SFF Project 404831 - Increasing the Market Share for New Zealand Olive Oil

Milestones M10
Fourth Focus Grove and Field Days Report

March 2018

Contents

Introduction 2
Focus Groves Status 3
Kakariki, Nelson 3
Bel-Hamed, Canterbury 5
Terrace Edge, Canterbury 7
Leafyridge, Wairarapa 9
Ngatarawa (Aquiferra), Hawke's Bay 12
Viaduct Olive Grove, Hawke's Bay 15
Olives on the Hill, Northland 16
Summary 18

Introduction

The purpose of the Sustainable Farming Fund project is:
To increase the market share for New Zealand-produced olive oil by identifying basic grove management practices to enable the industry to consistently lift productivity of fruit per hectare and thus also reduce costs of production. This will allow the New Zealand industry to compete effectively with imported olive oils to increase market share.

The objectives to achieve the purpose are aimed at practice changes that enhance tree and grove productivity.
The methods use expert tree crops horticultural advice focusing in two key aspects of grove management.

1. Improving tree health by disease control using affordable protectant spray programmes to eliminate foliage diseases that defoliate olive trees, a primary cause of low productivity in NZ groves.
2. Introducing practical, affordable tree pruning regimes that improve light distribution for stimulating flowering and fruit growth, aiding effective spray coverage and inducing adequate annual shoot growth to provide the required bud sites for new flower production – on an annual basis.

This report outlines the progress made by the Focus Groves and is based on the review and recommendations from the fourth round of Focus Grove visits and Field Days held in March 2018. This fourth round of visits was carried out in March 2018 by the two consultants engaged as part of the projects; one from Plant and Food Research and one from Forty Groves Ltd. Also attending were the President-Elect for Olives New Zealand, Craig Leaf-Wright (all visits), and the Executive Officer, Gayle Sheridan (all visits apart from Northland).

This report is based on the observations from the Focus Grove visits by the project consultants and Focus Grove owners coupled with discussion at the Field Days with attendees.

Focus Groves Status

Kakariki, Nelson

Approximately 30 people attended the Field Day and were welcomed to Kakariki Olives by the owners John and Helen Dunlop. The Nelson Branch organized refreshments to start and this provided an opportunity to meet the new owners of Kakariki Olives, Ray and Brenda Gregory.

Kakariki has suffered from tall trees approximately 9-10m and the focus has been in reducing tree size to improve tree health and enable more effective spraying and effective harvesting. It was noted that there was very good fruit load across the tree canopy of both the trial block and other blocks. There is also very good extension growth across the tree canopy ensuring the next few years.

It was noted that the Focus Grove trees are now smaller in height than control trees but will have at least the same volume of crop and possibly higher yield. The spray program now 3 years on, is providing very positive results and it was noted that Nelson has higher rainfall than many other olive growing regions therefore the spraying program is challenging. Also spring and autumn heavy dews but high sunshine hours. The wet weather after harvest 2017 also posed challenges in being able to spray because of wet conditions.

Stuart Tustin made the comment that the spraying program is not unique to olives but there is an issue with olive trees being evergreen, therefore the duration of disease control and management is greater. Other crops may also have more frequent programs, typically with higher value crops. Stuart said from an exploratory examination of fruit symptoms by a PFR pathologist, Anthracnose in olives is thought to be caused by a common fungal pathogen also known to cause summer fruit rot in apples.

The spray regime of Manzate is costing approximately $450 pa per ha chemical cost.
An issue with access to appropriate spraying equipment for many Field Day attendees highlighted a real opportunity for contract spraying or co-operative purchase of sprayers. Also many present (and at other Field Days) really did not have the time to implement the spraying recommended programme. Stuart Tustin reiterated that pruning does not compensate for spraying; both are necessary aspects of improving grove health and productivity. Tree size and suitability of tree structure for harvesting methods are also considerations that determine tree size.

In response to a question about mulching of pruning waste, the advice was that this is good compost back around trees, no need to remove and burn.

While the project aim is to increase productivity from less than 10kg per tree nationally to 15kg per tree, the Focus Groves are indicating that productivity of 20+kg per tree may be a realistic longer term target so long as biennial bearing can be controlled and reduced.

Overall the project consultants were very pleased with how Kakariki olives has progressed since the project started and the obvious improvements to the grove in relation to tree health and structure. This should be reflected in good harvest tonnage, assuming no unexpected weather events.

Enjoying the hospitality at Kakariki Olives

Above and below - discussing the pruning strategy

Bel-Hamed, Canterbury

A visit to Bel-Hamed olive grove near to the Canterbury Focus Grove, owned by Malcom and Sally McKenzie, had been arranged as this grove had been early adopters of the recommended pruning and spraying programme. There were 32+ attendees.

Bel-Hamed is one of first established groves in Waipara, at approximately 20 years old. Following the recommended programme has resulted in the trees looking excellent. It was noted that the tree canopy was healthy, there were bunches of olives, and the olives were plump and very good size. Branches were typically full of leaf (especially leaves older than 1 year) and with good extension growth for next year flowering and crop. Excellent fruit set was attributed to the very good tree health.

Given the trees are in such good condition the oil accumulation should be well set up for next few months and should result in good oil yield.

The grove demonstrated ideal tree structure with open canopy in middle with excellent light and spray penetration. Lower operating costs are a feature of this grove because trees are now in optimal shape and condition and showing positive effect of the spray program.

Malcom McKenzie commented that previously anthracnose had been an issue but this had been addressed and trees/fruit have never looked so good. Sally McKenzie said that while they use sheep to graze through the grove and these are good for pruning low shoots, this is and must be managed closely so they don't ring bark or otherwise damage trees.

Secondary pruning has become important to balance crop and to address potential over cropping which would adversely impact the following year. Stuart Tustin recommended sealing wounds from pruning to prevent potential disease.

Andrew Taylor commented that while there was an impressive crop load, the grove should be looking to an even larger crop next year because of the new extension growth. He said that the across the grove 25+kg per tree is looking possible and because of the tree structure, pretty much all will fall within mechanical harvester catchment area.

Stuart Tustin recommended that crop balancing should be the focus in pruning this year, as no restructuring is necessary in these trees.

In summary, an exemplary olive grove showing what can and could be achieved in groves across New Zealand.

The group was very impressed at the compact nature of the trees at Bel-Hamed, their evident health with no signs of disease and an amazing crop of large fruit as shown in the following photos.

Bel-Hamed olive grove

Bel-Hamed olive grove

Terrace Edge, Canterbury

The group was welcomed then to the Canterbury Focus Grove, Terrace Edge by Bruce and Jill Chapman. The Canterbury Branch had arranged a pot-luck lunch so was a very convivial interlude to the day.

Out in the grove it was noted that the crop load was a bit patchy, some trees great, others light. Generally there was a leaner canopy with evidence of disease, especially anthracnose and cercospora. The canopy is looking improved on 2 years ago. Stuart Tustin reiterated the recommendation of pruning to get tree structure set up for more consistent crop from effective light penetration and effective spraying.

Andrew Taylor added that the young leaves are susceptible so the need to spray on an ongoing basis. He also explained that Anthracnose is a fruit rot that expresses at onset of ripening from latent infections from back at flowering time. It affects many crops and needs to be dealt with early, before symptoms are apparent. Practical management for late in the season may require early harvesting if fruit rot symptoms develop, because the rot can spread explosively in ripening fruit.

There were questions about alternate products that did not require the same frequency of application as Manzate but these are not proven on olives, not licensed in New Zealand, the with-holding period not tested and many alternative fungicides are prohibitively expensive. The comment was made ‘why would you do that when the Focus Grove programme results are so evident’.

It was noted that there was a lower leaf and higher bare wood ratio at Terrace Edge than Bel-Hamed, despite being only 1 km apart.

The issue with processing cost was raised but this is directly linked to volume, so increasing crops and processing throughput could see a reduction in cost from economies of scale. It was noted that the cost of mechanical harvesters is the same irrespective of whether 10kg or 20kg per tree is harvested, so improving tree yields could greatly reduce harvesting costs.

Taking into consideration that Terrace Edge is also an organic wine grape producer, Stuart Tustin suggested that their grape disease program schedule could be extended into olive grove to good effect, because the weather triggers for vineyard spraying for organic grapes is identical to the weather triggers for controlling olive diseases. There followed a discussion whether the Sulphur-based grape fungicide programme could be used in the olive grove, using the same application timings as commented on above.

Discussing Frantoio trees at Terrace Edge Grove

Leafyridge, Wairarapa

Craig and Ruth Leaf-Wright welcomed more than 25 people to the Field Day. Craig said that at the start of the new season it had been dry but then raining pretty much weekly, therefore spraying weekly. He had carried out some secondary pruning to thin crop load, especially removing pendant branches that would not harvest successfully. He said that he thought disease was now under control, after 2 years. Stuart Tustin said, after having gone through the grove with Craig that it was very difficult to find signs of disease and noted the healthy two year old leaf through canopy. He said that the tree health was evident in the visibly green canopies.

Craig said he had implemented the Anthracnose recommendation in using Difference (Score) during flowering. About half those present report flowering has not translated into fruit set. Stuart said heavy flower doesn't always translate to high fruit set because of the big demand on tree resources at that time. If tree foliage is reduced from disease and poor canopy structure, there is less resources to support a high fruit set. Such conditions, which is almost the norm in inadequately-sprayed NZ groves, lead to poorer fruit set and lower crops, showing up as lower and variable crops despite very heavy flowering.

Craig had had leaf tests done and this showed a lower than optimum nitrogen level. Stuart said the nitrogen deficiency is probably showing in some yellow leaves, especially visible on heavy-cropping Picual trees. He added that dry soil means trees can't take up nutrients so timing of nutrient application is critical for effectiveness. Another limitation can be that waterlogged soil impacts on the root system and these have to recover before the tree can focus on nurturing the crop and new growth. Picual seems more sensitive to water issues from remarks by Craig.

Stuart guessed that the crop was looking like 5+kg per limb whereas 2017 the average was less than 10kg per tree. He noted that in addition to the grove looking very healthy with little sign of disease, there was also less leaf loss and excellent new growth extension setting up conditions of growth required for the next year crop.

There was a question about lichen but Stuart said this was not thought to cause an issue but should ultimately be addressed by pruning which removes the old lichen-affected limbs. Lichen is a sign of historical lack of sun and the worse issue is that the lichen shakes with olives during harvesting.

Another grower commented that 2017 unharvested fruit was on trees that had poor flower set this year? He said that the fruit had stayed on trees into October. This needs to be followed up but thought to relate to tree health again.

Stuart added that redundant canopy (excessive limbs and dense trees) negatively impacts on photosynthesis and tree health. He said that as we improve leaf health in groves it is reasonable to speculate that may result in higher oil content (at least be close to optimum for each olive cultivar).

In summary Stuart said there was a great crop with excellent bunches of fruit and regrowth across the grove. He recommended that maintenance pruning was now appropriate vs intervention pruning which had mostly achieved the desired results in restructuring the

trees. Next winter pruning after harvest, further restructuring cuts are envisaged that will almost complete the tree structure redevelopment.

Frantoio at Leafyridge - fabulous size surrounded by healthy leaves

Reviewing grafting

Plentiful new growth here and below

Coppiced tree showing great regrowth

Stuart advises Craig on maintenance pruning

Group at Leafyridge

Ngatarawa (Aquiferra), Hawke's Bay

Bob Marshall and Shona Thompson welcomed more than 40 people, from as far north as Mangawhai and as far south as Cromwell and all growing areas in between. Also in attendance were Fiona Clark from MPI and two representatives from Horticentre Group – Garry Burlace and Chris Herries.

Bob explained grove layout and management program, the trees were 16 years old, mainly for oil but also table olives. They have only been fertilised twice in the life of trees and he decided this was unnecessary. Typically they harvested 20+kg but last year only 14kg. But the previous winter they had carried out intensive secondary pruning which likely limited the crop yield potential, and this was then exacerbated with water supply irrigation constraints in summer. Bob said the Manzate spray was costing 52c per tree and he could spray the whole grove with one tank.

At Ngatarawa they had also done a secondary pruning in December to remove ~3-4 pendant limbs, because trees looked seriously heavily fruited after fruit set, likely to end up being over-cropped by harvest. It was estimated they had reduced the crop load by 10-15 percent. The secondary thinning was also concerned with enabling sufficient growth for next year, anticipating that water may also become restricted in January. This proved to be the case with drought conditions and water restrictions in January and February, but the trees and crop have recovered well with the arrival of autumn rain from cyclonic activity in February-March 2018.

Stuart commented that trees were very well balanced with good crop loads throughout, spread from top to bottom of limbs. He commented on the good new extension and good size of fruit, considering the January-February drought. He said because Ngatarawa were early adopters, starting the programme in 2012, they were now into maintenance mode with tree management. He said that leaf drop evident is due to old age of leaves, not disease. Stuart said this grove is in the condition where other focus groves are heading. However he noted the challenges in other regions has been height of trees and their free unmanaged shape. For example in Nelson trees were up to 8m high. So their focus has been working on tree structure, including quite dramatic restructuring in some cases.

Stuart noted there has been some minor evidence of anthracnose at flowering across groves, either catkins are killed or fruit rotten later on. He said that disease would readily recur and become problematic if not continually managed with the recommended spraying regime.

Andrew commented that the big variation in stages of the five focus groves made it hugely valuable for people being able to visit other regions. This grove is ahead of other groves because of early adoption of spraying and serious pruning, based on horticulture advice.

There was a question on harvesting and optimum shape for machine harvesters and the impact on the trees. Bob said the grove had been machine harvested for 8 years and no adverse effects evident to trees.

There was a question about why Manzate. Andrew advised it was historically used and well proven in New Zealand on many other crops and registered for olives internationally. Many suppliers offer this generic fungicide which is 'off patent' so is the most cost effective. In response to a question about Copper, Gary from Horticentre said that toxicity was a concern and in other crops there were limitations on the number of sprays. The Olives NZ Best Practice Manual recommends against Copper.

Stuart commented that factors that impact on spray effectiveness are the sprayer, calibration, rate/speed of application, incorrect nozzle size/droplet size = under application. These factors can account for under-performance of the recommended spray programme where people are trying to use it, but experiencing less than expected results. Recommended Manzate rate is 3kg per ha but at Aquiferra Grove, 2.5kg is used successfully because of tree height and structure allow for very effective penetration and coverage.

Stuart said that reduction of tree height and opening up canopy have been key issues across focus groves - rehabilitation while trying to maintaining acceptable crops for oil production and reducing biennial bearing. He added that in general it is understood that the lack of water causing drought during fruit development can shrivel fruit and reduce fruit growth, reduce oil accumulation, and can cause premature leaf drop.

Andrew said the challenge over autumn is the need to continue the spray program to protect fruit and new growth. The Olives NZ recommended with-holding period for Manzate is 30 days and then restart asap after harvest.

Stuart said groves are advised to do leaf analysis to determine what nutrients might be needed before any application. He talked about situation at Leafyridge which indicated that nitrogen level required some correction next season yet nothing else needed. He said you should justify any input by measurements and testing following the principles of Good Agricultural Practice for environmentally-conscious farming methods. Applying fertilisers and compounds without any indicators of the need, apart from being unwise, may also waste both time and money. He reiterated leaf test is more effective than soil testing for immediate tree condition (especially N content) but soil tests are valuable for other mineral nutrients and soil pH.

There was a comment on the narrow focus of the project and that there was no information on the impact of Manzate on olive fruit or the environment and that the Focus Groves had no kept a control block of previous practices. Andrew explained that Olives NZ had tried for 3 years for project funding. Advice, in discussion with MPI and including PFR, was to tighten the project focus on tree health; disease and canopy management. Feedback had been that if too many factors were included then it would be difficult to determine which had been successful. This targeted focus resulted in funding. When Focus Groves saw improvements they extended methodologies across their whole groves, understandably; a positive dilemma which removed a 'classical' control!

Andrew said there had been new learning in management of acknowledged diseases, Peacock Spot and Cercospora, also with Anthracnose, but in relation to the latter more was needed on how it spread across the country and how it manifests.

There was the comment that olives on the tree are low value, value is in the oil produced. Currently the national average is less than 7kg per tree and needs to be 20+kg. The Focus Grove Project target was for 15kg per tree but all of the Focus Groves were on track to out-perform that this year and the challenge would be to replicate the crops in 2019.

There was discussion about the 2017 poor harvest and biennial bearing. Stuart said if you do nothing you get biennial bearing because of inconsistent new growth. Good canopy health and function results in improving fruit growth, possibly advancing fruit maturity, reducing risk profile at harvesting from weather events. The industry relies on being able to get fruit off in a timely fashion in winter, hence importance of tree structure.

In summary Stuart said that the Ngatarawa Grove was an exemplary grove and this was evident in the health of the trees, their structure and the excellent crop load.
The afternoon concluded with a BBQ and most stayed on for this and enjoyed ongoing informal discussions.

Frantoio at Ngatarawa olive grove

Group at Ngatarawa olive grove

Discussing the effectiveness of the pruning strategy

Viaduct Olive Grove, Hawke's Bay

The day following the Hawke's Bay Field Day was the Olives NZ AGM and some 32 attendees then went on a field trip to the Viaduct olive grove at Mihaka, which is one of the largest in New Zealand with approximately 28,000 trees. This was an opportunity to see a 'super' grove that had adopted the Focus Grove principles with evident success in relation to health of the trees, plentiful new growth and an excellent crop. The crop is estimated to average 20+kg per tree.

Enjoying a picnic lunch at Viaduct olive grove

Examining new growth extention at Viaduct

Healthy branches full of good sized fruit

Frantoio fruit at Viaduct

Olives on the Hill, Northland

There were 15 growers in attendance as well as the project consultants. They were welcomed to Olives on the Hill by owners Chris and Linda Smith.

The first stop were the Leccino which had been coppiced in October 2015, so this was the subsequent 3rd growing season. Stuart commented this looked a very good crop for the new "age" of trees with a very healthy canopy. He and Andrew noted some anthracnose rot in more mature fruit. Evidence of a wet season and difficulty in growing this variety in the more humid Northland climate. The suggestion was to spray very tight with Manzate as close to harvest as possible. Also to harvest all these trees by mid-April, no exception, in order to remove diseased fruit from the tree to help reduce disease build up and risk to other cultivars. The Appendix document details the rapid spread of anthracnose in the Leccino after the Field Day.

The second stop were the grove project Frantoio block. Noted that this was the 3rd "focus grove guidelines" prune this season. Starting to see very good regrowth in the lower region of the canopy, with medium to heavy crop load across the block. It was noted that the crop was ideal; not too heavy to hinder tree regeneration but heavy enough to achieve a commercial harvest yield.

Some trees will only have 2 years of "renovation" pruning remaining before the trees are reduced to a fully-manageable size and will be moved on to "maintenance" pruning. Comments were made pointing out the increased light throughout the block compared to early focus grove visits and a large improvement in leaf health.

The group looked at olives on some pendant branches and Andrew discussed that studies show that olives grown on these downward facing branches produce less oil with a lower polyphenol level, than branches that are stronger and growing in the early season more erect and upwards-facing. Information was researched and provided by European studies regarding these differences.

Overall this was a very positive field day. Leaf health would be at an all-time high due to the spray and pruning regime, despite a very wet summer in Northland. It was unfortunate to see anthracnose in the Leccino, but not surprising after the rainfall this season. Hopeful that this season will be the first where Olives on the Hill harvest all of their trees.

The afternoon concluded with afternoon tea and informal chats amongst the group.

Climate notes from Mangawhai, Northland, 2017-18 season.
- 630 mm rain since flowering
- 470 mm so far 2018 with no sign of rain going away
- key growing months of January & February; average temp = 22, average humidity = 85% (day and night)

Frantoio at Olives on the Hill

Discussion around canopy management

Stuart showing thinning technique

Summary

All of the Focus Groves and several others visited as part of the Field Days, that have been following the recommended programme for proactive disease management and canopy management, are showing dramatic improvements. Indeed at least two groves have reached an 'exemplary' stage and are exemplars for the wider olive growing industry in New Zealand. The others have had bigger challenges, including adverse climate and out of control trees, but are well on the way to achieving this outcome. Potentially all the groves visited are looking at crop loads of around 20kg per tree, thus exceeding the project target. The challenge of course will be maintaining a similar crop load in 2019.

Groves are still having issues with anthracnose, and Difference has not totally eliminated the disease at flowering. This may not be surprising when inoculum load and weather are factored into the scenario, but overall Cercospora and Peacock Spot are increasingly being well controlled on a cumulative annual basis. The broader impact of anthracnose was not known prior to the project so is a work in progress. The broader effectiveness of Manzate is reflected in marked reduction in disease, reduced to very little new disease outbreaks in the major parts of the groves that are following the recommended programme.

The suggestion of using Copper came up at several Field Days. Copper is not recommended for olive trees and its application is strictly controlled in other crops. While it may be used overseas on olive trees, this is to prevent/address olive knot which is not an issue for New Zealand. Similarly other products, which are not licensed for olives in New Zealand, are not recommended often on a cost basis. Manzate was chosen for the Project because it is well proven on other crops in New Zealand and is registered for use on olives in Australia and Mediterranean countries and with a short with-holding period. It is also cost-effective in the olive grove scenario.

In conclusion, there is very constructive and affirmative feedback from the project consultants on all of the groves following the recommended programme. Excellent turnouts occurred at all the Field Days and a real awakening of acknowledgement that the project has already achieved substantial improvements for participants.