

CYCLONE RONA – ASSESSING RECOVERY SINCE 1999

By Alison and Digby Gotts


Cape Trib Exotic Fruit Farm, Cape Tribulation, Far North Queensland


September 2006

Our buildings, machinery and stock did not suffer any damage from Cyclone Rona in 1999, but the orchard showed extensive superficial damage. In the long term, our economic future appears to be unaffected. Our major crops of Mangosteen (250 trees) and Salak (1200 plants) suffered little, while other species that we planted to lift diversity and to provide shade such as bananas and legumes were decimated. Gross physical damage to trees was largely confined to 3 bands about 30 metres wide, running through the block. The ribbons of damage ran essentially east – west, meaning that rows of trees planted north – south were more likely to go down than trees in rows planted east – west.


Orchard Observations February 1999, January 2002 and September 2006


February 1999	January 2002	September 2006
12 coconuts at the farm gate entrance planted in 1988 have been uprooted. In their falling, they also took out several Ice-cream Bean, and broken two Mangosteens in half.	Idiotically we have replanted the coconuts in the same place. Don't ask why. The Ice-cream Beans have regrown completely. The two Mangosteens have reshot from the break and one of these is now flowering for the first time, at 11 years old.	Coconut trees are being removed as they reach maturity. Ice-cream beans are kept pruned. Mangosteens are fruiting regularly.
All mature or near mature sugar bananas were on the ground. Total loss of around 50 formed bunches and another 100 which would have formed over the next 4 months	We have now cut out all the bananas that were interplanted in the Salak and Mangosteen rows, as they were starting to shade out the trees.	No longer part of the farm design.
Two Black Sapotes (of 9) have been uprooted, and damaged beyond repair. Others show no damage apart from loss of crop (due for picking in April).	In fact we have lost 3 of our trees – one took another season to die. Unfortunately it was our best tree with fruit the size of grapefruit. We have had a crop each year since the cyclone.	Still cropping regularly although now at least one major branch is removed each year to keep the trees small enough to harvest.
One (of 6) Mamey Sapote screwed out of the ground. Others are undamaged and still hold immature fruit.	The Mameys that remain continue as if nothing has happened.	Extended dry seasons seem to be the most damaging environmental factor for this species.


<p>Eight (of 18) Breadfruit have been pruned from 10m high down to around 3m, but none have been killed.</p>	<p>Regrowth has been rapid and taking tour groups through the orchard, people find it hard to believe that these trees were described as toothpicks 3 years ago. Now bearing a heavy crop.</p>	<p>Breadfruit now being pruned back to maximum 4m stumps. Sucker growth on the 1999 stumps is at around 10m high. Refer to Figure 1 below which shows the stump and the suckers.</p> 
---	--	---

<p>Most of our Durians were within the second damage band. Six have been broken off at ground level, 6 have lost at least half of their timber, 8 are undamaged except for windburn and leaf drop.</p>	<p>Heavy pruning of the survivors meant vigorous sucker growth, and these canopies are now back to pre-cyclone cover. However the wood is still too young to produce flowers. Several of our older trees which seemed to come through the cyclone unscathed have now succumbed to a soil disease and look very unhealthy.</p>	<p>All trees have fruited on sucker growth. A very wet year this year and most of the surviving Durian are under extreme stress from Phytopthera. Unlikely to survive, and more young trees will be planted in clean locations. Refer to Figure 2 below which shows how the Durians have suckered.</p> 
---	---	---

<p>Six (of 22) Rambutan are bent to the ground. Two of these have been pruned to 2 meters and staked up, the others are damaged beyond recovery.</p>	<p>One of the staked trees has survived, the other has died. We are now getting our first crop since the cyclone.</p>	<p>Continuing to prune rambutan back to 4 m. Fruit bearing on sucker growth seems ok.</p>
---	---	---

<p>Ten (of 24) Abiu have been broken off at ground level or damaged beyond repair.</p>	<p>These 10 trees were pruned heavily and suckered. These suckers were selected for growth and now the trees are cropping again. Even those we thought were damaged beyond repair have survived</p>	<p>You have to look closely to see the old stump. The two permitted suckers per stump produce regular and reliable fruits. Refer to Figure 3 below showing a stumped Abiu</p> 
<p>Three of 5 Rollinia torn out of the ground.</p>	<p>The two remaining trees are now looking sick</p>	<p>Pruning back to 2-3 m and the trees are thriving.</p>
<p>Six of 15 Soursop bent to ground level. These have been pruned at the stump, with the stump still on its side.</p>	<p>These six soursops had vigorous sucker growth which was thinned to 3 or 4 major leaders. Now thriving and have picked the first crops from them.</p>	<p>Vigorous sucker growth has to be kept back and pruning out old wood to encourage new growth. Regular and reliable fruiting all year.</p>

<p>Of 14 Rambai most have been pushed over to 45 degrees lean. They have been staked and pruned.</p>	<p>The Rambai are now in heavy flower and you can still observe the 45 degree lean of the main trunk, though now the new branches are growing vertically from the pruned stumps.</p>	<p>No long term damage, trees still leaning but fruiting reliably. Refer to Figure 4 below showing the leaning Rambai trunk</p> 
<p>Jakfruit showed little damage - only where weak from Pink's disease or hit by another tree, usually coconuts where they went down.</p>	<p>Jakfruit in the windbreaks seem OK though some have developed Pinks disease since the cyclone, but not sure if this is related.</p>	<p>All Jakfruit going well. Poor and rocky soil seems to have helped them remain attached and upright through three cyclones. Our best windbreak species.</p>

<p>Six (of 22) Rambutan are bent to the ground. Two of these have been pruned to 2 meters and staked up, the others are damaged beyond recovery.</p>	<p>One of the staked trees has survived, the other has died. We are now getting our first crop since the cyclone.</p>	<p>Continuing to prune rambutan back to 4 m. Fruit bearing on sucker growth seems ok.</p>
<p>Mangosteen were only damaged by being hit by falling trees, usually coconuts or Jakfruit. Two were snapped in half. Four had several branches snapped. Twenty or so were leaning to 45 degrees or so and have been staked after being bent straight.</p>	<p>The staking of the Mangosteens into vertical positions seems to have worked – we had very heavy rain in the months following the cyclone giving the trees time to adjust. Four were killed by enthusiastic stake drivers who pierced the tap root hammering in the stakes at an angle to the tree. All the trees which were snapped off are now in heavy flower for the first time.</p>	<p>No long term damage. Needing to consider keeping tree below 4m to reduce wind damage and ease picking labour. Also pruning to keep windbreak trees down to prevent collateral damage. Refer to Figure 5 below showing the recovery of the main trunk of a broken Mangosteen</p> 
<p>Salaks were basically undamaged although all were leaning or completely squashed. Maintenance was difficult for six months or so until they grew upright. Many were buried under bananas for up to one month before being uncovered.</p>	<p>Salaks have survived with little damage in the longterm.</p>	<p>Salaks are currently being removed as production not adequate for the effort.</p>

Conclusions

1999: Coconut is a poor choice for a shelter belt. If they uproot, the whole plant goes causing much collateral damage due to the wide crown. We are now removing the coconuts that were planted in inter-rows with Mangosteens.

Breadfruit may work well in spite of being so weak. No trees were broken low down, and all recovered. Fiji Longan may also be successful in a similar way, but the sample size is too small.

Mangosteen and Salak are excellent choices for commercial crops in cyclone areas. It is worth pruning and selecting suckers and taking the trouble to stake trees upright again – keep in mind that we had 1000mm of rain over 4 days in March soon after the cyclone. Soft-wooded species such as Santol, Rambai and Durian are easily damaged but reshoot quickly. Need to watch to see how long these trees take to bearing fruit again – it looks like about 3 years.

2002: When you remember what destruction took place in our orchard, it is hard to imagine the destruction now. Everything has been cleared up and trees are covered with full canopies. People doing the farm tour are amazed that the farm has recovered so quickly. So are we.

We hope there will never be another cyclone, with the intensity of Rona while we are alive but if there is, we will come through it – we just can't bear the thought of all the work in clearing up the mess again. It took us six months of chainsawing and removing countless trailer loads of timber from the orchard.

There is an empty space in our orchard where a lychee used to grow – one of Don Gray's that we won in a RFCA raffle – and every time I walk past this space I wonder what happened to it – there was nothing left just a hole in the ground. In the approaching wet season we plan to fill in all the gaps left by dead trees – this means about another 100 fruit trees that we will be able to squeeze in that would not have fitted before – a wonderful opportunity to plant some new varieties.

2006: Our main lessons 7 years later relate to the basic observations that smaller trees suffered less damage and that sucker shoots coming from intact or partially intact root systems gave a very fast recovery back to normal production.

Falling windbreak trees did more damage than direct wind damage and maybe the need and function of windbreaks needs closer examination.

Pruning has become much more significant as an orchard management tool. Diversifying the farm income away from dependence on a single crop harvest has also been important for ensuring stability, although tourism remains our main business.