

Effect of mowing a legume fertility-building crop on shoot numbers of creeping thistle (*Cirsium arvense* (L.) Scop.)

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ABSTRACT

Perennial weeds with spreading root systems, e.g. *Cirsium arvense*, are difficult to control in organic arable rotations, particularly in those without grazed leys. Competitive crops and repeated mowing are proven methods of control that can be applied to the legume fertility-building crops in stockless rotations. An experiment at ADAS Terrington in 2000 compared a standard treatment of mowing at 45 cm legume height (x4) with mowing every two weeks (x8), and mowing when thistle flower buds were visible (x3). Thistle shoot numbers counted in July 2001 were around 75% less than at start of mowing in April 2000 (mean of 9.5 shoots per m²). The results suggest that achieving and maintaining a dense competitive crop has more influence than mowing frequency on creeping thistle survival under a clover fertility-building crop.

Keywords: organic farming; weeds; Cirsium arvense; creeping thistle.

INTRODUCTION

Perennial weeds, such as creeping thistle (*Cirsium arvense*), with spreading extensive root systems are difficult to manage in organic systems. Soil cultivation can lead to both increased shoot density and spatial spread as fragments of root readily produce new shoots and plants from adventitious buds. Competitive crops and repeated mowing are proven effective methods for thistle control (Donald, 1990). These are easiest to achieve in grass/clover leys, which if managed well, can provide adequate suppression of creeping thistle across the rotation. However, arable systems without livestock lack a similar multi-year competitive crop and provide ideal conditions for perennial weeds to thrive. Leys are grown but are usually only of one-year duration and are predominantly legumes to maximise short-term nitrogen fixation. There is opportunity to control weeds by manipulating the management of these fertility-building crops. Legumes in stockless rotations in the UK are generally mown three to four times per year and left as a mulch. Would more frequent mowing give better control? Would mowing by thistle growth-stage give better control? In 2000, there was an opportunity to test mowing frequency at ADAS Terrington when a field with a natural, even population of creeping thistle was scheduled to be in a legume fertility building crop.

MATERIALS AND METHODS

The experiment was located at ADAS Terrington on land in a stockless arable rotation managed to UKROFS organic standards since 1992. The field was

undersown with white clover (*Trifolium repens* L., cv. Arran) and lucerne (*Medicago sativa* L., cv. Vertus) in spring wheat in 1999. Three mowing treatments were applied to the legumes during 2000: when legumes grew to a height of 45 cm (standard treatment), when thistle flower-buds were visible, and every two weeks. Plots were 23 m by 4 m and there were five replicates in a randomised block design. Legumes were mown using a 2m wide tractor rear-mounted flail mower. Mowings were left as a mulch. Thistle shoot numbers were counted in ten fixed quadrats, each of 1m², in each plot. Counts were made in April 2000 before treatments were applied, and again in July 2001 in the following Calabrese crop. The change in thistle shoot numbers between the two assessment dates was analysed using Analysis of Variance.

RESULTS AND DISCUSSION

Legumes established and grew well. The sward was dominated by white clover with only around 10% ground cover from lucerne in May. Contribution decreased to around zero by September so the results essentially apply to a white clover sward. Apart from occasional docks (*Rumex obtusifolius* L.), the only weed present was creeping thistle. First mowing was on 30 May. Treatment 1 was mown three times; treatment 2, four times; and treatment 3, eight times. Thistle shoot numbers showed a marked decrease between April 2000 and July 2001 in all three treatments, with the size of the decrease similar across the treatments (table 1). The results suggest that achieving and maintaining a dense competitive crop has more influence than mowing frequency on creeping thistle survival under a clover fertility-building crop.

Table 1. Creeping thistle shoot numbers

Treatment	Thistle shoots April 2000 Number per m ²	Thistle shoots July 2001 Number per m ²	Change
Mown at a legume height of 45 cm	9.24	2.38	-6.68
Mown at thistle flower-bud visible	10.28	2.94	-7.34
Mown every two weeks	8.82	1.94	-6.88
SE (8df)			1.575
P			0.970 (NS)

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