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## Appendices

THE UNIVERSITY  
OF NEW ENGLAND

**How to answer the questions** – The best person to complete this survey is the person who makes the major decisions concerning the grazing enterprises on the property. You may, of course, discuss the questions with employees or other people in your family. If you own or manage more than one property, please complete the questions for the property on which you spend the most time.

## SECTION A

**Question 1** Please describe in the space below any innovative or particularly successful ideas for weed control in pastures that you have heard of or use on your property. Later in this survey you will be asked about the more commonly used control methods. As you go through that question and the rest of this survey you may think of other innovative weed control ideas, so please turn back and include these ideas below. *If there isn't enough room please feel free to attach additional pages.*

[illegible]

*I need to obtain some information about you and your property to ensure the survey is representative of all greeters*

- |                   |  |       |
|-------------------|--|-------|
| <i>Question 2</i> | What is the nearest town to your property? .....   | ..... |
| <i>Question 3</i> | What is the post code for the area in which your farm is situated? .....   | ..... |
| <i>Question 4</i> | What is the total area of your property?<br>Please tick if your answer is in Hectares <input type="checkbox"/> or Acres <input type="checkbox"/> ..... | ..... |
| <i>Question 5</i> | Into approximately how many paddocks is your property<br>divided (not including stock yards or small holding pens)? .....                              | ..... |
| <i>Question 6</i> | How long have you managed this property? .....   | ..... |
| <i>Question 7</i> | In what year were you born? .....  | ..... |
| <i>Question 8</i> | In an average year approximately what percentage of your total income do you receive from each of the following enterprises?                           |       |

Wool production.....	_____ %	Cropping for harvest and sale.....	_____ %
Mutton or surplus sheep.....	_____ %	Hay or silage production for sale.....	_____ %
Prime lamb production.....	_____ %	Other (please specify).....	_____ %
Beef cattle.....	_____ %		_____ %

- Question 9** What is your current total herd/flock size? ... .. Sheep ..... Cattle .....

- Question 10** Have you ever attended any of the following courses, gained a qualification or been involved in any of the following groups? Please tick those boxes that apply to you.

Programme .....	<input type="checkbox"/>	Farm 500 .....	<input type="checkbox"/>
Grazing for profit .....	<input type="checkbox"/>	Agricultural college .....	<input type="checkbox"/>
Farming for the Future .....	<input type="checkbox"/>	TAFI course .....	<input type="checkbox"/>
Sustainable Grazing Systems (SGS) .....	<input type="checkbox"/>	University degree .....	<input type="checkbox"/>
The Faired Paddock Program (FPP) .....	<input type="checkbox"/>	Other (please specify) .....	<input type="checkbox"/>
Landcare .....	<input type="checkbox"/>		

## SECTION B

**Question 1** Please list up to 10 pasture weeds that you consider are the most important on your property in order of priority.

**Question 2** Please indicate how the impact of each weed has been changing over the past five years.

*Please tick only 1 option below for each weed*

(Ranking number)	(most important)	Decreasing problem	Stable problem	Increasing problem
1	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	_____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(least important)

**Question 3** If you use any of the following control methods on your property please tick if you have found them generally successful or unsuccessful. Then list the weeds for which you have found those methods successful or unsuccessful using the corresponding ranking number from Question 1 above. *If you do not use a particular method please leave that line blank.*

Method	Successful → for which weeds?	Method	Unsuccessful → for which weeds?
Example Method	<input checked="" type="checkbox"/> e.g. 3, 4 & 7	Method	<input checked="" type="checkbox"/> e.g. 6 & 9
Chipping, hand pulling or grubbing	<input type="checkbox"/>		<input type="checkbox"/>
Cultivation or ploughing	<input type="checkbox"/>		<input type="checkbox"/>
Slashing or mowing	<input type="checkbox"/>		<input type="checkbox"/>
Burning	<input type="checkbox"/>		<input type="checkbox"/>
Hay or silage making	<input type="checkbox"/>		<input type="checkbox"/>
Crop rotation	<input type="checkbox"/>		<input type="checkbox"/>
Boom spraying of herbicide	<input type="checkbox"/>		<input type="checkbox"/>
Spot spraying of herbicide	<input type="checkbox"/>		<input type="checkbox"/>
Rope wick application of herbicide	<input type="checkbox"/>		<input type="checkbox"/>
Aerial spraying of herbicide	<input type="checkbox"/>		<input type="checkbox"/>
Spray grazing	<input type="checkbox"/>		<input type="checkbox"/>
Pasture topping (spray topping)	<input type="checkbox"/>		<input type="checkbox"/>
Winter cleaning	<input type="checkbox"/>		<input type="checkbox"/>
Biological control agents	<input type="checkbox"/>		<input type="checkbox"/>
Sowing pastures	<input type="checkbox"/>		<input type="checkbox"/>
Fertiliser application	<input type="checkbox"/>		<input type="checkbox"/>
Grazing management	<input type="checkbox"/>		<input type="checkbox"/>
Others (please specify)	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>

## SECTION C

**Question 1** Please indicate which of the following weed management activities you carry out on your property. Please tick the boxes for those activities that you undertake.

- Hay & grain fed out in containment areas ..... ☐
- All fodder produced on farm (hay & grain not brought in from off-farm) ..... ☐
- Paddocks regularly checked for weed infestations ..... ☐
- Weed infestations are recorded on maps ..... ☐
- Weed infestations are recorded in the paddock with markers ..... ☐
- Incoming machinery is checked for weed seeds and washed ..... ☐
- Internal quarantine areas established (e.g. holding paddocks for new stock brought in) ..... ☐
- Quarantine areas (buffer zones) established between neighbouring farms ..... ☐

**Question 2** As at today, approximately what percentage of your property is being used for each of the following purposes or pasture types?

- Grain or fibre crops for harvest ..... %
- Forage crops, excluding lucerne, for grazing, hay or silage (e.g. oats, millet, maize) ..... %
- Lucerne based pastures (pastures which are dominated by lucerne) ..... %
- Native pastures (pastures that have never been sown or fertilised) ..... %
- Fertilised native pastures (native pastures that have been fertilised) ..... %
- Sown or "improved" pastures (pastures that have been sown with introduced species) ..... %
- Unusable land (land which is not grazed or cropped) ..... %
- Other (Please specify) ..... %

Total should be 100%

Most farms have some paddocks or areas that may be very weedy while others may be weed free. This question aims to find out the proportions of your whole pasture areas that are affected by different levels of weediness.

**Question 3** Approximately what percentage of the total area of pasture (areas of lucerne, native, fertilised native, sown and any other pastures) on your property would you put into each of the following categories?

- Very weedy pasture areas**  
(pasture areas with more weeds covering the ground than desirable pasture plants) ..... %
- Moderately weedy pasture areas**  
(pastures with roughly equal proportions of ground covered by weeds and desirable plants) ..... %
- Lightly weedy pasture areas**  
(pasture areas with more ground covered by desirable pasture plants than weeds) ..... %
- Rarely weedy pasture areas**  
(pasture areas with scattered or very few weeds) ..... %
- Weed free pasture areas**  
(pasture areas with no weeds and made up of only desirable pasture plants) ..... %

Total should be 100%

**Question 4** Think of a typical paddock representing the pasture type which most commonly occurs on your property. What percentage of the plants in this typical pasture paddock would fall in the following categories?

- Perennial pasture grasses (grasses that grow for more than one year) ..... %
- Annual pasture grasses (grasses that have a 1 year life cycle) ..... %
- Legumes (e.g. clovers and medics) ..... %
- Grass weeds ..... %
- Broadleaf weeds ..... %
- Other (Please specify) ..... %

Total should be 100%

# SECTION D

**Question 1** Please list below any fertilisers or other products such as lime, gypsum or dolomite that you apply to your property? *If you don't apply these please skip to question 4.*

a [ ]  
b [ ]  
c [ ]  
d [ ]

**Question 2** Approximately how many years are there between applications of each product?

[ ] years  
[ ] years  
[ ] years  
[ ] years

**Question 3** Approximately how many tonnes in total are applied to your property in a single application of each product?

[ ] tonnes  
[ ] tonnes  
[ ] tonnes  
[ ] tonnes

**Question 4** Please indicate which grazing strategies you mainly use, which you sometimes use and which you never use. *Please tick one box on each line below.*

	Mainly use	Sometimes use	Never use
Set stocking or continuous grazing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rotational grazing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cell grazing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time controlled grazing .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify) [ ] .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Question 5** Spray grazing is a method of controlling weeds in pastures and is being studied as part of this project. It involves applying a low rate of a particular herbicide which does not kill certain broadleaf weeds but causes them to wilt. This makes the weeds more palatable to grazing stock. 1 to 2 weeks after spraying, the paddock is grazed with a much higher than normal stocking rate to encourage the livestock to eat out the weed. *Please tick your answer or write your response and then follow the directions to the next part of the question. If you find there isn't enough room to write your answer please feel free to attach additional pages.*

a. Were you aware of this weed control technique? ..... Yes ☐ go to b. No ☐ go to j.

b. How did you first hear about spray grazing? ..... go to c.

c. Have you ever trialed or used spray grazing? ..... Yes ☐ go to d. No ☐ go to i.

d. Where did you get the information on how to carry out spray grazing? ..... go to e.

e. Did you find spray grazing successful? ..... Yes ☐ go to f. No ☐ go to g.

f. What, if any, were the problems associated with using spray grazing? ..... go to h.

g. What are the reasons that spray grazing failed? ..... go to h.

h. Will you try or use spray grazing again? ..... Yes ☐ Survey finished No ☐ Survey finished

i. Are there any particular reasons you have not trialed or used spray grazing on your property? ..... Survey finished

j. From the limited description above do you think that it might work on your farm? ..... Yes ☐ Survey finished No ☐ go to k.

k. Are there any particular reasons why spray grazing would not work on your property? ..... Survey finished

**\*Survey finished**

*Thank you for completing this survey. Please return this form to me in the enclosed reply paid envelope. Also include my address and if you would like to receive the findings or participate further in this project.*

## Appendix 2 The covering letter for the postal survey (front and back)



THE UNIVERSITY  
OF NEW ENGLAND

School of Rural Science and Agriculture

Armidale, NSW 2351 Australia

Mark Trotter  
Agronomy & Soil Science

Phone 02 6773 2143  
Email mtrotter@pobox.une.edu.au

5<sup>th</sup> February 2004



034

45009

Mr [REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]

### Australian Pasture Weed Survey

Dear Noel,

Enclosed is a questionnaire which is part of a Ph.D. research project at the University of New England, funded by Meat & Livestock Australia studying weeds in Australian pastures.

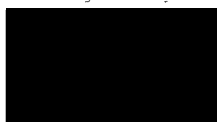
The aim of the project is to find out the best ways of controlling different pasture weeds by working out what is being successfully used on farms across Australia. These effective control methods can then be shared with other farmers in regions where they may not be using them yet.

The survey should take around 20 minutes to complete. Your response is important as I am only surveying a small number of selected graziers from specific areas around Australia.

I emphasise that your response will be completely confidential.

It is quite likely that the weed control methods that you are using, your ideas and the information you provide will help graziers in your local area as well as in other regions of Australia. So please take 20 minutes to fill in this survey and return it to me in the reply paid envelope provided.

Thank you for your time.



Mark Trotter  
Postgraduate Student  
The University of New England

## More Information

If you would like to know more about this research project please see the background section below.

If you are available to help further in this research or would like to receive the results and recommendations of this project, please complete the enclosed address card and return it with the survey in the reply paid envelope provided. You may also like to start receiving the free Prograzier magazine published by Meat & Livestock Australia, see the reverse side of the address card for details.

## Australian Pasture Weed Survey - Background

The University of New England and Meat & Livestock Australia are undertaking a project to find better ways for managing weeds in grazing lands. The enclosed survey is part of this Ph.D. project that will show the extent of weeds and how they are being handled on farms throughout Australia.

The aim of this research is to identify the weed management practices that are currently being used effectively on properties on a regional basis throughout Australia. This information will then be made available to graziers to help make decisions on weed control and management.

The project consists of 2 major steps.

The first is this postal questionnaire, the aim of which is to obtain information on farm characteristics, control strategies and how these affect the weed situation on properties.

In the second step I will be working closely with a small number of farms. I will be looking at soils, pastures and climate on these properties. I will also be examining the weeds and soil seed banks of these farms to see exactly how certain management techniques influence the long term weed situation. Anyone who is interested in working with me to find out more about how their control strategies are influencing the long term weed situation on their farm can indicate their interest on the enclosed address card. I will then contact them by phone to discuss the opportunity in more detail.

At the end of the project the results and findings will be made available to you directly by mail if you return the enclosed address card. This will give you an idea of what weed management strategies are working on other farms and which ones are not. This will enable you and other graziers to evaluate weed control strategies that have been tried and tested by other farmers in the field under real conditions.

If you have any questions about the project, the survey or wish to discuss weed issues please give me a call on 02 6773 2143. I look forward to hearing from you.

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No. HE03/134, valid until 17 July 2004). If you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:  
Research Services, University of New England, Armidale, NSW 2351  
Telephone: (02) 6773 3449, Facsimile (02) 6773 3543, Email: Ethics@metz.une.edu.au.

**Appendix 3 The response card and reply paid envelope. From top to bottom: front of card; back of card; and reply paid envelope.**



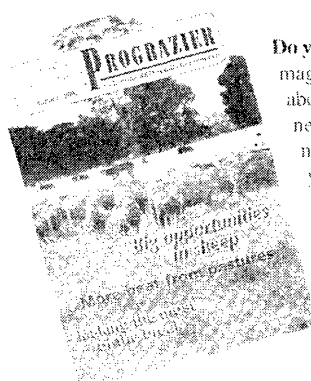
- ☐ I would like to receive the information on what weed control methods are being successfully used by other farmers and results of this project by direct mail as they become available.
- ☐ I am interested in weed control research and would be happy to be contacted by phone about the possibility for further involvement in this project (see the background section on covering letter for more details).
- ☐ I would like to receive the free Prograzier magazine (see reverse) and am happy to have my details included on MLA's mailing list.

Name:

Postal address:

Phone number:

Email address:



**Do you want more weed control ideas?.....**Prograzier is a free quarterly magazine put out by Meat & Livestock Australia. It contains stories about current research and development projects and on farm use of new grazing technologies. Prograzier includes articles on weed management, beef, sheep, lambs, land management and drought. If you would like to be placed on the mailing list for Prograzier, tick the appropriate box and complete your details on the reverse side of this card. Your details will then be forwarded to Meat & Livestock Australia who will put you on their mailing list. *You can have your name removed from the list at any time in the future by calling MLA on free call 1800 023 100.*



THE UNIVERSITY  
OF NEW ENGLAND

Agromony & Soil Science  
RB 66475-1

Delivery Address:

MARK TROTTER  
AGRONOMY AND SOIL SCIENCE  
UNIVERSITY OF NEW ENGLAND 2351

No stamp required  
if posted in Australia



University of New England  
Reply Paid 61883  
UNIVERSITY OF NEW ENGLAND NSW 2351

**Appendix 4 The telephone interview prompt sheet**

The appendix shows a copy of the first two pages of the telephone interview prompt sheet followed three examples of the control method specific questions. Similar detailed questions were asked for each control method reported by the respondent. These are not include here for brevity.

SRN

\_\_\_\_\_

Name

\_\_\_\_\_

Weed

\_\_\_\_\_

How long has this weed been on your property?

1-5 years

5-10 years

10-20 years

>20 years

Over the last 5 years would you say that the impact of \*weed\* on your property has been increasing, stable or decreasing?

Increasing

Stable

Decreasing

In the most recent season and at its time of flowering how much of your property would you say has \*weed\* at the following densities?

*Imagine a 1 hectare area, so that's an area of 100 metres by 100 metres. If one quarter of it was covered by blackberry then that is 25% ground cover. If between 1 and 25% that's a medium infestation (1%=one 10x10 or 25 2x2 size thickets). Anything less than 1% is a low density infestation.*

Dense (>25% ground cover)

\_\_\_\_\_

units

Moderate (1-25% ground cover)

\_\_\_\_\_

units

Low (<1% ground cover)

\_\_\_\_\_

units

Total farm area

\_\_\_\_\_

units

Over the last 5 years would you say that the area of land infested by \*weed\* has been increasing, stable or decreasing?

Increasing

Stable

Decreasing

Over the last 5 years would you say that the density of infestations have been increasing, stable or decreasing?

Increasing

Stable

Decreasing

When you completed your postal survey you indicated that you used the following control methods (read highlighted)

Have you ceased to use any of those control methods?

Have you started using any other control methods?

Where there any control methods that you have been using but weren't picked up in the postal survey?

Have you used any control methods in the past that you no longer use now?

	Ceased to use	Started using	Always used	Have used in the past
Boom spraying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pasture topping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spray grazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Winter cleaning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spot spraying	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grazing management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crash grazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fertiliser application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lime or gypsum application	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sowing pastures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Crop rotation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cultivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slashing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hay or silage making	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Burning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chipping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Boom spraying**

How many years have you used this control?

Which density infestations are targeted with this control?

What land classes are targetted with this control?

How often is this method undertaken?

At what stage of weed growth is this method targeted?

What chemicals do you normally use?

At what rates do you apply these chemicals?

What kind of applicator do you use?

Where this method is used what percentage of the weeds would be controlled in a single season?

Over a 5 year period, how would you say that the areas treated with this control have changed in the extent and density of \*weed\* infestation? (circle)

Decreased extent

Decreased density

No effect on extent

No effect on density

Increased extent

Increased density

### Pasture topping

How many years have you used this control?

Which density infestations are targetted with this control?

What land classes are targetted with this control?

How often is this method undertaken?

At what stage of weed growth is this method targetted?

What chemicals do you normally use?

At what rates do you apply these chemicals?

What kind of applicator do you use?

Where this method is used what percentage of the weeds would be controlled in a single season?

Over a 5 year period, how would you say that the areas treated with this control have changed in the extent and density of \*weed\* infestation? (circle)

Decreased extent

Decreased density

No effect on extent

No effect on density

Increased extent

Increased density

### General Grazing management

How would you describe your current grazing management?

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How many years have you used this strategy?

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How many mobs do you run?

---

How many paddocks do you have?

---

What triggers the decision to move stock?

---

Details of grazing management?

If time based, then range of time in paddock and range of time paddocks rested.

If pasture driven, then target dry matter in and dry matter out.

Where this method is used what percentage of the weeds would be controlled in a single season?

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Decreased extent	Decreased density
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Over a 5 year period, how would you say that the areas treated with this control have changed in the extent and density of \*weed\* infestation? (circle)

No effect on extent	No effect on density
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Increased extent	Increased density
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Are there any times when you rest paddocks particularly for \*weed\* management?

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details:

**Appendix 5 The six stage focus group process developed and recommended for use in future studies but abandoned due to time restriction in this study.**

Stage	Details	Purpose
1) Presentation of survey results to date	An initial presentation of the best management practices found through the survey was undertaken.	This process engaged the participants as they began discussing the value of results and control methods during this presentation.
2) Producers asked to provide detail for best management practices	The producers were asked to identify any key practices or tricks of the trade that were essential for the success of each control method. (e.g. "spraying in late Autumn" is a trick of the trade for control method of spot spraying). Each of these key practices was list on a white board under the heading of each control method.	Enabling the participants to have input at this stage was designed to develop a sense of self worth in their opinions and ideas.
3) The good and bad of individual control methods.	The producers where then asked to identify the good and bad features of each of the control methods.	Whilst the bad features or limitations where all that was desired, enabling producers to identify good features kept the tone of discussion balanced and not sliding into pessimism.
4) Details of the types of infestations found locally sought.	The details of the different types of infestations that require different treatments where obtained from the producers.	
5) Integrated control methods devised for each infestation type.	A calendar of control events was constructed for each infestation type. This was to be presented on a white board.	
6) Limitations to integrated strategies identified.	Producers where then asked to identify the reasons why a typical producer in this area might not be able or willing to implement the integrated strategies	

**Appendix 6 Details of best management practices described by respondents in question A 1 of the postal survey presented pertaining to capeweed.**

SRN	Controls used	Best management practice statement
95	Spray grazing	Spring sowing of phalaris and ryegrass, currie cockfoot and clover. Summer crop on paddock prior to sowing - get rid of most weeds. Spray-grazing for Capeweed.
136	Fertiliser application	Following the advice of a soil agronomist that a healthy soil will grow and sustain a healthy pasture, we have done soil tests and applied a mix of fertilisers aimed at balancing soil mineral levels. After two years of this new program, we've seen a reduction of some weeds such as Capeweed and Sorrel, but others such as Thistles and Onion Grass prevail.
140	Spray grazing	Spray-graze (Capeweed). 24D. Winter-clean (annual grasses). Spray seed.
153	Liming	We have found that the use of lime in lifting our pH, but more importantly, lifting our Ca levels, we have seen Capeweed and Barley Grass all but gone. As for Radish and Ryegrass (only a problem when cropping), the use of herbicides seems to be the only way of control.
178	Spray grazing	Have had good success spraying Capeweed in winter in clover and lucerne and then grazing heavily for a short period. Sheep were used and seem to eat out crowns of Capeweed.
184	Spray grazing	Spray tigrex at 90ml/ha to suppress broadleaf weeds early. Spray top pastures with 4-500ml of Glyphosate to stop grass-seed set. Can use MCPA 500 at 500ml to spray-graze - be careful of the withholding period (good for Mustard, Turnip, Capeweed).
185	Spray grazing	Have used 24D on Capeweed successfully for years as spray-graze, using a mister, but recently a problem, even with boomspray. Has to be done before vine budburst, and this is a bit early for Capeweed, but still works. Dock, Geranium and Thistles don't even germinate before budburst, so spray for these is now out. Dock wasp works well, but they are not tolerant to insecticides. Cutting Geranium for silage reduces seedset, and will not eliminate, but keeps it under control.
191	Spray grazing	Spray-topping Bent Grass and Ryegrass for suppression. Spray-grazing for Thistles and Capeweed. Use of fodder crops to control Tussocks.
201	Physical control	Roll Capeweed with cropping roller on frosty morning.
217	Burning & spraying	Gorse - burning with flame-gun and follow-up spray of regrowth with Grazon. Blackberry - tethered goats. Cape Weed - burning with flame-gun, follow-up spray with Roundup.
220	Spray grazing	Sprayed pasture infested with Capeweed with Igran and MCPA. Then left pasture for two weeks, then grazed it hard. Capeweed disappeared. Clover then grew to produce good pasture. Paterson's Curse - keep it out of your property at ALL costs before it gets in!! What you find, pull and put in plastic bag immediately - don't leave for a moment!
223	Other	We do not do any widespread spraying for weed control. Our pastures are virtually weed-free. However, we do spot-spray by hand the very isolated invasive weeds of Variegated Thistle, African Daisy, St John's Wort, Cape Tulip, Salvation Jane, Blackberry. These are proclaimed

SRN	Controls used	Best management practice statement
		weeds. If, by "weeds", you mean Capeweeds (Dandelion), Barley Grass, Silver Grass, Milford Grass, etc, we do not like them in our pastures, but have to "live" with them.
272	Spray grazing	Spray-grazing Capeweed and Erodrum (?) 100mls MCPA + 200mls Diuron (?) very effective. Winter-cleaning not very effective Barley/Silver Grass due to dry winters. Have been manipulating pastures for 15 years and now believe, apart from spray-grazing, that for effective control of annual grass weeds a proper (and expensive) 2-3 year renovation program is necessary.
291	Spray grazing & crash grazing	Curled Dock, Capeweed, Annual Grasses - spray-graze, crash-graze autumn (/winter), spring. Re-sow perennial grasses and legumes. Spot weeds: Bathurst Burr, Paterson's Curse, Cape Tulip, Variegated Thistle - very small percentage of property, kept to a minimum by strict management.
300	Spray grazing	Spray Clover/Rye pasture with 0.5L MCPA and 0.5L/ha Igran, then graze 7-10 days later to control Capeweed and Paterson's Curse.
334	Pasture Topping	Early spray-topping to stop the early maturing weeds from seeding, like Yellow Burr, Primrose, Cape Weed.
336	Spray grazing	Best control has been spray-topping with Roundup and grazing. MPCA on Cape Weed early and grazing and Glean any on Onion Grass mid-July.
379	Sowing pastures & boom spraying	For Cape Weed control, direct-drill short rotation ryegrass into bare areas before autumn break so as all seeds germinate at same time. Then later on, spray with a broadleaf herbicide to kill Cape Weed. This should work for Paterson's Curse and Storksbill, etc.
395	Spot spraying	Use spray-grazing successfully on Cape Weed without the need to increase stocking density.
406	Crash grazing	Changes in grazing management; ie, bigger mobs of sheep on smaller paddocks and rotated where possible. Heavy stocking rates to get Cape Weed under control with or without herbicide application.
429	Crash grazing	Spray Thistles once a year - three to four germinations depending on season. Using lime to balance soil acidity to reduce Geranium. Heavy grazing to control Cape Weed, plus promoting establishment of grasses; eg, tall Fescue, Ryegrasses. Do not know how to control Chick Weed or Barley Grass. Thistle infestation severe in first-year pasture - wary about spraying because of establishing sub-clover.
440	Boom spraying	Paterson's Curse - major problem in open country. Pastures having difficulty controlling it. Tried spraying with Roundup and broadleaf spray, but germination is a major factor. Marshmallows - very successful results with 800mls of Tigrex per hectare. Cape Weed - very successful result when sprayed early with 600mls of Tigrex.
486	Crash grazing	Cape Weed control - mob stocking of Cape Weed when it has high sugar levels prior to flowering. Similar in effect to spray-grazing, but without chemical application. Effective if timing is right.
579	Boom spraying	Sub-clover pastures (mainly nungarin). Clover stage-3 leaf onwards. To control Double Gee and Cape Weed, 100gms of active Diuron + 200gms of active 24D/ha, 5/6 leaf onwards. 100gms of active Diuron + 200gms

SRN	Controls used	Best management practice statement
		of active MCPA 500/ha. If sub is too grassy (especially Rye, we have ryetox) 2 weeks post-broadleaf spray, we will apply 750mls/ha Gramoxone 250 + 0.25mls of BS1000. This rate can increase with size of grasses and feed available. Medic pastures (serino and santiago) 3-leaf stage, 25gms/ha Broadstrike + 0.25% BS1000/100L water mix. If needed a grass selective; eg, Select, or Sertin will be used.
619	Spray grazing	Brushoff for Bracken control. Spray-grazing for Cape Weed control.
649	Spray grazing	Some pasture paddocks on my property have Yucca plants spread across them. Due to native vegetation legislation prevailing in South Australia, these plants cannot be removed. As a result, a boomspray cannot be used for weed spraying. I have been using a misting machine to apply Amine chemical at 100mls per acre for Cape Weed control to successfully spray-graze these paddocks during winter.
704	Other	WINTER-CLEANING OF SILVER GRASS APPEARS VERY SUCCESSFUL. Spraying Silver Grass late in winter/early spring when a high percentage of seed has germinated, then planting barley or seeding a new pasture appears to work well. Moderate applications of phosphorous appears to favour clover and reduce grass seed dominance. We have a problem with non-wetting sand which, in some years, doesn't wet up properly till late winter; another good reason for late spraying. Some paddocks appear to oscillate from good clovers to good Cape Weed and back from year to year. I don't know what to do about that.
717	Other	No weeds. A little Cape Weed. Nothing to speak of.
721	Spray grazing	We spray-graze MCPA or Amine over all grazing and hay crops every year to eradicate Thistles, Cape Weed, Geranium and Brassica Weeds. We cannot graze large numbers on every paddock; however, still achieve a 95% job. Have been doing so for approximately eight years.
748	Spray grazing	I have no real problems with weeds because I graze sheep and do no cropping and so a weed for some becomes feed for me. Cape Weed is a nuisance and I use a misting machine to spread MCPA at 500ml/ha in 12L water/ha. It is quite satisfying at that very low volume of water and the sheep graze out the Cape Weed after a week from being sprayed.
751	Boom spraying	Control of Paterson's Curse - I pull up all plants in mine and graze about 100 metres in neighbours. Any plants I find flowering I put in a plastic bag or bags and bash. Cape Weed in pastures is a concern and I spray with MCPA or similar. Paddy Melons I pull up. Stinging Nettles a concern. I spray with Ester 80 at the appropriate time. On roads Blackberries, I spray starting between Christmas and New Year and check each month. This gives me three goes at containing them. St John's Wort I spray. Most of these weeds start on the roads and I find if checked on roads, it makes it easier than in paddocks or hills. Rabbits the same.
783	Boom spraying & crop rotation	Having good success cleaning paddocks by sowing oats, using Glen at 2-3 leaf stage with 60gm/ha Lontrel to control Cape Weed. Cleans up weeds to allow perennial pasture to be sown.

SRN	Controls used	Best management practice statement
849	Spray grazing	Spray-grazing Cape Weed. Pasture topping. Ropewick and carpet wiper for Rushes. I think lime application helps with Rush control. We hand-chip or pull Thistles, Heliotrope, Melons. Some Thistle spraying is done if germination is thick.
877	Spray grazing	Spray-grazing to control Paterson's Curse and Cape Weed. Aerial spraying of steep hill for Paterson's Curse. Note: My property had no Paterson's Curse or St John's Wort until it spread from Government-controlled Crown land, where it was out of control.
919	Pasture topping	Hoeing African Feather Grass. Pasture-topping Cape Weed, Thistle, Fog Grass. Pasture-topping Fog Grass at seedset (late November). Encouraging perennial and legume grasses with superphosphate to smother out Cape Weed, Dock, Thistle, Barley Grass, Onion Weed and Fog Grass.

**Appendix 7 Details of best management practices described by respondents in question A 1 of the postal survey pertaining to blackberry.**

SRN	Controls used	Best management practice statement
12	Goats & spot spraying	GOATS were successfully used in the past to reduce Blackberry bush size. This method of control not now necessary as Blackberry under control due to regular spraying with improved chemicals. Improved spraying equipment over the past few years. I have replaced a pto unit and carry-all on tractor with a 5HP letting unit on the back of farm 4WD ute. This allows more country to be covered and access to difficult country. It is quicker and more efficient and far less work.
13	Other	Whilst I am only on 10ha, I am currently using a neighbour's 66ha of rough grazing. It is there I am battling a Nodding Thistle infestation (with great difficulty) and Blackberries (these are under control).
52	Other	I mainly use spot-spraying on my property as any weeds I have are sparsely spread. My property is bordered by Crown Land, which has a good weed population. Blackberry, St John's Wort. I receive some support from Government departments, but have done a fair amount of spraying myself. I have a problem with Cobbler's Peg or Wild Radish to some extent and will probably have to carry out boomspraying in the spring. When I first took over the property 25 years ago, Bracken Fern was a problem, roughly to acres. The application of Brushoff has taken care of that.
65	Crash grazing	Re Blackberry: Heavy grazing with Merino wethers after clearing with tractor or dozer and burning very successful in preventing regrowth.
117	Spot spraying	Blackberry and Sifton Bush; use a mixture of Brushoff and Roundup; 10g Brushoff, 500ml Roundup, 100L water.
211	Spot spraying	Cutting out Thistles before they go to seed. Cutting Love Grass before it seeds. Spraying any Blackberries, destroying any other weeds as they are found.
217	Goats	Gorse - burning with flame-gun and follow-up spray of regrowth with Grazon. Blackberry - tethered goats. Cape Weed - burning with flame-gun, follow-up spray with Roundup.
223	Spot spray	We do not do any widespread spraying for weed control. Our pastures are virtually weed-free. However, we do spot-spray by hand the very isolated invasive weeds of Variegated Thistle, African Daisy, St John's Wort, Cape Tulip, Salvation Jane, Blackberry. These are proclaimed weeds. If, by "weeds", you mean Capeweeds (Dandelion), Barley Grass, Silver Grass, Milford Grass, etc, we do not like them in our pastures, but have to "live" with them.
247	Spot spray	Winter spray-graze for most Thistle species. Target grazing for Wire Grass and St John's Wort. Spot-spraying using various chemical cocktails for Blackberry, Briar and St John's Wort. Helicopter spraying inaccessible areas.
249	Spot spraying	We have found the best idea for controlling many previously

SRN	Controls used	Best management practice statement
		troublesome weeds came about as a secondary outcome in a change of managing the animals on the property. After attending a two-day session at UNE with Alan Savory, we decided HRM made sense, read more, thought more, and then started. A steep learning curve and still climbing. With the animals in one, two or sometimes three, mobs on different parts of the place and all paddocks having two to four months' rest, weeds stopped being a problem. No more bare sheep camps, tracks grassed over, more "weeds" grazed when the big mob came into the paddock. Went from weeks hoeing Bathurst Burrs (before seedset), cutting off seed burrs and bringing in by the ute load to burn, to not having to worry about burrs. Fewer Thistles. The sheep took a liking to the Thistle flowers, Barley Grass disappeared, Love Grass partially controlled with grazing. Blackberry control has become more effective with newer herbicides.
264	Spot spraying	I am a bio-dynamic farmer. I tend to under-stock; hence, my stock are always healthy. My pastures are healthy because my soil is right. This means weeds and grubs aren't a big problem. I have to spray Blackberry because it is a big problem, but am getting on top of it. Infection from neighbours is the biggest problem. The Government refuses to prosecute. I can't stop Thistles blowing over a fence. Until the Governments and Councils start prosecuting, nothing will be done. Look at the Paterson's Curse problem. Roadside weeds have never been worse. New weeds are appearing. Recently, gravel was carted from a local pit which is infected with Paterson's Curse. Now we have that problem along our roadsides. Once Councils kept the roads clear. Now it is the responsibility of the adjacent landowner. But if you try and do the right thing and spray and clear our native strips, the Council will prosecute because we are clearing natural habitat. The situation is ludicrous. Pine plantations are a problem because the owners will not cooperate. Every noxious weed known flourishes in pine plantations. A new weed this year along the roadsides is Prickly Lettuce. The weekly Times in Victoria has been running a section on weeds for some weeks now. Every publication is full of letters complaining about inaction by appropriate bodies! The right to farm is becoming harder and harder. We are being bombarded by ridiculous laws. If you wanted to help us, perhaps you could do a thesis on this subject. As our pastures and soils become more degraded by intense stocking and more fertilisers, the problems are only getting worse. Good luck in your work.
340	Goats	Running goats for Blackberry control in riverways and stream that are hard to access with vehicles. Research a grub to eat out Double Gee seeds.
348	Crash grazing	Cell-grazing. Moving stock around in large flocks/herds over a large number of paddocks, preferably 50 or more, allows better development of plant roots, pastures are thicker and better able to compete with many species of weeds. Sheep camps grass-over, virtually eliminating Bathurst Burr, Nodding Thistle, Saffron Thistle, Horehound and many other weeds that frequent these camps. I think

SRN	Controls used	Best management practice statement
374	Goats	that other weeds such as Serrated Tussock are also less likely to become established. Blackberries and Briars do get chewed back fairly severely with heavy grazing from sheep running in large mobs. Goats for Briar/Blackberry/Broom and young Willows. Changing the person who spot-sprays Serrated Tussock each season. Don't assume/miss them. Carry small 2L spray pack in all vehicles for Serrated Tussock. Property map is vital.
387	Spot spraying & burning	We always carry light-weight home-made chippers on bike or truck. When spot-spraying Tussock late in season, add 2ml Glyphosate to the litre with Taskforce. We also find by adding Glyphosate to Brushoff for Blackberry control, much better than Brushoff on its own and, if possible, reduce the size of Blackberry bushes by burning the previous season.
411	Spot spraying & burning	We bought 700 acres, which was about one-third covered in Blackberries. We burnt them initially. It gave a great start. Since then, we have only spot-sprayed regrowth. They are no longer a serious problem. Burning them meant that far less herbicide was required to spray the leaf cover.
418	Spot spraying	I own 100 acres - half my land is timbered or scrub. I farm sheep, cattle and bees, so my land is near enough to be considered organically-farmed. I use about 10L of Roundup each year on the Blackberry and Briar bushes which occur on approximately 20 acres. For the other 480 acres of cleared land, I use a tractor and slasher; ie, no chemicals on 980 acres - I occasionally plant oats for stock to graze, but again use no chemicals. The only variation to the abovementioned procedures is a knapsack on my back (with Roundup) for the sparse Bathurst Burr and St John's Wort.
446	Spot spraying	For Fur Hedge and Blackberries, we work with DNRE and have a contractor spray them. Paterson's Curse is only in one paddock and a very small area of a couple of patches, so we dig it out (do not know how it got there). Heliotrope is on the railway line and feel it will eventually spread to our property. Our property is all types - creek flats, rocky rises and some bush.
462	Spot spraying & burning	Burn Blackberries in winter to allow access to spray the following summer. Depending on chemical used, follow-up sprays are required for next year or two.
507	Spot spraying	Using Grazon at 600mls/100L for Blackberries and Sweet Briar.
508	Boom spray	Our main activity was bulldozing contractors - now is weed spraying contractors - farm is lesser activity. To control Blackberry, Briar (not much), Teatree, Bathurst Burr, we used and still use a Casotti, which is an Italian-made boomspray - 10 metre-wide coverage - no wider than tractor which fits through trees, rocks, up against fences, will spray through fences, in between bushes, etc. It sends a spraying rotating 180 degrees jet of chemical/water 5 metres each side of tractor.
528	Other	Low rates herbicide in winter - August-September for Broadleaf weeds is best for many reasons. Biological control has not worked yet. Population has established, but no reduction in numbers.

SRN	Controls used	Best management practice statement
540	Spot spraying	Blackberries are a worry in timbered areas as birds spread them from our place and neighbours. When the drought finishes, we need to start weeding the property again! Hawthorns need sawing and cutting, which works well. Seed spread weeds are the worst. Basil bark treatment of Biddy Bush with Garlon and diesel. Small dosage (2ml) Garlon and diesel for scattered Scotch Thistle, Bathurst Burr. Similar method used for rough terrain for control of Blackberry, Briar, St John's Wort.
547	Slashing, cultivation, crop rotation & spray grazing	Superphosphate on better land and stock where St John's Wort is not too thick will eliminate the problem. This has happened here. Mow, slash or burn Blackberries on river flat, then plough with maleboard plough or chisel, then crop for two years will eliminate the problem. Very limited success has been achieved using spray application. These days, Paterson's Curse germinates all year round and is becoming immune to sprays. Blackberries and Briars can be eliminated by spray-grazing. The weed problem is increasing, together with the cost of control. Some neighbours do nothing, especially hobby farmers.
601	Spot spraying & aerial spraying	I'm afraid to say that my weed control is pretty much just as it recommends on the drum. I have found it very difficult to get much advice from my local chemical resellers, etc, because they don't want to be responsible for recommending anything (afraid of legal comebacks?). For Blackberry, I do mix Roundup with my Brushoff for a more lethal brew, but I think that is common practice. The helicopter I use from time to time likes to put vegetable oil (Synatrol) in with his Brushoff/Roundup/wetting agent mix.
611	Spot spraying	Spot-spray Bathurst Burr with Roundup. Spray Blackberry with Gazon plus wetting agent. Same Sweet Briar and Prickly Pear. 4WD motorbike with spray.
640	Crash grazing	Constant vigilance in identifying weed threats, then repeated treatment until destroyed. This is done on an annual basis, without any relaxation (missed seasonal treatments). New country can benefit from brief over-stocking, of particularly sheep, to reduce Blackberry infestation. Unfortunately, weed treatment is an overlooked part of management in this area and is generally not considered a major penalty when land values are determined. Enclosed is a copy of the latest inspection report from the local Weeds Council. Fortunately, the local Weeds Council has a new manager who relies on enforcement of The Act. This will revitalise community awareness and activity to decrease the seed deposition burden on landholders such as myself. As a regular summer event, even keeping 1000ha clean takes approximately two months of spot-spraying. I estimate between eight to ten thousand Blackberry, Briar and Cassinia seedlings each year over undulating to foot access terrain. Please see: <a href="http://home.winsoft.net.au/mattick/weeds">http://home.winsoft.net.au/mattick/weeds</a> for colour examples!
689	Spot spraying	Sheep grazed on hill paddocks to control Ragwort. Thistles and Wild Carrot sprayed with Amicide. Blackberries sprayed with Brushoff.

SRN	Controls used	Best management practice statement
699	Spot spraying	Blackberries and Briars have become relatively easy to control with modern chemicals; ie, Grazon and Brushoff. Bracken Fern is also controllable with Brushoff by boomspray and hand-gun. Paterson's Curse can be curtailed and reduced with MCPA and Igran mixed, but in the 2003 drought year, we had several germinations. Saffron Thistles can be controlled in a vigorous phalaris-based perennial pasture and sprayed for with MCPA for about three years after sowing. My main problem is in hill country in a fertilised subclover native-based pasture. Annual aerial spraying at 1.2L/ha in August reduces plant density.
731	Spot spraying	Our partnership runs two properties. One where we live, and used for this survey, is on an increasing level of production where weeds have been under control, not eliminated, for a long period. The second property of mainly granite soils which we have owned, has a high incidence of Serrated Tussock, greatly reduced incidence of Blackberry, St John's Wort, blue Heliotrope and other minor weeds. Aerial spraying by fixed-winged and helicopter (the most successful) on the Tussock, under guidance from the local Weeds Council, is having a success. Manual spraying of the other weed is effective in this situation. A method used on Serrated Tussock is a 1L garden spray bottle filled with a Serrated Tussock chemical at 8 x spot-spraying concentration, carried on bike or vehicle, and squirted on individual plants when found whilst routine checking of stock is a great success for scattered plants and saves remembering where they are.
751	Spot spraying	Control of Paterson's Curse - I pull up all plants in mine and graze about 100 metres in neighbours. Any plants I find flowering I put in a plastic bag or bags and bash. Cape Weed in pastures is a concern and I spray with MCPA or similar. Paddy Melons I pull up. Stinging Nettles a concern. I spray with Ester 80 at the appropriate time. On roads Blackberries, I spray starting between Christmas and New Year and check each month. This gives me three goes at containing them. St John's Wort I spray. Most of these weeds start on the roads and I find if checked on roads, it makes it easier than in paddocks or hills. Rabbits the same.
836	Aerial spraying & burning	Spraying Blackberries from the air in steep country and then burning was successful. Hoeing and spot-spraying Nodding Thistle has been successful. Grazing management appears to have assisted in reducing spread of Vulpia and Saffron Thistle.
851	Physical removal, burning & Spot spraying	Prevention of seeding will eventually exhaust seedbank in ground. This requires periodic inspection and spraying - even monthly. Once weed density has been reduced, above can be achieved very quickly; eg, back-pack on motorbike - 20ac in half-hour. Plane and helicopter spraying has been disappointing. Large Blackberries bulldozed into heaps and burnt. Regrowth sprayed next year. Too expensive and ineffective spraying large bushes.
878	Other	Increasing the numbers of cattle to graze weeds and pasture quickly. My phalaris-based pastures have a number of palatable Broadleaf

SRN	Controls used	Best management practice statement
892	Spot spraying	<p>Weed species that are eaten readily. Biggest problems facing our grazing country is infestation on major weed seeds of Tussock, Blackberry, St John's and Scotch Thistle from roadside and railway line and neighbouring lands. Paddocks of Scotch Thistle on the boundary fences.</p> <p>Other than Blackberry, we use no chemical weed control. Within two years, Blackberry will be reduced to only young seedlings that can be removed by hoeing. Our aim is to be certified organic by 2006. Currently, we utilise a planned grazing pasture management (aka time-control grazing - pulse grazing). Under this program, all livestock are run as a single herd, maximising stock density and herd impact. Grazing periods are only 1.5/2.5 days, depending on the grazing plan, and rest periods are long (90/180 days), allowing full plant recovery. Consequently, bare ground is virtually zero, allowing little or no weed recruitment. Those undesirable plants are further eaten or trampled and the response from perennials is exponential.</p>

**Appendix 8 Details of best management practices described by respondents in question A 1 of the postal survey pertaining to barley grass.**

SRN	Controls used	Best management practice statement
120	Crop rotation & boom spraying	Irrigate winter pastures later in March-April to reduce summer weeds; ie, Tiger Millet, Pig Weed, Burrs, etc. Rotate winter pastures paddocks with a cereal crop after the pasture has been infested by Barley Grass, Paterson's Curse, etc, then start clean again. Spray the weeds out before the crop.
153	Liming	We have found that the use of lime in lifting our pH, but more importantly, lifting our Ca levels, we have seen Capeweed and Barley Grass all but gone. As for Radish and Ryegrass (only a problem when cropping), the use of herbicides seems to be the only way of control.
203	Tree planting	Controlled grazing, pasture improvement, fertiliser and cropping rotations. Our biggest problem area is that land that is self-affected and then becomes Barley Grass-dominant. Fencing this land off and planting trees appears to be the most effective approach.
223	Other	We do not do any widespread spraying for weed control. Our pastures are virtually weed-free. However, we do spot-spray by hand the very isolated invasive weeds of Variegated Thistle, African Daisy, St John's Wort, Cape Tulip, Salvation Jane, Blackberry. These are proclaimed weeds. If, by "weeds", you mean Capeweeds (Dandelion), Barley Grass, Silver Grass, Milford Grass, etc, we do not like them in our pastures, but have to "live" with them.
272	Winter cleaning (failed)	Spray-grazing Capeweed and Erodium (?) 100mls MCPA + 200mls Diuron (?) very effective. Winter-cleaning not very effective Barley/Silver Grass due to dry winters. Have been manipulating pastures for 15 years and now believe, apart from spray-grazing, that for effective control of annual grass weeds a proper (and expensive) 2-3 year renovation program is necessary.
277	Pasture topping	Spray-topping, not new, is a useful tool in controlling some grasses, except that it is impossible to get a really good "kill" when Brome, Silver and Barley Grass is in the one area. All these set seed at various times and a compromise is always made when spray-topping. Caltrop and Innocent Weeds have similar problems and need only a few millimetres of rain to germinate also.
346	Spray grazing	Used (Asset) this year for spray-grazing. Did an excellent job on Geranium and Barley Grass, but was ineffective on Silver Grass. Very soft on Clover, even when flowering. Looking to again use (Asset) and try new product (Raptor) again this year.
386	Spray grazing & pasture topping	Mainly use tried techniques, such as spray-grazing, pasture topping to control Broadleaf weeds (Pato) and to control Barley Grass and Silver Grass.
398	Crop rotation	We have a short growing season. Spray-graze we find hard to control. Spray-topping gives a much better result, provided enough clover burr set

SRN	Controls used	Best management practice statement
429	Other	for next year. Finding a heavy crop of oats good for controlling grasses (eg, Rye, Barley, Brome). Spray Thistles once a year - three to four germinations depending on season. Using lime to balance soil acidity to reduce Geranium. Heavy grazing to control Cape Weed, plus promoting establishment of grasses; eg, tall Fescue, Ryegrasses. Do not know how to control Chick Weed or Barley Grass. Thistle infestation severe in first-year pasture - wary about spraying because of establishing sub-clover.
442	Other	I have undertaken a sustainable soil management course run by Earthlink Australia. This course, along with a soil test, indicates the soil presently is very unproductive for pasture species, therefore allowing weeds to be more predominant (especially Barley Grass). I am undertaking a program to balance the soil (mainly Ca/Mg ratio) by Gypsum and aerating the soil. By improving the soil, allowing pasture to improve, this will decrease and, hopefully eliminate, the majority of weed species. Intentions also to increase rotational grazing techniques.
487	Winter cleaning	Winter-cleaning 270ml/ha Paraquat 1L/ha Simazine mix good on Barley Grass, but lose a lot of winter feed. Connect at 300ml/ha and Hasten 500ml/100L of water good on Barley Grass, don't lose as much winter feed.
527	Crash grazing	I have found that by getting away from continually over-grazing with set stocking and by using grazing management as a way to increase native and introduced perennials, increase competition and reduce bare ground available for undesirable species to become established, plus the use of herbicides when and where necessary, the most effective way of control and reducing weed problems. Heavily-grazing weeds such as Barley Grass at the appropriate time helps reduce seed set. May have to be done several times in high-growth period. Palatable plants such as Wild Radish are only a cropping problem. I have personally found cultivation the worst possible control.
725	Liming	Bent Grass - major problem in some paddocks. Have been 100% successful in eradicating this root-bound plant. Spray 3L Roundup in early December. Then disc (off-set discs) early January. Cultivate 2-3 times during February-March-April. This year, I sprayed first week of November and disced just once. Harrowed just once (still very rough) and sowed turnips and green feed with super spreader. Reasonable germination of summer crop. But checking by walking over the paddock (40ha) yesterday 22 February, there seems to be a 100% kill of the Bent Grass, keeping in mind some hot dry weather in mid and late November may have helped (unseasonal). Barley Grass - don't see much at all last few years - liming over the last 6-7 years may be the answer.
919	Fertiliser application	Hoeing African Feather Grass. Pasture-topping Cape Weed, Thistle, Fog Grass. Pasture-topping Fog Grass at seedset (late November). Encouraging perennial and legume grasses with superphosphate to smother out Cape Weed, Dock, Thistle, Barley Grass, Onion Weed and Fog Grass.
945	Other	Farm, being all cultivation, is mainly used 5-8 years pasture, 3 years

SRN	Controls used	Best management practice statement
		crops; hence, cropped when weeds become a problem. Because crops are less profitable, trend has been not to crop heavy; hence, because of high fertility, Barley Grass has become a problem. The use of _____ has been a practice in recent years, with some success.

**Appendix 9 Details of best management practices described by respondents in question A 1 of the postal survey pertaining to serrated tussock.**

SRN	Controls used	Best management practice statement
15	Rotating wiper, boom spray	Only had property for one year, so have tried many controls, not entirely sure which work. 1. Roller wick wiper on Serrated Tussock only successful if rolled from two directions in Roundup. 2. Only chemical suitable on Viper's Bugloss is 700-1L MCPA and 300ml Igren. 3. 700ml-1L MCPA and 50ml Lantrel excellent on most broadleaf (thistles), but not Viper's. 4. Best solution for Serrated Tussock appears to be boomspray in 2L/hectare Tussock (Frenock).
48	Other	When we moved here almost 10 years ago, the property was covered in wall-to-wall Serrated Tussock and African Lovegrass, and had a thriving population of rabbits. We have, over time, attempted many and varied ways of eradicating, or at least controlling, the abovementioned weed infestations. If weather had been a bit more on our side, we may have had more success, even so we have over the last 10 years made this property into a quite productive area, which complements our other properties.
54	Other	I have spent many days during the year digging out Serrated Tussock and Thistles. It is becoming a harder task, as they are becoming more scattered over the property because my neighbours don't do much work to control their problems. I believe that Shire Councils haven't the guts to prosecute landowners that don't control their weeds.. Up until 6 years ago, I didn't have Paterson's Curse, now with a horse stud next to me who could not care less about it - it is being carried onto my property together with other weeds by birds. I hope I am not fighting a losing battle.
64	Boom spraying, crop rotation, pasture sowing, spot spraying, fertiliser application & grazing management	For Serrated Tussock, great success with booming with taskforce. Crop with forage brassica, then permanent pasture. All the while, spot-spraying and applying plenty of fertiliser and stocking lightly. (We bought 400ha of 90-100% Serrated Tussock land in 1985. After trialing with burning, ploughing, etc, with no success, we now chemical-plough and direct-drill only, with success).

SRN	Controls used	Best management practice statement
85	Other	This survey is maybe of little value to you. Our farm business covers areas held for 140 years to 4 years and large broad native pasture (some supered), to intensive farmer cropping country. It also covers four separate locations. I could give you a more meaningful reply if it covered only one holding and would be willing to redo the following for one holding only, if considered better. Our country is mostly very weed-free, has scattered Serrated Tussock, small patches of Saffron Thistle, and an increasing area (on one property) of Coolatai Grass. Blackberries were a major problem 50 years ago, but now very minor.
168	Boom spraying & grazing management	Using below recommended rates of Taskforce to control Serrated Tussock in pasture without killing desirable species. Timing is also important (spring) to accommodate 4-month no-grazing and crash-grazing prior to following autumn to maximise seed set of good pastures and subsequent germination, creating competition for any weed seedlings. Spray-topping for Bent Grass control - sub-lethal Glyphosphate and heavy grazing through summer.
268	Grazing management	Using horses to graze pastures to significantly reduce Serrated Tussock infestations (graze fairly hard in winter), especially on non-arable land.
348	Grazing management	Cell-grazing. Moving stock around in large flocks/herds over a large number of paddocks, preferably 50 or more, allows better development of plant roots, pastures are thicker and better able to compete with many species of weeds. Sheep camps grass-over, virtually eliminating Bathurst Burr, Nodding Thistle, Saffron Thistle, Horehound and many other weeds that frequent these camps. I think that other weeds such as Serrated Tussock are also less likely to become established. Blackberries and Briars do get chewed back fairly severely with heavy grazing from sheep running in large mobs.
371	Spot spraying, tree planting	Observations: Have sprayed and grazed smaller paddocks. Mob stocking seems to be one of our best strategies so that we hit weeds like Paterson's Curse. This year was particularly difficult because the drought has caused three large pockets of Paterson's Curse not seen before, and a Saffron Thistle problem. Main problem is Serrated Tussock. I spray regularly 20 hours a week (spot-spraying) - gradually getting under control. Sprayed worst paddock two years ago by helicopter (terrain doesn't allow boomspraying) - very successful - held weeds well. Will do again next year. Considering spraying Saffron Thistle by helicopter if he can avoid trees. Tried carpeting out Saffron Thistle, but think the native pastures are not strong enough to overcome Saffron. Have a program of tree planting to assist Serrated Tussock control (in conjunction with Greening Australia). Tried biological Thistle control, but no visible effect. Tried only stem-eating bugs, but heard you should use two different types of bugs. I have been trying to reach a guy in CSIRO re possibility of doing this year.
374	Spot spraying	Goats for Briar/Blackberry/Broom and young Willows. Changing the person who spot-sprays Serrated Tussock each season. Don't assume/miss them. Carry small 2L spray pack in all vehicles for Serrated Tussock. Property map is vital.

SRN	Controls used	Best management practice statement
387	Spot spraying & chipping	We always carry light-weight home-made chippers on bike or truck. When spot-spraying Tussock late in season, add 2ml Glysophate to the litre with Taskforce. We also find by adding Glysophate to Brushoff for Blackberry control, much better than Brushoff on its own and, if possible, reduce the size of Blackberry bushes by burning the previous season.
548	Spot spraying & chipping	Spray Tussocks any time of year except when in flower; use mattock then. Sheep graze the property too low and make control very hard. I suspect that they do not digest the seed, only fertilise it. Don't plough Tussocks or Teatree.
566	Spot spraying & chipping	Being an older person, I have sold and otherwise disposed of the bigger part of my land. The area I have left is particularly weed-free. I take pride in my farm looking weed-free and is much more productive for my livestock. I have found all my life identifying and controlling weeds early is the only way!! Unfortunately, I have a neighbour who doesn't control his Serrated Tussock and he is a good friend of mine. So I get a certain amount of Tussock seed blowing into my land, so I just cut them out (the seedlings!). I have been going to my neighbour with an ATV with saddle tank sprayer, and I have had very good results with Taskforce chemical; 10% of Roundup, before seeding in October and November. Self-motivation is the main thing!!
643	Tree planting	For Serrated Tussock - windbreaks. This, however, then requires the planting of some groundcovers under the trees. So far, little success, mainly due to drought.
697	Grazing management (failed)	For a little over 10 years, we have been using time-control grazing on the property here. Although the run of the seasons has been atrocious, this has helped to protect and nurture perennial species and forged a measure of grazing pressure on relatively unpalatable annuals. The process has been of limited value in the control of weeds such as Serrated Tussock.
708	Chipping & Tree planting	Serrated Tussock is very prolific on neighbour's property. We have fenced and planted trees on all boundaries and manage plants on our own land by hand-chipping.
731	Aerial spraying & spot spraying	Our partnership runs two properties. One where we live, and used for this survey, is on an increasing level of production where weeds have been under control, not eliminated, for a long period. The second property of mainly granite soils which we have owned, has a high incidence of Serrated Tussock, greatly reduced incidence of Blackberry, St John's Wort, blue Heliotrope and other minor weeds. Aerial spraying by fixed-winged and helicopter (the most successful) on the Tussock, under guidance from the local Weeds Council, is having a success. Manual spraying of the other weed is effective in this situation. A method used on Serrated Tussock is a 1L garden spray bottle filled with a Serrated Tussock chemical at 8 x spot-spraying concentration, carried on bike or vehicle, and squirted on individual plants when found whilst routine checking of stock is a great success for scattered plants and saves remembering where they are.

SRN	Controls used	Best management practice statement
744	Pasture promotion	Controlled grazing for St John's Wort. Thickening up of pasture for Serrated Tussock - drought finished that.
747	Spot spraying	Fenced off Horehound and planted trees. Tall fescue went gangbusters and choked out the Horehound. The trees went well too with spot-spraying to keep down the Fescue. Regular spot-spraying of Serrated Tussock for 15 years has seen it decline significantly at last. Rotational grazing has seen Rat's Tail Fescue decline, or has it been drought?
785	Tree planting	Planting of plantation and tree helps to stop the spread of Serrated Tussock.
792	Other	We use strategic grazing and livestock to control our pastures - depends on season, rainfall, pasture species and economics. We work on principle of "if it grows, eat it", with large numbers of sheep (wethers). Number-one enemy - Serrated Tussock.
805	Boom spraying (failed)	Two sprayings of herbicide on weeds when planting crops and pasture seeds. This method is successful with us as it cleans up the paddocks before planting. This method is unsuccessful for Serrated Tussock.
878	Other	Increasing the numbers of cattle to graze weeds and pasture quickly. My phalaris-based pastures have a number of palatable Broadleaf Weed species that are eaten readily. Biggest problems facing our grazing country is infestation on major weed seeds of Tussock, Blackberry, St John's and Scotch Thistle from roadside and railway line and neighbouring lands. Paddocks of Scotch Thistle on the boundary fences.

## Appendix 10 Complete notes to responses provided by medoid respondents interviewed by telephone for capeweed.

### SRN 401 Capeweed non-active

Control	Details
Chipping	<p>Chipping of <i>Arctotheca calendula</i> began two years ago in response to an increase in the density of a single known infestation and the discovery of new previously unknown infestations.</p> <p>Chipping has been carried out at the time of flowering (spring to summer) however an increased ability to identify this weed at the seedling stage has allowed this control to be implemented earlier. Known infestations are marked in the paddock with white pegs. Infested sites may be completely chipped three times in one season. Chipped plants are bagged and burned. The respondent considered chipping to be achieving greater than 95% control of weeds within season.</p>
Spot spraying	<p>Spot spraying is carried out on the larger infestations and bigger plants. Amicide 600® is applied with a knap sack sprayer and generally achieves a 90% kill rate within season. Some large plants may be chipped out if they appear to not be totally killed by spray. Like chipping this control has only recently been implemented.</p>
Grazing management	<p>This respondent operated a time controlled cell grazing strategy. 3 mobs (total DSE &gt;17,000) rotated through 100 paddocks with an average time in paddock of 3 days and paddock rest periods ranging between 30 and 90 days. Despite this intensive grazing program no mention was made by the respondent of any impact of this on <i>A. calendula</i> infestations.</p>
Integration	<p>The recent application of control against <i>A. calendula</i> where this respondent had previously been non-active is a good example of producer response to new incursions. Although not currently used, the respondent suggested that they may move to boom spraying the larger infestations. Although displaying some application of containment strategies (field markers) this respondent was targeting this weed only at one stage of its life cycle and demonstrated no integration of control methods.</p>

### SRN 622 Capeweed single-active

Control	Details
Boom spraying	<p>Boom spraying has only been undertaken a few times and not in the last five years. When done, MCPA® was applied at label rates using a tractor boom spray. The respondent estimated that this achieved an 80% kill of <i>A.</i></p>

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	<i>calendula</i> within season. The respondent suggested that he may undertake boom spraying this year.
Fencing off sheep camps	This respondent is proposing to fence off the infestations which occur entirely on sheep camps. These smaller paddocks may become day paddocks with sheep excluded at night to reduce the camping effect. The neighbour has done this and found it successful
Frost rolling	This respondent had heard of rolling cape weed after a heavy frost but had never seen it done.
Integration	Control was virtually not undertaken and when it has appears to be in response to an immediate increase in density.

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### SRN 408 Capeweed cluster 1

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Control	Details
Grazing management	General grazing management was rotational/set stocking until two years ago. Has now shifted to a predominantly intensive system. 8 mobs are run on 40 paddocks. Pasture condition determines stock movements, ryegrass is fed off at the three leaf stage and stock moved when its down to 1½ leaves (pasture height about 1½ inches). The previous system of rotational grazing/set stocking had resulted in no changed to <i>A. calendula</i> infestations, the intensive grazing program has resulted in a decrease in both extent and density of infestations. Deferred grazing had also been practiced with paddocks rested in late summer early Autumn and again in spring to encourage pasture competition against <i>A. calendula</i> and other weeds. This control method had proven effective and is effectively being forced onto all paddocks under the cell grazing system.
Pasture competition	“The goal is to move to a perennial pasture system for more production and better pasture quality (less weeds)”.
Spray grazing	<p>Spray grazing has been used annually for the last six years. <i>A. calendula</i> is sprayed from May to July with 2,4-D Amine then heavily stocked. Spray grazing will control up 99% of <i>A. calendula</i> plants and has resulted in a decreased extent and density of this weed.</p> <p>On previous properties it was estimated that <i>A. calendula</i> could be completely removed from the pasture after three successive years of spray grazing.</p> <p>A limitation to the application of spray grazing is the potential benefit to be gained from <i>A. calendula</i> in poor seasons. If Autumn rainfall is low this respondent will not spray graze, holding the <i>A. calendula</i> as a winter feed source. This results in reinfestation in the next year. The respondent</p>

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	pointed out that spray grazing needs to be undertaken when seasons permit. Although still successful cattle are not as good as sheep for spray grazing.
Boom spraying	Boom spraying was nominated only as a means of application for spray grazing.
Winter cleaning	Although nominated as a control the respondent was not sure of what winter cleaning was.
Slashing	Although the respondent had no experience with slashing <i>A. calendula</i> he insisted that this was an unsuccessful method
Integration	At the time of the survey this respondent effectively integrated spray grazing with deferred grazing. The respondent now integrates an intensive grazing system aimed at increasing perennial pasture plants and reducing weeds with the more direct control of spray grazing.

## SRN 765 Capeweed cluster 2

Control	Details
Chipping	Chipping used on the most dense infestations in spring when flowering makes them obvious.
Spot Spraying	Spot spraying is used against isolated dense infestations. MCPA® is used.
Crop rotation	<p>Although the respondent nominated cultivation as a control for <i>A. calendula</i> they only use this as part of a three year crop rotation.</p> <p>The crop rotation involves a Brassica forage crop followed by a cereal crop and finally the sowing of a rye grass pasture. The majority of land will undergo this rotation every 12 years. The affect of this rotation has been to reduce both the extent and density of infestation of <i>A. calendula</i></p>
Boom spraying (non-elective)	The paddock is firstly sprayed with glyphosate then cultivated in preparation for a spring sown <i>Brassica</i> spp. forage crop.
Cultivation	After the forage crop the paddock is cultivated and sown with a cereal crop.
Boom spraying (selective herbicide)	After sowing of the cereal crop a boom spray application of a broad leaf selective herbicide is undertaken. This is usually MCPA ®. This selective herbicide is used again the next season after sowing of the rye grass pasture usually. The rye grass pasture is usually sown under a crop of oats.
Boom spraying	Boom spraying outside crop rotation has only begun this year. Heavily

(in pasture)	infested pastures have been sprayed with MCPA in autumn. Areas were marked in the previous spring when <i>A. calendula</i> was in flower. Results of this are unknown at this stage.
Integration	This respondent's use of crop rotation demonstrates integration of controls over a period of time to reduce the soil seed bank. Unlike other respondents, no mention was made of the competitive ability of a sown pasture. Crop rotation was valued because of its ability to control weeds within the immediate season, particularly through the spraying of selective herbicide. The respondent also integrated the use of boom spraying within the pasture for large scale dense infestations. The integration of spot spraying and chipping against more isolated infestations appears logical, however these appear to be less successful at long term control.

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**SRN 870 Capeweed cluster 2**


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Control	Details
Grazing management	Rotational grazing system undertaken since 2001 involving 1 to 2 mobs of stock move amongst 13 paddocks. Pasture condition triggers stock movements with a benchmark of 500kg DM/Ha used to prompt transfer to new paddock. This method has resulted in a decreased extent and density of <i>A. calendula</i> . Drought has resulted in a recent cessation of this management strategy.
Crash grazing	Crash grazing has been used once to control a very dense infestation of <i>A. calendula</i> in an oat crop. In 2004, a 6 acre area of a 52 acre oat crop, which had become densely weed infested, was isolated using temporary electric fencing. In September, 43 heifers and 200 ewes and lambs were run on this paddock for a period of 1 month. The paddock was given a 1 month brake, in which time the oats regenerated (after rain) and then stocked again at roughly half the initial rate for another month. This process achieved 100% kill of <i>A. calendula</i> plants and resulted in a long term decrease in density, although not extent of infestation on this area.
Sowing pastures	The sowing of pastures has been undertaken sporadically since 1983 however since 2001 has been more regular. Arable land is targeted for pasture sowing. Sowing pastures is not specifically aimed at weed control but sowing density is determined to provide the best competition for undesirables. Pastures have traditionally been sown under a cover crop of wheat. This may soon cease with pastures species alone to be sown. Paddocks are locked up and then stocked to crash graze weeds. A light disc plough may be used followed by sowing. This control has resulted in a decrease in both extent and density of <i>A. calendula</i> .
Cultivation	"Cultivation is not effective unless combined as part of sowing a competitive pasture".

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Boom spraying	Boom spraying was used once as part of a crop sowing exercise, however this method has been discontinued due to an aversion to using chemicals.
Slashing	Slashing, whilst effective for other weeds does not control <i>A. calendula</i> , as this weed grows to low to the ground.
Chipping	Chipping is opportunistically used to control <i>A. calendula</i> in stock yards only
Integration	The sowing of pastures and general grazing management strategy are resulting in along term decrease in the density and extent of <i>A. calendula</i> . These two controls appear to be integrated to the extent that increased productivity has allowed more flexibility in paddock rotations. Specific control is only targeted at very dense infestations and has consisted only recently of crash grazing. <i>A. calendula</i> is not considered a weed of importance by this respondent, ranking it 6 <sup>th</sup> out of 9 weeds in the postal survey.

### SRN 726 Capeweed cluster 3

Control	Details
Crop rotation	Although not nominated in the postal survey the main form of control undertaken against <i>A. calendula</i> is crop rotation. Crop rotation generally involves two years of cereal crops followed by five years of lucerne and clover pasture. Crop rotation involves the integration of three main control techniques, boom spraying, cultivation, pasture sowing. Despite some of the individual methods within crop rotation proving to be highly successful at achieving short term control, the respondent believed that it was having no affect on <i>A. calendula</i> with densities increasing over the last 5 years. The short cropping phase of the rotation was considered by the respondent to be a possible cause of increasing <i>A. calendula</i> infestation. The respondent suggested that a longer crop phase would allow increased use of broad-leaf chemicals to reduce <i>A. calendula</i> infestations.
Boom spraying	Boom spraying of lethal dose chemical continues to be used as part of a crop and pasture rotation. Boom spraying is never applied to pastures as a stand alone control. In preparation for the first crop, boom spraying of glyphosate may be used to fallow an existing pasture. If rainfall is high further spraying of glyphosate may be used however the land is usually turned over to cultivation as the next step. Where boom spraying of glyphosate is applied a 100% kill of <i>A. calendula</i> is usually achieved, however rates are carefully monitored by a local agronomist to ensure success. Pre-emergent sprays have been used in the past however these have proven expensive and this respondent raised concerns about the residual effects on legume pastures.

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Cultivation	Land being prepared for crop may be cultivated up to three times from December through to sowing (depending on rainfall) and is specifically targeted at killing germinating weeds. Where <i>A. calendula</i> seedlings are established cultivation will achieve a 100% control.
Pasture sowing	<p>After the first year of cropping a second similar preparation is undertaken for a cereal crop to be under-sown with lucerne and clovers. The lucerne and clovers apparently provide little competition against <i>A. calendula</i> which has rapidly reinfested much of the land treated in this way.</p> <p>In recent years Autumn rains have frequently come later than expected resulting in a delayed germination of <i>A. calendula</i>. This delay means that crops and pastures are being sown into seed beds of germinating <i>A. calendula</i> that would normally have been controlled by cultivation or spraying.</p>
Winter cleaning	Although nominated as a successful technique in the postal survey this specifically timed chemical application has proven to have too greater impact on the legume component of pastures and has been discontinued.
Spray grazing	This respondent was aware of spray grazing, however was not going to use it as they were experiencing enough trouble with scours caused by stock consuming <i>A. calendula</i> without encouraging them to eat it. They considered the best time for spray grazing to conflict with shearing in which case sheep would be scouring causing fleece discounts.
Integration	The respondent's process of crop rotation shows a level of integration of controls. Other than this no other controls were targeted at <i>A. calendula</i> , with the respondent pointing out that they considered the options for control in the pasture phase to be limited as lethal dose herbicides were to damaging to non-target species and spray grazing not compatible with farm operations. The respondent made no mention of grazing management. This respondent considered <i>A. calendula</i> to be the most serious weed on their property.

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**Appendix 11 Complete notes to responses provided by medoid respondents interviewed by telephone for blackberry.**

**SRN 189 blackberry single-active**

Control	Details
Spot spraying	Spot spraying has been used for 30 years. It is only used on average every 2-3 years. Thickets are sprayed in spring with Garlon® at label rates from a 50 litre spray unit mounted on either a ute or motor bike. Briars are sprayed at the same time. A 100% kill achieved within season. This spot spray technique kills all thickets sprayed however there are very few to be sprayed.

**SRN 115 blackberry cluster 1**

Control	Details
Spot spraying	All density blackberry infestations are targeted with spot spraying. Spot spraying is undertaken annually with infestations revisited when regrowth is apparent. The respondent has found that spraying in the Autumn is the most effective however spraying is done from January to the first frost. On larger thickets Brush-off® is used as it is cheaper and a large volume is required. On smaller thickets or regrowth Grazon® is used as it is thought to be more effective. Moisture stressed plants are not sprayed as the chemical is not as effective on these. Both chemicals are applied at label rates using a tractor mounted spray unit. This respondent believes that the thicket needs to be totally covered to ensure a good kill. All canes must be completely saturated with the spray. Larger thickets may have occasional regrowth however smaller thickets are usually 100% killed by this treatment.
Burning	<p>The burning of sprayed thickets is carried out in the year following their spray treatment. The respondent believes this is important as the chemical is still working in the first year of spraying. After a year the thicket becomes a trellis for regrowth so it needs to be burnt. This regrowth may be difficult to spray if the thicket is not burnt as it inhibits the application of chemical.</p> <p>The application of this spot spray treatment and follow up burning has resulted in an overall decrease in the extent and density of blackberry infestations.</p>
Boom spraying, Spray grazing and biological	Boom spraying, spray grazing and biological control were identified in the postal survey as unsuccessful. In reality the respondent has not tried these but considers that they would be unsuccessful if he did. The respondent had

control	not observed biological control on his property no his neighbours properties.
Sowing pastures and fertiliser application	Although the respondent identified the ability of sowing pastures and fertilising application to increase competition he did not think that either was able to cause a reduction in blackberry establishment.
<b>SRN 639 blackberry cluster 2</b>	
Control	Details
Spot spraying	<p>Spot spraying has been used for over 20 years. Spot spraying is undertaken annually with an area likely to be sprayed every 3 to 4 years depending on blackberry establishment.</p> <p>Spot spraying is applied during late summer and autumn. This time has found to be the most successful. The respondent suggested that the reversal of sap flow occurs at this time so the chemical is carried into the crown. Grazon® is applied at label rates from a ute back spray rig. The respondent indicated that he thought blackberry was easier to kill when stressed either through reduced soil moisture or after the first frost. This spot spray treatment is effective, however there is occasional regrowth on small thickets and always regrowth on larger thickets. The respondent reported that spot spraying was reducing both the extent and density of blackberry infestations.</p>
Cultivation & burning	Cultivation has only been used once. This control was applied after burning thickets on creek flat. The area was cultivated and sown to oats twice. This was an effective control which completely eradicated the blackberry infestation.
Boom spraying	Although nominated on the survey form as an unsuccessful control method, this respondent had never used boom spraying. He had observed other graziers using it and thought it was successful however its application was limited to flat country with low lying thickets.
Slashing	Slashing has been used opportunistically in the past. The respondent suggested that all this did was “prune the blackberries” and did not kill them.
Integration	The respondent relies solely on spot spraying for control. Burning and cultivation have been integrated in the past however this has only been done once.

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**SRN 757 blackberry cluster 3**


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Control	Details
Spot spraying	Spot spraying has been carried out annually for 18 years. All densities and land classes are targeted with spot spraying however some gullies with dense infestations get controlled only occasionally. blackberry infestations are spot sprayed from November through to May. Grazon ® is used at the maximum label rate in November and December. The rate is then lowered to the minimum label rate from January through to March. The maximum label rate is again applied from April to May. A surfactant (unknown) is also added to the chemical. A ute-back spray rig is used to apply chemical. The respondent estimated that spot spraying achieves a 100% kill of standing vegetation however 20% of thickets regrow in the next season. The respondent indicated that spot spraying was responsible for reducing both the extent and density of blackberry infestations. The respondent indicated that persistence in application was the key to successful reduction in blackberry infestations.
Pre-spray Burning	Burning is used by the respondent in two ways. Firstly large thickets may be burnt prior to spot spraying to reduce the amount of chemical required. This process is isolated to large thickets in steep gullies. A small area at the base of the thicket will be spot sprayed in the summer prior to firing. This small area of standing dead thicket is used as a fire starter and when wind direction is correct it is lit. The fire is driven by the wind into the remaining (unsprayed) dormant thicket, burning off the majority of vegetative material. The regrowth can then be sprayed with less chemical and less expense.
Post-spray burning	Larger thickets that have been spot sprayed are burnt in the following winter.
Mechanical control	In accessible areas mechanical removal of thickets has been practiced in the past. Thickets were pushed off using a tractor blade. The piles of thickets were burnt and the regrowth spot sprayed in subsequent years.
Goats	Goats were trialled as a control 16 years ago for a period of 2 years. Goats were opportunistically purchased from a neighbour and placed in a heavily infested paddock. Some areas were slashed and the goats kept these in check eating the young shoots and eventually killing the thickets. The use of goats was aborted as wombats were destroying fences which enable the goats to escape. In addition the goats proved unprofitable. The respondent indicated that goats effectively reduced the density and extent of blackberry however follow spot spraying was required.
Sowing pastures	Sowing pastures as a control was found to be effective for a short term. Some time ago one area of the property was cultivated and sown to

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	ryegrass pasture. The cultivation and sowing of pasture reduced the density and extent of infestations however after a two year period spot spraying was resumed to maintain control.
Boom spraying	Boom spraying was trialled once on low growing thickets. Similar to spot spraying Gazon ® was applied. However, the respondent indicated that the results were less successful than those achieved through spot spray application with many thickets not dying.
Chipping	Chipping has been used regularly on one small infestation adjacent to the respondent's house. Despite several attempts at removal this infestation remains, although only at a low density.
Integration	This respondent is currently reliant on the integration of spot spraying and burning. Other control methods have previously been integrated to reduce the infestations to the levels now seen. There was no focus on pasture competition by this respondent.

#### **SRN 279 blackberry cluster 4**

Control	Details
Chipping	Chipping has been used in the past but was stopped. The respondent found that leaving even a small amount of root behind resulted in regrowth.
Spot spraying	Spot spraying has been undertaken annually for more than 20 years. Spot spraying is undertaken in spring and summer to prevent flowering and seed set. Brush-off® and Roundup® are used in combination at rates slightly higher than recommended on the label. The chemical is applied from a back pack sprayer. 98% of the canes that are sprayed will be killed within season. This program has resulted in a decreased density of blackberry infestation. The extent of infestation has not been reduced as neighbouring properties have large mature thickets which the respondent believes provides a source of reinfestation by birds.
Biological control	The respondent did not think that the variety of blackberry on their property was susceptible to the rust. The respondent had seen no affects of bio control agents on their blackberry infestations. The respondent mentioned that a less thorny version of a blackberry they found on their property and presumed to be a garden escape (possibly a boysenberry?) was destroyed by a fungus.
Fertiliser application	The respondent provided no details of the impact of fertilisers on blackberry infestation or other weeds. The respondent stated that "I haven't done any research on that".

Grazing management	Although grazing management was nominated the respondent could give no details of how they had found this method unsuccessful against blackberry infestations.
Integration	This respondent practices little integration of controls. They are reliant on diligent spot spraying to maintain the low level of infestation found on this property. It is worth noting that the respondent was definite about spot spraying canes before they went to flower. (note 2yr canes flower? Why spray annually)

### SRN 56 blackberry cluster 5

Control	Details
Spot spraying	<p>Spot spraying has been undertaken for over 20 years. Spot spraying has not been done in the last two years. Prior to this it was done annually with areas sprayed every two years on average. Both Grazon® and Brush-off® have been used at label rates. The chemical is applied using a tractor mounted spray rig. A quad bike is occasionally used however only on small areas as volume is limited.</p> <p>When applied spot spraying has reduced the extent and density of blackberry infestations.</p> <p>The application of spot spraying is limited in tree lots and wind breaks where blackberry infestations have been increasing. These younger trees cannot tolerate spraying. As they grow older (&gt;10years) spot spraying can again be implemented. However, tree lots and wind breaks need to be designed to allow access for weed control. This respondent has found his wood lots easy to access but his wind breaks difficult.</p>
Chipping	Chipping has never proven effective.
Burning	Burning has very occasionally been used. If a paddock were to be sown soon after spraying thickets then they would be burnt.
Mechanical removal	Mechanical removal has been used at least once in the past.
Granule herbicide	Granules have recently been trialled on blackberry thickets. This respondent is using the herbicide Graslan® which is not registered for blackberry. Rates applied have been lowest label rates however the respondent thinks he may have to increase this. The advantage of granule application is the ability of it to be easily carried on a motor bike or farm vehicle and applied opportunistically. A container and measuring spoon is all that is required.

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Integration	This respondent demonstrates no regular integration of controls. Spot spraying has been used alone in the past. Granules are now being used as a stand alone method.
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**SRN 21 blackberry cluster 6**


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Control	Details
Spot spraying	Spot spraying has been undertaken annually for 20 years. Although implemented annually a single area may only be treated every three years. Spot spraying is carried out from December to February. All densities and areas are targeted with spot spraying. A contractor is used to control denser infestations. The respondent spot sprays the less dense areas. Both the contractor and respondent use utility back spray rigs. Grazon® is used on smaller thickets at the maximum label rates. Brush-off® is applied to larger denser infestations as it is cheaper. Brush-off® is sometimes applied at twice the label rate. The respondent indicated that an 80% kill of blackberry thickets is achieved. The respondent reported that blackberry infestation have reduced in both extent and density due to spot spraying.
Burning	The respondent uses burning to control large thickets. Large thickets may be sprayed with Brush-off® and then brunt in winter or spring. The thicket will regrow however it is then spot sprayed with Grazon®. As long as the follow up spraying is effective the respondent suggests that this can “virtually wipe them out”.
Integration	The respondent integrates the use of burning and herbicides when targeting large thickets.

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## Appendix 12 Complete report of details of medoid respondents for barley grass.

### SRN 365 barley grass single-active

Control	Details
Grazing management	Although nominated in the postal survey grazing management the respondent could not describe exactly how they used this control. The general grazing management strategy was rotational with an average of 3 mobs rotating through 10 paddocks with movements dictated by availability of feed and worm control. The respondent did not appear to consider this general grazing management a control method for <i>Hordeum</i> spp. The respondent referred to grazing management being used in a non-deliberate crash grazing sense. It seems that stock moving through general rotations sometimes affected control. When questioned on the impact of grazing management on <i>Hordeum</i> spp. the respondent suggested that they did not kill it.
Sowing pastures	Although no details were gleaned the respondent made a short reference to the use of boom spraying in pasture establishment. The respondent suggested that this had been an effective process for the control of <i>Hordeum</i> spp.
Integration	No integration was apparent. This respondent was difficult to interview with few definitive answers. Results should be treated with caution.

### SRN 815 barley grass cluster 1

Control	Details
Sowing pastures	The sowing of pastures is targeted at isolated infestations of <i>Hordeum</i> spp. on old sheep camps. This respondent has previously moved to a cattle only enterprise but the affect of sheep camps remains. The sowing of pastures integrates several individual control methods including lethal dose boom spraying, occasional use of burning, cultivation and finally the sowing of a pasture. The pasture sown is usually a combination of rye grass, cocksfoot and clovers. This practice has been used for 10 years, achieves a 95% kill rate within season and has resulted in a decrease in the extent and density of <i>Hordeum</i> spp.
Boom spraying	Boom spraying is the first step in the establishment of a pasture over an infested sheep camp. Glyphosate is the most commonly applied chemical due to its ease of use. Glyphosate is applied using a boom spray.
Burning	Burning is occasionally used when there is a dense stand of weeds left after spraying.
Cultivation	Following the effective application of a herbicide and possible burning the area is cultivated using either a mouldboard or triple disc plough, the aim of which is to completely invert the soil. Following the cultivation the area is sown to pasture.
Crop rotation	In the past these dense infestations of barley grass on old sheep camps have occasionally been controlled through incidental crop rotation. The process of crop rotation is similar to that of sowing pastures above however an oats or millet crop is sown.
Spot spraying	Occasionally <i>Hordeum</i> spp. plants missed by the targeted sowing of pastures will be controlled by opportunistic spot spraying.
Slashing	The respondent made particular comment on other producers around him

	who were attempting to use slashing as a control for <i>Hordeum</i> spp., he considered this to be an ineffective management practice.
Integration	The specific and targeted use of sowing pastures to control <i>Hordeum</i> spp. on old sheep camps appears to be an intensive management program. The respondent, however, insists that in left uncontrolled that “sheep camps can infest the rest of the paddock”. The integration of individual control methods as preparation for sowing of pasture is evident. In addition to this the respondent alluded to the competitiveness of sown pastures and their ability to maintain control of <i>Hordeum</i> spp into the future. This respondent appears to have effectively integrated several short term controls along with a longer term solution

## SRN 23 Barley grass cluster 2

Control	Details
Winter cleaning	Winter cleaning was used up until two years ago. This control has not been used due to a lack of Autumn rain required for germination of <i>Hordeum</i> spp. Winter cleaning was used regularly prior to this for over ten years. Chemicals used include Simizine® at label and agronomist recommended rates. Chemical was applied by boom spray by contractor. Winter cleaning has only been used in lucerne and occasionally oats crops where infestations become dense. Despite its regular historical use, the respondent did not consider winter cleaning a long term successful practice indicating that “initial results look good but long term control requires competitive pasture”. The respondent was unable to estimate the within season proportion of weeds controlled by this method and suggested that it had no affect on the extent and density of <i>Hordeum</i> spp. infestations over a five year period.
Pasture topping	Like winter cleaning, pasture topping has not been used by this respondent in the last 2 years. Prior to this, pasture topping was used sporadically for more than ten years.
Sowing pastures	The respondent considered the sowing of pastures to be the best long term solution for <i>Hordeum</i> spp. The sowing of pastures involves the integration of several individual controls including lethal dose boom spraying, cultivation, a crop phase and sowing of pasture.
Boom spraying	Lethal dose boom spraying of glyphosate is applied in Autumn or winter depending on rainfall and subsequent germination of weed seeds.
Cultivation	Area to be sown is cultivated and preferably sown to a <i>Brassica</i> crop. After <i>Brassica</i> crop has died off the area may be sprayed again in the following Autumn or winter and sown by direct drill with pasture. Pasture species sown include Phalaris, cocksfoot and sub-clovers.
Hay and silage making	For badly infested lucerne paddocks the use of silage and hay making has effectively decreased both the extent and density of <i>Hordeum</i> spp. In one situation a paddock was cut for silage in late August, the lucerne was able to grow back quicker than the <i>Hordeum</i> spp. and out-competed much of it. The remaining weeds were eliminated by a further cut of the pasture for hay in October. The respondent indicated that this process is dependent on seasonal rainfall. In one case a paddock treated this way received late rain enabling some areas of <i>Hordeum</i> spp. to regenerate, quickly go to head and cause severe damage to lambs in the paddock.

Crash grazing	For one badly infested paddock an attempt at crash grazing was undertaken (further details required) the results were good.
Fertiliser	Fertiliser was briefly mentioned as a causal agent of increased <i>Hordeum</i> spp. Infestations but had reduced other weeds (eg <i>Vulpia</i> )
Lime	The respondent briefly mentioned the application of lime as a possible cause of reduced <i>Hordeum</i> spp. infestation. An average of approximately 400 tonne has been applied to the property over the last five years.
Integration	This respondent placed a high level of priority on the establishment of competitive perennial grass pastures. They considered that once established that competition was an effective control for <i>Hordeum</i> spp. The respondent clearly integrates several individual control methods over time to establish pastures. The respondent believes that “the secret to establishing pasture is to eliminate all competition at the time of germination” and these controls are aimed at attaining this. In addition to the short term controls involved in pasture establishment and the longer term effects of a competitive pasture the respondent has also used several controls that could be applied to infestations should they establish. Winter cleaning and pasture topping, although no longer the preferred controls could be applied. Strategic application of hay and silage making and the use of crash grazing could also be used to control any established infestations.

### SRN 601 Barley grass cluster 3

Control	Details
Pasture topping	The respondent nominated boom spraying as a control method however this was used in the application of a low rate of Glyphosate as pasture topping. The pasture topping has only recently been applied (2 years ago) and whilst the respondent indicated that it successfully controlled the <i>Hordeum</i> spp. in the short term (80% of <i>Hordeum</i> spp. killed within the season) they are not sure of the long term effects. The respondent noted that other weeds particularly <i>A. calendula</i> had moved in to take the places of the controlled <i>Hordeum</i> spp.
Notes	This respondent nominated spot spraying and aerial spraying in their postal survey however neither of these were actually used against <i>Hordeum</i> spp.

### Appendix 13 Complete report of details of medoid respondents for serrated tussock.

#### SRN 442 Serrated tussock single-active

Control	Details
Chipping	Chipping is used only occasionally when isolated plants are located during routine farm operations. A hoe is carried in the vehicle at all times to facilitate this. Chipping has been used as a control for around 10 years. Plants may be bagged if found in seed but most are removed before flowering.
Spot spraying	When larger infestations of isolated plants are found they will not be chipped but left and later targeted with spot spray. A back pack spray is used to apply Glyphosate at rates slightly higher than label recommendations. This method is often applied when pastures are low either through seasonal conditions or by deliberate stock movements. The reduced height of the pasture allows the <i>N. trichotoma</i> plants to be easily located.
Integration	There is a degree of integration of chipping and spot spraying with each being targeted at a different extent of infestation. This respondent indicated that they only used chipping in their postal survey however the phone survey revealed a long term use of spot spraying as well. This respondent has a small property and commented that many of his larger neighbours were struggling with significantly greater <i>N. trichotoma</i> infestations.

#### SRN 888 Serrated tussock cluster 1

Control	Details
Chipping	Chipping is used opportunistically to control isolate plants on the home block which has a low density infestation. Chipping has been undertaken for over ten years. Although this method is 100% successful at killing plants it is used against it was considered to have had no long term affect on extent or density as new plants emerge are found each year. This control is clearly keeping <i>N. trichotoma</i> from establishing a higher density infestation.

Control	Details
Spot Spraying	Spot spraying is used mostly on the second block of land which has been purchased two years ago. This block of land has higher density infestations. This method has been used for the two years since this blocks purchase. Spot spraying is applied whenever time becomes available to do so. Frenock® is used when spraying from March to October after which, Roundup® is added to the mix. Labels rates are observed. Chemical is applied using a back pack sprayer. The respondent particularly noted that “some farmers use a vehicle which allows them to carry a large amount of chemical. The problem with this is that they use to much and kill everything not just the tussock. Tussock can then come back in the bare patch left”. The respondent also noted that the use of glyphosate is not ideal as it also kills everything. The respondent pointed out that using a back pack sprayer means that you are usually directly on top of the tussock when spraying unlike higher pressure vehicle mounted spray rigs which allow “shooting” of the spray which in turn damages non target species. Spot spraying is reported a 100% successful where it is applied. Although the respondent considered spot spraying to have no affect on the extent on <i>N. trichotoma</i> infestations it had reduced their density.
General grazing management	The respondent mentioned that they also considered grazing management a sort of control. The two properties run a total of 14 mobs around 100 paddocks. The recently purchased block of land has had three very large paddocks split into nine. This has allowed more intensive management. This increase in grazing management intensity means that paddocks are grazed shorter allowing the tussock to be more easily identified and subsequently controlled. The respondent thought that the rotational system increased pasture competition reducing <i>N. trichotoma</i> establishment. Camping affects had also been diminished by increasing grazing management intensity. Although making the above statements the respondent was not sure wether the grazing management was having an affect on <i>N. trichotoma</i> infestations directly.
Maintaining pasture competition	The respondent mentioned that perennial grasses gave better competition than annual plants. With regard to pasture competition and grazing management the respondent stated that “keeping ground cover on country makes it better”
Integration	The respondent uses a measure of integration in that chipping is applied opportunistically and spot spraying against more easily locatable infestations. The more interesting observations made involve the respondent’s admission to the possible role of grazing management in control. The respondent did not seem to think that it was a very important part. The respondent seemed to give equal weight to the fact that grazing management allowed him to find the tussocks as well as providing competition. Certainly the more intensive general grazing strategy would be providing some form of control.

**SRN 763 Serrated tussock cluster 2**

Control	Details
Chipping	Chipping is applied to some areas as it is quicker than setting up to spot spray. Spot spraying can also be slower unless you have the more advanced equipment of retractable hoses. Chipping of an infestation is done by systematically covering the infested area. A mattock is used with tussocks bagged and then burned. Chipping has been undertaken for the last five years since the <i>N. trichotoma</i> infestation was identified.
Spot Spraying	Spot spraying is undertaken at the end of winter when grass is short and tussocks more easily found. Taskforce® is used at label rates and applied using a ute back set-up. Spot spraying has been used for two years. The respondent indicated that this method provided 100% kill of weeds treated. However, <i>N. trichotoma</i> was still increasing in extent and density on those areas treated.
Boom spraying	Boom spraying is a rarely used control method. The most recent application was the opportunistic use of a small amount of Glyphosate left over after treating a fallow. The Glyphosate was sprayed over a small but dense infestation. It achieved 100% kill however the long term affects are yet to be revealed.
Sowing pastures	The sowing of pastures was used by this respondent to promote competitive pastures to assist in overall weed control. Occasionally the sowing of an area of land might be undertaken specifically to control <i>N. trichotoma</i> . Species sown include phalaris, fescue and white and red clover.
Cultivation	The sowing of a pasture is preceded by several cultivations. Up to six cultivations of the area to be sown may be undertaken with the aim to promote the germination of weed seeds.
Grazing management	Grazing management to prevent the germination of weeds was suggested to be an undesirable practice by this respondent. This respondents philosophy was to use controls that aimed to eradicate as much of the seed for the soil seed bank as possible.
Integration	This respondent integrated the sowing of pastures to promote competition with the more direct controls of spot spraying and chipping. Although nominating boom spraying as a control it was used more like spot spraying than as a broad-acre treatment. This respondent had a focus on the soil seed bank and made disparaging comments about neighbouring farmers attempting to use grazing management to control weeds. He considered this just a temporary cover up with an event like drought eventually causing the weeds to emerge. Despite this, the respondent considered pasture competition an important part of his management program.

**SRN 792 Serrate tussock cluster 3**

Control	Details
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Control	Details
Spot spraying	<p>Spot spraying has been undertaken annually for over 20 years. Spot spraying is done year round. Task force® is used however glyphosate may be added to the mix as a marker. Label rates are usually used however when a large area of tussock needs to be controlled in a short period of time the rate may be doubled and tussocks given a “quick shot”. When a tussock is spot sprayed normally it is sprayed till dripping. When given a “quick shot” the tussock is sprayed with less volume of herbicide and may not be completely covered. This method enables more country to be sprayed in less time. The quick shot is equally effective as long as the tussock is sprayed from directly above and not at an angle. When a tussock is sprayed at an angle the opposite side of the plant may not receive chemical. Side spraying can result in partial kill of the tussock. Spraying from “over the top” also reduces non-target species damage as most of the chemical is held in the tussock.</p> <p>The normal spraying vehicle is a one tonne truck however a tractor may occasionally be used as it gives a higher point of observation. One limitation of spot spraying is the inability to see all tussocks. The paddock should be heavily grazed before spot spraying so that tussocks don’t hide.</p>
Boom spraying	<p>Boom spraying has been undertaken annually for 20 years. Boom spraying is done between October and March. All densities of <i>N. trichotoma</i> are targeted with this control. Task force is sprayed at sub-label rates in a rotation in which areas are sprayed every two to three years. Label rates are 2 L/Ha for mature tussock and 0.5 to 2L/Ha for seedlings. Rates used are 500-600mL/Ha on mature tussocks. These low rates are applied to infested areas every 2 to 3 years. The lower rates reduce the impact on non-target species.</p> <p>Herbicide is applied using a 1 tonne truck with 10 metre boom and tractor with 6 metre boom. The application of herbicide in this way results in a 99% kill of tussock within that season. The long term effectiveness of boom spraying is variable. In some areas where tussock has been present for many years as a very dense infestation the application of boom spraying on a 2-3 year rotation has resulted in a good initial kill of plants. However, in the next season the area is dominated by germinating tussock plants due to a lack of competition. After 2-3 years the area is sprayed again with the same result. After 10 years of this treatment there has only been a marginal increase in desirable species in these areas. The respondent suggests that the seed bank is substantial under these infestations and is the primary cause of continued infestation.</p>
Grazing management	<p>The grazing management program has changed due to drought conditions over the past 4 years. Prior to the drought stock were strategically grazed in large mobs over the 25 paddocks on the property. The aim of this program was to manage the pastures to increase competition. This more intensive grazing system had no effect on the extent or density of <i>N. trichotoma</i> infestations. Due to the drought the current situation is that mobs are grazed on many of these paddocks with pasture reduced to nearly bare ground. This has seen a dramatic increase in extent and density of <i>N. trichotoma</i> infestations over the past five years.</p>

Control	Details
Fertiliser application	The application of super phosphate fertiliser (70-75 tonne every two years) is perceived by the respondent to have favoured the <i>N. trichotoma</i> infestations with areas fertilised increasing in both extent and density. Current practice is to apply fertiliser with a direct drill when sowing oats with the aim to encourage the oats more than the tussock.
Chipping	Chipping is rarely practiced and only against very isolated individual plants. Chipping larger areas results in the generation of a seed bed which is frequently re-infested by <i>N. trichotoma</i> .
Integration	The integration of spot spraying and boom spraying across different types of infestations is apparent. The respondent suggests that grazing management, fertiliser application and their use in promoting competitive pastures has not been successful. The respondent admits that the lack of success is due to having to overgraze pastures in the drought to maintain productivity. Any benefit that might have been obtained through the integration of these controls has therefore been undone. At the moment the only control methods that appear to be properly applied are the application of herbicides.

**Appendix 14 SPSS out-put of statistical analysis of point quadrat, adjusted point quadrat and farmer estimations.**

Ranks				
		N	Mean Rank	Sum of Ranks
Broadleaf weed farmer - Broadleaf weed transect	Negative Ranks	7 <sup>a</sup>	4.93	34.50
	Positive Ranks	1 <sup>b</sup>	1.50	1.50
	Ties	0 <sup>c</sup>		
	Total	8		
Grass weed farmer - Grass weed transect	Negative Ranks	4 <sup>d</sup>	4.25	17.00
	Positive Ranks	2 <sup>e</sup>	2.00	4.00
	Ties	2 <sup>f</sup>		
	Total	8		

a. Broadleaf weed farmer < Broadleaf weed transect

b. Broadleaf weed farmer > Broadleaf weed transect

c. Broadleaf weed farmer = Broadleaf weed transect

d. Grass weed farmer < Grass weed transect

e. Grass weed farmer > Grass weed transect

f. Grass weed farmer = Grass weed transect

Test Statistics <sup>b</sup>		
	Broadleaf weed farmer - Broadleaf weed transect	Grass weed farmer - Grass weed transect
Z	-2.313 <sup>a</sup>	-1.363 <sup>a</sup>
Asymp. Sig. (2-tailed)	.021	.173
Exact Sig. (2-tailed)	.023	.219
Exact Sig. (1-tailed)	.012	.109
Point Probability	.008	.031

a. Based on positive ranks.

b. Wilcoxon Signed Ranks Test

### Ranks

		N	Mean Rank	Sum of Ranks
Broadleaf weed farmer - Broadleaf weed adj transect	Negative Ranks	2 <sup>a</sup>	4.75	9.50
	Positive Ranks	6 <sup>b</sup>	4.42	26.50
	Ties	0 <sup>c</sup>		
	Total	8		
Grass weed farmer - Grass weed adj transect	Negative Ranks	1 <sup>d</sup>	2.50	2.50
	Positive Ranks	3 <sup>e</sup>	2.50	7.50
	Ties	4 <sup>f</sup>		
	Total	8		

a. Broadleaf weed farmer < Broadleaf weed adj transect

b. Broadleaf weed farmer > Broadleaf weed adj transect

c. Broadleaf weed farmer = Broadleaf weed adj transect

d. Grass weed farmer < Grass weed adj transect

e. Grass weed farmer > Grass weed adj transect

f. Grass weed farmer = Grass weed adj transect

### Test Statistics <sup>b</sup>

	Broadleaf weed farmer - Broadleaf weed adj transect	Grass weed farmer - Grass weed adj transect
Z	-1.193 <sup>a</sup>	-.921 <sup>a</sup>
Asymp. Sig. (2-tailed)	.233	.357
Exact Sig. (2-tailed)	.273	.500
Exact Sig. (1-tailed)	.137	.250
Point Probability	.016	.125

a. Based on negative ranks.

b. Wilcoxon Signed Ranks Test