STUDIES ON BUNCH ROT DISEASES OF GRAPEVINE AND THEIR CONTROL

BY

MOHAMED ZAKI EL-SAYED GANIB
B. Sc. (Plant Pathology), Fac. Agric., Cairo Univ., Egypt, 2000.

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APPROVAL SHEET

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Approved by:

Dr. MOHAMED SALAH EL DIN FELAIFEL .....
Chief Researcher of Plant Pathology Research Institute, A. R. C.

Dr. MOHSEN AHMED MOSTAFA ……
Professor of Plant Pathology, Fac. Agric., Cairo University.

Dr. MOHAMED FAROUK ATTIA ……
Professor of Plant Pathology, Fac. Agric., Cairo University.

Dr. MAGDY MOHAMED SABER ……
Professor of Plant Pathology, Fac. Agric., Cairo University.

Date: / /

SUPERVISION SHEET

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SUPERVISION COMMITTEE

Dr. MOHAMED FAROUK ATTIA
Professor of Plant Pathology, Fac. Agric., Cairo University.

Dr. MAGDY MOHAMED SABER
Professor of Plant Pathology, Fac. Agric., Cairo University.

Dr. HUSSIEN ABD EL KAWY HUSSIEN
Senior Researcher of Plant Pathology, Pl. Patho. Res. Inst., A. R. C.

Name of Candidate: Mohamed Zaki El-Sayed **Degree:** M.Sc.
Title of Thesis: Studies on bunch rot diseases of grapevine and their control
Supervisors: Prof. Dr. Mohamed Farouk Attia, Prof. Magdi Mohamed Saber and Dr. Hussien Abd-El-Kawy Hussien
Department: Plant Pathology

Approval: / /

ABSTRACT

Two field trails with 15 years old grapevines cv. Thompson Seedless were conducted during 2003 and 2004 at Nobariya from Behera governorate to study the effect of the integrated disease management including canopy management, chemical control and biological control (during 2004 and 2005) to controlled the bunch rot disease.

The results showed that the disease incidence and severity were reduced by application of the canopy management treatment compared with non managed control. Also, data showed that the disease incidence and severity were reduced when the vines were treated with three sprays of fungicide (Euparen M) at bloom, pre-close and veraison stages.

Also, some factors which effect the disease were studied *i.e.* maturity stages, effect of temperature on rot development, different levels of nitrogen fertilizer (tested on cv. Red Globe of grapevine 10 years old at Meniya governorate during 2003 to 2004), gibbrellen applications (tested on Thompson Seedless cv. During 2004 to 2005), reaction of different grapevine cultivars to fungi causing bunch rot disease (tested on Thompson Seedless, Red Globe, Superior, Erly-Superior, Ruby Seedless and Flame Seedless). Fungi associated with the disease were isolated *Botrydiplodia theobromae, Alternaria alternata, Aspergillus flavus, Cladosporium herbarum, Penicillium italicum, Rhizopus* spp. and *Botrytis cinerea.* Also, some physiological studies on the fungi causing bunch rot disease, including the effect of pH and temperature on the causal fungi were carried out.

DEDICATION

I dedicate this work to whom my heart felt thanks to my parents and brothers and my sister for all the support they lovely offered along the period of my Degree of Master of Science. Also my friend's ***Mohamed Sabry*** *and* ***Alla Hashim*** *for their patience and help, as well as to me.*

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INTRODUCTION

Grapevine (*Vitis vinifera* L.) is the leading fruit crop all over the world. In Egypt, grapevine occupies the second rank among fruit crops after citrus. its important is due to the high sugar and vitamin contents, which are used for human consumption. However, the area under this economic crop was about 160005 feddans and the average of grape production reached 1391749 tons. (Anonymous, 2005).

Grapevine cultivars *i.e.*, Thompson Seedless (Banati), Superior, Early Superior, Flame Seedless, Ruby Seedless, Red Globe, Romi-Red, Fayoumi, Bezelanz, Azazi and Gharibi are the most important cultivars cultivated on a commercial scale, particularly in Behera, Dakahliya, Gharbiya, Menofiya, Sharkiya, Meniya, Fayoum and Beni Sweif governorates.

Under the Egyptian environmental conditions grapevine is attacked by several diseases, among which powdery and downy mildews and bunch rot diseases are of great economic importance.

Bunch rot under the Egyptian environmental conditions is a serious disease of grapes (*Vitis vinifera* L.) caused by *Alternaria alternata, Asperigillus niger, Botyritis cinerea, Botryodiplodia theobromae, Penicillium italicum, Cladosporium herbarum*, and *Rhizopus negricans* (El-Helaly *et al.*, 1965; Bedeer, 1976; Badawy, 1977; El-Tobshy *et al*., 1981; Radwan, 1985; Farag, 1992 and Mahrous, 1988 and 2003). In this instance, bunch rot of grape berries is commonly occurs in cultivars with dense canopies or tightly berry clusters. In Egypt, first symptoms of the disease on susceptible

cultivars are generally evident when fruit sugar levels begin to increase (veraison).

The major objective of the modern Egyptian agriculture is offering strategy which would lead, with the minimum use of pesticides, to increase the yield of economic crops. Accordingly, it seems extremely important to study this disease and its causal pathogens under the Egyptian environmental conditions to determine the best control measures which lead, as possible, to minimize the great losses caused by this disease at different stages of vine growth.

The present study was carried out in the laboratory and in private vineyards located in different governorates.

As a matter of fact, the knowledge of grapevine bunch rot disease in Egypt is still scanty and uncertain. Therefore, the present investigation was planned to clarify some topics to cover, as possible, the problems caused by the disease and face grapevine producers in ARE. These topics are as follow

1. Determination the occurrence and spread of bunch rot disease through an extensive survey conducted in several localities to highlight the economic importance of the disease.
2. Identification of the pathogens associated with the infected clusters of grapevine representing different localities and cultivars.
3. Studing the pathogencity of isolated fungi under standard conditions.
4. Studing the effect of some factors on the infection and the wide spread of the pathogens *i.e.* degree of maturity stages, different

levels of nitrogen fertilizer and some plant growth regulators (gibberellic acid).

5. The reaction of some grapevine cultivars to the disease.
6. The possible role of the antagonistic bio-agent *Trichoderma virde* in the biological control against grapevine bunch rots.
7. Screening of bio-fungicides to determinate the best and the least enveronmintal hazardous one for biological control.
8. Screening of fungicides to determinate the best and the least environmental hazardous one for chemical control.

REVIEW OF LITERATURE

1. Occurrence and distribution of the causal organisms of Grapevine bunch rot.

In many different countries, there are information and regional surveys about the infection of grapevine with bunch rot disease, *i.e*. Diaz Polanco and Bastida (1971) in Venezuela; Gupta (1956), Chahal and Malhi (1969), Patil and Moniz (1969) and Singh and Kainsa (1983) in India; Ouchi *et al.* (1976) in Japan; Du Plessis (1948) in South Africa; Marshina *et al.* (1979) in USSR; Barbetti (1980) and Nair (1985) in Australia; Krol (2004) in Poland and El-Helaly *et al.* (1965), Ragab (1971), Bedeer (1976), Badawy (1977), Abd-El-Sattar (1978), El-Tobshy *et al*. (1981), Radawan (1985), Farag (1992) and Mahrous (1988 and 2003) in Egypt.

Bunch rot disease of grapevine is mainly caused by different fungi belonging to different genera and species.

Du plessis (1948) attributed the rotting and spoilage of dessert grape to various causes, *e.g*. grey mold (*B. cinerea*), blue-green molds (*Penicillium* spp.), black molds (*Aspergillus* spp.), cobweb mold (*Rhizopus nigricans*) and velvet mold (*Cladosporium baccae*). *Hormiscienceum* sp., *Hormodendrum* sp., *Penicillium* sp., *Rhizopus* sp. and *Stemphylium* sp. are common raisin mold and rot fungi.

Gupta (1956) pointed out that *Aspergillus carbonarius* was isolated from infected grape berries. The fungus gained entrance through bruised surfaces or stem end of un-bruised fruits.