Investigation the relationship between herbicide resistance in wild oat genotypes (Avena ludoviciana) and freezing tolerance

To evaluate the fitness of five (DR4, NR11, SOR1, STR1, ZR5) resistant and two (SM, SKh) susceptible wild oat genotypes to Acetohydroxy acid Synthase Inhibitors herbicide (ACCase) to cold stress, an experiment was performed as factorial, based on completely randomized design with three replications at Ferdowsi University of Mashhad, Faculty of Agriculture in 2009. In this experiment wild oat genotypes exposed to Seven freezing temperatures (-3, -5, -9, -12, -15 and -21°C) poted plants were grown in natural conditions and maintained for acclimation, until 3-4 leaf stage and then, the plants were frozen according to the freezing temperature (FT) regimes, plant survival percentage, determined by counting survived plant, lethal temperature for 50 percent of the plants (LTD50) was determined based on survival percentage and reduce dry matter temperatures 50 percent (RDMT50) after the end of recovery (three weeks after the freezing). The results showed that the effects of frost temperature, and genotype on the rate of survival percentage and LTD50 in all genotypes was significant (P < 0.01). Reducing the temperature to less than -12 °C killed all of genotypes. Among wild oat genotypes, Mashhad sensitive herbicide genotype (SM) and Khuzestan sensitive herbicide genotype (SKh) showed the highest and lowest tolerance to freezing respectively based on LTD50 and (RDMT50). The experiment showed that herbicide resistance in weeds can lead to change their characteristics, including tolerance to cold, so based on the results of LTD50, wild oat resistant genotypes significant differ compared to sensitive herbicide genotype in their tolerance to cold stress.

Key words: Survival, wild oat, LTD50, Recovery, RDMT50