

Planning your new citrus planting: availability of propagation material

PAUL FOURIE, JACOLENE MEYER, THYS DU TOIT AND MICHELLE LE ROUX

Citrus Improvement Scheme, Citrus Research International

Citrus growers have experienced a few very profitable years, and the industry has seen unprecedented expansion, from existing citrus growers, as well as newcomers. Certified citrus budwood supply in the southern African Citrus Improvement Scheme (CIS) has more than doubled from a 5-yr average of 3.2 million buds in 2013/14 to 6.7 million buds in 2016/17. The majority (70%) of buds supplied in recent years has been for lemon and mandarin hybrid cultivars. Rootstock seed supply has increased from a 3-year average of 3 347 litres in 2013/14 to 5 593 litres in 2016/17.

Amidst this growth phase, some growers have expressed dissatisfaction with the time it takes to get a new cultivar in the ground on their farm. The aim of this article is to inform growers of the realities and complexities of propagation material supply and to highlight the importance of adequate planning, as well as the importance of involving other stakeholders in planning from an early stage.

The Citrus Foundation Block (CFB) has made significant improvements in order to address the unprecedented demand for rootstock seed and budwood experienced in the past few years. This involves expansion of greenhouse space and budwood production capacity (Fig. 1), implementation of rapid multiplication in heated tunnels (Fig. 2) and planting of new rootstock seed orchards (Fig. 3). The CFB grows 134 thousand multiplication trees of >360 different cultivars with an estimated stock potential of almost 10 million buds per annum. However, many of these cultivars are not in demand at all and the top 30 varieties comprise >90% of total number of buds supplied; this top 30 list is dynamic and varies from year to year. Therefore, CFB needs sufficient forewarning of changes in future budwood demand to manage stock levels of specific cultivars effectively. This is not easy, particularly when planning supply of such a variety of cultivars to a dynamic industry with so many different role players.

Many of the modern citrus cultivars are privately owned and managed. Private cultivars are more actively marketed than “open” cultivars. In some cases (for example, imported cultivars), there is a high demand for these cultivars, or they are marketed, even before CFB has received the cultivar! CFB engages with private cultivar owners and agents to plan budwood stocks according to the interest in their cultivars. However, it takes time to increase budwood stocks and it is unrealistic to expect very high supply volumes soon after introduction of a new cultivar.

We also realized the need to further improve our information networks to include growers, nurseries and developers, particularly to get adequate forewarning of large developments. For example, a big group in the Western Cape planned almost



Paul Fourie, CRI



Figure 1. Expansion of greenhouses to increase the budwood production capacity of the Citrus Foundation Block. (PHOTO BY DR GRAHAM BARRY, XLNT CITRUS)



Figure 2. Rapid multiplication of budwood source trees in heated tunnels.

1 000 ha of new citrus orchards and planned/placed orders with nurseries. They did not forewarn the CFB, and merely expected that budwood supply of the variety of cultivars they wanted to plant will be sufficient for their needs. Some of the cultivars they wanted to plant have not been supplied by CFB in decades, and CFB would have needed at least 1 year to increase its multiplication stock.

The recent demand for certain cultivars was not expected or predicted and CFB was not able to increase stock to sufficient levels. For example, the supply of 'Nules' Clementine increased from a 5-yr average of 90 thousand buds in 2013/14 to almost 600 thousand last season! Budwood supply of a new mandarin cultivar, 'Leanri' increased from 3 030 to 67 506 to 590 633, and for 'ARC Nadorcott LS (ARCCIT9)' mandarin from 29 160 to 267 422 to 511 582 buds in the past three seasons. Whilst the increase in budwood supply levels are commendable, demand still exceeded supply and nurseries had to postpone tree delivery dates in some cases.

CFB has increased its production and supply significantly, but needs at least a 1-year lead time to increase budwood stocks. Given the introduction of many new promising cultivars (or resurgence of old favourites), multiplication stock levels must be carefully planned. Upon introduction of a new cultivar, CFB receives a small number of buds and can establish a few (10-50) trees only. From these trees, new multiplication trees must first be made and it is biologically impossible to have high volumes of budwood available within the first 2 to 3 years after introduction. CFB is investigating the possibility of using in vitro multiplication methods to rapidly increase propagation material from a single bud; however, herein also lies the risk of multiplying large volumes of off-types, and this risk might outweigh the reward.

'Leanri' and 'ARC Nadorcott LS (ARCCIT9)' are good examples

of how budwood stock levels of high-demand cultivars increase over time. 'Leanri' was introduced in January 2014 and 47 trees were initially established. Given the high demand, CFB made almost 5 thousand new multiplication trees in the subsequent years and budwood supply directly from CFB increased from 1 780 buds in 2014/15, to 24 391 in 2015/16 and 82 990 in 2016/17; presently stocks are estimated at 200 thousand buds per annum. 'ARC Nadorcott LS (ARCCIT9)' was introduced in February 2009 but demand was initially low whilst the

cultivar was being evaluated. The demand recently increased and CFB had to increase stock by making almost 8 thousand new multiplication trees in the last 3 years to meet the demand: CFB supplied 8 360 buds in 2014/15, 41 852 in 2015/16 and 119 050 in 2016/17; presently stocks are estimated in the order of 300 thousand buds per annum. These are significant increases in production, but in both cases, demand still exceeded supply.

When CFB cannot timeously supply demand, the Scheme authorises nurseries to cut budwood from certifiable trees in nurseries (made from buds supplied by CFB) using the Scheme's BCIN system in order to limit delays in tree production. It is the CIS's goal to supply at least 80% of budwood demand directly from CFB. In recent years, CFB supplied circa 70% of the total budwood demand.

Following various media reports of a potential over-supply of lemons, demand for lemon cultivars has declined markedly this season. Lemon orders shifted to soft citrus cultivars, as well as old favourites such as Star Ruby grapefruit, Midnight and Turkey Valencia. Demand for these cultivars surprised both CFB and nurseries. As is the standard practice for high demand cultivars, CFB cuts budwood from these cultivars "on allocation". This means that budwood is only cut at optimal times (when the majority of buds have hardened off) to ensure maximum bud yield and minimal waste of buds. Consequently, CFB will not cut and supply budwood between these allocation cut periods, leading to a temporary unavailability. During these times, buds will be supplied via the Scheme's BCIN system. However, given the high demand for some of these cultivars, particularly those that have not been in high demand in previous years (i.e. few trees in nurseries), BCIN buds might also not be available.

As is evident from the increase in total rootstock seed and budwood

supply, tree capacity in nurseries has more than doubled to accommodate the increased demand, and most nurseries are still fully booked. Nurseries make trees almost exclusively on order and the delay in provision of trees is largely linked to the time it takes to make a tree (18-24 months). Experienced growers plan their developments and required tree delivery dates and accordingly order trees well in advance to ensure that they have space and rootstocks booked in their nursery of choice.

Nurseries often experience growers changing their orders, and instead of the cultivar originally ordered, they might opt for something else. This unexpected demand might potentially lead to short supply, as growers often order what others are ordering, leading to a rapid increase in demand. Supply of open cultivars will only be constrained by budwood availability. However, CFB will not supply buds from privately owned and managed cultivars without the cultivar agent's written approval, and the agents will not grant approval if contracts with the grower and the nursery are not in place and/or fees are not paid. Nurseries should therefore not place budwood orders for a private cultivar with CFB if their

client's 'paperwork' with the agent is not in order. This can lead to frustration and unnecessary delays and growers should therefore not leave these arrangements too late.

Growers and developers should understand that it takes 2 years to make a citrus tree. Often developers (particularly newcomers) want trees to plant now and since (almost) no trees are made on speculation by nurseries, none is available and they sense there is a "shortage". Plan early, and order space/rootstocks in nurseries according to your development plan. Please also include nurseries and the CFB in the planning phases of large developments.



Figure 3. Expansion of rootstock seed orchards at the Citrus Foundation Block.

CONTINUED FROM PAGE 74

of trees. Producers are well aware of the dangers regarding brown and sour rot infection of low hanging fruit, but often overlook the practical implications of the pickers' picking bags that will unavoidably rest on the ground when picking low hanging fruit. This result in contamination of the bags and carry over of soil and sand to the bins, increasing injuries and fruit infection.

To conclude

The choice of fungicides and order of fungicide application protects their long-term efficacy. Fruit protection and decay prevention begins in the orchard, long before harvest. An integrated approach in the prevention of decay, which includes, in addition to the correct choice and sequence of fungicide application, orchard management, sanitation of the drench and fungicide solutions, sanitation of fruit, and packline with appropriate sanitizers.

A few key words in fungicide resistance prevention or Good Pack-

house Practices include: minimal fruit injury; timely post-harvest fungicide application; effective fruit and pack line sanitation; effective fungicide application – residue loading; effective drying and waxing of fruit; not exceeding packing capacity of the packhouse; etc.

The packhouse manager largely operates in isolation, with the chemical representatives and visits by CRI personnel his only external extension inputs. The popularity and high attendance rate of the annual CRI Packhouse Workshops clearly demonstrates the hunger for information. The packhouse manager should communicate as wide as possible. He should implement external scientifically proven inputs selectively to his advantage for the optimum protection of the fruit against post-harvest decay and the fungicides against resistance. The effect of changes in pre-packhouse and packhouse practices on the potential increase in post-harvest decay potential should be a key consideration prior to implementation of any new practices.