JUNE 2020

Trevelyan's
where growers come first

Avocado Quarterly

Analysing The Season Ahead

Leigh & Yvonne Neilson – Avocado Growers

Lockdown proved useful on orchard given we were confined to our property (yes we are 70 years+). All seasonal activities were achieved and the orchard is right up-to-date. A big thank you to all our pruning, shelter trimming, mulching and spraying contractors. Also, Jonathan Cutting continued his regular visits over this time and kept us in good spirits with his advice and humour given we didn't go out into the infected world.

With 140 bins from 133 trees in the bank from last season, we head into this season having completed a heavy prune, reducing the original estimate of 110 bins down to 75 bins. We are very comfortable with this essential task and encourage all growers to ensure pruning is just a normal seasonal activity if sustainability is to be achieved. To us, this is just as important as spraying.

Fruit size at this time of year is an interesting study. Our advisor told us last week that our size was significantly larger than orchards at lower levels. We believe rainfall is a large contributor. We had 71mm in March, 63mm in April, 125mm in May, 171mm in June and 453mm YTD (up to the 24th).

Fruit quality should be top of mind for us all. We have brought into the theory that copper spraying before a rain event is the main key to preventing rots generally. While last season revealed an improvement in fruit quality, this is an ongoing issue. Why should some growers play the game and subsidise the non-conformers via the pool?

We feel very sorry for those growers who held fruit late to supply the local market. Who could have predicted the market would be affected by coronavirus? Having said that, the debate continues as to whether 'local market-only' growers should be compliant in the same manner as export growers.

We are all growers and should be fully compliant no matter what markets we supply. One standard for all.

Leigh Neilson keeping the orchard up-to-date over lock-down.

Operations Update

A SUMMARY OF END OF SEASON PAYMENTS BY PRIMOR BY SIZE BELOW					
SIZE	NET TO GROWER	AVERAGE PACKING REBATE	AVERAGE LATE HARVEST COMPENSATION	COMMISSION REBATE	TOTAL
16, 18, 20	$16.995	$0.90	$2.68	$0.295	$17.29
23, 24, 25	$17.568	$0.90	$2.68	$0.302	$17.87
28, 30, 32	$14.70	$0.90	$2.68	$0.270	$14.97
36	$10.863	$0.90	$2.68	$0.227	$11.09

End of Season Payments

Daniel Birnie – Avocado Manager

This season our average packing rebate was $0.90 per tray. The range was zero cents per tray up to $1.26 per tray.

The average late harvest compensation benefit was $2.68 per tray, and the range was zero cents per tray up to $9.42 per tray.

As an example of how the late harvest incentive worked, we had a grower who strip picked their orchard in early February. They picked 111 bins off their 100 trees (1.69 ha). Their export packout was 59% and average size was 24.5.

This grower, on Maungarangi Rd, received the $9.42 per tray late harvest incentive, bringing their OGR to $29.50.

With the local market payment included, their average return per bin was $1300, and OGR per ha was $77,000.

The majority of comments from growers we've heard when visiting orchards is that the late harvest compensation was about right this season, and justified the risk of holding fruit late.

The AVOCO Grower Relationship Committee will be meeting shortly to decide whether to keep the compensation the same, or to increase or decrease it.

Getting Rid Of Mites

By Katherine Bell– Avocado Services

Etoxazole sprays (such as Paramite or Eromite) carry out translaminar activity and break the mite's lifecycle. Being translaminar means the spray will move through the leaves to where the mites are feeding on the underside. The spray is effective on all stages of the mite lifecycle and also kills the eggs.

Etoxazole will sterilise any adult females and prevents moulting in larvae and nymphs. With its limited effect on adult mites, we recommend adding either an Abamectin (e.g. Avid) or Milbermectin (e.g. Mit-e-Mec) for large infestations. You will find with just adding Etoxazole that adults will be present for a couple of weeks after application.

Application timing is important as Etoxazole has a 63 day withholding period for Asian markets, but only a 14 day withholding period for New Zealand, Australia and China. It is best applied when nymphs are in their early stages of development. This is generally in winter before an increase in adult populations. Control occurs within 7 to 14 days after application and the spray has a residual effect for up to five weeks.

The spray should be applied to a dry canopy at 35ml per 100L of water and you are limited to one application per season. Etoxazole is soft on beneficials and since the spray is the only one in its class, there is no risk of resistance when using other miticides. This makes it an important part of our rotation programme to prevent resistance.

Avocado Nutrition And Regenerative Agriculture

Dr Jonathan Cutting – Avocado Technical Manager

Every autumn avocado growers conduct leaf and soil tests to see where their orchard's trees and soil are nutritionally. The results provide guidance as to opportunities to improve orchard performance in terms of fruit quality, yield and fruit size. The international avocado literature is heavily invested in plant nutrition/soil fertility articles. There are some conceptual conflicts depending on the topic, and understandably growers can be confused or overwhelmed. An added complication is that fertiliser use is becoming more regulated as a farming practise (clean water bill, Overseer, nutrient limits and regional council oversight), especially as the consequences impact the environment.

Recently, a new approach has become more widely talked about, namely "regenerative" or "restorative" agriculture. In a nutshell, "regenerative farming" is a long-term approach underpinned by sustainability concepts where the soil is improved or "grown" to become deeper, more fertile and more resilient with lower environmental impacts. The underpinning focus is rebuilding soil carbon, top soil depth and increasing soil flora and fauna biodiversity.

At the same time, more and more New Zealand avocados are being exported to ever more distant markets, stretching the time from harvest to consumption. This has an impact on fruit quality and growers are being asked to grow better fruit less prone to quality issues in distant markets.

So how do we respond, and what are the opportunities for growing blemish-free fruit with good keeping qualities of the right fruit size profile in our highly regulated and political environment?

One of the ways is to start implementing "regenerative" farming practises. In recent years, the avocado team here at Trevelyan's have been encouraging growers to view soil health as a wider part of orchard health. Over the past two winters we have:

- Encouraged growers to apply composts
- Encouraged orchard soil regeneration by reducing use of hard systemic herbicides
- Worked to reduce soil phosphate to soil Olsen levels of 25-40 to encourage larger root systems
- Encouraged soil copper mitigation
- Shifted soil pH to slightly acidic (pH 6.2-6.4)
- Tried to balance potassium, magnesium and calcium levels

Regenerative farming is still largely conceptual and gaining momentum rapidly. However, different people have different definitions of what comprises regenerative farming. There are no agreed standards, as in organics. In a nutshell the "regenerative" focus is largely on soil improvement as measured by soil carbon. The wider view and goals of regenerative farming are:

- Restoring the quality of our waterways

- Increasing carbon sequestration in our soils
- Reducing greenhouse gas emissions
- Improving food quality and safety
- Allowing healthy ecosystems to flourish

And all of this while increasing farm/orchard productivity, profitability, animal welfare and long-term agricultural sustainability. Sounds too good to be true!

But let us get back to avocado leaf and soil tests and developing fertiliser programmes. I do note that over many years (15+) the same orchards sampled annually are on a trend of using slightly more fertiliser most years to maintain a specific leaf and soil norm. A quick analysis, for example, of nitrogen and potassium on four orchards that I have been involved with for more than 20 years shows there has been an annual increase of 30 units in nitrogen and 40 units of potassium per hectare versus 15 years ago.

Looking at a Mulder's Chart of nutrient interactions in soil, it is easy to see the path we are going down. Too much nitrogen, phosphate and calcium has had negative impacts on boron, zinc, potassium and magnesium nutrition.

Is this sustainable and why is this happening? More importantly, what can we do about it?

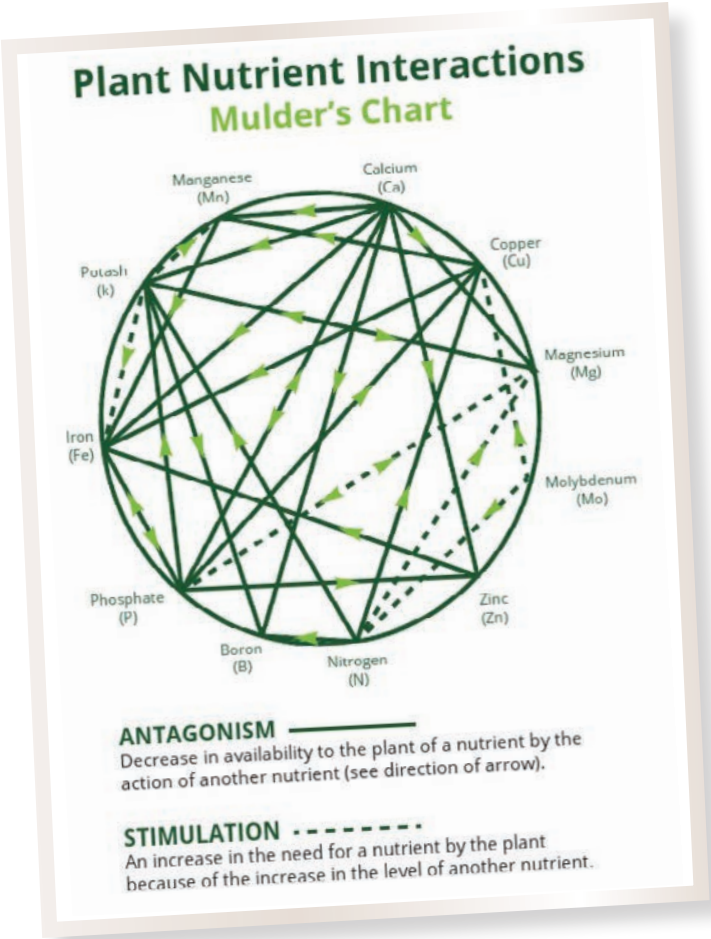


Fig 1. Mulder's Chart showing soil nutrient interactions.

Some key trends observed over time in New Zealand avocado orchards:

- Soil phosphate is very stable and very difficult to get into the desired 30-50 Olsen range if your starting point is high (>80 Olsen). We have some orchards with phosphate above 140! Why is phosphate important? A long-term nutritional study conducted in California established a strong inverse relationship between long-term yield and phosphate. There is an evolutionary driver but, in a nutshell, avocado trees grown in high phosphate soils have smaller root systems.
- Leaf calcium remains stubbornly low on most orchards, irrespective of calcium and liming inputs. Calcium nutrition in avocado is challenging as evapo-transpiration demands are low and the roots have no root hairs. A large root system and biologically active soils, including Mycorrhizal fungi, are necessary to maximise calcium uptake. High soil phosphate negatively suppresses both calcium and potassium uptake.
- Maintaining a soil K:Mg:Ca base saturation ratio of 1:2:5 is very difficult.
- Leaf boron is relatively easy to maintain in the 28-40 ppm range.
- Leaf zinc can be challenging, and this is not surprising as zinc uptake is suppressed by high levels of soil phosphate according to the Mulder's Chart of soil chemistry interactions.
- Growers who are using mulches, and especially composts, appear to suffer less photo oxidation (winter yellowing of leaves) and maintain their base saturation balances more easily.

Can regenerative agriculture help avocado growers? Loss of soil carbon is viewed as a real challenge in all forms of agriculture. This is the case in orchards where:

- Organic materials build up in soils that are not biologically active
- Soils have a low fungi-to-bacteria ratio
- Drainage is impaired
- Soil fauna and flora levels are low

The result is that growers rely on ever-increasing chemical inputs, from Phytophthora injection treatments to large inputs especially of nitrogen. Keeping soils healthy sounds overdone and carries of label risk of being viewed as "out of touch" and being a "greenie"!

But is this true? We know that healthy soils encourage healthier root systems. Healthy root systems will help take up those mass flow nutrients like calcium and boron increasing fruit resilience and fruit quality. Using some of the principles from regenerative agriculture we can focus on soil "health" and farm with nature rather than against it. We can use any combination of the following:

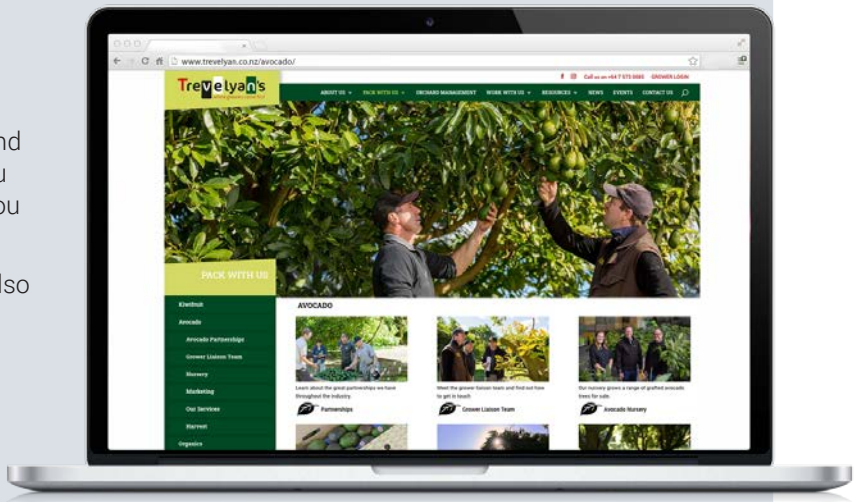
- Good orchard floor management, including the use of compost and practices that encourage the long-term build-up of stable soil carbon (in the form of humus and humic acids).
- Growing many species (the more the better) of deep-rooted annuals and bi-annuals on the orchard floor, rather than just grass (which needs mowing), to build up soil life and increase top soil depth – grow deeper soils! This is viewed as a cornerstone of regenerative agriculture. There are many types of commercial mixes available, such as the Kings Seeds Beneficial Insect Mix.
- Plant orchard floor plant species that provide good habitat to beneficial insects. Encourage insect diversity especially predator insects.
- Work at increasing mycorrhiza activity. This will improve plant nutrition and reduce the amount of fertiliser required annually. Monitor and measure.
- Use new novel low impact pest controlling technologies, such as mating disruption or trapping.
- When choosing insect pest spray chemicals, try to use products that have minimal impact on soil life, especially soil fauna. If you do spray, be very targeted and optimise spraying efficiency and minimise drift into non-target areas.
- Reduce orchard soil compaction, usually in the form of reduced orchard vehicle movements, or using lighter vehicles.
- Improve soil drainage and aeration.
- Reduce herbicide use, especially non-selective herbicides.
- Review your annual nutrient needs (as units of fertiliser) and choose fertiliser forms that pollute less (are not rapidly soluble). Consider incorporating the use of slow release and/or organic fertilisers as part of your annual applications. Increase frequency of applications (little and often).
- Consider green manures (Google if you're not sure what green manures are!).
- Consider using abiotic (environmental) stress reducers, such as seaweed extracts which contain natural plant hormones.
- Make use of nutrient mineralisation in the soil.
- Review and reduce orchard practices that accidentally encourage the build-up of either pests or disease. For example, leaving deadwood in trees as an inoculum source.
- Engage in annual testing and measurements of soil biology and orchard performance to determine success and progress.

Regenerative agriculture is a long game. If you choose to go down this path, embrace the concept, upskill yourself on the biological science it is based on, experiment and innovate, find some good supportive "friends" and set up or be part of a discussion group. And most importantly, be passionate and enjoy the journey!

AVOCO Audit Season

Christine Draffin
– Quality & Compliance Manager

Audit season is upon us and we are hoping to start mid/end of July.



Do I need an audit?

The general rule of thumb is, if you have exported and completed an AVOCO audit in the past and think you will only be supplying to local market this season, you will still need an AVOCO audit.

If you are a new or existing export grower, you will also require an AVOCO audit.

Those growers who are independently audited to GLOBALG.A.P. (eg SGS or Assure Quality), please supply a current audit certificate to us.

One of our team will be in touch soon. If you have any queries or concerns please contact Yvonne, Wendy, Josie or email gap@trevelyan.co.nz

Avocado Local Market Update

Lance Dodd – Avocado Domestic Market Manager

It's been a challenging autumn to say the least. Before looking at what has happened over the last couple of months, I had a look at what returns were one year ago in 2019.

In March 2019 tray returns were $67 per tray. In April we didn't have any fruit to sell, and in May 2019 they were over $90 per tray. This autumn, we have picked and packed over 2000 bins which was considerably more than what we expected to be kept for the late local market.

The second pool in March was really tough, as we entered lockdown. Fruit had to be repacked into different trays, and diverted from one market to another. This was due to cafes and restaurants closing down.

Retail demand slowed significantly, then picked up through April. However, we had to be careful to only pick enough to meet market requirements. Also – there was little demand for small fruit, and that continues through to now.

We thank growers for your understanding through this challenging time. New season fruit has started well, with OGRs in the $25 range.

Below we have reported the Orchard Gate Returns per tray during the February – April period.

CLASS 2	FEBRUARY		MARCH		APRIL	
	Feb-01	Feb-02	Mar-01	Mar-02	Apr-01	Apr-02
16	$15.35	$21.29	$18.65	$4.89	$24.16	$21.27
19	$18.62	$21.35	$19.49	$14.12	$24.41	$22.19
24	$20.82	$20.03	$23.04	$16.33	$18.41	$20.01
30	$12.64	$16.61	$19.02	$6.25	$21.04	$19.79
36	$3.69	$4.15	$4.16	$1.45	$2.49	$5.03
42	$3.61	$4.69	$6.09	$1.59	$2.88	$2.24

CLASS 3	FEBRUARY		MARCH		APRIL	
	Feb-01	Feb-02	Mar-01	Mar-02	Apr-01	Apr-02
16	$12.01	$17.90	$18.28	$3.79	$23.77	$12.87
19	$10.80	$17.44	$8.35	$3.54	$19.80	$19.23
24	$11.69	$17.38	$15.96	$3.30	$20.99	$21.44
30	$6.30	$5.13	$9.46	$0.76	$15.04	$17.74
36	$3.63	$4.82	$3.56	-$0.94	$2.48	$3.33
42	$3.64	$5.01	$1.97	$1.20	$1.80	$2.41
46						
mix	$7.81	$19.14	$3.58			
Per bin	**$729.00**	**$935.00**	**$892.00**	**$495.00**	**$1,094.00**	**$1,004.00**

Grower Profile Leighton Oats

Leighton and Amanda Oats have an orchard on Benner Rd in Pongakawa. The orchard was run down when purchased, with sick trees, and some of the orchard is very low lying and struggled with frost. Leighton and Amanda have turned the orchard around.

They are also interested in regenerative horticulture (which Jonathan writes about in his article). Their orchard is pruned well for sunlight and has mixed species of ground cover. Leighton has also been trialling the use of drones to identify flowering intensity on his orchard, and therefore where to prune in the spring. *Read more below...*

What is your background?
My Father owned a cabinet-making business in Te Puke so it was an easy transition into this as a trade after leaving school. After qualifying as a cabinet maker, I felt I needed a change and left this to start work in kiwifruit at the end of 1999. An opportunity arose for my wife and I to manage a large Hort16a kiwifruit orchard in Italy from 2004-2006. We then returned to New Zealand to manage kiwifruit orchards in Paeangaroa. We purchased our own avocado property in 2012. The property was in a poor state and I was told at the time by Daniel that 'we had purchased the worst orchard in the Bay of Plenty'. It had been frosted and all the crop was on the ground. Some of the trees had phytophthora, and basically poor tree heath all around.

What is your interpretation of 'regenerative horticulture?'
When PSA hit the kiwifruit industry, I was told by an Italian friend 'you have to protect the plant from the inside out'. This got me thinking and my journey of how we can make our plants stronger began. I realised that plant cell structure and nutrient density all play a part to growing a stronger, healthier plant. This all comes from a healthy soil.

Where do you find information on regenerative farming principles?
Over the last eight years I have been to a few 3-5 day courses with Graeme Sait, Nicole Masters and Neil Kinsey. I also read books on these subjects and talk with other growers who are trying different things.

What ideas/ products are you trialling?
Last season I heard more about the potential of mixed species cover crops, so I am currently experimenting with them in our orchard. I am balancing the nutrition in the soil by basing my fertiliser base mix on the Kinsey-Albrecht balancing approach.

I am also feeding the soil microbiology with seaweed, fish hydrolysate, humates etc and use a bacterial foliar spray to control my frosts.

A tree that was badly affected by phytopthera, that has been nursed back to health

My understanding is that phytophthora in the fungi world is a poor competitor so my goal is to create a strong microbial biomass so that the good fungi out-compete the bad, therefore reducing or eliminating the need to inject.

The seed mix variety Leighton is using on his orchard

Are avocados well-suited to regenerative farming? What are the big opportunities?
I think some of the opportunities we have in avocados include the potential to use multiple mixed species cover crops. They bring in beneficial insects to help control the unwanted ones. But the biggest opportunity with them is how roots of plants release exudates which signal the biology in the soil to release nutrients that are locked up, becoming available for the main crop.

What challenges do you foresee for growers adopting regenerative farming concepts, and specifically the use of copper fungicides?
The main challenge with growers starting to adopt regenerative growing is their mindset. For me, the first challenge with multi species crops was that the grass wasn't short right through the orchard anymore. But when you start understanding why the grass is longer and how different plants are interacting in the soil, it's pretty cool.

My understanding of copper is that plants need copper inside the plant to help with photosynthesis and cell wall structure. It is a nutrient so we need the right levels on the inside of the plant and in the soil, not just a protective barrier on the outside of the plant.

What are your challenges coming up?
With our orchard being near our house it would be ideal to not have to apply insecticides to control the economical damage to my trees. Trying biological/ organic alternatives to control insect pressure is a focus. Tree health is also a big part of this.

What do you think the challenges for the industry will be coming up?
As a small country we need to set the bar high; to aim at being the best in what we do and what we produce. So for me, growing avocados that are the best storing, the best tasting, the best looking and with little to no insecticides would be a pretty good goal to aim for. Achieving this would set us apart from other producers to be able get a premium for our crops.

Grower Profile Ian and Laura Schultz

Ian Schultz has an orchard on Rangiuru Rd in Te Puke, with his daughter Laura, who is becoming much more involved in the orchard.

Key points of interest about their orchard is that it is around 16 years-old and still on 7x7m spacing. They manage tree growth through the use of Sunny and regular pruning. The pruning is completed from a hydralada with an electric chainsaw.

Read more below...

What is your background?
Laura: I've worked on the orchard fulltime for almost nine months now. Growing up, I worked during summer holidays and breaks between study and other jobs – mostly working on kiwifruit in development blocks but I do remember planting our block three avos in 2013 when I was on a break from study (Diploma in Fashion).

I have previously taken a two year working holiday in Canada where I was a snowboard instructor in winter and did golf course maintenance in summer. When I came home, I spent about a year doing a few different jobs like landscaping, childcare and yoga teacher training while figuring out what I wanted to do next.

Tree to be pruned.

Your orchard is 16 years old and has 7x7 m spacings – what are the advantages, challenges and what is your pruning strategy?
Laura: I think it's a disadvantage to spend time and money removing trees when we can keep the ones we have and manage their size by consistently pruning. The challenge with 7x7 is keeping the trees small enough to prevent them crowding and allow enough light to filter through to the entire tree, not just the top half.

In the past we have pruned every second year or so and made some big cuts but it has been inconsistent. I pruned for my first time this year and made some big cuts and plan to prune twice yearly – autumn and spring. The strategy is to minimise the amount of limbs to two or three main limbs, open the middle of the tree to let light in and to stay on top of new growth so that it doesn't fill up with non-fruiting wood.

As a previous pig farmer, what are some of the benefits of using pig manure?
Ian: The piggery provided an abundance of compost, so we have tended to use compost and gypsum as the main base fertiliser. We spread compost mainly in the spring at 10 to 15 tonne per hectare with an additional lighter dressing in the autumn. It is a great soil conditioner and provides a reasonably balanced slow release of nutrients throughout the year. We use some additional N and K inputs in the spring and autumn to keep the trees topped up when demand is highest.

Why do you use the plant growth regulator 'Sunny' every year?
Ian: Sunny has been a part of our plan to control the summer flush and push more of the tree's effort into growing fruit rather than vegetation. The pig manure compost encourages the trees to grow more than we need, and I think Sunny has reduced the height gained each year. We have usually grown big fruit and maybe Sunny has helped in that regard.

Your long term average yield on the orchard is around 12 tonne per ha. What is your goal?
Ian: We need to be consistently doing 20 tonne per ha. To date our pruning strategy has been somewhat inconsistent and we have let trees get too congested, resulting in big variations in yield.

What are your challenges coming up?
Laura: The challenge will be staying on top of new growth and managing pruning whilst maintaining a good crop. Personally, I've got lots of learning to do about the trees and the industry.

What do you think the challenges for the industry will be coming up?
Laura: I think working together is a major challenge and managing our supply as a collective to export markets efficiently and effectively. I think developing new markets and providing consistency of quality and supply for those markets is also a challenge.

I wonder if we will have workforce challenges in the future as the industry grows as we have seen happen in kiwifruit. Of course an ongoing challenge is continuing to learn about our role with regard to sustainability and environmentally-friendly best practice and how to stay current and on top of those issues.

Top: Tree to be pruned. Bottom:Young tree.