

Abstract

Effect of N:K Ratio and Electrical Conductivity of Nutrient Solution on Growth and Yield of Hydroponically Grown Golden Thistle (*Scolymus hispanicus* L.)[†]

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Abstract: As the demand for high-quality wild greens rises, due to their high nutritional, culinary, and medicinal properties, the potential overexploitation and excessive disruption of their natural habitats bring serious environmental problems to the foreground. However, new alternative cultivation techniques, such as hydroponic cultivation, could take advantage of rational water management, optimal fertilization management and climate adaptation, to produce high-quality wild greens, all year round. As an initial step to assess optimal hydroponic cultivation conditions for golden thistle (*Scolymus hispanicus* L.), in this study we evaluated the effect of N:K ratio and electrical conductivity (EC) in the supplied nutrient solution on plant growth, yield and phenology. Four nutrient solutions were applied with a low or a high N:K ratio (1.59 or 2.38 mol/mol, respectively) combined with a low or a high electrical conductivity (EC) level (2.2 and 2.8 dS m⁻¹, respectively) in a 2 × 2 factorial experiment set as a completely randomized block design with 4 blocks and 48 plants per block. Golden thistle seedlings were planted in plastic growth-bags of hydroponic perlite substrate in an open, drip-irrigated, soilless cultivation system. The experiment commenced in December 2018, in a plastic greenhouse at the campus of the Hellenic Mediterranean University, Crete, Greece. After four months of cultivation, the post-harvest analysis showed that the high N:K ratio significantly increased the fresh weight of leaf and edible tuberous root, whereas the tested EC levels in the nutrient solution had no impact on plant fresh weight. The experimental treatments did not significantly affect leaf chlorophyll concentration (SPAD meter readings), chlorophyll fluorescence (Fv/Fm) or the number of leaves and the specific weight of the tuberous root of the plants. Our results indicate that wild golden thistle could be domesticated as an edible vegetable, and cultivated hydroponically at different seasons of the year using relatively low nutrient concentrations, thereby minimizing aquifer nitrate and phosphate pollution. A nutrient solution with a relatively high N:K ratio (here 2.38 mol/mol) is recommended for the hydroponic cultivation of golden thistle.

Keywords: *Scolymus hispanicus*; nitrogen; potassium; electrical conductivity; nutrient solution



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