

CEO REPORT

Larry McHugh

2021 season in review

Growers are now delivering the last few hundred tonnes of NIS for the 2021 season, and as our factories begin to process these final deliveries, the flowering trees are evidence that the next crop is fast approaching.

At the completion of the 2021 season, Marquis Macadamias will have received more NIS than ever before, and Marquis Marketing will have sold more kernel than it had ever sold before. Importantly, after a cautious start to the selling year, demand is firming and we are sold out in quite a few styles, with the market for smaller sizes slowly strengthening.

Once again, the resilience of the macadamia market has helped us through challenging times. This season saw the first reduction in NIS prices that we have experienced in over a decade, however the price reduction did not result in any long-term instability as the industry experienced in the past. We are looking forward to making payments to notional price by January and with another production year winding up, our attention is being focussed on next year.

Shares

I am pleased to say that we have received a large number of expressions of interest to acquire Marquis Macadamia shares and we are currently contacting each prospective

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shareholders to finalise their details and provide them with the relevant documentation. At each Board meeting over the next few months, the Directors will consider the applications and the share issue process will commence. Applications for Extraordinary Supply Agreements will also be considered and completed during this period.

World Macadamia Day

We would like to wish you a belated, but very prosperous, World Macadamia Day which was celebrated on 4th September. For those of you who missed our communications around the day, Marquis celebrated by planting rare, native macadamia trees at schools in both Australia and South Africa and talked to the next generation of macadamia growers about the importance of growing a healthy food crop in a sustainable and environmentally friendly manner. A full article is on page 5.



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Honey roast capability

Over the last few months, we have been finalising large scale production of our honey roast macadamias featuring minimised sugar and maximised honey. This product will soon be appearing on supermarket shelves in Australia and around the world and we would urge you to try it and we look forward to your feedback.



Kevin Quinlan

Kevin Quinlan recently made the decision to move on to new and bigger things and I would like to take this opportunity to thank Kevin for his 12 years of service with the company. We wish him all the best in his future endeavours and acknowledge his contribution to our Company through his work with our Shareholders.

We have been through many changes over the last 12 years, including the establishment of the Bundaberg factory and our marketing company, and the rebranding of the group. We have grown significantly across that time and have almost doubled the number of growers delivering to us. Kevin and his team have played a major role in our growth and development, particularly in introducing new growers to us and developing strong partnerships with all our shareholders and growers. Kevin has been an important part of our team and his wealth of knowledge and guidance of our grower services team will be missed.



MARKETING REPORT

Charles Cormack, General Manager at Marquis Marketing



As we hit the tail end of the harvest season in both Australia and South Africa, and we enter the back end of the sales season, it is indeed a pleasure to be able to write a very upbeat market report. Back in March 2020 who would have thought Covid-19 would still be playing such a major role in the economy and our lives. Although Covid is still very much with us and will be for a long time, the world is rapidly learning to live with it and the economies of most of our major markets are recovering fast and consumer demand for macadamias is returning to pre-pandemic levels or better.

As previously reported, retail and snack sales have remained strong throughout the pandemic in most markets, but demand for ingredient styles has also now started to show a strong recovery. This is being driven by a reopening of food service trade, particularly in the USA, but also by renewed interest in new product development using chip styles which have eased in price.

In a year that we expected to be cautionary and hesitant, we are now seeing encouraging demand growth in most geographic markets and industry sectors with some major customers requesting early delivery (indicating that inventory levels are low) and top up quantities to their contracts. Traditionally August and September have been quiet sales months with late season sales only happening in December and January but this year we have continued to sell strongly into September.



On the supply side, we have seen a contraction of global production volumes. As we predicted the Australian crop has now been formally forecast down from the original 50,700MT* to 48,500MT*, just 3% up on prior year. Also as expected, the official South African forecast has now

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been formally revised down to 54 174MT* which is well below the original official forecast of 57 000MT*. We still believe this lower forecast is a little on the optimistic side and the final volumes will likely be even lower. Overall, the 2021 global crop will be on par or only slightly up on prior year.

Demand for NIS in China has been steady, particularly for the larger sizes, and prices have remained steady to slightly rising with additional volumes being contracted late into the selling season. This has helped steady kernel prices in other markets.

With our 2021 kernel sales now at more than 10% above last year's volumes, and crop availability only modestly up from prior year. We are now in a strong position of being completely sold out in whole kernel, having only very limited availability of half kernel and even being heavily sold in two of the three chips styles.

We are confident that demand will continue to grow strongly through the balance of the year, and by the start of next season carry over stock will be low. We are urging all our customers to finalise their needs through to July next year to ensure continuity of supply.

** at 3% moisture content*

FACTORY OPERATIONS

Steven Lee, Chief Operation Officer



The sound of deliveries has begun to decrease in frequency over the last few weeks as the last of the 2021 crop is delivered. Some growers still report small quantities of crop to come and we would encourage this to be delivered as soon as practical to help maintain product shelf life.

The focus for growers has changed from harvest to orchard management and looking after the 2022 crop with flowering now in full swing. To date the weather through flowering has been favourable, which is essential as a starting base for next year's crop.

Following a difficult 2020 season Bundaberg growers have produced one of the best quality crops ever in that region – with low Reject kernel recoveries and a return to normal levels of Sound kernel after the affects of the 2019 drought.

Northern NSW growers, while down on early volume expectation have produced a reasonable sized crop with average sound kernel recoveries and slightly lower than average levels of Reject kernel – a good result all round. Processing of the 2021 crop is progress-

ing well with both factories ahead of schedule, taking full advantage of the good quality product supplied from both regions and extracting the most out of the recent factory upgrades.

The recent Covid outbreak in NSW has again changed our Lismore factory operations again with restrictions to visitors onsite, QR code check in and our retail store being closed to visitors . We would like to thank all growers, staff and suppliers who have worked with us navigating the recent changes.



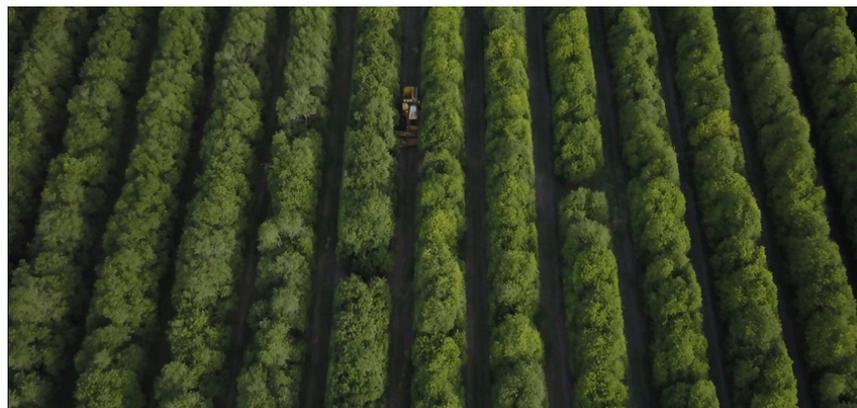
Bundaberg growers may have seen our development application notice in the local newspapers or on the roadside sign near the factory.

We are well through the application process and hope to start the project once approvals are in place.

Construction in Lismore has commenced for our newest building that will provide additional cold storage and processing area. Increasing capacity to handle the growing crop is imperative to our business and the industry.

The projects that we have recently completed and those planned for the immediate future demonstrate our commitment to our growers.

We have also been doing some product development work with a new line of honey roast about to hit supermarket shelves. Hopefully we'll be able to share some of this great tasting product with you at upcoming grower events.



**We make money
for growers,
not from them.**

**MARQUIS
MACADAMIAS**



World Macadamia Nut Day

Claudia Lordao, Marketing Manager

In celebration of World Macadamia Nut Day on Saturday 4th September, we donated macadamia trees for planting at local schools in the world's biggest macadamia producing regions in Australia and South Africa. We also hosted education sessions regarding sustainability practices in macadamia growing and processing for the students.

In Australia, we donated rare, native macadamia trees to be planted by students at six schools in the Bundaberg growing region of Queensland. The tree ceremony made us all proud, knowing that we were celebrating not only the Australian native bush, but also the farmers who grow them, our incredible staff and all our customers around the globe, who have been part of our history and are helping us take the macadamias to the world.

Educating the next generation of Bundaberg's locals through this initiative is paramount in ensuring the region remains the hub of macadamia growing. By giving

the students the responsibility to care for the growing macadamia tree, they will learn about the importance of macadamias and how they can contribute to the continued success of the local macadamia industry.



Students from St Luke's Anglican School



Steven Lee, Chief Operating Officer at Marquis Macadamias and Denise Bond, Executive Officer at Macadamia Conservation Trust.

We also donated \$10,000 to the Macadamia Conservation Trust to support conserving Australian wild macadamia trees in their native habitat. Conserving wild species plays an important role in supporting the macadamia industry, with the genetic diversity among wild plants helping the industry adapt to changes in weather patterns, emerging pests and possible diseases.

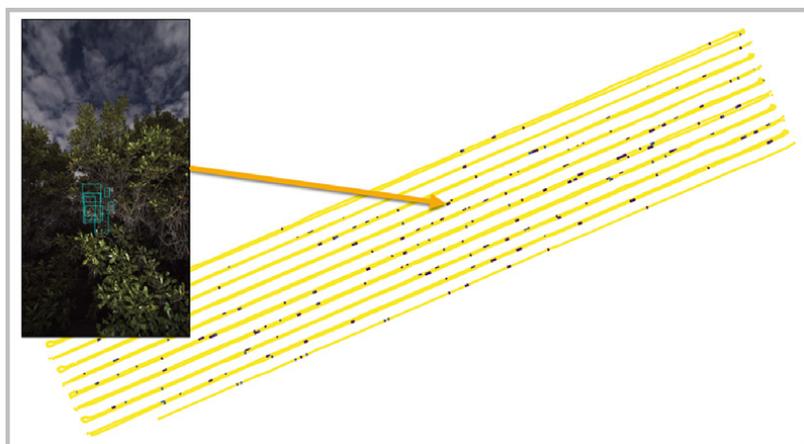
In South Africa, grade eight students were appointed custodians of the macadamia trees and will care for the trees over their next five years of schooling. As a part of the donation, Marquis Macadamias South Africa spoke with students on the importance of the macadamia industry to this growing region, both in terms of the economy and environmental sustainability.

Mistletoe Field Day

Simon Andreoli, Grower Liaison Officer

A field day was held on Friday the 3rd of September at Max and Yollie Millar's farm to view results of a trial of possible Mistletoe control treatments. The trial investigated the use of Phosphorous Acid and other Phosphorous sources at different rates with and without Pulse penetrant, as well as Ethephon. The trial aimed to answer questions about how effective spot spraying of these products is compared to conventional pruning and what rate may be required to achieve control.

Matt Johnson from Green Atlas was present to demonstrate the remote sensing detection system that was used in the orchard. This system helped to capture images of location of mistletoe within the rows and allowed for faster detection than walking the rows. This enabled infected trees to be identified and a trial plan to be drawn up. Utilizing GPS through a phone app, a live map can be produced which can then pinpoint where you are in relation to the map.

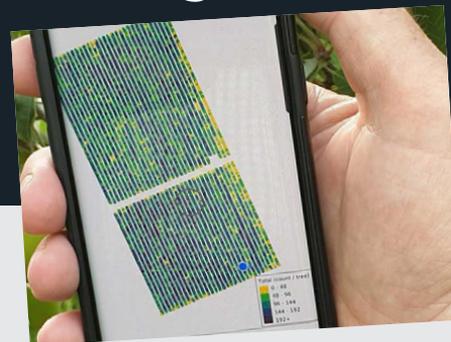


Above is a screenshot of the treatment zone with the treatments applied. Four mistletoe plants were included in each treatment.

The following treatments were applied on the 28th July. The treatments were applied with a knapsack sprayer to the point of runoff using Max's Hydralada to aid in access to the higher mistletoe.



Adding value through data driven decision making



Crop Scan Tech is a new service delivery business focused on providing data to tree crop growers in the Bundaberg district. The business uses technology developed by an Australian based company called Green Atlas. The system they have developed can measure anything that is visually identifiable in trees. So far this year, CST have utilised this technology at numerous Macadamia farms around Bundaberg. The number of nuts on trees has been counted early in the season to help predict harvest yield and counted later in the season to help farmers focus where to shake trees. CST have been able to identify and map the precise location of mistletoe. Allowing farmers to use an app on their phone/tablet walk directly to infected trees. The system also measures tree height, canopy area and canopy density. Which some farmers are now utilising to identify where to prune.

The cartography system sits on the back of an ATV that is driven up and down tree rows at about 15km/h (Mapping 50ha/day). The apparatus that sits on the back of the ATV is a combination of high-definition cameras (pointing in each direction), light strobes, batteries and computers. The cameras take 3 photos every second and captures everything 90 degrees to the lenses. This means that trees up to 8m tall fit within the photo and four photos are taken of every tree.

Matt Johnson, Green Atlas 0431411091





Field Day held in North Bundaberg at Yolmax Macadamia Farm

The treatments were:

1. Agrifos 600 @ 2.0 mL/1L (highest foliar spray rate)
2. Agrifos 600 @ 83 mL/1 L (1/4 trunk drench rate)
3. Agrifos 600 @ 167mL/1 L (1/2 trunk drench rate)
4. Agrifos 600 @ 334mL/1 L (trunk drench rate)
5. Agrifos 600 @ 2.0 mL/1L + Pulse @ 2.0%v/v
6. Agrifos 600 @ 83 mL/1 L + Pulse @ 2.0%v/v
7. Agrifos 600 @ 167mL/1 L + Pulse @ 2.0%v/v
8. Agrifos 600 @ 334mL/1 L + Pulse @ 2.0%v/v
9. Pulse @ 2.0%v/v
10. Standard pruning
11. Ethephon @ 120ml/100lts
12. MAP 1%
13. MAP 1% + Pulse @ 2.0%v/v
14. MAP 5%
15. MAP 10%

Preliminary results have shown that treatment effectiveness varied.

At this stage the higher Phos Acid rates with Pulse appear to be the most effective. There is however quite severe Macadamia leaf burn and subsequent leaf drop from these treatments, and care to minimise over spray would be advised. The treatments without Pulse, different forms of phosphorous (MAP) and the Ethephon treatments do not appear as effective.

These treatments will continue to be monitored for a few more months to see if the mistletoe will recover and if

new Macadamia leaf growth returns to treated branches. There will be a full write-up of the trial in a coming edition of The Nutshell.

Jacob Millar, Product Consultant from DTE Equipment the company that supplies the Hydralada was also present to answer questions about the machine. His company handles a range of different machinery.

Greg Mills, Technical Sales Manager, from Grassdale Fertilizers was also present to talk about their range of granulated carbon-based composted manures. Grassdale is part of Mort & Co the largest feedlot in Australia.



Jacob Millar, DTE Equipment (Hydralada supplier)
0437 062 321

Greg Mills - Grassdale Fertilizers
0448 719 354



2021 Mac Production Course

Grower Services Team

Back in June, 26 enthusiastic participants began the 4th Marquis Macadamia Production Course. Facilitated by Alan Coates, the course comprised 6 sessions, held as three blocks of 2 days each, with each block a month apart. Each session was structured with a morning of theory and an afternoon of bus trips visiting orchards and talking with growers.



Presentations and activities made up the first half of each day.

Topics for the first block were: industry background, tree characteristics, varieties, site selection, orchard design, nut quality, harvesting and marketing. The first field trip looked at newly developed orchards, with the field trip on the second day focusing on harvesting and dehusking. This included a visit to Victoria Park, where manager Warren Elvery firstly explained their de-husking operation and then discussed their custom-made dual head, de-husking harvester.

The second block focused on pest and disease management, sprayer set up and young tree establishment and management. The field trips included NSW DPI Alstonville research station where staff explained how they use the monitoring hedges to optimise spray timings.

The group then participated in a live spray coverage check that detailed the steps and practical considerations required to ensure you are achieving adequate spray coverage. The field trip on the second day visited a new / non-bearing coastal orchard where, after demonstrations from Allan, the group was given permission to implement their recently acquired skills.

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“We got a lot out of the course and was great to meet everyone. A valuable thing the course gave us was confidence that we were doing the right things in the orchard”.

Alstonville growers David and Sharron Grellman

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Lawrence grower Jarrad Smith said, *“It was great to share time, ideas and experiences with a few likeminded individuals in the macca game. Alan’s knowledge is clearly second to none and the course covered all key elements to consider from drainage/land management through to Integrated Pest Management. I’d recommend this course to new and well-seasoned growers”.*



Participants practising their pruning skills

Yamba grower, Dave Sanna explained, “The course is brilliant. Allan is great and his experience is impressive. The range of topics and information provided was excellent. I’ve got a very young orchard, so even if some of the information wasn’t directly applicable, there were still bits and pieces I could take away, especially all the tips on improving the efficiency of operations. The course does a great job of getting people together, looking at orchards and learning from Alan and each other”.

The final block looked at soil health, tree nutrition, fertiliser programs, processing with the final day dedicated to field visits to orchards that have implemented a range of Integrated Orchard Management (IOM) works. Once again, the feedback from participants was overwhelmingly positive and Marquis will be looking to hold the Macadamia Production Course again in 2022.

Alstonville grower Fiona Grigg said stated, “I cant speak highly enough of the Marquis Macadamias Production course for new or newish Macadamia growers. The course content is broad covering all aspects of macadamia husbandry which gives it wide appeal regardless of whether your orchard is young, old or something in between. I enjoyed the way the course is structured with mornings in the classroom covering theory and guiding principles and the afternoons visiting a range of different macadamia orchards. These field trips make you realise there is no right answer when tackling problems in your orchard, its more about working out an approach specific for your orchard rather than trying for black and white answers. Its Alan who makes the course, he brings the course content to life with stories and anecdotes collected over a lifetime in the industry. The course has made us feel more confident as growers and the other big bonus is connecting and developing friendships with the other growers attending the course”.

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““We enjoyed the course, with the mix of theory and practical and also the spacing over the three months. We’ve got a young orchard so the tree management parts were

Dunoon growers, Buck and Ann Peacey

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Chemical Accreditation Course

Marquis Macadamias will be running the AQF3 Chemical Accreditation and Recertification at the Lismore factory again in 2021. Covid-willing, the full course will be on Wednesday, October 20 and the half-day recertification will be on Thursday, October 21.

**Contact Jodie Hearity
to register your interest:**

(02) 6624 3900
reception@marquis.com

**Or call Matt Weinert
if you have any question:**

0438 644 136



Weed Control in Young Orchards

Grower Services Team

There's a huge range of challenges and potential pitfalls in the early stages of orchard establishment. One of these is controlling weeds around young trees. Without adequate control, weeds will compete with trees for nutrients, moisture, and light, which will restrict tree development, reduce orchard uniformity and slow tree growth.

To manage weeds in young orchards, many growers use knock-down herbicides such as glufosinate ammonium (e.g. Basta®), paraquat-diquat (e.g. Spray.Seed®) or glyphosate (e.g. Roundup®). These require regular applications to keep the area around the tree clear as they have no residual control. The need for repeated applications incurs a significant labour cost, increased risk of contacting the tree with herbicides and requires access in the orchard which can be difficult during adverse weather conditions.

Mulch is an effective tool used to suppress weeds in orchards that has other benefits such as moisture retention, soil temperature regulation and improving soil

structure/microbial activity. Issues for many growers with mulch include the need for specialist equipment to spread it, the large quantities required, and the additional cost required during the orchard establishment phase.

Pre-emergent herbicides are used in many different crops and are an effective way to manage weed germination. In non-bearing orchards, pre-emergent herbicides offer the potential to reduce the frequency of herbicide applications and reduce the risks associated with knock-down herbicides.

Key Takeaways

- Weed control during orchard establishment is critical to maximise tree growth.
- Marquis Macadamias undertook a trial with several growers comparing knock-down herbicides, mulch and residual herbicides.
- Mulch was very effective at suppressing weed growth and was as effective as the best chemical product for weed suppression.
- Chateau® (flumioxazin), a residual herbicide, provided the best control of weeds and gave over 12 weeks control.
- Knock-down herbicides would have required an extra two applications to provide the equivalent control to Chateau over the trial period.



Sugarcane mulch on BDG site at trial initiation.

Methods

The Marquis Grower Services Team established 3 trial sites (1x Bundaberg and 2x Northern NSW) in young orchards where growers were interested in trying alternative options to the standard knock-down herbicides they were using, with the additional treatments being pre-emergent herbicides and mulch to manage weeds. Treatments included: non-residual herbicides glufosinate ammonium (Basta®) and glyphosate (Roundup®); pre-emergent herbicides flumioxazin (Chateau®), isoxaben (Gallery®) and oryzalin (Prolan®) and thick mulch. Gallery only controls broadleaf weeds, while Prolan is more grass specific. These two products were used alone and in a tank mix.

The following rates were used:

1. Control - Basta only @ 5 L/ha (note this is the highest label rate, which could potentially be dropped depending on weed size and pressure)
2. Glyphosate (450g/L) @ 2.3 L/ha
3. Chateau @ 700 g/ha
4. Gallery @ 750 g/ha + Prolan @ 6.8 L/ha (High rate) (longer control)
5. Gallery @ 375 g/ha + Prolan @ 4.5 L/ha (Low rate) (shorter control)
6. Prolan @ 6.8 L/ha
7. Gallery @ 750 g/ha
8. Application of thick mulch

In the remainder of this article, we refer to tradenames of products, but note that products with the same active that are registered could be used. The use of tradenames does not constitute endorsement of the product.

The mulch treatment consisted of a 5 cm deep layer applied in a 1m wide strip along an 8 m or 9 m row spacing which equates to 55-60m³/ha. The mulch chosen was based on local availability. In Bundaberg (BDG) a thick layer of sugarcane mulch was used (Figure 1) and at Site



Karina Griffin applying the treatments at NNSW1.

2 in Northern NSW (NNSW2) mill mud was applied and then topped with hardwood chip (Figure 2). At NNSW1 site no mulch treatment was included as none was available on site.

When using residual herbicides, it is critical to ensure the area to be treated is free of weed. If weeds are present a tank mix of a knock-down herbicide with the residual herbicides is required to control these weeds. Therefore, at NNSW2 and BDG all pre-emergent herbicides were applied with glyphosate 450 @ 2.3 L/ha, while at NNSW1 Basta @ 5 L/ha was added to all pre-emergent herbicide treatments. A surfactant at 0.1% was added to all treatments to assist the knock-down herbicides. All water rates were around 350 L/ha. Figure 3 shows the weed pressure prior to the start of the trial.

Approximate costs of the different treatments were calculated on the assumption that the total width of the treated row would be 1 m wide.

Note: Pre-emergent herbicides require moist soil at application and then 10-15mm of rainfall or irrigation is recommended to move the product into the top of the soil profile. It is recommended that this rainfall or irrigation is received/applied within 21 days of application.



Pre-treatment photos for each trial site NNSW1 (left), BDB (centre) and NNSW2 (right).

Results

While weed pressure varied across sites, all had significant broadleaf weed pressure. Only the BDG site had consistent grass pressure and NNSW1 site had consistent sedge weed pressure. Weather conditions, and the type and quantity of weeds present were measured during the trial period. Potential phytotoxicity (leaf burn) from the residual herbicides, especially from the Chateau due to the lighter soils, was monitored; however, none was observed.

Data was statistically analysed. Values followed by different letters are statistically significantly different from each other, e.g. 'A' is significantly different to 'B'; 'AB' is not significantly different to 'A' or 'B' but is different to 'C'. Values presented are the average of the replicates.

NNSW Trial site 1

This site (NNSW1) did not have mulch applied as none was available at the site. All pre-emergent herbicides tested significantly reduced broadleaf weed pressure for 8 weeks. By 12 weeks (3 months) broadleaf weed germination was increasing in all pre-emergent herbicides. The trial was discontinued as the level of weeds became unacceptable and the grower wished to control the weeds in the trial area.

There was very high rainfall over the trial period, and it



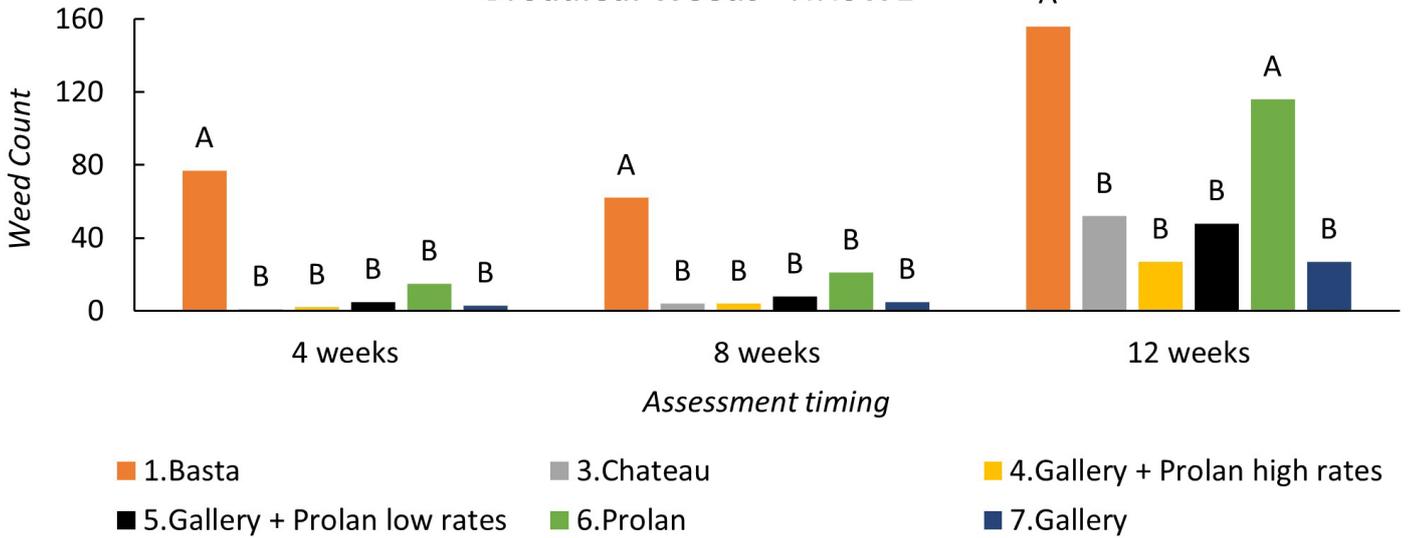
is likely that this affected the residual activity of the pre-emergent herbicides. The chemical labels suggest weed suppression can last for 4-6 months and data from the Bundaberg site showed that Chateau and Gallery activity was persistent up to 17 weeks, but the trial was discontinued as all other treatments had significant weed growth by this time and the grower wanted to control weeds in the area.

There was high pressure of sedge weeds at the site and Chateau provided commercially acceptable control. While Gallery + Prolan at the higher rate and Gallery only had a suppressive effect on sedge weeds compared to Basta, the total number of sedge weeds present was not commercially acceptable.



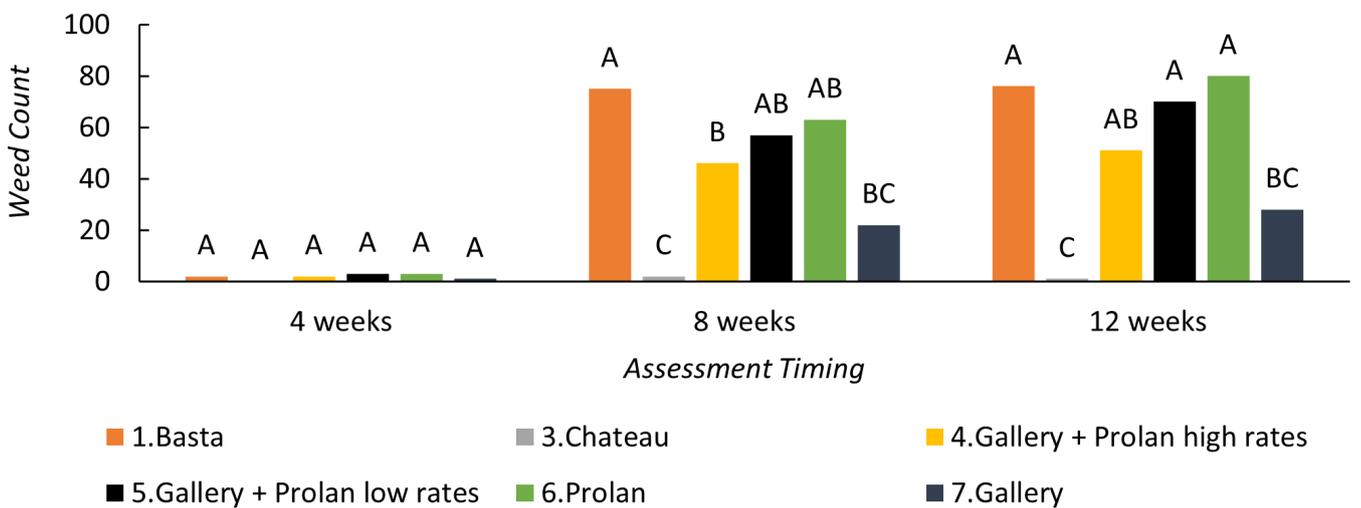
Example of weed pressure and treatment effects at NNSW2, 4 weeks after application.

Broadleaf Weeds - NNSW1



Weed control with treatment 3-Chateau, 8 weeks after application at site NNSW1 (left) and 12 weeks after application at site BDG (right). Note, dry matter on rows is grass from mowing.

Sedge weeds - NNSW1



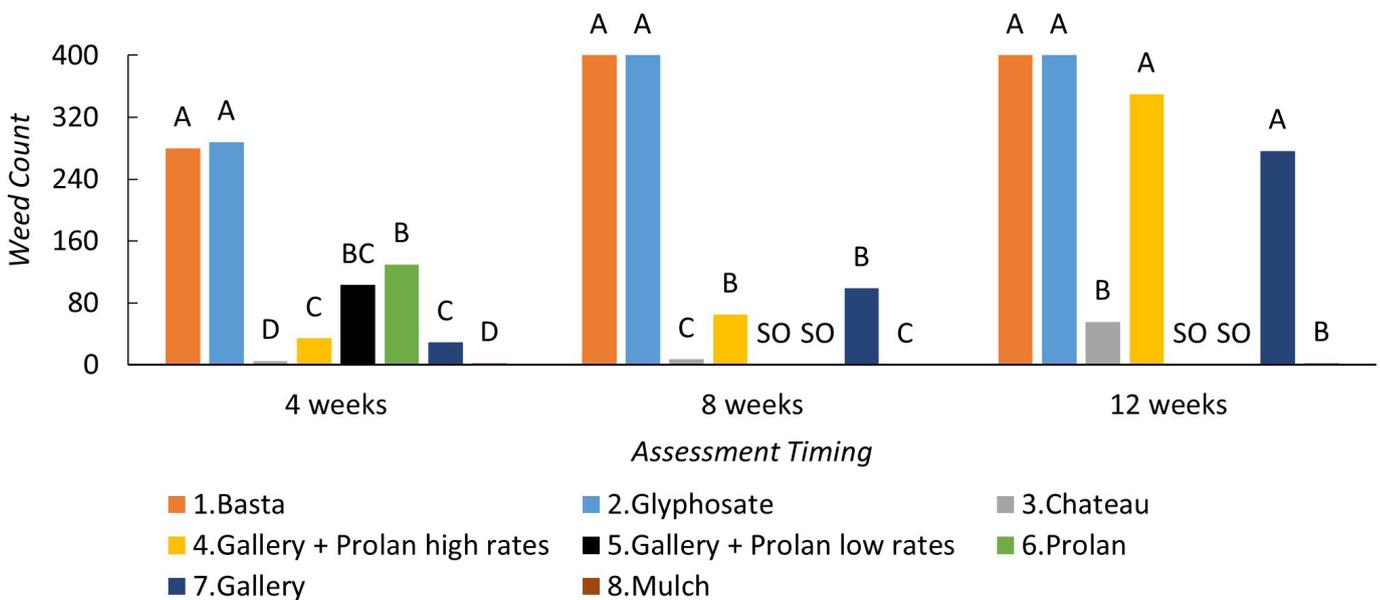
NSW Trial Site 2

At NNSW2 the mulch and Chateau treatments were highly effective in controlling weeds compared with the other treatments. All pre-emergent herbicide treatments significantly reduced broadleaf weed pressure at 4 weeks; however, the level of control with low rates of Gallery + Prolan and Prolan alone were not commercially acceptable. By 8 weeks high rates of Gallery + Prolan and Gallery alone were also not commercially acceptable.

Grass germination was highly variable across the site and was only present in high densities at the western end of the site and no significant differences found for this site.

In the following graphs, SO = sprayed out. At NSW2, The Gallery + Prolan low rate treatment and the Prolan treatment had high weed pressure, similar to Basta and glyphosate, and were sprayed out as it was clear they were not effective. However, the Basta and glyphosate treatments were retained to compare against the remaining residual treatments.

Broadleaf Weeds - NNSW2



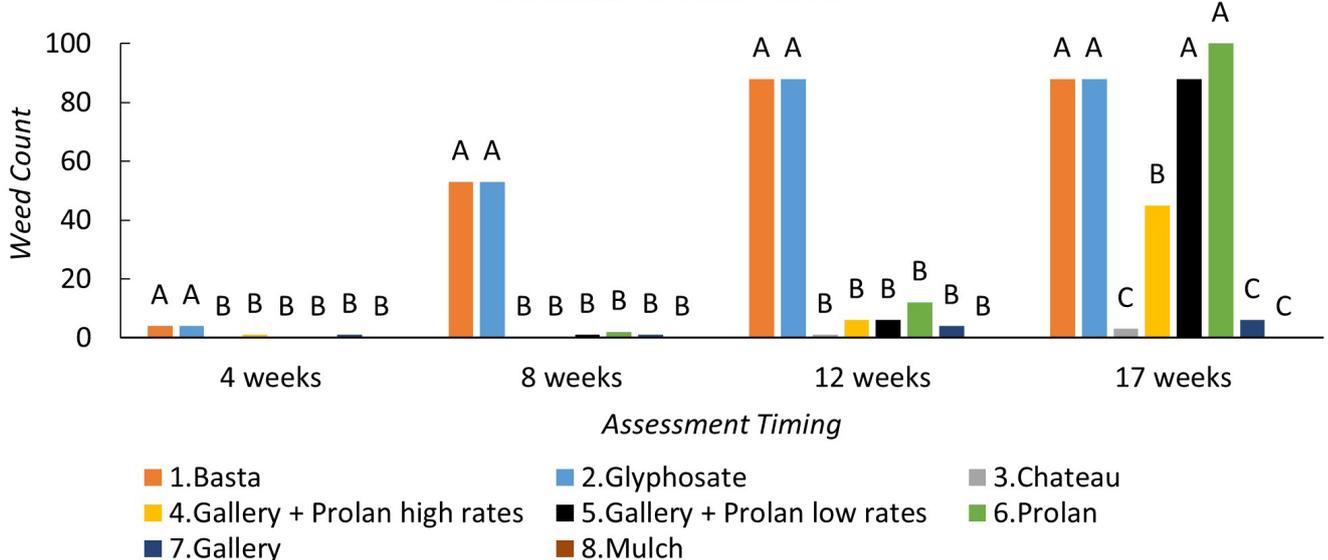
Bundaberg Trial

At this trial site (BDG) the mulch treatment was highly effective in controlling weeds with little or no weeds germinating through the mulch. However, creeping broadleaf vine weeds and some grass runners started to encroach from the side up over the top of the mulch, which would require interrow and spot spraying with knockdown herbicides to control.

All pre-emergent herbicides tested significantly reduced broadleaf weed pressure for 12 weeks. By 17 weeks after application only Chateau and Gallery alone had commercially acceptable suppression of broadleaf weeds.

All pre-emergent herbicides tested, except Gallery, significantly reduced grass pressure for 12 weeks. By 17 weeks after application only Chateau and Prolan alone had commercially acceptable suppression of broadleaf weeds.

Broadleaf Weeds - BDG



Economics

Cost analysis for each treatment is shown in Table 1. Comparisons were calculated on a cost per 100 m of row and on a per hectare basis for a 9 m row spacing. The costs of the added knock-down herbicides were excluded as the product use varied across sites. However, their approximate costs per hectare are listed shown in Table 1 and can be added to any treatment to calculate the total cost.

The mulch treatment has some approximate application volumes and costs, due to the nature of the product. The mulch rate was 55 m³/ha which, on a 9 m spacing, represents approximately a 5 cm layer that is 1 m wide. Mulch costs were assumed at \$25/m³ of material and an application cost of \$8/m³. An option to reduce the cost of the mulch treatment would be to apply only around the tree, significantly reducing the volume required. It's important to remember that weed control is only one of several benefits that mulch provides.

Approximate Treatment Costs

Treatment No.	Products	Application No.	Product Rate/ha	Product Cost (\$/100m row)	Product Cost @ 9m row Spacing (\$/ha)	Cost per Application (\$/ha)	Total Cost (\$/ha)
1	Basta	3	5L	\$ 0.79	\$ 8.70	\$ 70.00	\$ 236.20
2	Glyphosate (450)	3	2.3L	\$ 0.14	\$ 1.50	\$ 70.00	\$ 214.60
3	Chateau	1	700g	\$ 1.23	\$ 13.70	\$ 70.00	\$ 83.70
4	Gallery + Prolan high	1	750g + 6.8L	\$ 6.37	\$ 70.70	\$ 70.00	\$ 140.70
5	Gallery + Prolan low	1	375g + 4.5L	\$ 3.61	\$ 40.10	\$ 70.00	\$ 110.10
6	Prolan	1	6.8L	\$ 2.62	\$ 29.10	\$ 70.00	\$ 99.10
7	Gallery	1	750g	\$ 3.75	\$ 41.70	\$ 70.00	\$ 111.70
8	Mulch	1	55m ³	\$ 125.00	\$ 1,388.00	\$ 440.00	\$ 1,828.80

Chateau was the most effective pre-emergent herbicide, and the knock-down treatments (1 and 2) would have required additional sprays to maintain equivalent weed control (Table 1). NNSW1 would have required two additional Basta sprays during the 12-week monitoring period. As it takes approximately 1.5hrs to spray one hectare and labour and machine costs are estimated at \$50/hr than those two additional sprays cost a total of approximately \$170/ha. As can be seen in Table 1, the application costs are a significant contributor to the overall cost and any reduction in application requirements can result in significant savings.

Another important consideration is the risk, especially in the Northern Rivers, of not being able to get back on the paddock to complete applications due to wet weather conditions, which makes subsequent applications more difficult due to greater weed pressure and more advanced weed growth.

Conclusion

Effective weed control in young orchards is critical. In this trial mulch was highly effective in controlling weeds but the quantity required, availability of the material and cost per hectare was considerably higher than other treatments. All residual herbicide treatments significantly reduced broadleaf weed pressure for 8 weeks. The Prolan treatment, which is grass specific, was effective at controlling grasses for 12-17 weeks. The most effective treatments for controlling broadleaf weeds, grasses and sedges were Chateau and mulch.

While the cost of knockdown herbicides are considerably cheaper than the other products trialled, their short length of control means they require more frequent applications which makes these treatments less cost effective. The time and labour saving offered by using mulch and/or residual herbicides is considered a significant benefit, especially when this labour saving can be utilised for other tasks such as early tree training.

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