

# A SURVEY OF METHODS OF LUCERNE REMOVAL PRIOR TO CROPPING

K.P. Ransom, P.E. Egan

Department of Natural Resources and Environment, Bendigo, Vic, 3550

## Abstract

A survey was conducted of agronomists and farmers with experience in the removal of lucerne prior to cropping. Grazing management had limited application as a means of killing or weakening lucerne prior to its removal. Herbicides were used by most farmers with varying results. Tank mixes of glyphosate with a range of other chemicals including MCPA amine, 2,4-D ester, dicamba and clopyralid applied to actively growing lucerne were variable in effect but generally effective at removing 80% or more of lucerne. Post emergent herbicides were often used to retard or kill surviving plants. Cultivation was also used on most farms in their lucerne removal program. While there was a wide range of tyne and disc equipment used, the best results were achieved by wide sweep points with overlap between rows.

**Key words:** *Lucerne, removal, rotations, herbicides*

Lucerne is a valuable pasture plant on mixed cropping - grazing farms in south east Australia. It is commonly established for a 3 to 7 year pasture phase to be followed by 3 to 5 years of cropping. This requires the removal of the lucerne in preparation for the cropping phase due to the competition between crops and lucerne (1). Effective methods of lucerne removal prior to cropping is an important issue of concern to the agricultural industry.

## Method

To learn more about current on-farm practices a qualitative survey was conducted of agronomists and farmers selected for their experience in this area. Surveys were targeted at farmers who have incorporated lucerne and cropping on their property and agronomists with expertise in this area. A total of 25 people were interviewed from the mixed cropping - grazing areas of south eastern Australia. People interviewed included 15 farmers and 10 agronomists from either government, chemical companies or private consultants. People were located in Victoria (eg Shepparton, Bendigo, Ouyen), New South Wales (eg Wagga Wagga, West Wyalong, Condobolin) or South Australia (eg Keith, Clare). Characteristics of the farms surveyed are outlined in table 1.

## Results

Grazing management had limited use on most farms as a method of lucerne removal. Only 3 of the 15 farmers had a policy of heavy, usually continuous grazing that started in the season prior to removal. Two of these farmers felt that a period of 12 to 18 months of heavy grazing killed 60% to 100% of their lucerne. Three others mentioned heavy continuous grazing in summer immediately prior to removal in autumn to weaken the stand, but the others had no firm policy. One farmer used the spray grazing technique with MCPA amine the previous winter to remove broadleaf weeds as well as lucerne. He considered this to be an effective start to his removal program.

Herbicides were used by 13 of the 15 farmer respondents, but of these 3 had used them to a very minor level. The other 10 used herbicides moderately, usually in conjunction with cultivation to help with lucerne removal. There was general agreement amongst agronomists that tank mixes of glyphosate with a range of other chemicals including MCPA amine, 2,4-D ester, dicamba and clopyralid were sometimes effective at removing 80% or more of actively growing lucerne up to the point of flowering without moisture stress. Two farmers reported very good results with herbicides applied in late spring when plants were under little moisture stress. However farmers and agronomists both reported unexpected disappointing results in what they thought were ideal conditions. Only one farmer had relied solely on chemical herbicides to remove lucerne and then direct drilled with narrow points. He used herbicides the previous winter and

spring to control grasses and broadleaf weeds but this had little effect on the lucerne. The lucerne was heavily grazed over summer and the regrowth sprayed with glyphosate and MCPA amine. Regrowth in the crop was sprayed with a post emergent herbicide. In-crop herbicides were sometimes applied several months later. Even with these treatments several lucerne plants per square metre may persist, these would be removed the following year. Farmers and agronomists indicated post emergent herbicides were routinely used to control in crop lucerne regrowth, chemicals included MCPA amine and clopyralid.

Cultivation was an important component of lucerne removal on all except one property. There was a wide range of tyne and disc equipment used. Mixed results were obtained from cultivation and this was probably a result of the equipment and technique used. Three farmers and 2 agronomists reported excellent results from cultivation with tyne implements using wide sweep points with overlap between rows that gave a complete cut off of lucerne roots between 30 and 100 mm below the surface. One agronomist who had trials on different soils indicated that wide sweeps had penetration problems on some soils and an initial cultivation with narrow points was necessary. Another agronomist reported a case where disc implements were used several times on one paddock with minimum success.

Table 1. *Characteristics of the farms surveyed. ?*

	Mean	Lowest	Highest
Farm size (hectares)	1765	400	4400
Percentage of farm cropped, average of last 3 years, %	50	10	90
Percentage of pasture that is lucerne, %	55	10	99
Average age of lucerne when it is removed for cropping, years	6.1	3.5	11
Average density of lucerne stands on farm, plants per square metre	20	3	45
Average length of crop phase, years	3.5	2.0	6.5

## Discussion

Cultivation with a range of equipment was either the primary removal technique or fall back position after an incomplete job with chemicals on most farms. Most farmers also preferred a cultivation after a pasture phase. Several agronomists had conducted informal farmer surveys to find the herbicide combination that would give a reliable effective result. No one, to date, had found that combination. Most farmers regarded an 80% kill with herbicides as unsatisfactory, thus cultivation was still necessary. The variable results with herbicides in what some considered ideal conditions, plus a very limited market for herbicides for this purpose, indicate that label recommendations for use on lucerne are unlikely. However herbicides are still an important part of the combination strategy on many farms. Research on comparisons of chemicals for lucerne removal are unlikely to lead to label recommendations. Legislation in some states which prohibits the off label use of some chemicals could act to limit the adoption of sustainable lucerne farming systems. Cultivation with wide sweep points to completely cut off lucerne crowns from roots seems the most reliable. Research could evaluate a range of equipment under a range of conditions for this purpose.

## Acknowledgments

This survey was part of a project 'Lucerne in Crop Rotations' jointly funded by GRDC and the Victorian Department of Natural Resources and Environment. A detailed report on the survey is available from the authors.

## **References**

(1) Egan P. and Ransom K.P. 1996. *Proc. 8th Aust. Agron. Conf.* Toowoomba, p 231