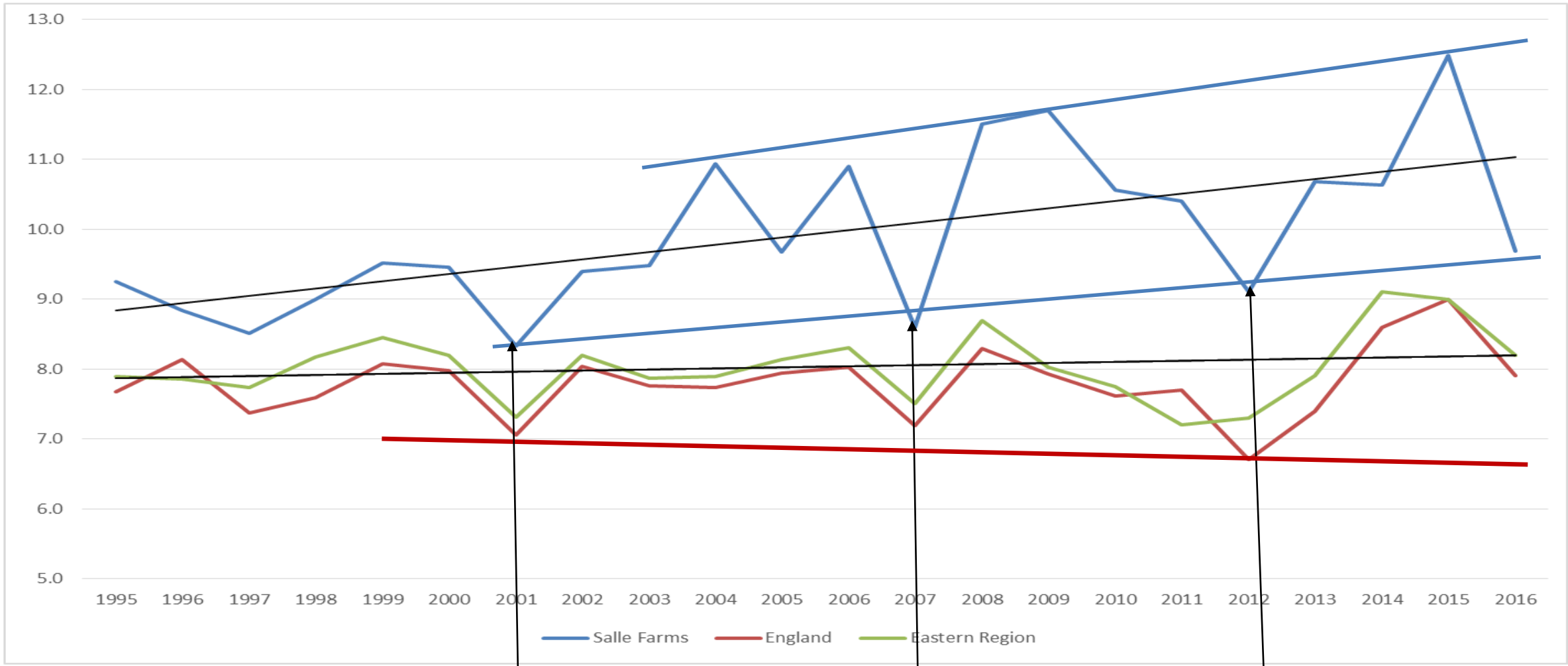

Wet Autumn followed by wet Spring

Wet Spring, Very Warm, Low radiation

Wet Spring and low radiation

Acknowledgement: DEFRA Cereal Production Survey

Mean Net Radiation (W m²)

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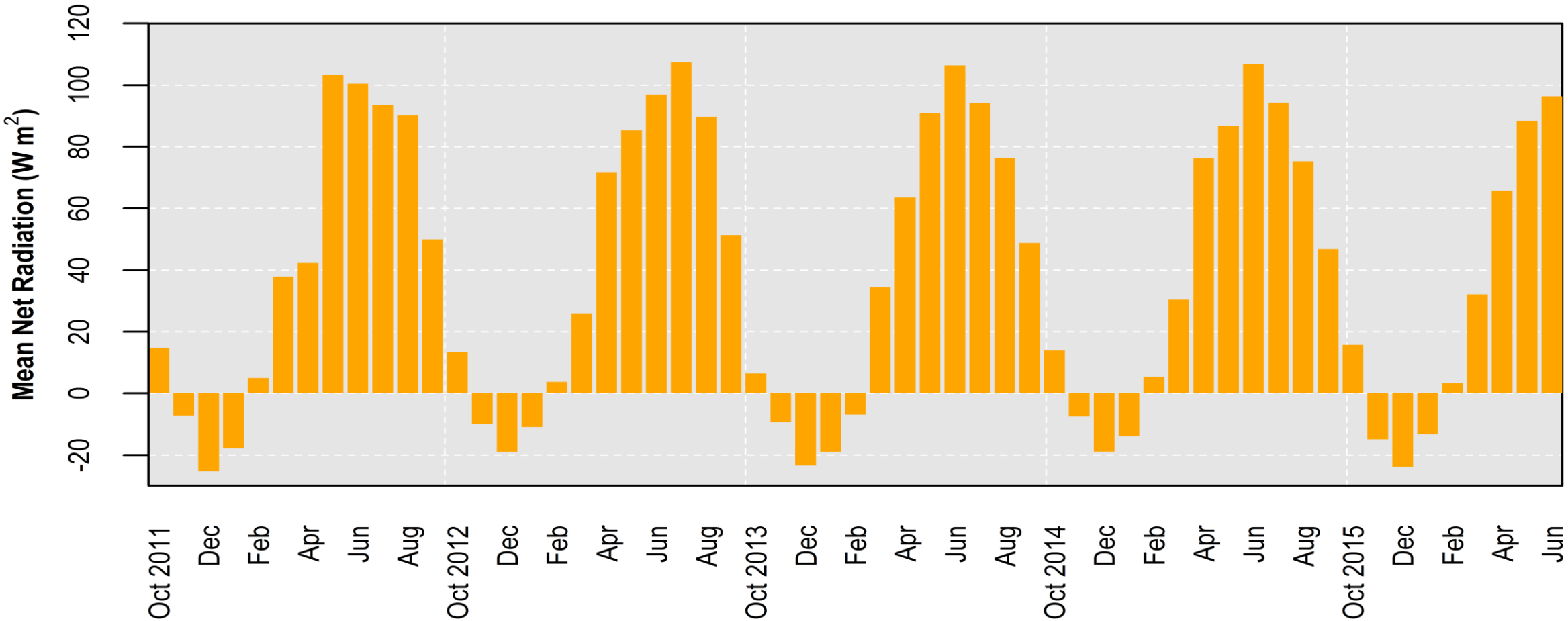

Implementation of Mitigation Measures

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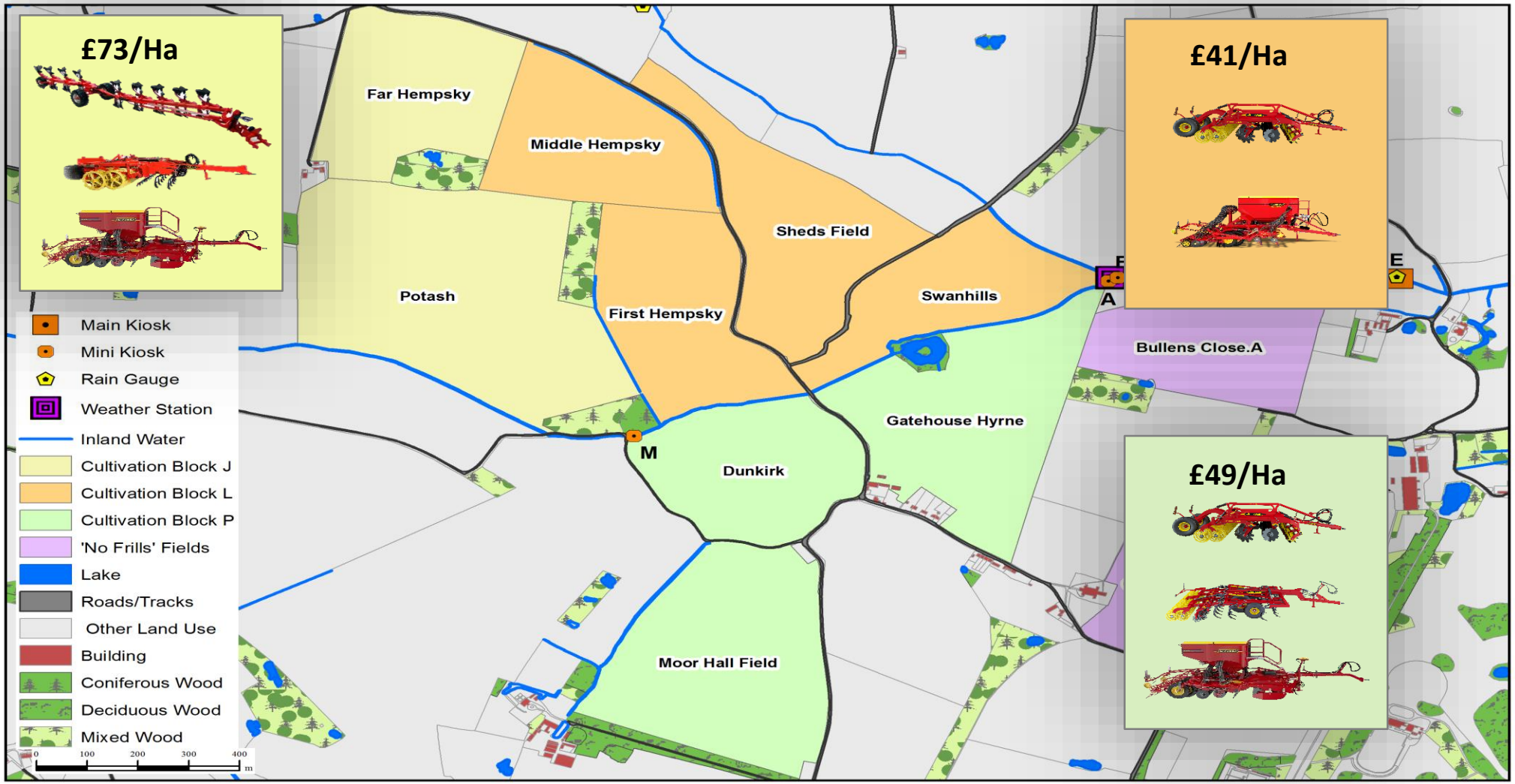

VÄDERSTAD

BBRO

UEA
University of East Anglia

Extended Field Drain Sampling Sites

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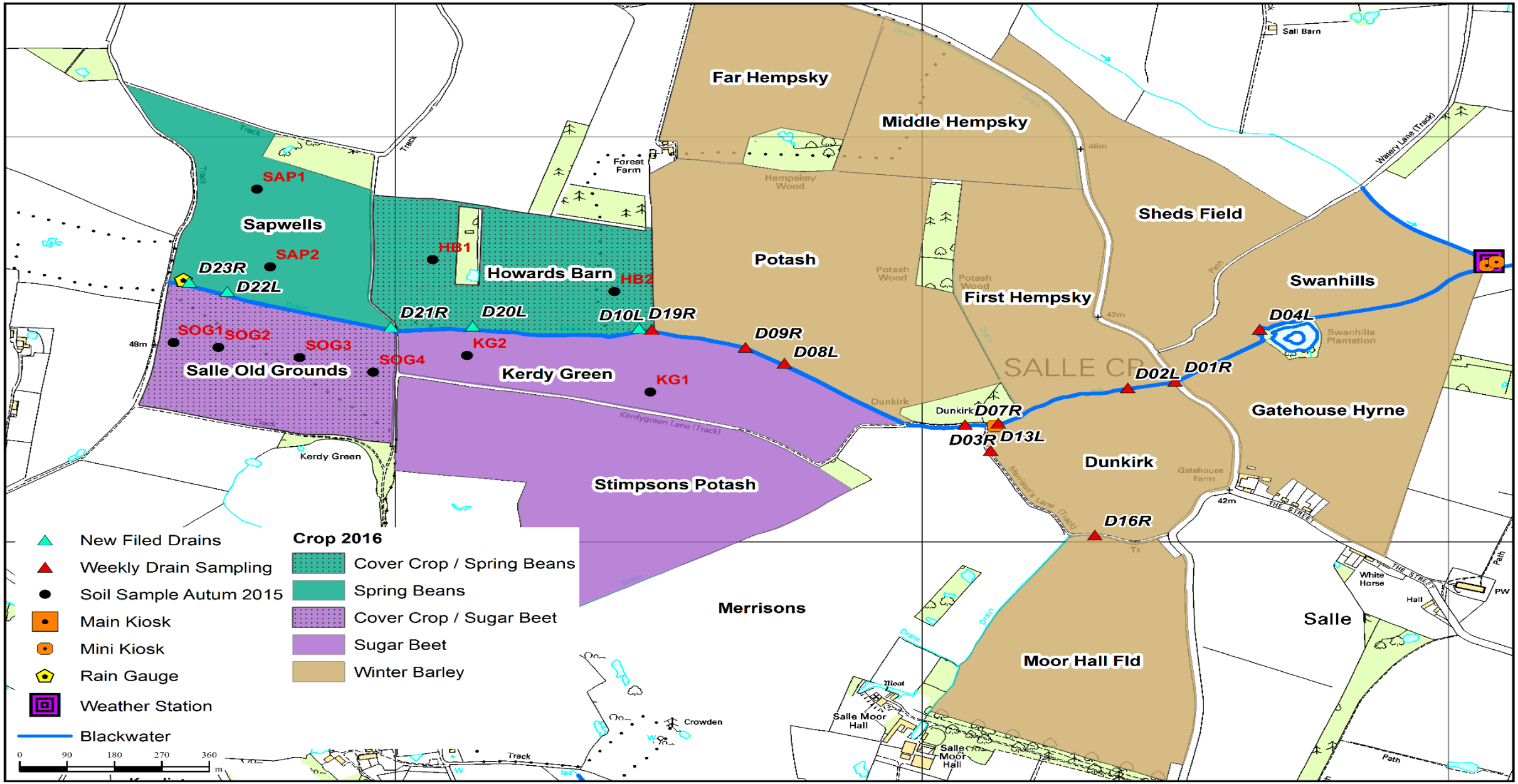

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Catchment monitoring observations

- Greatest nitrate-N and total phosphorus (TP) fluxes only occur when the shallow groundwater level is within 0.6 m of the ground surface and runoff coefficients (storm flow / rainfall) are greater than 0.1.

- Wet winter 2013 resulted in elevated shallow groundwater levels which led to more frequent activation of sub-surface pathways and tile drain flow.

- Fertiliser application varied considerably (up to 21% and 41% for nitrate-N and P inputs) across the three years due to differences in crop rotation between farms. However, proportional reductions in annual riverine nitrate-N and TP loadings were not observed at the sub-catchment outlet.

- Catchment may be in a state of *biogeochemical stationarity*, whereby ‘legacy stores’ of nutrients are buffering the stream against annual changes in fertiliser nutrient inputs.

Extended measures fields, 3 December 2015

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Salle Old Grounds

Oilseed radish/rye mix

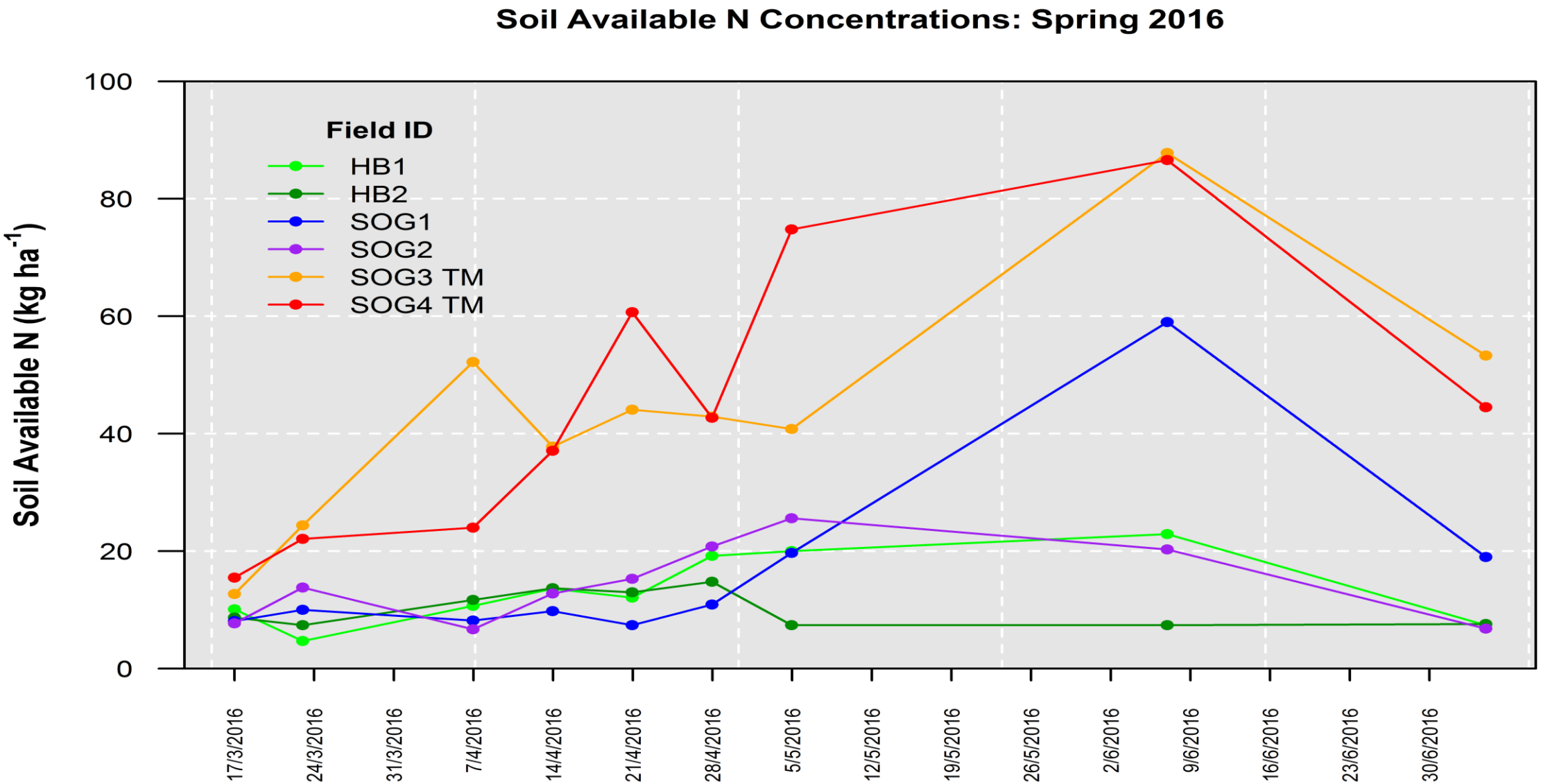
with turkey muck

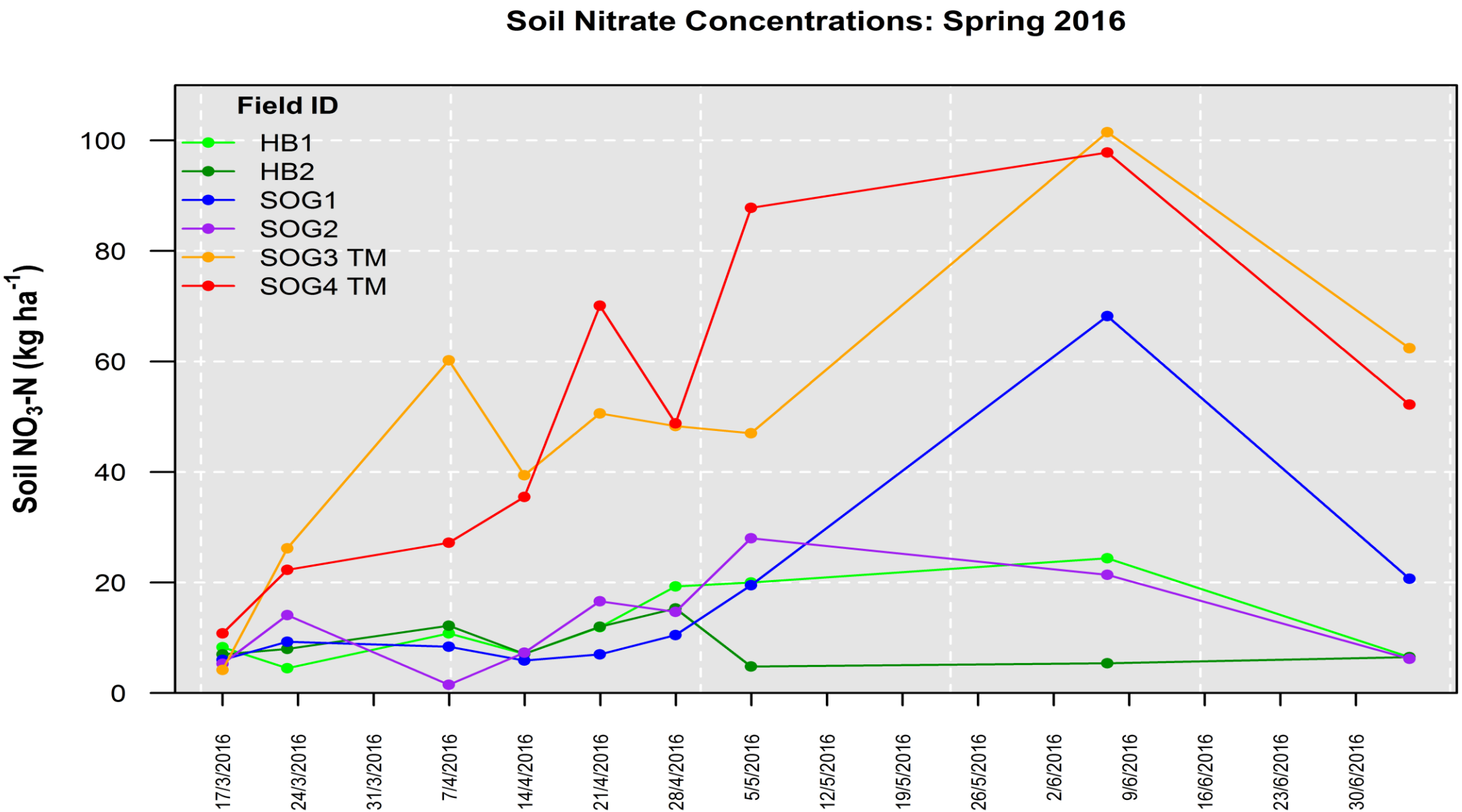
without turkey muck

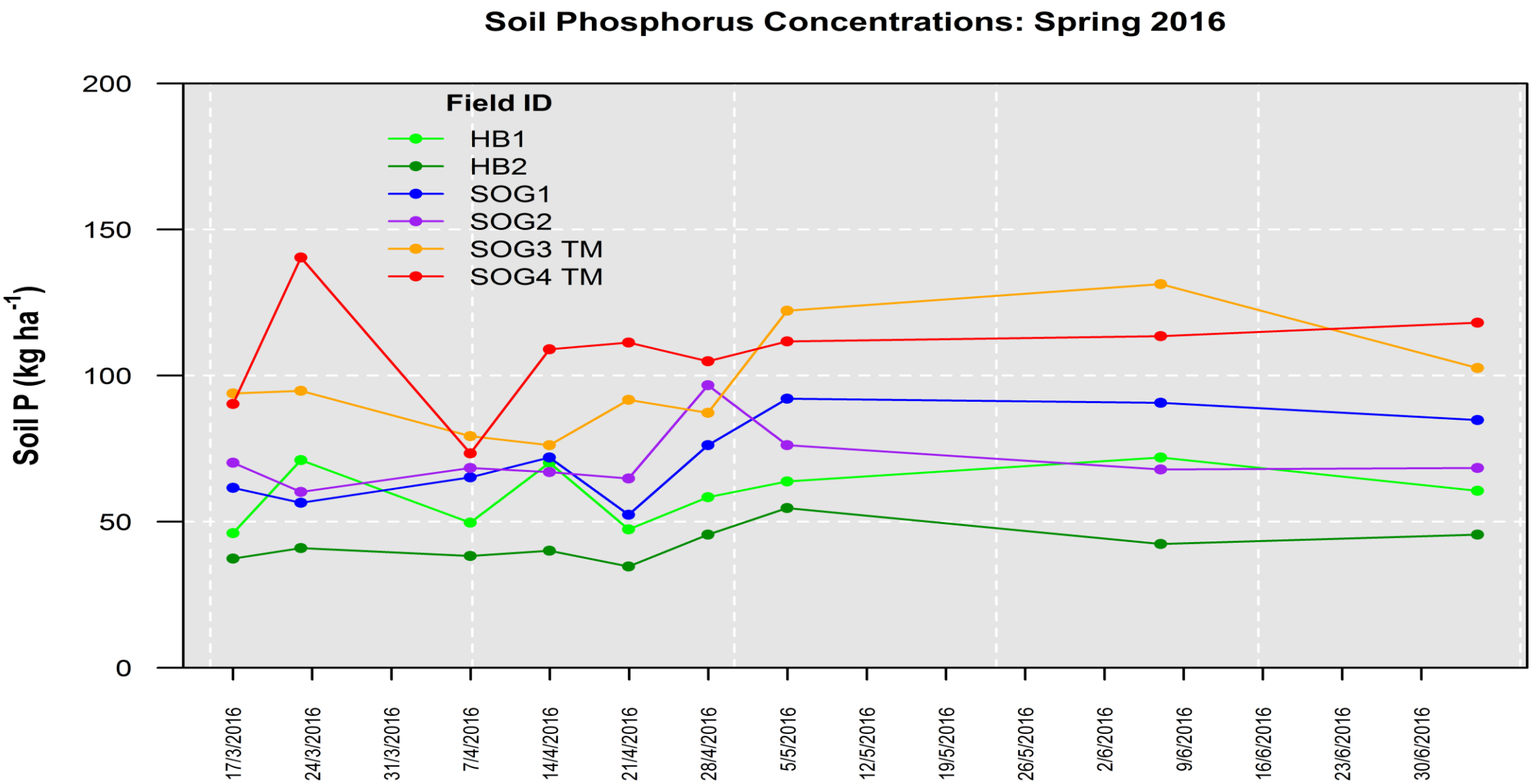
Howards Barn

Oilseed radish

without turkey muck


Soil Available N Concentrations: Spring 2016
Soil Available N (kg ha-1)
100
80
60
40
20
0
Field ID
HB1
HB2
SOG1
SOG2
SOG3 TM
SOG4 TM
17/3/2016
24/3/2016
31/3/2016
7/4/2016
14/4/2016
21/4/2016
28/4/2016
5/5/2016
12/5/2016
19/5/2016
26/5/2016
2/6/2016
9/6/2016
16/6/2016
23/6/2016
30/6/2016


Soil Nitrate Concentrations: Spring 2016
Field ID
HB1
HB2
SOG1
SOG2
SOG3 TM
SOG4 TM
Soil NO3-N (kg ha-1)
0
20
40
60
80
100
17/3/2016
24/3/2016
31/3/2016
7/4/2016
14/4/2016
21/4/2016
28/4/2016
5/5/2016
12/5/2016
19/5/2016
26/5/2016
2/6/2016
9/6/2016
16/6/2016
23/6/2016
30/6/2016


Soil Phosphorus Concentrations: Spring 2016
Field ID
HB1
HB2
SOG1
SOG2
SOG3 TM
SOG4 TM
Soil P (kg ha-1)
200
150
100
50
0
17/3/2016
24/3/2016
31/3/2016
7/4/2016
14/4/2016
21/4/2016
28/4/2016
5/5/2016
12/5/2016
19/5/2016
26/5/2016
2/6/2016
9/6/2016
16/6/2016
23/6/2016
30/6/2016

Cover crop total N uptake: Salle Old Grounds, December 2015

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	LEAF				ROOT				LEAF & ROOT			
	SOG1	SOG2	SOG3	SOG4	SOG1	SOG2	SOG3	SOG4	SOG1	SOG2	SOG3	SOG4
			w. TM	w. TM			w. TM	w. TM			w. TM	w. TM
Fresh weight (g/m²)	480	320	880	1200	80	80	120	240				
Dry matter (g/m²)	**39.48**	**26.32**	**72.38**	**98.7**	**24.92**	**24.92**	**37.38**	**74.76**				
Total N %w/w	0.03	0.03	0.05	0.05	0.01	0.01	0.01	0.01				
Total N (g/m²)	1.30	0.88	3.45	4.65	0.27	0.13	0.41	0.58				
Total N (kg/ha)	**13.03**	**8.76**	**34.53**	**46.49**	**2.69**	**1.27**	**4.11**	**5.76**	**15.72**	**10.04**	**38.64**	**52.24**

w. TM = with turkey muck

Sample SOG2

Sample SOG4 with turkey muck

2013-14 oilseed radish analysis	Mean N LEAF (kg N/ha)	Mean dry matter yield LEAF (t/ha)	Mean N ROOT (kg N/ha)	Mean dry matter yield ROOT (t/ha)	Mean N TOTAL (root & leaf) (kg N/ha)	Mean dry matter yield TOTAL (root & leaf) (t/ha)
Without starter N	57.31	1.91	13.15	0.64	70.46	2.55
With starter N	63.57	2.17	11.97	0.61	75.54	2.78

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2016 Maize Crop Yields

FIELD NAME	HA	Total Dry Weight	Dry Weight/Ha	Harvest Date	Previous Crop	Cover Crop	Organic Manure
622 Grove Field	9.38	340.43	36.29	27-Sep	Potatoes	No/cultivated	Liquid digestae
620 Cartshed	8.64	336.55	38.95	28-Sep	Potatoes	No/cultivated	Liquid digestate
604 Welgates	10.59	337.10	31.83	28-Sep	Potatoes	No/cultivated	No
104 Home Field	2.98	101.90	34.20	30-Sep	Maize	No/cultivated	No
115 Paradise	4.80	187.91	39.15	25-Oct	Maize	No/cultivated	No
Total	**36.39**	**1303.89**	**35.83**				
202 Chalk Pit	9.67	360.21	37.25	22-Oct	W Wheat	Overwinter stubble	No
204 Lowes	3.44	131.32	38.17	22-Oct	W Wheat	Overwinter stubble	No
201 Ring Park	7.31	276.66	37.85	25-Oct	Wheat	Overwinter stubble	No
200 20 Acres	5.91	243.83	41.26	25-Oct	Wheat	Overwinter stubble	No
116 Lower Hill	4.17	147.20	35.30	26-Oct	Maize	Overwinter stubble	No
122 Middle Field	3.96	140.87	35.57	26-Oct	Maize	Overwinter stubble	No
017 Stone Barn	3.53	141.17	39.99	03-Oct	Maize	Overwinter stubble	No
020 Gravel Pit	9.91	340.21	34.33	03-Oct	Wheat	Overwinter stubble	Farm Yard Manure
Total	**47.90**	**1781.45**	**37.19**				
			Plus 3.8%				
226 Wells 30 acres	10.72	503.78	46.99	29-Sep	W Barley	Oil Radish	Solid Digestate
121 Bones Belt	8.55	342.59	40.07	24-Oct	W Wheat	Oil Radish	No
114 10 acres	2.99	139.06	46.51	25-Oct	S Barley	Oil Radish	No
Total	**22.26**	**985.42**	**44.27**				
			Plus 23.5%				
TOTALS	**106.55**	**4070.77**	**38.21**				

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2016 Sugar Beet Crop Yields

	FIELD NAME	HA	FARM	VARIETY	SUGAR %	ADJ TOTAL WEIGHT	ADJ WEIGHT /HA	HARVEST DATE
Previous Crop Wheat with No Cover Crop	Barn Field	22.52	C Acre	Springbok	16.95	1447	64.25	20-Dec
	Manuels	19.89	C Acre	Springbok	17.74	1339	67.32	25-Nov
	Clockmoor	7.86	C Acre	Hayden	16.99	514	65.39	10-Jan
		50.27			**17.28**	**3300**	**65.65**	
Previous crop Wheat followed by Cover Crop (Oil Radish) Yield	35 Acres	12.38	Peterstone	Hayden	16.66	867	70.03	20-Oct
	Above Peterstone	10.63	Peterstone	Hayden	17.75	845	79.49	10-Nov
	Lightning	12.45	New Farm	Springbok	18.22	882	70.84	10-Nov
	Roundabout	8.05	Park Farm	BTS 755	17.55	635	78.88	01-Nov
	Four Score North	8.71	Park Farm	BTS 755	17.58	703	80.71	01-Nov
	First Nixons	5.5	Park Farm	BTS 755	16.75	390	70.91	10-Oct
	Cottage Piece (50%)	11.61	Park Farm	BTS 755	17.87	768	66.15	01-Dec
		69.33			**17.54**	**5090**	**73.42**	
							Plus 11.8%	
Previous crop Wheat followed by Cover Crop(Oil Radish) plus Solid Digestate	Gallow Hill West	8.83	New Farm	Springbok	17.67	777	88.00	01-Dec
	Hobbs	7.55	New Farm	Springbok	17.14	665	88.08	10-Jan
	Warrens Roundabout	5.24	New Farm	Hornet	17.32	461	87.98	01-Dec
	Back of Mos	5.69	New Farm	Hornet	17.05	501	88.05	10-Jan
	Gallows Hill East	13.88	New Farm	BTS 755	17.57	1222	88.04	01-Dec
		41.19			**17.41**	**3626**	**88.03**	
							Plus 34.1%	
	SUGAR BEET TOTAL	**160.79**			**17.43**	**12016**	**74.73**	

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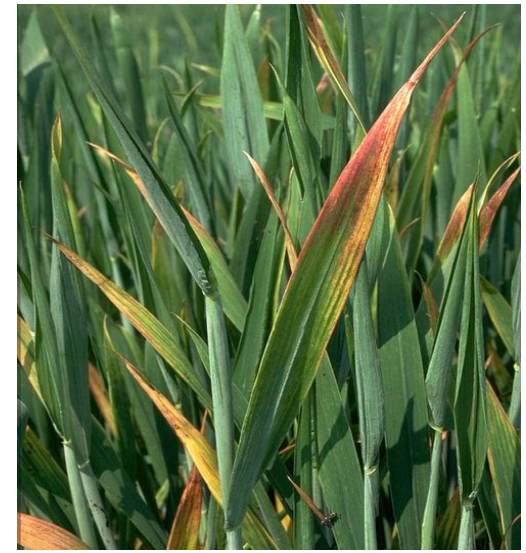
Sugar Beet 2016 Crop Yields	FIELD NAME	VARIETY	DATE DRILLED	SUGAR %	ADJ WEIGHT/HA	HARVEST DATE	GROWING DAYS	KG/HA GROWTH/DAY
No Cover Crop Land ploughed followed by Carrier-(NZA on heavy areas)-Karat	Kerdy Green	Hornet	22-Apr	17.02	64.25	03-Oct	164	0.39
	Stimp Potash	Hornet	23-Apr	16.91	62.37	04-Oct	164	0.38
	Odessa	Sabatina	21-Apr	17	69.31	22-Oct	184	0.37
	Rivetts	Sabatina	20-Apr	16.61	69.03	05-Dec	229	0.3
	Hut Field	Sabatina	20-Apr	16.61	68.33	07-Dec	231	0.2
	Hanger	Haydn	25-Apr	17.96	72.96	18-Dec	237	0.3
	Triangle	Haydn	22-Apr	17.27	73.56	14-Dec	236	0.31
	Average			17.05	68.54		206	0.32
Cover Crop (Oil Radish 18kg/ha) Turkey Muck (7.5t/ha) Carrier-Opus-Carrier-Karat	Low Farm	Haydn	01-May	16.63	84.93	14-Oct	166	0.51
	Wdhl Field	BTS	05-May	16.8	75.69	20-Oct	168	0.45
	Average			16.72	80.31		167	0.48
					Plus 17.2%			Plus 50%
Cover Crop (Oil Radish/Rye 27kg/ha) Turkey muck (7.5t/ha) Carrier-Opus-Carrier-Karat	Old Grounds	BTS	04-May	17.09	85.63	25-Oct	174	0.49
					Plus 24.9%			Plus 53%
AVERAGE				17.09	72.61		195	0.37

Cover crops – risks as well as benefits?

- Can cover crops increase pest and disease risks to crops in following rotations?
- And does it matter?
- How can benefits be maintained without increasing risks?
    - Species selection within a cover crop type – some are lower risk than others
    - Cover crop management – removal before pathogens increase, create gap between cover and crop



Acknowledgement: NIAB TAG

Brassica based:

Brassica species as cover crop	Clubroot risk to oilseed rape and vegetable brassicas
Mustard (B juncea)	Moderate risk
Oil Radish (Raphanus sativus)	Low risk
White mustard (Sinapis alba)	High risk

Acknowledgement: NIAB TAG

Legume based:

Legume species as cover crop	foot and root rots (pea and bean)	Aphanomyces root rot (pea and bean)	Leaf and pod spots (bean)	Leaf and pod spots (pea)	Chocolate spot (bean)
Vetches	At risk	unknown	No risk	At risk	At risk
Sainfoin	At risk	unknown	No risk	No risk	No risk
Clovers	At risk	unknown	No risk	At risk	No risk
Medicks	At risk	unknown	unknown	probable risk	unknown
Lotus	At risk	unknown	unknown	unknown	unknown
Fenugreek	unknown	unknown	unknown	unknown	unknown

Acknowledgement: NIAB TAG

AHDB Mycotoxin Risk Assessment

Factor	Details	Risk
Region (see map)	High	4
	Moderate	2
	Low	-2
	Very Low	-4
Previous crop	Maize	6
	Other	0
Cultivation	Direct-drilled	4
	Standard non-inversion tillage	3
	Intensive non-inversion tillage	2
	Plough (soil inversion)	0
Wheat variety Recommended List fusarium ear blight resistance rating	RL rating 1–5	1
	RL rating 6–9	0
	RL rating unknown	1

Acknowledgement: NIAB TAG