
Citrus Planting Management

2 Citrus Types and Cultivars

Learner Guide



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Introduction

How many citrus types and cultivars can you name? It is safe to say that there are probably more commercially-produced citrus cultivars than what most people can name. From much-loved lemons, oranges, naartjies and grapefruit that can be found in every supermarket – and on every second street corner in the citrus season – to more exotic cumquats, shaddocks and Minneolas, citrus growers today have their pick when it comes to cultivar selection.

How does a citrus grower go about deciding what to plant? It is a choice that has to be made with a long-term view – once trees are in the ground, fruit that they produce will have to be marketed for eighteen to thirty years, for a price that will give the grower a worthwhile return on his investment.

Terminology

The first thing to understand is the terms that are used to describe kinds of citrus.

definition

Type

For the purpose of citrus production in South Africa, we distinguish between four main types of citrus, which you will probably know about already. These are oranges, grapefruit, soft citrus (also sometimes called easy-peelers), and lemons and limes.

Variety

Variety is the term used to divide citrus types into different kinds. For instance, oranges can be divided into navels and valencias.

Cultivar

Cultivar means cultivated variety and can be used to further distinguish between fruit of the same variety. So, cultivars of navel oranges include Palmer, Navelina and Washington.

Rootstock

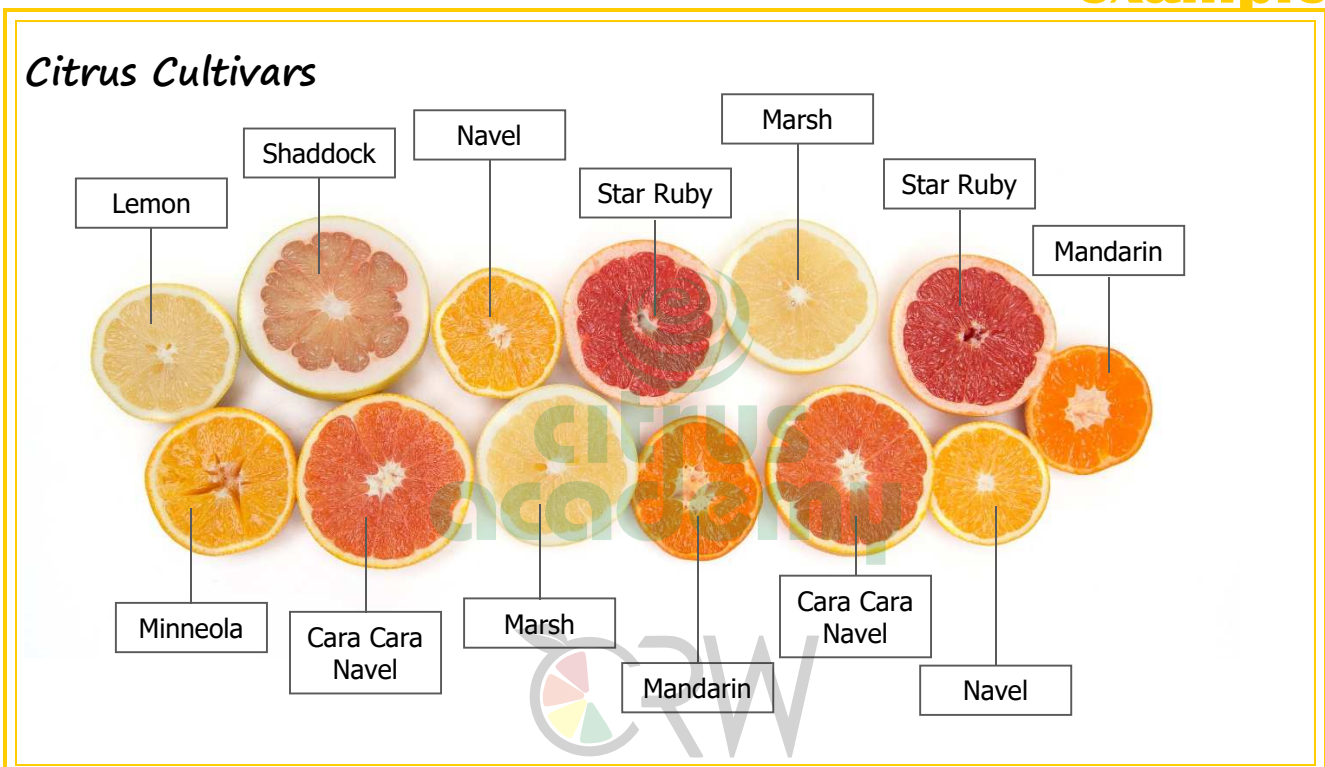
The last term that you need to understand before we get into the detail, is rootstock. First, you need to understand how young citrus trees are grown in a nursery. Seed is used to make seedlings. Once they have grown a little and the stems are about as thick as a pencil, a piece of budwood is grafted onto the seedling. The budwood is from the same cultivar that you want the fruit to be, and will grow to be the fruit-bearing part of the tree. The seedling part of the plant is called the rootstock.

Citrus Types and Cultivars

We will now look in more detail at the different kinds of citrus fruit.

Please keep in mind that new cultivars are constantly being developed. It is impossible to show every citrus cultivar here, but you need to understand what the major varieties and commercial cultivars are; also more or less when during the season different types and varieties are harvested and packed; which varieties are grown in which regions and how rootstocks and cultivars match up. You also need to know where you can find more information and sound advice about new cultivars.

example



Sweet Oranges

We will start with the citrus type that makes up the largest portion of production and exports from southern Africa: sweet oranges.

Oranges make up about two thirds of the citrus exports. Of the oranges that are exported, one third is navels and two thirds valencias.

information

Please Note

For the sake of clarification, horticulturally there are two other varieties of sweet oranges apart from navels and valencias, namely midseason oranges (referred to as mids), and blood oranges. Mids are traditionally marketed with valencias, and blood oranges with navels, so we will include them in those categories as well.

Navel Oranges

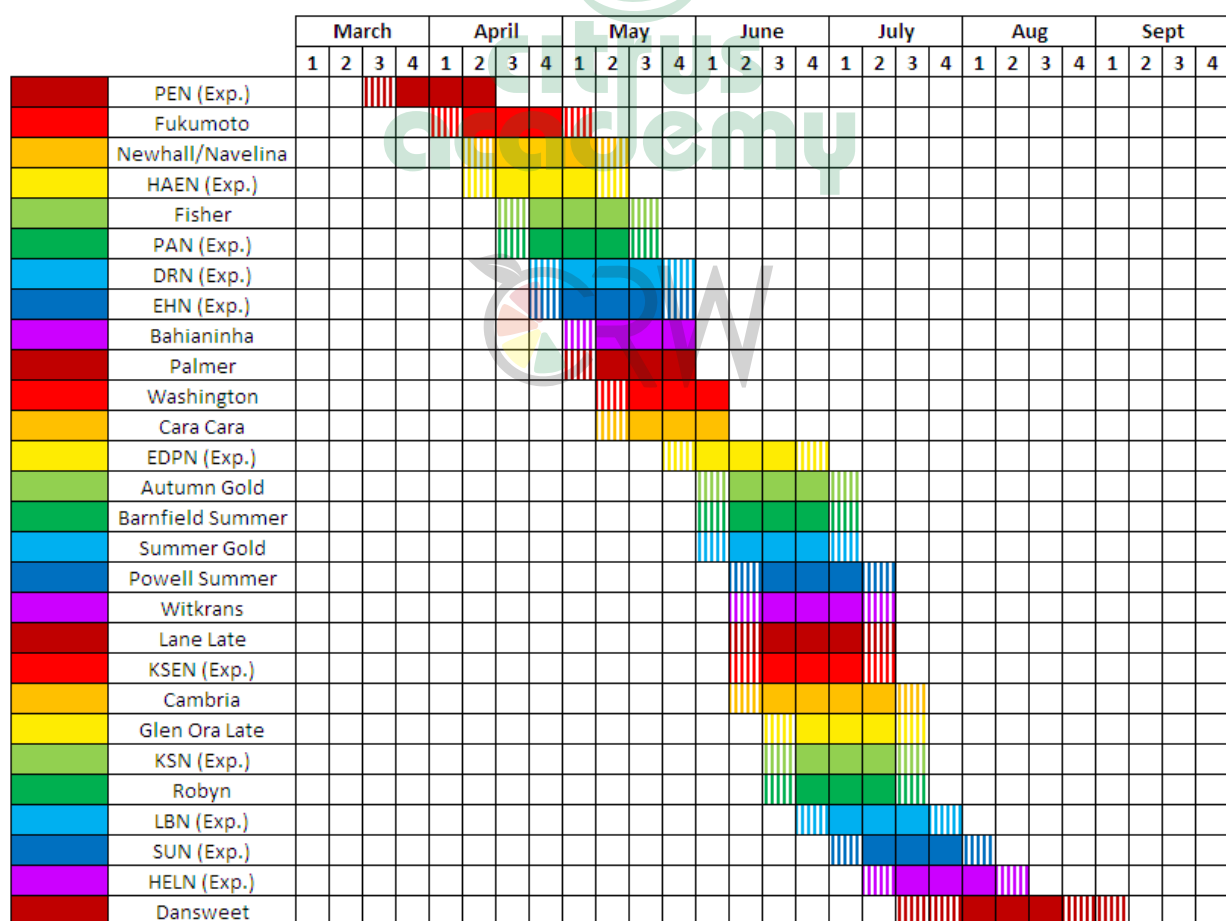


Navel oranges are named for the protuberance at the blossom-end of the fruit. It looks a little like a belly-button, but is actually is a small embryonic fruit. Navels are seedless, medium to large in size, and is a lovely yellow-orange colour when ripe. The fruit is easy to peel, and is known as a premier dessert fruit. The fruit shape and flesh colour varies depending on the cultivar.

Navels do well in the cooler production areas, where the night temperature drops considerably during the autumn. Remember that rind colour development in citrus depends on night temperatures dropping below 13°C while day temperatures are still relatively high.

The major production regions for navels are the Eastern Cape, cooler areas of the Limpopo province and the Western Cape.

The major commercial navel cultivars are Palmer, Bahianinha, Navelate, Washington and Cambria. There are cultivars that mature from as early as late-March and April, while the late varieties stretch into the season as late as August.



Source: CRI Cultivar Fact Sheets

Valencia Oranges

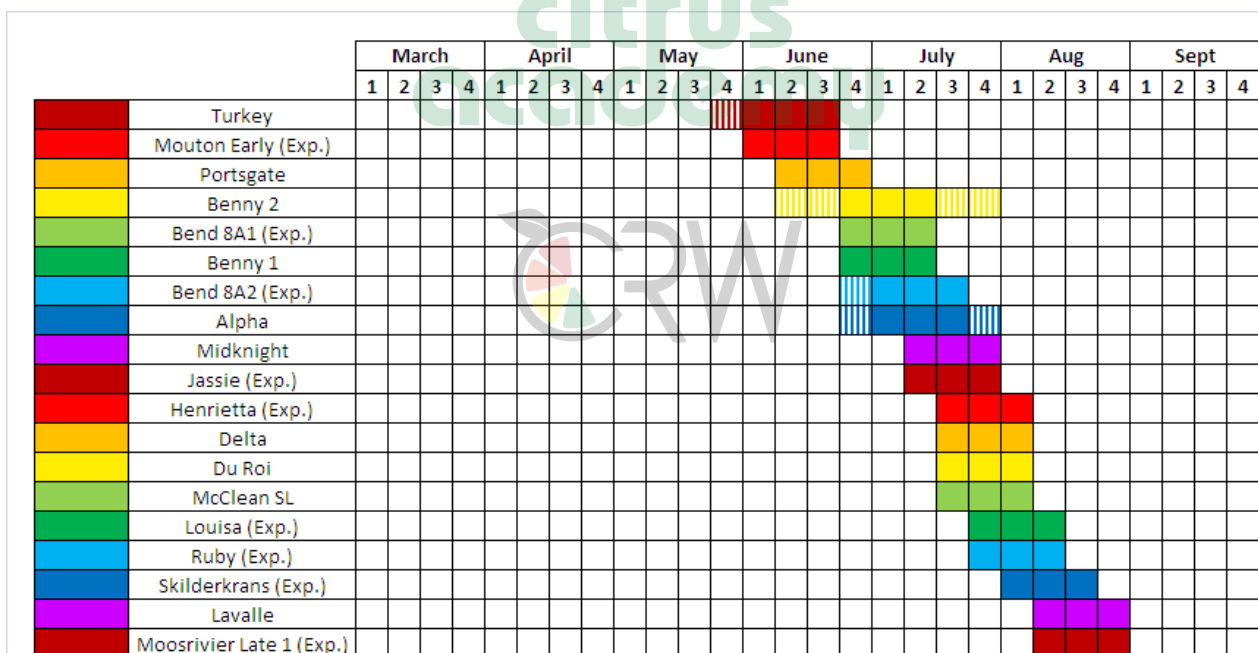


Valencias alone account for 44% of citrus exported from southern Africa, with 40% of hectares under citrus being used to produce valencia cultivars.

The fruit are medium to large, with a nice orange rind that is not too thick and have a smooth, finely pebbled texture. Valencias have a relatively high acid content and a high sugar content, which means that it has a lot of flavour and is delicious. It also has a high juice percentage. This makes Valencia oranges ideal for juicing and for eating fresh.

Valencias are suited to hot, humid areas. Two thirds of the valencias are produced in the Limpopo province and Mpumalanga, with the only other significant production being in the Eastern Cape, where we find 16% of the total planted hectares.

Midnight (technically a midseason orange), Delta valencia, Valencia Late, and Turkey valencia are the cultivars that are produced most, accounting for about 85% of the hectares used for valencia production. Turkey valencia is the first cultivar to mature, and are ready for harvesting from about the last week in May in the warmer production areas. The last Valencia cultivars mature around September.



Source: CRI Cultivar Fact Sheets

Soft Citrus

Soft citrus is a collective name for a group of fruit that is also referred to as easy-peelers or, in the common tongue, naartjies. The main characteristic that these fruit have in common is that they are easy to peel and tasty, making them the ideal snack fruit.

Soft citrus is grown in cooler, drier production areas, although there are some cultivars which have been shown to be suited to the hotter regions. Still, 75% of soft citrus in southern Africa is planted in the Eastern and Western Cape.

There are three distinct varieties of soft citrus, being satsumas, clementine and mandarin.

Satsumas



Satsuma cultivars are the earliest ripening soft citrus fruit. The fruit is usually seedless, with a loose rind that peels very easily. The most popular Satsuma variety is Miho Wase, making up 85% of the satsuma production.

Miho Wase is also the cultivar that matures the earliest of the Satsuma cultivars, and can be harvested from as early as mid-March. Other Satsuma cultivars are harvested until around the end of May.

	March				April				May				June				July				Aug				Sept			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Miho Wase																												
Kuno																												
Okitsu Wase																												
Miyagawa Wase																												
Ohtsu (Exp.)																												
Owari																												
Aoshima (Exp.)																												
Dobashi Beni																												
Ueno (Exp.)																												
Imamura (Exp.)																												

Source: CRI Cultivar Fact Sheets

Clementine



Clementine is the premier soft citrus variety. The fruit is easy to peel and if they are grown in exclusive blocks away from cross-pollinating varieties, they are seedless. When mature, the peel turns a lovely bright orange, and the flesh has a distinctive sweet flavour.

The most popular clementine cultivar is Nules, which accounts for about 75% of planted hectares. The earliest commercial clementine cultivar mature towards the end of March, with the last one finishing around mid-June.



	March				April				May				June				July				Aug				Sept			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Early Clementine (Exp.)																												
Oronules																												
Marisol																												
Early Oroval (Exp.)																												
SRA 63																												
Oroval																												
Nules																												

Source: CRI Cultivar Fact Sheets

Mandarins



Mandarin hybrids are similar to clementines. Mandarins are also excellent eating fruit, with a reasonably thin rind. The colour of the rind and flesh can vary from gold to deep reddish orange, depending on the cultivar.

Nadorcott is the most common mandarin cultivar, and accounts for about two thirds of the hectares planted with mandarin cultivars. Early mandarin cultivars are ready to be harvested around mid-May, and the season from there stretches as late as September.

Novas and minneolas are cultivars that are marketed under the mandarin umbrella, but which are actually separate varieties.

Novas are larger than other soft citrus fruit, and are not as easy to peel. The flesh of the Nova is deep orange and has a distinctive aroma. The segments are juicy, tender and sweet. They are harvested from April to mid-June.



The minneola is a hybrid grapefruit and tangerine. It tends to be a big fruit with a distinctive nipple at the stem-end of the fruit. When mature the rind is deep orange, and the flesh is juicy and aromatic, with a good, tangy flavour. They are ready to be harvested from mid-May to the end of July.

	March				April				May				June				July				Aug				Sept			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Nova																												
HEM (Exp.)																												
African Sunset																												
Or																												
Murcott X Clem																												
Valley Gold																												
Nectar (Exp.)																												
Sweet Spring (Exp.)																												
Nadorcott 1																												
Tango (Exp.)																												
Tasty 1 (Exp.)																												
Tahoe Gold (Exp.)																												
Mor																												
Yosemite Gold (Exp.)																												
Shasta Gold (Exp.)																												
Tasty 2 (Exp.)																												
Gold Nugget (Exp.)																												
Winola (Exp.)																												

Source: CRI Cultivar Fact Sheets

Lemons and Limes



Everybody is familiar with lemons – they are used fresh for cooking and in drinks, and lemon juice is a must-have in many kitchens. They are always available, and the average consumer expects to be able to buy them even in the middle of the summer.



Limes on the other hand are not as common. They are smaller, round and green in colour. They are not produced in South Africa in large volumes, because they need very hot and humid growing conditions.

The appearance and characteristics of lemon fruit vary considerably by cultivar, but they all have one characteristic in common – they are very sour. Lemons is the fastest growing citrus variety, and it has been extremely profitable for the last three or four seasons.

About half the lemons in South Africa is grown in the Eastern Cape, with the Limpopo province in second position. These two provinces together with the Western Cape account for 90% of lemon production.

The main lemon cultivar that is commercially grown in South Africa is the Eureka lemon, on its own accounting for about 85% of the planted hectares. The rind of the Eureka is smooth and reasonably thin, and a bright to golden yellow colour when the fruit is mature. The fruit has a high acid and juice content. There is also a seedless Eureka cultivar.

Eureka lemons can have as much as three fruit sets. This means that at the same time there can be as much as three lots of fruit on a tree that are at different stages of maturity. Because of this characteristic, trees can produce marketable fruit from as early as February in hotter areas, and to as late as mid-September in cooler regions. Other cultivars are used to fill in the periods between the maturation of the different fruit sets.

Grapefruit

This leaves us with the last citrus type, grapefruit. Grapefruit varieties share a distinctive tangy, sweet flavour. Grapefruit is a popular breakfast fruit, and for making marmalade. The three most common grapefruit cultivars are star ruby, marsh and rosé.

Grapefruit grows best in hot, humid conditions, with production shared mostly by the Limpopo province, Mpumalanga, Swaziland and KwaZulu-Natal. These regions account for 90% of production.

Star ruby is the earliest cultivar to mature, and is picked from around mid-May. The latest cultivars are harvested as late as August.

Star Ruby

Star ruby is by far the most common grapefruit cultivar, making up almost 85% of grapefruit hectares. The fruit is medium to large, and has a deep golden yellow to red colour. The flesh of the Star ruby is deep red, and it has a sweet flavour. The fruit rarely has more than one or two seeds, and it has a high juice content. It is the ideal fruit for fresh consumption.



Marsh



Marsh is a large, whitish-yellow fruit and is also virtually seedless. Marsh has a characteristic sharp, tangy flavour. It is suitable for fresh consumption or for processing into juice and is the favourite fruit for making marmalade.

Rosé

Rosé fruit is slightly smaller than Marsh, and is also virtually seedless. The rind of the fruit is light yellow with a distinctive red blush, and its flesh is pale pink in colour. The flavour is similar to that of the star ruby, but not quite as intense.



Shaddock



The last variety that should be mentioned is the shaddock, also called the pomelo or sometimes pummelo. This variety is not strictly a grapefruit, but the fruit is marketed with other grapefruit. The fruit has a thick rind, and thick, spongy pith. The flesh is light pink, with tough membranes between the sections. This makes it into a fruit that is not easy to eat, but for those that know it, it is one of the best tasting citrus fruit that you can wish to find. It matures towards the beginning of the season, in April to May.

	March				April				May				June				July				Aug				Sept			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Star Ruby																												
Marsh / Nartia																												
Jackson																												
Ray Ruby																												
Henderson																												
Rosé																												
Flamingo																												
Star Ruby late																												

Source: CRI Cultivar Fact Sheets

Citrus Rootstocks

The most commonly used rootstocks in citrus production in southern Africa are Roughlemon, Volckameriana, Swingle Citrumelo, Carrizo Citrange, Troyer Citrange, X639 (or Cleopatra XP Trifoliolate), C35, MXT, and Yuma citrange.

Before we go about selecting the right rootstock, it is important to be clear on the function of roots. Roots anchor the plant in the ground, absorb and transport water and nutrients into the plant, synthesise growth regulators, and store food reserves.

The right sort of rootstock is one that meets the following requirements: it is compatible with the fruit-bearing scion cultivar; it is adaptable to the soil and climatic conditions; it makes the fruit-bearing scion more productive and vigorous, is resistant to pests and diseases; and it influences the fruit maturity, quality, colour, size and yield. This may seem like a tall order, but the right rootstock can achieve all of this.

summary

Rootstock Selection

In summary, we can say that rootstock selection serves two purposes, namely:

- Minimising the effect of limitations that there might be at the site, such as the soil type, the quality of the irrigation water and disease presence.
- Secondly the rootstock can enhance the yield, fruit size and fruit quality

This table summarises the characteristics of commonly used rootstocks. Take a careful look at the table. Note the amount of research that has been done and the information that is available to show what rootstocks work best and under what circumstances, and how it impacts on tree performance.

	Rough-lemon	Swingle Citrumelo	Carrizo Citrange	X639	C-35	MXT
Disease Factor						
Exocortis	Tolerant	Tolerant	Sensitive	Susceptible	Susceptible	Susceptible
Tristeza	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant	Tolerant
Phytophthora	Susceptible	Tolerant	Tolerant	Susceptible	Tolerant	Tolerant
Citrus nematodes	Susceptible	Tolerant	Susceptible	(Not known)	Tolerant	Tolerant
Soil Factor						
Poor drainage	Susceptible	Tolerant	Sensitive	Sensitive	Tolerant	Sensitive
High clay content	Sensitive	Intermediate	Intermediate	Sensitive	Tolerant	Intermediate
High sand content	Tolerant	Intermediate	Intermediate	Intermediate	Intermediate	Intermediate
High chlorides	Tolerant	Intermediate	Sensitive	Intermediate	Sensitive	Sensitive
High pH	Tolerant	Sensitive	Sensitive	Tolerant	Sensitive	Sensitive
Drought	Tolerant	Intermediate	Intermediate	Sensitive	Sensitive	Sensitive
Replant	Sensitive	Tolerant	Intermediate	Sensitive	Tolerant	Intermediate
Tree Performance						
Tree growth rate	Vigorous	Moderate	Moderate	Moderate	Slow	Moderate
Final tree size	Large	Medium	Medium	Medium	Small	Medium
Cold hardiness	Poor	Good	Good	Good	Good	Good
Longevity	Fair	Good	Good	Fair	Good	Good
Yield per tree	High	Good	Good	Good	Good	Good
Fruit quality	Low	Good	Good	Good	High	High
Rind colour development	Intermediate	Late	Early	Early	Intermediate	Intermediate

information

Rootstock Selection

In volume 1 of the CRI Citrus Production Guidelines you will find more detailed information on rootstocks and on selecting the correct one. If you still need assistance and advice, consulting your nearest certified citrus nursery on the best choice of rootstock is the best way forward.

Safe Plant Material

Trees can be purchased from any of a number of accredited citrus nurseries. Trees must be ordered at least 18 months in advance to give the nursery enough time to make them. Make sure that the nursery you use is accredited by the Citrus Improvement Programme, so that you can be sure that they will supply trees that are true-to-type and of a high quality.

The nursery will use certified budwood from the Citrus Foundation Block for the fruit-bearing scion, and the trees will conform to the standards set by the Citrus Improvement Programme. In short, this means that the trees will be healthy with a good nutritional status; the trees will be free of pests and diseases; the stems of all trees will be straight; the bud union will be at least 20 cm above the soil level; the trees will have healthy with a well-developed root systems; and the trees will be free of harmful pathogens and nematodes.

Make sure that you discuss these details with the nursery owner when you order the trees. Visit the nursery from time to time to check in on your trees. When the trees are delivered, certificates issued by the CIP must accompany each consignment, certifying both the health of the trees and the origin of the budwood. Remember that this is a requirement for GlobalGAP registration.

definition

GlobalGAP

GlobalGAP is an internationally recognised set of farm standards dedicated to Good Agricultural Practices (GAP). Through certification, producers demonstrate their adherence to GLOBALGAP standards.

The Citrus Foundation Block is owned and operated by Citrus Research International, which means in essence that it belongs to the citrus growers of southern Africa. Most nurseries get the seed from which they grow their rootstock plants from the Citrus Foundation Block. All nurseries are however obligated under the Citrus Improvement Scheme to get all their budwood from the Citrus Foundation Block.

The Citrus Foundation Block is located in the Eastern Cape near Uitenhage, in a secluded valley where citrus is not commercially grown. The nearest commercial citrus orchards are located in Kirkwood, which is approximately 40 km from the CFB. To preserve this secluded location, South Africa's Department of Agriculture, which is the National Plant Protection Organisation of South Africa, endorsed a 5 km exclusion zone around the Citrus Foundation Block where no citrus trees are allowed to be grown, even in home gardens.

Conclusion

It is important to know your citrus, and particularly to know what grows best in your area. Seeing that export citrus has been grown in some production regions for up to 100 years, there is a lot of knowledge and data to tap into to find out what will work best. On the other hand, new cultivar development is one of the fastest growing areas of research, and new and exciting cultivars are being released onto the market all the time.

information

Stay Informed

To stay informed, subscribe to and read industry publications, attend the Citrus Research Symposium and CRI study group meetings, and keep in contact with your CRI extension officer. Visit www.cri.co.za for contact details.

