Your roots
of success

*/// **Vegetables** by Bayer*

BAYER

De Ruiter®

Welcome

The rootstock market is more dynamic than ever.

There are many cultivation strategies and methods and just as many specific wishes of growers. The selection of varieties (scions) increased over the last years. This means that the rootstock used must meet very specific requirements. De Ruiter is responding to these changing demands, and that is why we are pleased to present you with this exceptional selection of rootstocks together with some interesting scientific facts and, more particularly, information on these potential roots for your success.

Contents

Wild tomato *from* ***South America***

To find out more about the origin of the tomato, we have to go back to South America around the year 1500.

It is here that the Spanish conquerors came into contact with what the Aztecs call “xitomatl” in their language. Many years later, wild varieties were found surviving at an altitude of 3000 meters in the Andes Mountains. Some wild tomato varieties which are resistant to the large temperature swings between day and night are a source of amazing vigour and growth and are also not susceptible to corky root. Characteristics of wild varieties are the basis of the modern day rootstock.

The history of Rootstock

The grafting of a scion onto a rootstock has a long history and ancient civilisations were already using this technique for the decorative botanical effect.

The first commercial application in the cultivation of vegetables developed when it became clear that rootstocks can provide resistance in a crop against certain soil diseases without a negative impact on the quality of the fruits. By intelligently crossing different varieties, it then became possible to develop new hybrid rootstocks which were able to successfully combat diseases such as the feared corky root. In addition, it turned out that a good rootstock gave the plant improved resistance to stress conditions as well as a more vigorous growth pattern.

Various factors blocked the success of rootstocks until the end of the 1980s: inefficient grafting techniques, the limited germination capacity of rootstocks, and the introduction of heated cultivation and substrate types.

All this changed when Japanese grafting techniques entered Europe, allowing growers to carry out grafting activities much cheaper with a much higher success rate.

Extensive research led to the development of methods for drastically improving germination capacity, the development of hybrids with new types of resistance, and the availability of new rootstock varieties. As a result of all these developments, the use of rootstocks has become an integral part of the professional horticulture sector.

Rooted *in* ***Research***

De Ruiter has been at the forefront of developing and professionalising the rootstock market in Europe from the very start, beginning in the 1960s.

A brief trip back through our rootstock history:

1963

De Ruiter introduces ***the very first rootstock – 'KK' – for tomato varieties****. This rootstock is resistant to corky root and nematodes. The improved resistance to cold also makes it possible to cultivate these varieties earlier on in unheated greenhouses.*

1970

De Ruiter introduces the ***'KNVF'*** *rootstock with additional resistances against Verticillium and Fusarium.*

1975

De Ruiter continues working on the development of rootstocks with new types of resistance, for example KNVF2.

1996

The ***improved Japanese grafting technique*** *is introduced and is increasingly being used. The TMKNVF2 Fr. rootstock deserves a name of its own: Beaufort.*

2000

*De Ruiter develops **Maxifort**, a rootstock which grows 20% more vigorously than the Beaufort, especially for substrate-based cultivation.*

2002

***Innovative seed priming technology** gives the De Ruiter rootstocks an increased speed of germination as well as more consistent germination.*

2004

***The introduction of Multifort**, a unique variety due to its extremely vigorous growth characteristics in combination with resistance to Fusarium 3.*

2005

*De Ruiter introduces **protective coatings (pelleted seeds)** for rootstock seeds to ensure even better germination and sowability.*

2008

*De Ruiter develops **various rootstock varieties** to respond even more effectively to specific growing conditions and strategies.*

2009

*De Ruiter introduces the Rootmap, an **online webtool** in which the grower through answering questions will receive an advise which rootstock fits best with their circumstances.*

2012

*De Ruiter is constantly working on new rootstocks. This year we will be launching a **very promising rootstock**. This rootstock is being developed for high tech glasshouses and will offer even more growing power, uniform stems and higher productivity*

2020

*Monsanto researchers are utilizing the power of wild type tomatoes and new, advanced breeding technologies to deliver rootstocks with **stronger vigour**, better disease resistance and top seed quality. Productivity and reliability will meet and even exceed the needs of growers.*

The search for resistance

In addition to increased growth vigour, disease resistance in particular has been an important factor in the development of new rootstocks. At first, the goal was to achieve improved resistance against soil related diseases such as corky root, Verticillium, Nematodes and Fusarium. Rootstocks also played an important role in countries where the use of Methyl Bromide was no longer permitted. And sometimes a specific problem demanded a specific rootstock.

Success *at an angle of* ***45°***

An important factor behind the success of rootstocks was the introduction of the Japanese grafting technique at the end of the 20th century. This has now become the most commonly used and efficient grafting technique for Solanaceae (the family of plants to which the tomato, aubergine and sweet pepper all belong).

In brief, this Japanese grafting technique consists of the following:

1. Cut the rootstock off at an angle of 45°.
2. Cut the scion off at an angle of 45°.
3. Align the scion carefully in a straight line with the rootstock.
4. Keep both parts in place using a silicone grafting clip.

Why** use a* ***Rootstock?

Modern rootstocks offer a wide range of possibilities for cultivating various crops, including tomatoes, as effectively and efficiently as possible. The reasons for using rootstocks include:

1. Improved resistance to diseases.
2. Better quality of fruit.
3. Stress resistance to temperature differences and drought.
4. Stronger and improved root structures.
5. Stronger plants in the summer.
6. Better cold tolerance.
7. Improved resistance to and recovery from infections.
8. Better establishment of the plant under difficult conditions.
9. Vigorous growth for longer crop cycle.

***Your roots** of success*

Yield has to do with choices, especially if you cultivate tomatoes. This starts as early as the choice of rootstock. For every cultivation strategy, the grower must take a great many factors into account nowadays including:

Variety, cultivation medium, specific resistances, greenhouse type, CO_2 capacity, climate and cultivation method, etc. That is also why De Ruiter offers its clients five different and unique rootstock varieties which take their specific conditions into account - five solutions waiting for one thing only: your search for success.

Multifort

*Your roots of **strength***

Multifort is an extremely strong rootstock for the soil-based cultivation of tomatoes. It is a very unique rootstock because it combines extremely vigorous growth with resistance against Fusarium 3.

Resistances

HR	ToMV:0–2/Fol:0–2/For/Pl/Va:0/Vd:0
IR	Ma/Mi/Mj

Maxifort

*Your roots of **endurance***

The rootstock for substrate crops that has proven its value over and over again throughout Australia's harsh summers. Your safe choice, even for vegetative scions, **Maxifort** provides a balanced growth to maximise your yield.

Resistances

HR	ToMV:0–2/Fol:0,1/For/Pl/Va:0/Vd:0
IR	Ma/Mi/Mj

Your roots of success

DR0141TX

Your roots of ***performance***

This rootstock combines it all. The absolute superior power in this rootstock can be exploited and converted into higher yield potential and will equally give better endurance in long summer crops. **DR0141TX** has been developed with the trend towards artificially lit crops in mind.

Resistances

HR	ToMV:0–2/Fol:0,1/For/Pl/Va:0/Vd:0
IR	Ma/Mi/Mj

Equifort

Your roots of ***control***

Equifort is a generative tomato rootstock enabling better control of the plant and a more balanced crop. Equifort directs its vigour and activity towards fruit production, leading to higher average fruit weight and a larger number of trusses.

Resistances

HR	ToMV:0–2/Fol:0,1/For/Pl/Va:0/Vd:0
IR	Ma/Mi/Mj

Shincheonggang

Your roots of ***protection***

The tomato rootstock for open field staked crops and greenhouse crops that combines a complete disease resistance package with medium vigour.

Resistances

HR	ToMV:0–2/Rs/Fol:0–2/For/Va:0/Vd:0
IR	Ma/Mi/Mj

Cultivation *conditions determine* ***success***

With its broad range of rootstocks, De Ruiter is responding to the latest developments in the market.

The market is characterised by an increasing variety of cultivation methods and demands, a greater selection of available varieties, and a search for optimum cultivation systems. The choice of the appropriate rootstock is determined by a range of cultivation factors including the type of greenhouse, the variety chosen, the CO2 capacity, and last but not least the grower.

CO_2

The CO_2 capacity impacts upon crop growth throughout the cultivation season and also affects the choice of rootstock.

Greenhouse

Recently built greenhouses over 4 metres tall, larger glass surfaces and greater light penetration guarantee higher production potential.

Grower

Every grower has their own personal methods. Some target vegetative growth, others prefer a generative crop cycle.

Variety

To obtain optimum benefit from the variety as well as the rootstock used, both must be well suited to each other.

Substrate

The type of substrate also influences the choice of the rootstock. The plant will respond differently to a generative substrate compared with a vegetative substrate.

Automatic *Grafting*

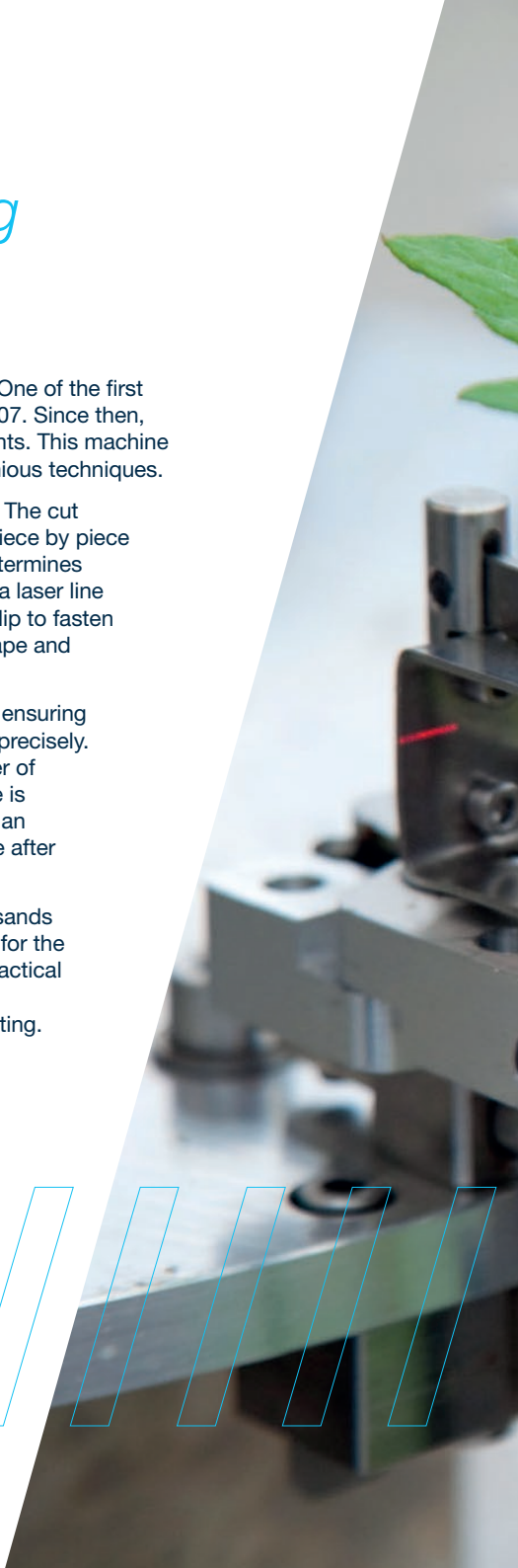
Innovation is ongoing business, also in rootstock. One of the first automatic grafting machines was introduced in 2007. Since then, a robot can graft young tomato and aubergine plants. This machine was developed in The Netherlands and uses ingenious techniques.

Handling the grafting machine is surprisingly easy. The cut rootstocks enter in trays. The scions are entered piece by piece in a carrousel of twelve positions. The operator determines the grafting position on the scion, with the help of a laser line projected on the plant. The grafting robot uses a clip to fasten the rootstock to the scion. This clip is identical shape and material to the one used in manual grafting.

The grafting machine has a unique cutting system ensuring that the cuts are parallel and stems match almost precisely. One of the most important benefits is the high lever of hygiene: the machine is easy to disinfect and there is minimal plant contact. Moreover, the machine has an automatic blade changer, so it is possible to define after how many grafts the blades need to be changed.

The grafting robot realises up to more than a thousands grafts per minute. And that truly is a breakthrough for the production process of grafted plants. Extensive practical research has proven that the rootstocks of De Ruiter are extremely suitable for automatic grafting.

Courtesy of Iso Group (Gameren, The Netherlands).



'Under' *all* ***conditions***

Choosing a tomato variety is difficult enough. That is why De Ruiter assists growers in searching for the most suitable rootstock for a specific tomato variety in combination with their cultivation conditions and other wishes. Based on many years of intensive selection and hybridisation work in combination with user satisfaction surveys, De Ruiter offers its clients a wide range of rootstock varieties in addition to its global standard: Maxifort. There is a suitable rootstock for every specific situation, taking individual cultivation conditions and type of crop for different growers into account. The cultivation consultants from De Ruiter are glad to assist growers in searching for the rootstock which is most suited to their specific conditions.

The challenging promise of De Ruiter

The combination of expertise provided by De Ruiter and Bayer promises an inspiring future for the rootstock market.

With the technology and research capabilities of Bayer, we will be able to obtain breakthrough results. For example, with the help of marker-assisted plant breeding activities, we will be able to discover valuable characteristics and resistances much more quickly. By working together, we will increase our chance of finding the best genetic material from one in a billion to one in five. Next, we will be able to integrate these discoveries into our new rootstock varieties via crossbreeding. This will become increasingly important, as our selection of rootstock varieties will also have to take into account the specific cultivation conditions used by individual growers all over the world. Speed in terms of innovation and diversity is therefore crucial.


0,5-10 µl

Pelleted Seeds

Sowing seeds for rootstocks is very labour-intensive.

In comparison to regular varieties, it takes twice as much time to sow rootstock seed even with the use of the most modern sowing machines. The use of pelleted seeds can solve this problem. De Ruiter is therefore now offering an alternative in the form of pelleted seeds. These seed pellets germinate just as quickly and uniformly as naked seeds. The only difference is that their unique physical characteristics save a great deal of time when sowing.

What are the advantages of pelleted rootstock seeds?

- The use of pelleted rootstock seeds saves growers a great deal of time and labour in comparison to unpelleted seeds. Sowing processes can now be completed just as quickly as for regular culture varieties.
- Sowability is excellent: the pelleted seeds can be sown one by one.
- No more double seeds on one plug.
- The seed falls in the middle of the plug.
- Extensive testing has shown that germination is not negatively affected.

What you need to know about pelleted seeds.

- The size of the pellet is 3 to 5 mm.
- The pelleted rootstock seeds are supplied in tins of 10,000 pellets.

Notes

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For more information visit
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De Ruiter®
Grow better together