

MANAGING GLYPHOSATE RESISTANT LIVERSEED GRASS IN NORTHERN NSW

CASE STUDY

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10. Case Study

10.1 Management of glyphosate resistant liverseed grass in northern NSW

10.2 Introduction

A Pallamallawa farmer and his agronomist noticed a suspect patch of liverseed grass in the summer of 2007/08. Plants were immediately sent for resistance testing using the Quick test[®] and resistance to glyphosate was confirmed. Since being confirmed as resistant to glyphosate, the farmer has been unrelenting in his efforts to control the small patch (<1 ha) of liverseed grass.

The farmer and his father had been managing the property for 13 years and the previous owner, a cattleman, did not consider weed control as a high priority. This suggests that the glyphosate resistance developed after 13 years of intensive selection pressure.

10.3 Property characteristics

A 600ha farm, located at Pallamallawa, east of Moree, in New South Wales was acquired by the current owner in 1998. Approximately 10 paddocks are used in a barley – chickpea – wheat – long fallow – summer crop rotation. Three centre pivot irrigators are used for high value crop production.

Summary

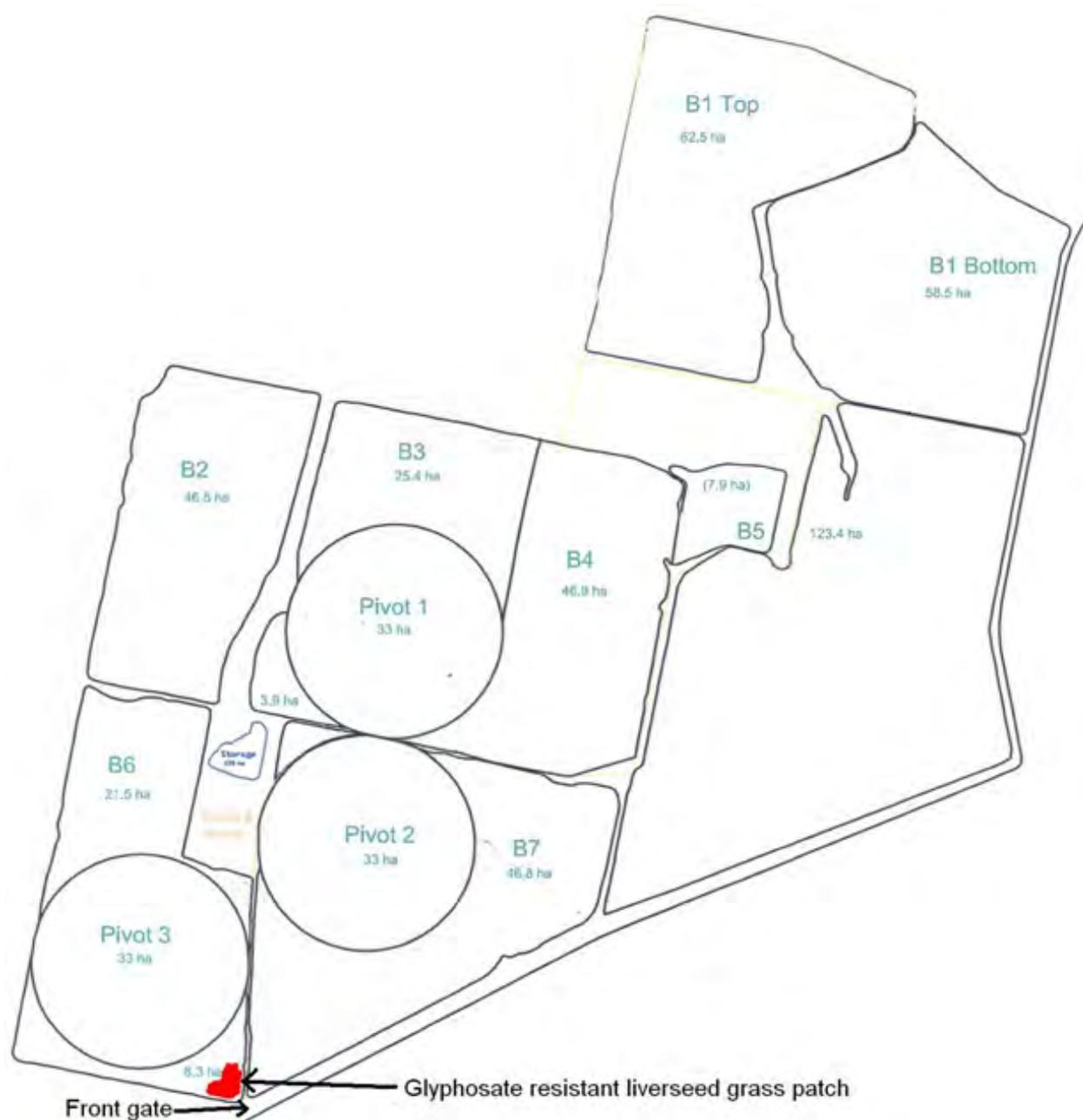
- ◆ Location: Moree Plains Shire, northern grain belt, New South Wales
- ◆ Rainfall: summer dominant, 620mm average annual rainfall
- ◆ Soil type: red clay loam
- ◆ Enterprises: predominantly winter cereals and chickpeas with a third of the property sown to cotton and sorghum
- ◆ Major weed problems: liverseed grass, wild oats, wild radish in small patches
- ◆ Herbicide resistance status: liverseed grass resistant to glyphosate
- ◆ Results of management program: early detection of the problem and continuous control of survivors using alternative tactics, patch management of the infestation with regular monitoring, the farm is profitable with minimal additional control costs while the affected area remains small

Problems and History

A suspect patch was first identified by the farmer's agronomist in January 2008. Live plants were promptly sent for resistance testing and the results confirmed a moderate 7-fold resistance to glyphosate. The farmer believes resistance had evolved from the heavy reliance on glyphosate and ineffective levels of control achieved with cultivation (not full disturbance).

Prior to the purchase in 1998, the previous owner managed the land for cattle production and grass weed management was not a high priority. Both liverseed grass and barnyard grass were seen as good stock feed. This meant that these weeds were at high densities when the current owner purchased the property.

Figure 31: Property plan showing the small area affected by glyphosate resistant liverseed grass (Tony Cook).



10.4 Management program

Since the original size of the infestation was very small (approximately 1 ha), the grower's intention was to reduce the infestation dramatically in size to achieve full eradication. As the infestation covered only a small proportion of the paddock, management strategies were targeted to that patch and not applied to the whole paddock.

The farmer's agronomist recommended changing herbicide mode of actions, increasing the frequency and effectiveness of cultivation and using the double knock technique. Occasionally the farmer still used glyphosate at maximum label rate, particularly as the first knock in the double knock.

Figure 32: The area in the foreground was infested with glyphosate resistant liverseed grass and is now cropped with winter cereal for brown manuring. The biomass from this crop will not be disturbed by cultivation and provide a good mulch to reduce germination of liverseed grass from October to December. Centre pivot irrigator the in background. (Tony Cook)



The newly adopted methods for the control for liverseed grass are:

- ◆ Flame® (Group B) as a fallow pre-emergence treatment early in the summer fallow;
- ◆ Double knock 1 - Applying a Group A herbicide followed by a bipyridyl herbicide (Group L) 5-7 days after the Group A herbicide;
- ◆ Double knock 2 - applying maximum label rates of glyphosate followed by a bipyridyl herbicide (Group L);
- ◆ Double cultivation with wide sweep points to ensure full disturbance, followed by monitoring to ensure 100% kill; and
- ◆ Brown manuring winter cereals using the decaying biomass as a mulch to reduce liverseed grass establishment.

Results

Initial infestations were small clumps of the weed distributed over about 1 ha. Today, after three years of focused management, an occasional liverseed grass plant can still be found. The farmer is confident that a few more years of this management may eradicate the remainder of the resistant liverseed grass.

The impact of glyphosate resistance on this farm as a whole has been low due to the small size of the infestation. The problem was identified and acted upon early, so management changes were only required on a small area (less than 1% of the farm). Economic losses due to the required management change were minimal and, provided this approach to resistance management is maintained, future costs should remain minor.

The benefit of focussing on the infested area only, is that normal crop rotations and management are largely conserved. Without the early intervention, resistant liverseed grass infestations would have become more widespread and reduced the moisture conservation in fallows which would have led to a decrease in the subsequent crop yield.

A notable change in the farmer's attitude towards weed management was seen, with two key changes being the increased level of post-treatment monitoring and the adoption of non-glyphosate tactics.

Challenges

No challenges arose after glyphosate resistance was confirmed, because the farmer had no 'mind-set' limitations to what had to be done. There was no hesitation to use cultivation or applying Group L herbicides. Planning and timely management enabled these tactics to be integrated into the farming system.

Although the original infestation was confined to a small part of the farm, new infestations could have spread to other areas. The farmer actively monitored surrounding areas and likely corridors of spread, such as verges of farm roads.

Conclusions

This case study highlights the importance of early detection, herbicide resistance testing and focused weed management and monitoring. The implementation of effective management was easy as the farmer had the confidence to change.

This glyphosate resistance case study is unusual due to the fact that the farmer acted early and reduced the infestation to a level where eradication is possible.

Key learning outcomes from this case study are:

- ◆ Focus on 100% control of seed set for problem weeds;
- ◆ Monitor treatment performance;
- ◆ Be prepared to make management changes early;
- ◆ Make weed management a high priority on the farm;
- ◆ Vary the control tactics;
- ◆ Be flexible to implement patch management of weeds;
- ◆ Use resistance testing services; and
- ◆ Always seek professional advice.

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