



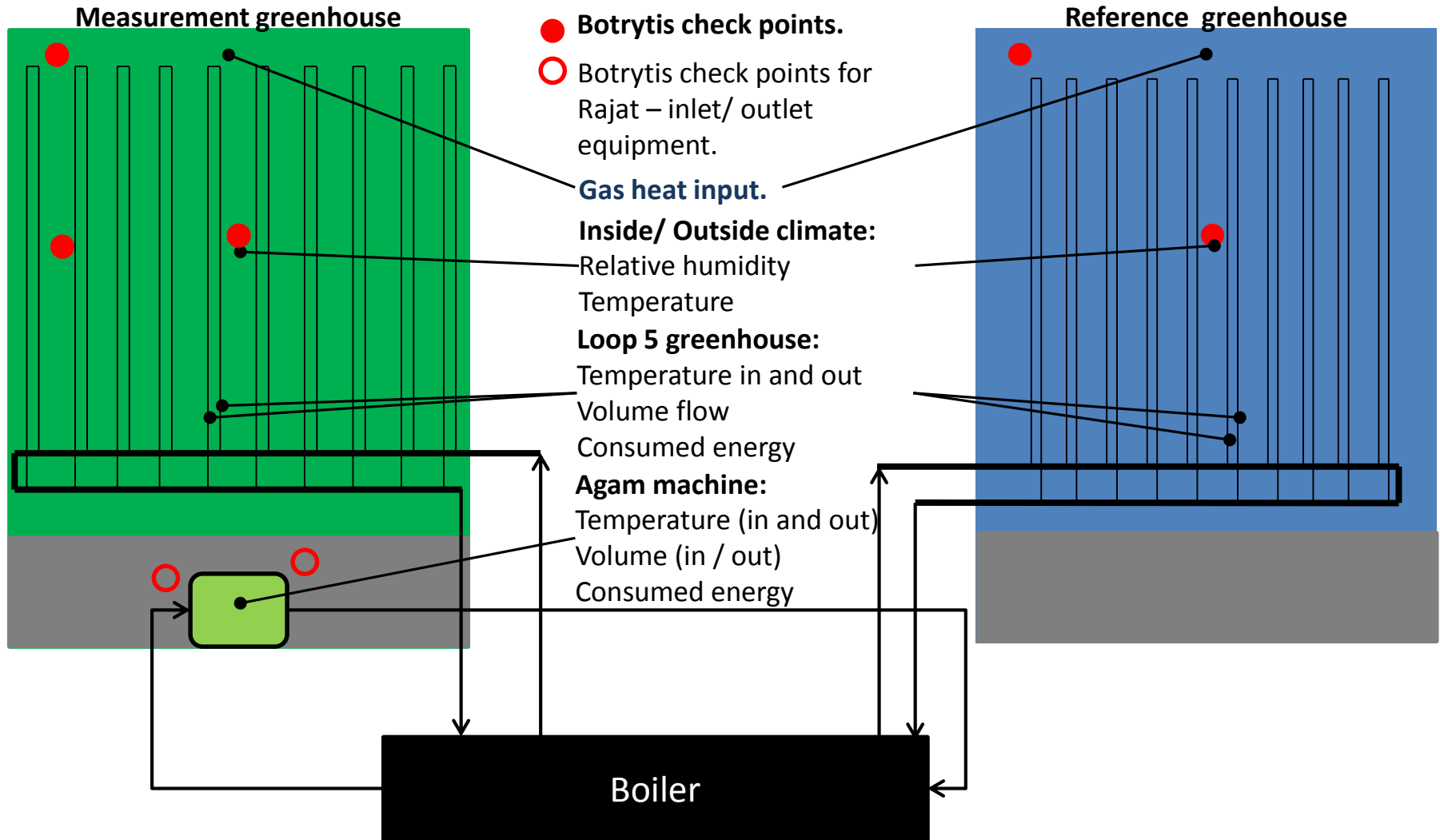
Agam Dehumidifier

Results on Energy savings, fungi removal
and energy modulation

8-5-2014



Measurement scheme for Air and energy experiments





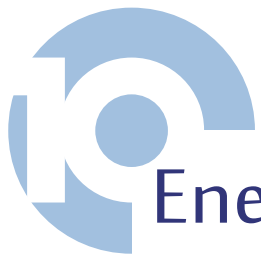
Summary of the tests performed

- Energy losses reduced ~ 60%.
- Fungi removal ~ 75%.
- Heat input reduced (modulation) ~ 75%.

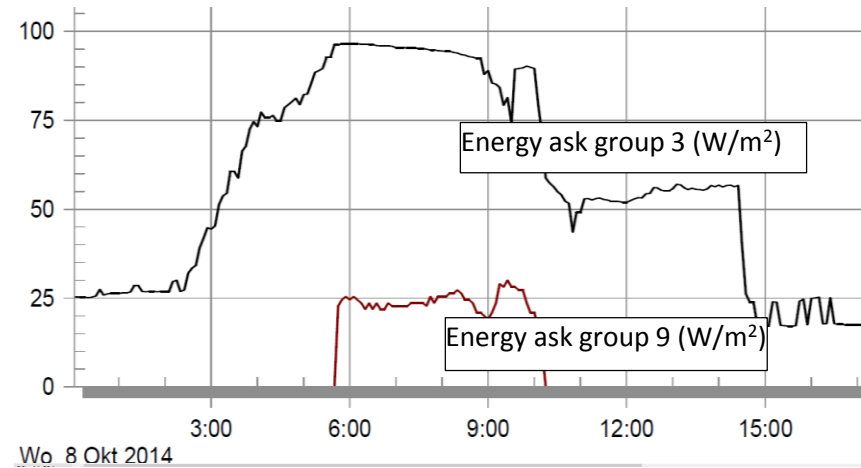
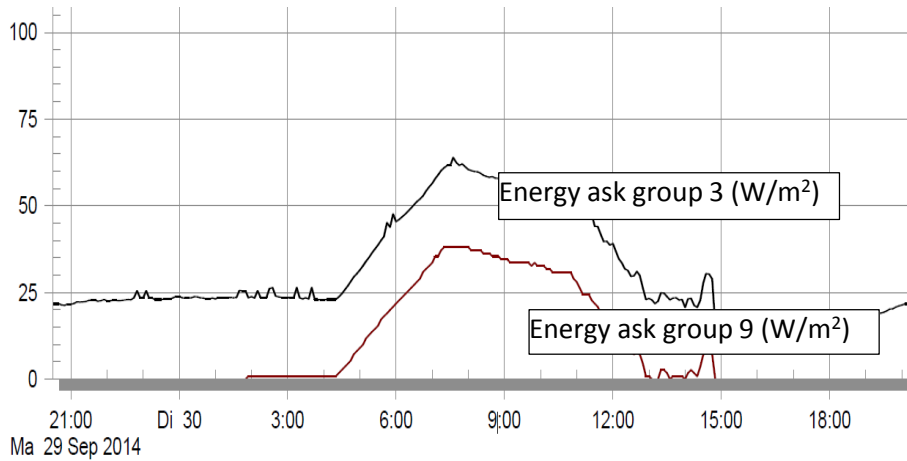


Part 1: Energy Measurements tests

The energy losses from the greenhouse was reduced by almost 60%.



Energy losses from the greenhouse

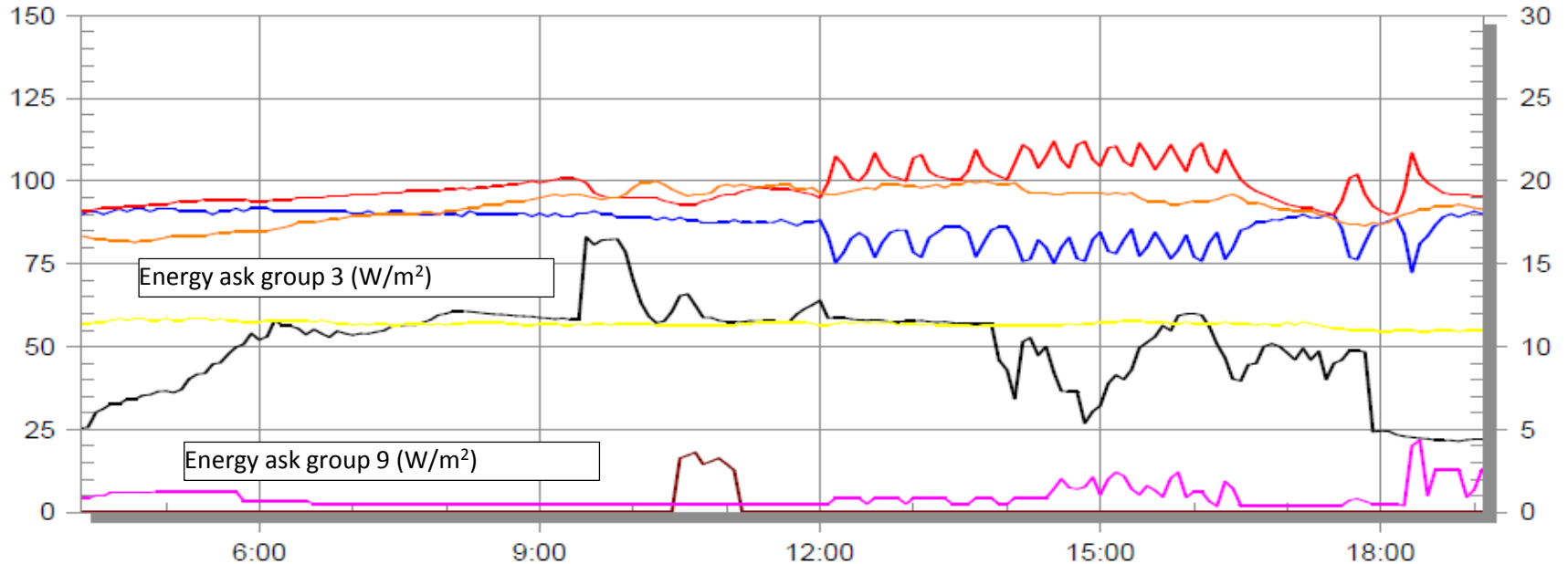


	30th September 2014 (without Agam Machine)			8th October 2014 (with Agam Machine)			% difference (30th September Vs 8th October)		
	Energy input, W/m2	Temperature difference	K value	Energy input, W/m2				Temperature difference	K value
			(W/m2.C)	Hot water	Agam	Total			
Group 3	48.33	4.30	11.24	69.38	0.00	69.38	5.3	13.09	16.45
Group 9	23.33	5.50	4.24	6.25	10.19	16.44	6.70	2.45	-42.18
								Difference	58.63

The above analysis is a part of ongoing research and measurements.



Plots of measurements



Vr 24 Okt 2014

Instellingen		Eenheid	Groep	Factor	As	Min	Max	Gem
●	kastemperatuur: meting meetbox	Temperature	afdeling 9	1	->	18	22,4	19,7
●	RV: meting meetbox	Humidity	afdeling 9	1	<-	73	92	87
●	klimaat: energievraag momentaan	Energy ask/ supply	Gr 9	1	<-	0	18,1	0,6
●	klimaat: energievraag momentaan	Energy ask/ Supply	Gr 3	1	<-	21,4	83,1	50,2
●	kastemperatuur klimaat: meting	Temperature	Gr 3	1	->	16,3	20	18,5
●	luwe zijde raamstand: meting	Window opening	Gr 9	1	<-	2	22	4
●	buitentemperatuur: meting	Temperature out	Gr 1	1	->	10,9	11,7	11,3



Weekly average values

Comparison	Total heat input (MJ/m²/day)	
	Week 39	% difference
Week 39	0.61	
Week 42 (AM)	0.40	-33.88
Week 43 (AM)	0.34	-43.70



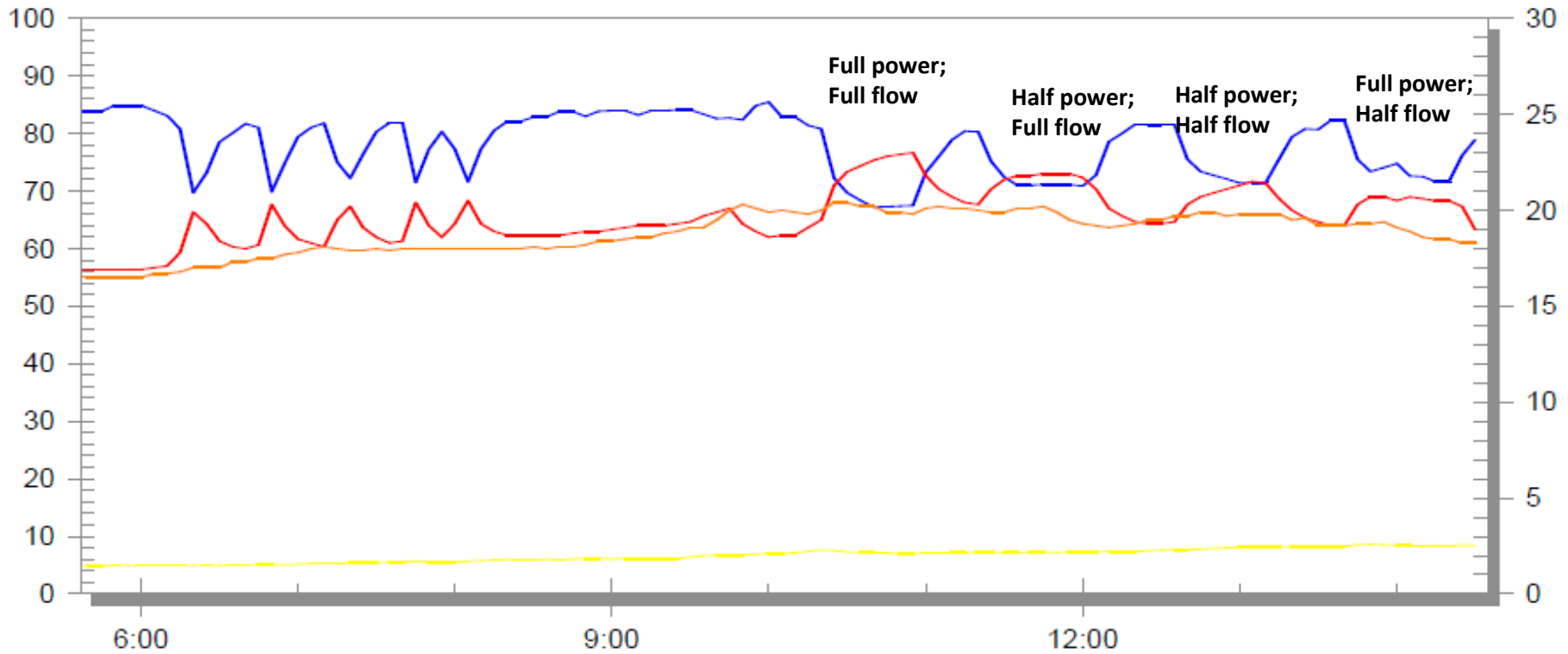
Part 2: Modulation of the heat input

- “The machine gives too much warmth in too little time”. Can this be modulated/ reduced?

Yes. By changing flow, power and area of the greenhouse. Test result show a reduction of up to 75% heat input by change of heat input.



Modulation of the heat input



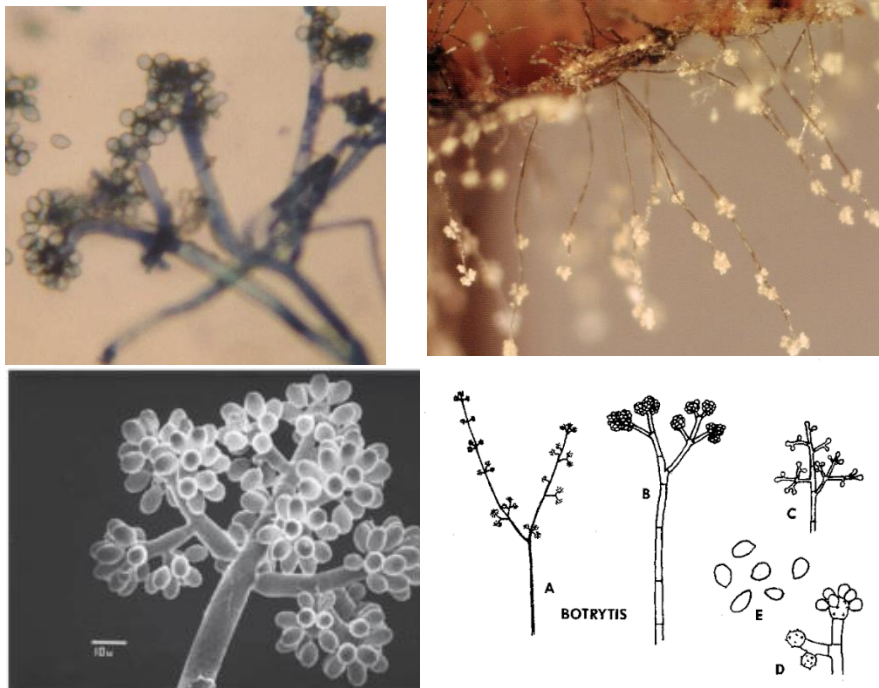
Vr 7 Nov 2014

Instellingen	Eenheid	Groep	Factor	As	Min	Max	Gem
● kastemperatuur: meting meetbox	°C	afdeling 9	1	->	16,9	23	19,7
● RV: meting meetbox	%	afdeling 9	1	<-	67	86	78
● kastemperatuur klimaat: meting	°C	Gr 3	1	->	16,5	20,4	18,8
● buitentemperatuur: meting	°C	Gr 1	1	<-	4,9	8,6	6,6

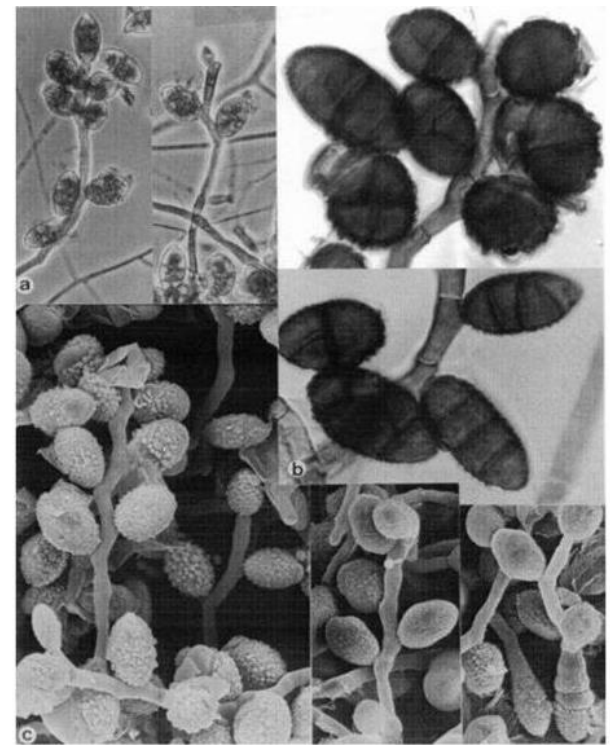


Botrytis tests

Reference from internet:



Reference from Aquamaar:





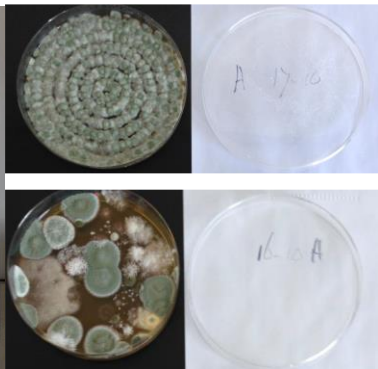
Botrytis test schedule

- Measurements of samples were taken on three occasions:
 - 29th September : Reference case without control; Windows allowed to open at will.
 - 17th October: 12 hours Agam Machine running; windows forcibly closed in greenhouse section 9.
 - 18th October: No Machine running; windows forcibly closed in greenhouse section 9.

Botrytis tests



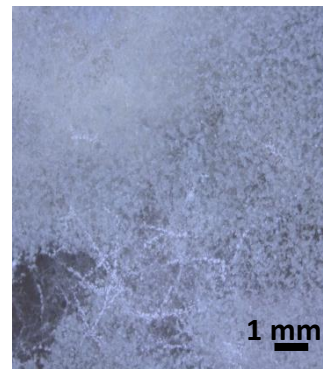
Incubator



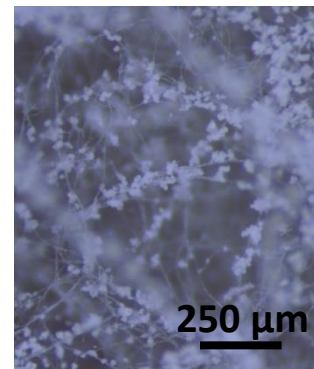
Bacteria



Microscope



1 mm



250 μm

analysis

	16 oktober							17 oktober						
ID	A	B	C	D	E	F	G	A	B	C	D	E	F	G
Monstertype	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht	Lucht
Lucht volume	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l	100 l
Determinatie	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee	Nee
Totaal bacteriën														
Overige micro-organismen	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Totaal schimmels en gisten														
Total count = Kve* 10	630	680	520	540	2.280	1.600	1.400	2.280	2.280	2.280	2.000	2.280	2.280	2.280
Botrytis	Ja	Ja	Ja	Ja	Ja	Ja	Ja	Ja	Nee	Ja	Ja	Ja	Ja	Nee
Niet geïdentificeerde soorten	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Andere Parameters														
Raam gesloten / open	Dicht	Dicht	Dicht	4% open	4% open	Dicht	Dicht	Dicht	Dicht	Dicht	Dicht	Dicht	Dicht	Dicht
Ventilator aan / uit / buisrail	Uit	Uit	Uit	Aan 38.4° C	Aan 38.4° C	Uit	Uit	uit	Uit	Uit	Aan 39°C	Aan 39°C	Uit	Uit
Agam machine	Aan	Aan	Aan	-	-	Aan	Aan	Uit	Uit	Uit	-	-	Aan	Aan
Tijd monsternamen +/-	7:20	7:30	7:40	7:50	8:00	8:05	8:05	7:20	7:30	7:40	7:50	8:00	8:05	8:10
Temperatuur gem	23.4 °C	23.4 °C	23.4 °C	17.9 °C	17.9 °C	23.4 °C	23.4 °C	19.5 °C	19.5 °C	19.5 °C	18.0 °C	18.0°C	19.3 °C	19.3 °C