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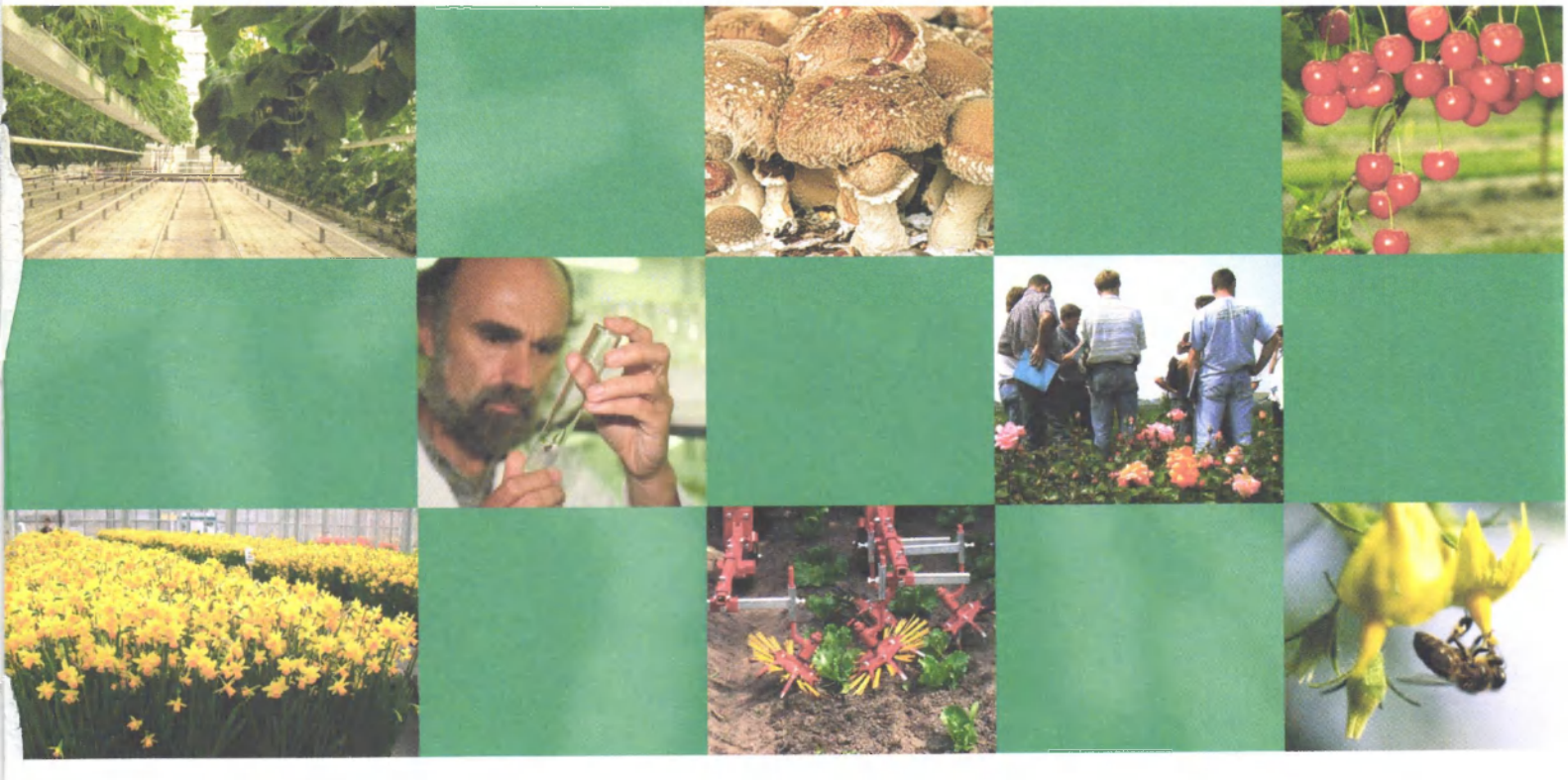
Phytotoxicity of Mavrik (tau-fluvalinate) in tulip

A.A.E. Bulle en A.Th.J. Koster



Applied Plant Research
Research unit Flowerbulbs, Nursery stock and Fruits
December 2008

PPO no. 3234062500

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PPO Project no. 3234062500 (PPO trial nrs. lv08t2 and lv08t3)

Applied Plant Research (Praktijkonderzoek Plant & Omgeving B.V.)
Research unit Flowerbulbs, Nursery stock and Fruits
Address : Prof. van Slogterenweg 2, 2161 DW Lisse, The Netherlands
: Postbus 85, 2160 AB Lisse, The Netherlands
Tel. : +31 252 46 21 21
Fax : +31 252 – 46 21 54
E-mail : info.ppo@wur.nl
Internet : www.ppo.wur.nl

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1 Aim of trials

To determine the phytotoxicity of the insecticide Mavrik (a.i. tau-fluvalinate) in tulip, in two field trials

At the end of the field trials the question came if a conclusion could be drawn about the efficacy of Mavrik against virus infection with Tulip Breaking Virus (TBV). Therefore bulbs were analysed to determine the amount of virus.

2 Material and method

In two field trials different spray applications were tested to examine the phytotoxicity of Mavrik in tulip 'Negritta' and 'Ballerina'. The spray treatments were applied weekly. The treatment schedule is given in table 2.1. Treatments with Mavrik were compared with untreated and treatments with Decis as standard. A detailed overview of the experimental setup can be found in appendix 1.

Table 2.1. Treatment schedule for trial numbers Iv08t2 and Iv08t3.

Treament	Product	Active ingredient (a.i.)	Amount a.i. (g/l)	Formulation	Dosis (l/ha)	Infection yes/no	Mode of application/ timing
1	Untreated	--	--	--	--	No	--
2	Mavrik 2F	tau-fluvalinate	240	EW	0.15	No	spray weekly
3	Mavrik 2F	tau-fluvalinate	240	EW	0.3	No	spray weekly
4	Decis	deltamethrin	25	EC	0.4	No	spray weekly
5	Decis	deltamethrin	25	EC	0.8	No	spray weekly

The phytotoxicity was determined by crop stand and yield. Genstat 11th edition was used for the statistical analysis of the data.

The aim of the trials was to determine the phytotoxicity of Mavrik, but at the end of the field trials the question came if a conclusion could be drawn about the efficacy of Mavrik against virus infection with Tulip Breaking Virus (TBV). Therefore the bulbs from two replicates of treatment 1 (untreated) were analysed with ELISA to determine the amount of virus. In case of a severe virus infection also the other treatments would be analysed.

3 Results

3.1 Crop

In both trials no differences were seen in crop stand. During the growth the crop stand was very good for both the treatments with Mavrik as the treatments with Decis and the untreated. At the end of June the crop of Negritta was for a longer period green and had a slower die back than the crop of Ballerina (table 3.1), but between the spray treatments no differences were determined.

Table 3.1. Crop stand, determined as percentage green canopy, on June 23rd

Treatment	Product	Dosis (l/ha)	Percentage green canopy Negritta	Percentage green canopy Ballerina
			trial lv08t2	trial lv08t3
1	Untreated	--	50	30
2	Mavrik 2F	0.15	50	30
3	Mavrik 2F	0.3	50	30
4	Decis	0.4	50	30
5	Decis	0.8	50	30

3.2 Yield

In both trials bulb weight of the two Mavrik treatments was not different from the untreated.
There were little differences in bulb weight between the treatments with Mavrik and Decis and between treatments with Decis and untreated. The cultivar Ballerina had a higher total bulb weight of size <10 and a lower bulb weight of size >10, but the average bulb weigt of size >10 was not different.

Table 3.2. Bulb weight of Negritta (trial lv08t2)

Treatment	Product	Dosis (l/ha)	Total bulb weight <10 (g)	Total bulb weight >10 (g)	Total bulb weight (g)	Average bulb weight (>10) (g)
1	Untreated	--	1413	1155	2568 ab	20.5
2	Mavrik 2F	0.15	1426	1310	2736 b	20.8
3	Mavrik 2F	0.3	1461	1156	2617 ab	20.8
4	Decis	0.4	1327	1106	2433 a	20.7
5	Decis	0.8	1316	1326	2641 ab	21.5
		LSD	*272.2*	*258.8*	*264.4*	*1.6*
			ns	ns		ns

Table 3.3. Bulb weight of Ballerina (trial lv08t3)

Treatment	Product	Dosis (l/ha)	Total bulb weight <10 (g)	Total bulb weight >10 (g)	Total bulb weight (g)	Average bulb weight (>10) (g)
1	Untreated	--	911 a	2680 ab	3590	22.7
2	Mavrik 2F	0.15	942 ab	2798 b	3741	22.7
3	Mavrik 2F	0.3	914 a	2844 b	3758	22.5
4	Decis	0.4	1021 b	2571 a	3592	22.7
5	Decis	0.8	958 ab	2764 ab	3723	22.1
		LSD	*99.6*	*217.4*	*214.8*	*0.7*
					ns	ns

3.3 Efficacy

In the two replicates of treatment 1 (untreated) the virus infection with TBV was at most 4% (table 3.4). This was such a low percentage that it was not useful to test the other treatments.

Tabel 3.4. Results of ELISA-tests for detection TBV (n=100)

Trial	Replicate	Number of bulbs with TBV
lv08t2 (Negritta)	A	2
lv08t2 (Negritta)	B	3
lv08t3 (Ballerina)	A	2
lv08t3 (Ballerina)	B	4

4 Conclusion

In two field trials the insecticide Mavrik (a.i. tau-fluvalinate) had no phytotoxicity effects on crop stand and yield of tulip.
The infection with TBV in part of the untreated bulbs was of such a low level that no conclusion can be drawn about the efficacy of Mavrik against virus infection. In further research, the efficacy of Mavrik should be tested with virus-infected bulbs planted next to the experimental plots.

Appendix 1. Experimental data

1	Experimental data	
1.1.	Crop	: Tulip
	- cultivar	: Negritta (Iv08t2), Ballerina (Iv08t3)
	- plant size	: resp. 6/7 and 9/10
	-Pretreatment bulbs	: standard
	-Standard desinfection bulbs	: yes
1.2.	Disease-, pest-, weed pressure	: virus / aphids
	-natural occurance	: yes
	- artificially	: no
1.3.	Location	
	- greenhouse/field	: field, PPO Lisse
	-soiltype	: sandy soil
	- previous crop	: narcis
	- standard fumigation or soil desinfection	: no
1.4.	Plot size (brutto area/surface.)	: Iv08t2 (Negritta): 1.5 x 1.5 = 2.25 m^2
		: Iv08t3 (Ballerina): 1.5 x 2.0 = 3 m^2
	- netto surface.	: Iv08t2 (Negritta): 1.0 x 1.0 = 1.0 m^2
		: Iv08t3 (Ballerina): 1.0 x 1.5 = 1.5 m^2
	-number of bulbs/field	: 240 Negritta, 160 Ballerina
	- plantweight / field	: Negritta 699 g, Ballerina 1865 g
	- number of replications	: 4
1.5.	trial data	
	- infection	: -
	- soil treatment(s)	: -
	- chemical application	: see spraying schedule
	- planting date	: 14-12-2007
	- plantdepth	: 10 cm
1.6.	Observations	
	I. Efficacy	
	- crop damage	: no
	- bulb damage	: no
	- root damage	: no
	- yield	: no
	II. Phytotoxicity	
	- emergence	: yes
	- stand(crop)	: yes
	- % bloom (color)	: no
	- die back or decrease	: yes
	- yield	: yes
	Observation scales phytotoxicity	: 0-10: 0 = bad, 10 = excellent
1.7.	Remarks or notes	: -

2 Treatments

2.1. Treatment schedule

Treatment	Product	Name active ingredient (a.i.)	Amount a.i. (g/l)	Formulation	Dosis (l/ha)	Infection yes/no	Mode of application/ timing
1	Untreated	--	--	--	--	No	--
2	Mavrik 2F	tau-fluvalinate	240	EW	0.15	No	Spray weekly
3	Mavrik 2F	tau-fluvalinate	240	EW	0.3	No	Spray weekly
4	Decis	deltamethrin	25	EC	0.4	No	Spray weekly
5	Decis	deltamethrin	25	EC	0.8	No	Spray weekly

2.2. Application of treatment

II. Spraying

- sprayer type : Veeze hand-held sprayer with 3 nozzles
- nozzle type : Lechler AD110 03 VS
- pressure : 3 bar
- volume : 500 l/ha

Trial Iv08t2 (Negritta)

Treatment	Product	Desired quantity spray mixture (ml/treatment)	Amount product needed to be measured (ml)	Amount of spraymixture (carrying fluid) (ml/treatment)
1	Untreated	-	-	-
2	Mavrik 2F	500	0.15	250
3	Mavrik 2F	500	0.3	250
4	Decis	500	0.4	250
5	Decis	500	0.8	250

Trial Iv08t3 (Ballerina)

Treat. nr.	Product	Desired quantity spray mixture (ml/treatment)	Amount product needed to be measured (ml)	Amount of spraymixture (carrying fluid) (ml/treatment)
1	Untreated	-	-	-
2	Mavrik 2F	500	0.15	375
3	Mavrik 2F	500	0.3	375
4	Decis	500	0.4	375
5	Decis	500	0.8	375

Appendix 2. Plot design

Trial lv08t2 (Negritta)

West

4A 5	5B 10	1C 15	3D 20
2A 4	2B 9	5C 14	5D 19
5A 3	4B 8	2C 13	1D 18
1A 2	3B 7	3C 12	2D 17
3A 1	1B 6	4C 11	4D 16

East

Trial lv08t2 (Ballerina)

West

1A 5	4B 10	5C 15	1D 20
4A 4	3B 9	2C 14	2D 19
2A 3	5B 8	3C 13	3D 18
3A 2	1B 7	1C 12	4D 17
5A 1	2B 6	4C 11	5D 16

East

Appendix 3. Spray registration form

Project nr. 3234062500 (trials lv08t2 and lv08t3)	Executor: J.P.T. Trompert

	date	time	Order of treatments	Temperature 1,5 m above the ground (°C)	cloudiness	Wind direc -tion	Wind speed at 2 m height (m/sec)	rain (mm)			Crop data		
								1 day before	At sprayi ng	1 day after	moisture	stage	length (cm)
1	10/4	16-17	2,3,4,5; A – D	14	no	W	3	0	0	0	dry	emergenc e	10
2	18/4	8-9	2,3,4,5; D – A	7	heavy clouds	O	2	0	0	0	dry	emergen e	15
3	25/4	9-10	2,3,4,5; A – D	11	half	ZW	3	1.2	0	0	dry	growth	30
4	2/5	9-10	2,3,4,5; D – A	12	no	ZW	2	6.7	0	0	dry	flowering	40
5	9/5	9-10	2,3,4,5; A – D	18	no	ZO	1	0	0	0	dry	after headed	45
6	15/5	9-10	2,3,4,5; D – A	17	little	NO	2	0	0	9.8	dry	growth	45
7	22/5	8-9	2,3,4,5; A – D	12	no	O	1	0	0	0	dry	growth	45
8	29/5	9-10	2,3,4,5; D – A	16	heavy clouds	N	1	0.2	0	1.4	dry	growth	45
9	4/6	11-12	2,3,4,5; A – D	17	little	W	1	0.2	0	0	dry	growth	45
10	11/6	13-14	2,3,4,5; D – A	18	variable	NW	3	0	0	0	dry	growth	45
11	20/6	8-9	2,3,4,5; A – D	15	little	W	4	2.4	0	0	dry	die back	45

Opmerkingen: --

Appendix 4. Raw data bulbs

Trial Iv08t2 (Negritta)

		Size smaller 10	Size 10/11		Size 11/12		Size 12/13		Size 13 op	
treatment	replication	weight(g)	number	weight (g)	number	weight (g)	number	weight (g)	number	weight (g)
1	A	1336	31	573	13	322	1	28	0	0
1	B	1505	37	677	20	470	2	54	1	37
1	C	1337	36	660	21	496	7	200	1	36
1	D	1473	39	696	15	344	1	28	0	0
2	A	1614	25	450	18	410	5	146	0	0
2	B	1278	39	706	23	553	5	149	5	165
2	C	1311	48	861	24	552	5	131	0	0
2	D	1499	34	599	17	405	4	115	0	0
3	A	1380	34	609	14	316	1	23	0	0
3	B	1638	39	693	18	403	5	138	0	0
3	C	1684	28	523	19	439	4	118	0	0
3	D	1141	22	407	28	635	6	184	4	138
4	A	1419	40	702	14	346	2	53	0	0
4	B	1196	34	641	11	263	12	362	1	39
4	C	1450	38	699	16	382	3	89	0	0
4	D	1242	24	432	16	359	2	59	0	0
5	A	1227	28	509	20	474	3	88	1	32
5	B	1254	26	488	24	564	7	208	0	0
5	C	1289	38	676	31	728	6	179	1	34
5	D	1492	33	596	23	541	5	149	1	37

Trial Iv08t3 (Ballerina)

		Size smaller 10	Size 10/11		Size 11/12		Size 12/13		Size 13 op	
treatment	replication	weight (g)	number	weight (g)	number	weight (g)	number	weight (g)	number	weight (g)
1	A	956	45	855	57	1327	19	565	3	110
1	B	912	43	782	59	1401	12	369	1	41
1	C	909	38	706	69	1661	9	251	1	38
1	D	866	45	812	56	1330	13	372	3	99
2	A	905	46	867	60	1424	13	388	0	0
2	B	1004	45	848	56	1312	21	632	3	99
2	C	880	47	884	62	1472	17	495	3	95
2	D	980	45	810	53	1236	20	599	1	33
3	A	920	51	920	60	1386	20	628	0	0
3	B	898	42	778	65	1578	17	491	3	114
3	C	832	56	1033	53	1252	17	507	2	70
3	D	1005	57	1020	50	1218	12	344	1	37
4	A	1024	36	667	60	1442	26	794	1	38
4	B	896	44	825	58	1350	15	430	2	70
4	C	1070	40	743	60	1420	8	229	2	57
4	D	1093	38	668	51	1196	12	356	0	0
5	A	1002	54	1010	54	1280	18	514	2	75
5	B	943	51	946	61	1445	11	314	2	73
5	C	969	59	1099	54	1242	14	424	1	36
5	D	919	51	928	60	1427	6	172	2	73