University of Zabol
School of Agriculture
Department of Agronomy and Plant Breeding

Thesis for Master's degree Agrotechnology

Title:

Effects of Iron and Zinc Foliar application (Different Levels) on Quantitative and Qualitative Yield of Sunflower (*Helianthus annuus* L.)

Supervisor:

Dr.I. Khammari

Advisor:

Dr. M. Dehmardeh

By:

Atefeh Nejadmehr

Summer 2021

Abstract:

The micronutrients iron and zinc, although in small quantities required by plants, play a prominent role in plant growth and development. Lack of iron in the soil causes paleness in the plant, which is observed in most soils of Iran. Iron and zinc deficiency is seen in calcareous and alkaline soils of arid regions. The aim of this study was to investigate the effect of foliar application of iron and zinc on the quantitative and qualitative yield of sunflower during a factorial experiment in the form of randomized complete block designs with three replications in the Agricultural Research Institute of Zabol University in Zahak (Chah Nimeh) in 2020. The first factor of foliar application of iron in three levels of non-foliar application, foliar application with a concentration of 3 per thousand and a concentration of 6 per thousand and the second factor of foliar application of zinc in four levels of non-foliar application of zinc, foliar application of zinc with a concentration of 3 per thousand, foliar application of zinc With a concentration of 6 per thousand and foliar application of zinc with a concentration of 9 per thousand. Foliar application was done in 6-leaf stages and the beginning of flowering. Characteristics studied in this experiment include plant height, grain yield, biomass yield, harvest index, head diameter, number of seeds per head, 1000-seed weight, measurement of chlorophyll and leaf carotenoids, grain oil percentage, grain protein percentage, grain iron concentration and concentration On the grain. SAS software was used to analyze the data and Excel software was used to draw the graphs. The results showed that foliar application of iron and zinc fertilizers improves the qualitative and quantitative yield of sunflower ($p \leq 0.05$). Sunflower oil (21.13% and 46.06%, respectively) were related to the treatment of 3 per thousand solutions of iron spraying and 6 per thousand spraying of zinc fertilizer and the lowest amount was related to the control treatment. The results of quantitative traits of sunflower showed the highest plant height, biomass yield, grain yield, 1000-seed weight, head weight in the treatment containing 3 per thousand iron fertilizers and combined with 6 per thousand zinc fertilizers and the lowest amount was related to the control treatment. The study of the main factors of sunflower plant showed that the increase in foliar application levels of iron fertilizer more than 3 per thousand and zinc more than 6 per thousand did not significantly increase the rate of increase of these indices.

Keywords: Plant nutrition, Sunflower yield, Iron, Zinc