

Part of the mandate of the Agricultural Research Council (ARC) is research and development. The Institute for Tropical and Subtropical Crops (ARC-ITSC) with its main campus in Mbombela, Mpumalanga, is mandated to conduct research on all tropical and subtropical crops in SA. Citrus is one of the crops on which there is major research focus and for which there is a dedicated breeding and evaluation programme.

The focus of ARC-ITSC's citrus breeding programme is on conventional diploid crosses as well as induced mutations and triploid development. Breeding activities are located at two sites: the Addo Research Farm in the Eastern Cape and Mbombela Research Farm in Mpumalanga. Breeding at Addo is mainly directed at improving mandarin cultivars. At Mbombela the focus is on breeding oranges, grapefruit, lemons and rootstocks through conventional and mutation breeding techniques.

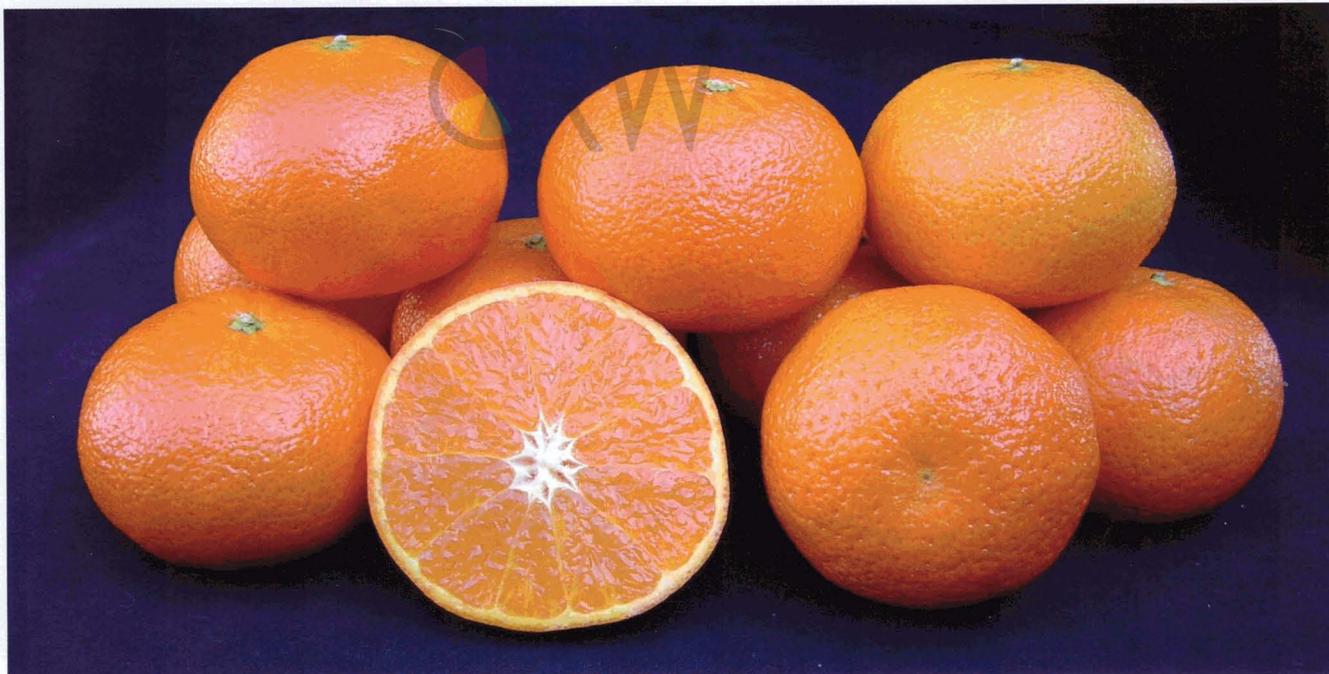
The citrus breeding programme utilises biotechnological tools to support the breeding process, such as development of tetraploid breeding parents, ovule and embryo rescue, DNA fingerprinting and finding markers for fast screening of seedlings.

Recent achievements include the establishment of a molecular citrus genotype reference database for citrus cultivar verification within the Citrus Improvement Scheme, the release of three new mandarin selections, and the development of a technique to mathematically determine the actual genetic contribution of the scion and rootstock to the phenotype of a single plant. The technique will enhance breeding progress in a conventional breeding programme as well as identify citrus cultivars that are resilient with regard to the impact of climate change.

The three new mandarin cultivars are Sonet, Valley Gold and African Sunset. Sonet is characterised by its high quality fruit and early-season ripening. The novel characteristics of Valley Gold under local conditions reside particularly in the late onset of maturity of the fruit, as well as in a tougher rind with a darker orange external colour. African Sunset, under local conditions when compared to Ellendale, is particularly novel with regard to the early onset of maturity of the fruit (mid-late June) as opposed to July/August for Ellendale. African Sunset is also distinctive in having a more pebbled rind and lower acid content, and is almost seedless, even in mixed blocks. All three new citrus cultivars of the ARC are protected by the Plant Breeders' Right Act 15 of 1976 (amended), which prohibits illegal multiplication.

The ARC, in all its activities, contributes toward national priorities as outlined in the Medium-Term Strategic Framework. The citrus breeding programme is therefore focused on the needs of the commercial sector to maintain a competitive edge on global markets and is directed by a proactive and innovative research agenda. Of great significance is the fact that smallholder and emerging farmers benefit from the research programme, as they have direct access to the products of research such as new and improved cultivars. In this regard, these farmers are being supported through a specially designed technology transfer initiative.

To ensure sustained production of citrus into the future, the ARC has revised its research programmes and is in the process of implementing the strategic plan to achieve strategic objectives. One of the key issues to be addressed is the effect of climate change on agricultural production and the mitigation of associated risks. In analysing past experiences and current trends and future scenarios, it is clear that all farmers of South Africa can rely on the research programmes to find scientific solutions to the challenges faced by the agricultural sector. Sustained and stable investment in agricultural sciences is required to improve productivity. Cultivar improvement in particular is key to the achievement of goals.



The African Sunset cultivar