

The effect of a range of cover crop species on spring barley

Centre: Morley

Trial Code: SB14-9502

Variety: cv Odessey

Objective

To examine a range of alternative and novel cover crop options and to determine their impact on the performance of spring barley

NAC theme: Agronomy (best practice & system resilience)

Summary

This experiment examined further the use of a range of autumn established over winter cover crops ahead of spring barley. Cover crops were sown in August, destroyed in February and spring barley was established in March. Cover crop GAIs indicated slow growth over the autumn through the winter; in general the legume species tended to show the least growth. Where a cover crop had not been used a spring barley yield of 4.87 t/ha was recorded; the highest yield in the experiment (5.21 t/ha) was associated with the barley following a brassica cover crop and the lowest (4.26 t/ha) associated with barley following Westerwold ryegrass, other yields were intermediate to this. This experiment was the second in a series of three supported by the National Agronomy Centre initiative; this will enable further cross site and season analysis to be undertaken.

Table 1: Treatments and GAI data

	Cover crop	Seeding rate	Follow crop	GAI		
				Cover crop (Nov 13)	Cover crop (Jan 14)	Barley (May 13)
1.	Black medic	6 kg/ha	Spring barley	0.2	0.2	2.5
2.	Common Vetch	100 kg/ha	Spring barley	0.3	0.4	2.5
3.	Westerwold Ryegrass	25 kg/ha	Spring barley	0.8	1.7	1.9
4.	Phacelia	10 kg/ha	Spring barley	0.5	1.2	2.4
5.	Sainfoin	25 kg/ha	Spring barley	0.1	0.1	2.6
6.	ASM mixture	10 kg/ha	Spring barley	0.3	0.3	2.5
7.	Chicory	15 kg/ha	Spring barley	0.4	0.6	2.5
8.	Radish	10 kg/ha	Spring barley	0.5	0.6	2.6
9.	No cover crop	-	Spring barley	0.1	0.0	2.5
	LSD			0.11	0.19	0.22
	Sig			P<0.0001	P<0.0001	P<0.0001
	CV (%)			19.3	20.0	5.1

This trial was funded by NIAB TAG National Agronomy Centre Initiative

NIAB TAG National Agronomy Centre, Huntingdon Road, Cambridge, CB3 0LE
Tel 01223 342200, Fax 01223 277602, Email info@niab.com

Copyright 2013: NIAB TAG National Agronomy Centre initiative information and reports should only be passed on to third parties with the expressed permission of NIAB and, where required, any relevant external funders.

- All cover crops were sown in late August 2013, sprayed off with glyphosate in February 2014 and incorporated into the soil surface with a Sumo Trio. The site was drilled with spring barley on 23rd March 2014. The legume mixture used was a mix of crimson clover, white clover, black medick and lucerne; based on the mix developed in the Leg LINK project (HGCA report 513). This mix is also being used in the New Farming Systems (NFS) project.
- Cover crop establishment and growth in autumn 2013 was assessed (Table 1). Crop GAIs (Green Area Index - a measure of the ratio between the total area of all green tissues and the area of ground from which they come) indicated slow cover crop growth and differences between covers. The higher levels of growth in November were associated with Westerwold ryegrass, phacelia and radish species.
- Comparison of cover crop GAI between November and January indicated further GAI development (growth) notably in Westerwolds ryegrass and phacelia with other cover crop GAIs remaining similar. In general the non-legume species had greater GAIs than the legume species in the experiment.
- The GAI in the spring barley crop showed little difference with respect to preceding cover crop treatment, with the exception of spring barley following Westerwold ryegrass; this indicated a significant reduction in GAI compared to untreated plots.
- In general, there were no specific weed issues associated with the cover crops noted in the following spring barley crops; although as indicated there was some evidence of a loss of vigour in the spring barley where the Westerwold ryegrass treatment had been used.
- Where a cover crop had not been used, a spring barley yield of 4.87 t/ha was recorded (Figure 1). There was some significant yield variation in barley crops following cover crop treatments with the highest yield (5.21 t/ha) associated with the barley following a radish cover crop and the lowest (4.26 t/ha) associated with barley following Westerwold ryegrass. The LSD value for yield was ca. 0.37 t/ha.
- This experiment protocol was first delivered through the NAC initiative in 2012/13; and an analogous report for this study can be found on the NAC website. While there have been some specific treatment changes, for information, Figure 2 depicts the mean yield response from common treatments in both studies. Through the support of the National Agronomy Centre initiative this research is being repeated again during the 2014/15 season and a more complete cross season appraisal of the data should be possible in future seasons.
- In both studies, field conditions resulted in slow rates of cover crop growth; this has potentially contributed to the weak yield responses recorded. In 2012/13 the strongest yield response was associated with spring barley following phacelia and in 2013/14 the strongest response was following radish (although it should be noted radish was not included in the 2012/13 study). However, both studies have indicated a yield loss associated with Westerwold ryegrass; possibly indicating that this cover crop is not well suited to use ahead of spring barley or that modified management practices would be needed if this cover crop were to be used. In both studies, legume cover crops conferred little yield benefit to following spring barley crops; this would be in contrast to previous NAC research, although in these cases yield responses were possibly associated with much stronger growth of the cover crop which was not apparent in these experiments.

This trial was funded by NIAB TAG National Agronomy Centre Initiative

NIAB TAG National Agronomy Centre, Huntingdon Road, Cambridge, CB3 0LE
Tel 01223 342200, Fax 01223 277602, Email info@niab.com

Copyright 2013: NIAB TAG National Agronomy Centre initiative information and reports should only be passed on to third parties with the expressed permission of NIAB and, where required, any relevant external funders.

Figure 1: Yield of spring barley following a range of cover crop approaches in 2013/14 (t/ha)

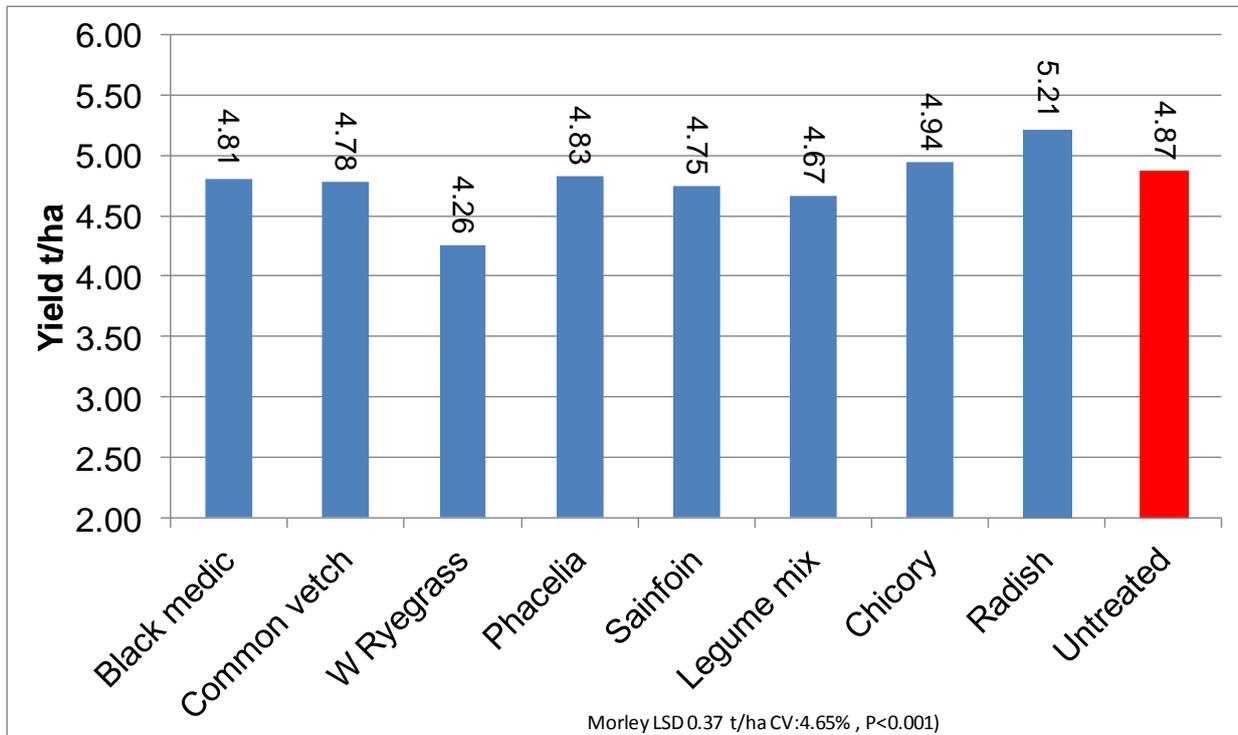
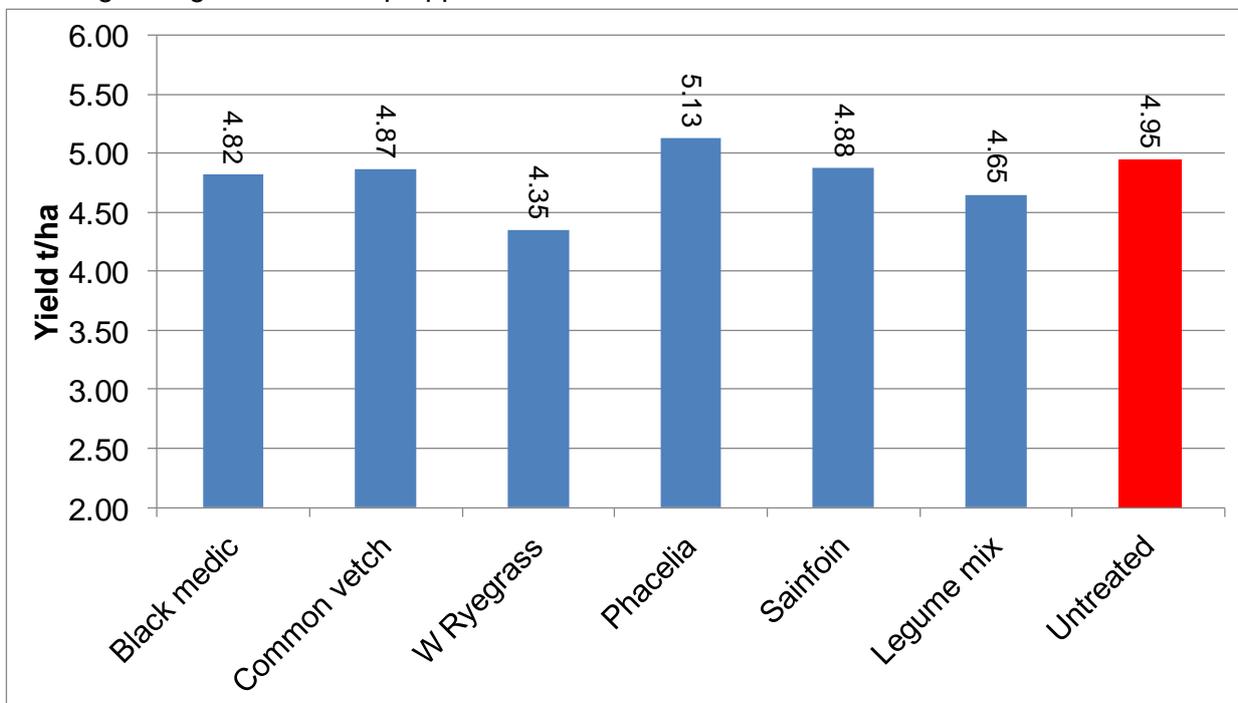


Figure 2: Mean yield of spring barley from common treatments in 2012/13 and 2013/14 following a range of cover crop approaches



This trial was funded by NIAB TAG National Agronomy Centre Initiative

NIAB TAG National Agronomy Centre, Huntingdon Road, Cambridge, CB3 0LE

Tel 01223 342200, Fax 01223 277602, Email info@niab.com

Copyright 2013: NIAB TAG National Agronomy Centre initiative information and reports should only be passed on to third parties with the expressed permission of NIAB and, where required, any relevant external funders.

Field details & overall applications to crop

Crop:	Spring Barley
Trial ID:	SB14-9502
Location:	Owers
Soil type:	Ashley series, sandy loam
Soil analysis:	P-27.2 mg/l, K-107 mg/l, Mg-60 mg/l, pH-7.8
Previous crop:	Spring Barley
Drill date (cover crop):	12/09/2013
Drill date (barley):	23/03/2014
Drilled plot size:	4 x 12 m ²
Replicates:	X 3

Input type	Product	Product rate	Date
Herbicide:	Finnish	70 g/ha	02/05/2014
Fertiliser:	Epso Top	5 kg/ha	03/06/2014
	Ammonium nitrate	120 kg/ha (N)	29/04/2014
	Kieserite	15 kg/ha	29/04/2014
Fungicide :	Arizona	0.70 l/ha	03/06/2014
	Jaunt	0.4 l/ha	03/06/2014
	Jaunt	0.4 l/ha	02/05/2014