

The relationship between sowing date of *Vicia faba* (field beans) and the level of damage caused by *Bruchus rufimanus* (bean seed beetle) in the UK.



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Introduction

Following evaluation of data collected from UK field bean crop harvest samples (Frontier Agriculture Ltd.) and crop development evaluations at a number of sites in East Anglia, a relationship emerged indicating that later pod formation resulted in a reduction of damage caused by *Bruchus rufimanus*. A series of field bean trials sown on three different dates was established in 2015 and the relationship between crop development, cultivar and damage further investigated.

Methods

Trials were sown at three sites in Lincolnshire during March and April 2015 at Dowsby (OS TF154291), Stubton (OS SK885488) and Lincoln (OS TF019744) on different dates during March and April (Table 1, Plate 1). Sowings were replicated 24 times and commercial cultivars Fuego and Fury were included within the trial design at each sowing date and site and analysed for varietal tolerance to *B. rufimanus*.

Plate 1: Trial design showing the layout of plots at the sites.

Table 1: Sowing dates at the three sites Dowsby, Stubton and Lincoln 2015

Site	Sowing period 1	Sowing period 2	Sowing period 3
Dowsby	11/03/15	27/03/15	10/04/15
Stubton	06/03/15		07/04/15
Lincoln	11/03/15		10/04/15

Plots developed to the dry harvest stage and following harvest, grain samples weighing approximately 400 grams from each plot were examined and classified for damage caused by *B. rufimanus* (Plate 2). Yield was calculated for each cultivar to determine the impact of sowing date on yield. Data were analysed using analysis of variance.



Plate 2: Damage caused to field beans by *B. rufimanus* larvae and adults.

Discussion

The results showed that *B. rufimanus* damage was reduced by up to 50% when sowing was delayed until April. Although field bean yield was suppressed in most cases when sowing occurred later, the results of this study may provide a valuable addition to UK recommendations for management of *B. rufimanus* and may allow growers to reduce insecticide applications in field beans during the critical flowering and pod formation period.

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Results

At all three sites there were statistically significant differences in damage caused by *B. rufimanus* between the sowing dates (Figure 1). The latest sown plots at all sites sustained approximately half the damage recorded in the earliest sown plots.

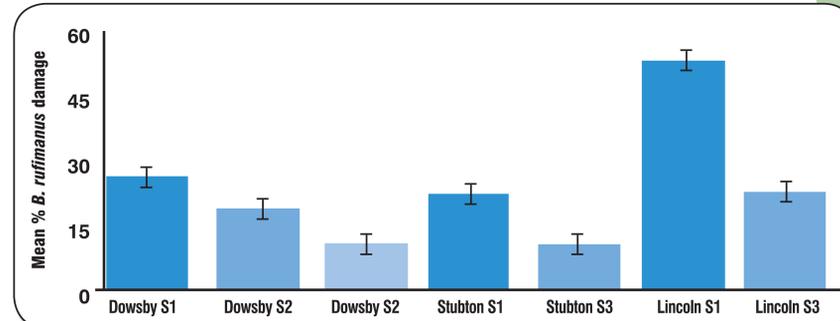


Figure 1: Mean *B. rufimanus* damage recorded as percentage weight for samples collected following harvest at the mature dry crop growth stage of spring field bean plots sown at different dates at Dowsby, Stubton and Lincoln in 2015 (Dowsby: probability = <0.001, LSD @ p = 0.05 = 4.141, CV = 30.4%; Stubton: Probability = <0.001, LSD @ p = 0.05 = 1.458, CV = 14.8%; Lincoln: Probability = <0.001, LSD @ p = 0.05 = 5.17, CV = 22.5%). S1 = Sowing period 1 (early March), S2 = Sowing period 2 (late March), S3 = Sowing period 3 (early-mid April).

There were statistically significant differences in the level of damage sustained between cultivars Fuego and Fury (Table 2) and at all sites Fuego had higher levels of damage than Fury.

Table 2: Mean *B. rufimanus* damage recorded as percentage weight for samples collected following harvest at the mature dry crop growth stage of spring field bean plots sown with the cultivars Fuego and Fury for all sowing dates at Stubton, Lincoln and Dowsby in 2015.

Cultivar	Mean % damage by weight at Stubton	Mean % damage by weight at Lincoln	Mean % damage by weight at Dowsby
Fuego	19.78 ± 1.55	41.34 ± 4.09	22.40 ± 2.31
Fury	13.29 ± 1.10	35.62 ± 3.62	15.34 ± 1.19
Probability	< 0.001	0.077	< 0.001
LSD@p=0.05	1.484	6.38	3.709
CV%	15.0	27.8	32.9

Yield was suppressed in most cases when sowing occurred later, particularly for those sowings that occurred during April 2015 (Table 3).

Table 3: Mean yield (tons per hectare) for the cultivars Fuego and Fury at Stubton, Lincoln and Dowsby in 2015.

Sowing period 1 = early March, sowing period 2 = late March, sowing period 3 = early-mid April.

	Mean yield (tons per hectare)					
	Stubton		Lincoln		Dowsby	
	Fuego	Fury	Fuego	Fury	Fuego	Fury
Sowing period 1	4.24 ± 0.27	5.08 ± 0.29	4.83 ± 0.14	5.40 ± 0.31	6.54 ± 0.25	7.15 ± 0.28
Sowing period 2					6.65 ± 0.23	6.92 ± 0.22
Sowing period 3	3.25 ± 0.27	4.77 ± 0.28	4.96 ± 0.16	5.05 ± 0.14	6.29 ± 0.20	6.40 ± 0.11
Probability	<0.001	0.117	0.448	0.237	0.113	<0.001
LSD@p=0.05	0.2347	0.3998	0.3741	0.6210	0.3563	0.3809
CV%	7.0	9.0	8.5	13.2	6.5	6.6