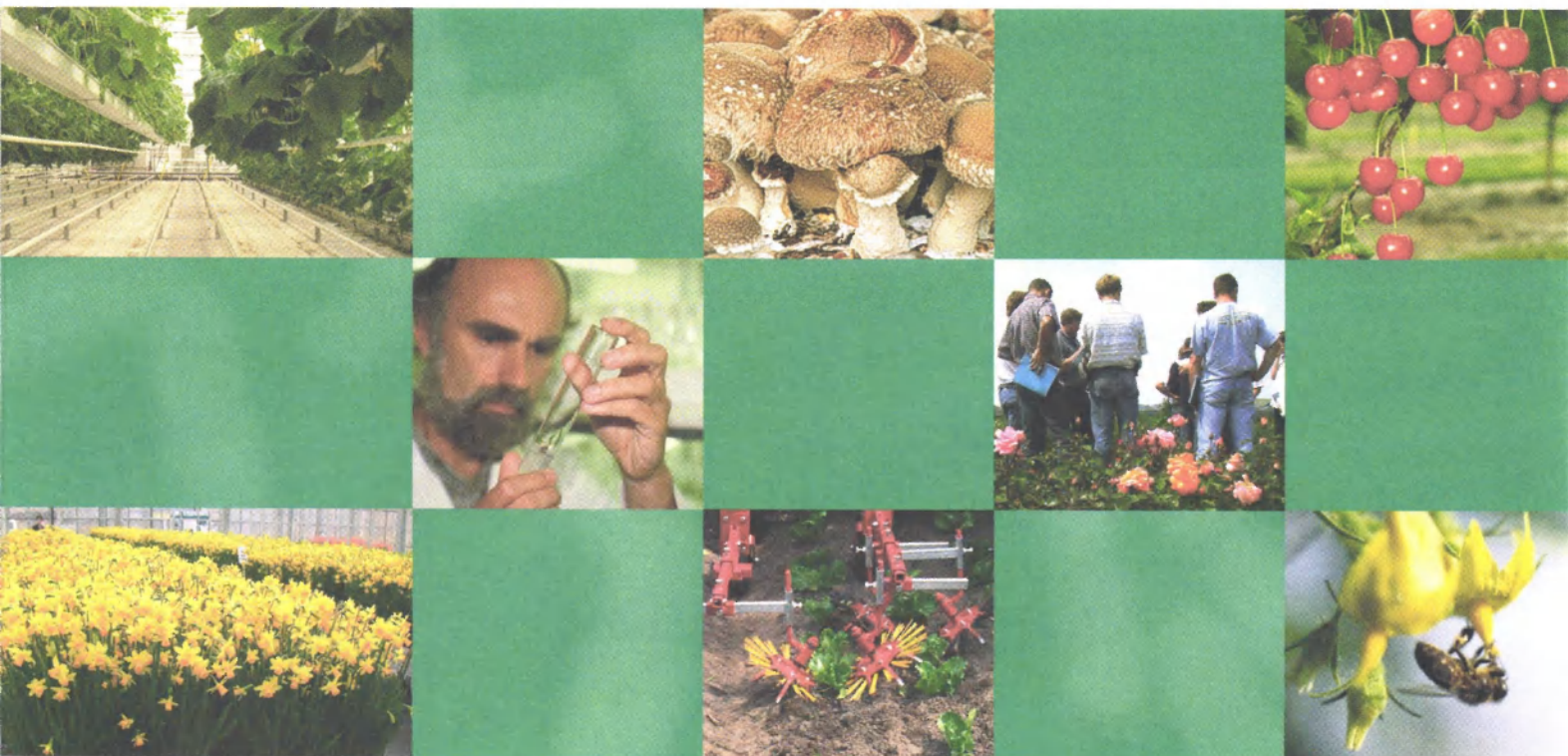




The effect of Spirit against *Stromatinia gladioli*

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Applied Plant Research
Research unit Flowerbulbs, Nursery stock and Fruits
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Table of contents

	page
1 INTRODUCTION	5
2 MATERIAL AND METHOD	7
3 RESULTS	9
3.1 Crop damage	9
3.2 Tuber infection.....	9
3.3 Yield	10
4 CONCLUSIONS.....	11
APPENDIX 1 EXPERIMENTAL DATA.....	13
APPENDIX 2 PLOT DESIGN	15
APPENDIX 3 RAW DATA CROP EVALUATION.....	17
APPENDIX 4 RAW DATA TUBER INFECTION AND YIELD	19

1 Introduction

In a field trial the use of the fungicide Spirit (a.i. tebuconazool and folpet) was tested against the fungi *Stromatinia gladioli* in gladiolus in comparison with Mirage Plus. The used tubers in this trial were light infected with Stromatina. The soil was not infected with Stromatina.

2 Material and method

In an experimental field trial different bulb dipping treatments were investigated for their use against *Stromatinia gladioli*.

In the treatment schedule (table 2.1) Sumisclex is the standard treatment. This trial was part of a larger experiment with 12 bulb dipping treatments in total.

Table 2.1. Treatment schedule. For all treatments 0.5% captan was included in the bulb dipping

Treat. nr.	Product	Name active ingrediënt (a.i.)	Amount of a.i.	Formulation	Dosage (%)	Mode of application
1	Untreated	-	-	-	-	bulb dipping, 15 minutes
2	Sumisclex	procymidon	500 g/l	Vloeistof	0.5	bulb dipping, 15 minutes
3	Mirage Plus	prochloraz + folpet	120 g/l 450 g/l	SC	1.25	bulb dipping, 15 minutes
5	Spirit SC	tebuconazool + folpet	100 g/l	SC	1.25	bulb dipping, 15 minutes
6	Mirage Plus	prochloraz + folpet	120 g/l 450 g/l	SC	0.6	bulb dipping, 15 minutes
11	Spirit SC	tebuconazool + folpet	100 g/l	SC	0.6	bulb dipping, 15 minutes

The efficacy of the treatments was determined by observing crop symptoms of *Stromatinia gladioli* on the field and after harvest by observing tuber symptoms and by measuring the yield parameters. Phytotoxicity was determined by emergence, crop stand and yield.

For the statistical analysis Genstat 10th edition was used for analysis of the whole experiment with 12 objects.

A detailed overview of the experimental setup can be found in appendix 1.

3 Results

3.1 Crop damage

The crop evaluation in the field showed small differences between the treatments (table 3.1). Both Spirit and Mirage Plus were as good as the standard treatment with Sumisclex. Between Spirit and Mirage Plus, in a dosage of 0.6%, were no differences in crop evaluation. When the dosage was 1.25%, Mirage Plus had a better crop quality than Spirit.

There were no differences in the total number of plants per treatment with symptoms of Stromatinia.

Table 3.1. Crop evaluation and number of plants with canopy symptoms on August 29th

Treat.nr.	Product	Crop evaluation ¹⁾²⁾	Total number of plants with crop symptoms (n=400)
1	Untreated	10.0 c	4
2	Sumisclex	9.5 bc	6
3	Mirage Plus, 1.25%	10.0 c	6
5	Spirit, 1.25%	8.8 ab	9
6	Mirage Plus, 0.6%	10.0 c	3
11	Spirit, 0.6%	9.5 bc	6
	<i>Fprob</i>	0.006	0.918
	<i>LSD</i>	1.004	ns

¹⁾ 0=no emergence, 10 = excellent crop

²⁾ The same lettercodes means that there is no significant differences between treatments.

3.2 Tuber infection

Although the tubers were already infected with Stromatinia when they were planted, the results showed a low percentage of tubers with symptoms of Stromatinia and no differences between the treatments. The missing tubers were probably lost by infection with Stromatinia. The treatment with Spirit (dosage 1.25%) had a lower percentage healthy tubers than the standard with Sumisclex and the treatments with Mirage Plus.

Table 3.2. Tuber infection: number of healthy tubers, number of tubers with symptoms of Stromatinia and missing tubers (n=100)

Treat.nr.	Product	Percentage healthy tubers (average/treatment)	Percentage tubers with symptoms (average/treatment)	Percentage missing tubers (average/treatment)
1	Untreated	85.8 bcd	2.0	12.3 abc
2	Sumisclex	93.5 cd	0.0	6.5 ab
3	Mirage Plus, 1.25%	92.3 cd	0.8	7.0 ab
4	Spirit, 1.25%	81.5 ab	0.3	18.3 cd
5	Mirage Plus, 0.6%	94.5 d	0.5	5.0 a
6	Spirit, 0.6%	85.8 bcd	0.0	14.3 abc
	<i>Fprob</i>	0.006	0.119	0.005
	<i>LSD</i>	9.527	ns	9.578

3.3 Yield

None of the applied fungicide treatments had an effect on total yield (table 3.3).

Tabel 3.3. Number and weight of healthy tubers, average per treatment.

Treat.nr.	Product	number of tubers, size <10	Total weight, size <10 (g)	Number of tubers, size ≥10	Total weight, size ≥10 (g)
1	Untreated	41	220.6	47	962.4
2	Sumisclex	48	245.1	45	775.3
3	Mirage Plus, 1.25%	46	252.8	46	926.2
4	Spirit, 1.25%	45	208.5	37	832.2
5	Mirage Plus, 0.6%	39	185.2	56	1328.5
6	Spirit, 0.6%	42	217.6	43	1000.7
	<i>Fprob</i>	<i>0.816</i>	<i>0.612</i>	<i>0.063</i>	<i>0.077</i>
		<i>ns</i>	<i>ns</i>	<i>ns</i>	<i>ns</i>

4 Conclusions

Conclusions

- Although the planted tubers were infected with *Stromatinia gladioli*, there were hardly any symptoms seen in the crop and in the harvested tubers.
- The percentage missing tubers varied from 5 to 18%, probably caused by *Stromatinia gladioli*.
- In this experiment the crop canopy in the field was less good in the treatment with Spirit (1.25%) compared with both concentrations of Mirage Plus.
- The treatment with Spirit (1.25%) resulted in a lower percentage healthy tubers compared with Sumisclex and both concentrations of Mirage Plus.
- Yield was not influenced by the fungicide treatments.

Appendix 1 Experimental data

1	<u>Experimental data</u>	
1.1.	Crop	: Gladiolus
	- cultivar : Priscilla	
	- plant size	: replication A 5/6, replication B 4/5, replications C and D 3/4
	-Pretreatment tubers	: standard
	-Standard disinfection tubers	: no, see trial protocol
1.2.	Disease-, pest-, weed pressure	: <i>Stromatinia gladioli</i>
	- natural occurrence	: no
	- artificially	: tubers were infected with <i>Stromatinia</i>
1.3.	Location	
	- greenhouse/field	: field PPO Lisse
	-soiltype	: sandy soil
	- previous crop	: fallow soil
	- standard fumigation or soil disinfection	: no
1.4.	Plot size (bruto area/surface.)	: 2.2 x 1.5 = 3.3 m ²
	- netto surface.	: 1.5 x 1.0x= 1.5 m ²
	- number of tubers per plot	: 100
	- plant weight	: replication A 200 gram/field, replication B 130 gram/field, replications C and D 80 gram/field.
	- number of replications	: 4
1.5.	trial data	
	- infection	: infected tubers
	- soil treatment(s)	: -
	- chemical application	: May 3 rd 2007
	- planting date(s)	: May 3 rd 2007
	- plant depth	: 10 cm
1.6.	Observations	
	<u>I. Efficacy</u>	
	- crop damage	: yes
	- tuber damage	: yes
	- root damage	: no
	- yield	: yes
	<u>II. Phytotoxicity</u>	
	- emergence	: yes
	- stand(crop)	: yes
	- % bloom (color)	: no
	- die back or decrease	: no
	- yield	: yes
	Observation scale phytotoxicity	: 0-10 scales, where 0 = bad, 10 = excellent
	Observation scale efficacy	: 0-10, where 0 = 100% diseased or no effect, 10 = healthy

- 1.7. additional information : Standard Operation Procedures: 02, 03, 05, 07, 08
: statistical evaluation with Genstat 10th edition.

2 Treatments

- 2.1. Number of treatments and coding. For all treatments 0.5% captan was included in the bulbdipping, also the untreated.

Treat. nr.	Product	Name active ingrediënt (a.i.)	Amount of a.i.	Formulation	Dosage (%)	Mode of application
1	Untreated	-	-	-	-	bulb dipping, 15 minutes
2	Sumisclex	procymidon	500 g/l	Vloeistof	0.5	Bulb dipping, 15 minutes
3	Mirage plus	prochloraz + folpet	120 g/l 450 g/l	SC	1.25	bulb dipping, 15 minutes
5	Spirit SC	tebuconazool + folpet	100 g/l	SC	1.25	bulb dipping, 15 minutes
6	Mirage plus	prochloraz + folpet	120 g/l 450 g/l	SC	0.6	bulb dipping, 15 minutes
11	Spirit SC	tebuconazool + folpet	100 g/l	SC	0.6	bulb dipping, 15 minutes

This trial was part of a larger experiment with 12 bulb dipping treatments in total.

- 2.2. Application of treatment
Dipping

Treat. no.	Product	Dosage (%)	Solution to be prepared (L/treatment)	Total product to be measured / weighed (ml or g per treatment)	Duration dipping treatment (minutes)
1	Untreated (water)	-	5	-	15
2	Sumisclex	0.5	5	25	15
3	Mirage plus	1.25	5	62.5	15
5	Spirit SC	1.25	5	62.5	15
6	Mirage plus	0.6	5	30	15
11	Spirit SC	0.6	5	30	15

For all treatments: 25 ml captan

Appendix 2 Plot design

rand A	rand B	rand C	rand D
	untreated	Mirage Plus 0.6%	
Mirage Plus 0.6%		Sumisclex	
			Spirit 0.6%
Spirit 0.6%	Mirage Plus 1.25%		Mirage Plus 1.25%
Sumisclex			
Spirit 1.25%		Spirit 0.6%	
Mirage Plus 1.25%	Mirage Plus 0.6%		untreated
		untreated	
			Sumisclex
untreated			
	Mirage Plus 1.25%		Mirage Plus 1.25%
		Mirage Plus 1.25%	
	Spirit 0.6%		Mirage Plus 0.6%
	Sumisclex	Mirage Plus 1.25%	

Appendix 3 Raw data crop evaluation

Crop evaluation on August 29th.

Treatment	Replication	Crop stand ¹⁾	Number of plants with symptoms <i>Stromatinia</i>
		29-aug	29-aug
1	A	10	0
1	B	10	1
1	C	10	3
1	D	10	0
2	A	10	2
2	B	9	2
2	C	10	1
2	D	9	1
3	A	10	2
3	B	10	2
3	C	10	2
3	D	10	0
5	A	9	8
5	B	9	1
5	C	8	0
5	D	9	0
6	A	10	1
6	B	10	1
6	C	10	1
6	D	10	0
11	A	10	0
11	B	10	0
11	C	8	6
11	D	10	0

¹⁾ scale for crop evaluation: 10 = excellent, 0 = bad

Appendix 4 Raw data tuber infection and yield

treatment	replication	tuber infection			yield			
		number healthy tubers	number of infected tubers	number of missing tubers	number tubers <10	total weight tubers <10 (g)	number tubers > 10	total weight tubers >10 (g)
1	A	88	2	10	29	148.2	60	1331.7
1	B	90	6	4	47	278	49	1034.4
1	C	78	0	22	39	194.2	38	672.8
1	D	87	0	13	47	262.1	40	810.6
2	A	96	0	4	21	116	75	1016.4
2	B	92	0	8	48	279.5	43	842
2	C	95	0	5	59	297.4	34	800.3
2	D	91	0	9	63	287.6	26	442.6
3	A	92	2	6	19	119.8	72	1624.2
3	B	95	0	5	41	277.3	53	986
3	C	85	0	15	64	336.6	22	355.6
3	D	97	1	2	60	277.5	38	739.1
5	A	86	1	13	28	174.6	60	1537.6
5	B	92	0	8	48	182.5	43	1016.5
5	C	74	0	26	63	268.9	10	144.5
5	D	74	0	26	40	207.8	35	630
6	A	91	1	8	13	76.9	79	2243.3
6	B	95	1	4	29	180.1	66	1435.4
6	C	98	0	2	51	213.1	47	991
6	D	94	0	6	62	270.5	31	644.3
11	A	98	0	2	27	151.6	70	1954.5
11	B	88	0	12	41	254.5	46	887.5
11	C	70	0	30	53	253.6	17	300.6
11	D	87	0	13	45	210.6	37	860.1

