بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

STUDIES ON EAR AND KERNEL ROT OF MAIZE CAUSED BY *ASPERGILLUS* AND *FUSARIUM* SPP.

BY

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INTRODUCTION

INTRODUCTION

Maize (*Zea mays* L.) is considered one of the most important cereal crops in Egypt. The cultivated area of maize is about two million feddans yielding almost 5.5 million tons according to the annual report of the Statistical Department, Ministry of Agriculture, A.R.E (1999).

Maize is subjected to the attack by several diseases. Some major diseases threat maize productivity. Grain mold in Egypt is one of the most prevalent diseases of maize. The disease may be caused by any one (or more) of several fungi, depending on locality and variety. Surveying harvested maize grains allover the country were done by maize pathologists throughout the National Campaign for Maize Productivity in Egypt (1997& 1998) revealed that the grain samples collected from-maize growing fields were contaminated with molds that caused visible and invisible deterioration. *Fusarium* spp. and *Aspergillus* spp. were found to be the most common fungi that could be recovered from the affected ears. These molds are known to be increased under bad storage conditions (Halloin, 1975) along with the produced mycotoxins. Aflatoxins as serious metabolites to human and animal that could be produced by some strains of *Aspergillus flavus* and *A.parasiticus* have been extensively studied by previous investigators.

This investigation was carried out to determine storage conditions that badly affect the stored maize grains expressed as kernel contamination with stored fungi as well as toxin production. Isolation and identification of ear and grains-rotting fungi and studying methods of artificial inoculation were studied. Also, the commercial maize hybrids

were screened for their susceptibility to infection with ear and grain molds under field conditions.

REVIEW OF LITERATURE

From ripening through harvest and storage, maize grains are especially vulnerable to attack by microorganisms by process commonly reffered to as weathering (Halloin, 1981) and storage deterioration (Christensen & Kaufmann, 1969). Fungi that play an important role in deterioration can be divided into field and storage fungi, based on their occurrence on cereal grains. Field fungi are those that contaminate or invade grains in the field, often during or after ripening, and during harvesting operations. These include genera such as *Fusarium*, *Alternaria* and *Helminthosporium* on grains. Storage fungi develop on grains during storage and commonly fall into two genera, *Aspergillus & Penicillium*. Field fungi can increase on grains under exceptional moist storage conditions (Halloin, 1975). Grain moisture content, temperature and relative humidity around stored grains, cracked kernels, length of time the grain is to be stored, and amount of insect and mite activity in grains are the major factors that determine when stored grains will be damaged by storage fungi (Scott, 1997). There are two major mechanisms by which microorganisms (primarily field and stored fungi) damage grains. These are production of exocellular enzymes and toxins. Various fungi, especially *Aspergillus & Fusarium* spp., produce mycotoxins, components toxic to animal and human.

Lutey & Christensen (1963) reported that filed fungi, such as *Alternaria, Fusarium,* and *cladosporium*, require higher moisture contents which amount to 24-25 %; they can be eliminated by storage at 14% moisture content at 30°C for 16 weeks. Stored fungi grow most rapidly at a temperature of 30°C, but some are thermophilic that can grow at temperature more than 30°C (Christensen and Kaufmann, 1969 and Muling & Chesters, 1970).

Gamal El-Din *et al.* (1987) reported that the most dominant fungi in maize grains could be arranged descendingly as *Fusarium moniliforme, Nigrospora oryzae, Fusarium graminearum, Penicillium* spp. *Aspergillus flavus, Aspergillus niger, Helminthosporium* spp., *Rhizopus* spp., *Mucor* sp. and *Alternaria* spp. They mentioned that severity and percentage of infection by these fungi increased by increasing moisture content and storage period. Prolonging storage periods at 18 °C generally resulted in reduced weight of both the germ and hull in either healthy or infected grains by *Nigrospora oryzae,* whereas no difference occurred when infected by *Fusarium moniliforme.*

Fusarium moniliforme J. Sheld is a widely distributed pathogen of maize (Zea mays L.), causing seedling disease, root rot, stalk rot, and ear or kernel rot (Kommedahl and Windels, 1981; Nelson, 1992 and Munkvold, 1994).

Saubois *et al.* (1996) identified *Fusarium* strains isolated from maize at harvest during 1993 in different fields of the northern-center area of the province of Santa Fe, Argentina, to the species level. Their distribution in the samples was evaluated and studies of prevalence were performed in maize grains from this region. The prevalence of *Fusarium* spp. In the samples was 100% and 29% were colonized by > 1 spp. *F. moniliforme* (*Gibberella fujikuroi*) was identified in 52.6% of the samples, *F. subglutinans* (*G. fujikuroi* var. *subglutinans*) and *F. graminearum* (*G. zeae*) in 29% and *F. oxysporum* in 2.6%. *G.fujikuroi* presented the highest levels of colonized grains (7.5-52.5%).

Caldwell *et. al.* (1981) suggested that *Fusarium moniliforme* is a better competitor in preharvested maize than *Pencillium funiculosum.* Initial kernel infection by the first pathogen may serve as an important deterrent to subsequent kernel invasion by other seed-infecting molds. However, from 15 species of *Pencillium* tested in the field, only there