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EFFECT OF SOME FUNGICIDES, SOWING DATE AND SEED RATE ON THE INCIDENCE OF ROOT ROT/WILT DISEASE COMPLEX AND YIELD OF GUAR CROP

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Abstract

Effect of seed dressing with fungicides and some agricultural practices such as sowing date and seed rate, on the incidence of root rot/wilt disease complex and yield components in guar was investigated.

Field experiments conducted at Ismaillia and Bahteem Agricultural Research Stations showed that Rovral and/or Vitavax/Captan (at rate of 2 g/l kg seed) reduced percentage of root rot/wilt disease incidence and increased seed yield of guar. Late sowing dates (15th June and 1st July) and seed rate of 30 or 50 seeds / 3m long row decreased percentage of infected plants and increased seed yield/plant.

At Bahteem, guar was much taller and yield was much greater than those obtained from Ismaillia.

INTRODUCTION

Guar *Cyamopsis tetragonoloba* Taub. is a new legume summer forage crop. It has been introduced in Egypt as a fodder plant to face the increase demands for forages. Moreover, guar is used as a medical plant where several pharmaceutical ingridients are used. Raw materials from guar are also used in different purposes such as paper, gum and oil industries (Ahmed 1956 and Magnier 1971).

Guar plants are attacked by some pathogens which cause root rot and wilt diseases. The impact of these diseases on yield is remarkable (Matiock and Oswalt 1964, Singh and Solank 1974 and Arab 1983). Several soil-borne fungi were frequently reported as the causal organisms of these diseases namely *Rhizoctonia solani*, *Sclerotium rolfsii*, *Fusarium equisti* and *Fusarium coeruleum* (Singh 1951, Vir and Grewal 1972, Morsy *et al.* 1987 and Arab 1983).

Chemical control and/or agricultural practices were applied to decrease root rot and wilt disease incidence and increase yield (Singh 1954, Singh and Singh 1955, Morsy *et al.* 1978 and Arab 1983).

In the present work, field studies were conducted at Ismaillia and Bahteem Agricultural Research Stations to determine the effect of seed dressing fungicides and agricultural practices, such as plant density and sowing date, on root rot/wilt disease incidence and some yield components of guar.

MATERIALS AND METHODS

The field experiments were conducted in sandy soil at Ismaillia and in clay soil at Bahteem Agricultural Research Stations under naturally infested soil.

1. Effect of seed dressing on root rot/wilt disease incidence and yield:

Guar seeds of a commercial cultivar (kindly provided by forage crops Dept., Field Crops Institute, ARC), were treated with five fungicides, namely, Rovral (50% Iprodione) at rate of 2 g/kg seed, Vitavax/Captan (37.5% carboxin + 37.5 captan) at a rate of 2 g/kg seed), Benlate (50% benomyl) at rate of 2 g/kg seed, Quinolate V4X (15% copper quinolate + 50% carboxin) at a rate of 3 g/kg seed; Homai 80 (60% Thiophanate methyl + 20% thiram) at a rate of 3 g/1 kg seed) and untreated seeds were used as a control treatment. 50 seeds were planted per row.

II. Effect of sowing date on the incidence of root rot/wilt disease complex and yield:

Guar seeds (50 seeds/row) were sown in three plantings at 15 days intervals

as follows: 1st of June 1990, 15th June 1990 and 1st of July 1990).

III. Effect of seed rate on the incidence of root rot/wilt disease complex:

Four seed rates were used as follows: 30 seeds/row, 50 seeds/row, 60 seeds/row and 70 seeds/row.

In the three experiments, rows were 3m long and four rows were used for each treatment. All treatments were replicated four times. All the agricultural practices were carried out as usual.

Root rot/wilt disease incidence (percentage of diseased plants) was counted and calculated 90 days after sowing. At harvest time, twenty plants from each treatment were taken at random to study the following characters: Plant height, number of pods/plant, number of seeds/pod, seed yield/plant and weight of 100 seeds. The obtained results were statistically analysed according to Snedecor and Cochran (1967).

RESULTS AND DISCUSSION

Results in Table 1 show that at both Ismaillia and Bahteem Research Stations, fungicide treatment offered a significant protection against root rot/wilt pathogens when compared with the control treatment (untreated seeds). However, differences among the fungicides efficiency were detected. Rovral at rate of 2 g/kg seed ranked as the most effective fungicide, followed by Vitavax/Captan at rate of 2 g/kg seed and Quinolate V4X at 3 g/kg seed, respectively. Nevertheless, Benlate was the least effective fungicide for controlling the disease.

Effect of seed dressing fungicides on growth and yield component at Ismaillia location showed an increase in seed yield/plant as a result of treating seeds of guar with Rovral, Vitavax/Captan, Quinolate V4X or Homai 80 when compared with the control treatment. On the other hand, plant height, number of pods/plant and number of seeds/pod did not differ significantly among the treatments (Table 1).

At Bahteem location, similar trends were obtained; however, seed yield/plant and plant height were almost twice that at Ismaillia location (Table 1). This increase

Table 1. Effect of seed dressing fungicides on the incidence of root rot / wilt disease complex of guar at Batheem and Ismaillia under field condition.

Fungicides	Dose g/kg seed	% of infected plants		Plant hieght (cm)		Seed yield / plant (g)		No. of pods / plant		No. of seeds/ plant		Weight of 100- seed (g)	
		Bah	Isma	Bah	Isma	Bah	Isma	Bah	Isma	Bah	Isma	Bah	Isma
Rovral	2	18.9	27.7	174.0	65.0	30.0	20.8	64.2	50.5	6.8	6.5	6.2	4.7
Vitavax/Captan	2	19.0	34.0	176.7	59.5	33.6	21.3	69.0	50.0	6.9	6.5	6.2	4.8
Quinolate V4x	3	20.8	35.9	167.5	61.7	34.1	20.2	60.1	42.7	6.5	6.4	6.9	5.7
Benlate	2	29.0	38.0	179.2	63.7	20.1	17.8	56.0	45.3	6.4	6.1	6.4	6.2
Homai 80	3	30.1	34.5	176.0	61.5	33.0	19.9	58.1	47.6	6.7	6.0	5.9	5.4
Control	-	35.0	35.0	161.7	67.7	26.0	17.0	59.0	53.0	6.1	5.3	5.8	5.6
L.S.D. at 5%		4.3	7.2	N. S.	N. S.	2.9	2.0	N. S.	N. S.	N. S.	N. S.	N. S.	0.4

N.S. = Not signifcant.

in seed yield as a result of fungicides application is mainly due to a notable increase in plant stand (percentage of survival plants). These finding are in agreement with Singh and Solanki (1974) and Arab (1983), who found constantly an increase in seed germination and seedling vigour of guar after fungicides application.

Data in Table 2 showed that percentage of root rot/wilt disease complex was decreased significantly when guar seeds were sown on 15th of June or 1st of July. Moreover, seed yield was also increased in the late dates of sowing than in the early sowing date (1st of June) at both locations. Plant height did not differ significantly at Ismaillia location among the different dates of sowing. While at Bahteem, significant differences among the treatments were detected.

Hence, guar plants grow better in semi-arid areas, the high temperatures of middle of June or first of July favour the development a strong plant growth which may tolerate root rot/wilt infection. Supporting evidence were reported by Singh (1954), Freigoun (1980) and Salih and Ageeb (1988). They found that date of sowing can reduce root rot and wilt disease incidence in guar and faba bean, respectively. Also, Dahiya *et al.* (1988) reported a significant reduction in wilt disease in chick-pea as a result of appropriate sowing data.

Results presented in Table 3 showed that seeding rates affected root rot/wilt disease incidence which was reduced at the lower seed rate (30 and 50 seeds/row). Also, seed yield/plant at both locations (Ismaillia and Bahteem) was increased at the lower seed rates than at the higher seed rates (60 and 70 seeds/row). Plant height at Bahteem exceeded that obtained at Ismaillia, probably due to nutritional factors among others.

The lower seed yield per plant found in the higher seed rates (60 or 70 seeds/row) may be due to the competition among the higher plant populations, thus resulting weaker plant. Singh and Singh (1955) mentioned that thin sowing reduced root rot/wilt in guar plants than thick sowing.

Generally, guar plants successfully were grown at Ismaillia and Bahteem locations, however, growth and some yield characters at Bahteem were remarkably better than that at Ismaillia. This could be due to the prevalent agroclimatic conditions at Bahteem which were more favourable for guar growth. Moreover, Bahteem soil is clay and rich in organic matter unlike Ismaillia soil which is sandy in texture with less capacity in holding water and poor in organic matter and micro- and macro-elements (Kadry *et al.* 1988). Also, the use of agricultural manipulations (seed

Table 2. Effect of sowing date on the incidence of root rot/ wilt diseas complex, seed yield and plant height at Ismailia and Bahtim during summer of 1990.

Sowing dates	% of root rot / wilt		Seed yield / plant (g)		Plant height (cm)	
	Bahteem	Ismaillia	Bahteem	Ismaillia	Bahteem	Ismaillia
1 st June	46.0	49.5	24.3	11.7	155.2	55.4
15 th June	44.3	47.1	25.1	17.6	147.9	53.3
1 st July	39.2	42.0	27.3	17.3	139.9	53.9
L. S. D. at 5 %	3.19	2.2	0.2	0.6	21.1	N.S.

Table 3. Effect of seed rate on the incidence of root rot / wilt disease complex, seed yield and plant height.

Number of seed / fow	% of root rot / wilt		Seed yield / plant (g)		Plant height (cm)	
	Bahteem	Ismaillia	Bahteem	Ismaillia	Bahteem	Ismaillia
30 seeds / row	31.4	38.0	34.2	18.6	188.1	55.8
50 seeds / row	33.9	38.3	34.3	18.2	167.2	64.5
60 seeds / row	37.5	40.5	27.9	16.4	169.7	68.8
70 seeds / row	39.7	43.5	25.3	15.1	172.5	70.8
L. S. D. at 5 %	5.6	3.9	2.4	1.9	N. S.	8.1

rate and sowing date) along with seed dressing fungicides might help in reducing root rot/wilt disease incidence and subsequently increase yield of guar plants.

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تأثير بعض المبيدات الفطرية ، مواعيد الزراعة ، معدلات التقاوى على نسبة الاصابة بمرض عفن الجذور الذبولى المركب والمحصول لنباتات الجوار

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تم اختبار معاملة بذور الجوار ببعض المطهرات الفطرية وكذلك دراسة تأثير مواعيد الزراعة ومعدلات التقاوى على نسبة اصابة الجوار بمرض عفن الجذور الذبولى المركب وتأثير ذلك على بعض الصفات المحصولية.

دلت النتائج الحقلية التى أقيمت فى محطتى البحوث الزراعية بالاسماعيلية وبهتيم أن معاملة بذور الجوار بمبيدات روفرال أو فيتافاكس كابتان (بمعدل ٢ جم/كجم بذور) قلل نسبة الاصابة معنويا بمرض عفن الجذور الذبولى المركب ، كما سببت زيادة معنوية فى المحصول عند مقارنتها بنتائج البذور غير المعاملة (الكنترول). أيضا بينت نتائج الزراعة المتأخرة فى منتصف يونيو وأول يوليو وكذلك استخدام معدلات التقاوى ٣٠ و ٥٠ بذرة للخط (٣ متر) الى تقليل نسبة الاصابة بالمرض موضوع الدراسة.

كما لوحظ أن أطوال النباتات والمحصول فى الجوار كانت أعلى بشكل واضح فى محطة بهتيم عنها فى محطة الاسماعيلية.