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THE EFFECT OF HUMIC ACID ON THE SOME MORPHOLOGICAL AND ROOT PHYTOCHEMICAL CHARACTERISTICS OF PURPLE CONEFLOWER (ECHINACEA PURPUREA L.) UNDER LIMITED IRRIGATION STRESS AFTER TWO YEARS

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In order to study the effects of Humic acid levels and irrigation regimes on the some morphological and biochemical characteristics of *Echinacea purpurea* L. during two years, a pot experiment was conducted as factorial based on randomized complete block design with three replications and four experimental units at research farm of Gorgan University of Agricultural Sciences and Natural Resources, during growing season of 2014- 16. The treatments were four levels of irrigation regimes (40, 60, 80 and 100 percent field capacity) and Humic acid including four levels: (0, 250, 500 and 1000 mg/kg) that morphological and root phytochemical characteristics were measured the end of second year. The results showed that irrigation regimes had significant effect on all measured properties except of root and shoot dry weight that decreased morphological effects and increased root phytochemical characteristics. Also leaves number, root length and wet and dry weight and shoot dry weight were effected by humic acid significantly that decreased all of the growth characteristics and morphological traits. Interaction effect of humic acid and irrigation regimes was significant for leaves number, root wet and shoot dry weight and total phenol of root. So, the Limited irrigation had negative effect on growth and plants increased its phenol and antioxidant component for tolerating of stress that these effects were poor after two years. Humic acid could not increase growth and yield in plants that were faced with stress after two years. Finally, it seems that *Echinacea purpurea* L. could adapted under drought stress after Consecutive years and is a good option for rained conditions.

Keywords: Antioxidant activity, Drought stress, Dry weight, Leaves number, Total Phenol.