

WINDBREAKS

increased focus needed

South-easterly winds in the Western Cape in the latter part of the year, can be especially damaging to young mandarin fruit. By Engela Duvenage.



South-easterly winds coincide with the first 12 weeks after mandarin petal drop. When these winds become more intense between October and December, they can cause up to 87% of the severe wind-scar damage seen in a season. However, says Heinrich Geldenhuys, such losses can be minimised with suitable windbreaks or other forms of wind protection, resulting in higher export volumes of quality fruit. Geldenhuys is a junior researcher who graduated in April 2022 with an MSc in Horticultural Science degree from Stellenbosch University (SU).

About the value of his study, Geldenhuys says: "Much of what we know about the impact of windbreaks and their use, especially in the Western Cape, was last researched in the early 2000s. Understandably, the industry has since had many other issues to consider in terms of research, such as how to control false codling moth and mitigate alternate bearing. However, windbreaks are not a topic that one can simply let be, because their correct use can benefit fruit quality and producers' profit margins."

Some of the research findings from his MSc study were recently published in the journal *Erwerbs-Obstbau* (Springer).

Since completing his studies, Geldenhuys has joined Citrus Research International



Heinrich Geldenhuys in one of the orchards where he did his studies

(CRI) as a citriculture research technician, and is associated with the SU Department of Horticultural Science.

Mandarins

His study was conducted in "Tango" mandarin (*Citrus reticulata*) orchards around Stellenbosch, where Beefwood (*Casuarina cunninghamiana*) and Chinese poplar (*Populus simonii*) were planted as windbreaks at different distances from the citrus trees.

"The end-of-year winds, just after fruit set, are more damaging than winds being experienced in July and August when late-mandarins are typically harvested," notes Geldenhuys.

Small, immature mandarin (*Citrus reticulata*) fruit were found to be quite susceptible to cosmetic blemishes caused by wind scarring.

Geldenhuys says that although wind can significantly affect how citrus looks, his studies showed that it very seldom has an influence on the pulp of the fruit and its eating quality. In most cases, it also does not significantly affect the yield and production of citrus trees within an orchard that is surrounded by windbreaks.

Tree-based windbreaks do not provide uniform protection for an entire orchard, he notes. Their effectiveness across the orchard depends on the height of the windbreak, porosity, and the wind speed.

During his studies, the highest pack-out of class 1 fruit was harvested from trees growing closest to the windbreak. Trees in the middle of an orchard tended to suffer more visible peel damage.

"Practically, windbreaks cannot be established at the ideal spacing of 50 m distance intervals for maximum wind protection, because it will mean that valuable production space is lost, along with direct competition between trees for sunlight, nutrients, and water," says Geldenhuys.

Windbreaks or shade netting?

The results of the current study confirm the impact of wind on external fruit quality, and the limitation of tree-based windbreaks with an increase in distance. They partly support the current movement towards fully covering orchards with shade nets.

Geldenhuys says that such a move has its pros and cons: "Many producers are turning to shade netting these days, due to exceptional pack-out rates. But the initial investment cost can be quite steep for most farmers. Also, the long-term impact of netting on the farm's carbon and plastic footprint is still an area of uncertainty."

Managing windbreaks

Geldenhuys warns that producers cannot simply let their planted windbreaks grow



Left: Windbreaks are used widely in the citrus industry to control wind damage

without maintenance, as the trees do need constant management and care to function optimally. Results from his postgraduate studies have confirmed that properly managed windbreaks lead to greater volumes of export quality fruit.

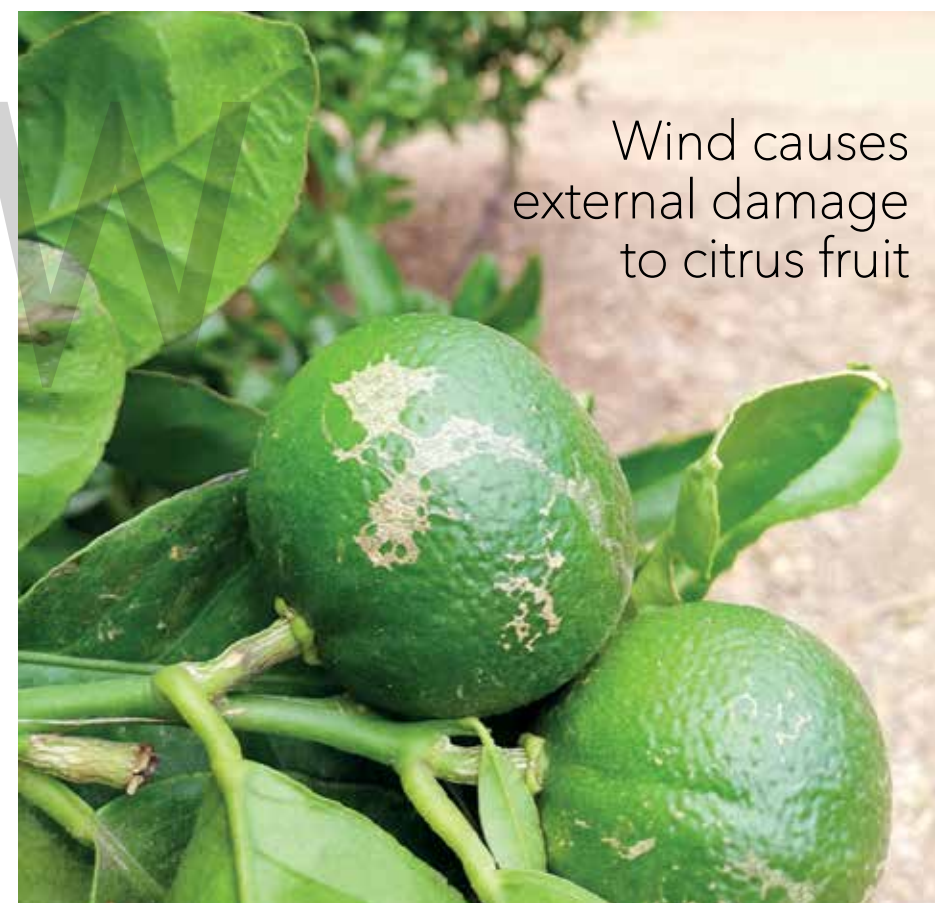
Some advice

- Make sure that there are no obvious gaps between the windbreak trees. Replant trees immediately where ones might have died.
- Prune dense windbreaks to allow sufficient airflow and to reduce very high wind speeds and turbulent airflow in the middle of the orchard.
- To reduce competition for sunlight, remove dead branches and long shoots that cause shading within the orchard.
- Consider root pruning, as it can be beneficial for windbreak species like *Casuarina*, which tend to compete with adjacent fruit trees.

Geldenhuys, who hails from Ceres, says some of his findings will be included in a new book, *Windbreaks in modern agriculture and horticulture* that is being edited by his MSc supervisors, Dr Elmi Lötze (extraordinary senior lecturer, Department of Horticultural Science, SU; Agri Technovation, South Africa) and Dr Maik Veste (CEBra-Centre for Energy Technology; University of Technology Cottbus-Senftenberg, Germany).

Geldenhuys' research project formed part of a larger FarmImpact project funded by the Federal Ministry of Education and Research in Germany, and led by Dr Veste.

Dr Veste's FarmImpact team, along with SU researchers, is currently looking into whether new local tree species can be planted as alternatives in windbreaks. ▀



Wind causes external damage to citrus fruit