

The genetic basis of resistance to broomrape (*Orobanche crenata*, Forsk) in faba bean (*Vicia faba* L.)

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ABSTRACT

Broomrape (*Orobanche crenata*, Forsk) is one of the most dangerous weed parasites attacking leguminous plants. In this study, the genetics of tolerance of faba bean (*Vicia faba*) to broomrape was investigated using the six-generation model, i.e P_1 , P_2 , F_1 , F_2 , BC_1 and BC_2 using two faba bean crosses in a naturally infected field with the parasite seeds. Data on number of *Orobanche* heads per plant obtained from different generations were biometrically analyzed. The data fitted the additive-dominance model of quantitative genetics. The additive effect was significant. The current data strongly suggest the existence of a polygenic system controlling faba bean resistance (tolerance) to broomrape.

Key words: *Vicia faba*, *Orobanche crenata*, resistance, genetic analysis.

INTRODUCTION

Prior to the application of modern genetic techniques, it is required to obtain preliminary information concerning the genetic makeup of a given organism. Such information have traditionally been obtained by conventional methods. Faba bean is one of the most important plant protein resources in the Egyptian agriculture. Therefore, much work has been directed to increase its productivity by using traditional agricultural practices including pest control, date of planting, etc. However, a few studies were conducted in faba bean to genetically improve many of its quantitative traits that contribute positively to its productivity (Bozzini and Chiaretti, 1997 and Link *et al.*, 1995).

Broomrape (*Orobanche* spp) which

belongs to the family Orobanchaceae is an obligate parasitic flowering plant. Its main distribution is in the Mediterranean region where large areas are heavily infested with it. Other regions with similar climatic conditions (California, Western Australia and Cuba) have also been invaded. Among more than 100 species of the genus *Orobanche*, only a few of them are of economic importance as weeds in cropping systems. They are parasitic on a wide range of families (*Asteraceae*, *Fabaceae*, *Solanaceae*, *Apiaceae* and *Cucurbitaceae*). One of such serious parasites that constrains the yield productivity and stability of legumes in the countries of West Asia, North Africa and South Europe, is the broomrape (*Orobanche crenata*, Frask). The growth of this parasite depends on the expanse of water, mineral and organic compounds from the host. The magnitude of yield reduction in the crops