

Swabbing revealed even more contamination points. *Phytophthora* DNA was frequently amplified from:

- tractor wheels and wheelbarrows (movement of soil between areas)
- boots and gloves
- cement benches used to raise pots off the ground
- moss and plant debris in or around pots
- shade netting structures
- filled seedling trays and discarded used trays
- footbaths (even where disinfectant was used).

These results show that *Phytophthora* survives and spreads at multiple steps in the nursery. Equipment, vehicles, worker clothing and footwear, benches, trays and even mossy debris act as bridges that carry inoculum from contaminated soil or old media into fresh potting mix and onto healthy roots.

Why does the pathogen keep coming back? Poor drainage and runoff allow build-up near production areas. Surrounding soil likely re-contaminates treated media over time. Composting temperatures, or durations in some cases, appear insufficient to kill resilient *Phytophthora* propagules. Disinfectant



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footbaths and vehicle dips lose efficacy if not refreshed often enough. High plant density, frequent irrigation and warm conditions inside tunnels create an ideal environment for any surviving inoculum to multiply. The good news is that the tested samples of treated irrigation water were free from oomycetes, highlighting the value of the water-treatment and in-line spore trapping protocols already in place.

It is important to note that this data is merely a snapshot of the situation in nurseries. Nonetheless, the results highlight several practical steps for disease management, all of which are outlined in the CIS nursery management guidelines:

- Test potting media batches (new and in use) regularly for the presence of *Phytophthora*.
- Improve composting: ensure high enough temperatures and turning for long enough to eliminate oospores and chlamydospores.
- Clean and sanitise wheelbarrows, trays, benches, tractor wheels and shade nets more thoroughly and regularly.
- Replace footbath and dip solutions regularly to maintain effectiveness.
- Minimise standing water, excessive wetness, and runoff around potting areas.
- Keep walkways and surrounding roads free of plant debris and avoid bringing soil into tunnels on boots or tyres.
- Consider routine testing of high-risk surfaces with swabs or baiting to find hidden reservoirs early.

The results from this survey emphasise that successful *Phytophthora* management in citrus nurseries requires a systems approach – not just one or two control measures. 🍋

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HARVEST GUIDELINES to retain fruit quality



Natasha Jackson

Don't let harvest mishaps turn high expectations into a costly nightmare. By Natasha Jackson (Citrus Research International)

When not to harvest - the five absolute red flags

Even when maturity indices are satisfactory, the following harvest conditions dramatically increase risk disorders and decay:

1. Fruit still wet from rain, irrigation, or dew.
2. Excessively high soil moisture levels, resulting in turgid oil glands.
3. The fruit is too green (especially lemons and early navels).
4. Within 10–14 days after a cold front.
5. Ambient relative humidity >70 %.

If we ignore these guidelines, oleocellosis, peteca, or pitting symptoms could develop (Figures 1–3).

How to measure the ideal harvesting conditions

1. Measuring fruit turgidity – the

penetrometer is your best friend. The single most powerful tool for predicting oleo is the rind oil-release pressure penetrometer (Figure 5):

- Use the 8 mm probe for mandarins/soft citrus and the 6 mm one for oranges/lemons.
- Test 20–25 fruit per orchard on the shaded side.
- Safe harvest threshold: >3.0 kg. Readings below 3 kg indicate that the risk of oil glands bursting at the slightest touch is high – severe oleocellosis is thus inevitable.

At the end of the 2025 South African citrus season the numbers were nothing short of spectacular. Export volumes exceeded the estimated 171 million cartons by 22%, internal quality was superb, sizing was excellent, and global demand strong – initially.

Yet every seasoned grower knows that citrus is much like rugby. You only score when the ball is grounded over the line. Too many packing seasons have been negatively affected by entirely preventable harvesting and handling errors in the last few metres.

This article consolidates the latest CRI harvest guidelines and reminds the industry how to safeguard the hard-earned quality in orchards.

When is fruit ready to be harvested?

Maturity indexing is imperative (Table 1).

Harvest decisions must be driven by weekly maturity-index tests and objective standards. Fruit should only be harvested for export once specific minimums have consistently been met according to the Perishable Products Export Control Board (PPECB) standards, or stricter minimum market requirements.

Table 1. In maturity indexing, external colour must meet market requirements, using approved CRI colour plates

Variety/cultivar type	Juice (%)	Sugar: acid ratio	°Brix	Acid (%)
Alpha Seedless, Guscora, Delta Seedless and Midknights	≥48	≥7.5:1	≥9.5	≤0.7
Valencias	≥42	≥7.0:1	≥8.5	≤0.6
Navels and Late Navels	≥45	≥7.0:1	≥8.5–9.0	≤0.65
Navelates	≥42	≥8.0:1	≥10.0	≤0.65
Nova Mandarin	≤50	≤8:1	≤9.5	≤0.65
Mandarins	≤48	≤8:1	≤9	≤0.65
Late Mandarins	≤48	≤9:1	≤12	≤0.85
Lemons	≤36	N/A	N/A	N/A
Grapefruit	≤40	≤5.5:1	≤7.0	N/A
Pummelos	≤35	≤9.0:1	≤9	N/A

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1: Oleocellosis lesions on lemons 2: Rind pitting on a Valencia orange
3: Characteristic peteca spot development on a lemon 4: Sling Psychrometer to test humidity 5: Use a thermometer to test fruit rind temperature

During harvesting, it is up to every manager and contractor to carry the established excellence across the "goal line".

2. Testing the humidity – the sling

psychrometer is a trusted tool. Whirl the sling psychrometer for 30 seconds and record the wet and dry bulb. Repeat these three times. Use the table provided to measure the humidity (Figure 4).

3. Measuring the fruit rind temperature – thermometer.

Insert the needle probe into the albedo of the fruit (Figure 5). The fruit rind temperature should always be 3°C higher than the wet bulb temperature of the sling psychrometer. Discard the punctured fruit.

4. Measure the soil moisture with a soil

auger. If the soil moisture content is too high, the tree will keep on absorbing the moisture, thus the fruit will remain turgid.

Harvesting do's and don'ts – protecting fruit in the first 30 seconds of picking

- Clip stems – never snap pick.
- Prevent long stems in the bins.
- No long nails, no running with picking bags, do not over-fill picking bags or bins.
- Picking bags should be kept clean and free of sharp edges.
- Soft citrus bins: fill only halfway.
- Gently roll the fruit out of the picking bag into the bin.
- Never leave harvested fruit in direct sun or dry hot winds for extended periods, as this will dehydrate the fruit rind.
- Low-hanging and dropped fruit stay in the orchard. Don't pick them – there's no 30-second rule.
- Separate unmarketable fruit in the field (saves packing costs and reduces pressure on the pack house).

- Bins must be sanitised, cleaned, and free of sharp edges after every delivery to the pack house.

The cost of not considering the natural environment

The images we see every season are heart-breaking: perfect fruit rejected to waste by oleocellosis, peteca, pitting, and plugging. Markets in Europe, the UK, North America, and Asia have a minimum tolerance for rind defects. One careless week of harvesting can wipe out the profit of an entire block and damage customer relationships built over decades.

The citrus growers of SA, field teams, and pack house staff have ensured a season of pristine quality fruit in the orchard and pack house. Now it is up to every manager and contractor to carry that excellence across the "goal line".

Follow these key principles below, and 2026 could be remembered as the season during which we didn't just gain the hard metres – we grounded the ball emphatically under the posts.

- Respect maturity standards.
- Measure rind strength.
- Enforce handling discipline.
- Monitor the weather like a hawk.

Let's finish each season as winners. ▶

For more detailed guidelines, videos and the latest colour charts, visit www.cri.co.za or contact your regional CRI postharvest extension specialist.



1



2



3



4



5



6



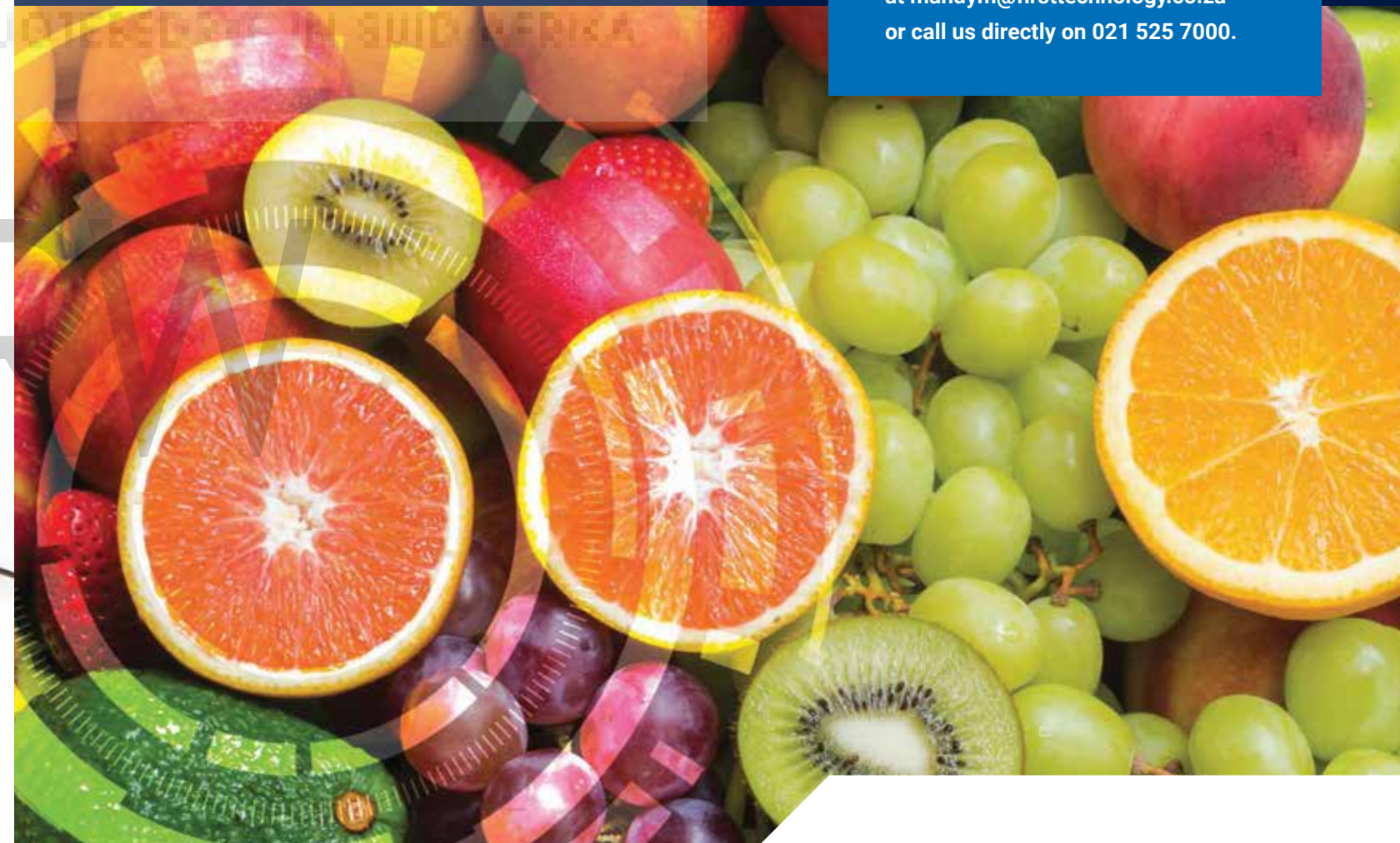
Using modern technology to simplify and enhance the fruit exportation process

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