

Abstract

Managing of chemical fertilizers and manure application and environmentally effects of their residues in soil and quantitative and qualitative yield of crops, especially cereals in dry areas and semi-dried of Iran is very important. In order to asses the effects of chemical fertilizers and manure on the physical and chemical properties of soil and qualitative and quantitative properties of barley (*Hordeum vulgare*) in Sistan an experiment was conducted as a randomized complete block with three replicates during 2012, at the research fields of Zabol University. Treatments consisted of six fertilizer including; application of 100% chemical fertilizer (NPK), application of 100% manure, application of 75% chemical fertilizer+ 25% manure, application of 50% chemical fertilizer + 50% manure, application of 75% manure + 25% chemical fertilizer and non-fertilizer application. Chemical Fertilizer was 300 Kg of urea ha⁻¹, 100 Kg of potassium sulfate ha⁻¹, and 200 Kg of triple superphosphate ha⁻¹ and 60 Mg of manure ha⁻¹. Studied characteristics were quantitative traits (germination percentage, germination rate, plant height, spike number plant⁻¹, tiller number plant⁻¹, one-thousand grain weight, grain number spike⁻¹, biological yield, grain yield and harvest index), qualitative traits (percent percentage, ash and fat content of grain, grain moisture, and concentrations of nitrogen, phosphorus, potassium, magnesium, sodium and iron in grain), light interception at canopy, and physicochemical properties of soil (concentration of nitrogen, phosphorus, potassium, calcium and magnesium, moisture volume of soil, pH and EC). Effects of different fertilizers was significant and application of that fertilizers increased quantitative yield and improved the qualitative indices, so that the greatest yield and yield attributes, protein percentage and nitrogen concentration was observed in plots received chemical fertilizer. In addition, interaction effects of chemical fertilizers and manure was significant. Soil properties improved with increasing of manure and gradual removal of chemical fertilizers. The results of qualitative and quantitative characteristics of soil suggested the application of manure significantly increased the concentration of major nutrients in soil and improved the structure of soil aggregates with keeping capacity of humidity and ability of root to penetration in soil.

Keywords: Barley, Fertilizer manure, Nitrogen, Phosphorus, Potassium, Soil properties



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**The effect of chemical fertilizers and
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properties of soil and qualitative and
quantitative properties of barley
(*Hordeum vulgar*) in Sistan**

Supervisor:

Dr. A. Ghanbari

Advisors:

Dr. A.R. Sirousmehr

Dr. M.A. Najafi

By:

M. Ahmadi Majd

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