

POST-HARVEST

# Time is ripe for getting harvest maturity right

By Alison Barber – APAL

A Western Australian project to lift fruit quality by setting minimum maturity standards at harvest is showing positive results in its second year, improving eating quality and giving growers data to get the best out of their crop marketing.

Photo: Victoria Baker

Given the technology horticulture has access to – pre-sizers with near infrared technology for assessing internal fruit quality, canopy mapping, platforms and robotic harvesters – cutting an apple in half and dipping it in iodine solution to see if it is ready for harvest is a strikingly simple tool.

Match the pattern formed as the iodine reacts with the starch against a standard 1-6 starch pattern index (SPI) chart and – taken with two equally simple pressure and soluble sugars (Brix) test readings – you have a pretty clear picture of the state of fruit maturity and can time harvest and storage to deliver the best fruit quality.

Simple, yet often under-utilised as the allure of early-to-market premiums, or demand for colour, result in immature or over mature, mealy and greasy fruit on shelves, both resulting in poor eating experiences for customers.

Lack of consistent quality is one of the biggest challenges the industry faces in rebuilding domestic consumption.

## Minimum standard

WA producers’ group Pomewest is pioneering a state-wide minimum maturity standard at harvest to tackle this and is in the second year of testing Gala, Granny Smith and Pink Lady apples and building greater engagement in maturity testing to lift both fruit eating quality and consumption.

Pomewest Executive Manager Nardia Stacy did not mince words when outlining the need for the project at the Grower R&D event in January, describing it as “combatting the dark side of industry”.

“Our goal is that when you buy a WA apple you will get a great apple,” she said.

“We have declining consumption and a lack of trust. Customers just want a great tasting, fresh apple. They see a beautiful piece of fruit and the taste doesn’t match.

“We are self-sabotaging our reputation.”

Nardia said the initiative had been inspired by the success of minimum maturity standards introduced by the WA Citrus and Tablegrape industries, both of which have the power through state legislation to remove immature fruit from the market.

Growers had responded well to the program and results were promising.

“The last two weeks we have not had a fail at wholesale,” she said. “Growers are asking us for iodine, which has never happened before. It is really getting traction.”

Pomewest set minimum maturity standards in consultation with growers (Table 1), provided



**Table 1:** WA Minimum Maturity Standards for apples straight from the tree.

## Key points

- ✔ Monitoring fruit maturity is critical for picking fruit in optimal condition
- ✔ Starch testing is not the only tool for measuring maturity, but it is cheap and easy to use
- ✔ Supply chain handling, post-harvest storage and transport also play an important role

tools, training and support for testing as well as commissioning independent random testing at wholesale and retail levels with results fed back to growers.

In the second year, random testing was stepped up and results sent back as a report to all growers, increasing transparency. Growers who achieve a season without fails are called out for their success.

Nardia said as well as encouraging growers to achieve, the testing had highlighted the importance of maintaining cool chain integrity along the supply chain, with more fails occurring at retail level, further down the chain, than at wholesale markets.

Pomewest Project Manager Susie Murphy-White who is working with growers on testing said in the first year there were some starch test failures >



WA growers Mat (lt) and Trent (rt) Fox.

**Photo:** Victoria Baker



Apple	Firmness (Kg-f)	Starch index on 6 point scale	Total soluble solids (°Brix)
Gala	6.5	3	11.8
Granny Smith	6.5	3	11
Pink Lady	6.5	3	13

in the early varieties, but a year on, the improvement was clear.

“We had those that were religiously testing, some that did pressure and Brix, but not starch, but we are now getting out into those who didn't test at all, who just ate the apple and said ‘yep, that's ready,’” she said.

“We are seeing far less fails this year, more people are taking care to test.”

Fails are followed up with the grower to make sure testing is being carried out correctly.

Pemberton growers Michael, Mat and Trent Fox have been using maturity testing to assess harvest timing for as long as Mat can remember and are strong supporters of the Pomewest program.

“We haven't had a fail yet and I hope not too,” he said.

“We've been doing Brix, pressure and starch levels to assess maturity for more than 10 years. We have better quality fruit and it stores better as well. It definitely helps.”

The Foxes are achieving packouts of 90 per cent for Pink Lady and Gala apples and also grow Kanzi, Fuji and avocados, with most of the 17-ha high density orchard in the south west of the state under net.

Mat tests all varieties prior to picking and still aims for three picks. “It's more labour, but we get better quality fruit,” he said.

He said setting minimum standards that helped lift quality was a good step to boosting consumption.

“It's very important that we get maturity right,” he said. “It's all about the consumer. If they have a bad experience they are not going to come back and eat it again.”

## Maximising options

Across the country Fruit Growers Victoria (FGV) is also advocating getting harvest maturity right, carrying out regional testing and sharing the results and advice on harvest timing and storage in a weekly Maturity Testing Report.

APAL Head of Group Quality and Innovation Andrew Mandemaker said maturity testing not only took the guess work out of harvest timing, delivering a better eating outcome for customers, but by improving fruit quality and storability had the potential to deliver better returns for growers.

“Every grower should understand how to test maturity, including starch plates, and do it on their own fruit,” he said.

“We know that disappointed customers will just give up, but at the start of harvest we see Gala picked too early and at the end we have over-mature fruit with a short shelf life and poor eating quality.”

Andrew said checking the maturity of apples while they were still on the tree also gave growers critical information for planning their crop marketing, maximising their options.



## WA Testing 2019 Results

Random testing was carried out by Total Quality Assurance Systems (TQAS).

WHOLESALE		2019
	Passed	(191 samples) %
Brix	117	97.5
Starch	92	76.7
Pressure	114	95

RETAIL		2019
	Passed	(191 samples) %
Brix	188	98.4
Starch	186	97.4
Pressure	171	89.5

“It is always better to understand the maturity of apples while they are still on the tree, rather than harvesting it and then deciding what to do with it,” he said.

“The ideal maturity will depend on how long you want to store it for. If it is less mature you can store it for longer, if it is not going to last you need to make plans for it. Knowing what you have got is important.”

While rapidly advancing packhouse technology and data systems that enabled traceback to an orchard or even block would make it very easy to identify who was sending poor quality fruit, Andrew said it was up to industry, not retailers, to ensure fruit met specifications.

“Databar stickers have made it a lot harder to hide poor quality fruit,” he said. “But the retailer shouldn't be our policeman.”

“If retailers come to us with a solution, their solution may not be the solution we want.”

“The problem belongs to industry and we need to own it.” AFG



Mat Fox tests starch levels of new season Gala to inform harvest timing decisions.

### Further reading:

What consumer's want from apples and pears (APAL research 2018)

Improving Pomefruit Quality (Ross Wilson, AgFirst, 2018)

Harvest with customer requirements in mind (John Wilton, AgFirst 2018)

Post-harvest quality: Slowing down the 'ticking clock' (Hannah James, 2017)

Harvest timing key to consistent quality (Angus Crawford, 2019)

The above articles can be found on APAL's website by searching by title.