



The effects of various levels of water deficit stress on forage yield and physiological characteristics of four cultivars of clover (*Trifolium* spp) under low input condition

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Abstract

This paper reports a study on the role of antioxidant enzymes and physiological characteristics of clover cultivars in their resistance against water deficit stress in the field conditions. Four cultivars of clover (*Trifolium* spp) namely, *T. resupinatum* L., *T. incarnatum* L., *Trifolium pretense* L., and *T. alexandrinum* L. under three levels of irrigation including %35, %50, and %65 soil moisture discharge were studied in a split plot experiment with completely randomized blocks design with three repetitions. Analysis of variance showed a significant effect of irrigation level on dry forage weight, leaf relative water content, and proline, catalase, peroxidase, chlorophyll b, and carotenoid contents. The effects of cultivars on dry forage weight, leaf relative water content, and proline, chlorophyll a, chlorophyll b, total chlorophyll, and carotenoid contents of the plants were also significant ($P \leq 0.01$). Generally, with an increase in the percentage of soil moisture, the dry forage yield showed a significant decrease. Also, water deficit resulted in increased proline content and also increased activities of catalase, peroxidase, and superoxide dismutase antioxidants. On the other hand, no significant differences were observed between cultivars with respect to the level of antioxidant activities. In addition, the effects of soil moisture discharge on the activities of all antioxidants except for those of superoxide dismutase were significant. Moreover, increasing the percentage of moisture discharge led to the reduction in the relative water content of the leaves and chlorophyll and carotenoid contents of all four cultivars of clover under study. Finally, the study concludes with recommending *T. incarnatum* L. as the most suitable clover cultivar for the climatic condition of the study region and under low input management (low irrigation, minimum fertilizer application, no herbicide application, and no weeding).

Keywords: antioxidant enzymes, water deficit, forage, clover

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