101-14

101-14 was developed by Professor Alexis Millardet with the assistance of the Marquis de Grasset in 1882 in France. It is not clear when it was imported to South Africa, but it was definitely one of the first after phylloxera was discovered in 1886. It is a cross of Vitis riparia × Vitis rupestris and the only commercially used rootstock in South Africa with this parentage. Two others, 3306 C and 3309 C never gained importance over 101-14 since it performed only similarly or worse in trials. Its grafting compatibility with Vitis vinifera cultivars is less than that of Richter 99 and Richter 110, especially with Chardonnay, Sémillon, Pinot noir and Colombar. 101-14 was, and still is, an important rootstock in South Africa although its popularity has declined rapidly over the past decade.

101-14 induces moderate vigour (2.5 out of 5) and early ripening due to a short vegetative cycle. It is considered to be the most vigorous limiting rootstock in commercial use. It has poor drought tolerance (from its Vitis riparia parentage) and is not recommended for dry-land conditions. The root system branches extensively with mostly fine roots. The natural tendency of the roots is not to penetrate deeply with a very small angle of penetration. It is not well adapted to sandy and gravelly soils, unless it is underlain by a relatively shallow clay layer where it can collect moisture (duplex soils). Deep red soils with an even distribution of clay (15% or higher) in depth are well-suited for 101-14. Do not plant 101-14 on easily compactable or, dry soils with low clay content; it performs poorly when the vigour is not adequate to utilise the soil in depth (Klapmuts and Swartland soil forms in warm regions, even with irrigation, are not recommended). Deep sandy soils are obviously also unsuitable.

This rootstock is also sensitive to the climatic conditions in which it is grown. It induces moderate vigour in the scion cultivar, and combined with a relatively shallow and weak root system, cannot support consistently high yields for 15 - 20 years. It is a rootstock for quality grapes in moderate coastal climates, although it has produced good results in deep fertile soils in warmer regions such as Robertson, Montagu and the Klein Karoo. It performed poorly in soils with pH less than 5, in actual fact the worst of all rootstocks tested. Once properly limed, however, it performed well. Just as its poor performance under acid soil conditions, it also does not prefer calcareous soils (its Vitis riparia × Vitis rupestris parentage), resisting only up to 9% active lime in the soil. 101-14 has moderate to good resistance to root knot, root lesion and dagger nematodes. This is strange compared to 3306 C and 3309 C which have low tolerance, maybe because of a different Vitis riparia species as parent? It also has high resistance to salinity which is strange considering the genetic background of its parents (this good resistance is also reported in some American literature). Resistance to Phytophthora cinnamomi is very good and it is a rootstock that can handle wet subsoils or higher water tables.

101-14 is the traditional rootstock of the coastal areas of Stellenbosch and Constantia. The shallow medium potential duplex soils of the Helderberg basin that consists of sandy/gravelly top soils underlain by shallow clays (Estcourt, Klapmuts and Kroonstad soil forms) that supports water tables in winter, draining slowly in spring, is a good example. Both the deep red soils on the slopes of the Helderberg and Simonsberg (Hutton, Clovelly and Oakleaf soil forms) and the granitic slopes of Constantia (with similar soils types), are very well-suited to provide good performance on 101-14. Here it induces moderate vigour and early maturity of late ripening vigorous red grape cultivars like Cabernet Sauvignon. In past years, many vineyards grafted to 101-14 and planted in the aforementioned regions were dry-land farmed. The introduction of supplementary drip irrigation has greatly stabilised cropping levels and improved quality.

101-14 also used to be the dominant rootstock in the Robertson Valley on shallow heavy clay soils before Richter 110 replaced it over the last 10 - 15 years. It was able to withstand the prolonged wetness that occurred under intensive irrigation (for high yielding white cultivars), as well as the salinity that is sometimes associated with these soils. The vineyards, however, did not age well under these stresses in combination with a harsh summer climate, which eventually led to the decline in its popularity.

101-14, and to a lesser extent 143 B, were the only other rootstocks used in the Jacquez era. Both these rootstocks were adaptable to a wider range of soils than Jacquez, especially on shallow duplex soils. The decline of Jacquez during the 1960s saw the increase of 101-14 and by 1970 it was the dominant rootstock in the industry with 40% of all plantings. Richter 99 was soon to start making its impact felt. It is strange to think that 30 - 40 years ago 101-14 was widely planted in the Swartland and Agter-Paarl areas without irrigation and when soil preparation and the adding of soil ameliorants (such as lime and phosphate) were still in its infancy. 101-14 never found application in the table and raisin grape industries due to its lack of vigour that is important for bunch quality and berry size.

The future of 101-14 is probably limited to the cooler coastal areas for high quality production where early ripening is required. Other better performing rootstocks like Richter 110, Richter 99 and US 8-7 have taken its place in the inland irrigated regions. I do not consider 101-14 to make a great “comeback” in the industry. D.P. Pongrácz was of the opinion that 101-14 was planted in excessive amounts solely because other better rootstocks were not available (he was referring to Richter 110 and Ruggeri 140).

At the time of the 1966 rootstock survey by the Stellenbosch Wine Institute, the following information existed for 101-14: The 1920 and 1925 surveys mentioned that it was a complete success everywhere. The 1927 survey again recommended it due to the good performance...
Ramsey is a natural selection of *Vitis Champinii* made by Thomas Munson on the limestone hills of Texas in 1900. It was imported to South Africa from the USA in 1938 incorrectly as Salt Creek. The true Salt Creek is a selection of *Vitis doaniana*, a closely related species, but not used as commercial rootstock. Ramsey is thought to be a natural hybrid between *Vitis candidans* and *Vitis rupestris*, and like Dog Ridge (another *Vitis Champinii* selection), it induces very high vigour in scions. Dog Ridge has mostly disappeared as rootstock due to poor grafting and rooting success, as well as the excessive vigour it induces. Grafting compatibility of Ramsey with most commercial *Vitis vinifera* cultivars are generally low—for both wine and table grapes (it fails completely with Muscat d’Alexandrie and La Rochelle).

Ramsey is well-suited to low fertility, coarse-textured sandy/stony soils. It really is the only rootstock that can prevail on marginal soils under irrigation. It performs well on a wide range of soils ranging from deep dry sandy soils to rocky and stony soils with low organic matter content, highly compactable soils, heavy clay soils, as well as poorly weathered granitic soils on the higher mountain slopes. Soil forms include Fernwood, Glennosa, Swartland, Estcourt, Westleigh, Longlands, Vilafontes, Dundee and Cartref. It has very good resistance to subsoil wetness, *Phytophthora cinnamomi* and salinity. Drought resistance is reported as moderate which is probably true, not because of poor drought resistance (considering where it occurs in its native habitat of the dry Texas hills), but probably because it depletes available soil moisture very quickly through high vigour and the large foliage and crops it can support. Lime resistance is also reported as only moderate, but this cannot be confirmed under South African conditions. No problems with lime induced chlorosis has been reported, even in regions with lime stone rich soils (most limestone rich soils in South Africa are of a hard crystalline form and therefore less active in influencing rootstock performance).

*Vitis vinifera* wine grape cultivars grafted to Ramsey grow vigorously and produce consistently high yields. Ramsey can adapt particularly well to soil differences in a vineyard, but can become too vigorous when planted on high fertility, organic material rich soils. In these cases the trellis design must be adapted to allow for the higher vigour. Ramsey can support yields of 30 - 35 tons/ha on vertical shoot positioning adapted Perold trellises and 60 - 70 tons/ha on Double Gables (here and there up to 100 tons/ha have been attained). Ramsey delays ripening of the fruit and can cause extensive problems with sour rot on cultivars with compact bunches.

Probably one of its main attributes is its very good nematode resistance. Nematode presence is especially high in warmer climates under intensive irrigation on sandy and loamy soils. It has exceptional resistance to root knot and root lesion nematodes, but has only moderate resistance to dagger nematodes. High concentrations of ring nematodes have been reported on Ramsey roots without any significant negative impact on vineyard performance.

Ramsey is by far the most important rootstock for the table grape industry and comprises at least 75% of all plantings. In many regions table grapes are planted on marginal soils outside of the alluvial plains (so-called “buitegronde”), especially in the Orange and Olifants River Valleys where the grapes can mature earlier. Ramsey is the only rootstock suited for these conditions and still provides high vigour for bunch quality and berry size.

The phylloxera resistance of Ramsey is questionable according to some scholars. Phylloxera does not occur in its natural habitat in Texas. Ramsey has been used extensively in South Africa over the last 30 years without any signs of phylloxera sensitivity, even when replanting with Ramsey on the same soil. *Vitis candidans* (one of its parents) have naturally moderate phylloxera resistance, but *Vitis rupestris* unquestionable. Ramsey comes from the same region as *Vitis Berlandieri* which has excellent phylloxera resistance.

Experience with Ramsey was relatively limited until the 1980s being overshadowed by rootstocks like Jacquez and 101-14 initially and later Richter 99. It was only with the development of the table grape industry in the Orange River in the mid 1980s that Ramsey came to the fore. It was soon realised that Ramsey had characteristics that no other rootstock in South Africa had at the time. It opened up the possibility for establishing vineyards on soils previously considered to be too marginal for grape production. Today, Ramsey is planted in especially the warmer inland intensively irrigated grape growing regions. It is not considered for premium wine production due to the excessive vigour and crop loads it induces, as well as the risk of reduced fruitfulness of naturally less fruitful cultivars like Cabernet Sauvignon in the coastal region.

The decrease in wine prices over the past 8 - 10 years has prompted growers to plant cultivars and clones with higher yield potential. Ramsey as rootstock saw vast increases in popularity. It is expected that Ramsey continue to be a very important rootstock for the foreseeable future, until such time that the demand for premium wines stabilises and traditionally lower yielding coastal areas start establishing new vineyards on other less vigorous rootstocks again.