

## The effect of stock exclusion and herbicide application on seed rain in a degrading phalaris stand

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There is little known about the quantity and composition of the seed that falls (seed rain) in phalaris-based pastures. In fact there are no known published estimates of seed rain in these pastures and only a small number investigate non-sown pasture species. Generally, perennial grasses form a minor component of an improved pasture seed bank but our interest was to examine management practices that would enable phalaris recruitment in a degraded (17 year-old) pasture.

### Methods

The experiment consists of two replicates of four treatments:

- set stocking (10 DSE/ha);
- herbicide application and cessation of grazing;
- herbicide application only; and
- cessation of grazing only.

The herbicide treatment consisted of 1.25 L/ha simazine plus 750 ml/ha MCPA sprayed on 20/8/93 after which the 11 m x 16m plots were destocked for one week. The stock exclusion treatments commenced on 6/10/93 and were reopened to grazing on 23/2/94. Seed rain was estimated using six 150 mm diameter traps (per plot) set 20 mm above the ground, protected by wire cages and sprayed regularly with a residual commercial insecticide. Final seed trap sampling was made on

5/6/94. Trap contents were then pooled, seeds identified and seeds counted by subsampling.

### Results and Discussion

The seed rain of phalaris in the set-stocked treatment was negligible compared with the treatments where stock were excluded (Table 1). In these treatments the numbers of seed that fell would translate into a sowing rate of 42-68 kg/ha. The effect of excluding stock without spraying herbicide was to markedly increase the seed production of Patterson's curse. However, there was an increase in the amount of annual ryegrass seed produced when plots were sprayed and locked-up. This points to a competitive response between Patterson's curse and annual ryegrass.

Although treatments could be devised to encourage phalaris to produce considerable amounts of seed, these treatments allowed substantial seed production by other potentially very competitive species such as annual ryegrass, silver grass and Patterson's curse. Later observations showed that very little of the phalaris seed was present in the seed bank by winter 1994 and of this there were instances of phalaris recruitment. We can speculate that many of the seeds were either lost to insect/rodent predation or germinated in a series of false breaks. Future work will need to examine a range of spraying and grazing strategies if recruitment of phalaris is to be feasible.

**Table 1.** Quantity of seed rain (#/m<sup>2</sup>) in a phalaris-based pasture

	Phalaris	Paterson's curse	Silver grass	Annual ryegrass	Soft brome	Total annual grasses
Set stocking	9b	368b	10439	1235b	3188	14854
Herbicide/grazing cessation	4574a	141b	4103	6149	8252	18495
Herbicide	75b	37b	4169	1226b	5262	10657
Grazing cessation	2801a	4131a	12100	1037b	7243	20381

Means followed by a common letter are not significantly different at P<0.05