



Reducing barley grass in crops and pastures

Background

All non-pasture plants growing within a pasture are competing with the pasture species for moisture, nutrients and sunlight, weakening the growth of the pasture, reducing its potential yield and lowering its feed value (Bickford, 1991).

Barley grass is a non-pasture species that has appeared to be increasingly prevalent in recent years across the Murray Dairy region.

Barley grass is an annual species renowned for rapidly germinating in autumn to provide valuable stock feed soon after breaking rain (or irrigation). Small barley grass seedlings can be identified by looking for remnants of the seed which can often be found attached to the root system (Moore et al).

Barley grass invades pastures, particularly when a considerable amount of nitrogen has accumulated in the soil as a result of rhizobial activity on clover roots. In the clover-ley system of farming developed for wheat growing in the high rainfall belt, this invasion is suggested as an indicator that the time is right to “cash in” on this nitrogen by growing a number of cereal crops. In north-eastern Victoria for example, the time taken for this to happen is about seven years (Lamp et al, 1991).

Factors which make barley grass a major weed for the dairy industry

Barley grass is less productive than other cultivated pasture species

While barley grass can provide a bulk of highly nutritious feed in early autumn and winter during its vegetative stage, the plant is

early maturing which limits the total potential dry matter yield produced. As such it is rarely cultivated for pasture production (Tamar Valley Weed Strategy).

Barley grass seed causes stock health problems

The awned seeds are a problem in pasture, hay and silage where they have the potential to cause trouble to grazing stock particularly to the mouth, nostrils and eyes (Lamp et al, 1991).

Post-emergent herbicide is limited in cereals

There is a limited range of post-emergent herbicides available for the control of barley grass in wheat and other cereals.

Barley grass is readily dispersed

It can be carried on animals and fabric and is a common contaminant of hay and grain feeds.

Barley grass populations can develop resistance to herbicides

There have been reports of barley grass being resistant to paraquat and diquat and to several Group A “fop” herbicides. Some populations have cross resistance to the Group A “dim” herbicides (Moore et al).

Barley grass tends to be more dominant in the winter rainfall areas. Barley grass flourishes on a wide range of soil types, particularly on lightly grazed, fertile, ley pasture paddocks. Without intervention, barley grass tends to build up as fertility increases. While low grazing pressure leads to increased density, high stocking rates can be used to reduce levels of the weed in a pasture (Moore et al).



Seasonal conditions that favour barley grass

Increasing soil fertility is a commonly recognised factor favouring barley grass, as can be seen in animal camp areas. It is favoured by bare soil areas such as those in thinning lucerne stands. In fact, barley grass has been shown to establish on a bare surface more rapidly than annual ryegrass. While stock will enthusiastically graze the weed in its vegetative phase, under low grazing pressure they will avoid it almost completely once floral stages begin. Therefore in good spring conditions, barley grass can produce large amounts of seed (Moore et al).

Conditions that favour germination and establishment

Barley grass will germinate at a wide range of temperatures (7–32°C) although its optimum range is 10–15°C. The seeds germinate more rapidly in response to autumn rain than other grasses (such as ryegrass species) and are able to establish before the soil surface dries out. Slightly saline conditions favour establishment mainly because barley grass has a greater tolerance to higher osmotic potentials at germination than most other pasture species. It has low level of hard seed and most of the seed formed in the spring will germinate in the following autumn. Since a very high proportion of barley grass will germinate on the autumn break, it is unusual for further significant germinations during the year.

Seed survival in the soil

There is no evidence indicating that barley grass produces much hard seed, and little if any long-term dormancy has been observed in this species. Over 99% of seeds germinate in the first year after seed-set. Where activities such as pasture spray-topping are correctly timed, field observations indicate that barley grass control (as evidenced by autumn germinations) will be very high (Moore et al).

Control

A table outlining the tactics that should be considered as part of an integrated plan to manage barley grass is included on page 4.

The table outlines the three control methods for barley grass which involve cropping and cultivation, grazing management and the use of herbicides. These control methods can be used either individually or in conjunction with each other.

Cultivation of infested areas followed by a cropping phase that permits the use of selective herbicides that are registered to be used on barley grass has a high potential of eradicating barley grass.

Grazing management will not eradicate barley grass, however if used correctly, it may reduce seed production. Close grazing when plants are young plus mowing in late spring is useful in limiting seed formation. Do not overgraze, as this may allow barley grass to proliferate.

Several herbicides are registered for barley grass, including glyphosate and paraquat (Tamar Valley Weed Strategy). Herbicides can be used in a cropping phase to control barley grass or in the pasture phase the nuisance value of seed heads can be reduced, by spray topping (Lamp et al, 1991). Contact your local herbicide reseller for further information on which herbicide may be appropriate for your situation.

An integrated plan to control barley grass

Obtain advice from an Agronomist in relation to the most appropriate mix of the three control methods for the various areas of your farm that are infested with barley grass. This is important because the methods used to control barley grass potentially have different levels of success and also have different costs and levels of risk.

Some of the options that Agronomists are discussing with dairy farmers are outlined on the following page.

1. Areas that have high concentration of barley grass

- a. Areas that were heavily infested with barley grass last spring could be pre irrigated in autumn with the aim of germinating the barley grass seed, the germinated weeds can be sprayed using a knockdown (non selective) herbicide at the 2 to 4 leaf stage and then sown to the preferred pasture or crop type.

This option is likely to give good control but there are risks including:

- ▶ the barley grass may not germinate when irrigated (as may occur in hot weather).
- ▶ if sprayed too early after irrigation a lower proportion of the barley grass will have germinated and as such will not be killed.
- ▶ considering the cost of irrigation water and the cost of spraying this option may have high costs.

- b. Areas that were heavily infested with barley grass last spring could be sown to crops that allow the use of post emergent herbicides (annual clovers such as sub or shaftal, lucerne or wheat), irrigated (or germinated with rain) and the germinated weeds can be sprayed out of the pasture or crop using an appropriate post emergent herbicide.

This option is likely to give good control but there are risks including:

- ▶ reduction in the yield of the pasture if sowing only annual clover pastures compared to sowing a pasture of annual ryegrass and annual clover.

2. Areas that have a low to moderate concentration of barley grass

- a. Areas that had a low to moderate infestation with barley grass last spring could be sown this autumn and managed to allow a spray topping program to be implemented in late winter or early spring prior to the emergence of seed heads.

This option is likely to give good control but there are risks including:

- ▶ not being able to apply herbicide at the critical time due to adverse conditions (wind/rain).

- b. Areas that had a low to moderate infestation with barley grass last spring could be sown this autumn and managed so that an early cut of silage is taken prior to the emergence of seed heads and any residues are sprayed with an appropriate herbicide.

This option is likely to give good control but there are risks including:

- ▶ not being able to harvest the silage at the critical time due to rain.
- ▶ not being able to apply the herbicide on the residue at the critical time due to adverse conditions (wind/rain).
- ▶ reduction in the yield of the pasture by ending the growing season in late winter or early spring.

3. Areas that have a low to high concentration of barley grass

- a. Areas that had a low to high infestation with barley grass last spring and that need to be deep cultivated (as may occur in the land forming process)

This option is likely to give good control but there are risks including:

- ▶ the cost of landforming.
- ▶ not burying the barley grass seed deep enough as part of the process to prevent germination.

References

- Bickford, R.N.S. (1995). Pasture Management. Inkata Press.
Lamp, C. and Collet, F. (1996). Field guide to weeds in Australia. Inkata Press.
Lamp, C.A., Forbes, S.J. and Cade, J.W. (2001). Grasses of temperate Australia: a field guide. CH Jerram Science Publishers.
Moore, J., Sutherland, S. and Verbeek, B. www.agric.wa.gov.au
Tamar Valley Weed Strategy. www.weeds.asn.au

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Tactics that should be considered when developing an integrated plan to manage barley grass

		Most likely % control (range)	Comments on use
Agronomy 1	Crop choice and sequence	85 (0–95)	Avoid planting barley in infested areas.
Agronomy 2	Herbicide tolerant crops	80 (40–95)	Triazines and imidazolinone herbicides provide useful control in triazine- and imidazolinone-tolerant crops respectively. Contact your local herbicide reseller for further information.
Tactic 1.1	Burning residues	50 (0–75)	Dropping chaff and straw into windrows improves control.
Tactic 1.2	Inversion ploughing	90 (70–99)	Use skimmers to ensure deep burial.
Tactic 1.3	Delayed sowing	60 (30–80)	Level of control depends on autumn break. Use in combination with Tactic 2.2a.
Tactic 2.1	Fallow and pre sowing cultivation sowing	50 (30–80)	Requires dry weather following cultivation.
Tactic 2.2a	Knockdown (non-selective) herbicides for fallow and pre-sowing control	80 (50–90)	Works best is delayed until the 2–4 leaf stage after good opening rains. Contact your local herbicide reseller for further information.
Tactic 2.2b	Double knockdown	80–(60–95)	Works best is delayed until the 2–4 leaf stage after good opening rains. Contact your local herbicide reseller for further information.
Tactic 2.2c	Pre-emergent herbicides	80 (75–90)	Sulfosulfuron provides good control in wheat. Contact your local herbicide reseller for further information.
Tactic 2.2d	Selective post-emergent herbicides	90 (80–95)	Several “fop” herbicides provide good control in broadleaf crops. Sulfosulfuron provides good control in wheat. Contact your local herbicide reseller for further information.
Tactic 3.1	Pasture spray-topping	60 (50–90)	Graze heavily to induce more uniform emergence of heads. Timing is critical. Graze or spray regrowth. Contact your local herbicide reseller for further information.
Tactic 3.2	Silage and hay crops and pastures	50 (30–80)	Silage provides better control than hay making. Graze or spray regrowth. Contact your local herbicide reseller for further information.
Tactic 3.3	Renovation crops and pastures—green manuring, brown manuring, mulching and hay freezing	75 (50–90)	Graze heavily to induce more uniform emergence of heads. Timing is critical. Graze or spray regrowth. Contact your local herbicide reseller for further information.
Tactic 3.4	Grazing—actively managing weeds in pastures	30 (0–50)	Use high stocking rates early in the season to reduce numbers, and late in the season to reduce seed-set on infested paddocks.

(Moore et al).