

The 2011 walnut cultivar trial - Report from 2015

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Introduction – NZWIG cultivar trials

At present, most commercial walnut orchards in New Zealand are dominated by just two cultivars – Rex and Meyric – with other cultivars in only small numbers. Rex and Meyric were recommendations from the NZ Tree Crops Association selection trials at Lincoln University, which were planted in the mid 1980s and started producing results in the mid 1990s. NZWIG would like to see continuing progress in this area, with the goal being a wider range of good cultivar options available to walnut growers.

So in 2005, the first of our two cultivar trials was planted. It contains Serr (a USA cultivar imported in the 1970s); selections from Vernon Harrison, Jenny and Malcolm Lawrence, and Diana Loader; and Rex and Meyric for comparison. The research committee is currently involved in detailed assessments of walnut samples from this trial (looking at factors such as weight of nuts, visual attractiveness, shell seal and crack-out percentage). We also have multi-year data on tree growth, timing of budburst and flowering, and yield. In the near future we will be able to publish a report with initial recommendations on which of the cultivars are the most promising (our progress report from several years ago is listed below as North (2012)).

Then in 2011, a second cultivar trial was planted, and this is the one we are reporting on here. Because the trees are still young, we only have growth data so far. This trial contains three cultivars imported from Tasmania in 2009: Lara (originally from France), and Tulare and Howard (originally from USA). Information about how these cultivars were chosen for import can be found on the web page listed below (North, 2009). The trial also contains four further New Zealand selections and Rex and Meyric for comparison.

(See notes below about how the trial cultivars were chosen for import)

Design of the 2011 cultivar trial

There are three trial sites – one in North Otago and two in central Canterbury (Aylesbury and Charing Cross). We had been hoping to also include a North Island site but were unable to find one.

The nine varieties being trialled have been given code numbers so they can be assessed without bias: the code numbers are 220 to 228. Jenny Lawrence is holding the codes and name correspondences and, once we are ready to make recommendations from the trial, we will ‘crack the code’ and report them by name.

At the largest of the sites (Aylesbury) there are five replicates of each of the nine varieties being trialled (i.e. 45 trees in all). At the North Otago site there are five replicates of most varieties, but no trees of 228. At the smallest of the sites (Charing Cross) there are four replicates of most varieties but no trees of 226. Most trees were planted in 2011 but a few were added in 2012. In particular these were of varieties 226, 228 and 220 for which we had poorer grafting wood available and lower grafting success.

The varieties are randomly located within the sites, using randomised block layouts. They are labelled by their code number.

Progress so far

Each winter, from 2012 to 2015 inclusive, we have measured the trunk diameters of all the trial trees. Trunk diameter (measured at a height of 600mm) is our standard method of tracking tree growth. Table 1 shows the average trunk diameters in 2015 (averaged for each variety) after four years of growth. Figure 1 shows the same data in graphical form.

Table 1: Average trunk diameter (at 600mm height) in 2015 (mm) for each variety on each trial site. The cells shaded blue indicate those varieties where all, or a significant number, of the trees were planted a year later (in 2012). In addition to the shaded cells at the North Otago site, a number of other individual trees were planted or transplanted late. The varieties have been ordered from largest to smallest using the trunk diameters at the Aylesbury site

| Cultivar code | Charing Cross | | |
|---------------|---------------|---------------|-------------|
| | Aylesbury | Charing Cross | North Otago |
| 224 | 45.8 | 27.3 | 19.5 |
| 227 | 43.9 | 33.6 | 13.8 |
| 225 | 37.3 | 22.3 | 18.2 |
| 228 | 36.6 | 19.8 | |
| 226 | 35.5 | | 11.5 |
| 220 | 34.5 | 22.5 | 10.8 |
| 221 | 31.2 | 19.5 | 14.7 |
| 222 | 29.1 | 15.5 | 18.8 |
| 223 | 29.1 | 21.5 | 11.8 |
| Average | 36.1 | 23.2 | 15.7 |

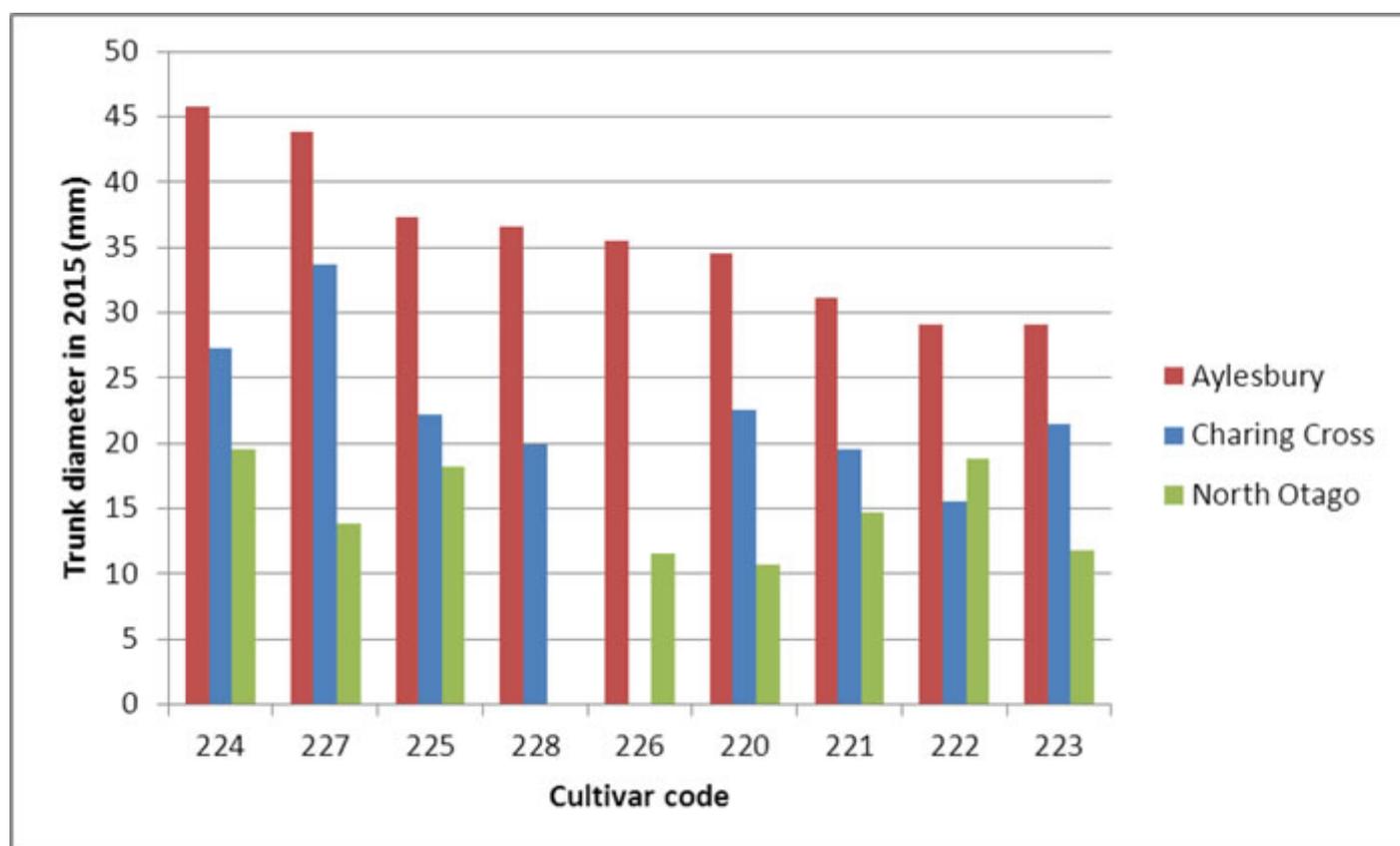


Figure 1: 2015 trunk diameter data from Table 1 in graphical form, ordered from largest to smallest by the trunk diameter at the Aylesbury site. Those varieties planted later (in 2012) are highlighted in blue in Table 1.

There are differences in tree growth between sites but this is not our main interest. What we wish to find out is which varieties perform the best and the worst *within* each site. There have been a few tree deaths at each site. In Table 2 we show the number of trees of each variety remaining alive at each site (out of the number planted).

Table 2: Number of trees remaining alive at each trial site out of number planted

| Cultivar code | Aylesbury | Charing Cross | North Otago |
|---------------|--------------|---------------|--------------|
| 220 | 5/5 | 1/2 | 4/5 |
| 221 | 3/5 | 2/4 | 3/4 |
| 222 | 5/5 | 4/5 | 4/5 |
| 223 | 5/5 | 4/4 | 5/5 |
| 224 | 5/5 | 4/4 | 4/5 |
| 225 | 5/5 | 2/4 | 6/6 |
| 226 | 5/5 | 0/0 | 2/2 |
| 227 | 5/5 | 4/4 | 6/6 |
| 228 | 5/5 | 3/3 | 0/0 |
| TOTAL | 43/45 | 24/30 | 34/38 |

In coming years we will continue to collect growth data and, as the trees get older, we will also collect information on budburst and flowering times, yield and walnut characteristics.

Acknowledgements

NZWIG research committee thanks Darrell Johnston of River Terrace Nurseries for propagating the trees in the cultivar trial, and the trial growers – Russell Hurst, Hugh & Jill Stevenson and Anna Brenmuhl – for making the sites available.

References

North H, 2012. Report on NZWIG trial of New Zealand walnut selections. *Health in a Shell* 79: 2–17.

North H, 2009. See Below. Choosing the cultivars to import for the 2011 trial.

Choosing the cultivars to import for the 2011 trial

[In 2009 the following information was supplied by Heather North from the NZWIG Research Committee, for members' information and comment. It outlines the characteristics under consideration for each of the cultivars - GN]

HOWARD + LARA

Going by the recent Special Information Meeting, people seem pretty happy with Howard and Lara as two definites for import. They came out looking fine in the Lincoln University taste test (no significant difference between these and Rex - though Meyric came out a bit lower).

Lara flowers quite late - 28 days after Serr in Tasmania - and its budburst is also 28 days after Serr's budburst, according to Tasmanian data. The budburst of Howard is 20 days after Serr budburst, and flowering 25 days after Serr flowering.

This should lower the frost risk compared to Rex and Meyric. At Lightfoot Walnuts (near Lincoln, Canterbury) , Rex budburst is around 20 days after Serr, but its flowering is around the same as Serr. Meyric budburst is about 7 days after Serr budburst, and its flowering also about 7 days after Serr flowering.

The Tasmanians say that Serr is the particularly early variety that they have, whereas all their other varieties leaf out at fairly similar (later) times, with only a few days between them.

In the Lincoln University test data, Howard and Lara also looked good for crackout (both over 50%), in comparison to Rex (43%) and Meyric (over 50%). They are also good enough on shell seal and strength, scoring 15 and 13, respectively, out of 20. Rex scored 19 on shell seal. Meyric scored 12, and we know from experience that it's on the weak end of the scale. It's adequate, but we probably wouldn't want to go much weaker than Meyric. Meyric is easy to open with your hands, making it a good table nut, but it's more risky for letting moisture in or cracking under pressure in the sacks.

Both Howard and Lara come highly recommended by the Tasmanians.

CHANDLER

We've already made a decision not to import this one. It is recommended by the Tasmanians as a good variety, though it's probably fourth out of the four that they recommended to us. We cannot rule out Chandler on the basis of flavour - it came out well in the taste test, with scores equal to or higher than Rex and Meyric. However, we do need to rule it out on the basis of shell seal and strength, where it scored only 3 out of 20 in the Lincoln University data (far lower than Meyric at 12 out of 20). We must assume, however, that Chandler's shell seal must be fine when grown in California, as their mechanical harvesting knocks walnuts around far more than we do here, and they don't appear to have any problem with the nuts breaking. Chandler budburst in Tasmania is 21 days after Serr budburst, and its flowering is 28 days after Serr flowering.

TULARE + FERNETTE

We need to make a decision between Tulare and Fernette for our third cultivar to import.

The Tasmanians recommend Tulare, whereas they do not plant Fernette commercially. They use Fernette only as a pollinator for Lara, as it has its catkins quite late (we should be able to pollinate Lara with Rex I think). The Tasmanians say that Fernette is late to come into bearing, so production would be delayed with this variety. I am not sure what the nut size is like - one Tasmanian has said to me that they're small and another said they're OK! Fernette came out just as heavy as all the other Tasmanian nuts in the Lincoln University measurements (all quite a lot bigger than the NZ varieties), but the nuts we brought in for tasting were their jumbo grade, so we probably can't take too much from this.

Unfortunately we don't have much data on Tulare, because we did not bring it in for the Lincoln University taste test, and the trees they have in Tasmania are quite young, so they have not collected flowering data yet. I would be very surprised if it did not match up to the others in taste, but we have no data on this. As far as I understand, it leafs out at a similar time to most of their other cultivars (significantly later than Serr) but we have no Tasmanian data. One of the Californian researchers who was at the recent Walnut Symposium in Melbourne and who visited us in NZ afterward has given us Californian data showing that Tulare's budburst falls between that of Howard and Chandler, and its flowering falls between the flowering of these two varieties also. Thus it should also have a lower frost risk than Rex and Meyric.

According to the Tasmanians, Fernette budburst is 36 days after Serr, and flowering is 37 days after Serr flowering. That's almost sounding ridiculously late, like the G026 in the Lincoln Uni trial block!

Fernette came out looking great in the taste test - significantly better than the others - and that's the reason members have been asking us to think about making this our third cultivar for import.

However, its shell seal and strength was only 9 out of 20, which is quite a bit lower than Meyric (which scored 12). This is probably not a great characteristic.