

RECOVERY OF HYBRID EMBRYOS OBTAINED FROM INTERSPECIFIC CROSSES BETWEEN COMMON AND TEPARY BEAN

By

A.R. Aggour, M.S. Zaki, F.A. Abo-Sedera and L.A. Abd El-Rahman
Dept. of Hort., Fac. of Agric. Moshtohor, Zagazig Univ., Egypt.

ABSTRACT

Interspecific crosses were made between two common bean cultivars: Giza 3 and Contender, and a tepary bean line: Tepary 13. Pod, embryo, and callus culture techniques were used to recover the hybrid embryos of the interspecific crosses. The immature hybrid pods and immature embryos gave the best results when cultured on medium contained MS mineral nutrients with KNO_3 and NH_4NO_3 deleted and 10 mM KCl and 1.5 mM K_2SO_4 added, 20 g sucrose, 100 mg myo-inositol, 10 mg thiamin. HCl, 1 mg nicotinic acid, 1 mg pyridoxine. HCl, 3 mg glycine, 40 mM glutamine, 20 mM asparagine, and 1 g casein hydrolysate per liter. The cultured immature hybrid pods increased in weight by 72.6% and 34.4% and in length by 12.1% and 10.7% after 28 days from culturing for the crosses Giza 3 x Tepary 13 and Contender x Tepary 13, respectively. The cultured hybrid embryos of the cross Contender x Tepary 13 significantly preceded those of the cross Giza 3 x Tepary 13 concerning forming regular shoots with chlorophyll as well as normal roots. The hybrid embryo-derived callus gave the best results concerning propagation and proliferation when cultured on medium contained macro- and micro- elements of Murashige and Skoog medium, 100 mg/l myo-inositol, 0.4 mg/l thiamin.HCl, 1 mg/l nicotinic acid, 1 mg/l pyridoxine.HCl, 4 mg/l kinetin, 2% sucrose, and 0.8% agar.

INTRODUCTION

Water shortage in many parts of the world is expecting to be the limiting factor for agriculture in the near future. The demand for drought-resistant cultivars is increasing due to the limiting water sources which are not going to be enough for irrigation of crops, especially with the continuous increase of population.

Interspecific hybridization:

Common bean (*Phaseolus vulgaris*) is one of the most popular vegetable crops in Egypt. Unfortunately, common bean is susceptible to drought. On the other hand the tepary bean (*Phaseolus acutifolius*) is drought tolerant and adopted to dry-land culture (Mok *et al.*, 1978; Thomas *et al.*, 1983; Pratt *et al.*, 1985; Mok *et al.*, 1986; Andrade-Angular and Jackson, 1988; Kumar *et al.*, 1988; Angelini and Allavena, 1989; Mohamed, 1990; Sabja *et al.*, 1990; Mohamed *et al.* 1992). Transfer of drought tolerance trait from *P. acutifolius* to *P. vulgaris* will be of great importance. The interspecific hybridization between the common and tepary beans has been proposed to facilitate genetic exchange between these two *Phaseolus* species. The restricted development of hybrid embryos, low