



## Chimeras in late Valencia cultivars

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During the last couple of years, CRI, together with citrus experts in South Africa, investigated the exceptionally high and problematic levels of chimeras in certain late Valencia cultivars. Various investigations have been done and are still ongoing. A workshop was also held to discuss the problem, possible causes and solutions. To date, causes and solutions could not be determined, but it is clear that producers experiencing these problematic levels of chimeras suffer economic losses. This CRI Cutting Edge serves as information to keep producers up to date with the problem and investigations, and to make a more informative decision regarding future plantings and cultivar choices.

### Problem

High levels of chimeras resulting in poor pack-out percentages and high levels of fruit drop of specifically 'Late' and 'McClean' Valencia, and to a lesser degree 'Alpha', 'Kobus du Toit Late' and 'Du Roi' Valencia. Problematic levels of chimeras were observed on certain farms in Letsitele, Onderberg, Hoedspruit, Groblersdal and Marble Hall areas. The high incidence and degree of chimeras was particularly prominent, and in certain orchards, as much as 100% of the trees had chimeras, with levels of 10-40% chimera fruit per tree. Observers were also surprised with the big variation in types of chimera fruit.

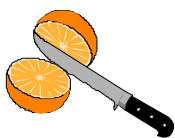
In contrast to the above observations, there was also feedback from farms in Letsitele, Karino, Onderberg and Citrusdal, where no abnormal chimera levels in orchards from the same sources of 'Late' Valencia were observed.

### Cause

Almost no scientific literature is available explaining these abnormal levels of chimeras in citrus, and we are therefore mostly speculating about probable causes. The investigations so far have focused on the source of plant material, UV radiation, inherent instability of Valencia cultivars, and the agricultural chemical products used in nurseries and/or orchards that might induce chimeras.

Due to a lack of scientific support, none of the above factors can at this stage be identified as the single cause. It is more likely that a combination of factors, together with the cultivar's inherent chimera susceptibility, contribute to the problem. The investigation to possible causes is ongoing.





## Solution

### *Producers with problem blocks*

Producers with problem orchards are recommended to continue with their own surveys and to share their information with CRI. The options for management practices are limited since the cause of the chimera problem is not understood at the moment. Tagging of chimera branches before harvest, and pruning of the branches after harvest, was discussed, but it is uncertain whether this is a commercially viable solution. In order to determine the possibility of a chemical cause, producers are recommended to refrain from using systemic insecticides and from spraying organophosphate insecticides between bud and flower in a few rows of problem orchards. The incidence of chimera fruit in treated and untreated rows can then be compared.

Problem blocks that are not economical due to the appearance of chimeras, can be heavily pruned, be grafted to an alternative cultivar, or be removed.

### *New plantings and alternative late Valencia cultivar options*

Cultivars where abnormal high levels of chimeras were recorded, were specifically 'Late' and 'McClean' Valencia, and to a lesser degree 'Alpha', 'Kobus du Toit Late' and 'Du Roi' Valencia.

The following alternative late Valencia cultivar options can be considered:

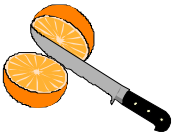
- Commercial: 'Alpha' (Citrogold), 'Gusocora' (Citrogold), 'Lavalle' (Citrogold)
- Experimental (limited amount of bud wood available): 'Bely' (CGACC), 'Henrietta' (Citrogold), 'Jassie' (open), 'Kobus du Toit Late' (Citrogold), 'Louisa' (Citrogold), 'Maxi' (CGACC), 'Millennium' (XLnT Citrus)

For more information regarding these alternative options, contact CRI's coordinator for Cultivar Evaluation, Johan Joubert ([jj@cri.co.za](mailto:jj@cri.co.za) ; 013-7598000).

## Follow-up surveys

The general opinion arising from the workshop was that many producers are unaware of the chimera levels in their Valencia orchards, and that the problem may be worse and more widespread. The investigation into the chimera problem should therefore be expanded in order to get more clarity regarding possible causes and solutions. Follow-up investigations will be done by CRI in 'Late' and 'McClean' Valencia orchards of various ages in various areas in the 2016 season. Chemical spraying programmes, as well as fertilising programmes, will also be compared. Depending on the outcome of these investigations, management recommendations and/or proposals will be formulated for follow-up research.

**Valencia producers are herewith requested to do a thorough survey of the incidence and severity of chimeras in their Valencia blocks, and to return the questionnaire (see below) to CRI. Packhouses are also requested to report their cull data concerning chimeras the past season, per selection and orchard, in order for orchards with severe problems to be researched thoroughly during the coming season.**



## Chimeras in laat Valencia kultivars

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In die afgelope paar jaar het CRI die ongekende hoë en problematiese vlakke van chimeras in sekere laat Valencia kultivars saam met sitruskundiges in Suid-Afrika ondersoek. Verskeie ondersoekte is gedoen en gaan steeds voort. 'n Werkswinkel is ook gehou om die probleem, oorsake en moontlike oplossings te bespreek. Tot op hede kon oorsake en oplossings nie bepaal word nie, maar dit is duidelik dat produsente wat hierdie problematiese vlakke van chimeras ervaar, ook ekonomiese verliese lei. Hierdie CRI Snykant dien as inligtingstuk om produsente op hoogte te hou van die probleem en ondersoekte, en om self 'n meer ingeligte besluit te maak rakende toekomstige aanplantings en kultivar keuses.

### Probleem

Hoë vlakke van chimeras wat tot swak uitpakpersentasies en buitengewone hoë vrugval van veral 'Late' en 'McClean' Valencia, en tot 'n mindere mate 'Alpha', 'Kobus du Toit Late' en 'Du Roi' Valencia, gelei het. Problematiese vlakke van chimeras het op sekere plase in Letsitele, Onderberg, Hoedspruit, Groblersdal en Marble Hall areas voorgekom. Die hoë voorkoms en graad van chimeras was veral opvallend en in sommige boorde het tot soveel as 100% van die bome chimeras gehad, met vlakke van 10-40% chimera-vrugte per boom. Waarnemers was ook verras oor die groot variasie in tipe chimera-vrugte.

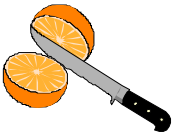
In teenstelling met bogenoemde waarnemings was daar ook terugvoer van plase in Letsitele, Karino, Onderberg en Citrusdal waar geen abnormale chimera vlakke in boorde vanaf dieselfde bronne van 'Late' Valencia waargeneem is nie.

### Oorsaak

Feitlik geen wetenskaplike literatuur is beskikbaar om hierdie abnormale vlakke van chimeras in sitrus te verduidelik nie, en gevolglik word op hierdie stadium maar redelik gespekuleer. Die ondersoekte het tot dusver gefokus op die bron van plantmateriaal, UV-straling, inherente onstabiele van Valencia kultivars, en die landbou-chemiese produkte gebruik in kwekery en/of boorde wat moontlik chimeras kan induseer. Weens 'n gebrek aan wetenskaplike ondersteuning kon geen van

bogenoemde faktore op hierdie stadium as die enkele oorsaak identifiseer word nie. Dit is meer waarskynlik dat 'n kombinasie van faktore gepaardgaande met die kultivars se inherente chimera gevoeligheid bydra tot die probleem. Die ondersoek na moontlike oorsake gaan voort.





## Oplossing

### *Produsente met probleemblokke*

Produsente met probleem boorde word aangeraai om voort te gaan met hul eie opnames en inligting met CRI te deel. Die opsies vir bestuursmaatreëls is beperk, siende dat ons nie tans die oorsaak van die chimera probleem verstaan nie. Merk van chimera takke vóór oes, en snoei daarvan ná oes was bespreek, maar dit is bedenklik of dit kommersieel 'n haalbare oplossing is. Om die moontlikheid van 'n chemiese oorsaak te bepaal, word produsente aangeraai om die gebruik van sistemiese insekdoders en spuit van organofosfaat insekdoders tussen bot en blom in 'n paar rye van probleem boorde te weerhou. Die voorkoms van chimera-vrugte in behandelde en onbehandelde rye kan dan vergelyk word.

Probleem blokke wat onekonomies is weens die voorkoms van chimeras kan of straf gesnoei word, of oorgewerk word na 'n alternatiewe kultivar, of uitgestoot word.

### *Nuwe aanplantings en alternatiewe laat Valencia kultivar opsies*

Kultivars waar abnormale hoë vlakke van chimeras aangeteken is, was veral 'Late' en 'McClean' Valencia, en tot 'n mindere mate 'Alpha', 'Kobus du Toit Late' en 'Du Roi' Valencia.

Alternatiewe laat Valencia kultivars wat oorweeg kan word, is die volgende:

- Kommersieel: 'Alpha' (Citrogold), 'Gusocora' (Citrogold), 'Lavalle' (Citrogold)
- Eksperimenteel (beperkte hoeveelheid okuleerhout beskikbaar): 'Bely' (CGACC), 'Henrietta' (Citrogold), 'Jassie' (oop), 'Kobus du Toit Late' (Citrogold), 'Louisa' (Citrogold), 'Maxi' (CGACC), 'Millennium' (XLnT Citrus)

Vir meer inligting oor hierdie alternatiewe opsies, kontak CRI se koördineerder vir Kultivar Evaluasie, Johan Joubert ([jj@cri.co.za](mailto:jj@cri.co.za) ; 013-7598000)

## Opvolgondersoeke

Die algemene mening uit die werkwinkel was dat vele produsente onbewus is van die chimera vlakke in hul Valencia boorde, en dat die probleem dalk erger en meer wydverspreid is. Die ondersoek na die chimera probleem moet dus uitgebrei word om sodoende meer duidelikheid oor die moontlike oorsake en oplossings te kry. Opvolgondersoeke sal deur CRI in 'Late' en 'McClean' Valencia boorde van verskillende

ouderdomme in verskillende areas in die 2016 seisoen gedoen word. Chemiese spuitprogramme asook bemestingprogramme sal vergelyk word. Na aanleiding van die uitkoms van hierdie ondersoeke, sal bestuursaanbevelings en/of voorstelle vir opvolgnavorsing geformuleer word.

**Valencia produsente word hiermee gevra om deeglike opnames van die voorkoms en intensiteit van chimeras in hul Valencia blokke te maak en om die onderstaande vraelys aan CRI terug te besorg. Pakhuise word ook versoek om hul uitskotdata t.o.v. chimeras die afgelope seisoen te verskaf, per seleksie en boord, sodat boorde met ernstige probleme die komende seisoen deeglik nagevors kan word.**

