Supermarket Maturity Monitoring - 2025

Navel Oranges

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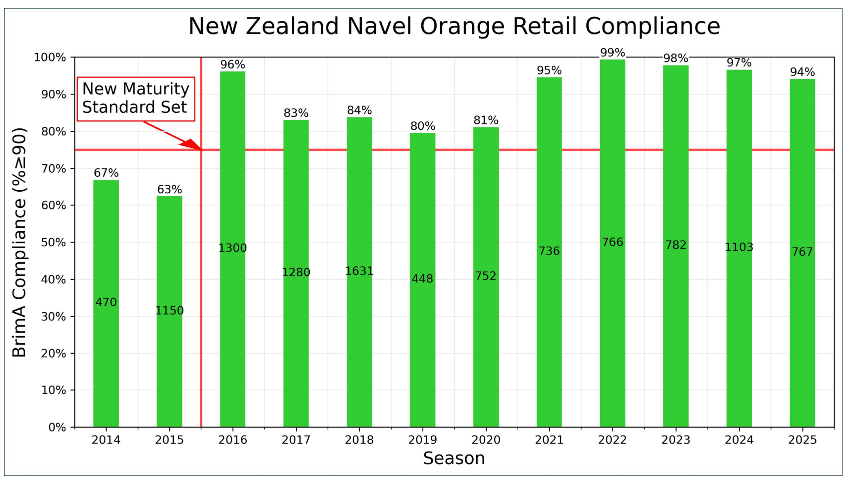

A confidential report prepared for Citrus New Zealand

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Executive Summary

Monitoring of navel orange internal quality during the first 10 weeks of the 2025 season (30th June 2025 to the 1st of September 2025) indicated that 94% of NZ Navel Oranges met the minimum maturity standard, making it another excellent season in terms of in-market fruit acceptability. There was a small difference in acceptability between Auckland and Christchurch with Auckland average acceptability at 92.7% and Christchurch at 98.6%.

The fruit quality at the start of monitoring was poor (102 average BrimA for week 1) with two very poor samples at 27% and 56% compliance. In the following weeks, BrimA generally increased through the monitoring period. Based on unpublished data, we know that over 75% of consumers will enjoy navels at a BrimA of 100. As a result, this season, consumers received great tasting fruit from the second week of the monitoring programme which should result in strong repeat purchases for the remainder of the season.

Average BrimA levels this season were the sixth highest recorded due to a combination of the moderate Brix and moderate acid.

All but two samples met the Citrus NZ minimum maturity standard in both Auckland and Christchurch.

This retail maturity monitoring programme is an essential component that enables the sector to maintain excellent levels of fruit quality season-on-season by providing visibility of the retail quality of NZ navel oranges. This programme collects retail fruit quality data for 10 weeks. Extending the monitoring period further into the season would provide insight into the fruit quality as navel varieties change later in the season.

Contents

Introduction

Background

Citrus New Zealand has been undertaking supermarket surveys of navel oranges on behalf of the industry since 2014. These surveys provide an independent assessment of in-market fruit quality that complements the on-orchard pre-harvest clearance monitoring. Analysis of this data provides valuable insights into the consumer acceptability of New Zealand (NZ) navel oranges at retail within and between seasons.

Objective

Report on the maturity status of Navel Oranges sampled from the Distribution Centres of the two major supermarkets (Foodstuffs and Woolworths) during the first 10 weeks of the 2025 navel orange season.

Citrus NZ navel orange Maturity Standard

The Citrus NZ navel orange maturity standard was approved at the Citrus NZ AGM on 20 August 2015 and came in force at the beginning of 2016. Resolution (2) from that meeting adopted the BrimA maturity standard for navels at a minimum BrimA level of ninety (90), along with the existing requirement that ≥ 75% of fruit in the sample must have a BrimA value ≥ 90.

The Citrus NZ navel orange maturity standard has a similar minimum BrimA level to the Californian and Australian navel orange maturity standards. The BrimA (pronounced "bree-mah" - an abbreviation of Brix minus Acid) measure was developed by researchers at Plant & Food Research (Jordan et al., 2001).

The equation for calculating BrimA is:

$$\text{BrimA} = (\text{Brix} - (\text{TA}*4))*16.5$$

A more detailed discussion as to why a BrimA level of ninety was chosen and how this corresponds to consumer liking can be found in Loeffen (2015).

A new measure, called the BrimA Fractile, was introduced in 2016. The BrimA Fractile is the BrimA value associated with the lower quartile (25% = 1 – 75%) of the empirical BrimA distribution of a sample. In other words, when the BrimA Fractile of a sample is ≥ 90, the sample can be considered cleared.

Methodology

Sampling Procedure

This season's sampling was carried out for ten weeks starting 30th June 2025 and ending on the 1st of September 2025. All samples were collected by Distribution Centre (DC) quality control staff at the Auckland DCs for Foodstuffs and Woolworths, and the main South Island Foodstuffs DC in Christchurch.

On Monday of each week, each sampler selected sixteen (16) New Zealand grown navel oranges from each consignment having an identified crate card or PLU number. If there were multiple consignments or PLU's available, the sampler selected 16-fruit of each.

Each sample was separately bagged and given a unique identifier written on the outside of the bag and on a piece of paper inside the box and couriered to Verified Lab Services in Kerikeri for measurement of each fruit.

Measurement Protocol

Brix was measured with an Atago Palette PR-32α (digital) Refractometer, and the Titratable Acidity, expressed as %Citric acid, (referred to as acid in the rest of this report) was measured using a G-won Fruit Acidity Meter GMK-835F. The protocol for this testing is detailed in Appendix 1.

The Brix and acid results were recorded in an Excel spreadsheet under the relevant fruit sample code and sent to Citrus NZ, who then passed the data on to Delytics.

Analyses

Quantile plots and time series graphs were produced for the various fruit properties, where the 2025 data was compared with similar data collected between 2014 and 2024.

Results

Season Overview

The supermarket sampling in 2025 was carried out for ten weeks contiguous from 30th June 2025 to 1st September 2025 (week 10). Forty-eight (48) samples, comprising 767 New Zealand navel oranges, were measured. Figure 1 provides an overview of the 2025 retail compliance (%fruit with BrimA ≥ 90) relative to previous seasons.

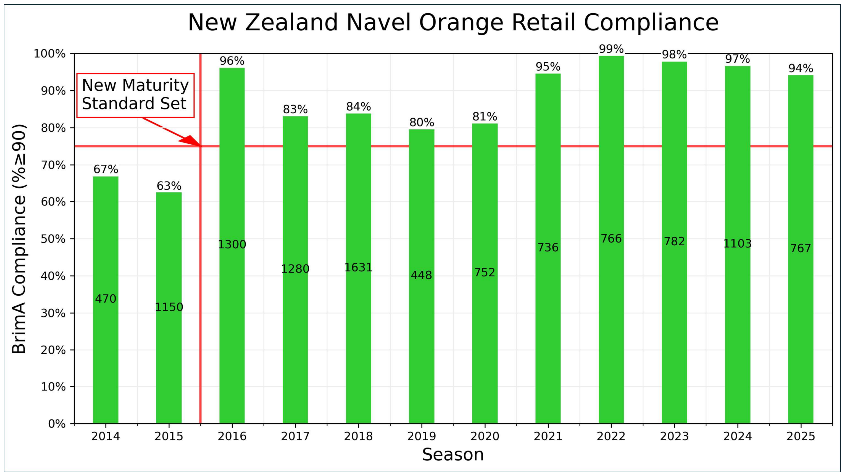

Figure 1 Percent of fruit that met the Citrus NZ BrimA maturity standard vs. season.

The overall acceptability (weighted average of all samples) of 94.3% is the sixth best result in the eleven years of data collected to date.

The weekly average percentage of sampled fruit that met the Citrus NZ maturity standard is plotted against sample collection date and compared with previous seasons in Figure 2.

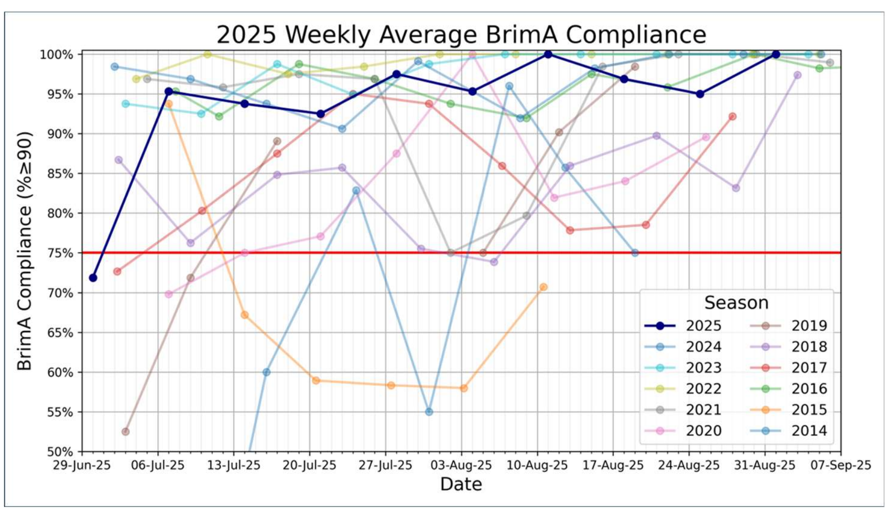

Figure 2 Weekly average percent of fruit that met the Citrus NZ BrimA maturity standard vs. collection date.

The weekly average acceptability for 2025 started at 72% in the first week on the back of two failed samples in the first week at 27% and 56%. After that, from week 2 onwards the compliance was above 90% and above 95% for most weeks. Aside from the first week, overall, the navel maturity across the monitoring period has been excellent.

The weekly average Brix levels in 2025 were relatively mid-range compared with previous seasons during the monitoring period, albeit with a positive spike in the last week of monitoring (Figure 3).

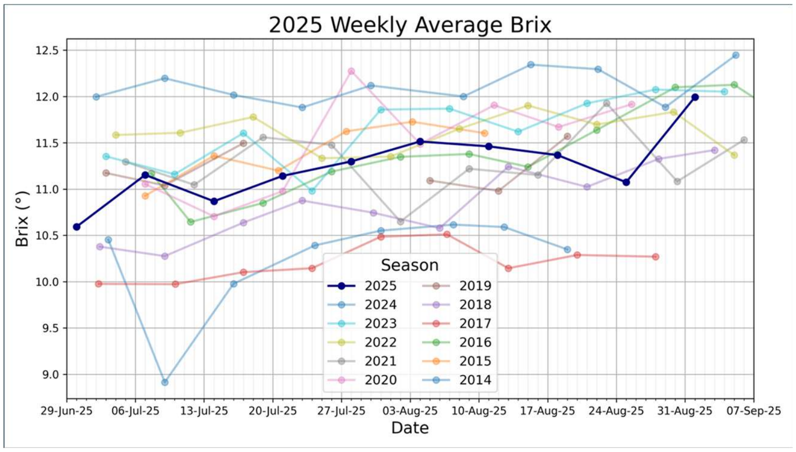

Figure 3 Weekly average Brix vs. collection date.

The weekly average Acid results for 2025 were relatively mid-range compared with previous seasons' monitoring (Figure 4).

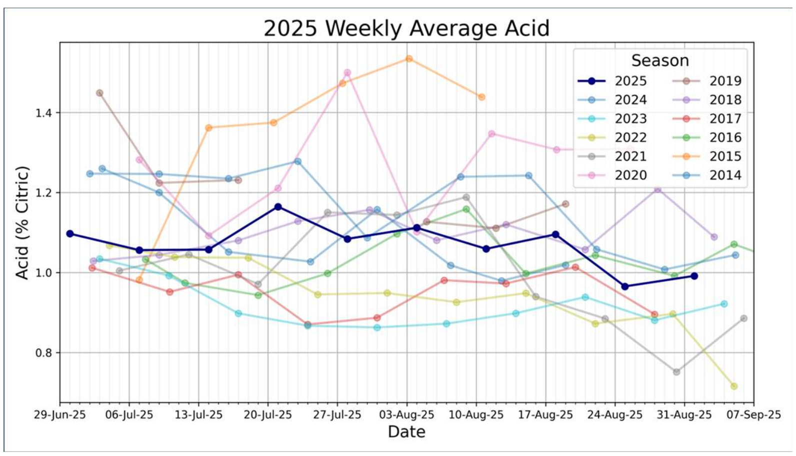

Figure 4 Weekly average Acid content vs. collection date.

The weekly average BrimA levels were relatively mid-range compared with previous seasons over the monitoring period except the last week where the high Brix levels increased the BrimA value (Figure 5).

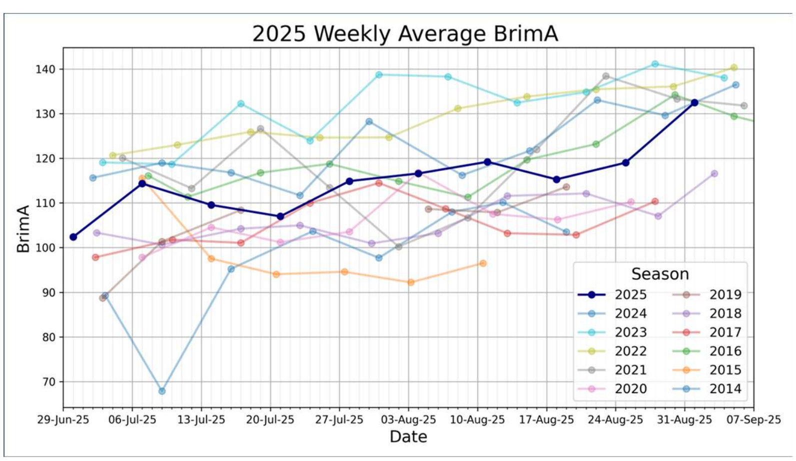

Figure 5 Weekly average BrimA vs. collection date.

Discussion

This has been another good season for fruit maturity with overall acceptability at 94%. The fruit quality data for this 2025 season compares very favourably with all previous seasons as shown in Figure 1.

When we explore the reason for this, we see that in 2025, Brix was typical (Figure 3) at an average of 11.2°, while Acid was also typical (Figure 4) at an average of 1.07% Citric. These two combined to create an average BrimA value (of 115.1) when compared across eleven seasons of monitoring (Figure 6). This BrimA, ranked 6th highest across 11 seasons of monitoring, however it was the lowest value recorded in the last 5 years.

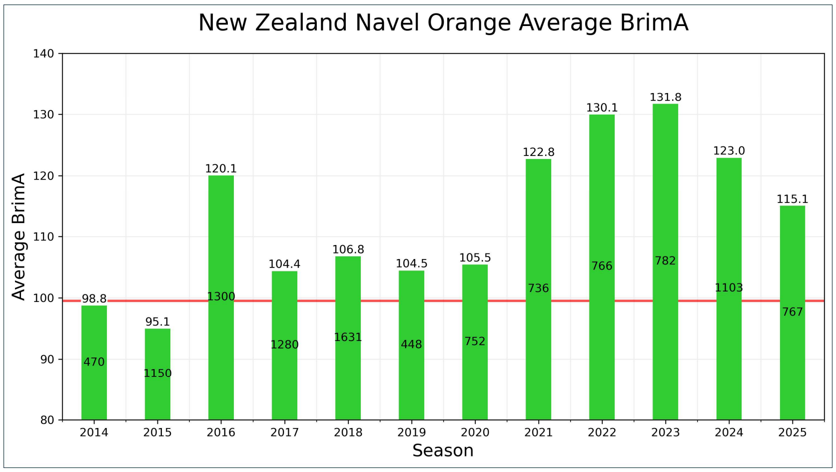

Figure 6 Average BrimA vs. season. The Red line shows the predicted average BrimA for a typical sample with 75% of fruit above 90.

BrimA compliance was poor (72%) in the first week of monitoring, because of two very poor-quality samples. Beyond the first week, quality improved and weekly compliance was above 90% and above 95% for most weeks.

The very high acceptability of the samples collected in the final weeks of sampling is encouraging and should bode well for strong repeat purchases from consumers this season.

Conclusions

The fruit quality at the start of monitoring was poor (102 average BrimA for week 1) and BrimA generally increased through the 10-week monitoring period. Based on unpublished data, we know that over 75% of consumers will enjoy navels at a BrimA of 100. As a result, this season consumers received great tasting fruit from the second week of monitoring which should result in strong repeat purchases for the remainder of the season.

The 2025 retail (Distribution Centre) monitoring season was excellent in terms of overall in-market fruit acceptability, with 94% of NZ fruit above the Citrus NZ minimum maturity standard.

The combination of moderate Brix and moderate acid has resulted in moderate BrimA values which has been reflected in reasonable overall acceptability. It is interesting to note that this season, we have seen the sixth highest BrimA levels since monitoring began in 2014, however it was the lowest value recorded in the last 5 years.

Recommendations

The current timing of the retail sampling programme provides visibility about the consumer acceptability of early season navel oranges which is critical for repeat purchases throughout the season.

An extended sampling duration would provide a more complete picture particularly as navel varieties change markedly across the season. This is especially important there currently is little or no monitoring beyond the blanket clearance date (27th August 2025), so there is no visibility of fruit quality once the blanket clearance has taken effect. This is an issue of concern as overseas studies in Avocados have shown a drop in acceptability once the blanket clearance has taken effect.

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Appendix 1: Laboratory testing protocol for Navel Oranges

Before testing, the refractometer and acidity meter were cleaned with distilled water and dried with a lab wipe. Approximately 0.3ml of room temperature distilled water was placed into the refractometer sample well and the 'Start' button was pressed. The Brix meter should read '0.0'. If it did not read zero, the 'Zero' was pressed to reset. The sample well was emptied and dried with a lab wipe. The acidity meter does not have a re-zero function.

Each fruit was cut in half. Both halves were juiced, and the juice run through a fine-mesh wire sieve (~1mm hole size) into a suitable container. The liquid in the sample container was well stirred.

A small volume of undiluted juice was pipetted from the sample container into sample well of refractometer, ensuring that the prism of the refractometer was covered. The technician immediately pressed 'start' on the refractometer and the Brix measurement on the display was transferred electronically into the Excel sheet. The refractometer well was cleaned with distilled water and dried with a lab wipe. The Brix measurement was repeated with another well mixed sample of undiluted juice. The Brix measurement on the display was again transferred to Excel. If both measurements were within 0.2˚, the average of the two readings was calculated. If they were not within 0.2˚, the measurements were repeated with a new portion of well-mixed undiluted juice until two results were obtained within 0.2˚. The average of these two readings was recorded as ˚Brix to two decimal places.

The undiluted juice sample was again well stirred and immediately 0.3 ml of juice was pipetted into a 50ml sample container, followed by the addition of 29.7 ml of distilled water. The diluted sample was then well-mixed. No less than 2.5 ml of the well-mixed diluted sample was pipetted from this container onto the sample well of acidity meter, ensuring that the sensor in the well was completely covered. The technician pressed the 'MEAS' button and recorded the measurement. The acidity meter sample well was then cleaned with purified water and dried with a lab wipe. The acid measurement was repeated with another well-mixed diluted sample from the 50ml container, and the measurement recorded. If both measurements were within 0.02%, the average of the two readings was recorded. If they were not within 0.02%, the measurement process was repeated with a new portion of well-mixed diluted sample from the 50ml container until two results were obtained within 0.02% of each other. The average of these two readings was recorded as %TA to two decimal places.

All results were reviewed prior to release to Citrus NZ, and any results outside the expected range were retested on the same day. Atypical acidity results were subjected to a second dilution before retesting.

Both meter sample wells were cleaned with distilled water and dried with a lab wipe. All other equipment was cleaned by brushing under a running tap, then rinsing with deionised water. Excess water was removed before re-using. A new pipette tip was used for each sample.

Acknowledgements

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