American-Eurasian J. Agric. & Environ. Sci., 15 (7): 1323-1330, 2015
ISSN 1818-6769

DOI: 10.5829/idosi.aejaes.2015.15.7.12706

Role of Zinc Nutrition in Maize for Growth and Yield: An Overview

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Abstract: Maize (*Zea mays*) is one of the most important cereal crops throughout the world. It is used as feed for animals, food for human and raw material in industries. The production and yield of maize is effected due to various biotic and abiotic factors. The role of micro and macronutrients in maintenance of maize is much important. Micronutrient showed a strong influence on growth, metabolism and the reproductive phase in plants, animals and humans. Plants require 16 elements, which are significant for their growth and development. Among the micronutrients Boron and $ZnSO_4$ act as imperative action for growth and plants development. $ZnSO_4$ is a micronutrient and perform important role in the plant at numerous events. $ZnSO_4$ is a member in excess of 300 enzymes in plants and that you used to have to cover's share of dependability. The prescribed review will provide its authors the chance to understand the role of $ZnSO_4$ in normal functioning of maize plants.

Key words: Cereal · Micronutrients · Yield · Maize · Maturity

INTRODUCTION

Maize *(Zea mays L.)* is one of the highest productive cereal crops in the world and it is also important for countries like Pakistan, where the population is growing rapidly every day. After wheat and rice, maize is economically the 3rd most significant cereal crops in Pakistan. Maize accounts for 4.8 % of all the cropping area and 3.5 % of the value of agricultural production. KPK and Punjab are the two main provinces of Pakistan which almost contribute about 97% of the total production while Sindh and Balochistan contribute remaining 3% of total production. Maize is spread over an area of 0.122 million hectares in AJK. Spring maize also covers 0.070 M hectares and produces 50 million ton grain yield in Punjab province [1]. Maizegrain is an enriched food produces an array of products, by products and value additions. Maize takes a part of 2.1% in the value added and 0.4 % in gross domestic product (GDP) of Pakistan. It was grown on an area of 1117 thousand hectares which resulting 5.4 % increase over previous year total cultivated land and production stood at 4527 thousand tones with yield 4053 kg/ha in 2013-14 [2].Grain is the main product of maize. It contains more oil and starch than other grains [3]. Maize is an important crop for human consumption directly and indirectly, as it is one of the main energy foods for livestock. It is also a source of low-cost raw materials for agro-based industries and it is well known used for the manufacture of corn starch. The cultivation of Maize has wide adaptability and can grow in areas across the semi-arid with an annual precipitation 20-25 cm to those where the annual rainfall is 400 cm [4]. There are soils with high pH and low organic matter (OM) minimizes the microelements availability such as boron (B), zinc (Zn) and iron (Fe) to crops [5]. Yield potential of maize is very high but very low yield is achieved. Reason for getting low yield is poor agronomic practices such as imbalance use of fertilizers and poor management of irrigation scheduling and its frequency. Seed priming refers to the technique of pre-sowing hydration moderate, used in the process of germination, but there is no appearance of a radical [6].

Lack of zinc (Zn) is a common micro-deficiency in arid and semiarid areas of the World. Its deficiency is common in cereals, especially in calcareous soils of arid semi-deserts. It is stated that approximately 50 % of the land

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used for the production of cereals in the world are deficient in Zn [7]. Boron rises the carrying quickness of the sugar (which are produced in the photosynthesis in the leaves of mature plants) energetically growing regions, as well as in fetal development. Boron is significant to guarantee sugars are essential for all the roots of the plant growth. Numerous studies have exposed, that $ZnSO_4$, boron and other trace elements can cause severe production declines of different regions and also been described that the levels of micronutrient scarcity may fluctuate from one section to the plant [8]. Numerous studies demonstrate that the micronutrients are of a variation of system operation, to increase the growth as well as produce yield and it is correspondingly observed that the absenteeism of these constituents moderates the proficiency of diverse dimensions.

Importance of Maize: Maize (*Zea mays* L.) is one of the mainly essential crop in Pakistan, which fulfill the demand of three important sectors like as a food for human utilization, feed for livestock and poultry [9]. It was also reported that approximately, 10% of the corn was used as food for humans[9]. Its grain constitutes about 9.7396 % grain protein, 4.85% grain oil, 9.4392% grain crude fibre, 71.966% grain starch, 11.77% embryo while fodder contains 22.988% acid detergent fibre, 51.696% neutral detergent fibre, 28.797% fodder cellulose, 40.178% fodder dry matter, 26.845% fodder crude fibre, 10.353% fodder crude protein and 9.095% fodder moisture [10]. Pakistan shares 4.6% of the total cereal production. There are two main seasons for corn production in Pakistan, main February to late March or mid-July to mid-August, both seasons and have duration of 3-4 months [10].

Micro and Macro Elements: Plants require 16 elements, which are significant for their growth and development, macro-and micronutrients classified. Macronutrientsrequired in large quantities and micronutrients required relatively in small amount. Contribution of the main elements of the plant than other entries. And "generally provides that at least 30% to 50% performance explains the nutrients from the market [11]. Among the micronutrients Boron and $ZnSO_4$ act as imperative action for growth and plants development [12]. $ZnSO_4$ is a micronutrient and perform important role in the plant at numerous events [14]. $ZnSO_4$ is a member in excess of 300 enzymes in plants and that you used to have to cover's share of dependability. It can be incorporated in the protein solutions. Deoxyribonucleic acid, ribonucleic stability acid [13]. Use simply two to three inputs (nitrogen, phosphorus and potassium) and without that it is not sufficient to reach potential return [14,15].

Jahiruddin *et al*. [16], accompanied an experiment in a glasshouse to appraise the effect of boron and $ZnSO_4$ concentrations in soil nutrients, studied in plants or in the rhizosphere of soybean and corn. The plants were grownup for 2 months in two dissimilar soils for 12 years. Before planting, the soil B, $ZnSO_4$, B + $ZnSO_4$, control treated without $ZnSO_4$ and boron along with basal dose of NPK. Appendix B and $ZnSO_4$ showed a significant influence on the production of dry matter. The B concentration and $ZnSO_4$ in plant tissues, it is desirable to use the power obtained from milk, $ZnSO_4$, rhizosphere concentration increases the concentration of Cu is reducedor the concentration of Fe will not be significantly changed. Increasing the concentration of B, $ZnSO_4$ in rhizosphere, which makes the pH of soil decreases. Concentration of nutrients in the soil fertilized soil generally higher outlet.

Modasih [16] found that the combination of chelated micronutrients in operation or not chelate has a higher yield and organic grains in the individual requirement of micro-nutrients. Begum [6] conducted an experiment in the Kharif period for testing reaction of trace elements in rice (cultivar BR26). Nine procedures were used with the basic NPK. $ZnSO_4$ treatment of grain and straw yield control is greatly increased. Dip carrot seedlings was a good exercise for easier and less expensive. In another study, the effect of trace elements on corn in the winter, for three consecutive years (2007-2009) was tested in acidic soil. The experimental results indicated that the treatment has a substantial effect on the parameters examined. Three years of data analysis performance high post-harvest for the production of grain processing and perceived as very important reaction however, is a reaction to the production of corn plots with small micro-cells (5.43 to 5.99 t / ha grains), treated with the exception of the observed harvest, sulfur missing nutrients (4.71 t / ha). The highest (5.99 t / ha) grain yield was harvested used in combination with NPK (120:60 with 40 kg / ha), the trace elements (B, $ZnSO_4$, S, $MnSO_4$ and Mo) that produces grain yield is almost (171% 1.48 t / ha) NPK granules treated crop was higher, than in the control plot (2.21 t/ha) recorded [17].

Effect of trace elements studied the seed of the Government and the demonstration farm Jamra, Mardan. $ZnSO_4$, Cu, Fe, $MnSO_4$ were separately or in combination. The result showed that the corn crop returned well to all objects trace studies [7] Dry matter (DM) yield of B, Cu,

$ZnSO_4$, $MnSO_4$ research and grain yield used to evaluate the treatment effects of trace elements. $MnSO_4$ and $ZnSO_4$, was satisfactory for standard plant growth. It was found that the production of corn will be enhanced by the use of the rates of the trace elements significantly [18].

Nan *et al*. [19] accompanied a research on springtime wheat and corn or studied the combined effect of $ZnSO_4$ and $MnSO_4$. Examined it can be a synergistic outcome of these two essentials under conditions that are free $MnSO_4$ and $ZnSO_4$ content increased in the soil absorption or adding $MnSO_4$, $ZnSO_4$ or promote in these two cultures. The role of trace elements (Cu, $ZnSO_4$, $MnSO_4$ and Fe), in maize, originate that the mutual use of iron, manganese, zinc sulfate and significantly enhanced panicles per plant, number of seed, weight of wheat and corn yield [20]. It was also found that trace elements had a synergistic affiliation with other units. An experiment was conducted to determine the cumulative result of the tertiary elements, (Zn, Cu, Fe, Mn and B) in order to study wheat. We used different doze Zn, Cu, Fe, Mn and B (4, 2, 5, 2 and 1 kg / ha, respectively). A substantial rise in the content of dry matter, straw and grain yield was seen, with the addition of these elements [21]

Awan and Abbasi [22] performed an experiment to estimate the outcome of phosphorous and maize growth rate of copper. The experiment carried out in one pot. P @ (0, 25, 50 mg kg^{-1}) and Cu @ (0, 2.5, 5 mg kg^{-1}) sandy loam soil was in all probable arrangements. Five corn plants were in each pot, N and K, respectively in the culture tassling stage attain at (75 and 50 mg kg^{-1}). Fresh and dry weight of fodder corn was increased with increasing P dose and Cu with the highest mixture only. Nitrogen concentration improved by the practice of copper, while the phosphorus application declines. The conclusion that the interaction, between copper and phosphorus in the soil, which greatly affect the production of fodder maize. The experiment was conducted to evaluate the effects of various trace elements and nitrogen of maize yield calcareous soil and ground determine zinc deficient. To this end limestone, clay, calcium carbonate was used in this study. The experiment was carried out in a greenhouse with three repetitions and maize was grown. Changed doses of nitrogen were given in a pot experiment NH_4NO_3. Four changed dosages of zinc as $ZnSO_4$.7H Ọ. Accordingly, the amount of dry matter of corn increased, with increasing concentration of zinc oxide. Although Fe, Cu and the concentration of $MnSO_4$ was reduced by the nitrogen concentration and zinc [23]. Corn is one of the most complex crops, to zinc supply provide sand culture nutrient solution containing 5 levels $ZnSO_4$, B, Fe, Cu and cultivated $MnSO_4$. It was found that the uppermost yields attained, at the subsequent applications of trace elements, (ppm) in the nutrient solution: (7.73 $ZnSO_4$, 0.185 B, 0.0045 Fe, 0241 $MnSO_4$ and 0.0042 Cu). It has been shown that the nutritional value of change requests for change leads to other nutrients. Micro-nutrients were higher picture content in maize tissues, except that (in ppm): (308 $ZnSO_4$, 19.5 B, 3802 Fe, 49 $MnSO_4$ and 3.8 Cu). The precarious threshold of $ZnSO_4$ in corn plants was 100 ppm and the load on the host, trace element B in the range among (10 and 20 ppm) correctly. If other trace elements are in demand balance Fe, the acute rate of $MnSO_4$, is between (50 and 75 ppm) of Cu and which was (3 to 5 ppm). Percentage of N, S, Ca, K and $MnSO_4$ moderately dependent quantities of trace elements. Corn seems to have a strong demand for Zn-R.B [24].

Micronutrients experiment on sunflower and sesame seeds were evaluated [25]. These plants are grown in different soil types and improve a meaningful answer to the question of microelements ($ZnSO_4$, Fe and B) the macro importance given the productivity and quality. $ZnSO_4$ and Fe sunflower and sesame reaction high efficiency ranges from (25-50 kg ha^{-1}), respectively, liable on the type of soil. B application (@ 0.2-0.5) would investigate ligulate phase sunflowers to increase the yield of oil. Less than (16 mg kg^{-1} ZnSO4 in leaf <50 mg kg^{-1} and iron <8 mg kg^{-1})in dry matter. Then the critical limits for the lack of sunflower.

Shabban [26] examined the effect on the stability of trace nutrients leaves, growth yield and yield components two cultures. The outcome of two doses of mineral fertilizers, by (0.65% $ZnSO_4$,5.2% $MnSO_4$ and 0.65% Cu) in the absorption of nutrients and the balance in the leaves and examined its effect on the components of performance and yield wheat and corn. The result showed that the increase of the dressing fertilizer absorption $ZnSO_4$, $MnSO_4$, Ca, Mg, Fe and Cu in the leaves of maize and wheat. For corn the N, P and K were particularly increased by the higher dose. In wheat, P / $ZnSO_4$, P / $MnSO_4$ and Fe / $ZnSO_4$, while corn N / P, N / K, N / Fe, P / $MnSO_4$ and P / $ZnSO_4$ move toward right level. This has led to a significant rise in the productivity and performance of mechanisms. Plant height, No. of sprouts, grainand straw yield of wheat, increased significantly with the higher dose. Meanwhile, No. of ears, the ear weight, grain weight, 100 grains weight with both doses of the blade (T_1, T_2) of the production of maize. In above the growing amount of T_2 increased 1000 grains and yield.

Of all the trace elements boron and $ZnSO_4$, vigorous nutrients in the soil, as affected by their shapes and interchangeable, with amalgamations of organic materials. The use of sludge often contains large amounts of these elements, in the mobile platforms into the ground line [9]. Corn (FAO 240 cultivars) were grown in monoculture, were assessed from 2003 to 2007 working consecutive goals, in five growing seasons, there the corn reaction with zinc ($ZnSO_4$ and NPK) fertilized bottom two doses of nitrogen, or studied (80 and 140 kg N ha^{-1}). Average corn grain yield (GY) in the year was (9.82 t ha^{-1} and at 10:49). In GY NPK treatment was the result of collaboration, between all key parts of the crop. TKW generally reacted to doses of N and provides $ZnSO_4$. The results reflect the possibility of a substantial reduction in the nitrogen content and $MnSO_4$, $ZnSO_4$, provided external power source [27]. It was reported that, the mineral has a strong influence, on maize grain at a critical stage, in turn affects the final grain yield. The first two cuts (N: 115 and 175 kg N ha^{-1}), the three basic forms of (NPK fertilizer NPK + MgS, NPK + MgS + $ZnSO_4$). This theory was in two factorial experiments in the field, they tested the following factors. $ZnSO_4$ heard absorbent core was much higher, than in other parts of the grain. Just over 50% of $ZnSO_4$ accumulated in grain, which showed a substantial rise in response to a basic fertilizer input. $ZnSO_4$ suboptimal amount of total nitrogen demand, accumulate on grain yield of maize affected on the basis of a linear model, which provides in accordance with the optimum of N above, the following linear quadratic model and therefore, less effective in N. Corn accumulated $ZnSO_4$ reaction with a greater capacity for physiological sink ear, showed significant correlated [27].

The effect on maize productivity and nutrient uptake studied [28]. After application of micro-elements, in the volcanic soil. The experiment was carried out, in a pot or in the field, to identify some of the limitations of trace elements in volcanic soils Mpangala, Tanzania optimize corn yield. Dry matter yield and plant, B the concentration of copper and $ZnSO_4$ plant B, Cu and absorption and grain crops used to access $ZnSO_4$, treatment effects of microelements. In fertilizers pot Cu, B and Cu, $ZnSO_4$ separated on the basis of two levels (0 and 2 mg B kg^{-1}, 0 and 5 mg kg^{-1} and 0 to 10 mg kg^{-1}) administered $ZnSO_4$ combined with rate constants (240 mg kg^{-1}) was also to provide, access to a velocity value based P, is used to winning. The second optimal pot study, Cu was attempted in greenhouse times, between (0 and 20 mg kg^{-1}) for the preparation. Cu were tested, sequential Cu rise expressively (p-0.05), both dry matter and, grain yield of maize, the optimal rate was (20 mg kg^{-1}) is the estimated emissions. This high rate may be due to the high binding capacity of Cu volcanic soils. Boron and $ZnSO_4$ was satisfactory to surge plant growth. They concluded that, maize production expressively enlarged vegetation. They decided that maize production, expressively Mpangala and similar surfaces can be increased in the area of the environment, the use of (N, P and $ZnSO_4$ at 120, 80 and 10 kg ha^{-1}).

Effect of different solutions of microelements ($ZnSO_4$, $MnSO_4$ and $FeSO_4$), a corn field has been studied in one direction. $ZnSO_4$ significantly affected, fresh and dry weight % germination of seeds, of these treatments, except $FeSO_4$ solution [29]. In one experiment it was found that the (AK94-DMR-ESR-Y) yellow corn genotype was the most capable and realistic, with iron absorption and high $ZnSO_4$ and $MnSO_4$ beans. His yellow corn is high in iron strength, $ZnSO_4$ and $MnSO_4$ absorption of beta-carotene [30]. Stage leaves dietary micronutrients, ($ZnSO_4$, $MnSO_4$ and Fe in dry base) four lines of corn consanguineous parents and 12 hybrids, were in a single experiment on acidic soils were studied [28]. It turned out that all elements in all studies of materials related varieties. Four dissimilar hybrids, were $ZnSO_4$ fertilization (0 and 3 kg Zn ha^{-1}) studied in India during the period (2002-2005). The results confirm that (BARI hybrid maize-3 and BARI-6) maize was the (effective $ZnSO_4$) more reactive $ZnSO_4$. It also notes that 984 Pacific gave the maximum seed yield is (10.46 t / ha) depending on the function of $ZnSO_4$. The result was also observed, that corn hybrid (BARI-3) deficiency in soils enough farmers, $ZnSO_4$ at a lower dose (1-2 kg/ha), $ZnSO_4$ fertilization grow [14].

Abu El- Nour [4] reported that, the reaction of the growth and nutrition of micronutrients in the study carried corn irrigatedwith saline water. The treatments were: (1 irrigation tap water, 2 watering mixture of NaCl and $CaCl_2$ and April 3 at 2 foliar sprays with EDTA compounds micro 2.8% $ZnSO_4$ + 14% N, 2.8% Fe, 2, 8% $MnSO_4$ @ 1 g / l). Root growth has had a substantial effect on the growth and nutrient content. Salinity treatment measures a negative impact, on growth and nutrient content in the root and shoot, except the roots and shoots each. They are spraying the plants with a compound of salinity in the intensive track, presented a substantial consequence on the dry weight, whereas this treatment induced depression of salinity treatments, can reduce dry weight. Sprinkle with salt stressed plants tracer compounds showed a substantial influence on both the root and shoot nutrient content, with some exceptions where N and P content displayed a slight decrease, associated to the order of treatment. The effect of the interaction of the type of soil and foliar trace element was momentous.

We studied effect of P-and micronutrient design, arbuscular mycorrhizal fungi (AMF) and a decision of $ZnSO_4$, Cu, Fe $MnSO_4$ and maize (*Zea mays* L.). Greenhouse soil (3:1) (pH 6.5) on potted maize inoculated with *Glomus intraradices* or less was achieved in the sand. The purpose of the experiment was the contribution of Cu absorption mycorrhiza assess the impact of levels and micronutrients $ZnSO_4$, $MnSO_4$ and P, Fe corn plant. Two levels of P (10 and 40 mg / kg of soil) and three levels of a mixture of trace elements: (0, 1X and 2X, 1X mg contained in 1 kg of soil, Fe 4.2, 0:24 $ZnSO_4$ was 1.2 $MnSO_4$ used 0.06 Cu, 0.78 B and 0.036 Mo) pots. The hyphae are remnants P at least compared to the high P, if not applicable to mineral soil. Inoculation with mycorrhizal roots and micronutrient application increased biomass. $ZnSO_4$ outbreaks total content was greater than mycorrhizal plants not grown in soil with a low or lower and P no tracers. The total recovery of Cu increased, mycorrhizal colonization, when applied micronutrients. Mycorrhizal plants contain low $MnSO_4$, non-mycorrhizal plants at the top level of soil micronutrients. AMF increases the whole content, of Fe-shoot, in which the addition of tracers, but refused to take Fe, when adult plants high micronutrients added $ZnSO_4$*G.intarradices* effect. Cu, Fe and micro absorption, $MnSO_4$ changing layers and P at the bottom added [31].

The purpose of this study was to investigate the effect of $ZnSO_4$, $MnSO_4$, Cu uptake and shoot dry matter yield, of the important parts of the grains of rice and corn. Six experiments were conducted emissions and treatment involves the application of $ZnSO_4$ at (0, 5, 10, 20, 40, 80) and (120 mg kg^{-1}), to $MnSO_4$ and (640 mg kg^{-1} 10, 20, 40, 80, 160, 320) and applying Cu (0, 2, 4, 8, 32, 64 and 96 mg kg^{-1}). $ZnSO_4$ improved rice yield and Cu to improve the performance, of rice and beans. $MnSO_4$ improve absorption of Mg, Fe and $ZnSO_4$ and reduced Ca absorption in maize. Copper has a positive or negative attitude and absorption of primary and secondary elements, depending on the types of crops and the nutrients intricate [32].

Experiment was carried out to evaluate the outcome of $ZnSO_4$ and nitrogen in corn on the experimental farm, at Shiraz University (29°50'N and 52°46'E 1810 m) during, the spring and summer of 2007. Three levels of nitrogen, (120, 260, 400 kg ha^{-1}). Three levels of zinc ($ZnSO_4$) were applied and two corn hybrids (704, 540). The results showed that, the interaction among nitrogen and $ZnSO_4$, was positive and substantial. Iron absorption and metabolism of entry into the facility due to better interaction between nitrogen and $ZnSO_4$. But $ZnSO_4$ was an antagonistic effect, on the iron content. $ZnSO_4$ and the appropriate quantity of nitrogen was used, to cover the preoccupation and effects of antagonists [33] deliberate the growth of food grain, $ZnSO_4$ and incorporation of zinc. The influence of the components in the growth of wheat $ZnSO_4$, in hydroponic culture solution, was examined with sand. $ZnSO_4$ five treatments are administered in combination with other nutrients cereals. Plants in the control treatment with low latency compared to systems, with $ZnSO_4$ pots deficit. $ZnSO_4$ deficiency symptoms defined in wheat seedling were not observed. However, the symptoms of copper deficiency were evident, when high doses of $ZnSO_4$ are applied, for a long time. Dry yield improved with rising $ZnSO_4$, rate of (15 ml ha^{-1}). The test results showed that the concentration of $ZnSO_4$ in a second stage of growth was lower, than the first growth stage and the absorption of the higher plants, $ZnSO_4$ dry matter yield was higher, than in the other phase.

The growth and the mechanism for the production of nitrogen fertilizers, wheat increased from (50 to 200 kg N ha^{-1}). All parameters related to growth and productivity has increased demand for N was raised to (100 or 150 kg N ha^{-1}). Tassling in crop applications, became accelerated improvement in the supply of N. Nitrogen and planting density l4 does not depend on the absorption of $ZnSO_4$, $MnSO_4$, Cu and Fe of the blade; except that the absorption increases, $MnSO_4$, N fertilization rate was better, than (150 kg N ha^{-1})[34]. The greenhouse study was conducted, to facilitate access to critical levels of Fe, $ZnSO_4$, $MnSO_4$ and several mestnostyah. Diethyenetriamine (DTPA) extractable Fe, $ZnSO_4$ and $MnSO_4$ victory constantly connected absorption in maize leaves. The floor with or without the addition of Fe, $MnSO_4$ and $ZnSO_4$ acetate crops such as (EDTA) ethylenediaminetatra acetate salts. The relationship was significant only for $ZnSO_4$. With the pull of DTPA method, a critical level of Fe in the floods, was sandy and calcareous soils it offered (5.6, 3.4 and 3.8 mg kg ha^{-1}). Ask $MnSO_4$ critical level, in sandy and calcareous soils, were (1.4 and 1.2 ug g^{-1}). Major alluvial and calcareous soils levels were (0.9 and 0.7 mg g^{-1}) and is not critical, but not for sandy soils observed [35].

A field experimentation on sandy loam soil, Fatehpur (Ustipsamments), free $ZnSO_4$, Cu, B and Mo edge enough, Fe and $MnSO_4$ performed. Farmyard manure (FYM) and trace elements that are used, to improve the soil leads, to an obvious and trace elements that, are important in availability. There was a significant response of maize, wheat leaf and soil micronutrients in both groups and found no FYM except corn, which is not the foliar

application of Mo, B and B to lower, the absence of FYM. Corn responded to great $ZnSO_4$ and Cu in wheat and Mo, Fe, $ZnSO_4$ and MnSO4. Micro size, whose corn was higher in the treatment receiving FYM used, compared with those who did not. Substrate applied micronutrients, were better than their foliar [36].

The research was carried out, (29 ° 50 'N and 52 ° 46' E, 1810 m) to notice the effects of $ZnSO_4$ and nitrogen, for corn on the experimental farm, of Shiraz University, in the spring and summer of 2007. Three levels of urea nitrogen applied at (120, 260, 400 kg ha^{-1}), three different states, such as zinc ($ZnSO_4$) and two corn hybrids (704,540). The results showed that the interaction, among the zinc oxide and a significant and beneficial effect. Iron absorption and entering the plant metabolism is improved by the ratio of nitrogen and $ZnSO_4$ but had the opposite effect, on the iron content. Good amount of $ZnSO_4$ and nitrogen, is used to cover both the absorption and the antagonistic properties [35,36].

An experiment was conducted on spring wheat and corn for the study of the relationship between Cd and $ZnSO_4$. It has been described that there is a synergistic effect. These two metals in the charge to increase, the content of Cd in the soil and improve absorption $ZnSO_4$ and cadmium accumulation in these $ZnSO_4$ two crops [19]. Experience in the corn wet $ZnSO_4$ were checked. $ZnSO_4.7H_2O$ to (0 and 5 mg kg^{-1}). Delivered four phases moisture leaves (70-75% and 40-45%) of the power supply, we were informed that the application of $ZnSO_4$, improves the efficiency of the increasing use of process water and physiological effects of drought, on plants corn to decrease [9,37].

Bakyt and Sade [37], conducted an experiment, to study the reaction of the truth including grains (Tokak 57/37, 90 Erginel, 50 Cumhuriyet, 97 Kiral andObrk 86), the use; of $ZnSO_4$ (control, up to 9, 18 and 27 kg ha^{-1}). $ZnSO_4$ deficient in calcareous soils. Relative increase due to $ZnSO_4$ grain control ranged from (16% to 29% in 1994/95 and 1995/96) growing season. Plant height increased use of grains $ZnSO_4$. Leaf surface in leaves was increased by application of $ZnSO_4$ in all grains excluding, Bulbul 89. While, all grades, the number of grains on each spike increased by 24%, applying (18 kg $ZnSO_4$ ha^{-1}). $ZnSO_4$ fertilization considerably improved grain yield, for all varieties of barley. Relative improvement in plant height, number of grains on each spike, the highest number each square meter, control zinc were (28%, 31% and 35% in 1994-1995 to 20%, 22% and 18%). Results 1995 to 1996 confirmed, the lack $ZnSO_4$ is one of the most important nutrients, limiting crop production, in the province of Konya in central Anatolia.

Effect of different levels of boron (0, 0.5, 1.0, 1.5, 2.0 and 2.5 kg ha-1 B), was studied in farmers field in D.I. Khan on cotton varieties. B-557 was used boron in the form of boric acid. NPK @, utilized in basic dose 100-50-50 kg ha^{-1}.The concentration of boron in the soil and leaves before flowering and in the soil after harvest significantly affected. Leave (1.40 and 18 mg kg^{-1}) live is determined in cotton leaves and in soil.

Micronutrient deficiencies are a strong influence on growth, metabolism and the reproductive phase in plants, animals and humans. Widespread micronutrient deficiencyhas been found in the country of India. In India, hundreds of thousands (2:52) Analysis of surface soil samples, from around the world together, the prevalence of deficiency in the soil differs, $ZnSO_4$ revealed. From these samples, (49, 12, 4, 3, 33% and 41%) of the shortage of available soil test $ZnSO_4$. Iron (Fe), $MnSO_4$, copper (Cu), boron (B) and sulfur (S). Back ground, coarse texture, lime, sodium or alkali with a sandy texture, low pH and high concentrations, of organic matter, usually are low $ZnSO_4$. $ZnSO_4$ peak loadable in plants, is the absence of its assumed, that the synthesis of RNA, which in turn inhibits protein synthesis and to limit growth reduction and increased susceptibility to various pathogens [38,43,44]. Similarly, another group of researchers, compared the amount of rhizospher phytosiderophores in wheat, sorghum and maize, $ZnSO_4$ inadequate nutrient solution and shows that the roots of sorghum and release a large amount of bleeding compared with corn. This is with $ZnSO_4$ in the growth of corn, may be the reason for the lack of command to explain $ZnSO_4$ field grown corn the other two species in the same situation [39-45]. Individual effect of B (0, 1.5, 3.0 or 4.5 kg ha^{-1}) and Zn (0, 2.5, 5 or 10 kg ha^{-1} Zn), were for maize yield, quality corn and absorption of nutrients studied. Application B (3.0 kg ha^{-1}), improves the average corn yield, in control of 22 percent. Application of 5 kg Zn increased, grain yield of maize, by 19% over the control. The protein content was suggestively rise, with increasing Zn and B [40-46].

CONCLUSIONS

It was concluded that micronutrient deficiencies are a strong influence on growth, metabolism and the reproductive phase in plants, animals and humans. It was found that the production of corn will be enhanced by the use of the rates of the trace elements significantly because trace elements had a synergistic affiliation with other units. Copper has a positive or negative attitude and absorption of primary and secondary elements, depending on the types of crops and the nutrients intricate.

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