

EVALUATION OF SOME *Phaseolus* GERMPLASM FOR RESISTANCE TO THE TWO-SPOTTED RED SPIDER MITE. I. BIOLOGICAL, HISTOLOGICAL AND CHEMICAL STUDIES

Ahmed R. Aggour^{*}, Gad H. Rady^{**}, Mohammed M. Kandil^{**}, and Hussein A. Azouz^{**}

^{*}Department of Horticulture, ^{**}Department of Plant Protection, Faculty of Agriculture- Moshtohor, Zagazig University, Benha Branch

ABSTRACT

Two lima bean (*P. lunatus*) cultivars, i.e. Henderson and King of the Garden, two tepary bean (*P. acutifolius*) lines, i.e. Tepary 13, and Tepary 16 and two common bean (*P. vulgaris*) cultivars, i.e. Bronco and Giza 3, were evaluated for resistance to the two-spotted red spider mite. Incubation period, duration of immature stages, life cycle, female longevity, and female fecundity of the two-spotted red spider mite reared on leaves of the different *Phaseolus* germplasm under two different temperatures, i.e. 25°C and 28°C were found to be efficient in evaluating the genetic variation in resistance observed among these germplasm. Significant negative correlations were observed between thickness of upper and or lower leaf epidermis and each of female longevity and number of eggs/female. Number of hairs/mm² on the lower leaf surface of the studied *Phaseolus* germplasm was found to be one of the components of resistance to the two spotted red spider mite. The high levels of nitrogen, phosphorus, sugars, and total protein in leaves of *Phaseolus* germplasm were found to enhance preference of the individuals of the two-spotted red spider mite to live and reproduce on such leaves. On the other hand, the presence of potassium and sodium in leaves of *Phaseolus* germplasm at high levels was found to have negative effect on the individuals of the two-spotted red spider mite reared on such leaves.

INTRODUCTION

The different species of genus *Phaseolus* include several vegetable crops which have special importance in human diet and breeding programs of beans in many parts of the world (Hassan, 1993). *Phaseolus vulgaris* (common bean) is considered one of the most important crops for both local consumption and exportation. *Phaseolus lunatus* (lima bean) grows well in Egypt, and is considered as a good source for genes controlling resistance to high temperature. *Phaseolus acutifolius* (teparty bean) is considered as a good source for genes controlling tolerance to drought, salinity, and many diseases. Genes exchange among different *Phaseolus* species can be accomplished through classic breeding and biotechnology techniques (Aggour *et al.*, 1996).

The two-spotted red spider mite, *Tetranychus urticae* (Koch) is a very dangerous pest which attack bean plants in the field causing serious damage (Lee *et al.*, 1988; Farrag *et al.*, 1998) and under heavy infestation it can completely destroy the plants (Hill, 1987).