

Dagustu N., G. Bayram, M. Sincik, M. Bayraktaroğlu, 'The short breeding cycle protocol effective on diverse genotypes of sunflower (*Helianthus annuus* L.)', Turkish Journal of Field Crops, 2012, 17(2): **Basımda**

Abstract

Immature embryo culture of sunflower (*Helianthus annuus* L.) was studied for shortening the generation time in breeding programs. The seed development from pollination to maturity in sunflower takes 50-60% (60 days) of the life cycle duration (120-150 days). This technique allows the production of fertile plants from immature embryos of 11 sunflower genotypes. Immature embryos of 10-12 days after pollination were dissected from seed grown plants (SGP), were transferred into MS medium allowing shoot and root development for 5-10 days. Young plantlets were transferred to soil, developed to maturity and were then self pollinated and set seed. The first cycle of immature embryo raised plants (IERP) was obtained. The four cycles of IERP were obtained from immature embryo culture technique in contrast to one generation per year with conventional breeding. The majority of cultured embryos developed into vigorous plantlets with 3-6 leaves. Out of 1320 immature embryos, the average response of the explants were 92.1% (1216). The 75% of the developed plantlets had vigorous roots and were transplanted into viol containing 1:1:2 peat: perlite: soil mixture (v/v) at 24 ± 2 oC in 16h/8 h (light/dark) in the growth chamber. The only 70.3% of them was grown to maturity, self-pollinated and set seed. The overall result was average 40-45 regenerated and matured plants per 100 immature zygotic embryos. The regenerated plants also showed no morphological changes. The analysis of variance for all agronomic characters (plant height, head diameter, number of leaves, stem diameter, number of branches and seed number per head) taken from the mean of four generations *in vitro* grown plants resulted in significant differences among genotypes at 5% level. All the agronomic characters examined at *in vitro* regenerated plants decreased compared to field grown plants.

Key words: fertile plant regeneration, immature embryo, shortening the breeding cycle, sunflower.