

CUTTING Edge

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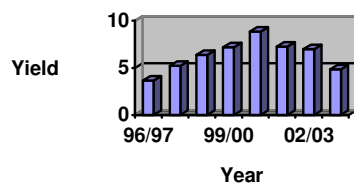
What has happened to avocado yields?



The Cutting Edge is a regular article written by Dr Jonathan Cutting for the New Zealand avocado industry magazine, AvoScene.

The New Zealand avocado industry appears to have hit a nasty turn in its development journey. After several years of both steady and sometimes spectacular yield increases (which peaked in the 2000/01 season at almost 9 tonnes per ha), the national yield has dropped steadily to approximately 5 tonnes per ha for the 2003/4 season.

National Yield 1996 to 2004 (tonnes per ha)



This pattern is very atypical of other countries, which tend to have strong “on and off” years. The New Zealand experience is rather different and shows a strong pattern of rising and then falling yields. Undoubtedly weather and climate has played a part but this sort of pattern is more indicative of grower behaviour changes. I personally believe that the New Zealand avocado industry is facing a very real yield challenge, and that it is based on two causes, a decreasing grower skill base and changing grower

behaviours that have not been well thought through.

So what has happened to yield and what can we collectively as a sector do about it? Firstly we need to review what major changes have happened and how these have possibly influenced the outcomes. Secondly we need to address what growers can do, and then as a sector what the formal structures (AGA and AIC) can do, to address and assist with the problem.

Before we get into the management and orchard environment changes that have occurred I do think that it is important to understand our grower behaviours and industry culture. There is strong belief in “anecdotal evidence” in our industry and we need to see this in perspective and understand how it impacts on our sector. It interests me greatly that the medical profession, for example, attaches very little value to anecdotal evidence in the view that it distorts the truth and the reasons resulting in anecdotal “evidence” are often unrecorded or not understood at all. With a lack of understanding all too often the wrong conclusions are reached. When human health is in question we use the scientific approach of proper statistically sound experimental design, not anecdotal evidence!

So let’s look at anecdotal evidence in a way we can all understand it as it has particular relevance for atypical experiences. We may know of a person who smokes 30 cigarettes a day, enjoys 15 rum and cokes a week, prefers egg and bacon every morning, loves steak and chips most evenings, hates exercise and is over weight but reaches the ripe old age

of 80. Anecdotally if you looked at this particular case you could, rather erroneously, conclude that this is a great recipe for long life. But we know that if the average person (Joe or you or I) practiced such a life style we would be lucky to live till 60 and overlaid with a stressful environment (domestic or work) then 50 becomes a real challenge.

All orchards are not equal and all are subject to variations, some are the most fortunate equivalents of “genetic anomalies” and their virtues are often sung. I have in the course of my travels been on orchards which have never been injected against *Phytophthora* root rot, or have never been irrigated or hardly fertilized and these orchards have performed adequately and, in a few isolated cases, have even performed quite well. That does not mean that what has occurred on these orchards is “good practice”. It means that an exceptional set of conditions including soils, microclimate and germplasm have combined to produce a given result in any one year. Not understanding this is a recipe for disaster. I remain concerned that technical advice to growers has become “cult” driven with advisors deviating from best practice in an attempt to brand or differentiate them. Their views and recommendations are not exposed to scrutiny, constructive debate or peer review. The price, in its wider context, is unfortunately and sadly borne by growers some of whom become “lemmings” in the process.

Every orchard is different and there is no single recipe for success. Clearly “one shoe does not fit all” and there is no silver bullet for success. Sadly many growers are continually searching for a non-existent panacea and are most unlikely to achieve horticultural success as long as this search remains their focus. Growers are far better served by searching for and understanding sound science which results in the promulgation of good scientific principles which in turn underpin good orchard practice. Anyone who cites an anecdotal example somewhere of an orchard that performs

well and attributes it to a single input (for example low nitrogen or high nitrogen or *Phytophthora* prevention, or lack of *Phytophthora* injection) is both reckless and dangerous; and good growers would do well to avoid the advice of such people.

There are some very good avocado growers in New Zealand who I have been fortunate to meet over the years and we have engaged in quite wonderful discussions on growing avocados. These growers, a few in each region, are all exceptionally good growers and most are very humble and modest about their orchard achievements. Like all growers they have better and worse years but they all do have something in common. They never jump on the latest band wagon or fad, they question persistently until they understand and before they implement new advice, and they all practice, admittedly in their own way, good horticultural principles. What else do they have in common? They have been in the industry a very long time (no newbies here), have a wealth of experience to draw on, walk their orchards with their eyes wide open, and listen with their ears rather than their mouths. Most importantly they are all passionate about growing avocados and particularly about growing avocados in New Zealand. If ever you get the opportunity to rub shoulders with any of them it is worth listening to what they have to say especially when it comes to growing avocados.

So let us get back to yield and consider and ponder the reasons for the lack thereof. This is in itself a large topic and obviously I can not do it justice here. Rather I will just cover a few thoughts, enough hopefully to get you all thinking. First, there has been rapid expansion of new acreage in the past 6-7 years. Mature acreage has more than doubled in the period 97/98 to 02/03 with acreage rising from 940 ha to more than 1,890 ha last year. There are more than 2,100 new ha planted since spring 1998 that has still to be included in the total acreage. That gives the industry a total acreage of over 4,000 ha. This is a sizeable industry and if performing properly (using average tray

returns from the past 6 years) should be worth more than \$110 million at farm gate (\$190 million first point of sale value). If the industry performs similarly to the 2003/4 season in terms of yield the farm gate return would be less than \$45 million. An important point is that with rapidly expanding acreage and many new growers the average skill level within industry is falling! To all the new growers out there – what in isolation and superficially apparently makes sense is not always the truth – beware the “anecdotal advisor”!

Second, there have been two big changes in the complex pollination equation. The Veroa bee mite has devastated feral bees to the point of irrelevance and the amount of pollinator trees has fallen as a percentage of planted acreage. As there has been global consolidation around Hass growers have removed other avocado cultivars. As many Hass orchards with pollinators have been thinned it is the pollinators that in many cases have been removed. More worrying is that many new larger blocks have been planted without any pollinators at all. The early recommendations for pollinator trees were at 5% (one pollinator tree to 19 Hass trees) but in view of recent research, particularly in California, this recommendation has now been raised to 10% and even 12% pollinators. We have all the good pollinator varieties in New Zealand namely Zutano, Bacon and Ettinger. What we now need is for growers to ensure they have enough pollinator varieties in their own orchards.

Third, there has been an overall and dramatic improvement in leaf condition and canopy density due to improved nutrition and better root rot control. This requires a large water resource but many growers are still not irrigating. Two dry years, both winter and summer, in the Bay of Plenty have not helped the situation. Mulching trees does not make more water; it conserves water and reduces soil evaporative losses. Therefore it is not a substitute for irrigation.

Fourth, there is too much planting on marginal land especially in the Western Bay of Plenty. There is no substitute for good uncontroled land that lies to the north or north east with good air drainage. Orchards planted in risky environments carry that risk for the life of the orchard. People who do not understand that should really not be growing avocados!

Fifth, there are just too many old and tired trees that we can bring back to life in terms of canopy but cannot rejuvenate in terms of their roots. The poor planting techniques used a decade or two ago resulted in many trees with small root systems and in many cases we now have a “Sherman tank above the soil with a mini minor fuel tank below the soil”. No matter what we do to the top half of the tree we are still stuck with the small root system. This topic is an article in itself and best left for another occasion. All of the above contribute to the lower yield problem in New Zealand but each in isolation in no way explains the problem. It is a complex problem based on multiple integrated causes and requires both time and an integrated solution.

Sixth, we really have small understanding of how severely the impact of six spotted mite affects yield and biannual bearing. This pest is a sap feeder, reduces tree carbohydrates and storage reserves, reduces leaf area and function and must have a dramatic effect on whole tree physiology. We can only begin to wonder what the impact is on yield!

The AIC and AGA made a policy decision over a decade ago not to be involved in grower extension but to allow commercial forces to function and provide this service to growers. Instead the AGA and AIC would undertake a research programme and provide information and results to the wider industry including industry advisors and consultants who could then interpret and flow the information to growers. The fruit quality issues from 4-5 years ago and six spotted mite in Northland forced the re-direction of substantial resource in addressing these problems. As a result production, especially yield opportunities

and challenges have suffered. The amount of New Zealand generated production research information has declined significantly. Based on industry performance this policy and the later R&D investment decisions have not delivered the expected production benefit to growers and some would go so far as to say, that it has failed.

In contrast to the AGA expectations, we now have a grower community that on average is unsettled, divided, confused, technically less skilled, and feeling disempowered. I would suggest that AGA rethink some of its policies before it is viewed as aloof and disconnected from growers, and it needs to do this before yields can improve in a sustained way in New Zealand. It should be worth talking to your local AGA representative about.