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STUDIES ON INSECT VECTORS OF PLANT VIRUS DISEASES INFESTING LEGUMES IN EGYPT

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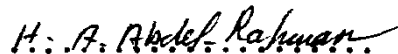
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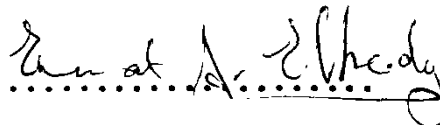
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INTRODUCTION

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INTRODUCTION

Leguminous crops are important in the diet of a large percentage of the population of the world. They are grown for home use, for market, for canning, for freezing, or for seed purposes. The most important food legumes are Faba bean, Vicia faba L.; Beans, Phaseolus vulgaris (L.); Pea, Pisum sativum L.; Cowpea, Vigna sinensis (Savi.); Lentil, Lens esculenta (Moench); Fenugreek, Trigonella foenum-graecum L.; Lupin, Lupinus termis (Forsk.); and Lucerne, Medicago sativa L., .. etc.

Legumes are liable to attack by several insect pests from the early stage of growth through the late developmental phase to the post harvest stage. The most important of the field insects in several countries as well as in Egypt are the different species of aphids, which cause severe crop losses principally by direct feeding damage and transmission of virus diseases.

The pea leaf roll virus (PeLRV) and cowpea aphid-borne mosaic virus (CAMV) are among the most important viruses known to infect V. faba and V. sinensis, respectively. They infect many other species of legumes, and are recorded in many parts of the world.

Because of the importance of the two viruses in the cultivation of food legumes in Egypt and a lack of information concerning various aspects in transmission

of the two viruses by insects, an investigation was undertaken to study the virus-vector relationship and susceptibility of certain faba bean varieties to aphid infestation. The economic threshold and the economic injury levels for Aphis craccivora on faba bean crop were studied. These are first records in Egyptian environment.

PART I

RELATION BETWEEN
APHIDS AND LEGUMINOUS PLANTS

REVIEW OF LITERATURE

1. Aphid Species Associated With Legume Crops :

Aphids are long-established pests of legume species in many parts of the world. The most important aphid species infesting legumes is the black bean aphid or "black-fly" Aphis fabae Scop., once known also as "Collier" and "black dolphin", which causes severe crop losses principally by direct feeding damage. The pea aphid, Acyrtosiphon pisum (Harris); Acyrtosiphon sesbaniae Karkarji David and the vetch aphid, Megoura viciae Buckt., are occasional pests which seldom cause economic damage by feeding but are associated more with the transmission of several virus diseases of Vicia faba L. The cowpea or groundnut aphid, Aphis craccivora Koch, is the principal pest of legumes in the world and causes damage both by direct feeding and transmission of virus diseases.

Legume is also an occasional host for several very polyphagous aphids, one of which the green-peach aphid, Myzus persicae (Sulz.) which may transmit virus disease to Vicia faba.

As far as legume aphids are concerned, there are many reports from different parts of the world indicating the relative importance of these aphid species and their seasonal occurrence on faba bean and cowpea plants in the spread of disease agent.

CS

Kirkpatrick (1955) noticed that Aphis craccivora was an abundant species infesting legumes.

Falk (1958) found that Aphis fabae caused a considerable damage to broad beans (V. faba) in Berlin.

Johnson (1966) found that the condition of the food-plant (Vicia faba) can have an important influence on the development of winged forms in A. craccivora in the field.

Smith and Bérube (1966) found that the size of populations of Macrosiphum (Acyrtosiphon) pisum (Harris) depended on food-plant species, aphid type, stage and number initially present, time of growth and some physical factors in Canada.

White (1967) reported that A. craccivora was found commonly on native plants of nine leguminous species which serve also as sources or reservoir of virus diseases transmitted by A. craccivora in Australia.

Wegorek and Ruszkiewicz (1968) found that the common aphid species occurring on leguminous fodder plants were Acyrothosiphon pisum, Therioaphis trifolii, Myzus persicae, Aphis fabae and A. craccivora. Population densities were affected by weather and declined after heavy rain in Poland.

El-Kady (1969) stated that A. sesbaniae was observed for the first time in Egypt on Vicia faba as well as A. pisum which naturally attack broad bean.