

**Strawberry & Raspberry**  
**Plants**



**KRAEGE**  
INTERNATIONAL



**Stefan Kraege**



**Markus Staden**

Dear colleagues,

Another challenging year with weather disturbances like late frosts and heavy rains has almost passed. In Germany, that led to a noticeable decrease in harvest, which in many cases could not be compensated by higher prices in general. It is therefore no wonder that since production costs are still on the rise, even more effort goes into protecting the production of berries.

Not only in Germany but also in a number of other European countries we notice a clear trend towards protected cultivation. In this context, the cultivation of Everbearers is getting more attention from the growers. Unfortunately, this form of strawberry cultivation in regard to the selection of varieties is still somewhat confusing. We are still trying to enlarge our range in that area with further trade licences. We have also started to propagate individual varieties, but that will take time.

As diverse as the amount of varieties are also the different possible modes of production with the Everbearers. Topics like planting timing, planting types, single harvest or second year production are currently being tested. The topic of Predators in protected cultivation is becoming more interesting – you should also be aware of that.

With all these new possibilities available to us we should not forget the traditional procedures that are tried and tested.

As far as berry varieties are concerned, we have further developed the production of plug plants and long cane plants. With memberships in various cultivation programs we plan to further develop our offer of varieties and of course maintain the current one.

At the end of this preface we would like to thank our colleague August Löckner for forty years of service in our company. Due to his experience, his calm



nature, and his friendliness, August Löckner was a reliable figure in ensuring a constant plant production on the highest level. We would like to express our special gratitude for the valuable support in training the new colleagues which ensures that his successful work will be continued in the years to come.

We wish August Löckner all the best for his well-deserved retirement.

We hope for a fruitful year 2018 in berry cultivation for all our customers and look forward to working together successfully!

All the best,

Stefan Kraege, Markus Staden



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**Kraege International** has been a specialist propagator of strawberry plant material since 1958. Our company produces more than 25 different strawberry varieties on about 200 hectares of rented land. Strawberry frigo plants account for the lion's share of our business. We continuously work to maintain and improve plant material health.

It all starts with producing our own mother plants. (Read more on this on the next page.) Our particular strength is the wide range of varieties we offer.

Having good contacts with all major plant breeders worldwide, we are able to test new varieties at an early stage. As you can see from the picking period table, we have a wide range of products with all currently popular varieties included.

In addition to strawberry plants, Kraege focuses on the production of raspberry plants. The latter are offered as bare-rooted cane as well as potted plants gained from root cuttings.



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## Mother plants from our own production!

Healthy plants are the basis for successful fruit cultivation. Producing our own starting material we take the decisive step to ensure the propagation of healthy plants. As we know from experience new diseases emerge regionally at first before spreading over larger areas.

Cultivating mother plants of different origin at one site always involves a high risk of disease progression. We minimise the risk by keeping our starting material strictly apart from plants of other origin. For the reasons mentioned above we have put a "closed system" in place.



The production of our elite plants starts with in-vitro propagation in the laboratory. Unlike in common meristem labs, the idea is not to produce as many seedlings as possible in a short period of time. Instead, our one and only intention is to get a small number of definitely healthy plants. In the following steps, we exclusively use runners for propagation. First of all, the in-vitro plants are propagated in a saran house. The tightly woven, gauze-like saran fabric prevents insects from entering the house and infecting the plants with viruses. Mother plants as well as seedlings are grown on table beds, in safe distance from the ground bed, so that infection by soil fungi is excluded. For extra safety, the super-elite plants (SEE) produced in the saran house are inspected for diseases on an annual basis.

The super-elite plants (SEE) are then propagated on a special site, far away from other strawberry plantations. The resulting elite plants (EE) are used for the production of commercial plant material and are subject to constant supervision by the Chamber of Agriculture.



## Variety sighting/testing

“What’s new in varieties?” is the question most frequently asked by strawberry plant buyers. What they want is a healthy, early or late season variety of outstanding fruit quality and yield potential – in short: the perfect strawberry variety. Unfortunately, there is no such a thing, and there won’t be in the future. Selection and breeding of new varieties aims at various objectives. Healthy plants, if possible with resistance to common diseases, and an extended season are the most relevant criteria.

Good varieties are recognised early on. The “candidates” are tested for several years and initially suggested for trial planting only. Intensive testing of strawberry varieties is essential for us to keep our stock up to date.

The experimental results are the basis for our variety evaluation in this brochure. The description shall give you an overview of our current range of varieties and describe the fundamental characteristics. In doing so, results of the experimental stations and im-



Thanks to our good contacts to strawberry breeders we get new clones in for evaluation each year. The most promising ones are planted in our experimental garden and tested for special properties they might have. Usually this concerns a “normal outdoor cultivation”. With interesting varieties additionally tests concerning earliness or rather lateness are done.

pressions from experience are taking into account. Nevertheless, depending on weather conditions, there are very different results each year. A concluding evaluation of a variety is therefore possible after 2 – 3 years at the earliest.

A particular variety evaluation is also getting more and more specific in terms of production and site. In this instance the producer is on his/her own. You have to find the most interesting varieties for your site and your production methods.



# Strawberry Plants

## Carousel of varieties

What constitutes a good variety?  
Or more precisely: When is a variety so good that it should be introduced onto the market?

The carousel of varieties turns at high speed and it becomes increasingly difficult for the grower, the experimenter and especially for the breeding companies to maintain an overview.

The development of a healthy breeding takes some time and the variety should still be in demand when it is available in larger quantities. After all, licenses for interesting varieties are very expensive and hard to get. In the past, growth conditions were relatively comparable.

However, today, there are almost as many methods of cultivating strawberries as there are varieties.

Time and capacity are lacking and due to different production methods, fertilization programs and marketing methods it is very expensive to test new varieties.

Therefore, a new variety is often tentatively cultivated under standard conditions (Elsanta).

If it does not yield enough crops within the next two years, it is removed from the programme. Ultimately, there are enough varieties that can be tested.

This raises the next question. How many varieties do we actually miss because we do not have time to develop new growing methods for new varieties?



Varieties that are characterised by excellent fruit qualities or a specific taste deserve the effort to compensate eventual weaknesses by a suitable growing method. With some varieties, e.g. Flair (fertilization strategy), Alba (herbicide sensitivity), Malwina (thrips, strawberry blossom weevil), this has worked perfectly in recent years.

For those, who feel called to lead new varieties to success, we always have new varieties for test plantings available.





**Sonsation**



**Sonsation** is a novelty from the cultivation program of Flevo Berry in the main season.

Sonsation convinces with an evenly formed fruit and very good flavor. The fruit color of Sonsation is an

appealing medium red with an attractive brightness. Sonsation has a good firmness of fruit with a slightly sensitive skin. The yield is above average.



**Allegro**



Fresh Forward introduces with **Allegro** a new selection, which will probably be given a variety name towards the end of year.

Allegro is a very promising new early variety, which is comparable in ripening to Clery. Its predominant strength is its suitability for all marketing strategies. The selection convinces with medium to big, solid berries.

The fruits are light-red, very conical shaped with a high yield of class 1/A berries. The yield is even higher than Rumba and significantly so in relation to Clery. The juicy berries have a high sugar content. The taste is very delicious which is quite remarkable for an early variety suitable for trade.





The variety **Magnus** (GS 10-81-17) is an interesting late variety from the cultivation program of Flevoberry. The variety is in the Ripening Time after Florence/ Faith with big, firm berries and a good taste. The yield is high;

the evenly formed, medium red fruit is especially suitable for trade marketing.



**Renaissance** is a new flavor variety from the breeding department of Hansabred. It ripens in the medium harvesting period. The medium sized berries come across very evenly, heart-shaped and without deformations. The yield of Renaissance is medium to high, with an average weight of the single berry. The plant health is very good with a good tolerance level of mildew, botrytis and

phytophthora cactorum. Renaissance has been bred with a special emphasis on aroma. Its intense flavor is far above the average of the other varieties. It is therefore highly recommendable for the gourmet market and use. Renaissance is also suitable for direct marketing and pick your own.



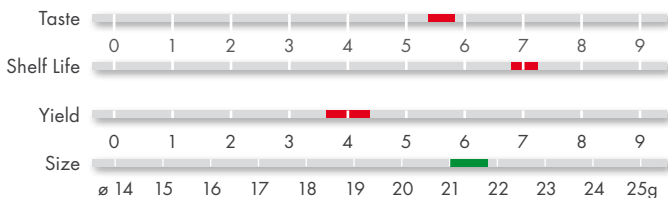


– protected variety, Head Licence: Planasa, Spain

## Dream

Colour medium-red, glossy

Comments Flower trusses over the leaves, frostprotection

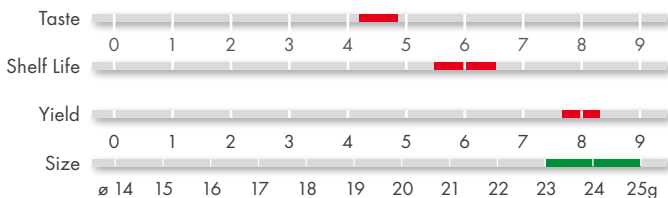


– protected variety, Head Licence: New Fruits, Italy

## Alba

Colour light-red, glossy

Comments good shelf life, susceptible for Phenmedipham!





– protected variety, Head Licence: W. Faedi, Italy

### Garda

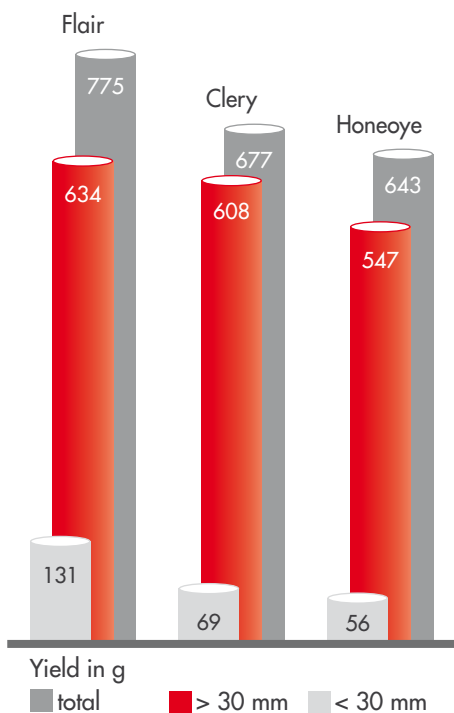
Colour medium-red ... red, glossy  
 Comments alternative for Alba in the early season



## Straberry Plants



Flair, a variety of Flevo Berry has an interesting ripening time, wich is 5 – 7 days earlier than Honeoye. It is very good for growing in tunnels with an even earlier ripening time. Taste of the attractive fruits is excellent. Flair has long flower truses and is an very "open" plant. It is necessary to have a frost protection. A special fertilisation program is recommended, to optimise the yield. Have a look in the variety info on [www.kraege.de](http://www.kraege.de).



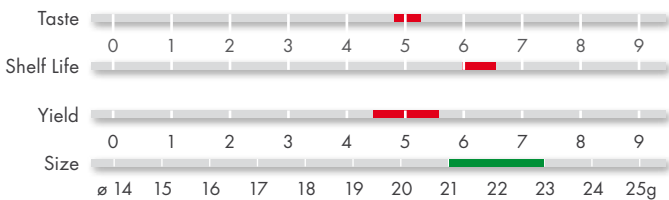


– protected variety, Head Licence: Flevo Berry, NL



## Flair

**Colour** medium-red, glossy  
**Comments** interesting early variety for direct marketing, we recommend to seek special advice on cultivation to get the optimum growth, yield and fruit size





Daroyal® is a cross-breed (Elsanta x Parker) from Darbonne's breeding programme. Daroyal® ripens three to five days earlier than Honeoye. Attractively shaped fruits of large to very large size characterise this variety. The fruit colour is a glossy red to dark red. Yields are good or even excellent. Every single fruit can be picked and sold (unlike Honeoye where at least 30% of the last fruits remain unpicked due to their small size and poor flavour).

The fruits are best marketed on the day they are picked, because they have a tendency to darken in the cold storage. Daroyal® is fine for selling at market stalls as well as for pick-your-own plantations.

Daroyal® is a vigorous, robust variety that does fine on plots without crop rotation. Unlike Honeoye, it is very resistant to Verticillium. Earlier cultivation with fleece material or plastic film is possible and promising (see test results).

Daroyal® produces very long spadices (similar to Darselect®) and should be planted in protected sites.



Daroyal® is significantly superior to the currently favoured early-season Honeoye in terms of ripening period, taste, fruit size and plant health.







– protected variety, Head Licence: ©Darbonne

### Daroyal®

Colour glossy, red ... dark red  
 Comments resistant for Verticillium wilt, suitable for direct marketing and pick your own

Taste 

0 1 2 3 4 5 6 7 8 9

Shelf Life 

Yield 

0 1 2 3 4 5 6 7 8 9

Size 

ø 14 15 16 17 18 19 20 21 22 23 24 25g



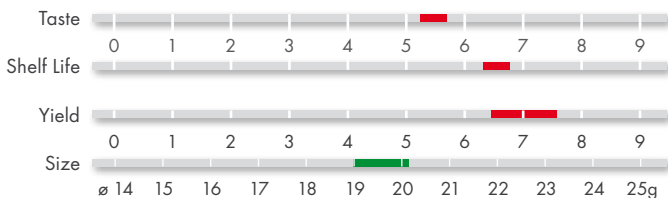


– protected variety, Head Licence: Fresh Forward B.V. Wageningen, NL



## Allegro

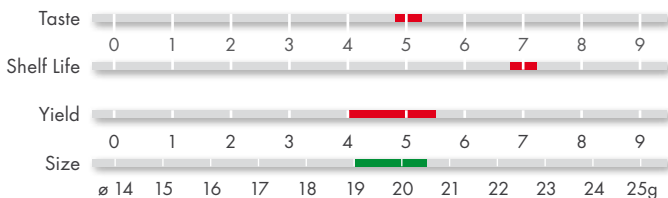
Colour medium-red, very glossy  
 Comments attractive early variety with good taste,  
 suitable for all marketing channels



– protected variety, Head Licence: C.I.V., Italy

## Clery

Colour light-red ... red  
 Comments taste and yield depend a lot on the area,  
 good disease resistance

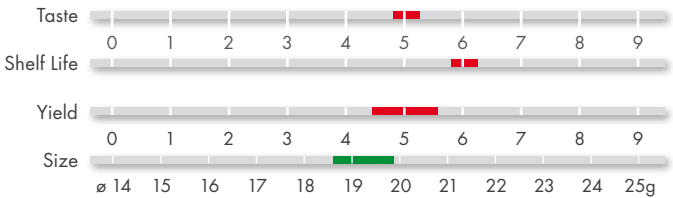




Provenance: USA

## Honeoye

Colour glossy, red ... dark-red  
 Comments susceptible to Verticillium wilt, suitable for production under polyethylene or fleece covering



too deep



too high



right depth

**The right planting depth is crucial for successful production!**

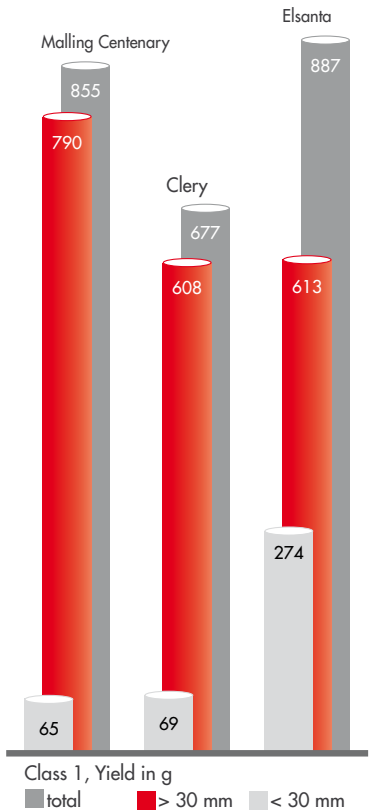


## Strawberry Plants



Malling Centenary is an early variety from the breeding program of East Malling (GB). The ripening time has varied within the last couple of years. While in the first year of planting the variety ripened just two days after Clery, the last several years have established a ripening time a few days before Elsanta. The variety can be covered to ripen 3 – 5 days after Clery. The harvest will be noticeably beyond Clery when planted earlier. In the open field production we had yields that were above those of Elsanta. In England Malling Centenary has good results in the 60 day production. Malling Centenary stands for a variety with unique fruits. The flavor of Malling Centenary is good to excellent with a nice strawberry aroma. The berries are of medium red, they will darken slightly when kept cool. They will then have a uniform red berry color which is slightly darker than Elsanta. Malling Centenary has a wonderful sheen to it; the berries are big and very, very uniform in size. We have harvested 98% of berries with class A! The firmness of the berries is very good. Our results for their shelf life is considerably above that of Elsanta.

These qualities of Malling Centenary are so convincing for us that we consider the risks minor. What are those risks? According to the experiences made so far the variety is not very resistant to diseases. They are susceptible for Xanthomonas and Phytophthora Cactorum. The variety blossoms are a little bit above the leaves and has to be protected against frost. After initial negative reports about rain damage the variety is gaining popularity for open field production. Due to the perfect appearance and the good flavor, Malling Centenary can be used for all marketing channels.

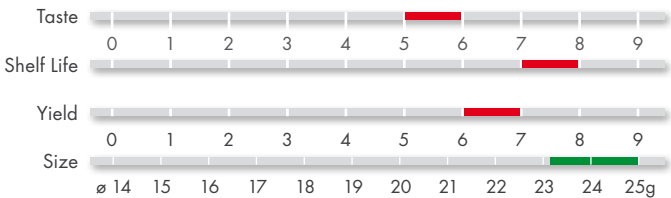




– protected variety, Head Licence: Meiosis, GB

## Malling Centenary

**Colour** medium-red, very glossy  
**Comments** very attractive fruits, suitable for all marketing channels, susceptible to Xanthomonas, Phytophthora cactorum



Its real advantage, however, is definitely the tunnel production. The fruit quality and the harvest with this kind of cultivation is extraordinary. The harvest provides almost completely class A berries, with a high weight of the individual berries.

Malling Centenary is easy to pick with a high picking rate.

We consider Malling Centenary among the most promising varieties on the market. It has an interesting ripening time and a great flavor. In the punnet Malling Centenary is a class of its own.



Rumba is an early cropping variety from the breeding programme of Fresh Forward. Rumba ripens about seven days before Sonata, and the season is considerably longer than that of Honeoye or Clery.

The variety produces medium-red fruits with an appealing gloss. The fruits are large, uniform and firm. They have a good shelf life and retain their gloss and shine even after cold storage. The flavour of the juicy fruits is good. Regular picking is important as the berries would otherwise get too dark.

For an earlier season start, Rumba can be grown under fleece and/or plastic film as well as in polytunnels. Yields are high thanks to the proper size and weight of the individual fruits. There are barely any crippled fruits. The pedicels are not too long, so the blossoms are fairly well protected by the foliage against late frosts and heavy rain. Even so it is important to cover the plants with plastic film or fleece in spring to protect the flowers from night frosts.

Rumba is a very healthy, vigorous variety that has so far shown no particular susceptibility to specific diseases.

The breeders however recommend preventive treatment against *Botrytis* and *Rhizoctonia*.



35 cm has been proven the right spacing between the plants in a row. Two types of planting material can be used – frigo plants in spring or green plants early in August. Given the large size of the fruits, two-year cultivation is possible without any problems. However, the plants must be protected against winter frosts in the second year, because the rhizomes will have grown up fairly high by that time.

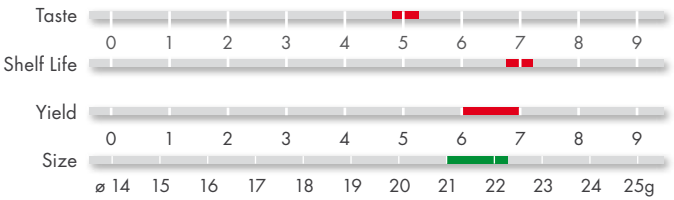
Boron-containing fertilisers should be used sparingly, as the variety tends to uptake excessive amounts of this trace element. Apart from this Rumba is relatively easy to cultivate and without any special fertilisers.



– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

## Rumba

Colour medium-red, glossy  
 Comments good presentation in the punnet, robust plant





Darselect® is a successful variety for pick-your-own plantations, direct marketing and the commercial sector. It is very suitable for early season production, and it can also be planted on former strawberry sites.

Cold-store Darselect® plants should be planted in April/May.

Fresh plant material is planted best in early August.

Plants should be kept free of mildew.

First mildew symptoms show up in Darselect® plants at an early stage and have to be treated immediately. The fruits are not affected by mildew.

When selecting the field keep in mind that the variety is susceptible to blossom frost damage.

Darselect® blooms early with blossoms growing above the leaves. Earlier season production will increase the risk of frost damage. So make sure you select a well protected site. Frost irrigation is recommendable in critical areas.

A cultivation scheme adapted to the variety will give optimised results. Especially the yield and the gloss of the fruits can be further improved. Where nitrogen requirements are concern, apply the usual 80 kg/ha.

The right date of fertiliser application is important for the plants to generate blossoms early in autumn.

The leaf mass development should be completed by early September. Therefore, don't apply nitrogen to newly planted fresh dug material, or choose a very careful dose. Modest fertiliser application is also advisable in the spring (although it has to be considered that a larger leaf mass can help minimise the risk of sunburn damage). The main nitrogen application is done after the harvest.

When growing Darselect® make sure you maintain a proper balance of potassium and magnesium in the soil (soil analysis). Magnesium application during the fruit growth phase can enhance the gloss of the fruits. We recommend using leaf fertilisers.

The fruits are perfect for picking when the outer skin shows a uniform brick-red colour. Pick every 3 – 4 days, as a rule of thumb. When harvested ripe, Darselect® will reward you with fruits of excellent flavour, flawless quality and good transport properties.

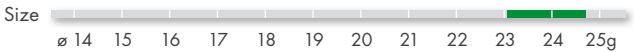




– protected variety, Head Licence: ©Darbonne

### Darselect®

Colour medium-red, glossy  
 Comments susceptible to mildew, red spider and sunburning, suitable for production under polyethylene or fleece covering

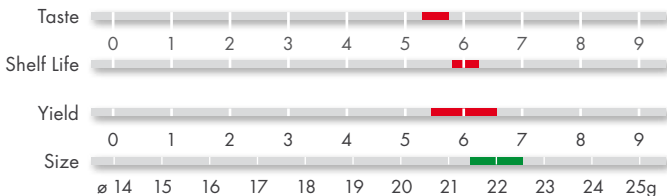




– protected variety, Head Licence: Vissers, NL

## Elianny

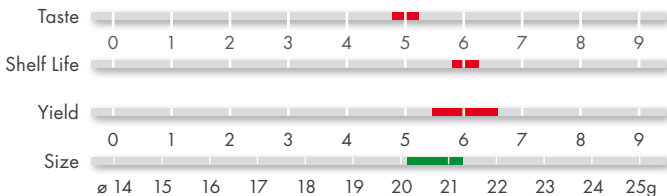
Colour glossy, medium-red  
 Comments fruit with firm flesh and sensitive skin



– protected variety, Head Licence: Vissers, NL

## Kimberly

Colour glossy, medium-red  
 Comments good disease resistance, but sensitive to Phytophthora, very sensitive to Colletotrichum!

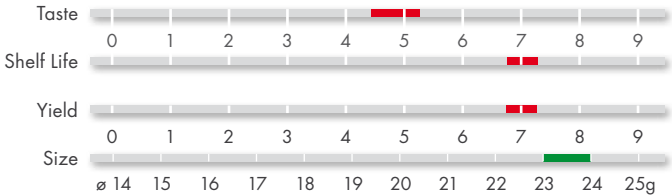




– protected variety, Head Licence: C.I.V., Italy

### Aprica

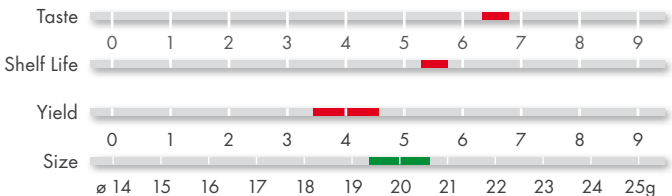
Colour medium-red, very glossy  
 Comments good Shelf Life, very attractiv fruit for the wholesale market



– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

### Lambada

Colour bright, medium-red  
 Comments very sensitive to mildew



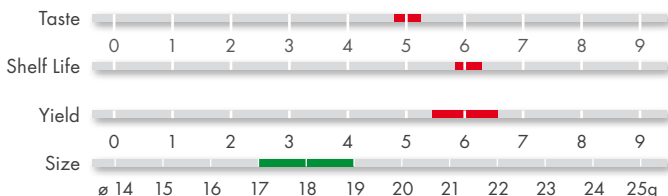


– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

## Elsanta

Colour bright, light-red ... red

Comments poor disease resistance, suitable for production under polyethylene or fleece covering



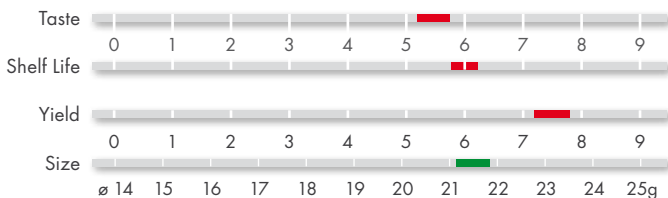
– protected variety, Head Licence: Flevo Berry, NL



## Sonsation

Colour medium-red, glossy

Comments interesting new variety for direct marketing





– protected variety, Head Licence: East Malling, GB

## Elegance

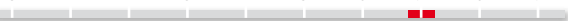
Colour medium-red, glossy

Comments very attractive fruit, great for supermarkets, susceptible to mildew and Phytophthora

Taste



Shelf Life



Yield



Size



Elegance is a midium-season cropping variety from East Malling's breeding programme. It crops a bit later than Elsanta and has a long season.

Elegance produces large, very uniform, medium-red fruits. There are almost no crippled fruits to speak of. The attractive gloss and the overall appearance of the fruits in the punnet are truly convincing. Yields are impressive with a large percentage of Class 1 fruits. Its good shelf life makes Elegance an interesting variety for supermarkets, while it has to be accepted that the flavour is unexceptional and the aroma not very pronounced. Elegance is easy to pick and suitable for 60-day production.

The plants are healthy and feature an erect habit. The fruits are well displayed on long pedicels, which gives a high picking rate.

Cultivation is fairly easy as experience has shown so far. Where diseases are concerned, we have to mention the high susceptibility to mildew.

Elegance is a promising variety for supermarkets. The berries look great in the punnet.



– protected variety, Head Licence: New Fruits Italy

## Asia

Colour bright, medium-red

Comments very big first fruits, good presentation in punnet and basket

Taste



Shelf Life



Yield



Size

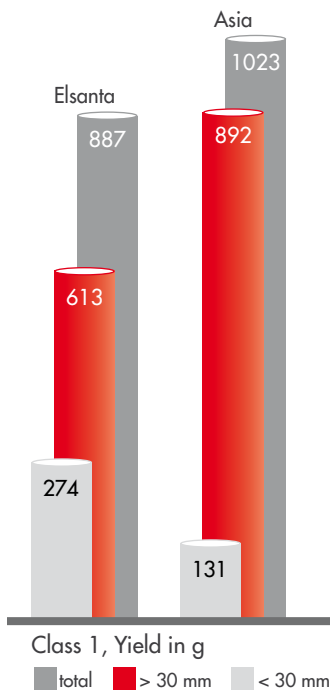


## An interesting variety for the high season

Asia, bred by New Fruits of Italy, ripens about 2 – 3 days after Elsanta. The uniformly shaped, attractively glossy fruits feature an excellent firmness. Their colour is a bright medium red. Yields match those of Elsanta, with a larger percentage of Class 1 fruits. Asia flowers bloom slightly under the foliage, the large fruits give a high picking rate.

The berries are very nice to look at, in the basket as well as in the punnet. This makes Asia an interesting variety for pick-your-own and direct marketing. Depending on weather conditions, wholesale marketing can also be worth a try.

The plants are vigorous and little susceptible to Verticillium.

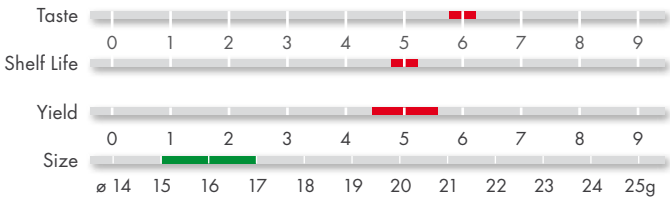




– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

### Polka

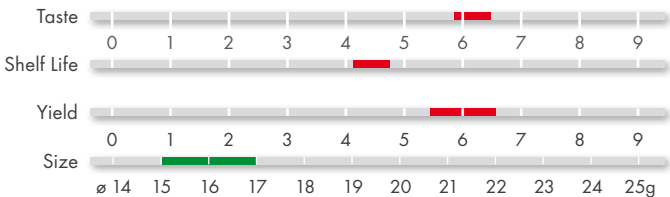
Colour glossy, red ... dark-red  
 Comments one-year culture recommended (fruit size), tolerant to Verticillium slightly, susceptible to mildew



– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

### Korona

Colour glossy, red ... dark-red  
 Comments good disease resistance, very good for pick your own, getting small in the second year





Sonata is a crossbreed variety (Elsanta x Polka) by Fresh Forward. It ripens about 1 – 3 days after Elsanta, producing large, firm and attractively shaped fruits. The fruit is glossy and medium-red all over, without any green tips. The flavour is excellent with good levels of sugar.

Yet another advantage over Elsanta is the consistently uniform shape, with no crippled fruits. The plant is robust yet susceptible to *Ph. Cactorum*, which must be considered in your plant protection scheme. Sonata is sensitive to heat. Earlier production with plastic film or non-woven material is possible but won't give the same effect as with e.g. Darselect®.

Later cultivation with straw is an option. Sonata is the ideal A+/waiting bed plant material for 60-day culture. These positive characteristics have made Sonata a major mid-season variety over the last few years.



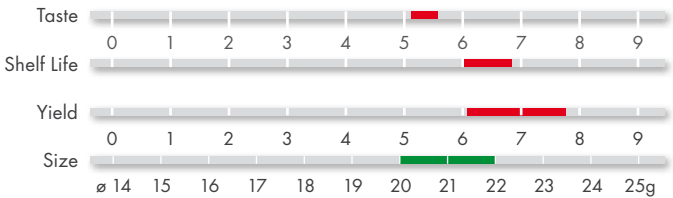




– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

### Sonata

Colour light-red ... red, bright and glossy  
 Comments large, attractive fruit, no mishaped fruits, sensitive to *Phytophthora cactorum*, suitable for production under polyethylene or fleece covering

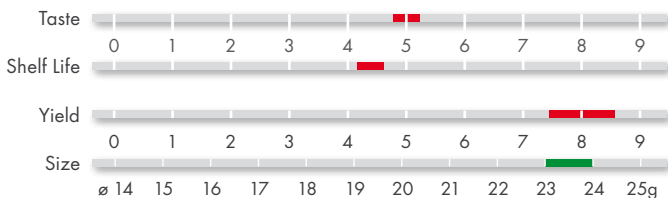




– protected variety, Head Licence: Fresh Forward International B.V. Wageningen, NL

### Salsa

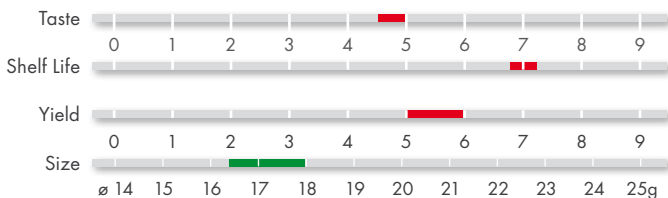
Colour light-red ... red, bright and glossy  
 Comments very high yield, for pick your own and direct selling



– protected variety, bred by Scottish Crop Research Institute, Dundee, Scotland

### Symphony

Colour light-red ... red, bright and glossy  
 Comments good resistance to Phytophthora



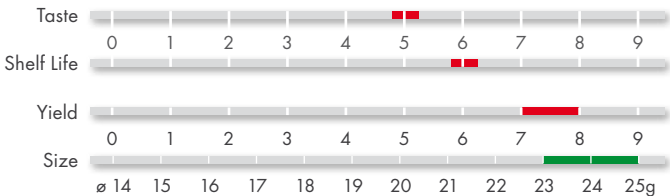


– protected variety, Head Licence: Flevo Berry, NL



## Faith

**Colour** medium-red, glossy  
**Comments** attractive fruit, suitable for supermarkets, direct selling and pick your own



Faith is a late variety from the breeding programme of Flevo Berry. The variety ripens about 7 – 10 days after Elsanta and is therefore located in the interesting ripening period directly before Malwina. Faith convinces with big, conically shaped, firm fruits. The colour is medium-red with an attractive gloss. The yield is high. The fruits are big with high individual fruit weights.

Altogether Faith is a fruit with a good taste and a very nice presentation in punnet. Well branched infructescences with big fruits facilitate the yield, so that very high picking rated can be reached.

Faith is a very vigorous variety that should be planted with a wider plant distance. It flourishes for a long period and therefore ensures a steady, long yield. Faith can be strohverspätet very well.

Faith is not very prone to mildew and botrytis, but should be protected against phytophthora cactorum. A preventive treatment with the usual supplements (phosphorous acid) is recommended. During our experiments Faith has not been very sensitive to rain.

Faith is the late variety between Sonata and Malwina that both convinces with a good taste and a very nice presentation in punnet. It is very well suited for direct marketing as well as for retail sector marketing.

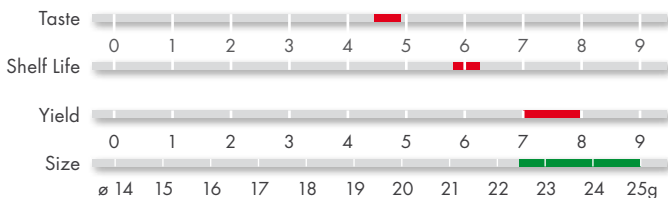


– protected variety, Head Licence: Meiosis, GB

## Florence

Colour red ... dark-red

Comments good disease resistance, susceptible to sunburning

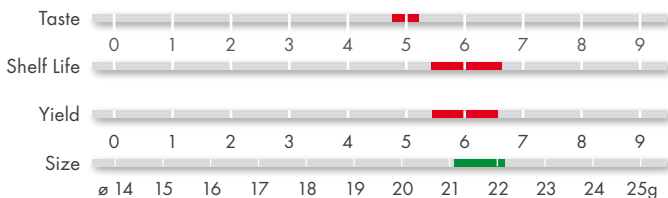


– protected variety, Head Licence: Meiosis, GB

## Yamaska

Colour orange-red, bright and glossy

Comments very vigorous, male sterile, good pollination with Florence



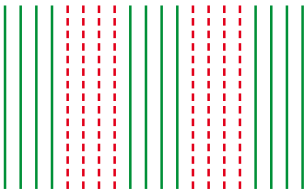


## Faith, Florence – Yamaska

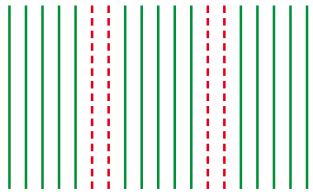
Being an all-female variety, Yamaska needs a male for pollination. This is where Florence recommends itself as a late season variety of excellent quality. To ensure good pollination, Florence should be planted at least every sixth to eighth row. Row spacing will depend on what marketing channel you are going to serve.

When picking the two varieties make sure you are using separate punnets (different fruit colours). If you are going to serve the commercial sector only, keep the proportion of Florence as small as possible, because its rather dark fruit colour is likely to be less accepted.

Planting example: Yamaska – Florence, Faith



4, 6 or 8 rows of each variety alternating for commercial marketing only



5 or 7 rows of Yamaska alternating with 2 rows of Florence for combined commercial and direct marketing

Yamaska cold-stored material should not be planted before mid-May, fresh plants from the first or second week of August. Yamaska is a very vigorous variety, comparable to Malling Pandora. Please note that a too strong vegetative growth may impair pollination or cause albinism.



### Here are some recommendations to follow:

- Late planting date for cold-store material (from mid-May)
- In-row plant spacing should be 40 to 50 cm, spacing between rows 1 meter where possible
- No nitrogen fertiliser in spring
- Soil must contain a sufficient amount of potassium and magnesium
- Row widths should be kept narrow towards autumn

# Strawberry Plants

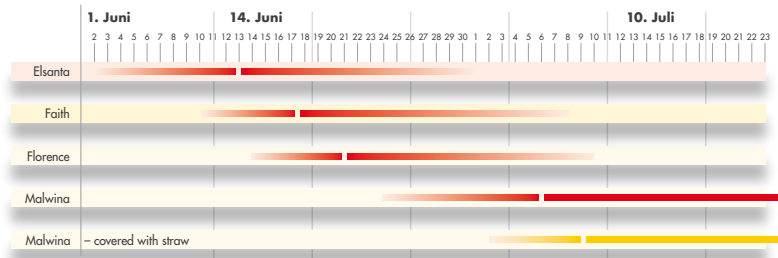


## Advantages

- very late picking period
- selffertility, no other variety for fertilization
- excellent taste
- attractive fruit
- tolerant to verticillium

## Important:

- complete picking season together with late varieties like: Florence, Faith, Yamaska, Salsa
- thinning to 3 – 4 crowns for a second year crop
- picking every two days for a high fruit firmness
- special spraying against thrips and strawberry blossom
- susceptible to Ph. cactorum, protection with phosphor acid chemicals recommended
- **If the planting is to late, there will be no Flowers !**



Look out for Thrips and Blossom Weevil

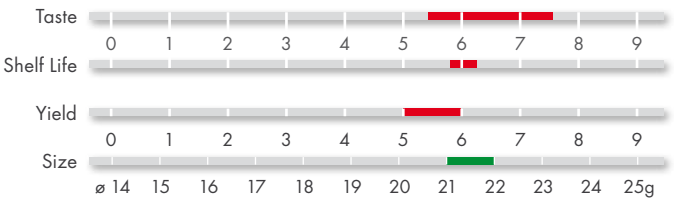




– protected variety, Head Licence: Peter Stoppel, Germany

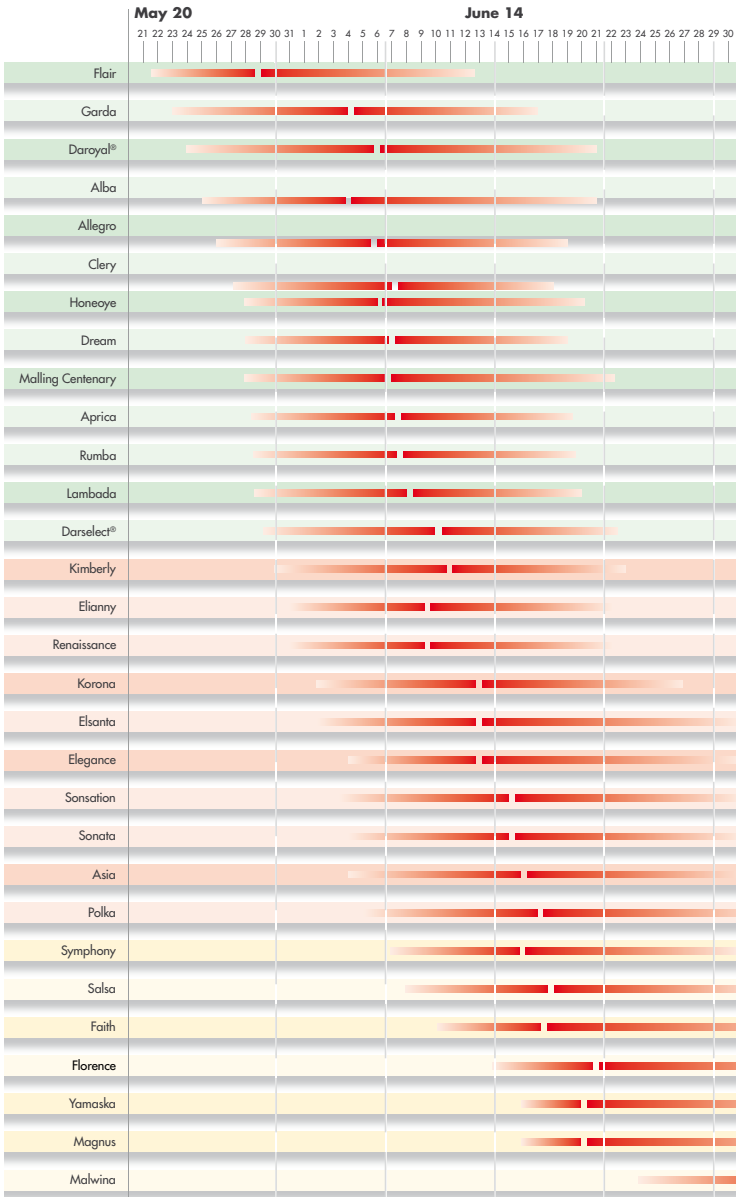
## Malwina

Colour glossy, red... dark-red  
 Comments very late picking period, self-fertilization



## Picking Periods

Trials on KRAEGE/Telgte





# Strawberry Plants



July 10																								Taste	Shelf life	Yield	Size		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	0 – 9	0 – 9	0 – 9	Ø g/fruit		
																									5,2	6,2	5	21 – 23	
																										3,5 – 5,5	8	8	23 – 25,5
																										5,73	6	6,5	20
																										4,6	6,5	8	22 – 24,8
																										5,5	6,5	7	20
																										5	7	5	18 – 20
																										5,2	5 – 6	5	18 – 20
																										5,5	7	4	21,8
																										5,2	7,5	6,7	23 – 25,5
																										5	7	7	23 – 24
																										4,9	7	6,5	21,9
																										6,5	5,5	4	20
																										6,1	7	6	23 – 25
																										5	6	6,5	21
																										5,5	6	6	22
																										5,5	6	6	18 – 20
																										6,25	4,5	7	15 – 17
																										5,2	6	6	16 – 19
																										4	7	7,5	22
																										5,5	6	7,5	22,5
																										5,5	6,5	7,5	21,5
																										5,3	6	7,5	23,5 – 25
																										6,25	5	5,5	15 – 17,5
																										4,75	7	5,5	17
																										5,2	4,5	8	24
																										5	6	8	23 – 25,5
																										4,7	6	7,5	22 – 25
																										5	6,5	6	22
																										4,7	7	5,5	22
																										6	6	5,5	21,6



## Strawberry Everbearers



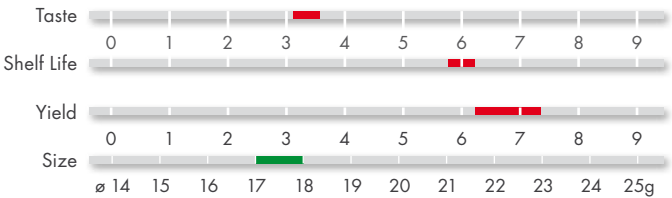
42



– protected variety, Head Licence: Peter Vinson

### Everest

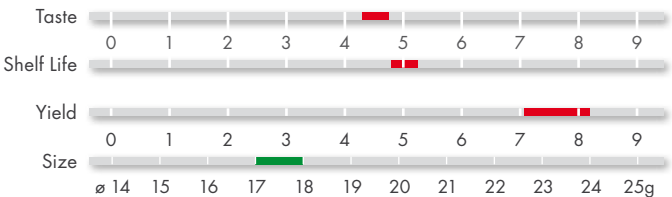
Colour red ... dark-red, shiny  
Comments poor disease resistance, suitable for supermarkets and direct selling



– protected variety, Head Licence: Peter Vinson

### Evie II

Colour bright, light-red ... red  
Comments berries are susceptible to cracking when it rains



# Strawberry Everbearers

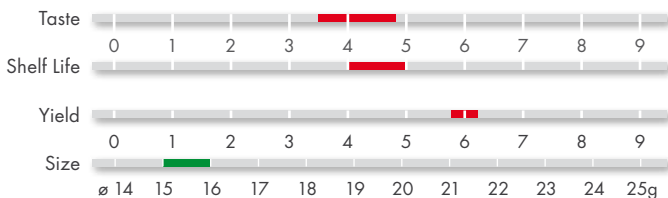


– protected variety, Head Licence: Flevo Berry, NL



## Florin

Colour glossy, attractive bright red  
Comments beautiful fruit in the punnet

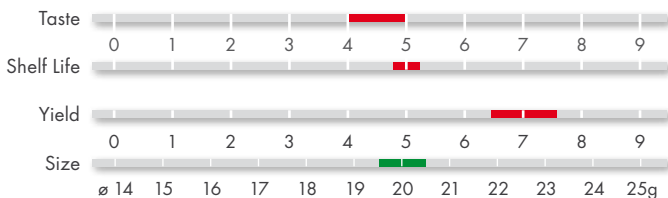


– protected variety, Head Licence: Flevo Berry, NL



## Florina

Colour medium-red, glossy  
Comments beautiful fruit in the punnet



## Strawberry Everbearers



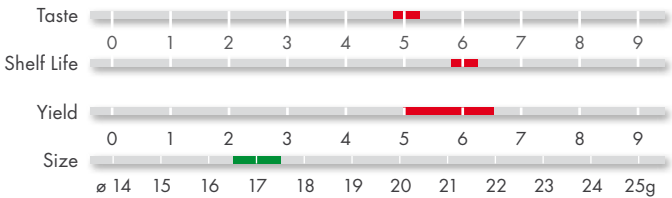
44



– protected variety, Head Licence: Peter Vinson, GB

### Verity

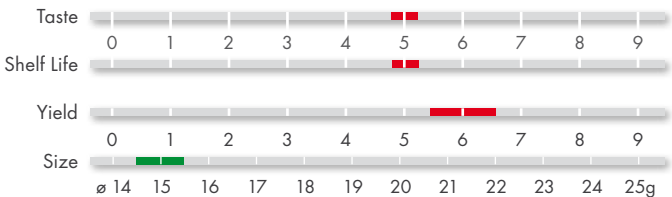
Colour medium-red ... red, glossy  
Comments early everbearer with good taste, poor yield in the open field, substrate culture recommended



– protected variety, Head Licence: Ciref, France

### Charlotte

Colour glossy, red...medium-red  
Comments woodland strawberry flavour



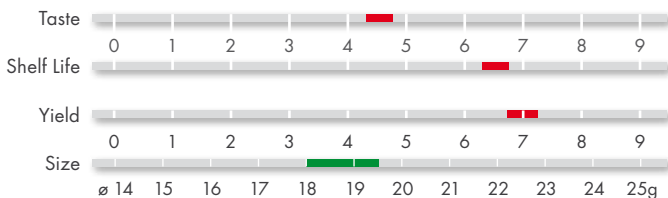
## Strawberry Everbearers



– protected variety, Head Licence: Franco Zenti, Italy

### Malga

Colour medium-red, glossy  
Comments attractive fruit, good taste, early picking

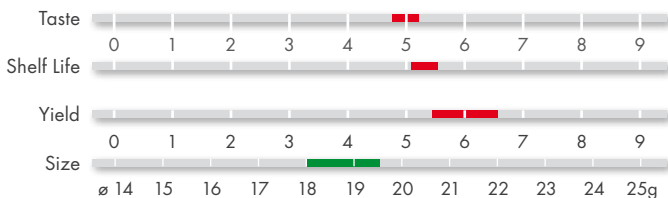


– protected variety, Head Licence: Flevo Berry, NL



### Florentina

Colour medium-red, glossy  
Comments aromatic taste



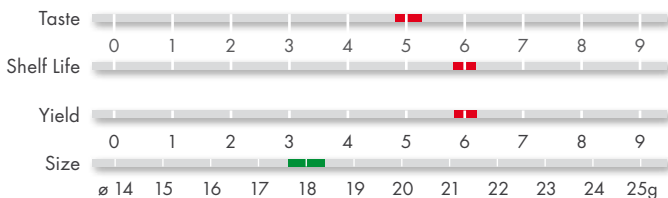
## Strawberry Everbearers



– protected variety, Head Licence: C.I.V., Italy

### Murano

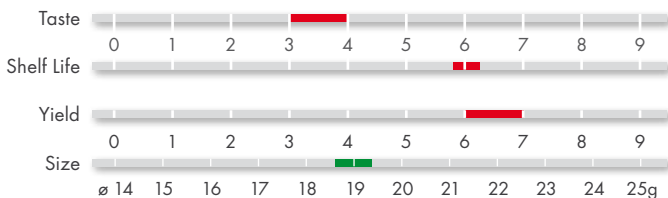
Colour medium-red ... red, glossy  
Comments attractive fruits, good taste



– protected variety, Head Licence: University California, USA

### Portolas

Colour bright ... medium-red, glossy  
Comments godd shelf life, very good for the wholesale market





**Fresh plant:** available end of July,  
August Kraege fresh plants are lifted all by Hand

**Misted Tips:** potted freshplants available end of July, August





## Tray plants

The production of tray plants starts much like those of potted plants. Misted tips are harvested, put in pots and rooted under irrigation systems. In contrast to the plug plants, who will be delivered as soon as possible after having rooted the tray plants will remain on a tray field within their trays until they are dormant in December. Tray plants have a harvesting potential that is comparable to productive waiting plants.

They are suitable mainly for 60 day culture in substrat houses. In order to guarantee a commercially successful cultivar the potential of the plant has to be used to the maximum.

The production and storage of this plant type is extreme involved and therefore cost intensive. The required plants should be ordered in June/July of the preceding year.



Plants has to be ordered until June 15<sup>th</sup>





## Cold-stored strawberry Plants

are available in various grades, which are best described by the crown diameter.



### Weak grade (A) plants (8 – 10 mm)

This grade can be perfectly adequate when planting on light to medium soils. Do not pick in the planting year, remove the blossoms instead. Plant as early as possible.

### Standard grade (A) plants (10 – 14 mm)

The most common grade planted. Can be picked in the planting year, but this will result in less yield.

### Grade (A+) plants (+ 14 mm)

The perfect grade for 60-day culture. To be planted about 8 – 10 weeks before the picking date. Good irrigation is essential to succeed with this time- and cost-intensive production method.

## Waiting beds: Darselect® · Elsanta · Flair · Malwina Sonata · Malling Centenary



Plants has to be ordered until June 15<sup>th</sup>

Our waiting-bed plants are exclusively produced from fresh plant material! The fresh plants are harvested by hand and replanted shortly afterwards to ensure almost unimpaird growing.

Elsanta waiting beds can be supplied in three grades:

- „light“ (15 – 18 mm)
- „medium“ (18 – 22 mm)
- „heavy“ (> 22 mm)

Waiting-bed plants are especially suitable for greenhouse production, dam cultivation and 60-day culture.



## Fruit marketing:

When comparing direct marketing and wholesale marketing it becomes quite obvious that each marketing venue has its very own demands on the characteristics of the different varieties. The only thing in common for both sale points is that varieties will be needed over a longer harvesting period. The criteria flavor, shelf life, and harvest are weighed differently. Direct marketing has to put the stress on daily freshness and varieties with a good flavor. In order to achieve that they will accept higher production costs and possibly a less firm berry.

For the supermarkets low production costs and shelf life are the most important issue, often at the expense of flavor. Apart from the varieties that can be used solely for one of the marketing venues there are some interesting varieties, which will serve either venue. That might sometimes result in a compromise but does provide flexibility in marketing! There are enough varieties – early to late, rich in flavor to neutral in flavor, rich in harvest to low harvest in a connoisseur variety. There is a right berry for everyone!

100%



Direct marketing

50%

**DAROYAL®**

**LAMBADA**

**DREAM**

**KORONA**

**RENAISSANCE**

**POLKA**

**MALWINA**

**FLAIR**

**HONEOYE**

**KIMBERLY**

**ELIANNY**

**ASIA**

**SALSA**

**FLORENCE**

**ALLEGRO**

**CLERY**

**MALLING CENTENARY®**

**DARSELECT**

**SONATA**

**FAITH**

**SONSATION**



For the reasons mentioned before we recommend the following varieties for pick your own and direct marketing:

### Early Season

- Flair: 6 days before Honeoye, good flavour
- Daroyal®: High yielding variety 3 days before Honeoye
- Honeoye: now as before the most important early season variety
- Lambada: outstanding flavour, great for winning new customers or as a treat for loyal customers
- Darselect®: can be an interesting early season variety if earlier production under plastic film is applied
- Malling Centenary: good taste, very attractive fruits

### Mid Season

- Asia, Korona, Polka: the best-selling varieties for the pick-your-own sector; increasingly used for one-year production to improve the quality and size of the fruits
- Sonata
- Sonsation

### Late Season

- Salsa: robust plant, very high yield, good flavour
- Faith, Florence, Yamaska: very late varieties, suitable for extending the season by 10 days
- Malwina: very late variety with an excellent taste

## Wholesale marketing

50 %



100%

**ALLEGRO**

**CLERY**

**MALLING CENTENARY®**

**DARSELECT**

**SONATA**

**FAITH**

**SONSATION**

**RUMBA**

**ELSANTA**

**SYMPHONY**

**YAMASKA**

**ALBA**

**GARDA**

**APRICA**

**ELEGANCE**





The farming of raspberry plants has increased steadily during the last years. New varieties and intensive farming have made raspberries more interesting not only for direct marketing but also for trade production. While the change in the summer varieties has already been in favor of Tulameen and Glen Ample we witness an increase in the fall varieties. New varieties like Kwanza, Kweli, and Mapema provide interesting alternatives to the more established varieties Himbo-Top and Polka.

The demands of the trade on the quality of raspberries are rising. In order to meet these demands it is important to choose the right variety but also the right method of production. Shorter cultivation periods, a more intensive raspberry cultivation as well as the farming of raspberries in substrate lead to better and more even fruit quality. This substrate cultivation is often done with raspberry Long Cane plants.

In view of the more intensive production, it is necessary that the plant propagator can offer the right plants.

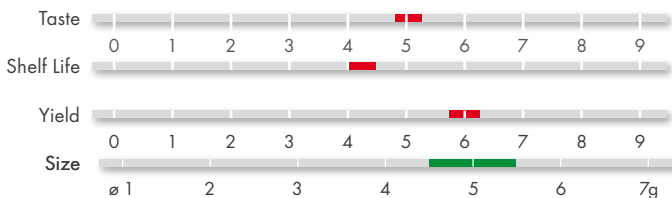
We have expanded our own production of high-end raspberry plants into Plug plants and Long Cane plants.



– protected variety, Head Licence: Meiosis, GB

### Malling Freya

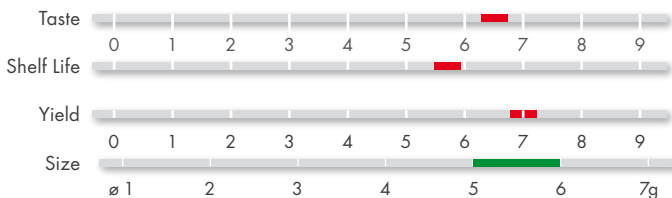
Colour medium-red ... red  
 Comments earliest summer-bearing variety,  
 interesting variety for direct marketing



– protected variety, Head Licence: Scottish Crop Research Institute, Dundee, Scotland

### Glen Ample

Colour glossy, medium-red  
 Comments good to pick, beautiful, large, round-shaped fruit,  
 susceptible for leaf and bud mite

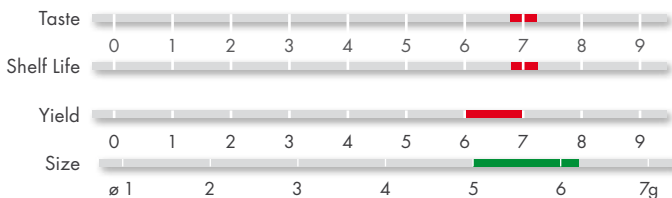




Provenance: Canada

## Tulameen

Colour attractive, bright, glossy fruit  
 Comments the top variety for quality, susceptible to Phytophthora



## Tulamenn/Glen Ample: The standard in retail sector marketing and direct marketing

Tulameen and Glen Ample are the two standard varieties within the summer-bearing raspberries. They are characterized by high yields and an excellent. The fruit size (picking rate) is also convincing.

The berries are well qualified for retail sector marketing as well as for direct marketing.

Both Tulameen and Glen Ample are suitable for Long Cane production

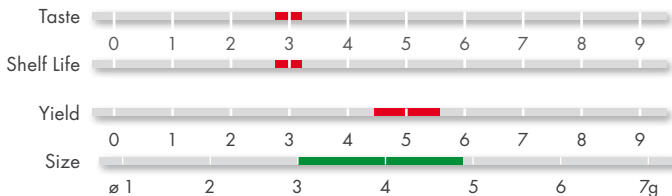




– protected variety, provenance: East Malling/GB, 1989

### Autumn Bliss

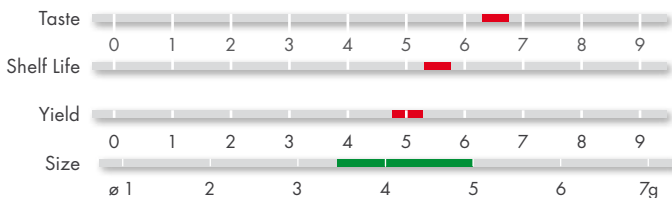
Colour medium-red ... dark-red  
 Comments early primocane, not easy to pick



– protected variety, provenance: Poland, Instytut Brzezna

### Polka

Colour glossy, medium-red  
 Comments very good fruit quality, early primocane





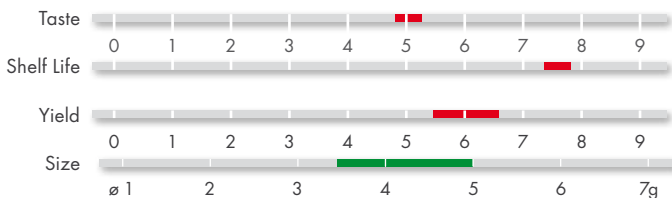


– protected variety, Advanced Berry Breeding, NL

## Kweli®

Colour medium-red ... red, glossy

Comments vigorous growth, lots of young canes, berries separate easily from the core

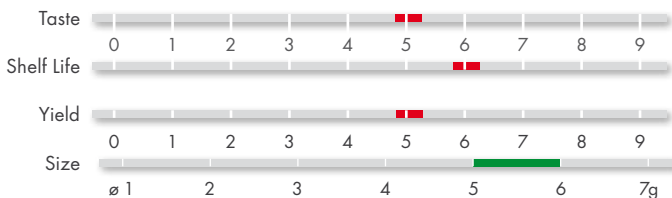


– protected variety, Hauenstein AG, Switzerland

## Himbo-Top®

Colour attractive, bright, glossy fruit

Comments Himbo-Top® does not darken after picking, very late crop



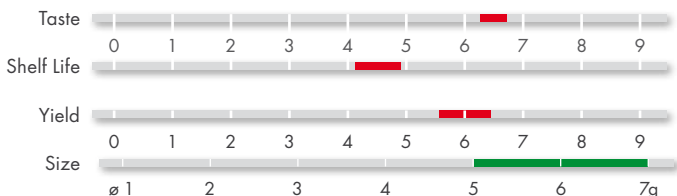


– protected variety, Advanced Berry Breeding, NL

## Mapema®

Colour red ... dark red, glossy

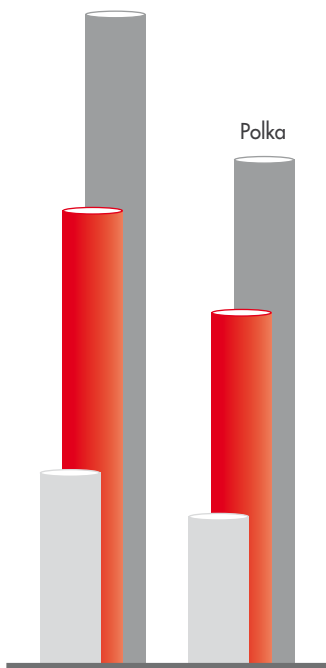
Comments interesting new variety for direct selling and pick your own



**Mapema** is a raspberry variety from the breeding programme of Advanced Berry Breeding. The early yield beginning of this autumn raspberry is comparable to that of Polka. The fruit colour is also very similar to Polka. Mapema is slightly dark with a beautiful gloss. The big, conical fruits enable a high picking rate. Mapema convinces with a good taste. This makes the variety especially interesting for direct marketing. Mapema is a very vigorous variety. She can be very well established on the field and is characterized by powerful canes.

Mapema

Polka



Mapema Polka

■ total:	4.500	3.500 g/m
■ class 1:	3.150	2.450 g/m
■ class 2:	1.350	1.050 g/m

Yield in g, 8 – 10 canes/m,  
open field production

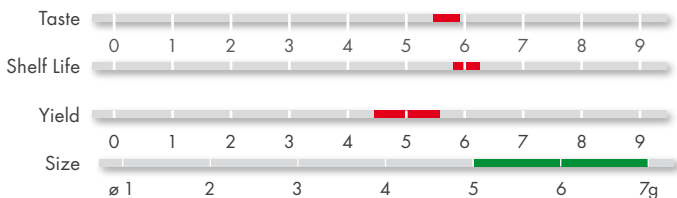


– protected variety, Advanced Berry Breeding, NL

## Kwanza®

Colour bright red, glossy

Comments very beautiful in the punnet, cultivation in plastic tunnels recommended



## Three interesting varieties from Advanced Berry Breeding.



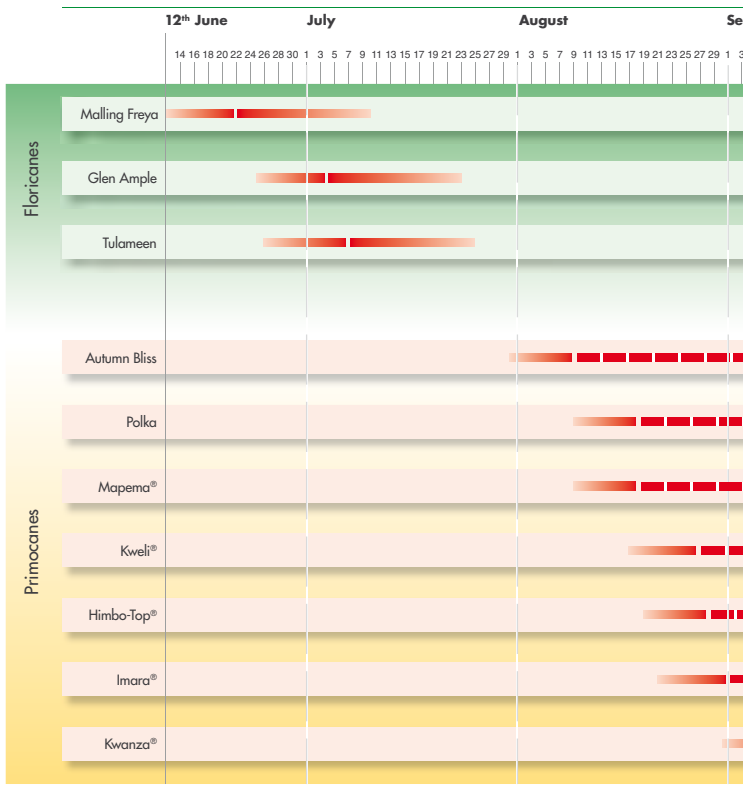
Kweli, Mapema and Kwanza are very promising primocanes that have the potential to give two harvests, in autumn and spring. All three varieties are recommended for tunnel production. Their attractive fruits are large and of good firmness.

The breeder, Advanced B. Breeding, has adopted a new way of licencies charged once per plant but on an annual basis per linear metre of varieties planted. Licence fees are payable to Meiosis, UK.

For further information:  
[www.kraege.de/en](http://www.kraege.de/en)

# Picking Periods - Raspberries

Trial, KRAEGE/Telgte



# Picking Periods

September														October														Taste	Durability	Yield	Size
																												0-9	0-9	0-9	Ø g/Fruit
																												5	4,5	6-7	4,5-5,5
																												6,5	5,5	6,5-7,5	5-6
																												7	5,5-6	6-7	5-6,5
																												3	3	5	3-5
																												6,5	4	5	3,5-5
																												6,5	4,5	6	5-7
																												5	5,5-6	5,5	3,5-5
																												5	5,5-6	5	5-6
																												5	5,5-6	5	3,5-5
																												5,5	6	5	5-7





### **Potted fresh plants:**

- root cuttings, for planting in middle of May



### **Bare-rooted canes:**

- one year old, for planting in autumn or early spring



## Potted fresh plants

The raspberry potted fresh plants produced by Kraege are raspberry plants as a result of propagation by cuttings. In order to produce this type of plant, root material is planted and cuttings are made from the young buds. The cuttings are placed in multi-cell plug trays where they take root. The potted fresh plants are delivered with substrate pellets 4–6 cm in size. This type of plant serves, among other things, as the starting material for the raspberry long cane production. Potted fresh plants are also good for establishing production areas in natural soil.

## Delivery of the plants

The delivery of plants that have been ordered takes place according to prior agreement. As a rule, we need a few days to get the plants ready for dispatch. After receiving the plants, you should plant them as quickly as possible. If this isn't possible due to bad weather conditions, the cases with the seedlings must be unloaded from the palettes and placed ideally in a semi-shaded area. The fact that you should regularly check the seedling cases and, if necessary, water them goes without saying. If the plants are well-cared for, the planting can be postponed for a few days.

## Planting

After careful preparation of the soil, planting can be carried out starting in May. In order to achieve a sufficient cane height, all plants should be in the ground by mid-June. It is important

that these delicate plants are definitely planted so that they are free of frost. Watering the plants from overhead guarantees soil contact between the root balls and the natural soil. A consistent supply of water and nutrients is crucial in achieving the desired cane length of 1.80 cm. Drip irrigation with appropriate fertilisation can ensure this. In this way, the basis for the yield potential in the following year can be laid in the year of planting.

In order to control weeds, we recommend that foil or Mypex should be laid out before planting. If a ridge former is available, it is recommended to plant the potted green plants on dams. The faster warming of the dam stimulates the growth of roots and prevents water stagnation.

## Planting requirements

In order to achieve high yields in the first crop year, a planting distance of 6 plants per metre is recommended. The row distances result in the following number of plants per hectare:

- 2,5 m = ca. 24.000 plants/ha
- 3,0 m = ca. 20.000 plants/ha
- 3,5 m = ca. 17.200 plants/ha
- 4,0 m = ca. 15.000 plants/ha

The distances between the rows should be chosen according to the technical equipment available. Besides the recommended distance between the plants to establish the production of the fruits, an appropriate trestle for breeding the canes must also be available.

The goal in any case should be to achieve a cane length of 180 cm in the year of planting. Any seedling canes (along with the main stems) should be removed in the year of planting.



## Trellis

The raspberry canes must be supported in any case. This is done by tying the canes to a wire or a Tonkin stake. As an alternative, the canes can be fixed between two tight cords. The important thing is that the canes are not moved too much by wind. Otherwise the growth rate will be greatly limited. This is especially important for varieties that grow slowly, such as Glen Ample. The distance between the stakes should be between 4 and 6 metres. Along with a structure to stabilise the canes, the lateral canes must also be supported. The easiest way to do this is to use cords or a net.

## Fertilisation

Fertilisation should always be preceded by a soil test. As already mentioned, you should fertilise again via drip irrigation. At the beginning of the cultivation, you should have the irrigation water tested.

The results will tell you which quantities of nutrients are contained in the water and how you should then fertilise again.

The first irrigation after planting should be done without fertiliser (the root growth should be stimulated by the "search for nutrients"). As soon as you can see that the delicate roots are leaving the root balls and are beginning to colonise the soil, you can start to fertilise again.

A nitrogen-based, soluble mixed-nutrient fertiliser is generally suitable for raspberry production. In order to control the fertilisation, some water droplets have to be collected at some point of the installed drip irrigation. A commercially available EC-meter can be used to test the collected water.







Depending on the EC-value of the collected water, the saline content of the first fertiliser dosage should not exceed an EC of 1.8. With increasing growth, the raspberry plants' need for nutrients also increases. You must adapt the fertilisation to the needs of the plants.

In autumn it is better to change the fertilisation from nitrogen-based to potassium-based. This supports the hardening of the stems and reduces the sensitivity to frost.

Generally speaking: as long as the

raspberries are growing, they should have luscious green foliage. Your goal is to achieve a cane length of 180 cm in the year of planting. Fertilisation and watering are of crucial importance for this.

## **Cane management**

Starting in the first year of cultivation, seedling canes for the following year have to be produced for raspberries that bear fruit in the summer. The first growth of seedling canes should be removed. You can let the second set of seedlings remain. It is very important to know the right time to let the seedling canes grow. After all, they have to reach the length of 1.80 m in the same year. The next generation of seedlings must be thinned out to the desired number.

Canes that are destined for harvest and the seedling canes are always in competition with one another as regards the available nutrients and light. Another problem is that because of the continuous harvest, plant protection strategies for seedling canes cannot be carried out resolutely.





## Annual plants

Along with the establishment of a “classic” raspberry open field, the same plant system can also be used for annual raspberry cultivation. This type of cultivation requires changing the location annually and an annual replanting. The advantage of this cultivation variant is that there is no competition between seedling canes and canes to be harvested.

Some steps – such as the thinning out of the seedlings – can be omitted. Negative developments that can arise with the ageing of a raspberry plant (diseases, declining size of the fruit and – quality) are thus circumvented from the beginning.

The yield, the size of the fruit and the resulting picking rate are the decisive factors for the success of an annual raspberry cultivation. This can only succeed if the canes achieve a sufficient length with an appropriate number of nodes.





## Long Canes

Raspberry Long Cane plants are, as the name indicates, long canes that are covered with buds. They are therefore suitable for harvesting in the year they are planted.

Essentially there are two different Long Cane types: bare root and potted plants.

The bare root Long Cane plants are shoots 1.60 – 2 m in length, which were taken from a raspberry propagation bed. Depending on the concentration of the material planted and the light conditions there, these canes have internodes of differing lengths and therefore different numbers of buds. The root growth should be as intensive as possible and have many fine root hairs.

If you look at a raspberry field and see that roots have spread everywhere, even between the rows, it becomes clear that the root growth and thus also the water absorption will soon be the weak point of long cane cultivation with bare root plants. That is why potted plants have increasingly gained in importance.

To produce this type of plant normally two potted green plants are planted in a container. These two green plants will be pulled up a trellis

in the year when planted during the entire vegetation period. The aim is to have a container that has a good root system and two canes about 1.80 m in length. As soon as the growth is completed and the plants are in their dormant period, they are placed in cold storage at minus 2° C.

In the following year, the long cane plants are removed from cold storage and are placed or planted in a foil tunnel or under rain covers.

Depending on the time the plants were placed, harvesting should occur 65 to 80 days after planting. This type of nursing extends the production of raspberries. Production before and after the harvest in the field is possible. Basically this kind of cultivation can be compared to that of strawberry Frigo plants.

The main varieties for a fruit production with long cane plants are the summer raspberries Tulameen and Glen Ample.

The standard method is to plant 6 canes per metre. This means that there are 3 plants with 2 canes per metre.

For this very intensive method of production, we often produce in foil tunnels or under rain covers. On the one hand, this helps short-rotation culture and, on the other, serves as rain shelter.

## Training and pruning

Apart from the selection of varieties training and pruning do have an essential influence on yield and plant health of the facility.

### Floricanes

In the year of planting the cane is pulled-up for harvesting in the following year. In the year of production canes are pulled up parallel to the harvest, in order to harvest them in the following year. In doing so, the growing of young canes is competing with the yield. This cycle repeats over a number of years.

In order to counteract the competition of yield and growing of young canes and to prevent the alternation of raspberry stocks, the annual cultivation of raspberries shows promising results. Within this proceeding summer raspberries get harvested just once, afterwards the area is cleared and replanted.

### Primocanes

#### - with one harvest per year

In the year of planting the canes are grown. Depending on the date of planting and the development a small yield can be expected. In autumn/winter, the canes get cut near the ground. In spring, new canes sprout from the root buds and get harvested in autumn.

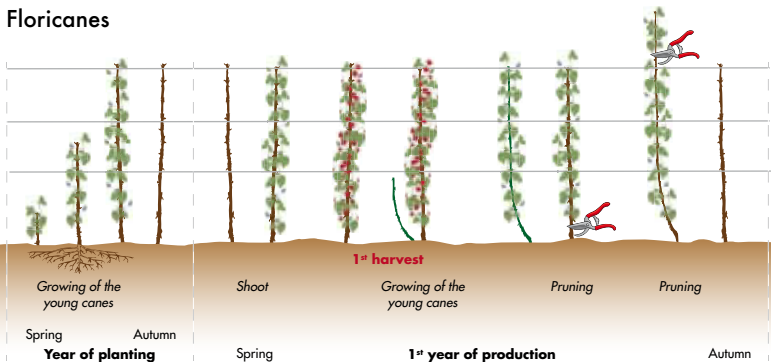
### Primocanes

#### - with two harvests in the second year of production

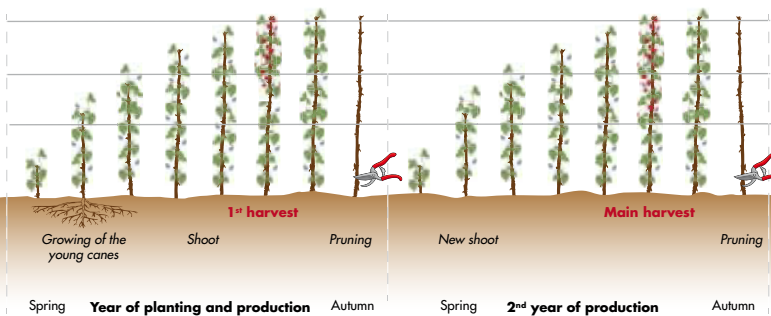
In the year of planting the canes are grown. Depending on the date of planting and the development a small yield can be expected. After harvesting, root segments get cut below the last inflorescence. The cane below the last inflorescence remains in place over winter and can be harvested in the following year. Usually the harvest takes place 2 – 3 weeks before the harvest of summer raspberries. Parallel to this harvest one grows young canes. These carry a yield in the autumn of the same year. After the third harvest a new planting of the stock usually takes place.

This kind of cultivation of raspberries is much more intensive and usually takes place in special companies. Cultivation below rain capes or in a tunnel is recommended. This cultivation method often comes along with cultivation in substrate. First experiences have shown that high yields and an expansion of the harvesting period can be achieved by combining new autumn varieties and this production method.

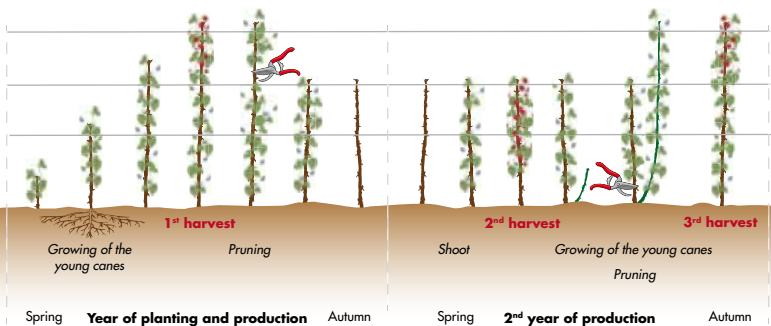
## Floricanes



## Primocanes - with one harvest per year



## Primocanes - with two harvests in the second year of production





### **Ordering dates**

During the last years the number of varieties as well as possible growing methods increased continuously. Different plant types are needed for individual production methods. Having these plant types in stock in all favoured varieties is hardly possible. To guarantee that you will actually get the best plant type in your favoured variety you should contact us and tell us about your plans at an early stage.

The listed order dates make it easier to harmonise our production and your plant needs.

### **Your contact persons:**

#### **Christian Rohling**

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### **Delivery of plants**

Our reliable logistics guarantees a fast delivery of the plants to your place. The desired delivery date should be coordinated with us 2 – 3 days in advance. The delivery will then be executed with one-day-service and at reasonable delivery costs. For moderate extra costs we can also deliver with special refrigerated trucks. Of course it is always an option for you to pick up your plants yourself; a short-term appointment coordination will help to avoid unnecessary waiting time. Pick-up times are Monday to Friday with prior arrangement.



## Strawberries

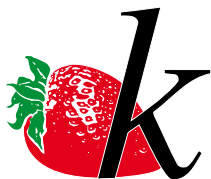
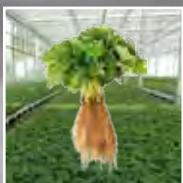
### Ordering dates:

- frigo plants:  
October – January  
→ for delivery from January
- waiting bed plants:  
until 15<sup>th</sup> June  
→ for delivery in the following year
- tray plants:  
until 15<sup>th</sup> June  
→ for delivery in the following year
- fresh plants, misted tips:  
until 15<sup>th</sup> May  
→ for delivery in July/August

## Raspberries

### Ordering dates:

- bare-root canes:  
until 31<sup>th</sup> August  
→ for delivery in autumn/winter
- potted fresh plants  
until 15<sup>th</sup> January  
→ for delivery in May/June
- long cane plants:  
until 30<sup>th</sup> April  
→ for delivery in the following year



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15.11.2018.1000