

Application of Trinexapac-ethyl to enhance the appearance quality and resistance to Traffic stress of two cold-season grass species

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Traffic stress occurs across all ornamental and sport lawns. Traffic means lawn damages as a result of compaction, tearing and etc. due to movement of players, machineries and animals. Studies have shown that the application of plant growth regulators is one of the ways for improving the traffic resistance. Trinexapac-ethyl is a plant development retarder widely used in lawn management. Although there are some evidence that trinexapac-ethyl may improve lawn Traffic resistance, but there are rare data on trinexapac-ethyl resistance mechanism. The main objective of the present study was to investigate the effect of Trinexapac-ethyl on Traffic stress resistance of two cold season lawn species and characterization Trinexapac-ethyl and traffic impacts on the morphological and physiological traits of these species. The present research was conducted in 2011-2012 in Esfahan University of technology within lands around greenhouse of agriculture science department on two lawn species of Wheatgrass and Tall fescue. The experiment was arranged as factorial in completely randomized block design with three replicates. Treatments involved two species, three levels of Trinexapac-ethyl and two Traffic levels. Trinexapac-ethyl was applied in three levels (0, 0.25 and 0.5 kg/h) on plots in dimension six m² in three times and three weeks interval. Artificial Traffic was applied on half on plots by simulator device. Results showed that Trinexapac-ethyl and Traffic decreased plant height, the shoots fresh and dry weight. The levels of 0.25 and 0.5 kg/h reduced Wheatgrass and Tall fescue height about 18.93, 27.02, 12.08 and 15.01 % respectively. In both lawn species, Trinexapac-ethyl increased color intensity and in contrast, traffic stress caused plant to be paled. Wheatgrass density was improved and decreased under Trinexapac-ethyl and Traffic stresses respectively. Both treatment did not affect Tall fescue significantly 0.5%. Trinexapac-ethyl improved tillering in Wheatgrass and Tall fescue about 31.14 and 17.87% respectively. Traffic did not affect both species tillering significantly. Results of research showed that Traffic resulted in low leaf relative water content, chlorophyll content, antioxidant activity and higher electrolyte leakage in both species. The plants treated with Trinexapac-ethyl during experiment showed higher relative water content than control ones, also electrolyte leakage for both species was reduced significantly by Trinexapac-ethyl. At the same time, Trinexapac-ethyl accelerated enzymes activity in sorbitol peroxidase, peroxidase and super oxide dismutase under Traffic stress. However catalase activity did not affected by both Trinexapac-ethyl and stress significantly. Finally Trinexapac-ethyl improved Traffic resistance through enhancing osmotic regulation and enzyme activity in both Wheatgrass and Tall fescue.

Additional index words: Trinexapac-ethyl, Tall fescue, Wheatgrass, Traffic stress, Antioxidant enzymes, Growth rate