

# Valencia selections on two rootstocks in Mbombela

Mbombela (Nelspruit) is known for the best Midnight Valencia fruit in the country. By Johan Joubert and Paul Cronjé (both CRI)



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The Mbombela area represents a mid- to mid-late Valencia production area in SA due to its unique climatic conditions. These include optimal heat units during flower and fruit set periods after winter, to stimulate a good fruit set. Sudden heat spikes in this period result in poor crop set or excessive fruit drop later in the season, typically known as “November-drop”.

Consumer demand for quality fruit is high in the different export markets, and prolonged shelf life of fruit is vital to optimise profitability. Valencias – also known as “hard citrus” – add significant value to the production chain and are the foundation of the citrus industry.

The trial

This Valencia trial consists of Midnight and Late Valencia as the control selections, and three commercial cultivars, including McClean SL, Jasi and Kobus du Toit Late on two rootstocks. The trial is planted at

Crocodile Valley Estate, part of Komati Fruit Group, in a commercial Midnight orchard to ensure optimised management practices. McClean SL and Kobus du Toit Late are privately owned cultivars managed by the Citrus Growers’ Association Cultivar Company (CGACC) and Citrogold; the other cultivars are open varieties.

Objective

The trial aims to determine suitable Valencia cultivars on Swingle citrumelo (SC) and US-812 (SxB) citrandarin rootstocks for an intermediate citrus production area. Characteristics that are important for a successful cultivar include consistent productivity, fruit size, rind colour, internal fruit quality (Juice, °Brix, acid levels and °Brix/acid ratio), low seed count and an extended picking window.

Evaluation

According to standard export requirements for Valencias, a °Brix/acid ratio of 9:1 is considered the build-up towards peak maturity at 10:1. After peak maturity, the ratio increases to 12:1 and beyond, where fruit is regarded as over mature. Annual yield determination, and tree and fruit characteristics of the cultivars are evaluated to verify trueness to cultivar and to determine climatic

suitability. Field evaluations for various fruit characteristics, production parameters and laboratory analyses were conducted two to three times during the season to determine optimal fruit maturity windows. Due to a severe hail storm in the 2021 production season, no data is presented for that season because of the severe fruit loss.

Rootstock characteristics

US-812 (SxB) citrandarin – (SA Selection)

US-812 rootstock is a hybrid of Sunki mandarin and Benecke trifoliolate orange (*Citrus reticulata* × *Poncirus trifoliata*), developed at the USDA in Fort Pierce, Florida. The South African selection was imported as seeds from Israel in 1996, which were originally sourced from Florida (USDA, Fort Pierce). The seed source was introduced through Post Entry Quarantine (PEQ) and budwood from seedlings was entered into the Citrus Improvement Scheme (CIS). Differences were observed between the characteristics of the original US Department

Table 1: Internal fruit quality data for Jasi Valencia orange at Crocodile Valley Estate (Mbombela)

| Jasi         |                |         |       |        |       |           |                       |                   |
|--------------|----------------|---------|-------|--------|-------|-----------|-----------------------|-------------------|
| Rootstock    | Date harvested | Juice % | °Brix | Acid % | Ratio | Avg. seed | Fruit external colour | Count 88 (% crop) |
| SC           | 06/08/2019     | 56.1    | 11.6  | 1.40   | 8.3   | 3.2       | T1-3                  | 59                |
|              | 22/07/2020     | 62.9    | 11.9  | 1.40   | 8.5   | 2.0       | T1-3                  | 41                |
|              | 19/07/2022     | 56.9    | 11.0  | 1.35   | 8.1   | 2.3       | T1-2                  | 41                |
|              | 17/07/2023     | 56.3    | 11.6  | 1.45   | 8.0   | 2.2       | T1-2                  | 44                |
| US-812 (SxB) | 06/08/2019     | 51.7    | 11.3  | 1.35   | 8.4   | 2.5       | T1-4                  | 67                |
|              | 22/07/2020     | 59.7    | 12.4  | 1.35   | 9.2   | 1.5       | T1-3                  | 37                |
|              | 19/07/2022     | 55.1    | 11.1  | 1.30   | 8.5   | 2.3       | T1-2                  | 37                |
|              | 17/07/2023     | 58.2    | 12.3  | 1.15   | 10.7  | 1.3       | T1-2                  | 45                |

of Agriculture (USDA) rootstock and that of the local selection, which includes low seed numbers (avg. two compared to 12 seeds for USDA source). The local selection shows semi-dwarfing of trees with a Valencia scion, not noted for the USDA source.

US-812 performs well on most replant soils in the citrus producing regions of SA, developing medium-sized trees and good quality fruit on young trees with good to excellent internal quality. However, US-812 is still relatively new in SA and has not been extensively tested with different cultivars in different soil types.

Swingle citrumelo (SC)

Swingle citrumelo is a hybrid of Duncan grapefruit and trifoliolate orange, developed in 1907 in Eustis, Florida. Swingle produces large, vigorous and productive trees with a fruit size similar to, or slightly larger than Carrizo and US-812 (SxB). However, it’s associated with delayed rind colour development and late fruit maturity due to higher acidity. Swingle overgrows most orange cultivars, which induces benching. Swingle can develop blight, but the incidence is lower than other rootstocks. It has good tolerance to *Phytophthora* root rot, citrus nematode and citrus tristeza virus (CTV).

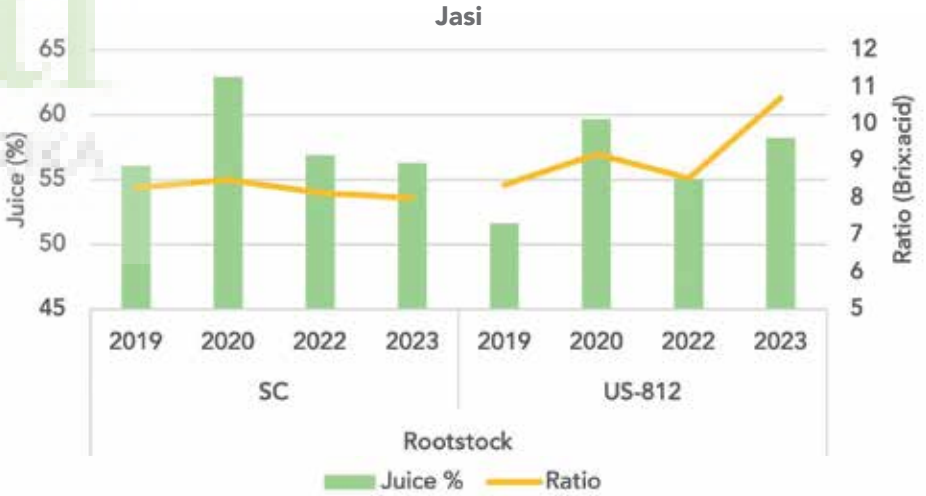


Figure 1: Juice content and Brix:acid ratio, 2019-2023

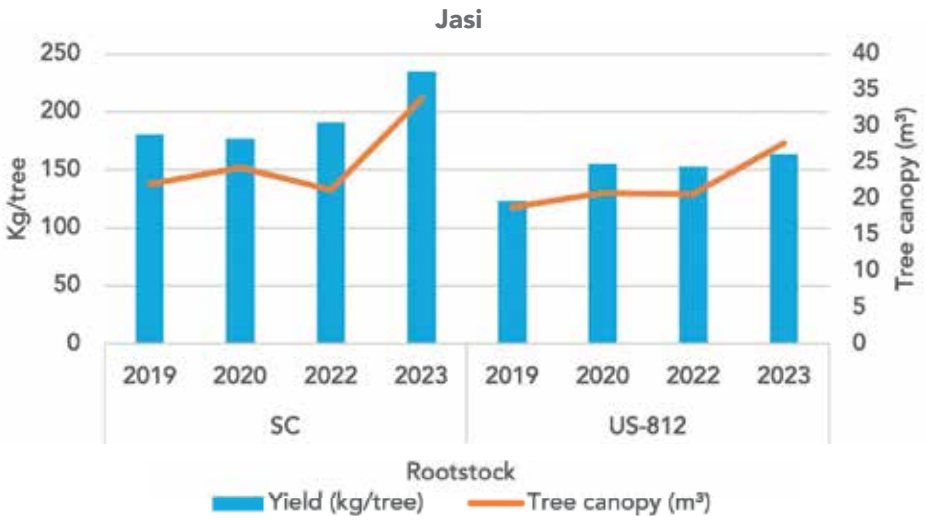


Figure 2: Yield (kg/tree) and tree canopy volume per tree, 2019-2023

This is part one of a two-part series on rootstock evaluation.



Figure 3: Jasi Valencia fruit on Swingle citrumelo rootstock

Results and discussion

Jasi was discovered in the Letsitele region in an Old-Clone orchard as a branch mutation. The selection is later maturing with good internal fruit quality and promising juice levels (Table 1) as well as good external appearance. The tree is compact and less vigorous (Figure 3) compared to typical old clone Valencias and bears a good, early crop on young trees. This contributes to the good fruit set on the trees, with minimum crop manipulation (Table 1). Fruit size is uniform medium to medium large, with a smooth rind that is deep orange at maturity (Figure 3). The fruit shape is round to

slightly elongated. Most fruit range from counts 88 to 72/64 and seed counts are one to three per fruit. Given the low seed counts and good fruit size, this selection is considered a promising addition to the new range of Valencia cultivars. Yields above 150 kg/tree on both US-812 and SC are achieved for mature orchards. Internal flesh colour is orange and the flesh texture is softer than standard Valencias. Tree canopy volumes were smaller in combination with US-812, compared to the Jasi trees propagated on the Swingle rootstocks (Figure 2). Maturity is mid-July to end of August in this intermediate citrus production area.

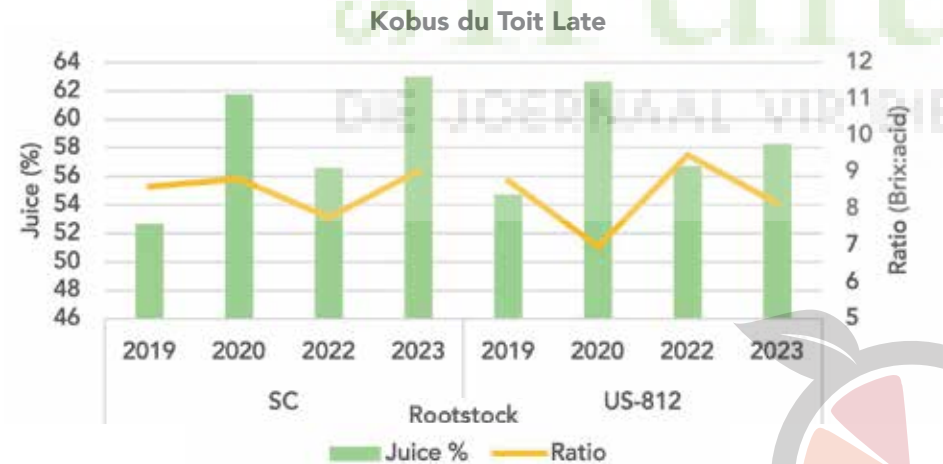


Figure 4: Juice content and Brix:acid ratio, 2019-2023

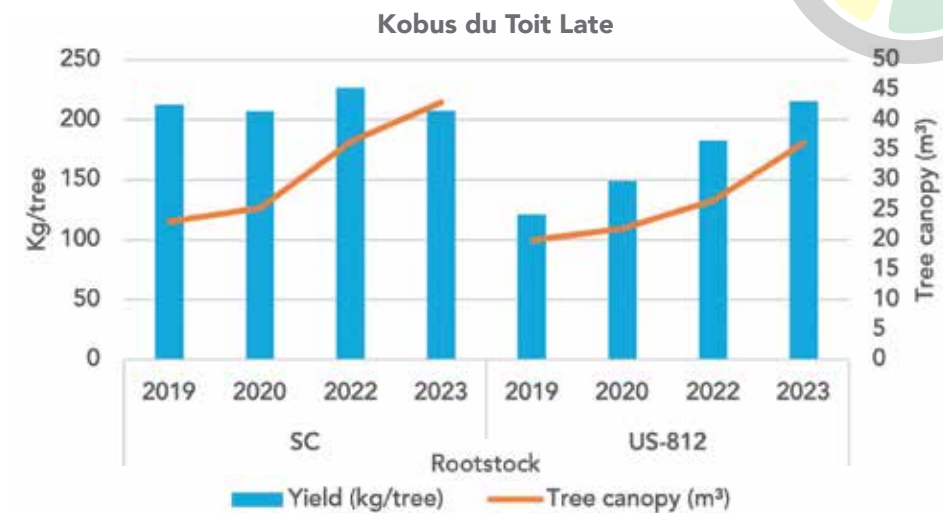


Figure 5: Yield (kg/tree) and tree canopy volume per tree, 2019-2023

Table 2: Internal fruit quality data for Kobus du Toit Late Valencia orange at Crocodile Valley Estate (Mbombela)

| Kobus du Toit Late |                |         |       |        |       |           |                       |                   |                    |
|--------------------|----------------|---------|-------|--------|-------|-----------|-----------------------|-------------------|--------------------|
| Rootstock          | Date harvested | Juice % | °Brix | Acid % | Ratio | Avg. seed | Fruit external colour | Count 88 (% Crop) | Count 105 (% Crop) |
| SC                 | 06/08/2019     | 52.7    | 11.2  | 1.30   | 8.6   | 4.0       | T1-4                  | 46                | 51                 |
|                    | 22/07/2020     | 61.8    | 11.9  | 1.35   | 8.8   | 2.0       | T1-3                  | 60                | 11                 |
|                    | 20/07/2022     | 56.6    | 10.5  | 1.35   | 7.8   | 3.2       | T1-2                  | 51                | 18                 |
| US-812 (SxB)       | 17/07/2023     | 73.8    | 11.3  | 1.25   | 9.0   | 1.5       | T1-2                  | 44                | 26                 |
|                    | 06/08/2019     | 54.7    | 11.4  | 1.30   | 8.8   | 1.3       | T1-3                  | 42                | 38                 |
|                    | 22/07/2020     | 62.7    | 11.5  | 1.65   | 7.0   | 0.8       | T1-3                  | 52                | 7                  |
|                    | 19/07/2022     | 56.7    | 10.9  | 1.15   | 9.5   | 2.2       | T1                    | 48                | 16                 |
|                    | 17/07/2023     | 58.3    | 11.0  | 1.35   | 8.1   | 2.0       | T1-3                  | 47                | 29                 |



Figure 6: Kobus du Toit Late tree with fruit and a typical US-812 (SxB) rootstock bud-union

Kobus du Toit Late was also derived from an Old-Clone Valencia orchard in the Letsitele Valley in the Limpopo Province, the largest Valencia production area in SA.

Good yields are the main characteristics of the cultivar. At the Valencia trial at Crocodile Valley Estate, average yield per tree on Swingle was above 200 kg, followed by US-812 with a range between 120 and 215 kg per tree (Figure 5). The US-812 rootstock resulted in a more compact tree compared to Swingle. Therefore closer tree spacing is required when establishing a new orchard (Figure 5). Kobus du Toit Late had a desirable fruit size for export requirements and peaked from count 88 to 72, with low seed counts ranging from one to four per fruit (Table 2). Closer to peak maturity, the colour development was similar on both rootstock combinations and ranged between T1 and T2/T3 on the colour plate index. The internal quality was good with a juice percentage above 53, °Brix was up to 12 (best on SC), and good ratios were achieved for this later maturing cultivar.

Maturity is similar to Jasi and Late Valencia according to acids and fruit colour, but maturity peaks a week earlier, from the third week of July to middle August. 🍊

The Letsitele Valley in the Limpopo Province is the largest Valencia production area in SA.

