Upper North Farming Systems

Stubble Management Guidelines

Flaxleaf fleabane

Flaxleaf fleabane is emerging as a challenging weed in no-till stubble retention cropping systems. Photo: Ruth Sommerville, UNFS

Key facts

- Recent changes to farming systems, primarily the widespread use of chemicals for summer weed control, has seen Flaxleaf fleabane (*Conyza bomaniensis*) become more prolific in no-till stubble retention (NTSR) systems across South Australia.
- Young (one month or less) plants can be easily controlled with herbicides but when plants have developed strong root systems, chemical control becomes more difficult.
- Effective broadacre control of fleabane requires an integrated weed management (IWM) approach, using chemical and non-chemical control techniques such as grazing or strategic cultivation.

Flaxleaf fleabane (*Conyza bomaniensis*) has been a problem weed across Queensland and northern New South Wales cropping regions for many years, but has only recently emerged as a difficult-to-control weed in South Australia and Victoria.

Fleabane is a surface-germinating weed previously controlled by a combination of cultivation, sulfonylurea (SU) herbicides and grazing, but is emerging as a major challenge in no-till stubble retention (NTSR) farming systems. It has been present in many areas of SA as a summer weed along roadsides and around yards, but has not caused problems in cropping paddocks until recently.

Individual fleabane plants can produce up to 120,000 small, light-weight seeds, which can be dispersed by strong winds with about one per cent of seed travelling 10km or more. Managing seed levels can be difficult as neighbouring paddocks, roadsides and non-arable areas can be a continual source of new infestation.

Fleabane thrives in NTSR farming systems as the seeds are not deeply incorporated, with most seeds germinating from the top 1cm of soil. Fleabane emerges when air temperatures are between 10–30^{0}C, with optimal temperatures between 20–25^{0}C. Provided there is adequate moisture, plants will germinate in crops and pastures from late August through to November.

Controlling fleabane during the summer fallow is important for conserving soil moisture. Research in SA has proven that effective fleabane control during summer can result in significant soil moisture being retained for following crops (Figure 1).

Project information

This Flaxleaf fleabane management guideline has been developed for the Upper North Farming Systems Group (UNFS) as part of the Maintaining Profitable Farming Systems with Retained Stubble Initiative, funded by the Grains Research and Development Corporation (GRDC UNF00002).

The Stubble Initiative involves farming systems groups in Victoria, South Australia and southern and central New South Wales, collaborating with research organisations and agribusiness, to address challenges associated with stubble retention.

The GRDC, on behalf of growers and the Australian Government, is investing $17.5 million in the initiative that has been instigated by the GRDC Southern Regional Panel and the four Regional Cropping Solutions Networks that support the panel.

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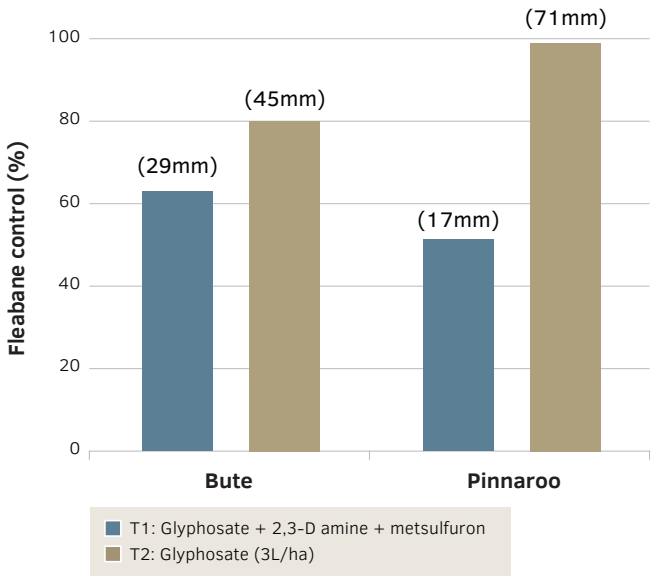
Figure 1. The effect of fleabane control on residual soil moisture



Note: *Fleabane control as a percentage at each site (Bute and Pinnaroo) is displayed in the columns, with saved soil moisture shown in brackets at the top of each column. Soil moisture was measured to a depth of 1.2m.*

Source: Fleet B and Gill G, (2013) Fleabane ecology and control in cropping systems of southern Australia, University of Adelaide, GRDC Adviser Update

Integrated approach critical to control

While fleabane presents a serious and costly weed challenge, GRDC-funded research has shown that a strategic approach using integrated weed management (IWM) can significantly reduce the weed's impact on crop production.

Fleabane has a natural tolerance to the uptake of herbicides due to fine, dense hairs on the leaf surface and a thick cuticle (leaf surface). Populations of fleabane resistant to glyphosate have been found in SA, NSW and Queensland, earning fleabane the title of Australia's first glyphosate-resistant broadleaf weed.

When treated early (one month old or younger) glyphosate can control susceptible fleabane plants. When mature however, the weed is difficult to control with glyphosate, regardless of its resistance status (Figure 2).

Individual fleabane plants can produce up to 120,000 small, lightweight seeds. Photo: Ruth Sommerville, UNFS

Control is often made more difficult as plants are sprayed post-harvest during summer, when they are well established and spray conditions are often sub-optimal.

University of Queensland researcher Dr Steve Walker says the key to getting on top of fleabane is to attack all parts of the weed's life cycle to keep the seedbank low. Adopting an IWM strategy, which includes chemical and non-chemical tactics, will result in substantially fewer fleabane problems and dwindling resistant populations in subsequent seasons.

Pre-harvest chemical control options

A range of pre-emergent and in-crop products can help control earlier-emerging fleabane plants. Based on experience from Northern NSW, pre-emergent herbicides such as trisulfuron (e.g. Logran®), metribuzin, simazine, terbuthylazine (Terbyne®), and isoxaflutole (Balance®) all have some activity on fleabane. In-crop applications of 2,4-D amine, metsulfuron (e.g. Ally®) and clopyralid (e.g. Lontrel®) are effective in controlling newly-emerged and younger fleabane plants.

Post-harvest chemical control options

Most research to date has focussed on fleabane control during summer, after the crop has been harvested and fleabane plants have started to elongate. At this stage fleabane has a well-developed root system and as it progresses towards maturity it becomes more difficult to control with herbicides.

Figure 2. Fleabane becomes increasingly difficult to control with herbicides as the plant matures

Cotyledons hairless, spear-shaped, bluish-green in colour.

Best control stage

First seedling leaves almost round and hairy. Later leaves oval with toothed margins.

Best control stage

Flowers in a terminal pyramid-shaped cluster with white to pale pink hairs.

Difficult stage to control

Mature plants hairy, often branched at the base and up to 70cm high

Difficult stage to control

TABLE 1. Herbicide efficacy on fleabane at Bute and Pinnaroo, summer 2012

Herbicide treatment	Fleabane control (%)	
	First knock	Second knock
Untreated	0	36
Glyphosate (570g/L) @ 1L/ha	30	54
Glyphosate (570g/L) @ 2L/ha	55	82
Glyphosate (570g/L) @ 3L/ha	89	95
Glyphosate (570g/L) @ 4L/ha*	93	97
Glyphosate (570g/L) @ 1L/ha + 2,4-D amine (700g/L) @ 1.1L/ha	50	87
Glyphosate (570g/L) @ 1L/ha + 2,4-D amine (700g/L) @ 1.1L/ha	50	84**
Glyphosate (570g/L) @ 1L/ha + metsulfuron (600g/kg) @ 5g/ha	50	73
Glyphosate (570g/L) @ 1L/ha + 2,4-D amine (700g/L) @ 1.1L/ha + metsulfuron (600g/kg) @ 5g/ha	57	91
Glyphosate (570g/L) @ 1L/ha + 2,4-D amitrol (250g/L) @ 2.8L/ha	63	80
Glyphosate (570g/L) @ 1L/ha + 2,4-D dicamba (500g/L) @ 0.5L/ha	46	69
Glyphosate (570g/L) @ 1L/ha + 2,4-D dicamba (500g/L) @ 1L/ha	58	91
Glyphosate (570g/L) @ 1L/ha + 2,4-D carfentrazone (400g/L) @ 45mL/ha	32	53
Glyphosate (570g/L) @ 1L/ha + 2,4-D saflufenacil (700g/L) @ 18g/ha***	29	45
Glyphosate (570g/L) @ 1L/ha + 2,4-D amine & picloram (300g/L & 75g/L) @ 0.7L/ha	50	97
Glyphosate (570g/L) @ 1L/ha + clopyralid (300g/L) @ 0.3L/ha	42	69
P<0.001 LSD = 10.934		

Second knock herbicide application was paraquat (250g/L) @ 2.4L/ha. The surfactant LI700 @ 300mL/ha was used with all herbicide treatments except weher indicated.

** Only at Bute site*

*** Second knock was fluroxypyr (400g) @ 400mL/ha*

**** Bonza surfactant used instead of LI700.*

The above treatments are for research purposes and some may not be registered.

Final assessments (April 2012) on % control for main herbicide treatment alone (first knock), and with the addition of a subsequent paraquat application (plus second knock). Data was pooled from the sites. Bute site: knife roller 11 January 2012, first knock 12 January 2012, second knock 9 February 2012. Pinaroo sites: knife roller and first knock 1 February 2012, second knock 1 February 2012.

Source: Fleet B and Gill G, (2013) Fleabane ecology and control in cropping systems of southern Australia, University of Adelaide, GRDC Adviser Update

Note: *Some common product names for chemistry used in these trials.*

Metsulfuron	e.g. Ally™
Amitrole	e.g. Amitrole®
Carfentrazone	e.g. Hammer®
Saflufenacil	e.g. Sharpen®
Clopyralid	e.g. Lontrel®
Picloram	e.g. Tordon™ 75-D
Fluroxypyr	e.g. Starane®

A range of herbicide options for fleabane control during summer are shown in Table 1.

In this study, high rates of glyphosate (3–4L/ha) provided excellent control even when a second knock was not implemented. However, using glyphosate alone may be a short-lived strategy, as resistant populations of fleabane continue to emerge.

These trials showed that fleabane control was significantly better where a second knock of paraquat was applied, particularly when the first herbicide application provided at least 50 per cent control or better.

Achieving 100 per cent control with herbicides during summer can be expensive. Spray grazing or the use of precision spray technologies (i.e. WeedSeeker™ or WEEDit™ systems) will help reduce herbicide costs.

Non-chemical control options

Crop competition

» As a seedling, fleabane is a poor competitor. Increased crop competition from cereals using higher sowing rates and narrow row spacings can suppress growth and weed seed production.

Strategic tillage

» Strategic soil disturbance is an effective option to control fleabane in areas of high infestation or going into a crop with limited in-crop control options.

Grazing

» Grazing and spray grazing are effective tools to control fleabane as the plant is palatable to both sheep and cattle.

Integrated approach offers effective fleabane control

Barry Mudge, Port Germein

Fleabane has become an important summer weed on the sandy-loam cropping soils north of Port Pirie, where the storage of out-of season-moisture through effective summer weed control is given the highest priority.

According to Barry, fleabane is one of a number of weeds that are becoming increasingly difficult to control by conventional (chemical) means alone.

The Mudge Family has found a combination of grazing (fleabane is quite palatable to stock), chemical control and, as a last resort, the use of low-disturbance chisel sweeps or a blade plough will give effective control.

Barry has found glyphosate-based sprays, even at rates of up to 4L/ha to be fairly ineffective against fleabane. He also suggests it is essential to follow-up with a second knock of paraquat, one week to 10 days after the initial glyphosate application, which can become an expensive exercise.

Fleabane infestations on roadsides have contributed to the burgeoning weed seedbank across much of SA's cropping areas. Photo: Andrew Storrie, Agronomo Consulting

In fleabane-susceptible paddocks, Barry recommends maintaining high levels of surface cover to allow integrated weed control measures to be implemented without risking soil erosion.

Further information

- GRDC website: https://grdc.com.au/Resources/IWMhub/Section-8-Profiles-of-common-weeds-of-cropping/Flaxleaf-Fleabane
- Barry Haskins on fleabane: https://www.youtube.com/watch?v=YYgZKzNeOIc
- (www.qaafi.uq.edu.au/content/Documents/weeds/IWM-Fleabane-guide.pdf)

Acknowledgements

This guideline was developed with data from the GRDC-funded *Profitable crop sequencing in the low rainfall areas of South Eastern Australia* project (DAS00119), in collaboration with: Michael Wurst (Rural Solutions), Ruth Sommerville (Rufous and Co), Nigel Wilhelm (SARDI), Matt McCallum (McAg Consulting), Barry Mudge and Patrick Redden (Rural Directions), Andrew Walter, Joe Koch and Matt Foulis.

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