Effect of ensiling on weed seed viability

J. Piltz, R. Stanton, C. Rodham and H.Wu

EH Graham Centre for Agricultural Innovation (an alliance between the Department of Primary Industries and Charles Sturt University), Wagga Wagga Agricultural Institute, NSW, 2650.
john.piltz@industry.nsw.gov.au

Abstract: *Seeds from 10 weed species were ensiled, underwent 48 hour in sacco digestion or both. Seed germination and viability were compared with untreated seeds. Ensiling reduced weed seed viability. Placement in the rumen for 48 hours also reduced viability though the effect was more variable between species. The greatest reduction in viability occurred with the combination of treatments.*

Key words: weed seed, silage, viability

Introduction

Based on anecdotal evidence it is generally assumed that ensiling renders most weed seeds non-viable but this has only been scientifically tested on a very limited basis (Blackshaw and Rode 1991; Mayer *et al*. 2000). A preliminary experiment was conducted at the Wagga Wagga to determine the effect of ensiling on the viability of seeds of 10 Australian weed species.

Methods

Weed seeds of different species were placed in Dacron bags (50 seeds per bag) of the type used for degradability studies and ensiled for three months in chopped cereal forage. Two bags of each weed species were placed in each of four plastic bag mini-silos (replicates). Upon opening one bag of each weed species from each silo plus a bag containing 50 untreated seeds were placed in the rumen of one of four mature Red Poll steers for 48 h. Bags from each mini-silo were placed in the rumen of the same animal. Weed seed germination and viability was tested against control seeds. After 18 days ungerminated seeds were tested for viability using the tetrazolium test.

Results and discussion

The viability of untreated seeds varied with species (Table 1). Viability of wireweed seed used in this experiment was very low while that of the grass weeds was generally high. Ensiling reduced the viability of seeds. Digestion also reduced the viability of most weed seeds though the effect is highly variable. The combination of ensiling plus digestion rendered all seeds non-viable except for those of marshmallow. It was concluded that ensiling prior to feeding to ruminants is an effected strategy as part of an Integrated Weed Management package.

Table 1. Effect of treatment on weed seed viability.

Weed species	Control	Silage	Digestion	Silage + digestion
Barley grass	96	0	5	0
Brome grass	69	0	5	0
Silvergrass	98	0	12	0
Wild oats	79	5	1	0
Marshmallow	58	37	33	43
Paterson's curse	31	0	16	0
Prairie ground cherry	90	0	87	0
Silverleaf nightshade	91	1	92	0
Wild radish	41	1	8	0
Wireweed	3	0	2	0

References

Blackshaw RE, Rode LM (1991) Effect of ensiling and rumen digestion by cattle on weed seed viability. *Weed Science* 39(1), 104–108.

Mayer F, Albrecht H, Pfadenhauer J (2000) The influence of digestion and storage in silage and organic manure on the germinative ability of six weed species (*Papaver argemone, P. dubium , Legousia speculum-veneris, Centaurea cyanus , Spergula arvensis , Trifolium arvense*). *Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz* 17, 47–54.