



**Testing of plant extracts for control  
of apple sawfly  
Trials with Quassia-MD, NeemAzal T/S  
and Tracer**

**Trial protocols:** 2011-710  
2012-713

**Number of trials:** 4

**Assignment:** GUDP Project FruitGrowth

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**Date:** 21 October 2013

## TITLE PAGE

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**Title:** Testing of plant extracts for control of apple sawfly  
Trials with Quassia-MD, NeemAzal T/S and Tracer

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Protocol ID: 2011-710  
2012-713

Trial number: 2011-710-2  
2011-710-3  
2012-713-1  
2012-713-2

Number of pages: 41

Trial leader: Klaus Paaske

Research assistant: Magnus Gammelgaard Nielsen

Trial period: May 2011 – June 2012

Performance criteria: GEP (Good Experimental Practice)

### **Trial leader's authentication**

The undersigned hereby declares that this work was performed under my directions and in accordance with the Principles of Good Experimental Practice. The study was conducted according to the procedures herein described, and this report represents a true and accurate record of the results obtained.



Klaus Paaske



Date

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## 1. SUMMARY

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These trials were conducted as a part of the GUDP project “FruitGrowth – Novel organic solutions securing future growth” with the aim of testing potential plant extracts for control of apple sawfly, *Hoplocampa testudinae*.

The products Quassia-MD, NeemAzal T/S and Tracer were selected for this project, however; Tracer is not a plant extract but its active substance spinosad is made by fermentation of the bacteria *Saccharopolyspora spinosa*. The active substance in Quassia-MD is Quassia, which is an extract from the trees *Quassia amara* or *Picrasma exelsa*, and the active substance in NeemAzal T/S is azadirachtin, which is an extract from the tree *Azadirachta indica*. All 3 substances are allowed in organic production according to EU Regulation 837/2007, but use in Denmark requires that the products are approved by Miljøstyrelsen as a pesticide, but none of the products have been approved until now.

The trials were conducted in 2 organic apple orchards according to the same protocols and conducted during 2 growing seasons, in total 4 trials were made.

One or two applications were made and targeted to be made when the first eggs started to hatch and 3-4 days later. Assessment of efficacy was made by counting the number of apples infested with apple sawfly larvae.

The best control was achieved with Quassia-MD and the best timing of this product was found to be at the start of hatching, but a split application with 2 times half dose rate is also possible.

Tracer was found to be slightly less effective than Quassia-MD, and with this product the best efficacy was found after split application with 2 times half dose rate.

The efficacy of NeemAzal T/S was only moderate so this product will only be interesting if Quassia-MD or Tracer is not available.

Phytotoxicity was assessed after the applications, but no signs of phytotoxicity were found in any of the treatments.

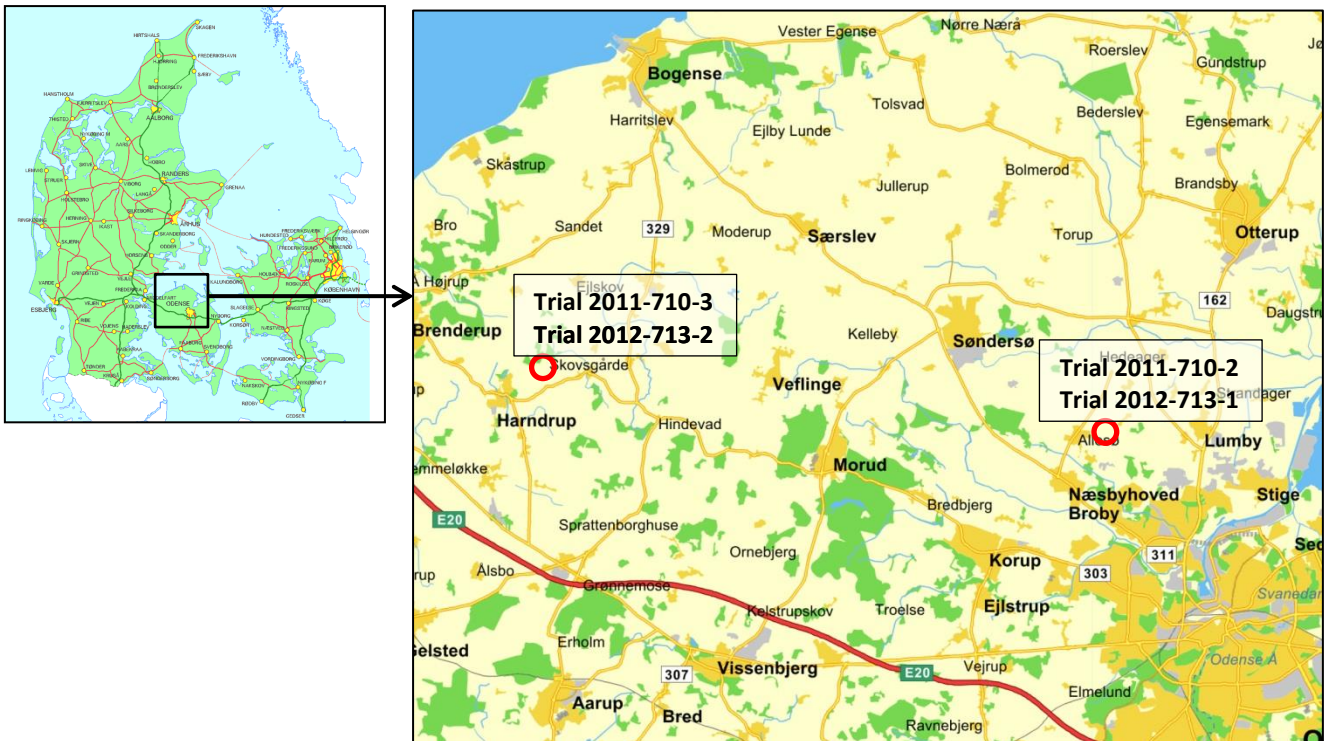
The results of the trials prove that Quassia-MD and Tracer are effective for control of apple sawfly, and this report is available for any applicant who may seek approval of these products in Denmark.

## 2. METHODS AND MATERIALS

The trials were established in organic apple orchards where apple sawfly, *Hoplocampa testudinae*, was a problem in previous growing seasons. In order to confirm the presence of the pest, white sticky traps were placed in the orchard by the growers who monitored the traps regularly until the end of flowering. In 2011 a trial (2010-710-1) was planned in an orchard where apple sawfly had caused severe damage in previous years, but for unknown reason no sawflies were caught on the sticky traps this year. Therefore this trial was cancelled and replaced by trial 2010-710-3.

### Geographical location of the trials

Trial	2011-710-2, 2012-713-1	2011-710-3, 2012-713-2
Trial host	Henning Bæk Hansen Søhusvej 194 5270 Odense	Poul Rytter Larsen Harndrup Skov 11 5463 Harndrup
Trial location	Søhusvej 2551 5270 Odense	Same
GPS coordinates	Latitude: 55.44980 Longitude: 10.31711	Latitude: 55.47261 Longitude: 10.04580



### Crop description

Trial	2011-710-2, 2012-713-1	2011-710-3	2012-713-2
Crop	Apple ( <i>Malus sylvestris</i> var. <i>domestica</i> )	Apple ( <i>Malus sylvestris</i> var. <i>domestica</i> )	Apple ( <i>Malus sylvestris</i> var. <i>domestica</i> )
EPPO code	MABSD	MABSD	MABSD
Variety	'Holstener Cox'	'Rubens'	'Holstener Cox'
Planting year	2000	2004	2007
Soil description	JB 5-6, sandy clay	JB 5-6, sandy clay	JB 5-6, sandy clay

### Site description and design

Trial	2011-710-2 2012-713-1	2011-710-3	2012-713-2
Design	Randomized blocks	Randomized blocks	Randomized blocks
Replications	4	4	4
Crop spacing	3.5 x 1.0 m	3.25 x 1.0 m	3.25 x 1.0 m
Tree height	2.5 m	2.5 m	2.5 m
Plot size:			
- number of rows	2	2	2
- number of trees/row	10	10	8
- m <sup>2</sup>	70	65	52

### Protocol treatments

Treatment	Timing		Dose rate per ha per treatment		
	A	B	kg/l product		g active substance
			2011 trials	2012 trials	
1. Untreated	-	-	-	-	-
2. Quassia-MD	X	-	1.63 kg	1.14 kg	12
3. Quassia-MD	-	X	1.63 kg	1.14 kg	12
4. Quassia-MD	X	X	0.815 kg	0.57 kg	6
5. Quassia-MD *	X	X	*	1.14 kg	12
6. NeemAzal T/S	X	-	3.75 l	3.75 l	39.75
7. NeemAzal T/S	-	X	3.75 l	3.75 l	39.75
8. Quassia-MD	X	-	0.815 kg	0.57 kg	6
NeemAzal T/S	-	X	3.75 l	3.75 l	39.75
9. Quassia-MD	X	-	1.63 kg	1.14 kg	12
NeemAzal T/S	-	X	3.75 l	3.75 l	39.75
10. Tracer	X	-	0.25 l	0.25 l	120
11. Tracer	-	X	0.25 l	0.25 l	120
12. Tracer	X	X	0.125 l	0.125 l	60

\*: only included in 2012-trials

All treatments: + Trifolio S-forte 1.6 l/ha

**Timing A:** When the first eggs are beginning to hatch

**Timing B:** 3-4 days after A

### Product identification

Quassia-MD: Quassia 12 g/kg, batch No.: n.a.

NeemAzal T/S: Azadiracthin 10.6 g/l, batch No.: 2011: 070411Z; 2012: 160312L

Tracer: Spinosad 480 g/l, batch no.: YG17272078


Trifolio S—forte: Additive (plant oil 50%, tensids 50%)

All products are allowed in organic production according to EU regulations but not allowed as plant protection products in Denmark. Therefore they are not allowed to be used before such an approval is granted by Miljøstyrelsen.

### Application details

Application	Trial 2011-710-2		Trial 2011-710-3		Trial 2012-713-1		Trial 2012-713-2	
	A	B	A	B	A	B	A	B
BBCH growth stage	68	69	68	69	69	69	69	69
Date	18/5	21/5	18/5	21/5	24/5	28/5	24/5	28/5
Time of the day	11-13	11-13	8-10	8-10	19-21	10-12	16-18	7-9
Temp. °C	17.4	20.6	15.7	19.5	19.5	24.2	24.8	20.7
Humidity % RH	68	48	78	55	62	46	49	69
Wind speed m/s	1.5	0.5	0.5	0	0	0.5	0	0.5
Wind direction	S	W	S	-	-	SE	-	0
% cloud cover	90	0	95	0	0	0	0	0
Leaf surface	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry

### Application equipment

<b>Type</b>	Wanner crossflow orchard sprayer, customized for trial treatments	
<b>Operating pressure</b>	5 bar	
<b>Nozzle type</b>	Lechler	
<b>Nozzle size</b>	TR-80-03	
<b>No. of nozzles</b>	8	
<b>Ground speed</b>	4.7 km/h	
<b>Water volume</b>	800 l/ha	

## Assessments

Assessments of efficacy were made by counting the number of apples with infestation of sawfly larvae approx. 3 weeks after application B. In the 2011 trials assessment was made on 200 apples per plot but in the 2012 trials both trial locations suffered from late frost damage so it was not possible to assess 200 fruits per plot. Therefore assessment was made of all fruits on 6 trees per plot.

The efficacy is calculated according to Abbott's equation:

$$W = \frac{(C \div T) * 100}{C}$$

Where: C = number in untreated plot  
T = number in treated plot  
W = degree of effect in per cent

## Statistical analysis

For data management and statistical calculations the ARM program (ARM 8, Gylling Data Management Inc.) was used. Homogeneity of variance was tested by Bartlett's test. In case this test indicated no homogeneity of variance, analysis of variance was performed on transformed data. In case a transformation was made, this is indicated in the table as follows: TL = LOG(x+1), TA = ARCSIN(SQR(X/100)) or TS = SQR(X+0.5). If still no homogeneity of variance was obtained by the transformation, the statistical analysis should be treated with caution.

The data were subjected to analysis of variance, and treatment means were separated at the 95% probability level using F-test (Student-Newman-Keuls test).

## Guidelines

EPPO Standard PP 1/32(2) *Hoplocampa* spp.

EPPO Standard PP 1/152(3) Design and analysis of efficacy evaluation trials

EPPO Standard PP 1/181(3) Conduct and reporting of efficacy evaluation trials including GEP

EPPO Standard PP 1/135(3) Phytotoxicity assessment

## Deviations from protocol

In trials 2012-713-1 and 2013-713-2 it was not possible to make assessment of 200 apples per plot because late night frost had damaged so many flowers that the number of apples on assessable trees was less than 200. Therefore assessment was made on all apples on 6 trees and hence the number of apples assessed varied between 54-79 in trial 2012-713-1 and 109-170 in trial 2012-713-2.



### 3. RESULTS

A summary of the results is shown in tables 1-2 and figures 1-2 and detailed figures can be found in the AOV Means tables on pages 12-16 and raw data are shown as Plot Data Summaries on pages 17-33.

In table 1 is shown the results from the 2011 trials in which 15.2% attack was found in the untreated plots in one trial and 23.8% attack in the other trial. In both trials this was reduced significantly by all treatments, except for plot 5 in trial 2011-710-2.

The best control was achieved with Quassia-MD, and no difference was seen between the 2 timings of the full dose rate. When the full dose rate of Quassia-MD was used as a split application, the efficacy was equal to the single treatments with full dose rate in trial 710-2 but in trial 710-3 the effect was significantly better.

The efficacy of NeemAzal was significantly lower than Quassia-MD, and in trial 710-3 these differences were significant. When a combination of Quassia-MD as treatment A and NeemAzal as treatment B was used, the level of control was by and large equal to a single treatment of Quassia-MD at full dose.

Unfortunately a single treatment with half dose of Quassia-MD was not included, so it is not possible to evaluate how much the treatment with NeemAzal is contributing to the efficacy of the treatment.

The efficacy of Tracer as a single treatment was slightly lower but not significantly lower than the efficacy of Quassia-MD in trial 710-2, but in trial 710-3 this difference was significant. When Tracer was used at both timings, the efficacy was equal to the efficacy of Quassia-MD.

**Table 1. Trials 2011, % apples with attack of sawfly larvae**

Treatment	Dose rate kg/l/ha	Timing		Trial 2011-710-2	Trial 2011-710-3
		A	B	3 June – 13 DAT-2	9 June – 19 DAT-2
1. Untreated				15.2 a*	23.8 a*
2. Quassia-MD	1.63 kg	X		3.7 bc	2.8 d
3. Quassia-MD	1.63 kg		X	1.8 bc	2.8 d
4. Quassia-MD	0.815 kg	X	X	2.4 bc	1.0 e
5. NeemAzal T/S	3.75 l	X		10.4 a	14.5 b
6. NeemAzal T/S	3.75 l		X	5.0 b	14.6 b
7. Quassia-MD NeemAzal T/S	0.815 kg 3.75 l	X	X	2.6 bc	2.9 d
8. Quassia-MD NeemAzal T/S	1.63 kg 3.75 l	X	X	1.2 c	1.9 d
9. Tracer	0.25 l	X		4.9 b	6.4 c
10. Tracer	0.25 l		X	3.2 bc	6.2 c
11. Tracer	0.25 l	X	X	2.1 bc	2.8 d

\*: calculated on LOG(x+1) transformed data

In table 2 is shown the results of the 2012 trials. The pest incidence was higher this year with approx. 33% attack in untreated in both trials, and as in 2011 this was reduced significantly by all treatments.

This year the best effect of Quassia-M was achieved when applied at timing A; however not significantly different to timing B. When half dose of Quassia-MD was used at both timings, the efficacy was equal to a single treatment of Quassia-MD, and when Quassia-MD was used at full dose rate, the efficacy was increased but not significantly.

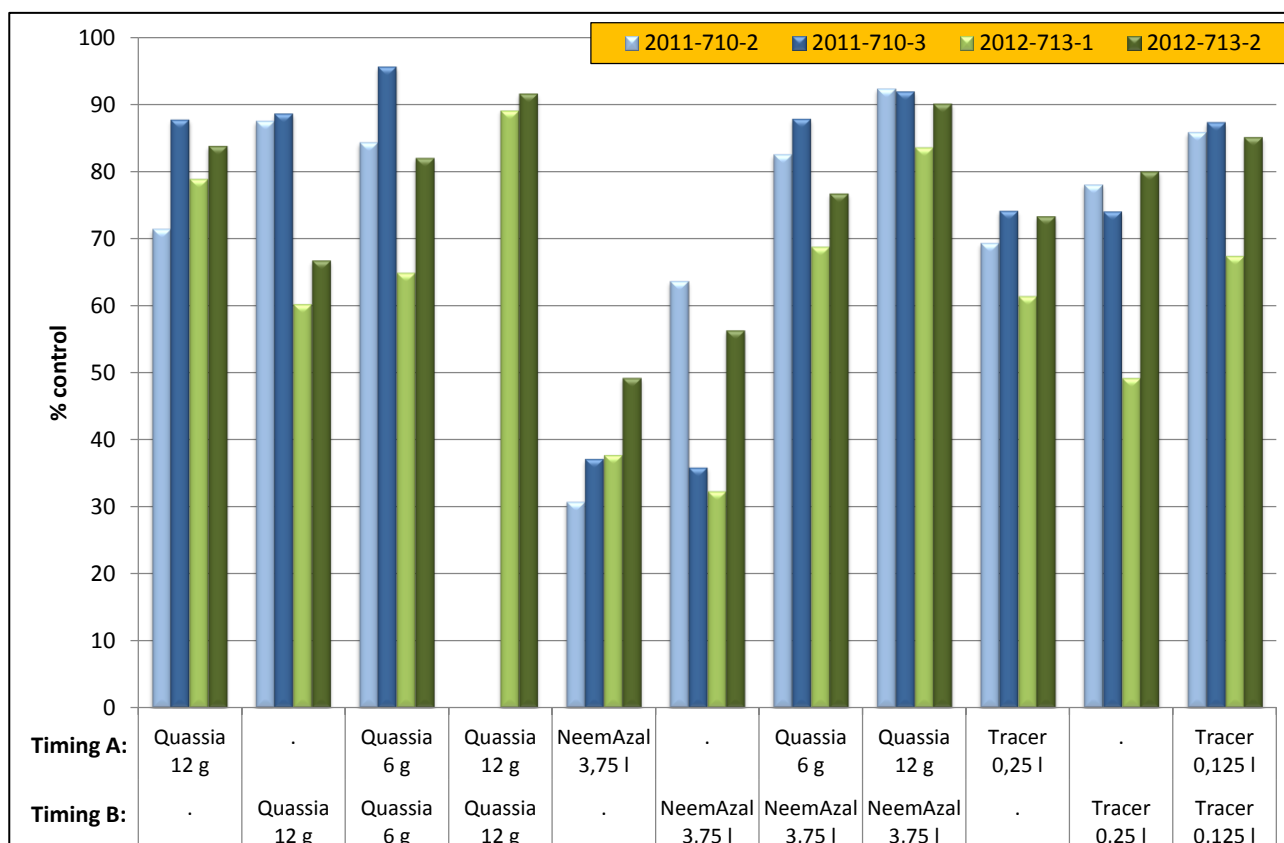
As in the 2011 trials the efficacy of NeemAzal was clearly inferior to Quassia-MD, and combinations of these two products showed no advantages compared to use of Quassia-MD alone.

The efficacy of Tracer was lower than Quassia-MD but not significantly, and this year the differences between a single treatment and treatments at both timings were lower.

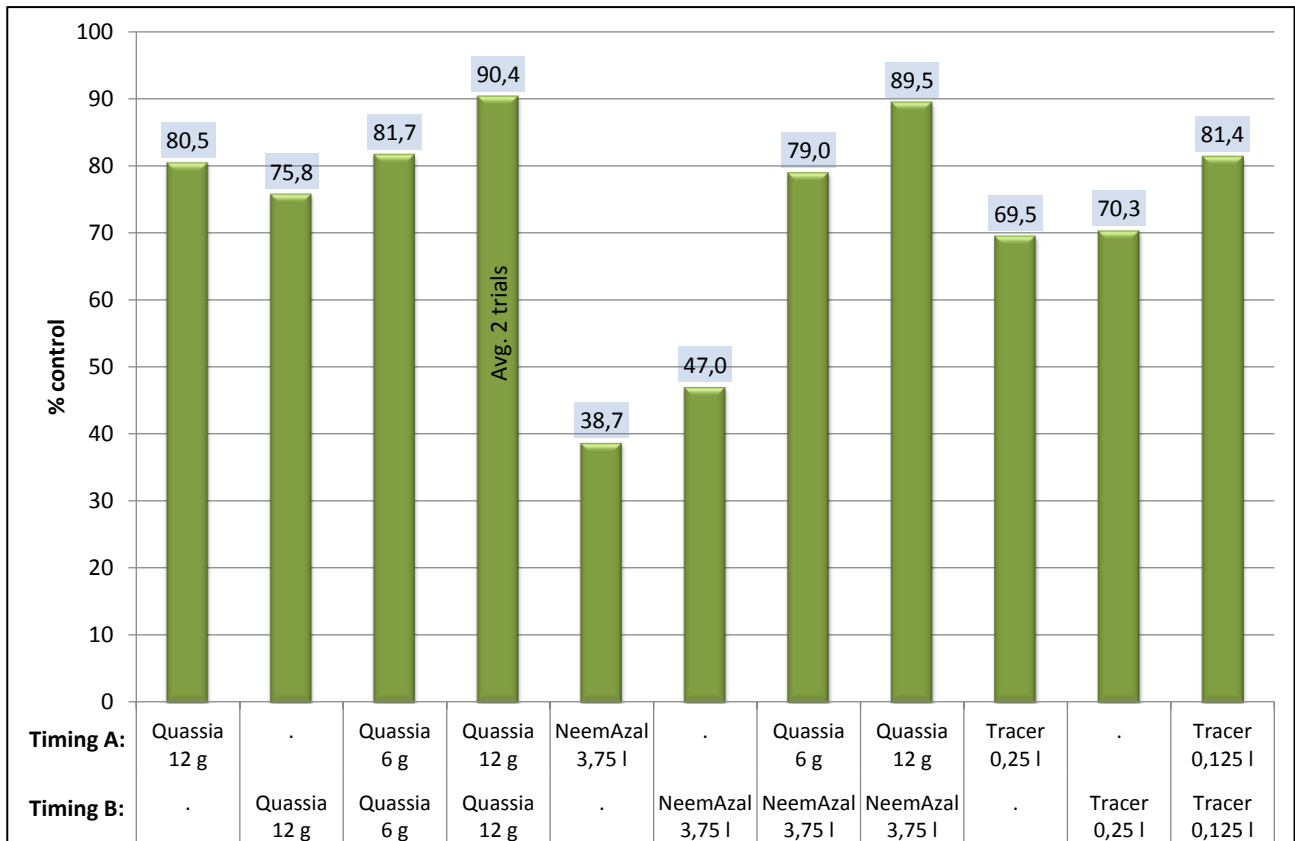
**Table 2. Trials 2012, % apples with attack of sawfly larvae**

Treatment	Dose rate kg/l/ha	Timing		Trial 2012-713-1	
		A	B	19 June – 22 DAT-2	9 June – 19 DAT-2
1. Untreated				33.2 a	32.4 a
2. Quassia-MD	1.14 kg	X		6.8 de	5.0 cd
3. Quassia-MD	1.14 kg		X	13.1 b-e	10.7 bcd
4. Quassia-MD	0.57 kg	X	X	11.6 cde	5.5 cd
5. Quassia-MD	1.14 kg	X	X	3.6 e	2.8 d
6. NeemAzal T/S	3.75 l	X		20.3 bc	16.4 b
7. NeemAzal T/S	3.75 l		X	21.9 b	14.3 bc
8. Quassia-MD NeemAzal T/S	0.57 kg 3.75 l	X	X	10.1 cde	7.2 cd
9. Quassia-MD NeemAzal T/S	1.14 kg 3.75 l	X	X	4.9 e	2.9 d
10. Tracer	0.25 l	X		12.2 cde	8.8 bcd
11. Tracer	0.25 l		X	16.6 bcd	6.2 cd
12. Tracer	0.25 l	X	X	10.6 cde	4.8 cd

The results of the trials, expressed as % reduction of apples with damage from sawfly larvae, are shown for individual trials in figure 1 and in figure 2 as average figures.



**Figure 1. % reduction of apple with sawfly damage, results from single trials**



**Figure 2. % reduction of apples with sawfly damage, average of 4 trials**

On average of the 4 trials conducted the best control was achieved with Quassia-MD. In these trials timing A was slightly better than timing B, and the same level of efficacy was reached with a split application of 2 times half dose rate. According to literature the sawfly larvae must ingest Quassia directly after hatching in order to achieve the maximum efficacy; therefore it is important that the hatching is monitored carefully so that the timing of the treatment is optimal. In case of doubt about the start of the hatching it may be useful to split the application.

The efficacy of Tracer was also at a satisfactory level, but the best effect was achieved with split application of 2 times half dose rate.

The efficacy of NeemAzal was insufficient, and the product is only interesting for control of apple sawfly if Quassia or Tracer is not available.

### Phytotoxicity

Phytotoxicity was assessed after the applications and at the assessment of larvae infestation of the fruits but no signs of phytotoxicity were found in any of the trials.

### Conclusion

From the result of these trials it is concluded that Quassia-MD is very effective for control of apple sawfly when applied at beginning of the hatching. Tracer is also effective, but the result indicates that split application is more effective than a single treatment. The efficacy of NeemAzal was insufficient, and this product is only interesting for control of apple sawfly if Quassia-MD or Tracer is not available.

**4. AOV Mean Tables**

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# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect	I Insect
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code	MABSD	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name	Apple	Apple	Apple	Apple	Apple
Part Rated	FRUIT -	FRUIT -	FRUIT -	FRUIT -	FRUIT -
Rating Date	03/06/2011	03/06/2011	03/06/2011	03/06/2011	03/06/2011
Rating Type	DAMAGE	PESINC	PESINC	CONTRO	CONTRO
Rating Unit	NUMBER	percent	percent	%UNCK	%UNCK
Sample Size, Unit	200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT
Footnote Number	1	2	2	3	3
Trt-Eval Interval	13 DA-B	13 DA-B	13 DA-B	13 DA-B	13 DA-B
ARM Action Codes		T1	TL[2]	TAB[1]	TA[4]
Trt No.	Treatment Name	Rate	Appl Unit	Code	
1	Untreated				30 a
2	Quassia-MD Trifolio S-forte	1,630 kg/ha 1,6 l/ha	A A		7 c
3	Quassia-MD Trifolio S-forte	1,630 kg/ha 1,6 l/ha	B B		4 c
4	Quassia-MD Trifolio S-forte Quassia-MD Trifolio S-forte	0,815 kg/ha 1,6 l/ha 0,815 kg/ha 1,6 l/ha	A A B B		5 c
5	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	A A		21 b
6	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	B B		10 c
7	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	0,815 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		5 c
8	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	1,630 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		2 c
9	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	A A		10 c
10	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	B B		6 c
11	Tracer Trifolio S-forte Tracer Trifolio S-forte	0,125 l/ha 1,6 l/ha 0,125 l/ha 1,6 l/ha	A A B B		4 c
LSD (P=.05)					6,0
Standard Deviation					4,1
CV					43,38
Bartlett's X2					26,246
P(Bartlett's X2)					0,003*
Replicate F					1,558
Replicate Prob(F)					0,2201
Treatment F					17,218
Treatment Prob(F)					0,0001
					2,98
					2,06
					43,38
					26,246
					0,003*
					1,558
					0,2201
					17,218
					0,0001
					0,22t
					17,97
					0,15t
					12,44
					25,41
					18,36
					8,797
					21,031
					0,551
					0,013*
					1,155
					2,428
					0,3432
					0,0848
					13,072
					20,432
					27,792
					0,0001
					11,80t
					8,17t
					14,75
					13,909
					0,126
					2,526
					0,0763
					27,792
					0,0001

**ARM Action Codes**  
 T1 = 100\*([C1]/200)  
 TL[2] = LOG([2]+ 1)  
 TAB[1] = Abbott (% of Untreated)[1]  
 TA[4] = Arcsine square root percent([4])

Footnote 1: Number of apples with sawfly damage  
 Footnote 2: % apples with damage from sawfly  
 Footnote 3: % control

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)  
 t=Mean descriptions are reported in transformed data units, and are not de-transformed.  
 Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:                  Investigator: Klaus Paaske  
                                  Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name	Apple	Apple	Apple	Apple
Part Rated	FRUIT -	FRUIT -	FRUIT -	FRUIT -
Rating Date	09/06/2011	09/06/2011	09/06/2011	09/06/2011
Rating Type	DAMAGE	PESINC	PESINC	CONTRO
Rating Unit	NUMBER	percent	percent	%UNCK
Sample Size, Unit	200 FRUIT	200 FRUIT	200 FRUIT	100 FRUIT
Footnote Number	1	2	2	3
Trt-Eval Interval	19 DA-B	19 DA-B	19 DA-B	19 DA-B
ARM Action Codes		T1	TL[2]	TAB[1]
Trt Treatment	Rate	Appl		
No. Name	Rate	Unit	Code	
1 Untreated			1	4
2 Quassia-MD	1,630 kg/ha	A	48 a	23,8 a
Trifolio S-forte	1,6 l/ha	A	6 c	2,8 c
3 Quassia-MD	1,630 kg/ha	B	6 c	2,8 c
Trifolio S-forte	1,6 l/ha	B	6 c	2,8 c
4 Quassia-MD	0,815 kg/ha	A	2 c	1,0 c
Trifolio S-forte	1,6 l/ha	A	2 c	1,0 c
Quassia-MD	0,815 kg/ha	B	2 c	0,6 e
Trifolio S-forte	1,6 l/ha	B	2 c	0,6 e
5 NeemAzal T/S	3,75 l/ha	A	29 b	14,5 b
Trifolio S-forte	1,6 l/ha	A	29 b	14,5 b
6 NeemAzal T/S	3,75 l/ha	B	29 b	14,6 b
Trifolio S-forte	1,6 l/ha	B	29 b	14,6 b
7 Quassia-MD	0,815 kg/ha	A	6 c	2,9 c
Trifolio S-forte	1,6 l/ha	A	6 c	2,9 c
NeemAzal T/S	3,75 l/ha	B	6 c	2,9 c
Trifolio S-forte	1,6 l/ha	B	6 c	2,9 c
8 Quassia-MD	1,630 kg/ha	A	4 c	1,9 c
Trifolio S-forte	1,6 l/ha	A	4 c	1,9 c
NeemAzal T/S	3,75 l/ha	B	4 c	1,9 c
Trifolio S-forte	1,6 l/ha	B	4 c	1,9 c
9 Tracer	0,25 l/ha	A	13 c	6,4 c
Trifolio S-forte	1,6 l/ha	A	13 c	6,4 c
10 Tracer	0,25 l/ha	B	12 c	6,2 c
Trifolio S-forte	1,6 l/ha	B	12 c	6,2 c
11 Tracer	0,125 l/ha	A	6 c	2,8 c
Trifolio S-forte	1,6 l/ha	A	6 c	2,8 c
Tracer	0,125 l/ha	B	6 c	2,8 c
Trifolio S-forte	1,6 l/ha	B	6 c	2,8 c
LSD (P=.05)			8,7	4,33
Standard Deviation			6,0	3,00
CV			41,54	41,54
Bartlett's X2			40,272	40,272
P(Bartlett's X2)			0,001*	0,001*
Replicate F			2,998	2,998
Replicate Prob(F)			0,0462	0,0462
Treatment F			23,415	23,415
Treatment Prob(F)			0,0001	0,0001

### ARM Action Codes

T1 = 100\*([C1]/200)  
 TL[2] = LOG([I2]+ 1)  
 TAB[1] = Abbott (% of Untreated)[1]

Footnote 1: Number of apples with sawfay damage

Footnote 2: % apples with damage from sawfly

Footnote 3: % control

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

t=Mean descriptions are reported in transformed data units, and are not de-transformed.

Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-1      Protocol ID: 2012-713  
 Location: Henning Bæk      Study Director: Klaus Paaske  
 Project ID:                      Investigator: Klaus Paaske  
    Sponsor Contact: Project FruitGrowth

Pest Type		I Insect	I Insect	I Insect	I Insect
Pest Code		HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name		Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name		Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code		MABSD	MABSD	MABSD	MABSD
Crop Scientific Name		Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name		Apple	Apple	Apple	Apple
Rating Date		19/06/2012	19/06/2012	19/06/2012	19/06/2012
Rating Type		COUNT	COUNT	PESINC	CONTRO
Rating Unit		NUMBER	NUMBER	percent	%UNCK
Sample Size, Unit		6 TREE	6 TREE	6 TREE	6 TREE
Footnote Number		3	6	7	8
Trt-Eval Interval		26 DA-A	26 DA-A	26 DA-A	26 DA-A
ARM Action Codes		T1	T2	T3	TAB[7]
Trt No.	Treatment Name	Rate	Appl Unit	Code	
1	Untreated				3
2	Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha	A A		6
3	Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha	B B		7
4	Quassia-MD Trifolio S-forte Quassia-MD Trifolio S-forte	0,57 kg/ha 1,6 l/ha 0,57 kg/ha 1,6 l/ha	A A B B		8
5	Quassia-MD Trifolio S-forte Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha 1,14 kg/ha 1,6 l/ha	A A B B		
6	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	A A		
7	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	B B		
8	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	0,57 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		
9	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	1,14 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		
10	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	A A		
11	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	B B		
12	Tracer Trifolio S-forte Tracer Trifolio S-forte	0,125 l/ha 1,6 l/ha 0,125 l/ha 1,6 l/ha	A A B B		
LSD (P=.05)		32,92		6,05	6,87
Standard Deviation		22,80		4,19	4,76
CV		37,59		50,05	34,61
Bartlett's X2		17,081		14,516	12,14
P(Bartlett's X2)		0,106		0,206	0,353
Replicate F		4,525		4,748	0,773
Replicate Prob(F)		0,0092		0,0073	0,5174
Treatment F		0,403		4,229	12,178
Treatment Prob(F)		0,9447		0,0006	0,0001

### ARM Action Codes

T1 = [C1]+[C2]  
 T2 = [C4]+[C5]  
 T3 = 100\*([C6]/[C3])  
 TAB[7] = Abbott (% of Untreated)[7]

Footnote 3: Total number of apples per plot  
 Footnote 6: Total number of apples with sawfly damage  
 Footnote 7: % apples with damage from sawfly  
 Footnote 8: % control

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-2      Protocol ID: 2012-713  
 Location: Poul Rytter      Study Director: Klaus Paaske  
 Project ID:                      Investigator: Klaus Paaske  
    Sponsor Contact: Project FruitGrowth

Pest Type		I Insect	I Insect	I Insect	I Insect
Pest Code		HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name		Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name		Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code		MABSD	MABSD	MABSD	MABSD
Crop Scientific Name		Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name		Apple	Apple	Apple	Apple
Rating Date		19/06/2012	19/06/2012	19/06/2012	19/06/2012
Rating Type		COUNT	COUNT	PESINC	CONTRO
Rating Unit		NUMBER	NUMBER	percent	%UNCK
Sample Size, Unit		6 TREE	6 TREE	6 TREE	6 TREE
Footnote Number		1	2	3	4
Trt-Eval Interval		26 DA-A	26 DA-A	26 DA-A	26 DA-A
ARM Action Codes		T1	T2	T3	TAB[7]
Trt No.	Treatment Name	Rate	Appl Unit	Code	
1	Untreated				3
2	Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha	A A		6
3	Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha	B B		7
4	Quassia-MD Trifolio S-forte Quassia-MD Trifolio S-forte	0,57 kg/ha 1,6 l/ha 0,57 kg/ha 1,6 l/ha	A A B B		8
5	Quassia-MD Trifolio S-forte Quassia-MD Trifolio S-forte	1,14 kg/ha 1,6 l/ha 1,14 kg/ha 1,6 l/ha	A A B B		
6	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	A A		
7	NeemAzal T/S Trifolio S-forte	3,75 l/ha 1,6 l/ha	B B		
8	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	0,57 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		
9	Quassia-MD Trifolio S-forte NeemAzal T/S Trifolio S-forte	1,14 kg/ha 1,6 l/ha 3,75 l/ha 1,6 l/ha	A A B B		
10	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	A A		
11	Tracer Trifolio S-forte	0,25 l/ha 1,6 l/ha	B B		
12	Tracer Trifolio S-forte Tracer Trifolio S-forte	0,125 l/ha 1,6 l/ha 0,125 l/ha 1,6 l/ha	A A B B		
LSD (P=.05)		65,67	8,61	6,35	18,04
Standard Deviation		45,48	5,97	4,40	12,49
CV		32,67	49,2	45,12	17,95
Bartlett's X2		9,569	17,638	17,879	17,468
P(Bartlett's X2)		0,57	0,09	0,084	0,065
Replicate F		13,570	4,789	0,258	0,720
Replicate Prob(F)		0,0001	0,0070	0,8549	0,5471
Treatment F		0,855	8,278	14,259	16,560
Treatment Prob(F)		0,5898	0,0001	0,0001	0,0001

### ARM Action Codes

T1 = [1]+[2]  
 T2 = [4]+[5]  
 T3 = 100\*([6]/[3])  
 TAB[7] = Abbott (% of Untreated)[7]

Footnote 1: Total number of apples per plot  
 Footnote 2: Total number of apples with sawfly damage  
 Footnote 3: % apples with damage from sawfly  
 Footnote 4: % control



## 5. PLOT DATA SUMMARY

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# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect
Pest Code	HOPLTE
Pest Scientific Name	Hoplocampa tes>
Pest Name	Apple fruit sa>
Crop Code	MABSD
Crop Scientific Name	Malus domestica
Crop Name	Apple
Part Rated	FRUIT -
Rating Date	03/06/2011
Rating Type	DAMAGE
Rating Unit	NUMBER
Sample Size, Unit	200 FRUIT
Footnote Number	1
Trt-Eval Interval	13 DA-B
ARM Action Codes	

Trt	Treatment	Rate	Appl	
No.	Name	Rate	Unit	Code Plot
				1
1	Untreated			109 25
				109 27
				109 14
				109 17
				109 17
				204 38
				204 36
				204 31
				204 19
				204 53
				302 54
				302 26
				302 27
				302 32
				302 19
				408 32
				408 28
				408 45
				408 31
				408 36
				Mean = 30
2	Quassia-MD	1,630 kg/ha	A	101 12
	Trifolio S-forte	1,6 l/ha	A	101 5
				101 13
				101 18
				101 18
				206 5
				206 6
				206 3
				206 8
				206 8
				309 0
				309 8
				309 3
				309 9
				309 12
				404 0
				404 10
				404 0
				404 2
				404 7
				Mean = 7
3	Quassia-MD	1,630 kg/ha	B	103 2
	Trifolio S-forte	1,6 l/ha	B	103 5
				103 0
				103 4
				103 8
				207 0
				207 4
				207 4
				207 5
				207 5
				311 0
				311 0
				311 4
				311 9
				311 7
				402 0
				402 6
				402 2
				402 1
				402 5
				Mean = 4

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type				I Insect
Pest Code				HOPLTE
Pest Scientific Name				Hoplocampa tes>
Pest Name				Apple fruit sa>
Crop Code				MABSD
Crop Scientific Name				Malus domestica
Crop Name				Apple
Part Rated				FRUIT -
Rating Date				03/06/2011
Rating Type				DAMAGE
Rating Unit				NUMBER
Sample Size, Unit				200 FRUIT
Footnote Number				1
Trt-Eval Interval				13 DA-B
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot		1
4 Quassia-MD	0,815 kg/ha	A 107		2
Trifolio S-forte	1,6 l/ha	A 107		4
Quassia-MD	0,815 kg/ha	B 107		4
Trifolio S-forte	1,6 l/ha	B 107		5
		107		0
		201		0
		201		3
		201		6
		201		11
		201		6
		303		4
		303		6
		303		2
		303		5
		303		2
		406		4
		406		12
		406		5
		406		8
		406		7
		Mean =		5
5 NeemAzal T/S	3,75 l/ha	A 110		21
Trifolio S-forte	1,6 l/ha	A 110		18
		110		5
		110		14
		110		13
		208		16
		208		3
		208		2
		208		18
		208		25
		304		34
		304		20
		304		17
		304		36
		304		19
		401		33
		401		17
		401		38
		401		35
		401		32
		Mean =		21
6 NeemAzal T/S	3,75 l/ha	B 105		8
Trifolio S-forte	1,6 l/ha	B 105		7
		105		22
		105		23
		105		2
		210		2
		210		3
		210		13
		210		10
		210		11
		308		14
		308		12
		308		11
		308		14
		308		12
		405		18
		405		7
		405		6
		405		4
		405		2
		Mean =		10

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type				I Insect
Pest Code				HOPLTE
Pest Scientific Name				Hoplocampa tes>
Pest Name				Apple fruit sa>
Crop Code				MABSD
Crop Scientific Name				Malus domestica
Crop Name				Apple
Part Rated				FRUIT -
Rating Date				03/06/2011
Rating Type				DAMAGE
Rating Unit				NUMBER
Sample Size, Unit				200 FRUIT
Footnote Number				1
Trt-Eval Interval				13 DA-B
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot		1
7 Quassia-MD	0,815 kg/ha	A 111		6
Trifolio S-forte	1,6 l/ha	A 111		11
NeemAzal T/S	3,75 l/ha	B 111		5
Trifolio S-forte	1,6 l/ha	B 111		0
		111		1
		203		0
		203		9
		203		6
		203		0
		203		2
		307		3
		307		1
		307		9
		307		2
		307		1
		410		2
		410		9
		410		4
		410		23
		410		9
		Mean =		5
8 Quassia-MD	1,630 kg/ha	A 104		2
Trifolio S-forte	1,6 l/ha	A 104		1
NeemAzal T/S	3,75 l/ha	B 104		0
Trifolio S-forte	1,6 l/ha	B 104		0
		104		7
		202		4
		202		11
		202		1
		202		4
		202		2
		305		0
		305		3
		305		0
		305		0
		305		0
		409		1
		409		6
		409		0
		409		0
		409		4
		Mean =		2
9 Tracer	0,25 l/ha	A 106		5
Trifolio S-forte	1,6 l/ha	A 106		2
		106		3
		106		5
		106		2
		211		3
		211		5
		211		15
		211		15
		211		23
		301		8
		301		13
		301		9
		301		10
		301		14
		403		9
		403		15
		403		12
		403		21
		403		7
		Mean =		10

## Aarhus University, Department of Agroecology, Flakkebjerg

### Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect			
Pest Code	HOPLTE			
Pest Scientific Name	Hoplocampa tes>			
Pest Name	Apple fruit sa>			
Crop Code	MABSD			
Crop Scientific Name	Malus domestica			
Crop Name	Apple			
Part Rated	FRUIT -			
Rating Date	03/06/2011			
Rating Type	DAMAGE			
Rating Unit	NUMBER			
Sample Size, Unit	200 FRUIT			
Footnote Number	1			
Trt-Eval Interval	13 DA-B			
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot	1	
10 Tracer	0,25 l/ha	B 102	8	
Trifolio S-forte	1,6 l/ha	B 102	0	
		102	4	
		102	3	
		102	17	
		209	2	
		209	0	
		209	13	
		209	1	
		209	14	
		310	5	
		310	1	
		310	0	
		310	8	
		310	10	
		407	3	
		407	4	
		407	11	
		407	14	
		407	9	
		Mean =	6	
11 Tracer	0,125 l/ha	A 108	3	
Trifolio S-forte	1,6 l/ha	A 108	4	
Tracer	0,125 l/ha	B 108	7	
Trifolio S-forte	1,6 l/ha	B 108	0	
		108	5	
		205	3	
		205	3	
		205	8	
		205	2	
		205	0	
		306	0	
		306	2	
		306	3	
		306	1	
		306	0	
		411	12	
		411	7	
		411	18	
		411	2	
		411	4	
		Mean =	4	

Footnote 1: Number of apples with sawfly damage

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type		I Insect	I Insect	I Insect	I Insect	I Insect
Pest Code		HOPLTE	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name		Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name		Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code		MABSD	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name		Malus domestica	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name		Apple	Apple	Apple	Apple	Apple
Part Rated		FRUIT -	FRUIT -	FRUIT -	FRUIT -	FRUIT -
Rating Date		03/06/2011	03/06/2011	03/06/2011	03/06/2011	03/06/2011
Rating Type		DAMAGE	PESINC	PESINC	CONTRO	CONTRO
Rating Unit		NUMBER	percent	percent	%UNCK	%UNCK
Sample Size, Unit		200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT
Footnote Number		1	2	2	3	3
Trt-Eval Interval		13 DA-B	13 DA-B	13 DA-B	13 DA-B	13 DA-B
ARM Action Codes			T1	TL[2]	TAB[1]	TA[4]
Trt Treatment	Rate Appl					
No. Name	Rate Unit Code Plot	1	2	3	4	5
1 Untreated	109	20	10,0	1,0	0,0	0,0
	204	35	17,7	1,3	0,0	0,0
	302	32	15,8	1,2	0,0	0,0
	408	34	17,2	1,3	0,0	0,0
	Mean =	30	15,2	14,3t	0,0	0,0t
2 Quassia-MD 1,630 kg/ha A	101	13	6,6	0,9	34,0	35,7
Trifolio S-forte 1,6 l/ha A	206	6	3,0	0,6	83,1	65,7
	309	6	3,2	0,5	79,7	63,3
	404	4	1,9	0,3	89,0	70,6
	Mean =	7	3,7	2,8t	71,4	73,2t
3 Quassia-MD 1,630 kg/ha B	103	4	1,9	0,4	81,0	64,2
Trifolio S-forte 1,6 l/ha B	207	4	1,8	0,4	89,8	71,4
	311	4	2,0	0,4	87,3	69,2
	402	3	1,4	0,3	91,9	73,4
	Mean =	4	1,8	1,4t	87,5	87,8t
4 Quassia-MD 0,815 kg/ha A	107	3	1,5	0,4	85,0	67,2
Trifolio S-forte 1,6 l/ha A	201	5	2,6	0,5	85,3	67,5
Quassia-MD 0,815 kg/ha B	303	4	1,9	0,4	88,0	69,7
Trifolio S-forte 1,6 l/ha B	406	7	3,6	0,6	79,1	62,8
	Mean =	5	2,4	2,0t	84,3	84,5t
5 NeemAzal T/S 3,75 l/ha A	110	14	7,1	0,9	29,0	32,6
Trifolio S-forte 1,6 l/ha A	208	13	6,4	0,8	63,8	53,0
	304	25	12,6	1,1	20,3	26,7
	401	31	15,5	1,2	9,9	18,3
	Mean =	21	10,4	8,7t	30,7	29,1t
6 NeemAzal T/S 3,75 l/ha B	105	12	6,2	0,8	38,0	38,1
Trifolio S-forte 1,6 l/ha B	210	8	3,9	0,6	78,0	62,0
	308	13	6,3	0,9	60,1	50,8
	405	7	3,7	0,6	78,5	62,4
	Mean =	10	5,0	4,2t	63,6	64,3t
7 Quassia-MD 0,815 kg/ha A	111	5	2,3	0,4	77,0	61,3
Trifolio S-forte 1,6 l/ha A	203	3	1,7	0,3	90,4	71,9
NeemAzal T/S 3,75 l/ha B	307	3	1,6	0,4	89,9	71,4
Trifolio S-forte 1,6 l/ha B	410	9	4,7	0,7	72,7	58,5
	Mean =	5	2,6	1,8t	82,5	83,2t
8 Quassia-MD 1,630 kg/ha A	104	2	1,0	0,2	90,0	71,6
Trifolio S-forte 1,6 l/ha A	202	4	2,2	0,4	87,6	69,4
NeemAzal T/S 3,75 l/ha B	305	1	0,3	0,1	98,1	82,1
Trifolio S-forte 1,6 l/ha B	409	2	1,1	0,3	93,6	75,4
	Mean =	2	1,2	0,8t	92,3	92,9t
9 Tracer 0,25 l/ha A	106	3	1,7	0,4	83,0	65,6
Trifolio S-forte 1,6 l/ha A	211	12	6,1	0,8	65,5	54,1
	301	11	5,4	0,8	65,8	54,2
	403	13	6,4	0,8	62,8	52,4
	Mean =	10	4,9	4,1t	69,3	69,7t

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2      Protocol ID: 2011-710  
 Location: Allesø      Study Director: Klaus Paaske  
 Project ID:      Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect	I Insect
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code	MABSD	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name	Apple	Apple	Apple	Apple	Apple
Part Rated	FRUIT -	FRUIT -	FRUIT -	FRUIT -	FRUIT -
Rating Date	03/06/2011	03/06/2011	03/06/2011	03/06/2011	03/06/2011
Rating Type	DAMAGE	PESINC	PESINC	CONTRO	CONTRO
Rating Unit	NUMBER	percent	percent	%UNCK	%UNCK
Sample Size, Unit	200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT	200 FRUIT
Footnote Number	1	2	2	3	3
Trt-Eval Interval	13 DA-B	13 DA-B	13 DA-B	13 DA-B	13 DA-B
ARM Action Codes		T1	TL[2]	TAB[1]	TA[4]
Trt Treatment	Rate	Appl			
No. Name	Rate	Unit	Code	Plot	
				1	2
10 Tracer	0,25 l/ha	B	102	6	3,2
Trifolio S-forte	1,6 l/ha	B	209	6	3,0
			310	5	2,4
			407	8	4,1
			Mean =	6	3,2
11 Tracer	0,125 l/ha	A	108	4	1,9
Trifolio S-forte	1,6 l/ha	A	205	3	1,6
Tracer	0,125 l/ha	B	306	1	0,6
Trifolio S-forte	1,6 l/ha	B	411	9	4,3
			Mean =	4	2,1
					0,5
					68,0
					83,1
					84,8
					76,2
					2,3t
					78,0
					78,3t
					81,0
					91,0
					96,2
					75,0
					1,5t
					85,8
					87,0t

**ARM Action Codes**  
 T1 = 100\*([C1]/200)  
 TL[2] = LOG([2]+ 1)  
 TAB[1] = Abbott (% of Untreated)[1]  
 TA[4] = Arcsine square root percent([4])

Footnote 1: Number of apples with sawfly damage  
 Footnote 2: % apples with damage from sawfly  
 Footnote 3: % control

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:              Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect		
Pest Code	HOPLTE		
Pest Scientific Name	Hoplocampa tes>		
Pest Name	Apple fruit sa>		
Crop Code	MABSD		
Crop Scientific Name	Malus domestica		
Crop Name	Apple		
Part Rated	FRUIT -		
Rating Date	09/06/2011		
Rating Type	DAMAGE		
Rating Unit	NUMBER		
Sample Size, Unit	200 FRUIT		
Footnote Number	1		
Trt-Eval Interval	19 DA-B		
ARM Action Codes			
Trt Treatment	Rate	Appl	
No. Name	Rate	Unit	Code Plot
			1
1 Untreated	105		109
	105		58
	105		72
	105		71
	105		30
	207		45
	207		48
	207		58
	207		27
	207		38
	302		40
	302		22
	302		35
	302		54
	302		32
	407		39
	407		48
	407		21
	407		42
	407		61
	Mean =		48
2 Quassia-MD	1,630 kg/ha	A	107
Trifolio S-forte	1,6 l/ha	A	107
			107
			107
			107
			202
			202
			202
			202
			202
			202
			306
			306
			306
			306
			306
			411
			411
			411
			411
			Mean =
			6
3 Quassia-MD	1,630 kg/ha	B	103
Trifolio S-forte	1,6 l/ha	B	103
			103
			103
			103
			206
			206
			206
			206
			206
			307
			307
			307
			307
			307
			403
			403
			403
			403
			403
			403
			Mean =
			6



# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:                  Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type				I Insect
Pest Code				HOPLTE
Pest Scientific Name				Hoplocampa tes>
Pest Name				Apple fruit sa>
Crop Code				MABSD
Crop Scientific Name				Malus domestica
Crop Name				Apple
Part Rated				FRUIT -
Rating Date				09/06/2011
Rating Type				DAMAGE
Rating Unit				NUMBER
Sample Size, Unit				200 FRUIT
Footnote Number				1
Trt-Eval Interval				19 DA-B
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot		1
4 Quassia-MD	0,815 kg/ha	A 110		9
Trifolio S-forte	1,6 l/ha	A 110		0
Quassia-MD	0,815 kg/ha	B 110		4
Trifolio S-forte	1,6 l/ha	B 110		0
		110		0
		208		7
		208		0
		208		0
		208		0
		208		0
		208		0
		301		0
		301		5
		301		0
		301		7
		301		4
		410		0
		410		0
		410		2
		410		2
		410		0
		Mean =		2
5 NeemAzal T/S	3,75 l/ha	A 102		33
Trifolio S-forte	1,6 l/ha	A 102		26
		102		30
		102		45
		102		20
		210		36
		210		33
		210		24
		210		42
		210		32
		304		13
		304		33
		304		25
		304		18
		304		8
		409		45
		409		32
		409		33
		409		22
		409		28
		Mean =		29
6 NeemAzal T/S	3,75 l/ha	B 101		26
Trifolio S-forte	1,6 l/ha	B 101		24
		101		23
		101		24
		101		42
		205		38
		205		71
		205		56
		205		29
		205		28
		308		35
		308		36
		308		42
		308		17
		308		22
		401		13
		401		10
		401		12
		401		14
		401		20
		Mean =		29

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:                  Investigator: Klaus Paaske  
                                  Sponsor Contact: Project FruitGrowth

Pest Type				I Insect
Pest Code				HOPLTE
Pest Scientific Name				Hoplocampa tes>
Pest Name				Apple fruit sa>
Crop Code				MABSD
Crop Scientific Name				Malus domestica
Crop Name				Apple
Part Rated				FRUIT -
Rating Date				09/06/2011
Rating Type				DAMAGE
Rating Unit				NUMBER
Sample Size, Unit	200 FRUIT			
Footnote Number				1
Trt-Eval Interval				19 DA-B
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot		1
7 Quassia-MD	0,815 kg/ha	A 104		9
Trifolio S-forte	1,6 l/ha	A 104		12
NeemAzal T/S	3,75 l/ha	B 104		8
Trifolio S-forte	1,6 l/ha	B 104		6
		104		4
		211		5
		211		0
		211		6
		211		2
		211		11
		309		4
		309		16
		309		0
		309		5
		309		4
		404		9
		404		6
		404		3
		404		0
		404		4
		Mean =		6
8 Quassia-MD	1,630 kg/ha	A 109		4
Trifolio S-forte	1,6 l/ha	A 109		6
NeemAzal T/S	3,75 l/ha	B 109		7
Trifolio S-forte	1,6 l/ha	B 109		6
		109		5
		204		0
		204		3
		204		8
		204		0
		204		2
		303		2
		303		4
		303		2
		303		11
		303		0
		406		6
		406		3
		406		1
		406		0
		406		6
		Mean =		4
9 Tracer	0,25 l/ha	A 111		12
Trifolio S-forte	1,6 l/ha	A 111		19
		111		33
		111		22
		111		18
		201		16
		201		11
		201		14
		201		14
		201		12
		310		15
		310		3
		310		3
		310		10
		310		8
		408		6
		408		11
		408		8
		408		12
		408		7
		Mean =		13

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:              Investigator: Klaus Paaske  
 Sponsor Contact: Project FruitGrowth

Pest Type	I Insect			
Pest Code	HOPLTE			
Pest Scientific Name	Hoplocampa tes>			
Pest Name	Apple fruit sa>			
Crop Code	MABSD			
Crop Scientific Name	Malus domestica			
Crop Name	Apple			
Part Rated	FRUIT -			
Rating Date	09/06/2011			
Rating Type	DAMAGE			
Rating Unit	NUMBER			
Sample Size, Unit	200 FRUIT			
Footnote Number	1			
Trt-Eval Interval	19 DA-B			
ARM Action Codes				
Trt Treatment	Rate	Appl		
No. Name	Rate Unit	Code Plot	1	
10 Tracer	0,25 l/ha	B 106	29	
Trifolio S-forte	1,6 l/ha	B 106	22	
		106	9	
		106	12	
		106	19	
		209	2	
		209	14	
		209	7	
		209	20	
		209	10	
		311	3	
		311	2	
		311	21	
		311	12	
		311	11	
		405	2	
		405	10	
		405	14	
		405	18	
		405	11	
		Mean =	12	
11 Tracer	0,125 l/ha	A 108	15	
Trifolio S-forte	1,6 l/ha	A 108	8	
Tracer	0,125 l/ha	B 108	1	
Trifolio S-forte	1,6 l/ha	B 108	4	
		108	0	
		203	5	
		203	8	
		203	2	
		203	7	
		203	0	
		305	16	
		305	13	
		305	6	
		305	3	
		305	4	
		402	3	
		402	0	
		402	3	
		402	0	
		402	14	
		Mean =	6	

Footnote 1: Number of apples with sawfly damage

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:                  Investigator: Klaus Paaske  
                                  Sponsor Contact: Project FruitGrowth

Pest Type	I Insect			
Pest Code	HOPLTE			
Pest Scientific Name	Hoplocampa tes>			
Pest Name	Apple fruit sa>			
Crop Code	MABSD			
Crop Scientific Name	Malus domestica			
Crop Name	Apple			
Part Rated	FRUIT -			
Rating Date	09/06/2011			
Rating Type	DAMAGE			
Rating Unit	NUMBER			
Sample Size, Unit	200 FRUIT			
Footnote Number	1			
Trt-Eval Interval	19 DA-B			
ARM Action Codes	T1			
Trt Treatment	Rate	Appl		
No. Name	Rate	Unit	Code	Plot
				1
				2
				3
				4
1 Untreated				68
				34,0
				1,5
				0,0
				207
				43
				21,6
				1,3
				302
				37
				18,3
				1,3
				407
				42
				21,1
				1,3
				0,0
				0,0
				Mean =
				48
				23,8
				22,0t
				0,0
2 Quassia-MD	1,630 kg/ha	A	107	5
Trifolio S-forte	1,6 l/ha	A	202	7
			306	4
			411	5
				2,4
				3,7
				0,6
				82,9
				0,5
				88,0
				0,5
				87,2
				Mean =
				6
				2,8
				2,4t
				87,7
3 Quassia-MD	1,630 kg/ha	B	103	10
Trifolio S-forte	1,6 l/ha	B	206	4
			307	6
			403	2
				5,2
				2,2
				0,4
				84,7
				2,8
				89,8
				1,0
				0,2
				84,7
				0,2
				95,3
				Mean =
				6
				2,8
				1,9t
				88,6
4 Quassia-MD	0,815 kg/ha	A	110	3
Trifolio S-forte	1,6 l/ha	A	208	1
Quassia-MD	0,815 kg/ha	B	301	3
Trifolio S-forte	1,6 l/ha	B	410	1
				1,3
				0,7
				0,1
				96,2
				0,1
				96,8
				0,3
				91,3
				0,4
				0,1
				98,1
				Mean =
				2
				1,0
				0,6t
				95,6
5 NeemAzal T/S	3,75 l/ha	A	102	31
Trifolio S-forte	1,6 l/ha	A	210	33
			304	19
			409	32
				15,4
				16,7
				1,2
				22,7
				1,2
				47,0
				1,2
				24,2
				Mean =
				29
				14,5
				13,6t
				37,1
6 NeemAzal T/S	3,75 l/ha	B	101	28
Trifolio S-forte	1,6 l/ha	B	205	44
			308	30
			401	14
				13,9
				22,2
				1,3
				0,0
				15,2
				1,2
				16,9
				0,9
				67,3
				Mean =
				29
				14,6
				13,0t
				35,8
7 Quassia-MD	0,815 kg/ha	A	104	8
Trifolio S-forte	1,6 l/ha	A	211	5
NeemAzal T/S	3,75 l/ha	B	309	6
Trifolio S-forte	1,6 l/ha	B	404	4
				3,9
				2,4
				0,5
				88,5
				0,5
				88,9
				0,5
				84,2
				0,4
				89,6
				Mean =
				6
				2,9
				2,3t
				87,8
8 Quassia-MD	1,630 kg/ha	A	109	6
Trifolio S-forte	1,6 l/ha	A	204	3
NeemAzal T/S	3,75 l/ha	B	303	4
Trifolio S-forte	1,6 l/ha	B	406	3
				2,8
				1,3
				0,3
				91,8
				1,9
				0,4
				89,6
				1,6
				0,4
				92,4
				Mean =
				4
				1,9
				1,5t
				91,9
9 Tracer	0,25 l/ha	A	111	21
Trifolio S-forte	1,6 l/ha	A	201	13
			310	8
			408	9
				10,4
				6,7
				0,9
				69,4
				0,9
				69,0
				0,6
				78,7
				0,7
				79,1
				Mean =
				13
				6,4
				5,6t
				74,1

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3      Protocol ID: 2011-710  
 Location: Harndrup      Study Director: Klaus Paaske  
 Project ID:                  Investigator: Klaus Paaske  
                                  Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name	Apple	Apple	Apple	Apple
Part Rated	FRUIT -	FRUIT -	FRUIT -	FRUIT -
Rating Date	09/06/2011	09/06/2011	09/06/2011	09/06/2011
Rating Type	DAMAGE	PESINC	PESINC	CONTRO
Rating Unit	NUMBER	percent	percent	%UNCK
Sample Size, Unit	200 FRUIT	200 FRUIT	200 FRUIT	100 FRUIT
Footnote Number	1	2	2	3
Trt-Eval Interval	19 DA-B	19 DA-B	19 DA-B	19 DA-B
ARM Action Codes		T1	TL[2]	TAB[1]
Trt Treatment	Rate	Appl		
No. Name	Rate	Unit	Code	Plot
				1
				2
				3
				4
10 Tracer	0,25 l/ha	B	106	18
Trifolio S-forte	1,6 l/ha	B	209	11
			311	10
			405	11
				9,1
				5,3
				4,9
				5,5
				1,0
				0,7
				0,7
				0,8
				73,2
				75,5
				73,2
				73,9
				74,0
				6,2
				5,1t
				74,0
11 Tracer	0,125 l/ha	A	108	6
Trifolio S-forte	1,6 l/ha	A	203	4
Tracer	0,125 l/ha	B	305	8
Trifolio S-forte	1,6 l/ha	B	402	4
				2,8
				2,2
				4,2
				2,0
				0,5
				0,4
				0,7
				0,3
				91,8
				89,8
				77,0
				90,5
				87,3

### ARM Action Codes

T1 = 100\*([C1]/200)  
 TL[2] = LOG([2]+ 1)  
 TAB[1] = Abbott (% of Untreated)[1]

Footnote 1: Number of apples with sawfay damage  
 Footnote 2: % apples with damage from sawfly  
 Footnote 3: % control

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-1      Protocol ID: 2012-713  
 Location: Henning Bæk      Study Director: Klaus Paaske  
 Project ID:                      Investigator: Klaus Paaske  
    Sponsor Contact: Project FruitGrowth

Pest Type		I Insect	I Insect	I Insect	I Insect	
Pest Code		HOPLTE	HOPLTE	HOPLTE	HOPLTE	
Pest Scientific Name		Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	
Pest Name		Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	
Crop Code		MABSD	MABSD	MABSD	MABSD	
Crop Scientific Name		Malus domestica	Malus domestica	Malus domestica	Malus domestica	
Crop Name		Apple	Apple	Apple	Apple	
Rating Date		19/06/2012	19/06/2012	19/06/2012	19/06/2012	
Rating Type		COUNT	COUNT	PESINC	CONTRO	
Rating Unit		NUMBER	NUMBER	percent	%UNCK	
Sample Size, Unit		6 TREE	6 TREE	6 TREE	6 TREE	
Footnote Number		3	6	7	8	
Trt-Eval Interval		26 DA-A	26 DA-A	26 DA-A	26 DA-A	
ARM Action Codes		T1	T2	T3	TAB[7]	
Trt Treatment	Rate Appl					
No. Name	Rate Unit Code Plot	3	6	7	8	
1 Untreated		103	75,0	23,0	30,7	0,0
		210	41,0	12,0	29,3	0,0
		305	63,0	21,0	33,3	0,0
		410	48,0	19,0	39,6	0,0
	Mean =		56,8	18,8	33,2	0,0
2 Quassia-MD	1,14 kg/ha A	106	58,0	4,0	6,9	77,5
Trifolio S-forte	1,6 l/ha A	206	55,0	4,0	7,3	75,2
		301	56,0	5,0	8,9	73,2
		411	50,0	2,0	4,0	89,9
	Mean =		54,8	3,8	6,8	78,9
3 Quassia-MD	1,14 kg/ha B	107	68,0	14,0	20,6	32,9
Trifolio S-forte	1,6 l/ha B	202	33,0	2,0	6,1	79,3
		312	45,0	6,0	13,3	60,0
		409	89,0	11,0	12,4	68,8
	Mean =		58,8	8,3	13,1	60,2
4 Quassia-MD	0,57 kg/ha A	108	59,0	6,0	10,2	66,8
Trifolio S-forte	1,6 l/ha A	201	45,0	5,0	11,1	62,0
Quassia-MD	0,57 kg/ha B	309	48,0	6,0	12,5	62,5
Trifolio S-forte	1,6 l/ha B	408	72,0	9,0	12,5	68,4
	Mean =		56,0	6,5	11,6	64,9
5 Quassia-MD	1,14 kg/ha A	110	128,0	8,0	6,3	79,6
Trifolio S-forte	1,6 l/ha A	208	26,0	0,0	0,0	100,0
Quassia-MD	1,14 kg/ha B	304	94,0	5,0	5,3	84,0
Trifolio S-forte	1,6 l/ha B	406	69,0	2,0	2,9	92,7
	Mean =		79,3	3,8	3,6	89,1
6 NeemAzal T/S	3,75 l/ha A	111	74,0	16,0	21,6	29,5
Trifolio S-forte	1,6 l/ha A	205	55,0	10,0	18,2	37,9
		310	41,0	10,0	24,4	26,8
		412	76,0	13,0	17,1	56,8
	Mean =		61,5	12,3	20,3	37,7
7 NeemAzal T/S	3,75 l/ha B	109	94,0	15,0	16,0	48,0
Trifolio S-forte	1,6 l/ha B	212	26,0	7,0	26,9	8,0
		307	43,0	12,0	27,9	16,3
		403	53,0	9,0	17,0	57,1
	Mean =		54,0	10,8	21,9	32,3
8 Quassia-MD	0,57 kg/ha A	105	91,0	13,0	14,3	53,4
Trifolio S-forte	1,6 l/ha A	203	87,0	11,0	12,6	56,8
NeemAzal T/S	3,75 l/ha B	308	44,0	1,0	2,3	93,2
Trifolio S-forte	1,6 l/ha B	402	45,0	5,0	11,1	71,9
	Mean =		66,8	7,5	10,1	68,8
9 Quassia-MD	1,14 kg/ha A	112	81,0	8,0	9,9	67,8
Trifolio S-forte	1,6 l/ha A	209	42,0	3,0	7,1	75,6
NeemAzal T/S	3,75 l/ha B	302	75,0	2,0	2,7	92,0
Trifolio S-forte	1,6 l/ha B	404	25,0	0,0	0,0	100,0
	Mean =		55,8	3,3	4,9	83,8

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-1      Protocol ID: 2012-713  
 Location: Henning Bæk      Study Director: Klaus Paaske  
 Project ID:                      Investigator: Klaus Paaske  
    Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect					
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE					
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>					
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>					
Crop Code	MABSD	MABSD	MABSD	MABSD					
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica					
Crop Name	Apple	Apple	Apple	Apple					
Rating Date	19/06/2012	19/06/2012	19/06/2012	19/06/2012					
Rating Type	COUNT	COUNT	PESINC	CONTRO					
Rating Unit	NUMBER	NUMBER	percent	%UNCK					
Sample Size, Unit	6 TREE	6 TREE	6 TREE	6 TREE					
Footnote Number	3	6	7	8					
Trt-Eval Interval	26 DA-A	26 DA-A	26 DA-A	26 DA-A					
ARM Action Codes	T1	T2	T3	TAB[7]					
Trt Treatment	Rate	Appl							
No.	Name	Rate	Unit	Code	Plot	3	6	7	8
10	Tracer	0,25 l/ha	A	101		91,0	20,0	22,0	28,3
	Trifolio S-forte	1,6 l/ha	A	204		64,0	9,0	14,1	52,0
				303		46,0	3,0	6,5	80,4
				405		33,0	2,0	6,1	84,7
				Mean =		58,5	8,5	12,2	61,4
11	Tracer	0,25 l/ha	B	104		50,0	5,0	10,0	67,4
	Trifolio S-forte	1,6 l/ha	B	211		48,0	11,0	22,9	21,7
				306		18,0	3,0	16,7	50,0
				401		119,0	20,0	16,8	57,5
				Mean =		58,8	9,8	16,6	49,2
12	Tracer	0,125 l/ha	A	102		88,0	14,0	15,9	48,1
	Trifolio S-forte	1,6 l/ha	A	207		49,0	4,0	8,2	72,1
	Tracer	0,125 l/ha	B	311		69,0	6,0	8,7	73,9
	Trifolio S-forte	1,6 l/ha	B	407		62,0	6,0	9,7	75,6
				Mean =		67,0	7,5	10,6	67,4

### ARM Action Codes

T1 = [C1]+[C2]  
 T2 = [C4]+[C5]  
 T3 = 100\*([C6]/[C3])  
 TAB[7] = Abbott (% of Untreated)[7]

Footnote 3: Total number of apples per plot  
 Footnote 6: Total number of apples with sawfly damage  
 Footnote 7: % apples with damage from sawfly  
 Footnote 8: % control

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-2      Protocol ID: 2012-713  
 Location: Poul Rytter      Study Director: Klaus Paaske  
 Project ID:                    Investigator: Klaus Paaske  
                                      Sponsor Contact: Project FruitGrowth

Pest Type		I Insect	I Insect	I Insect	I Insect	
Pest Code		HOPLTE	HOPLTE	HOPLTE	HOPLTE	
Pest Scientific Name		Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	
Pest Name		Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	
Crop Code		MABSD	MABSD	MABSD	MABSD	
Crop Scientific Name		Malus domestica	Malus domestica	Malus domestica	Malus domestica	
Crop Name		Apple	Apple	Apple	Apple	
Rating Date		19/06/2012	19/06/2012	19/06/2012	19/06/2012	
Rating Type		COUNT	COUNT	PESINC	CONTRO	
Rating Unit		NUMBER	NUMBER	percent	%UNCK	
Sample Size, Unit		6 TREE	6 TREE	6 TREE	6 TREE	
Footnote Number		1	2	3	4	
Trt-Eval Interval		26 DA-A	26 DA-A	26 DA-A	26 DA-A	
ARM Action Codes		T1	T2	T3	TAB[7]	
Trt Treatment	Rate Appl					
No. Name	Rate Unit Code Plot	3	6	7	8	
1 Untreated		109 205 304 410	104,0 156,0 77,0 108,0	37,0 40,0 27,0 36,0	35,6 25,6 35,1 33,3	0,0 0,0 0,0 0,0
	Mean =		111,3	35,0	32,4	0,0
2 Quassia-MD	1,14 kg/ha A	108	132,0	9,0	6,8	80,8
Trifolio S-forte	1,6 l/ha A	210	190,0	14,0	7,4	71,3
		308	89,0	2,0	2,2	93,6
		411	201,0	7,0	3,5	89,6
	Mean =		153,0	8,0	5,0	83,8
3 Quassia-MD	1,14 kg/ha B	101	57,0	8,0	14,0	60,6
Trifolio S-forte	1,6 l/ha B	203	175,0	17,0	9,7	62,1
		306	78,0	9,0	11,5	67,1
		409	157,0	12,0	7,6	77,1
	Mean =		116,8	11,5	10,7	66,7
4 Quassia-MD	0,57 kg/ha A	110	119,0	9,0	7,6	78,7
Trifolio S-forte	1,6 l/ha A	212	326,0	30,0	9,2	64,1
Quassia-MD	0,57 kg/ha B	305	119,0	3,0	2,5	92,8
Trifolio S-forte	1,6 l/ha B	402	117,0	3,0	2,6	92,3
	Mean =		170,3	11,3	5,5	82,0
5 Quassia-MD	1,14 kg/ha A	106	73,0	2,0	2,7	92,3
Trifolio S-forte	1,6 l/ha A	202	191,0	2,0	1,0	95,9
Quassia-MD	1,14 kg/ha B	309	97,0	4,0	4,1	88,2
Trifolio S-forte	1,6 l/ha B	412	300,0	10,0	3,3	90,0
	Mean =		165,3	4,5	2,8	91,6
6 NeemAzal T/S	3,75 l/ha A	104	51,0	6,0	11,8	66,9
Trifolio S-forte	1,6 l/ha A	211	178,0	19,0	10,7	58,4
		307	101,0	14,0	13,9	60,5
		401	106,0	31,0	29,2	12,3
	Mean =		109,0	17,5	16,4	49,5
7 NeemAzal T/S	3,75 l/ha B	112	159,0	32,0	20,1	43,4
Trifolio S-forte	1,6 l/ha B	209	198,0	20,0	10,1	60,6
		303	48,0	7,0	14,6	58,4
		408	161,0	20,0	12,4	62,7
	Mean =		141,5	19,8	14,3	56,3
8 Quassia-MD	0,57 kg/ha A	111	110,0	4,0	3,6	89,8
Trifolio S-forte	1,6 l/ha A	204	154,0	16,0	10,4	59,5
NeemAzal T/S	3,75 l/ha B	302	46,0	6,0	13,0	62,8
Trifolio S-forte	1,6 l/ha B	405	229,0	4,0	1,7	94,8
	Mean =		134,8	7,5	7,2	76,7
9 Quassia-MD	1,14 kg/ha A	103	95,0	4,0	4,2	88,2
Trifolio S-forte	1,6 l/ha A	207	188,0	11,0	5,9	77,2
NeemAzal T/S	3,75 l/ha B	310	132,0	1,0	0,8	97,8
Trifolio S-forte	1,6 l/ha B	407	104,0	1,0	1,0	97,1
	Mean =		129,8	4,3	2,9	90,1



# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-2      Protocol ID: 2012-713  
 Location: Poul Rytter      Study Director: Klaus Paaske  
 Project ID:                      Investigator: Klaus Paaske  
    Sponsor Contact: Project FruitGrowth

Pest Type	I Insect	I Insect	I Insect	I Insect
Pest Code	HOPLTE	HOPLTE	HOPLTE	HOPLTE
Pest Scientific Name	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>	Hoplocampa tes>
Pest Name	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>	Apple fruit sa>
Crop Code	MABSD	MABSD	MABSD	MABSD
Crop Scientific Name	Malus domestica	Malus domestica	Malus domestica	Malus domestica
Crop Name	Apple	Apple	Apple	Apple
Rating Date	19/06/2012	19/06/2012	19/06/2012	19/06/2012
Rating Type	COUNT	COUNT	PESINC	CONTRO
Rating Unit	NUMBER	NUMBER	percent	%UNCK
Sample Size, Unit	6 TREE	6 TREE	6 TREE	6 TREE
Footnote Number	1	2	3	4
Trt-Eval Interval	26 DA-A	26 DA-A	26 DA-A	26 DA-A
ARM Action Codes	T1	T2	T3	TAB[7]
Trt Treatment	Rate Appl			
No. Name	Rate Unit Code Plot	3	6	7
10 Tracer	0,25 l/ha A 105	65,0	5,0	7,7
Trifolio S-forte	1,6 l/ha A 208	204,0	11,0	5,4
	301	72,0	12,0	16,7
	404	181,0	10,0	5,5
	Mean =	130,5	9,5	8,8
11 Tracer	0,25 l/ha B 102	152,0	7,0	4,6
Trifolio S-forte	1,6 l/ha B 206	205,0	16,0	7,8
	312	168,0	4,0	2,4
	403	131,0	13,0	9,9
	Mean =	164,0	10,0	6,2
12 Tracer	0,125 l/ha A 107	98,0	5,0	5,1
Trifolio S-forte	1,6 l/ha A 201	181,0	8,0	4,4
Tracer	0,125 l/ha B 311	132,0	8,0	6,1
Trifolio S-forte	1,6 l/ha B 406	167,0	6,0	3,6
	Mean =	144,5	6,8	4,8

### ARM Action Codes

T1 = [1]+[2]

T2 = [4]+[5]

T3 = 100\*([6]/[3])

TAB[7] = Abbott (% of Untreated)[7]

Footnote 1: Total number of apples per plot

Footnote 2: Total number of apples with sawfly damage

Footnote 3: % apples with damage from sawfly

Footnote 4: % control

## 6. PLOT MAPS

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# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-2  
Location: Allesø  
Project ID:

Protocol ID: 2011-710  
Study Director: Klaus Paaske  
Investigator: Klaus Paaske  
Sponsor Contact: Project FruitGrowth

Block	1	2	3	4
	111 7	211 9	311 3	411 11
	110 5	210 6	310 10	410 7
	109 1	209 10	309 2	409 8
	108 11	208 5	308 6	408 1
	107 4	207 3	307 7	407 10
	106 9	206 2	306 11	406 4
	105 6	205 11	305 8	405 6
	104 8	204 1	304 5	404 2
	103 3	203 7	303 4	403 9
	102 10	202 8	302 1	402 3
	101 2	201 4	301 9	401 5

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2011-710-3  
Location: Harndrup  
Project ID:

Protocol ID: 2011-710  
Study Director: Klaus Paaske  
Investigator: Klaus Paaske  
Sponsor Contact: Project FruitGrowth

Block	1	2	3	4
	111 9	211 7	311 10	411 2
	110 4	210 5	310 9	410 4
	109 8	209 10	309 7	409 5
	108 11	208 4	308 6	408 9
	107 2	207 1	307 3	407 1
	106 10	206 3	306 2	406 8
	105 1	205 6	305 11	405 10
	104 7	204 8	304 5	404 7
	103 3	203 11	303 8	403 3
	102 5	202 2	302 1	402 11
	101 6	201 9	301 4	401 6

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-1  
Location: Henning Bæk  
Project ID:

Protocol ID: 2012-713  
Study Director: Klaus Paaske  
Investigator: Klaus Paaske  
Sponsor Contact: Project FruitGrowth

Block	1	2	3	4
	112 9	212 7	312 3	412 6
	111 6	211 11	311 12	411 2
	110 5	210 1	310 6	410 1
	109 7	209 9	309 4	409 3
	108 4	208 5	308 8	408 4
	107 3	207 12	307 7	407 12
	106 2	206 2	306 11	406 5
	105 8	205 6	305 1	405 10
	104 11	204 10	304 5	404 9
	103 1	203 8	303 10	403 7
	102 12	202 3	302 9	402 8
	101 10	201 4	301 2	401 11

# Aarhus University, Department of Agroecology, Flakkebjerg

## Control of apple sawfly in organic apple production

Trial ID: 2012-713-2  
Location: Poul Rytter  
Project ID:

Protocol ID: 2012-713  
Study Director: Klaus Paaske  
Investigator: Klaus Paaske  
Sponsor Contact: Project FruitGrowth

Block	1	2	3	4
	112 7	212 4	312 11	412 5
	111 8	211 6	311 12	411 2
	110 4	210 2	310 9	410 1
	109 1	209 7	309 5	409 3
	108 2	208 10	308 2	408 7
	107 12	207 9	307 6	407 9
	106 5	206 11	306 3	406 12
	105 10	205 1	305 4	405 8
	104 6	204 8	304 1	404 10
	103 9	203 3	303 7	403 11
	102 11	202 5	302 8	402 4
	101 3	201 12	301 10	401 6

## 7.1. CLIMATE

Meteorological data during the trial period, measured by the nearest stations operated by the Danish Meteorological Institute, are shown in the figures below. For both trials MET Station 6126 Årslev, located approx. 17 km from trials 2011-710-2 and 2011-713-1 and approx. 30 km from trials 2011-710-3 and 2011-713-2

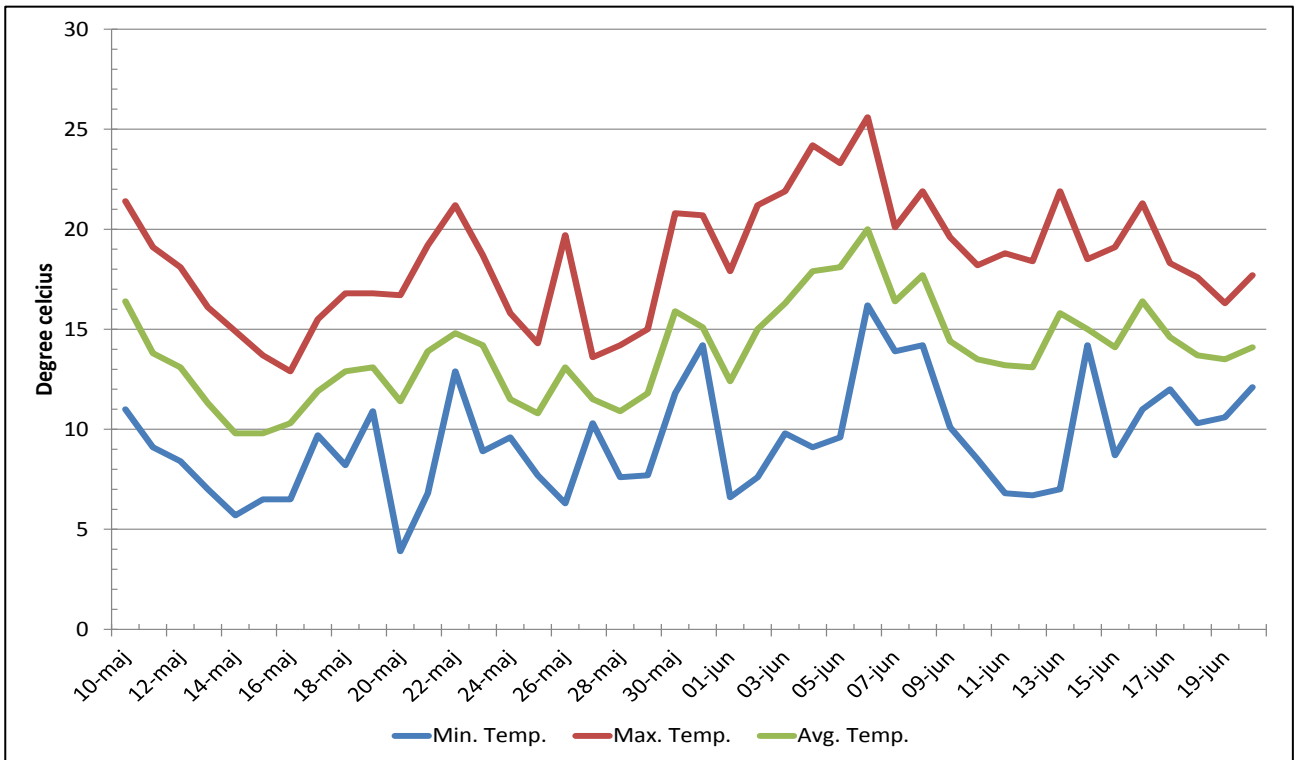


Figure 3. Temperature 2011



Figure 4. Temperature 2012

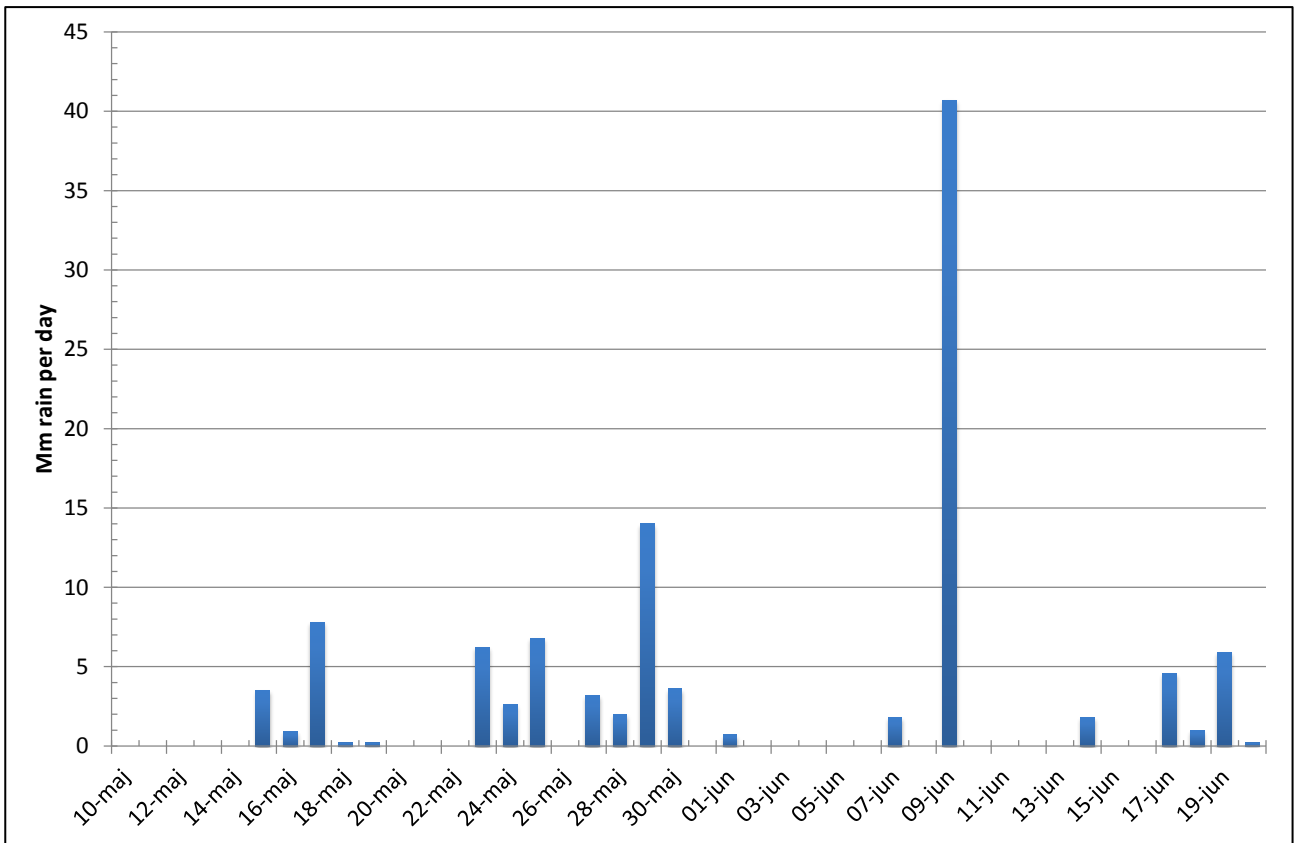


Figure 5. Precipitation 2011

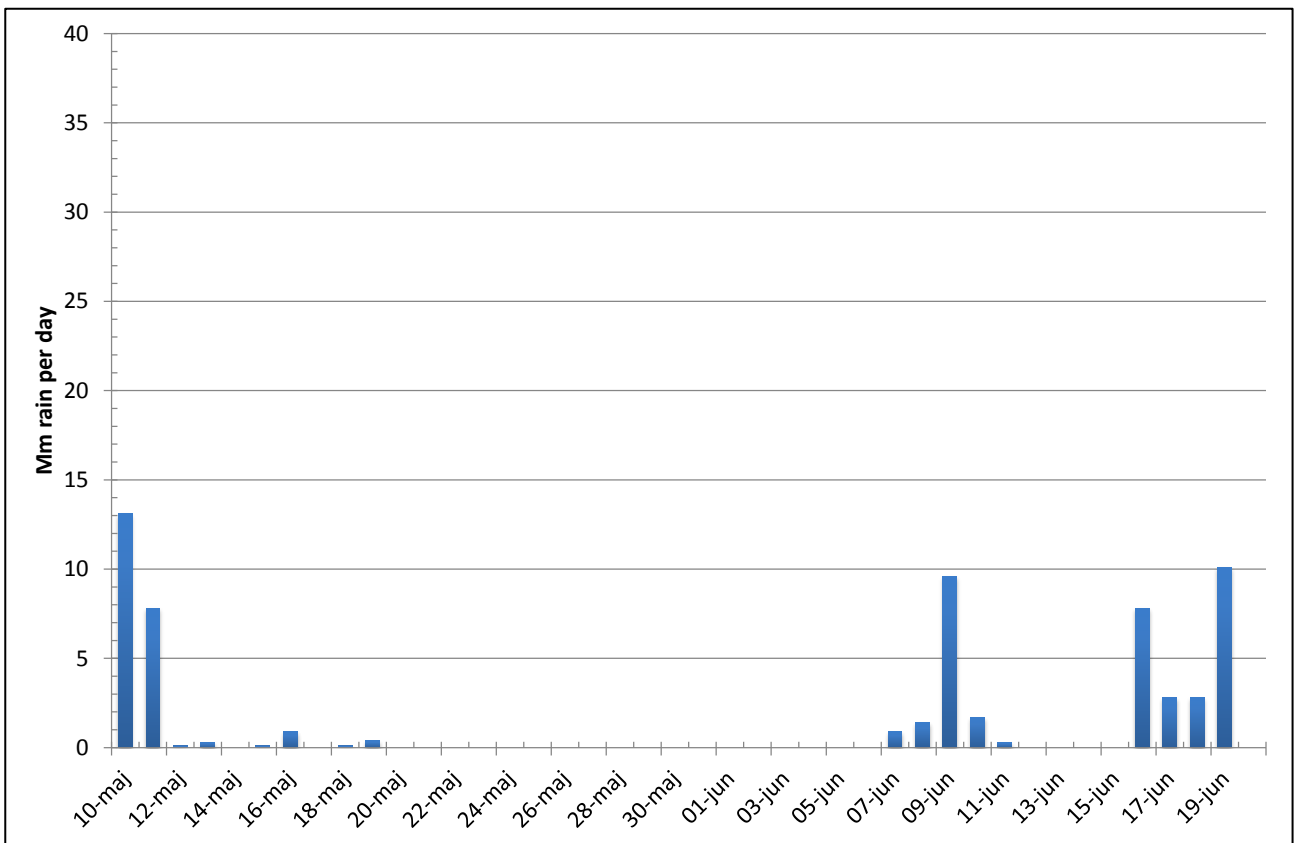


Figure 6. Precipitation 2012



## 7.2. GEP Certificate

University of Aarhus  
Faculty of Agricultural Sciences  
GEP Recognition Unit



# Certificate

GEP approval is granted to

Testing unit: University of Aarhus  
Faculty of Agricultural Sciences  
Department of Integrated Pest Management  
(diseases and pests)  
DK-4200 Slagelse

The approval applies to the execution of GEP efficacy trials of pesticides within

Testing areas: Field trials  
Fruitgrowing trials  
Greenhouse trials


GEP

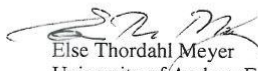
The GEP Recognition Unit at the Faculty of Agricultural Sciences (DJF), University of Aarhus, controls organisation, staff, premises, trial fields, trial equipment, standard operation procedures and trial reports. The testing unit is subject to continuous control and inspection.


The certificate is valid for a period of 6 years.

Date of approval: 1 January 2008

Signed: 20 February 2008

  
Nina Sørup Hansen  
Danish Environmental  
Protection Agency

  
Else Thordahl Meyer  
University of Aarhus, Faculty of  
Agricultural Sciences

  
Peter Kryger Jensen  
University of Aarhus, Faculty of  
Agricultural Sciences

*Ministerial order no. 533 of 18 June 2003 states that investigations of the efficacy of plant protection products carried out in Denmark after 1 January 1996 for registration purposes must be performed by testing units which have been approved to carry out these investigations by the University of Aarhus, Faculty of Agricultural Sciences according to the Commission Directive 93/71/EEC.*

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DK-4200 Slagelse

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