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Abstract

The aim of this study was to determine *in vitro* regeneration capacity of selected genotypes and develop a regeneration protocol for commercial sunflower (*Helianthus annuus* L.) genotypes for using germplasm protection studies. The experiment was set up at Uludag University, Faculty of Agriculture, Department of Field Crops, Tissue Culture Laboratory in 2010. The cotyledon and hypocotyl explants were excised from 3 day-old seedlings of sunflower genotypes; Sirena (MayAgro Seed Corporation) and Pactol (Agromar A.Ş.). To determine the effect of hormone consentrations explants were cultured in sixteen different embryo induction medium (EIM) supplemented with four different rates of (0.1, 0.5, 1.0, 1.5 %) benzylaminopurine (BA) and Naphthaleneacetic acid (NAA), %0.1 Gibberellic acid (GA_3) and 0.05% casein hydrolysate. The experiments were kept in 18/6 hour light/dark photoperiod at 26±2 ^oC for one month. The sunflower genotypes have been tested for their ability to produce callus, shoot and root organs, embryo like structure (ELS) and plantlet formation. The data were taken after two weeks. The experiment was analyzed by using JUMP statistical packet programmed according to completely randomized design with 3 replications. The rates of callus, shoot and root organ formation depending on the genotype, explant, medium and the interactions between each of them. The rate of plantlet depended on the medium, genotype and interaction between genotype and medium while the rate of ELS depended on interactions between genotype and medium, genotype and explant. The highest root and shoot regeneration were obtained from cotyledone explants while hypocotyle explants produced the highest callus formation. The third medium (0.1% BA, 1% NAA) gave the best shoot (10.00%) and root (6.50%) regeneration, while the best callus formation as a score (2.45) was seen from twelfth (1% BA; 1,5% NAA) and sixteenth medium (1.5% BA; 1.5% NAA). The first medium (0.1% BA; 0.1% NAA) gave the highest plantlet formation (6.50%) while the highest ELS (2.50%) was obtained from second medium (0.1% BA; 0.5% NAA). The genotype, Pactol had the best results in terms of shoot and root regeneration (2.00%, 1.31% respectively), plantlet and callus formation (2.13%, 2.37 score respectively). This system is still being working at our laboratory conditions to improve the regeneration capacity.

Key words: Sunflower, *in vitro* regeneration, callus shoot root formation.