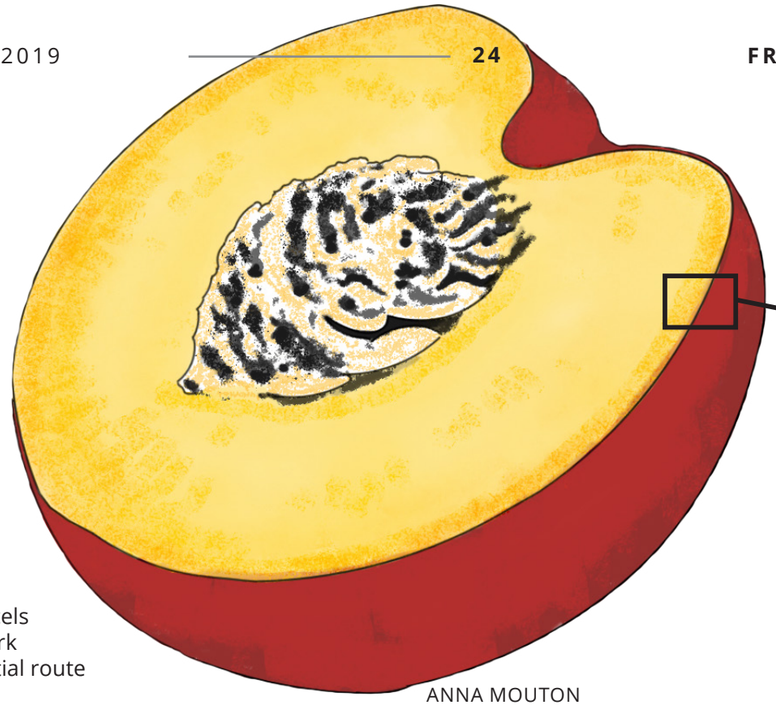
Under the microscope

The peel of a stone fruit consists of a single layer of epidermal cells overlaying the hypodermis which has several layers of cells. The cuticle does not contain cells. It consists of cuticle layers that connect to the epidermal cell walls, a cuticle proper that contains no cell wall materials, and an outermost layer of epicuticular waxes.

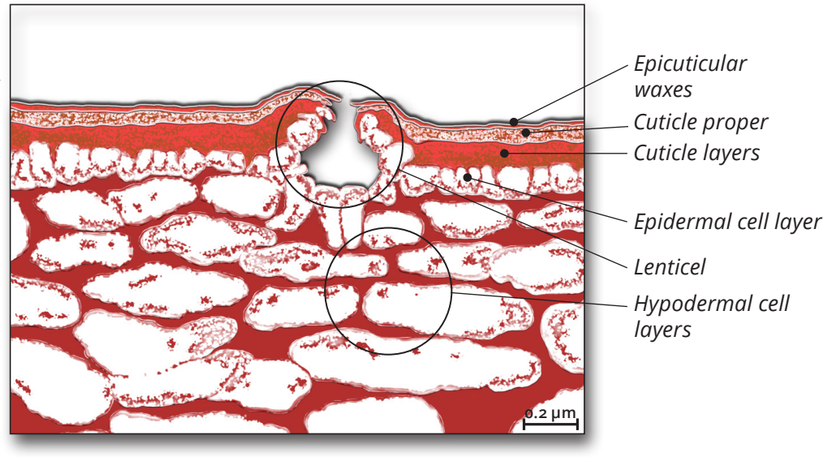
MORE ON LENTICELS

Lenticels are gaps in the epidermis. They develop from non-functional stomata. Unlike stomata, lenticels cannot close, but they may become blocked with cork cells or covered by the cuticle. Lenticels are a potential route for water loss from the fruit.



ANNA MOUTON

SECTION OF STONE FRUIT SKIN ENLARGED X 50 000



FURTHER RESEARCH AND POSSIBILITIES FOR SHRIVEL MANAGEMENT

Kritzinger's study also involved a packaging test, which yielded very useful results. To reduce moisture loss, plums are sometimes packed in high-density polyethylene (HDPE) bags. In this study a range of perforated HDPE bags, currently used in the South African fruit industry, were compared to low-density polyethylene (LDPE) bags with different numbers of micro-perforations.

The study showed that LDPE micro-perforated bags reduced shrivel incidence in Laetitia with plus-minus 50% and in African Delight with about 93%. Under ideal conditions, the use of LDPE-92 and LDPE-72 micro-perforated bags may be a viable option to reduce moisture loss, while still maintaining fruit quality. However, this will have to be tested on a commercial level to verify the results.

"The micro-perforated bags look promising, so I think more research is needed there," says Kritzinger. "However, you will never be able to completely solve the issue. It is just the way that the fruit is."

According to Kritzinger, the study paves the way for other research possibilities such as looking into edible coatings. Edible coatings are wax-like substances sometimes used in citrus to limit moisture loss. Successful use of edible coatings requires an understanding of natural cuticle composition, for which this study is a great start.

While this project compared three different cultivars, another study by Kritzinger currently underway compares plums of the same cultivar that shrivelled with those that did not. The hope is to identify certain wax properties within a cultivar that reduces shrivel susceptibility, and potentially find a way to produce more plums with such properties.

The factors found by Kritzinger to contribute to shrivel might also provide plum breeders with markers to select against. Trees that may produce fruit with a propensity to shrivel could be culled from breeding programmes at an early stage. **FQ**

New Project Tackles Shrivel In Pears

Moisture loss in pears is the subject of a new project that started in April this year. The project team includes Anél Botes of the Agricultural Research Council's division of Post-harvest and Agro-processing Technologies, and Dr Elke Crouch of Stellenbosch University's Department of Horticultural Science. With their findings the research team hopes to advise industry on the best post-harvest and storage protocols to reduce shrivel in pears.

Moisture loss in pears starts at harvest and continues throughout the post-harvest chain, right up to consumption. The process of water loss is influenced by several variables including fruit properties and environmental factors such as humidity and temperature.

The researchers will first examine post-harvest protocols currently followed by the pear industry. Thereafter, they will investigate various pre- and post-harvest factors. These include the effect of harvest maturity on water vapour permeability of the fruit peel. The researchers will evaluate fruit quality on two maturities of Packham's Triumph throughout a simulated post-harvest chain. They will also determine differences in peel properties between various cultivars — including Packham's Triumph, Abate Fetel and Forelle — harvested at optimum maturity.

In addition, the researchers will seek practical solutions to shrivel by testing the use of humidification systems to limit moisture loss in pears during long-term storage. The team will also investigate plastic liners used in bins during storage, specifically how different positioning impacts fruit quality.

The project proposal has been positively received by the pear industry. The project is set to conclude by March 2022. **FQ**