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"World Food System —
A Contribution from Europe"

Improving Zinc Nutrition of Wheat in Iran

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Abstract

Zinc (Zn) is an important micronutrient for both plants and humans and Zn deficiency in crop plants and humans occurs in several countries around the world. Zinc deficiency in humans often develops from diets that are low in bioavailable Zn. It is particularly widespread in populations that depend on cereals such as wheat as their main staple food. In Iran, wheat is the most important agricultural crop and its average consumption is about 400 grams per head and day. Since wheat is a main source of food, Zn concentration in the grains is one of the main determinants of the food quality with respect to human Zn nutrition in this country.

Soil is the primary source of Zn for plants and factors such as Zn availability in soil, plant genotype, mineral nutrition and health, all affect the Zn uptake by plants. Currently, more than 40 percent of agricultural land in Iran is affected by low availability of Zn mainly due to high pH, low organic matter content and inadequate land use (e.g. monocropping). Mineral nutrition (including Zn nutrition) of plants can be improved by using mineral fertilisers, organic manure, plant residues and/or human waste. Alternatively, Zn nutrition of plants can also be improved, at least on a short-run, by promoting mycorrhizal symbiosis, which has the capacity to contribute substantially to plant Zn nutrition.

Recently started collaborative project between Iran and Switzerland aims at following: 1. Assessing the importance of mycorrhizal symbiosis and Zn fertilisation in wheat growth and Zn uptake from Zn-deficient soil; 2. Assessing Zn acquisition by wheat from plant residues under different fertilisation regimes, and 3. Evaluating different pre-crops for their potential to improve subsequent wheat crop growth and quality (with respect to their Zn content). This will be addressed in a series of experiments using Iranian soil and employing soil sterilisation, mycorrhizal inoculation, wheat cultivars with different Zn-efficiencies, and tracing movement of Zn in a soil-plant system by employing radioisotope 65Zn.

Keywords: Acquisition from soil, arbuscular mycorrhizal fungi, organic matter, wheat, zinc

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