Assessing the Efficiency of Fast Blast® in Eliminating Fleabane and Preventing its Regrowth

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Weed control is an important aspect of any agricultural production system, as weeds compete with the primary crop for water, light and nutrients resulting in a negative impact on the yield of the primary crop grown. Fleabane (*Erigeron bonariensis*) is a surface germinating weed that is difficult to control with herbicides as it is more tolerant to glyphosate than other annual weeds (Walker et al., 2012). It is also hard to control as its tough woody nature and hairy leaves makes herbicide coverage difficult (Fleabane, 2021). In developing orchards, weed control is essential to allow newly planted and established trees access optimal water, nutrients and light to enhance the growth and yield. Due to Fleabanes difficult to control nature, it can be hard to control and therefore integrated weed management is advised for effective weed control. Fast Blast® is a product produced by Dual Chelate Fertiliser Pty Ltd which is a formulation designed to increase plant uptake of both foliar and soil applied products through biologically active mechanisms. Fast Blast® was used in conjunction with a number of foliar herbicides to help control the population and regrowth of Fleabane in a developing almond orchard. It was found that applications of herbicide with Fast Blast® did not completely knock down the larger, established Fleabane, however there was less regrowth on established Fleabane plants and complete kills on the smaller Fleabane plants. There was also better knock down on other annual weeds such as grasses, Patty Melon and Wild Sage compared to the control.

Key Words: Fleabane, weed control, Fast Blast®, herbicides, glyphosate

Introduction

Fleabane is a common weed that competes with productive crops for water, nutrients and sunlight. One of the hardest weeds to control is Fleabane which causes loss in income, especially in broadacre cropping and also increase expenses due to more money spent on herbicides and spraying related costs. Fleabane is had to control due to its strong root system which is able to survive harsh summers with little water, hairy leaf surfaces, thick cuticle and few stomata (Summer weeds, 2021). Together, these characteristics of Fleabane produce some natural tolerance to herbicides. Fleabane also has staggered germination throughout spring and summer making it even harder to control (Fleabane, 2021). Therefore, for the best herbicide uptake the Fleabane plants need to be sprayed when they are young (rosette stage) before stem elongation happens. If not, a higher dose of herbicide is likely required to achieve better knock off rates.

Due to Fleabanes natural tolerance to herbicides, glyphosate resistance has been identified in Flaxleaf Fleabane meaning that although glyphosate has provided decent control in Fleabane in the past, increased resistance will result in more applications at higher rates with less effectiveness (Walker et al., 2012). Therefore, different herbicide groups with alterative active ingredients are recommended to achieve a higher percentage of knock off.

Therefore, new methods of weed control need to be considered to improve knock down rates in Fleabane.

Dual Chelate Fertilizer Pty Ltd has developed a patented product called Fast Blast®. Fast Blast® is a product formulated to increase plant uptake of both foliar and soil applied products through biologically active mechanisms. Fast Blast® contains 32.8% Biologically Active Organic Molecules (BAOM), 48.2% Organically Derived Amino Acids and 8.2% other Organic Acids. As Fast Blast® contains a multitude of organic molecules, amino acids and bio-stimulants, the Fleabane's stimulate the physiological functions of weeds during the herbicide application (if used in combination with herbicides). These stimulants aid in better absorption of weedicides, and thereby effective weed control.

This study aimed to assess the efficiency of Fast Blast® and herbicide mix at knocking down Fleabane in an almond orchard and to also reduce the regrowth of Fleabane plants compared to using herbicides alone. Other weeds such as grasses, Patty Melon and Wild Sage were also monitored to assess knock down.

Glyphosate 450® (non-selective systemic herbicide) and Basta® (non-selective partially systemic) were used in conjunction with wilt as the primary control herbicide mix with Fast Blast® added to make the treated mix.

Objectives

The specific objectives of this study were:

1. To assess the knock down of young and established Fleabane plants.
2. To determine how much regrowth appears in treated and control Fleabane plants.
3. To examine knock down of other weeds such as grasses, wild sage and patty melon.

Materials and Methods

Site Selection and Trial Design

This trial was conducted in the Mallee region of Victoria in a developing almond orchard. A block free from recent herbicide applications was selected by the farm manager and agronomist based on the severity of Fleabane weeds.

Once the block was selected, herbicide spraying commenced with a trailed herbicide sprayer for the under tree and mid-row weed management. One half on the block was treated with the designated herbicide mix alone (Control), and the other half was treated with the designated herbicide mix + Fast Blast® (Treated). The table below shows the herbicide application and associated rates.

Table 1: Herbicide application spray rates. Once Fast Blast® was added into the tank mix, the tank was agitated for 10 minutes.

3500L Water	Control Tank Mix
20L Glyphosate 450	
40L Basta	
10L Wilt 700	
1500L of control mix sprayed out – 2000L of tank mix left	
Added 4L of Fast Blast®	Treated Tank Mix

Once 1500L of the herbicide mix was sprayed out, Fast Blast® was added (2ml/L) and agitated for 10 minutes. Spraying then commenced again.

Assessing knock-off of Fleabane

Due to the inconsistence fleabane growth in the block. It was difficult to find similar looking Fleabane plants to compare between the control and treated areas. Therefore, random Fleabane plants were selected in both the treated and control areas of the block with different levels of growth. These plants were tagged with pink flagging tape and the row number they were located on.

Images were taken of individual Fleabane plants just before the herbicide application, 9 days after the application and again 14 days after the application to assess the regrowth of the Fleabane plants. The images were then compared to the control and conclusions were made.

Results

The following images show the comparison between selected Fleabane plants. Some other weeds such as Patty Melon, Wild Sage and other grasses were also photographed to highlight the better knock- off rates with the use of Fast Blast® instead of the control.

3/2/21 (Date of Application)	12/2/21	26/2/21

228 – Control 1
Fleabane

Figure 1: Fleabane plant treated with normal herbicide mix with no additions of Fast Blast®.

228 – Control 2
Fleabane

Figure 2: Fleabane plant treated with normal herbicide mix with no additions of Fast Blast®.

3/2/21 (Date of Application)	12/2/21	26/2/21

234 – Treated 1
Fleabane

Figure 3: Fleabane plant treated with normal herbicide mix with and Fast Blast® (2ml/L).

234 – Treated 2
Fleabane

Figure 4: Fleabane plant treated with normal herbicide mix with and Fast Blast® (2ml/L).

3/2/21 (Date of Application)	12/2/21	26/2/21

234 – Treated 3
Fleabane

Figure 5: Fleabane plant treated with normal herbicide mix with and Fast Blast® (2ml/L).

9 Days After Application – 12/2/21

Control – Grass, Wild Sage

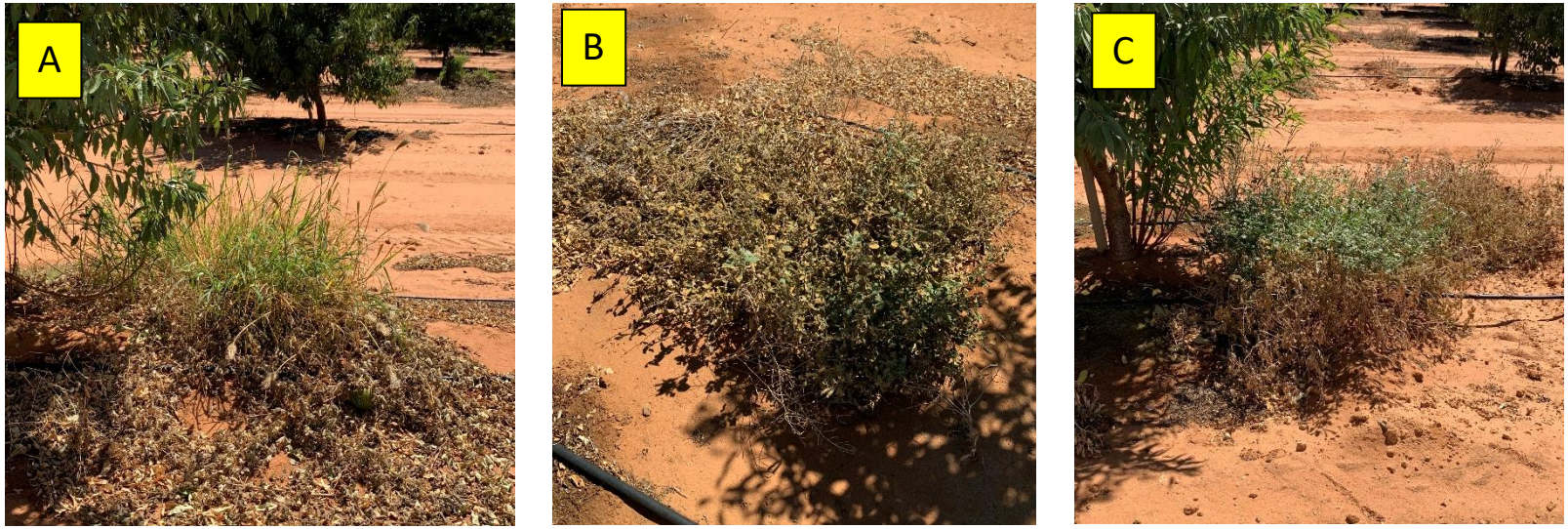

Figure 6: Other weeds noted in the almond orchard which were only treated with the control herbicide mix containing no Fast Blast®. A – Grass, B Wild sage, C Wild Sage.

Treated – Paddy Melon

Figure 7: Paddy Melon treated with the normal herbicide mix with the addition of 2ml/L of Fast Blast®. Image taken 9 days after herbicide application.

Discussion

On the 03/03/21, the selected block was split into 2 sections where the first section was sprayed with a normal herbicide mix containing Glyphosate 450 (systemic), Basta (partial systemic) and Wilt 700 and then the other section was sprayed with the same herbicide mix with the addition of 2ml/L of Fast Blast®. For more details on application rates, refer to table 1.

The herbicide was sprayed using a commercial 4000L trailed herbicide sprayer designed for the almond orchards to target weeds under the almond trees and also in the mid rows. The weather conditions were 30.2 degrees Celsius, 0mm of rain and a maximum wind speed of 7km/hr which is ideal conditions for herbicide spraying.

Before the weeds were sprayed in this particular block, a row from the control and a row from the treated blocks was selected and images of weeds were taken to track knock off efficiency and also to assess regrowth so periodic photos of the weeds could be taken and compared. The main weed which was being targeted was Fleabane as this weed is notoriously hard to knock off completely due to its woody nature and hairy leaves.

Images were taken 9 days after application to allow the herbicides to potentially knock off the weeds and again 23 days after application to analyze regrowth patterns.

Analyzing Control Herbicide Mix

Figure 1 shows a Fleabane plant which has been previously affected by herbicides as seen by the patrial dead stems. After the application of the control herbicide mix, after 9 days majority of the Fleabane plant had died, however there was still a small amount of green low down at the base of the plant. After 23 days, regrowth occurred on half of the plant with increased vertical growth. This regrowth is most likely caused by the nature of the plant due to its hairy leaves, woody stems and long establishment. Although both herbicides used – Glyphosate 450 and Basta, have systemic properties, this still was not enough to completely knock down the plant.

Figure 2 shows a Fleabane plant that is not as dense and more spread out in comparison to figure 1. 9 days after the control herbicide application, there was a complete knock off and after 23 days it was confirmed that there was also no regrowth. Therefore, it can be concluded that Fleabane weeds which are not well established with low densities produces a better knock off in comparison to well established plants which are more dense.

Analysing Fast Blast® Herbicide Mix

Figure 3 shows an established Fleabane plant that has also been previously sprayed with herbicide but experienced regrowth. 9 days after the application of the herbicide and Fast Blast®, there was significant knock off of the Fleabane plant, however after 23 days, regrowth occurred again. When studying the image of the Fleabane plant 23 days after the herbicide + Fast Blast® application, there is regrowth, however it is not as significant as the regrowth seen in figure 1 (control herbicide mix). With additions of Fast Blast® there is less vertical growth and less regrowth overall compared to figure 1's regrowth which did not have Fast Blast®. This is because the Fast Blast® used in conjunction with the herbicide improves the systemic nature of the products which increases the movement of the herbicide active ingredients throughout the plant system. Fast Blast® is an extremely high organically derived product with 32.8% BAOM and 48.2% amino acids. Together, these work in conjunction to improve multiple pathways and systems within the plants which in turn improves the herbicide uptake and movement around the plant promoting a better knock off rate (Whiteside, Garcia and Treseder, 2012).

Figure 4 shows a smaller dense Fleabane plant which was sprayed with herbicide and Fast Blast®. Again, after 9 days the plant looks completely knocked off however after 23 days was some small regrowth occurring.

Figure 5 shows a Fleabane plant which is less dense and more spread out in terms of the foliage. When looking at the progressive images, 9 days after the application of herbicide and Fast Blast® the plant was completely knocked-off and there was no regrowth after 23 days.

Analysing Knock-off Rates of Other Weeds

Figure 6 shows various other weeds which were recorded in the almond orchard block treated with the control herbicide mix. Figure 6 (A) shows a large clump of grass which had lower tissue death where the herbicide spray touched the grass, however there is still growth continuing up on the

Figure 6 B and C show two sperate Wild Sage plants which were also treated with the control herbicide mix. It can be seen that after 9 days, there was still sections of the plant which were still alive and therefore regrowth would occur. Because these weeds were not treated with the Fast Blast®, the movement of herbicide throughout the plant is not as effective as if Fast Blast® was applied to the herbicide mix. Due to the absence of Fast Blast® there were patches of growth still present amongst the weeds which therefore resulted in an unsatisfactory knock down.

Figure 7 shows a large Paddy Melon plant which was treated with the herbicide mix and Fast Blast®. It can be seen that with the Fast Blast® mixed in with the herbicide there was a more improved knock-off compared to the other weeds need in figure 6 (wild sage for comparison). This Paddy Melon was very large and the herbicide mix with Fast Blast® still resulted in a better knock down leaving far less green compared to figure 6. This is because Fast Blast® was able to increase the movement and keep the herbicides circling around the plant for longer increasing the time for the herbicides to take effect. In previous studies, it was found that there was an increase of 59% in the residual content of Glyphosate found in the tissues of weeds when Fast Blast® was used along with herbicides. This residual levels of Glyphosate in the weeds produce a more long-lasting kill compared to using herbicides alone.

Conclusion

In conclusion it was found that using Fast Blast® in conjunction with a specialised herbicide mix containing Glyphosate 450, Basta and Wilt 700 produced a slightly better knock down rate compared to using the standalone herbicide control mix when targeting Fleabane plants.

However, when analysing the differences in knock down rates in other weeds which are easier to control such as grasses, wild sage and paddy melons, it was recorded that there was a better knock down rate compared to the control due to better herbicide translocation which was induced through additions of Fast Blast® in the herbicide mix.

When comparing Fleabane plants treated with the control herbicide mix and herbicide mix + Fast Blast®, it was found that Fleabane plants treated with the standalone control herbicide mix had more regrowth compared to the mix with Fast Blast®. It was seen that there was slightly more vertical growth especially when comparing figure 1 (control) to figure 3 (with Fast Blast®). The regrowth also looked healthier in the control herbicide mix.

Key Findings

- Similar overall knock down between control herbicide mix and herbicide mix + Fast Blast®.
- More vertical regrowth seen in the control mix which also seemed to be healthier.
- Less vertical regrowth seen in the herbicide mix + Fast Blast®.
- Complete knock down of Fleabane pants which are less dense and more spread out due to better herbicide coverage. Complete knock down in both control mix and herbicide mix + Fast Blast®.
- Better knock down of other weeds which are easier to kill such as paddy melon with the use of herbicide mix + Fast Blast®.
- Regrowth seen in other weeds such as grass and wild sage which was treated with the control mix and therefore wasn't a complete knockdown.

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