

Survey of Seed-Borne Fungi in the Libyan Jamahiriya

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ABSTRACT

Seeds of nine crops were tested by routine seed health testing. A total of 21 fungal species representing ten genera were identified and are considered a new record for the Libyan Jamahiriya.

INTRODUCTION

Seed production is increasing annually in the Libyan Jamahiriya due to the increase of cultivated area established by the government in many agriculture projects. Wheat and barley are the most important crops grown in the country. Other crops such as oat, sorghum and maize are used as forage crops. Vegetable crops such as tomato, bean, pepper, pea and chickpea are grown in small scale but their seed production may increase in the future.

Several seed-borne diseases are known to occur on these crops in other countries (9,11). In the Libyan Jamahiriya few attempts have been made to survey plant diseases (1,4,5,8), but there has not been any comprehensive study of seed-borne organisms. The present investigation comprises a study of seed-borne fungi, associated with seeds of important crops in the Libyan jamahiriya.

MATERIALS AND METHODS

Twenty three samples of nine crops harvested in 1975-1976 were obtained from farmers in Tripoli, Garian, El-Zawia and Ben-Gashir. The following methods were used:

1. Dry examination

About 400 seeds of each sample were first examined by the naked eye and then under low magnification of a stereomicroscope.

2. Blotter method

Seeds of each crop were examined for seed-borne fungi by the blotter method (6). Four hundred seeds selected randomly from each of the 23 samples, with or without

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Table 1 Seed-borne fungi encountered in seed of crops from the Libyan Jamahiriya.

No. of samples	2	3	3	2	3	3	3	2	2
Fungi Host	Capsicum annuum L. (Chilli, pepper)	Cicer arietinum L. (Chick pea)	Hordeum vulgare L. (Barley)	Phaseolus vulgaris L. (Bean)	Pisum sativum L. (Pea)	Lycopersicum esculantum L. (Tomato)	Sorghum vulgare L. (Sorghum)	Triticum aestivum L. (Wheat)	Zea mays (Maize)
<i>Alternaria tenuis</i>	-*	-	+	-	-	-	+	+	+
<i>A. Porri</i>	+	-	-	-	-	-	-	-	-
<i>Ascochyte pisi</i>	-	-	-	-	+	-	-	-	-
<i>Aspergillus flavus</i>	+	+	-	-	+	-	-	-	-
<i>Aspergillus niger</i>	-	-	-	-	-	-	-	-	-
<i>Aspergillus sp.</i>	-	+	+	+	+	+	-	-	-
<i>Collettrichum dematium</i>	-	-	-	-	-	+	-	-	-
<i>Drechslera bicolor</i>	-	-	-	-	-	-	+	-	-
<i>Drechslera sorokiniana</i>	+	-	+	-	-	-	-	+	-
<i>Drechslera teres</i>	-	-	+	-	-	-	-	+	-
<i>Drechslera sp.</i>	+	-	+	-	+	-	-	-	-
<i>Fusarium equiseti</i>	+	-	+	+	+	-	-	+	-
<i>F. graminearum</i>	-	-	+	-	-	-	-	+	-
<i>F. moniliformae</i>	+	+	+	+	-	-	+	+	+
<i>F. oxysporum</i>	-	+	+	-	-	-	-	-	-
<i>F. semitectum</i>	-	+	-	+	-	-	-	-	-
<i>F. solani</i>	-	+	-	-	-	+	-	-	-
<i>Myrothecium sp.</i>	-	+	-	-	+	-	-	-	-
<i>Phoma sp.</i>	-	-	-	+	-	-	-	-	-
<i>Sclerotium rolfsii</i>	-	-	-	+	-	-	-	-	-
<i>Stemphylium sp.</i>	-	-	+	-	-	-	-	-	+

* (-) No fungi isolated.

(+) Fungi isolated.

Table 2 Percentage of predominant seed-borne fungi isolated from indicated crops.

% isolates					
Crop	<i>Alternaria tenuis</i>	<i>Aspergillus sp.</i>	<i>Drechslera sp.</i>	<i>Fusarium equiseti</i>	<i>Fusarium moniliformae</i>
Barley	40	12	18	13	28
Bean	—	6	—	36	20
Chick pea	—	17	—	12	16
Maize	11	—	—	—	—
Pea	—	3	—	—	31
Pepper	—	8	1	10	—
Wheat	—	0.5	14	—	15

surface disinfection by dipping the seeds in 10% clorox (sodium hypochlorite) solution for 10 minutes, were plated in plastic petri-dishes. The plates contained three layers of moistened blotters. The number of seeds incubated per petri-dish depended on size of the seed tested; 50 in the case of small seed; 25 for medium sized and 10 for large sized. The plated seeds were then incubated at $25 \pm 2^\circ\text{C}$ for seven days in alternating cycles of 12 hours near ultraviolet light and 12 hours darkness. All fungi were identified under stereomicroscope (wild M 8 type) based on their growth character, followed wherever necessary by preparation and examination of slides under compound microscope (2,3,7,10).

Seeds of some crops were additionally tested by the Agar plate Method (6). Seeds were treated with 10% clorox and incubated as in the standard method.

RESULTS AND DISCUSSION

Dry examination of most of the seed samples of different crops contained impurities such as dust particles, stones, pieces of straw and weed seeds. Insect damage was observed in some of the samples of peas, bean, wheat and barley. Discoloration was observed in barley.

Fungi found in seeds of different crops are recorded in Table 1. A total of 21 fungal species representing 10 genera were identified. The predominant fungi isolated from the majority of the samples were listed in Table 2. *Alternaria tenuis* was isolated from 40% of the barley samples and was associated with discoloured grains. The role of *Alternaria tenuis* and its effect on barley seed should be investigated. The widespread occurrence of *Fusarium moniliformae* infecting a wide host range is of particular interest. The pathogenic potentials of this fungus and the other listed in Table 1 should be investigated.

The fungi identified in this study are the first seed-borne organisms to be recorded in the Libyan Jamahiriya. There is a need to establish a good program for detection of pathogenic organisms in seeds of many crops. Imported seeds should be checked thoroughly for pathogens to avoid introduction of new diseases to the country. Also infected seeds should not be introduced to unfested areas within the country.

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حصار لأمراض البذور بالجمهورية

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تم اختبار تسعة أنواع من بذور المحاصيل المختلفة بالطرق التقليدية المعروفة وذلك لعزل بعض الفطريات المحمولة بهذه البذور ، وقد تم تعريف احدى وعشرون نوعا من الفطريات تمثل عشرة أجناس .

وتعتبر هذه الدراسة الأولى من نوعها في الجمهورية من حيث حصر الفطريات المحمولة في هذه البذور وتحديد أنواعها وأجناسها .