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CHEMICAL CONTROL OF SOME FABA BEAN DISEASES WITH FUNGICIDES

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Abstract

Chemical control of faba bean chocolate spot (*Botrytis fabae*), Alternaria leaf spot (*Alternaria alternata*) and rust (*Uromyces viciae fabae)* diseases was studied in field trials during 1989-1990 and 1990-91 growing seasons. The tested fungicides singly or with Dithane M-45 offered a sufficient protection against these diseases and increased seed yield over the control. However, the efficiency of spraying Dithane M-45, singly or with other tested fungicide was more effective and reduced leaf spots and rust diseases severity.

INTRODUCTION

Chemical control of chocolate spot (*Botrytis fabae*), alternaria leaf spot (*Alternaria alternata*) and /or rust (*Uromyces viciae fabae*) diseases on faba bean (*Vicia faba* L.) was studied by several investigators (Nassib and Mansour 1976; Hanounik 1981; Mohamed *et al.* 198; Shata *et al.* 1984; Al-Samadisy *et al.* 1987; Yeoman *et al.*, 1987; Habib 1990).

Increasing seed yield as a result of spraying with fungicides was reported (Nassib and Mansour 1976, Shata *et al.* 1984, Bainbridge *et al.* 1985, Creighton *et al.* 1985 and Yeoman *et al.* 1987).

The problem of adequately protecting plants against fungi by using fungicides has been complicated by the development of fungicidal resistance (Mussa 1986). Development of fingicidal resistance in *Botrytis cinerea* to Captan and Thiram (Parry and Wood 1959), to Benlate (Urek 1985) and to Thiophanate-methyl (Pourtois *et al.* 1976) was reported.

In order to nullify or reduce the negative effect of such resistances , treatments with more than one fungicide have been introduced. Mixtures of fungicides were applied to control chocolate spot and / or rust diseases of faba bean (Yeoman *et al.* 1987).

The aim of this work was to examine and evaluate the potentailities of some fungicides sequence to control chocolate spot, alternaria leaf spot and rust diseases of faba bean in three applications or in two applications with Dithane M-45 in between.

MATERIALS AND METHODS

The experiments were carried out at Agric. Res. Station, Fac. of Agric. Alex. Univ., Alexandia, Egypt, during 1989-90 and 1990-91 growing seasons. Faba bean Giza 3 cultivar was used.

Fungicides applied were Dithane M-45 (250 g/100 L), Saprol (100 ml./100 L), Bayleton (60 g/100 L), Ridomil plus 48 (60 g/100 L), Benlate 50% w.p. (60 g/100 L), Vitavax/Thiram (100 g/100 L) and Platavax 20(350 ml./100 L). These fungicides were applied using two programs. These were spraying plants with any tested fungicide 3 times, or spraying the fungicide once between two sprays with Dithane M-45 beginning at mid flowering stage (15 days spraying intervals) . Unsprayed plats were used as a control treatment.

The field was divided into plots of 1/500 fd. each. The plot area was 8.4 m2 (2.8 m.wide x 3 m long). Every plot contained 4 rows, 3 m. long and 60 cm. apart. Each row contained 10 hills on the eastern side. Three seeds / hill of faba bean Giza3 cultivar were sown on 27 November, 1989 and on 6 December, 1990.

The growing plants were sprayed with fungicides on 17 February, 4 and 19 March in 1990 and on 2 , 17 March and 1 April in 1991. Other cultural practices were conducted as recommended.

The experimental design was a complete randomized block design with three replicates.

Severity of chocolate spot, alternaria leaf spot and rust diseases were determined. Seed yield of each plot was weighed and expressed as kg/plot.

The data were statistically analyzed as described by Snedecor (1961).

RESULTS AND DISCUSSION

Faba bean sprayed with Dithane M-45, Plantavax 20, Saprol, Benlate 50% w.p., Vitavax / Thiram, Ridomil plus 48 or Bayleton 3 times at 15 days intervals reduced significantly chocolate spot severity in 1989-90 and 1990-91 (Table 1). Ridomil plus 48, Plantavax 20, Dithane M-45, Benlate 50% w.p., Bayleton followed by Vitavax / Thiram were the most effective fungicides during the two seasons. They reduced chocoloate spot severity by 91.51, 85.11, 84.68, 82.13, 75.74 and 71.91% respectively in 1989-90 and by 65.08, 63.18, 63.18, 60.31, 57.46 and 53.01% respectively in 1990-91 compared to the control.

Spraying faba plants with of Dithane M-45 followed by a spray of Bayleton, Saprol, Ridomil plus 48, Vitavax / Thiram, Benlate 50 w.p. or Plantavax 20 then a spray with Dithane M-45 again (programme II of application) at 15 days interval, significantly reduced chocolate spot disease severity during the two seasons.

Reduction of chocolate spot disease severity as a result spraying with Dithane M-45 (Mancozeb) was also found by Yeoman *et al.* (1987). Moreover, spraying faba bean with Benlate (benomy) was significantly effective for controlling chocolate spot disease (Bainbridge *et al.* 1985 and Creighton *et al.* 1985).

Treating faba bean plants twice with Dithane M-45, interrupted once with any

other tested fungicide, was more effective than applying any given fungicide 3 times at 15 days interval, except with Benlate 50% w.p. in 1989-90 season.

Data in Table (2) indicate that spraying faba bean plants of Giza 3 cultivar with Dithane M-45, Bayleton, Platavax 20, Saprol, Benlate 50% w.p., Vitavax / Thiram or Ridomil plus 48 three times, at 15 days interval or once between two sprays with Dithane M-45, at 15 days interval during the two seasons, significantly reduced alternaria leaf spot disease compared the unsprayed treatment. No significant differences between the tested fungicides or between the tested programs of application, during the two seasons were detected.

Disease reduction was more pronounced in the 1st season than the 2nd one with any fungicidal treatment, probably because of the lower disease pressure in the former.

In agreement with the present results, Al-Samadisy *et al.* (1987) found that spraying with Dithane M-45 was very effective for controlling alternaria leaf spot of faba bean.

Data in Table (3) indicate that spraying faba bean plants with any of tested fungicide 3 times or once between two sprays of Dithane M-45 significantly reduced rust disease severity in 1989-90 and 1990-91 seasons as compared with the control.

Further evidence was provided by Mohamed *et al.* (1981), Shata *et al.* (1984) and Yeoman *et al.* (1987). They found that spraying faba bean with Carboxin, Plantavax, Thiram or Bayleton were very effective for controlling rust.

Data in Table (4) show that spraying faba bean plants three times with any tested fungicide or once between two sprays with Dithane M-45, increased seed yield. The increases in seed yield differed with the fifferent fungicides and application programs . In 1989-90, spraying with Bayleton, Dithane M-45, Saprol, Ridomil or Vitavax / Thiram for three times and Dithane M-45, followed by either Saprol or Plantavax 20 then by Dithane M-45 were the most effective for increasing seed yield.

The present results indicate that fungicidal application significantly reduced

the incidence of three major diseases of faba beans, with slight variation among fungicides tested. Such results are in agreement with some previous reports with respect to chocolate spot and rust control with Dithane M-45 (Nassib and Mansour 1976, Shata *et al.* 1984 and Yeoman *et al.* 1987) as well as the resulting increase in seed yields. Benlate (Bainbridge *et al.* 1985 and Creighton *et al.* 1985), Plantavax (Shata *et al.* 1984) and Thiram or Bayleton (Yeoman *et al.* 1987), also increased seed yields od faba bean.

It is a common phenomenon in some fungi to develop resistance or tolerance to certain fungicides (Mussa 1986; Pony and Uoad 1959; Urek 1985; Pourtois *et al.*, 1976). However fungicidal mixtures as well as diversifying the fungicide used in the consecutive sprays help preventing the build up of such resistances, and attain a reasonabce disease control.

In the present work, it is clear that different fungicides in sequence resulted in better disease control than in case of applying the same fungicide repeatedly. This can be attributed to higher efficacy on a cumulative basis of the different fungicides as well as to the variation in thier mode of action.

The present results indicate that fungicidal application significantly reduced the incidence of three major diseases of faba bean with slight variations among fungicides tested. Such results are in agreement with some previous reports on chocolate spot and rust control with dithane M-45 (Nassib and Mansour 1976; Shata *et al.,* 1984; Yeoman *et al* .,1987). Other fungicides such as Benlate (Bainbridge *et al.,* 1985; Creighton *et al.,* 1985), Plantvax (Shata *et al.*,1984) and Thiram or Bayleton (Yeoman *et al.,* 1987) also increased seed yields of faba bean.

In short, spraying faba bean plants with Dithane M-45, Bayleton, Saprol, Ridomil plus 48 or Vitavax / Thiram 3 times at 15 days interval or spraying any tested fungicide once bewteen 2 sprays with Dithane M-45 at 15 days interval may increase seed yield.

Table 1. Effect of spraying with fungicides on the severity of chocolate spot of faba bean (Giza 3 cultivar)

Fungicidal Treatment.	Chocolate spot disease severity in 1989 - 90 Infection %	Efficacy %	1990-91 Infection%	Efficacy %
A- *Programme 1				
Bayleton.	3.80	75.74	8.93	57.46
Saprol.	5.20	66.81	10.40	50.48
Ridomil plus 48.	1.93	91.51	7.33	65.08
Vitavax/Thiram.	4.40	71.91	9.87	53.01
Benlate 50% W.P.	2.80	82.13	8.33	60.31
Plantavax 20.	2.33	85.11	7.73	63.18
Dithan M-45.	2.40	84.68	7.73	63.18
B-** Programme 2				
Bayleton.	1.07	93.19	6.80	67.62
Saprol.	1.33	91.49	6.80	67.62
Ridomil plus 48.	0.33	97.87	5.73	72.70
Vitavax/Thiram.	1.47	90.64	6.87	67.30
Benlate 50% W.P.	2.93	81.28	8.00	61.91
Plantavax 20.	1.87	88.08	7.07	66.35
Dithan M-45.				
Control (unsprayed.)	5.67	0.00	21.00	0.00
LSD at P = 0.05	3.09	19.72	2.31	10.99
LSD at P = 0.01	4.19	26.66	3.12	14.85

* Prog 1 : Spraying the fungicide 3 times at 15 days interval.

** Prog 2 : Spraying the fungicide once between two sprays with Dithane M-45 at 15 days interval.

Table 2 . Effect of spraying with fungicides on the severity of chocolate spot of faba bean (Giza 3 cultivar).

Fungicidal Treatment	Chocolate spot disease severity in 1989 - 90 Infection %	Efficacy %	1990-91 Infection%	Efficacy %
A- *Programme 1				
Bayleton.	4.40	86.53	7.40	76.13
Saprol.	6.40	80.41	8.53	72.48
Ridomil plus 48.	3.07	90.60	5.47	82.36
Vitavax/Thiram.	7.07	78.36	9.33	69.90
Benlate 50% W.P.	4.00	87.76	6.53	78.94
Plantavax 20.	4.93	84.91	6.87	77.84
Dithan M-45.	5.13	84.30	7.60	75.48
B-** Programme 2				
Bayleton.	4.60	85.92	6.67	78.48
Saprol.	5.47	80.20	8.93	71.19
Ridomil plus 48.	5.40	83.47	8.13	73.77
Vitavax/Thiram.	5.40	83.47	7.67	75.26
Benlate 50% W.P.	6.00	81.64	8.40	72.90
Plantavax 20.	4.73	85.52	7.47	75.90
Dithan M-45.				
Control (un sprayed.)	32.67	0.00	31.00	0.00
LSD at P = 0.05	11.24	34.41	4.23	13.66
LSD at P = 0.01	15.19	46.50	5.72	18.46

* Prog 1 : Spraying the fungicide 3 times at 15 days interval.

** Prog 2 : Spraying the fungicide once between two sprays with Ditha M-45 at 15 days interval.

Table 3 . Effect of spraying with fungicides on the severity of chocolate spot of faba bean (Giza 3 cultivar).

Fungicidal Treatment	Chocolate spot disease severity in 1989 - 90		1990-91	
	Infection %	.Disease Efficacy %	Infection%	.Disease Efficacy %
A- *Programme 1				
Bayleton.	1.27	96.34	3.80	90.26
Saprol.	6.27	81.73	9.20	76.41
Ridomil plus 48.	0.87	97.49	5.73	85.31
Vitavax/Thiram.	5.67	83.65	9.07	76.74
Benlate 50% W.P.	4.80	86.15	7.93	79.67
Plantavax 20.	4.53	86.93	8.07	79.31
Dithan M-45.	1.13	96.74	3.53	90.95
B-** Programme 2				
Bayleton.	2.00	94.23	3.80	90.26
Saprol.	1.60	95.38	4.47	88.54
Ridomil plus 48.	1.00	97.12	3.13	91.97
Vitavax/Thiram.	1.47	95.76	3.60	90.77
Benlate 50% W.P.	2.20	93.65	4.53	88.38
Plantavax 20.	1.73	95.01	4.40	88.72
Dithan M-45.				
Control (un sprayed.)	34.67	0.00	39.00	0.00
LSD at P = 0.05	6.32	18.23	4.76	12.21
LSD at P = 0.01	8.54	24.63	6.43	16.49

* Prog 1 : Spraying the fungicide 3 times at 15 days interval.

** Prog 2 : Spraying the fungicide once between two sprays with Dithane M-45 at 15 days interval.

Table 4 . Effect of spraying with fungicides on the severity of chocolate spot of faba bean (Giza 3 cultivar).

Fungicidal Treatment.	Chocolate spot disease severity in 1989 - 90 Seed yield.	Increase%	1990-91 Seed yield.	Increase%
A- *Programme 1				
Bayleton.	3.687	125.23	2.873	83.34
Saprol.	3.367	105.68	2.533	61.65
Ridomil plus 48.	3.233	97.50	2.173	38.67
Vitavax/Thiram.	2.973	81.61	2.416	54.18
Benlate 50% W.P.	2.373	44.96	2.000	27.63
Plantavax 20.	1.737	6.11	2.333	48.88
Dithan M-45.	3.483	112.77	3.700	136.12
B-** Programme 1				
Bayleton.	2.573	57.18	3.333	112.70
Saprol.	2.850	135.19	3.450	120.17
Ridomil plus 48.	2.657	62.31	3.283	109.51
Vitavax/Thiram.	2.360	44.17	3.703	136.31
Benlate 50% W.P.	2.833	73.06	3.757	139.76
Plantavax 20.	3.533	115.82	3.540	125.91
Dithan M-45.		0.00		
Control (un sprayed.)	1.637		1.567	0.00
LSD at P = 0.05	1.308	79.90	0.866	55.27
LSD at P = 0.01	1.769	108.06	1.171	74.73

* Prog 1 : Spraying the fungicide 3 times at 15 days interval.

** Prog 2 : Spraying the fungicide once between two sprays with Dithane M-45 at 15 days interval.

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المقاومة الكيماوية لأمراض التبقع البني والألترناري وصدأ الفول البلدى بإستخدام المبيدات بنظامين مختلفين في الرش

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تم دراسة المقاومة الكيماوية لأمراض التبقع البني والألترناري وصدأ الفول البلدي في تجارب حقلية في موسمي ١٩٩٠/٨٩ ، ١٩٩١/٩٠ بمحطة بحوث الصباحية بالأسكندرية.

وجد أن جميع المبيدات المختبرة سواء بمفردها أو مع مبيد الدياثين م ٤٥ قد قلل شدة الإصابات المرضية بتبقعات الأوراق والصدأ ، وزاد محصول البذرة مقارنة بالكنترول (النباتات غير المرشوشة) .