

CHAPTER 1

INTRODUCTION

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Several hundred mealybug species occurred and most plants are susceptible to one or more of these insects. Some species, like the Mealy bug *Icerya seychellarum* (Westwood), the citrus mealybug and obscure mealybug occur on many different hosts throughout mild-winter areas. Mealybugs tend to congregate in large numbers, forming white cottony masses on plants. High population slow plant growth and cause premature leaf or fruit drop and twig dieback. Honeydew production and black sooty mold are the primary damage caused by most mealybugs. Also, high population can cause plant decline and young plants may be killed.

Pesticides are substances applied to kill or repel pests or control damage. They can provide a quick but temporary reduction in pest populations. Some pests develop resistance to pesticides so that spraying becomes less effective. The tolerant and resistant individuals are more likely to survive an application and produce descendents. Pesticides sometimes damage plants (cause phytotoxicity), especially if plants lack proper cultural care, environmental condition are extreme, or pesticides are used carelessly. Pesticides are currently the principal method for pest control and will likely continue to be used until more biologically based management systems can be developed and to meet this demand, pesticides suppliers have begun to commercialize biopesticides as an alternative to chemical ones.

Biopesticides are naturally occurring organisms or their by-products that can be used to control pests. The entomopathogenic fungi can be used as biopesticides since they cause infection to their respective hosts. The

entomopathogenic fungi can attack a wide range of both immature and adult insects. They also available now as commercially biopesticides because they can be mass-produced by a fermentation process and formulated to enable the fungi to withstand ultraviolet light and temperature and humidity conditions encountered in the field.

Damage of arthropod pests is one of the most serious threats to the world economy. A variety of methods have been used for their control. The need for the use of biological control agents rise due to the pesticide resistance, food safety concerns and environmental awareness. The use of entomopathogenic fungi is an important and promising component of bio-control agents for controlling arthropod pests. This study focuses on the potential of an entomopathogenic fungus against an insect pest to evaluate the virulence of this entomopathogenic fungus in order to be involved with the eco-friendly arthropod pest management strategy.

The entomopathogenic fungi would become integral components of many insect-pest management systems (Pierre Ferron, 1985).

The present investigation was designed to coincide the following requirements:

- 1- Evaluation of the pathogenicity of the biocontrol agent *Verticillium lecanii* against *Icerya seychellarum* on citrus in the greenhouse.
- 2- Determination of the virulence of *Verticillium lecanii* (Zimm.) Viegas passage through artificial media and an insect host *Icerya seychellarum* (Hemiptera: Monophlebidae).
- 3- Mass-production of *Verticillium lecanii* on different media types

(liquid media, solid media and diphasic system).

- 4- Evaluation of shelf life and viability of laboratory prepared wettable powder formulation of the entomopathogenic fungi *Verticillium lecanii* (Zimm.) Viegas.

- 5- Evaluation of the biological performance of certain bio- pesticides, botanical, mineral oils, and chemicals insecticide against the mealy bug *Icerya seychellarum* in Citrus trees with two sprays types (Application at sunset and Application in the morning).