DNA fingerprints of faba beans tolerant to broomrape (*Orobanche crenata*, Forsk)

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ABSTRACT

Ten newly developed faba bean varieties (Cairo 1,Cairo 2 , Cairo 241, Cairo 375, Giza Blanca, Giza 2, Giza 402,Giza 461, Giza 674, and Giza 716) were subjected to molecular genetic analysis. Random primers for DNA amplification by PCR and agarose gel-electrophoresis gave clear variations of the DNA- banding patterns (ranging between 6 to 10 bands). Profiles of the DNA fingerprints of the varieties Cairo 1,Giza 402 and Cairo 241, known to be tolerant to broomrape parasitism, showed unique DNA bands as compared to other varieties. The constructed computer dendrogram of the banding data indicated clear relationships (0.44, 0.46&0.60) between the three aforementioned varieties. As G-402 (highly tolerant to broomrape) is a common ancestor of the varieties, it is possible that genes for resistance to O.crenata have been transmitted from G-402 to other newly developed varieties. Coefficient of relationships between the 10 varieties, at the DNA level, ranged from the lowest 0.22 (between Cairo-1 and Giza-716) to the highest 0.92 (between Cairo-2 and Cairo-241). Explanations of the degrees of relationships on the basis of the ancestores are discussed.

Key words: *DNA fingerprints, V.faba,resistance, O.crenata.*

INTRODUCTION

Faba bean is one of the most important plant protein resources in the Egyptian agriculture. It is the main protein crop for the low income people in Egypt. Faba bean is rating the first among the strategic crops in Egypt. Moreover, it is considered as an indirect source for nitrogen biofertilizers of the lands grown by it. In Egypt, most faba bean varieties suffer from susceptibility to many plant pathogenic microorganisms and pests that negatively affect productivity per unit area. The most important is its susceptibility to the destructive weed parasite broomarpe (*Orobanche crenata*,Forsk). Studies during the past three decades showed that the yield losses due to infestation with broomarpe are estimated by about 35-40%. Under severe infestation, loss may reach 100% annually (Hussein *et al.*, 1986). However, the problem became complicated, as most Egyptian agricultural soils are highly contaminated with the seeds of that dangerous parasite, which can remain alive in soil for more than 20 years. Application of herbicides definitely pollutes environment and, later leads to the accumulation of health risks.

Genetic analysis of faba been resistance to broomrape indicated that this character is under major and polygenic systems. Several trials have been made to study the genetics of resistance to broomrape in *Vicia faba* and related species.These studies, using biometrical analysis ,indicated the presence of additive – dominane models of polygenic