

Root Rot of Wheat in the Libyan Jafara Plain: Chemical Control and Cultivar Susceptibility

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ABSTRACT

Four seed dressing fungicides were used in controlling root rot disease caused by *Drechslera sorokiniana* on four wheat cultivars. Results showed a variation in the efficacy of fungicides and the ability of cultivars to withstand the disease infection. All fungicides used, significantly reduced the disease severity on the four wheat cultivars. Granosan was more effective with Sidi-Masri and Gameneya. All wheat cultivars used were susceptible to the pathogen.

INTRODUCTION

Wheat is one of the most important cereal crops grown in Libya. The total cultivated area during 1982/83 growing season was 248,000 hectares with a production of 208,670 tons (9). In the last few years the yield of cereal crops in the Jafara Plain Cereals Project has been decreasing. Preliminary survey of the disease situation (4) indicated that common root rot caused by *Drechslera sorokiniana* was prevalent.

Chemical seed treatment for disease control has become a standard practice for cereal crops and is relatively an easy and inexpensive method of disease control. Seed treatments have been shown to effectively control the seed-borne phase of *D. sorokiniana* in New Zealand (5). Poor results were achieved in Canada when seed treatments were used to control the root rot disease because control of the pathogens on/around the seeds did not necessarily prevent infection of the basal stems and subcrown internodes, especially when soil borne conidia were also present (2). In New Zealand, systemic base fungicides carboxin, carboxin + thiram and carbendazim + maneb, applied at a rate of 0.4% active ingredient significantly reduced disease severity. The latter two fungicides also significantly increased plant weight over that of the untreated control (6).

Disease severity and yield loss relationship studies for two consecutive years revealed high estimate of yield losses (4). The objectives of this study were to evaluate the comparative efficacy of seed dressing fungicides in controlling root rot of wheat and the ability of wheat cultivars to withstand soilborne conidial infection.

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MATERIALS AND METHODS

Four wheat cultivars (Gameneya, Sidi Masri, Tannuri and; Mexicali) were grown under dry farming conditions at Jafara Plain Cereal Project. The common name, active ingredients (a.i.) and percent a.i. of the four fungicides were:

- 1) Agrosan, (Phenyl mercury acetate) 1.6% W/W organomercury.
- 2) Granosan, Carbendazim (Methyl-2 benzimidazole carbamate; A 5% Maneb (Manganese-ethylene bis-dithiocarbamate 60%.
- 3) Mancozeb (1, 2-ethanediyil biscarbamodithioato (2-) manganese mixture with (1, 2 ethanediyilbis (Carbamodithioato) (2-) Zinc. 80%.
- 4) Quintozene (Terrachlor) Pentachloro nitrobenzene 75%. + Fenaminosulf (Dexon) Sodium 4-Dimethylamino-phenyl diazene sulfonate 70%.

A mixture of quintozene and fenaminosulf was also used in this trial. Fungicides were mixed directly with the seed in a jar at a rate of 2gms formulation per kilogram of seeds. Three replicates of 20 plots 2m² were set up for each treatment/cultivar combination in Abushayba where conidia of *Drechslera sorokiniana* were abundantly recovered from the soils tested. Field plots were fertilized with ammonium phosphate at a rate of 170 kg/ha. The disease score was tested at growth stage 11.3 (7) by sampling 100 plants randomly selected from each treatment as suggested by Ledingham (8).

RESULTS AND DISCUSSION

Results are summarized in Table 1. They indicate a variation both in the efficacy of fungicides and the ability of cultivars to withstand the disease infection. All the fungicides used significantly reduced disease severity on the four wheat cultivars compared with untreated control. Granosan, Mancozeb, and PCNB + Dexon were not significantly different among themselves when dressed on Gameneya seeds. However, there was significant difference between granosan and agrosan. Granosan and agrosan gave better disease control with Sidi Masri compared with Mancozeb and PCNB + Dexon. Similar results were obtained by using different seed dressing fungicides i.e. carboxin, carboxin-thiram, carboxin-captan, benomyl, Mancozebe, Duter, Panogen 15, Panogen PX, and LFA 2043 for the control of root rot of wheat and barley (1, 2, 3, 5, 10). Variations in the efficacy of fungicides used in this experiment were due to chemical structure, mode of action and other properties of each chemical.

Table 1 — Comparison of disease incidence on wheat cultivars fungicides mixtures.

Wheat cultivars	Fungicides ^a				
	Agrosan	Granosan	Mancozeb	PCNB + Dexon	Control
Gameneya	15 ^b	11.2	12.4	13.1	19.6
Sidi Masri	6.2	4.7	11.9	10.2	17.6
Mexicali	14.25	13.4	14.0	15.3	20.0
Tannuri	11.8	14.5	14.3	14.6	20.2

a = Treatment = 200 gm. fungicide/ 100kgm seeds LSD at 5% 3.65

b = % disease incidence.

Our results show that all wheat cultivars used were susceptible to the pathogen (Table 1). In New Zealand no barley cultivar was immune to *D. sorokiniana*, although some recently released cultivars were less susceptible than the widely grown cultivar Zephyr (6). Variations existed within cultivars for a given chemical treatment. These variations may be due to the genes of the cultivars. The continuing and more wide spread use of these and similar seed treatments should ensure that spread of the pathogen via seed-borne inoculum is controlled and the use of seed treatments allied with low population of conidia in the soil, coupled with sanitation and other cultural practices, may lead to a reduction in root rot of cereals or at least prevent the build up of the pathogen involved.

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تعفن جذور محصول القمح بسهل الجفارة بليبيا المكافحة الكيماوية وقابلية الأصناف للإصابة

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المستخلص

تمّ معاملة بذور أربعة أصناف من القمح (سيدي المصري، جامينا، تانوري، ومكسيكالي) بالمبيدات الفطرية (جرانوسان، أجروسان، مانكوزيب، ومخلوط من تراكلور وديكسون) لمكافحة مرض تعفن جذور محصول القمح المتسبب عن الفطر *Drechslera sorokiniana* بنسبة 200 جرام / 100 كجم بذور.

وأوضحت النتائج بأن هناك فروقات متباينة من حيث فاعلية المبيدات ومدى مقاومة الأصناف للإصابة بالكائن الممرض، كما أثبتت أيضاً أن المبيدات الفطرية لها تأثير إيجابي وفعال في مكافحة المرض على الأصناف الأربعة عند مقارنتها بالبذور غير المعاملة (مقارنة)، أما المبيد الفطري جرانوسان فقد كان له تأثير جيد فقط على الصنفين سيدي المصري وجامينا، كما أن الأصناف المستعملة في هذه الدراسة لم تكن مقاومة للإصابة بالفطر *D. sorokiniana*.

مطابع اديتار

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