

# Nutritional extras...



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# Nutritional extras...

- Nutrient solution optimized for soilless and soil culture
- Extra foliar nutrition for fruit quality
- Side-effects of fertilisers, plant elicitors on fruit quality, plant disease resistance

# Foliar nutrition...

Ca and P foliar nutrition can improve fruit shelf life

- <Chelal-Ca, Fructol (5/815+4), Chelal-Mg, Wuxal-Ca usually have no effect on yield, fruit size but can improve shelf life by reducing gray mould infection
- <Positive effect of foliar treatment with MgSO<sub>4</sub> on leaf colour and mildew infection but no clear effect on fruit firmness nor gloss
- <Reduction of fruit rot by foliar nutrition of Seniphos (3/23/4) on softer varieties in greenhouse culture

# Rot in % na bewaring

Behandeling	in frigo uit frigo telling	29/09/04	5/10/04	12/10/04	19/10/04	26/10/04
		1/10/04	6/10/04	13/10/04	20/10/04	29/10/04
		5/10/04	11/10/04	18/10/04	25/10/04	2/11/04
Controle		34	35	21	60	42
Actisil druppelen		50	30	40	43	19
Actisil spuiten		48	32	22	53	13
Actisil + Ca(NO <sub>3</sub> ) <sub>2</sub> spuiten		53	22	12	56	36
Ca(NO <sub>3</sub> ) <sub>2</sub> spuiten		33	23	10	28	10

# Hardheid bij oogst

Behandeling	29/09/2004	5/10/2004	12/10/2004	19/10/2004	26/10/2004
Controle	71,06 n.s.	56,76 a	65,60 n.s.	66,46 n.s.	64,00 n.s.
Actisil druppelen	72,00 n.s.	67,36 c	65,84 n.s.	60,92 n.s.	66,42 n.s.
Actisil spuiten	67,66 n.s.	58,56 a b	61,06 n.s.	64,78 n.s.	69,14 n.s.
Actisil + Ca(NO <sub>3</sub> ) <sub>2</sub> spuiten	71,80 n.s.	64,48 b c	64,24 n.s.	67,18 n.s.	68,84 n.s.
Ca(NO <sub>3</sub> ) <sub>2</sub> spuiten	72,62 n.s.	63,62 a b c	60,08 n.s.	66,66 n.s.	69,00 n.s.

# Phosphorous acids...

Several products with active ingredient phosphorous acid : Phostrol (Nufarm Inc), Agri-Fos (Agrichem Inc), Prophyt (Helena Chem), Phosfik(Kemira)

- <USA and Germany labelled for control of leatherrot (*Phytophthora cact.*) and red steele (*Phytophthora frag.*)
- <Direct effect on pathogens and indirect effect by stimulation of natural defense system of plants
- <no pre-harvest interval
- <labelled as fertilisers and cheap substitute for Aliette

## Trials at Michigan USA 2005

- Effect of 4 sprays of several phosphorous acids against leatherrot and some effects against bacterial angular leaf spot on calyx
- No significant control of gray mould (*Botrytis cin.*)
- Agri-Fos, Phostrol ad ProPhyt could be fytotoxic expressed by slight burning of leaf tips

## Trial Michigan, USA 2005

<b>Treatment</b>	<b>% leatherrot in first harvest</b>	<b>% control in first harvest</b>	<b>% leatherrot in second harvest</b>	<b>% control in second harvest</b>
<b>Control</b>	<b>21</b>		<b>35</b>	
<b>ProPhyt 3.6 pt</b>	<b>14</b>	<b>71</b>	<b>18</b>	<b>49</b>
<b>Aliette WDG4 lb</b>	<b>9</b>	<b>83</b>	<b>13</b>	<b>63</b>
<b>Physpe 14.4 fl oz</b>	<b>5</b>	<b>83</b>	<b>13</b>	<b>63</b>
<b>Physpe 14.4 fl oz</b>	<b>5</b>	<b>88</b>	<b>9</b>	<b>74</b>
<b>Phostrol 3.5 pt</b>	<b>13</b>	<b>92</b>	<b>11</b>	<b>69</b>
<b>Agri-Fos 4.5 pt</b>	<b>14</b>	<b>96</b>	<b>8</b>	<b>77</b>



## Trials at Meerle and Tongeren, Belgium 2003

- Effect of 3 irrigations of Phosfik at rates of 10 l/ha soil culture of Elsanta
  - < Positive effect on supression of Phytophthora cactorum in combination with Aliette
- Effect of 4 irrigations of Phosfik at rates of 3 l/ha soil culture of Elsanta
  - <Yield increase of 9 % and significant more Class I fruit

## Trial Meerle 2003

<b>Fertigation</b>	<b>Treatment</b>	<b>Kg/pl</b>	<b>Kg/m<sup>2</sup></b>	<b>Phytophthora cactorum in %</b>
<b>Normal</b>	<b>Control</b>	<b>0.378 ns</b>	<b>1.510</b>	<b>26.8</b>
<b>Normal</b>	<b>Aliette 0.125 g/pl</b>	<b>0.431 ns</b>	<b>1.726</b>	<b>24.3</b>
<b>Normal + Phosfik</b>	<b>Control</b>	<b>0.460 ns</b>	<b>1.838</b>	<b>25.6</b>
<b>Normal + Phosfik</b>	<b>Aliette 0.125 g/l</b>	<b>0.507 ns</b>	<b>2.029</b>	<b>17.9</b>
<b>Normal</b>	<b>Paraat 0.1 g/pl</b>	<b>0.647 ns</b>	<b>2.586</b>	<b>5.8</b>

## Trials at Middelbaden, Germany

- Effect of dipping in 0.3% Phosfik at planting during 15 minutes and spraying in October at rates of 10 l/ha reduced *Phytophthora cactorum*
- Spraying at rates of 15 l/ha Phosfik reduced *Phytophthora cactorum* even more but not significantly

## Mittelbaden, 2003

Treatment	Number of plants wilting due to <i>P. cactorum</i>			
	5 October	16 January	14 May	30 May
Control	7	10	35	38
Standard	6	7	9	10
Phosfik	3	3	4	4

## Effect of phosphorous acid Phosfik against powdery mildew Trials at Meerle 2003

- Effect of 3 foliar application in a greenhouse culture of Elsanta
  - < Positive effect on suppression of *Sphaerotheca mac.*
  - < Result was more effective than Systhane (myclobutanil) but less effective than Topaz and Signum
  - < Also Kendal, a plant fertiliser (3/15) had some effect against powdery mildew
  - < Also relative good results with fertilisers KHCO<sub>3</sub> or bicarbonaat (4-5 kg/ha) and Actisil (Silicon)

## Trial Meerle, 2003

<b>Treatment</b>	<b>Active ingredient</b>	<b>Rate</b>
<b>Kendal</b>	<b>3.2 N, 15.5 K<sub>2</sub>O</b>	<b>2 l/ha</b>
<b>Signum</b>	<b>6.7 pyraclostrobin+ 26.7 boscalid</b>	<b>1.8 kg/ha</b>
<b>Phosfik</b>	<b>3 N, 27 P<sub>2</sub>O<sub>5</sub>, 18 K<sub>2</sub>O</b>	<b>2 l/ha</b>
<b>Thiovit</b>	<b>Sulphur 80 WP</b>	<b>5 kg/ha</b>
<b>Topaz</b>	<b>Penconazol 100 EC</b>	<b>0.5 l/ha</b>
<b>Switch</b>	<b>37.5 Cyprodinil+ 25 fludioxinil WG</b>	<b>1 kg/ha</b>
<b>Stimuleaf</b>	<b>60 % H<sub>2</sub>O<sub>2</sub></b>	<b>1 l/ha</b>
<b>Systhane</b>	<b>Myclobutanil 240 EC</b>	<b>0.25 l/ha</b>

## Effect against powdery mildew

<b>Treatment</b>	<b>Powdery mildew % TH3</b>	<b>Efficiency Abott %</b>
<b>Control</b>	<b>40.3</b>	<b>-</b>
<b>Kendal</b>	<b>20.3</b>	<b>49.5</b>
<b>Signum</b>	<b>11.8</b>	<b>70.6</b>
<b>Phosfik</b>	<b>16.3</b>	<b>59.6</b>
<b>Thiovit (Sulpher)</b>	<b>11.8</b>	<b>70.6</b>
<b>Sulpherburner</b>	<b>16.3</b>	<b>59.4</b>
<b>Topaz</b>	<b>14.8</b>	<b>63.3</b>
<b>Switch</b>	<b>15.9</b>	<b>60.5</b>
<b>Stimuleaf</b>	<b>26.3</b>	<b>34.9</b>
<b>Systhane</b>	<b>24.4</b>	<b>39.4</b>

# Rootstimulants

- Several substances based on fertilisers and natural plant hormones can improve root development. Plants defence mechanisms are stimulated, often cytokinines and gibberelins affect plant growth and resistance
- Radifarm, Radicante, Seaflakes, Seaprills etc.; (Terrasorb, Anorel
- Dipping or irrigation after planting



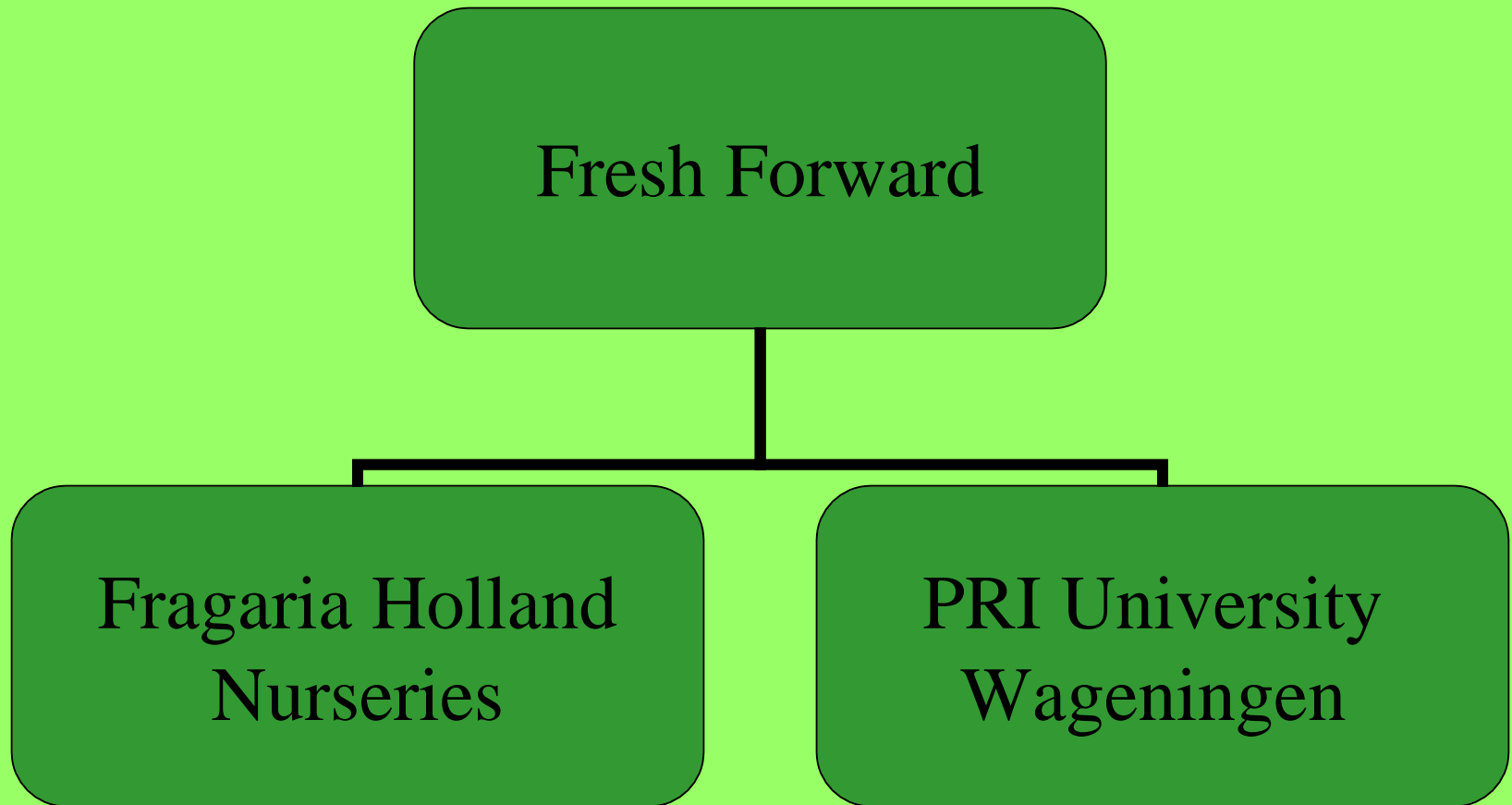
## Trial 2004

<b>Product</b>	<b>% N-P-K</b>	<b>Other ingredients</b>	<b>Rate of application</b>
<b>Radifarm</b>	<b>2-0-4</b>	<b>Fe, Zn, polysaccharides</b>	<b>2.5 cc/l</b>
<b>Seaflakes</b>	<b>1-6-19</b>	<b>Mg, S, Cu, Fe, 600 ppm cytokinines &amp; gibberellins</b>	<b>500 g/m<sup>3</sup></b>
<b>Seaprill</b>	<b>3-2.6-10</b>	<b>Mg, S, Cu, Fe, 600 ppm cytokinines &amp; gibberellines, 160 ppm auxines, 0.6 % betaines</b>	<b>500 g/m<sup>3</sup></b>
<b>Bioradicante</b>	<b>7.2</b>	<b>Fe, Mn, Zn, B, Mo</b>	<b>3.5 cc/l</b>

## Trial with plug plants 2004

Treatment	2 weeks after rooting				Rhizoom diameter december (mm)		Kg/pl		Kg/m <sup>2</sup>
	Rootlength in cm		Roots per stolon						
Bioradicante	4,2	a	28,2	b	16,1	ab	0,363	ns	3,811
Radifarm	12,8	b	21,6	a	17,4	bc	0,417	ns	4,378
Seaflakes	13,8	bc	27,8	ab	18,1	c	0,408	ns	4,284
Seaprills	15,1	c	28,8	b	17,5	c	0,404	ns	4,242
Controle	14,1	bc	26,8	ab	16,0	a	0,404	ns	4,242

# New strawberry varieties



# SONATA

- June bearer
- Cross of Elsanta x Polka
- Compact growth habit, shorter first inflorescence
- Higher chilling requirement than Elsanta
- Fruits are protected from sunburn in outdoor crop
- Very good quality flowers : big anthers with lots of pollen, viable pistils



# SONATA

- Very good fruitset
- First fruits large and little bit wedged
- Uniform short conical fruits
- Almost no misshaped fruits !
- Orange-red colour
- Internal pink colour
- Not too dark in summer
- Colours not enough in very late autumn in greenhouse



# SONATA

- Almost as firm as Elsanta. However, slightly more sensitive skin
- Carefull with bruising, 250 and 330 gram packaging preferred
- Shelf life comparable to Elsanta
- In general good sweet taste, juicy berries





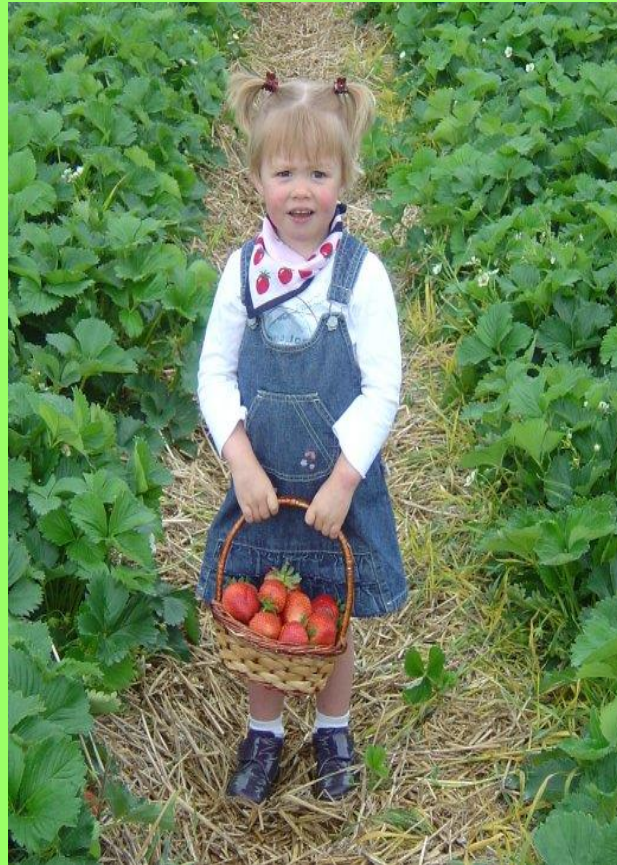
# SONATA

- Production comparable to Elsanta or 5 % less but no misshaped
- Generally 2 days later than Elsanta in spring and summer, 1 week later in autumn
- Variety for spring production in greenhouse, tunnel and outdoors, summerproduction as 60 day plant



# ISAURA

- June bearer
- Compact growth habit, short inflorescences partially hidden under the foliage
- Good protection against sunburn and rain
- Very late variety, flowers 2 weeks after Elsanta
- Produces 10-14 days after Elsanta
- Good quality flowers with sufficient pollen and viable pistils





# ISAURA

- Very good fruitset
- Fruits are uniform conical as Elsanta
- Low incidence of misshaped fruits !
- Glossy and red colour
- Internal red colour
- Maintains brightness well during storage
- Almost as firm as Elsanta.
- Shelf life comparable to Elsanta



# ISAURA

- In general good sweet taste, juicy berries
- Can be slightly more acid than Elsanta
- Yields around 600 gram/plant as fresh plant
- Good substitute for other late varieties
- Suitable for late crop outdoors and as 60 day planting

