

Sonsation

A very tasty mid-season selection

Plant Breeders' Right assignment number: 2015/2402

Party entitled to Plant Breeders' Rights: Flevo Berry

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- Juicy berries with a lovely taste
- Very shiny appearance
- Good disease tolerance against Phytophthora Cactorum
- Very uniform fruits and it maintains its' size till the end of the harvest season
- Well displayed fruits, easy picking



Picture 1: Flevo Berry

The variety

Sonsation has been developed by the Flevo Berry breeding program and is the first introduction in the mid-season segment. The berries of Sonsation are very attractive. They are bright-red, conical in shape and very glossy. The calix is fresh and dark green. Sonsation maintains its' gloss also under more difficult circumstances and after a cold store period. The berries have a sensational taste inviting you to eat the whole punnet at once. It's the juicy bite which gives you this great eating experience. Directly you taste the sweetness of the fruits, followed by a fresh aftertaste. The bright red berries with an intensive gloss make the picture complete; if the perfect strawberry exists, Sonsation is getting very close!

The cultivation

Sonsation is an easy growing and healthy plant. It is a compact plant with upright leaves. Sonsation easily makes side crowns which ensures its' high yielding capacity. Flower trusses are at leaf length and still well protected against spring frost. Sonsation tends to have more flower trusses but less flowers per truss. Flowers have an excellent pollen quality ensuring a very well fruit set. Fruits are well displayed and very easy to pick. The berries are uniform although the primary berries sometimes can be a little grooved. Ensure to make Mg and Ca sufficient available at re-growth and during flowering. Increase K earlier than with other varieties; for example when the first set flowers reach 1cm fruit size. The firmness of this lovely fruit is comparable to Sonata and Elsanta, and therefore harvest carefully.

Sustainability

Flevo Berrys' vision is to develop strawberries varieties with a great taste and which can be cultivated with respect for people and nature. All growers trials show that Sonsation is easy growing by its' strong developed root system. The variety has a strong barrier against root diseases like phytophthora Cactorum. Further research is needed on how far crop protection measurements against phytophthora can be minimized. Regarding mildew, the variety shows good tolerance in field conditions with comparable preventive measurements done as with Elsanta and Sonata.



Picture 2: Delphy

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Cultivation practise at tray field

With every new variety we have to learn how to grow it!

Delphy has closely examined the development of Sonsation on the tray field compared to Sonata with different nurseries. In general it is advised to perform plant mapping to look at the height of the flower truss and the number of flower trusses in order to be able to start with the right N fertilization strategy.

- In 2017 flower initiation of Sonsation started 4-5 days earlier than Sonata. Although 2018 the start was in general later, relative to Sonata, Sonsation again was earlier.
- Root development of Sonsation is strong and quicker than Sonata.
- Sonsation develops fewer leaves and leaf surface than Sonata.
- Be aware that Sonsation is easily making side crowns.
- To develop less heavy plants, a direction could be a later tipping date and prevention of stress on the tray field.
- Keep the fertilization moderate until flower initiation. When flower initiation has started increase fertilization depending on the goal.



Picture 3: Delphy

At Proefcentrum Hoogstraten the **volume of N at the tray field** was tested with 2 strategies; 159 kg/N per Ha (PCH1) and 123kg/N per Ha (PCH 2). Production does increase with more N but especially for medium and smaller fruit sizes. Also other strategies (Herkomst 3-4-5) show a stable volume of large berries and variation in medium and smaller ones.

Forced early crop 2018 – glass house

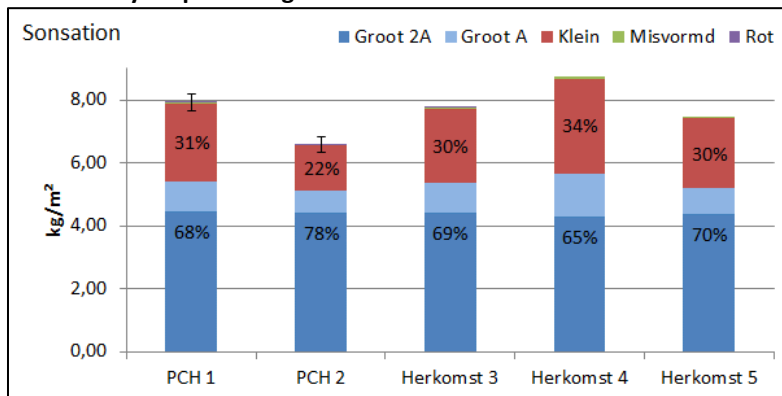


Figure 1: source PC Hoogstraten

Cultivation practise in glass house

Forced early crop

The forced early crop is one of the most common cultivation systems for Sonsation in glass house production. Sonsation is being used with planting periods in the second half of December till early January.

- Sonsation needs a comparable amount of chill hours like Sonata; 1600 hrs (without the use of cyclic lightning). The variety responds very positive to cyclic lightning during the night. It shows that even with full night lightning the shape of the berry is not effected/elongated. Further research is in progress to learn how much of the required chill can be compensated by additional lightning.
- Planting distance of 12 plants/m² to 16 plants/m² have been tested positively by the use of tray plants with 5,5-6 trusses. 14 plants/m² so far seems the optimal. Be aware of the capacity of Sonsation to easily make side crowns and do not plant too dense.
- The impression is that the variety roots slow under low light levels. Keep temperature (and feeding) low after planting and respond when light levels increase.
- Sonsation is quicker with the development of flower trusses than Sonata
- Truss teasing with Sonsation is much quicker compared to Sonata; because the primary truss of Sonsation does not split as deep.
- Start with Sonsation earlier with potassium in the feeding recipe.
- Start date of the harvest is comparable to Sonata, but mid harvest date of Sonsation is usually a few days later
- Truss length is uniform, therefore fruits are close to each other. Be aware of the large fruit load and take care of prevention of fruit damage. Harvest the ripe fruits frequently and work hygienic.
- In some occasions primary fruits got a little grooved and some got white shoulders. Fruit shape remains conical and the Sonsation maintains a good fruit size towards the end of the harvest, also during warmer periods.
- Focus all climate settings at maintaining fruit quality during harvest.
- In practise, yields up to 8.62 kg per m² with good grading has been obtained.
- Towards the end of the harvest, chlorosis of old leaves can be visible.

Forced early crop 2018 – glass house

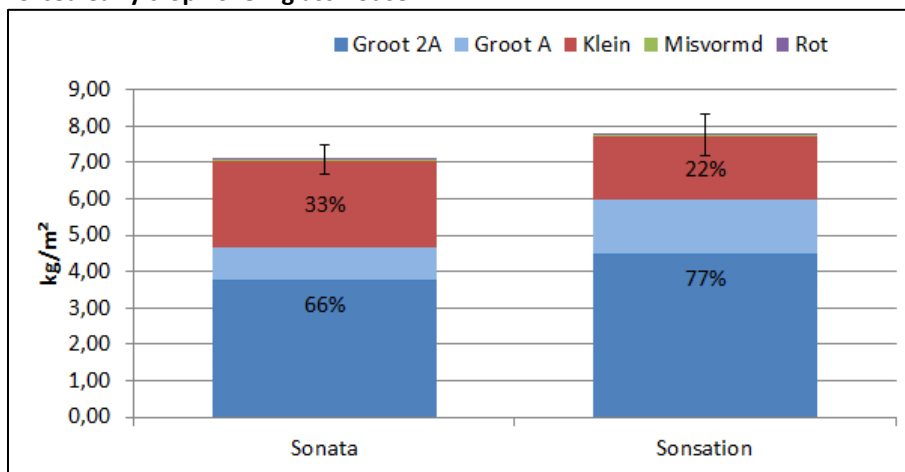


Figure 2: source PC Hoogstraten

Double cropping

The double cropping system is the most used growing technique with many glass house growers in Northern Europe using Elsanta. Several trials are being conducted with growers and research stations how Sonsation performs. For example a 2018 fertilization trial with Delphy; research on tray field to obtain different plant types for planting in autumn 2019/2020.

Fruiting trials at PC Hoogstraten already showed great fruits during October. The crops stretched well and flower trusses had great length. It was remarked that bees and bumblebees prefer Sonsation over Elsanta when grown in the same area.



Picture 4: PC Hoogstraten

Wintercrop

Sonsation is a variety which can be forced for an early production, due to its excellent pollen quality, yield capacity and plant health. Some growers and also PC Hoogstraten are trailing to get Sonsation as early as possible by a short day treatment at the tray field and planting at the end of November (verduisterde teelt).

- Cuttings 21st of jun. "Short day treatment" from 7 aug to 24 sep (19 to 9 hrs)
- Coldstore: 19 oct to 29 nov (approx. 680 hrs)
- Trials with plantdate 29 nov (10,5pl/m²)
- Production (>7kg p/m²) and grading (81% big 2A) than Sonata and a Brix approx. 9

Glasshouse, Winter 2017-2018

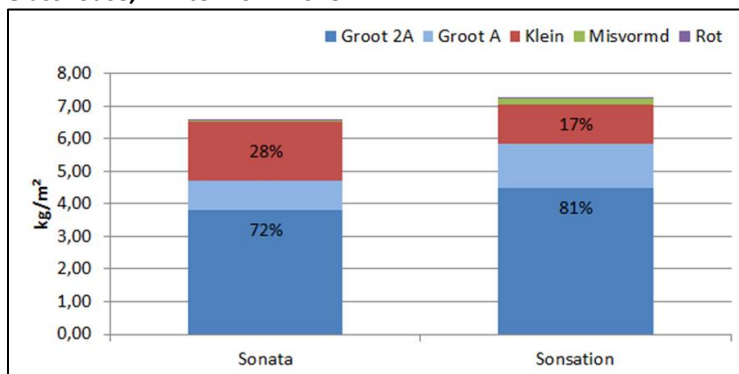


Figure 3: Source PC Hoogstraten

A different strategy for a wintercrop under full LED is trialled with several growers in Benelux, HAS Den Bosch, Flevo Berry, Signify, Delphy by the use of frozen trayplants, planted in October.

Fertilization directions for cultivation in substrate:

Knowing the exact nutritional needs of a variety can help achieving better growth, better quality and higher yields. However the optimum fertilization of strawberries is still subject of a lot of research. For the standard west European variety Elsanta quite some research is done, but new varieties likely demand another fertilization strategy. For an optimum fertilization have leaf samples analyzed to decide whether or not to adjust the fertilization recipes.

Below is a standard recipe. With this recipe, combined with water analysis a grower specific fertilizer recipe can be made. Important to know is the following:

- A good leaf / flower balance is important for an optimum production and taste.
- In case of more flower trusses and or more developed flowers at the winter dormancy (flower higher than 10-12 mm) more nitrogen may be needed in order to stimulate leaf growth.

	Advantage	Disadvantage	Sonsation
Ph	In the low range, micronutrients and phosphorus are better available	Low Ph will limit the uptake of macronutrients	5.3 to 6.0
Ec	Sufficient dissolved minerals are needed for plant growth	A high EC will result in leaf burning; low EC will cause slow growth	Raising EC-level to 2 does not harm, but also gives no significant improvement on quality
N	Growth, leaf and stem mass, vegetative crop stage	Too vegetative crop, late start of flower induction. High Nitrogen causes susceptibility for: powdery mildew, botrytis, aphids, spider mite, thrips.	Follow standard Elsanta scheme
P	A good root system, fertile flowers	Micronutrients are being limited in uptake, first Fe, then Zn and then Mn and Cu	No special needs
K	Effect on fruit colour, producing firm fruits. Stimulating growth. Sufficient K will avoid leaf burning in illuminated cultivations	Suppresses Ca in uptake = blossom end rot, excess will cause vegetative growth, limits Mg uptake	The need for K is larger compared to Sonata or Elsanta. Make K sufficient available for Sonsation. Start by lowering Ca and Mg at fruitsize of 1cm. Mg to a certain level and further lower Ca, to go maximal in K ((7mmol/L) at full flowering stage. Potentially change a part of KNO ₃ by K ₂ SO ₄ to reduce N.
Ca	Avoiding blossom end rot, firm fruit skin/cells	Relatively few disadvantages, Mg and K are less available for uptake	Start with a slightly higher Ca scheme. From regrowth until start of fruit setting.
Mg	Efficient NO ₃ conversion, healthy growth. Important for chlorophyll production	High Mg will result in lower K and Ca uptake	Make Mg more available at start and flowering phase. Lower in fruiting phase to make more K and Ca available.
S	Efficient NO ₃ conversion, healthy growth. Important for protein production	Acid soil conditions, pH will drop and an extreme uptake of Mn.	Direction could be to increase S. Watch out for your pH.
Cl	Healthy growth, Efficient NO ₃ conversion	Competition with NO ₃ in uptake, can lead to N deficiency	No special needs
Fe	Green leaf colour, without spots, avoiding yellow plants	High Fe results in lower Mn and Zn uptake	No special needs
Mn	Green leaf colour, without spots, low fungal susceptibility	High Mn results in lower Zn and Fe uptake. High Mn = calyx burning and fungi growth in the end	Sonsation needs more Mn
Zn	Green leaf colour, without spots, prevents leaf burning in illuminated cultivations	High Zn uptake results in lower Mn and Fe uptake	Sonsation needs more Zn
B	Stimulates Ca uptake, ensures firm fruit connections to the vine, limits yellow calyxes. Improved fruiting, less vine breaking	Toxic for plants, first leaf tip discolouration, followed by plant die off	Slightly higher B
Cu	Limits fungal susceptibility from inside the plants	Results in lower Fe and Zn uptake, produces firm crops, slower growth	Follow standard Elsanta scheme

Table 1: source NovaCropControl

The fertilization and nutrient status of Sonsation have to be permanently monitored and adjusted by the strawberry growers advisors. A basic feed recipe for Sonsation on substrate is below;

Stage	Note	SUM EC	NH4	K	Ca	Mg	NO3	PO4-P	SO4-S
Start		2,6	0-1	5	4,25	1,5	10-12	1	1,0-1,5
Flowering		2,8	0	6	3,75	1,5	12	1	1,5
Fruiting	From 1 cm fruit size	3,0	0	7,5	3	1,25	12	1	1,5

Stage	note	SUM EC	Fe	Mn	Zn	B	Cu	Mo	Cl max	Na max
Start		2,6	35	20(-40)	12	20	1	0,5	1	0,5
Flowering		2,8	35	20(-40)	8	20	1	0,5	1,5	0,5
Fruiting	From 1 cm fruit size	3,0	35	20(-40)	8	20	1	0,5	1,5	0,5

Feeding trails at PC Fruit, location Sint Truiden, Belgium

Plant distance: 10 pl/m² Planting date: 12.03-2018

Substrate, table tops

K-source

- No spectacular differences between different K sources
- KNO₃ scheme gives highest production (but not significant) and Brix, but also the highest % fruit rot and bruises
- KCL scheme gives significant less fruit rot but also lower brix and less gloss
- K₂SO₄ gives least bruises and most firm berries



Picture 5: PC Fruit

	Kg/pl	Kg (%)	Class I (kg/m ²)	Class II (kg/m ²)	Class I (%)	Class II (%)	Brix	Fruit rot (%)	Bruising (%)	Fruit firmness (g/mm) Fresh	Fruit firmness (g/mm) After 7d storage
KNO ₃	0,92	100	6,80	1,10	82	12	8,0a	53a	58	250	197
KCL	0,90	98	6,42	1,35	80	15	7,7b	36b	56	245	199
K ₂ SO ₄	0,89	97	6,36	1,24	80	14	7,9ab	45ab	53	250	199

Table 2: PC Fruit

EC trials

- **Raising EC-Levels can not harm, but also does not bring much extra**
- Using a higher EC gives a 3% lower Class I yield and a 9% lower total yield
- Using a higher EC improves all quality parameters but none of them was significant
- Firmness does not significantly seem to be improved by a higher EC

EC	Kg/pl	Kg (%)	Class I (kg/m ²)	Class II (kg/m ²)	Class I (%)	Class II (%)	Brix	Fruit rot (%)	Bruising (%)	Fruit firmness (g/mm)	
										Fresh	After 7d storage
1.5	0,94	100	6,4	1,6	76	18	8,3a	45a	59	251	210
2.0	0,86	91	6,3	1,1	81	14	8,2ns	41b	55	249	204

Table 3: PC Fruit

Cultivation practices at table tops

Sonsation is suitable for growing on table tops. Teasing the trusses goes faster than compared to Sonata. Adapt your truss support to the variety, to prevent bended trusses and loss of production.

Spring crop

Location: Meerle, table tops

Planting date: 27th of March 2018

Planting distance: 4 trayplants per m²/ 12 per mtr

Protected cultivation on table-top, spring 2018

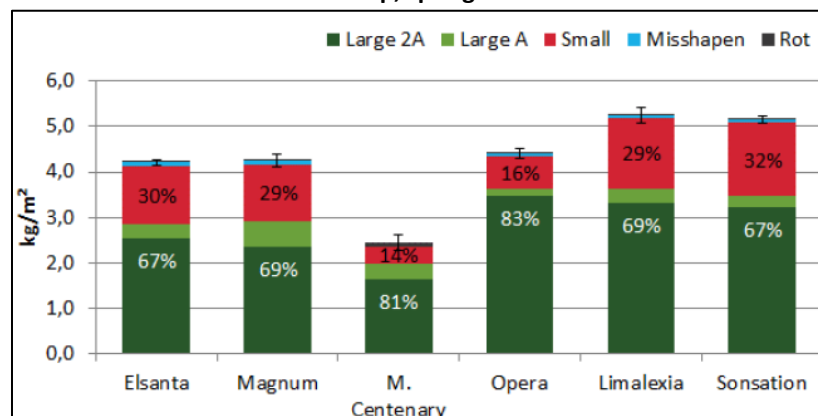


Figure 4: Yield and grading, source: PC Hoogstraten

Location: Ireland, table tops

Planting date: 23rd of March 2018

Sonsation 3/trough	Sonsation 4/trough
<ul style="list-style-type: none"> • 240 plants (3/ trough) • Total production: 258.08 kg • Total grams / plant : 1.08 kg/plant • production /m² : 4.56 kg/m² • Average brix - 9.2 • Average size (mm) - 40.50mm • Average weight (g) - 29.75g 	<ul style="list-style-type: none"> • 480 plants (4/ trough) • Total production: 405.61 kg • Total grams / plant : 845 g/plant • production /m² : 4.77 kg/m² • Average brix - 8.4 • Average size (mm) - 40.25mm • Average weight (g) - 28.50 g

Week	22	23	24	25	26	27	28	28	30	
kgs	-	1.50	28.13	44.60	82.06	67.00	26.68	7.34	0.77	3 / trough
kgs	-	1.70	35.75	68.96	113.90	89.31	76.19	17.36	2.44	4 / trough

Autumn crop

Sonsation performs well in terms of production and yield in an autumn crop. Even though the variety is relatively strong against mildew, preventive measurements are needed.

Location: Niedersachsen

Plant distance: 13 frigo/m, A++

Planting date: 08.07-2017

Variety	Yield (kg) per tunnel	Yield g/Plant	Start harvest	End harvest
Sonsation	3282	332	28.8.2017	08.10.2017
Elsanta	2130	198		

Cultivation practises in soil

Sonsation performs very well in soil production. The variety is high yielding, has a good average fruit size and a high % class I berries. Take care of enough Magnesium and Boron. Avoid an excess of nitrogen.

Location: Meerle, August Planting soil

Plant distance: 4 per m²

Planting date: 17-08-2017

Covered soil cultivation, spring 2018

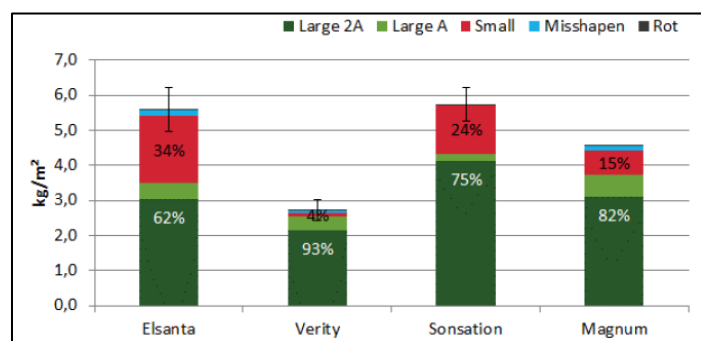


Figure 5: Source PC Hoogstraten

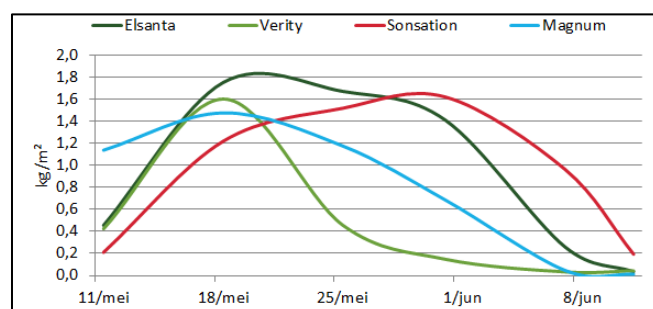


Figure 6: Fruit Pattern, source: PC Hoogstraten

Location: Sint Truiden (single dams 60cm width, 10cm high)
 Plant distance: 4m² (33,3cm distance)
 Planting date: 16-08-2017

	Class 1 per m ² (kg)	Loss of plants (%)	Brix	Fruit weight
Sonsation	2,97	1%	7,7	31
Elsanta	2,33	27%	6,1	23
Malling Centenary	1,68	11%	7	27

Location: Sint Truiden (single dams 60cm width, 10cm high). Tunnel (22-01-2018)
 Plant distance: 4m² (33,3cm distance)
 Planting date: 30-08-2017

	Class 1 per m ² (kg)	Loss of plants (%)	Brix	Av. Fruit weight	1st pick
Sonsation	3,18	0%	7,7	31	11-05-18
Elsanta	2.84	24%	6,1	23	11-05-18
Malling Centenary	1.95	11%	7	27	15-05-18

Location: Dresden-Pillnitz
 Plant distance: 1,00 m x 0,30 m, frigo
 Planting date: 11.05.2017

Variety	Yield g/Plant	Class 1 g/Plant	Class 1 %	Fruit weight g	Production pattern > 10g/plant	50% of production
Sonsation	811	635	78	18,9	28.5.-13.6.	4.6
Elsanta	822	595	72	15,0	25.5.-11.6.	1.6



Picture 6: Landwirtschaftskammer Niedersachsen

Location: Niedersachsen
 Plant distance: 5,00 m x 0,25 m, frigo
 Planting date: 20.04.2016

Variety	Yield	Class 1 g/Plant	Class 1 %	Fruit weight g	Production pattern	50% of production
Sonsation	894	752.3	83.7	18,8	02.06-04.7	13.6
Sonata	939	699.6	74.3	17.6	06.06.-04.7	13.6

Fruit quality through the eyes of the consumer

The fruit quality of Sonsation has been compared to Sonata by Innovative Fresh. They continuously monitor the quality of fruits and vegetables in supermarkets. Their unique approach to evaluating fresh produce ensures what they are testing is exactly what the customer is experiencing

In growing year 2018 Sonsation was scored equal vs Sonata by the consumer. Adding to this that plant health and grading of Sonsation is better, makes Sonsation a safe choice for grower and consumer

*Final score calculated with the average of 2x taste, 1 x appearance

	Variety	Appearance	Diameter	White shoulders	Wet bruise	Dry bruise	Decay	Taste	Firmness	Brix	Acid	Sweet/Acid	Final score*
Average	Sonata	7,2	35	1	4	21	0	7,5	385	7,7	0,8	9,8	7,4
	Sonsation	7,3	37	1	5	20	0	7,4	426	8,1	0,7	10,9	7,4

Innovative fresh