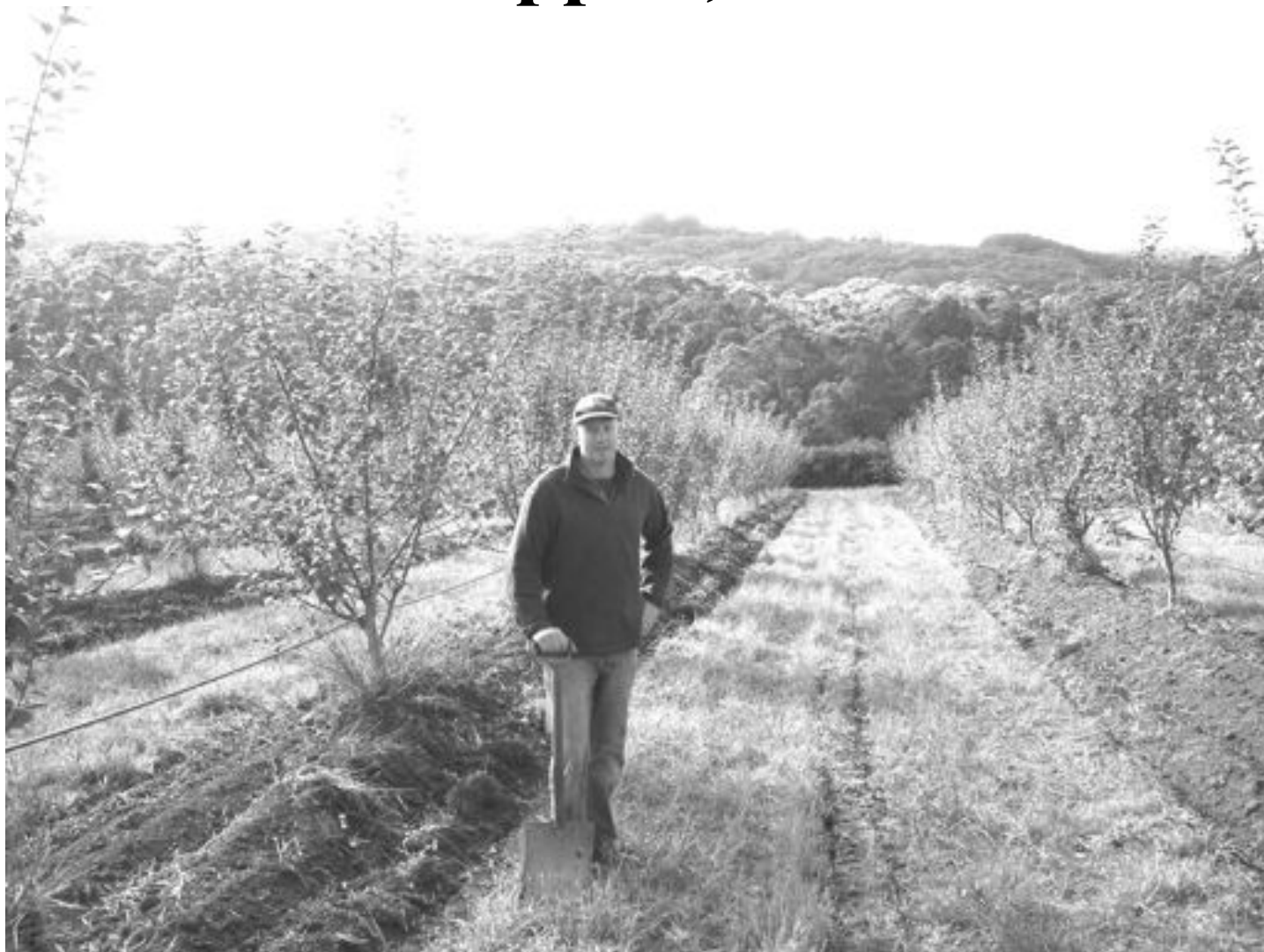


Mock Apples, Red Hill



Neville Mock, fourth generation apple grower, second generation Biodynamic apple grower

Neville and Raelene Mock run a 50-acre (22 hectare) Biodynamic apple orchard at Red Hill on the Mornington Peninsula, south east of Melbourne. Neville's father, grandfather, and great grandfather were orchardists before him, and his great-great grandfather was a market gardener! His father Wally bought the Red Hill property in 1960, and converted it to Biodynamics in 1974 (I have been eating their delicious apples since the late seventies). Neville and Raelene also grow some pears and cherries.

The growing of Biodynamic apples is a highly complex art and science, and Neville has seen the highs and lows over the last thirty years. He has seen the effects of years of excessive rainfall, years of extended drought, and the effect of mineral shortages. He has battled insect and disease problems. He has drawn on the experience of the generations before him, and his own innovative ideas to gradually build a very sophisticated and successful system of orchard management.

Insects and diseases are now of minor consequence, nutritional management is highly refined, and through

value adding, Neville and Raelene can not only provide consumers with a tantalizing array of apple products, but also considerably soften the effect of bad seasons.

The Red Hill soil is typically a red volcanic basalt, only 200mm deep, over a solid red clay subsoil. Neville and Raelene's soil is now a rich brown colour as a result of 30 years of prepared 500 application (spring and autumn) together with annual green manure crops, and is now 300mm deep.

Establishing New Trees

When an old block of trees needs to be removed because it has become unproductive, it is necessary to give the soil a rest before new trees are planted. Green manures and vegetables are grown for a few years to rejuvenate the soil. When the soil has had a good break from fruit growing, and is in good heart, raised rows, running downhill, are roughly formed up with a Merbein (disc) plow. The rows are spaced five metres apart. The young trees (whipsticks) are planted four metres apart and snipped off to grow the frame. The whole area is green manured for three or four years while the trees establish, and as the green manures are ploughed in, the lands can



Four generations of apple orchardists



Young apples, dun peas

be progressively more accurately formed.

Neville aims to develop a vase shaped framework of five or seven leaders – an odd number because trees with an even number of leaders tend to split. The young trees are pruned to outward facing buds, and spreaders may be used to open up the framework early. The leaders must be free from competition, and the ‘three-to-one’ rule is used – any lateral with a diameter greater than one third of the diameter of its leader must be removed or it will compete with the leader.

The trees are irrigated with drippers close to the tree until they begin to produce their first fruit. Later, as they become bigger, a drip line is attached at 2 metres height, with sprinklers that cover a five metre diameter. Water is

used judiciously and the 50 acre orchard is watered with only 11 megalitres of water per year.

Nutrition

Orchard nutrition is a very complex matter. It is very important to get the balance right, neither under-feeding nor over-stimulating. The most important tool in Neville’s situation is undoubtedly the autumn and spring-sown green manure crops.

Neville is putting a lot more emphasis on nutrition than he used to. For ten years he used no phosphorus, and the trees started to look hungry and develop purple leaves and other symptoms. Now, when he feels something is lacking, he has tests done on soil and leaves for major and minor elements. He uses several different laboratories, and usually a trend becomes apparent. Neville looks at the results as a whole, combined with his careful and experienced observation of the trees, and makes a decision based on these factors. He will then discuss it with Alex Podolinsky (Bio-Dynamic Agricultural Association of Australia) and Frances Porter (Bio-Dynamic Research Institute) before applying elements. If he follows the advice of the laboratories, it will be with much smaller quantities than recommended.

Nutrients applied other than manures are phosphorus (applied as rock phosphate, at 50kg/hectare every few years), small amounts of potassium, zinc and boron as occasionally required, and lime (liquid lime, applied in small quantities regularly, mixed in with tree sprays). These inputs are generally applied to the green manure crop, though rock phosphate is applied to the whole area independently, because it is so slow to become available to roots.

Biodynamic compost would be the ideal fertilizer for an orchard, applied annually, but in practice it is impossible to source sufficient compost materials to meet the requirements of a 50-acre orchard each year. Instead, Neville sources local manures (tested and free of any chemical residues).

Biodynamic growers are very careful not to feed their crops directly with the water-soluble nutrients that come with raw manures. Rather, manures and other nutritional inputs are put through one, or preferably two green manure crops, so that any soluble nutrients are incorporated in the soil colloidal humus before the food crop (in this case, the apple trees) starts feeding.

Neville’s program is to apply nutritional inputs to the tree lines (as far out as the drip line of the trees) in autumn, straight after picking, and to sow a green manure crop. The manure and other inputs feed the green crop, which is ploughed in in spring, and incorporated in the soil humus by the time the trees become active again. The soluble nutrients in the manure do not affect the trees because they are going into dormancy.



Ploughing off



Tree row ploughed, manured, and sown

As soon as the apples in a block are harvested, a specially designed, hydraulically retractable disc plough is run along the tree line to ‘plough off’ – the soil is ploughed away from the tree line, killing any grass or weeds. The plough is retracted by the operator when approaching a tree trunk.

Nutritional inputs and green manure seed are spun out onto the bare soil, and the soil ‘ploughed back’ with another disc plough, to cover the seed and manure, and to restore the soil to its original position. Cereal green manures such as oats¹ are sown in autumn – cereal crops are more successful than legumes in autumn as they are not troubled by snails and slugs, which attack the slow growing legumes at this time of year. With an early autumn break this year, however, Neville thinks that legumes would have done well, growing more quickly with the remaining seasonal warmth.

When the green manure crops are ready, they are ploughed in with a disc plough. A leguminous green manure is then sown in early spring. Thus, normally, two green manures are grown each year.

Because the trees are cultivated in this manner from when they are young, no stabilizer roots establish in the top part of the soil that is cultivated. No roots bigger than one centimetre are cut, and this just stimulates new ones to come up – similar to the dying off and growing of new roots when pasture is grazed or slashed, or the stimulation of new growth after pruning.

The hardest apples to manage under this system are the Granny Smiths – they flower and become active at the same time as all the other apples, but are harvested late, usually in May. They not only feed for longer than the other varieties, but also have the least time after picking for establishment of a green manure crop before winter. It is thus more difficult to satisfy their nutritional requirements under this system.

The area between the rows is *not* green manured as it is required to carry tractors and cherry pickers during the year and would be quickly ruined if ploughed. Instead, a clover-rich pasture is maintained and slashed as required to keep it growing dynamically. If this area becomes compacted, or if clovers are supplanted by prairie grass (this is part of the natural pasture cycle), the whole area *is* ploughed and sown to green manure, before re-sowing with clover.

Pests and Diseases

Organic and Biodynamic apple growers must be absolutely vigilant as regards pests and diseases. Neville and Raelene went through some difficult years where codlin moth built up to serious levels and up to half the crop was affected. During this time they started value

¹ Oats are very good at bringing phosphorus up from deep in the subsoil

adding to find a way to use damaged fruit that could not be sold fresh (more on that below).

The pest and disease problems that are of most concern are codlin moth, leaf mites and black spot.

Neville has got the codlin moth population down to very low levels by really focusing on the problem and applying all measures at his disposal. He sand blasted the trees while dormant to remove any loose, cracked bark, as these areas are prime habitat for codlin moth grubs. He then applied the Biodynamic tree spray² to nourish and repair the bark (this spray is now applied every winter). He used Trichogramma wasps (a codlin predator), pheromone ties (which attract the male moths and thus disrupt breeding), corrugated cardboard bands around the tree trunks to catch the grubs, monitoring to tell when the moths were flying, and spraying with pyrethrum when they *were* flying. When thinning of apples was carried out in November and December, any codlin (or black spot etc) affected fruit were collected and disposed of.

Now that the problem is under control, the on-going program consists of new, improved pheromone ties³ which last for six months, two to a tree, BD winter tree spray to keep the bark healthy and smooth, and collection of any struck fruit during thinning. Pyrethrum is no longer used, as a side effect of spraying pyrethrum is that predators of the leaf mite are killed.

Mites, which suck sap from the leaves, can be a problem at times, but if no action is taken, natural predators such as ladybirds and stepheris (a ladybird relative) eventually deal with them and their eggs in autumn, resulting in a lower population next season. Predator mites can also be purchased. Winter oil and the BD winter tree spray also kill a lot of over-wintering mite eggs.

Black spot is a serious potential problem for apple and pear growers and it is important not to let it gain a foothold in the orchard. Orchard hygiene is very important. A heavy carpet of leaves can harbour pests and diseases – a harrow can be run through to disturb the leaves. Prunings are mulched in with a mulcher. Any black spot affected apples are removed, not allowed to lie on the ground and cause problems.

Black spot is more of a threat in a wet spring – sulphur or copper sprays can be used, and the small amount of liquid lime added to sprays also helps. 501 can be sprayed after flowering in wet seasons.

With all pest and disease problems in the orchard it is important to be proactive. If you have to be reactive when the problem is there it is virtually too late already.

Pruning

As stated before, young trees are pruned to develop a vase shape, with five or seven leaders. Laterals are allowed to grow and fruit for several years – once they get too long, they are either shortened or cut right out. If they become more than one third the diameter of their leader, they are also cut out. The aim is to have wood that is one, two and three years old, so that there is fruit for this year and fresh growth that will start fruiting next year. Wood that is too long or old will produce too much fruit and require too much work in thinning. Leaders are cut back a little each year. This pruning system is very simple and quick, taking maybe six cuts per leader.



One-third rule – the lateral going to the left from the leader in the middle of the page will be removed



Janne picking Fujis

Value Adding

Mocks make a range of apple products in addition to the fresh fruit. Apples are freeze dried – the fruit is sliced and frozen, then put into a vacuum chamber where the moisture is removed. This process results in stable dried fruit without the use of sulphur dioxide, and preserves the colour, nutrition and flavour of the fruit. A range of other fruits from their own orchard and others is also freeze dried. The computer controlled freeze-drying equipment was built by the Mocks!

² See Biodynamic Growing No. 3, p8

³ From Japan, available from Muir's, Victoria



5000 litre barrel of apple cider vinegar

Apple cider vinegar is made from the unpasteurized apple juice. This is the real thing, taking a whole year to produce. The vinegar ‘mother’ stays in the four 5000 litre oak barrels all the time (local wine-makers can’t believe Mocks can keep the mother going – pesticide residues in conventionally grown fruit kill the mother). The sugars are converted to alcohol, which is then converted to acetic acid by natural fermentation. After one year, when acidity has reached 4% (which ensures its safety and stability), the ACV is drawn off from the top and bottled. It is not filtered. It contains beneficial live bacteria, and is reputed to be very beneficial for health. Most commercial ‘apple cider vinegars’ are produced in *one day* by adding alcohol to pasteurized apple juice and putting it through an acitator to convert the alcohol to acetic acid. It contains no live cultures and is a completely different product.

A local wine maker makes apple cider for them from their apple juice – a sweet and a dry, both beautiful, but my advice is *don’t drive afterwards!*



Debbie and Neville in the farm shop

Farm Shop

Neville and Raelene have an on-farm shop, which is run by Raelene’s sister Debbie. It is open seven days a week

from 10am – 4pm, and is very popular with locals and tourists⁴. A range of fresh produce is available. Neville says they get a lot of comments from people about the excellent quality of the apples – people over forty, particularly, still remember how apples tasted when they were young, and complain that they are unsatisfied with the quality of supermarket apples. It is sobering to think that younger people may *never* have tasted a good apple or even realize what they are missing!



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⁴ 1095 Flinders Road, Red Hill