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The Effect of Foliar Application of Ferrous sulfate on Production of Multi-capsule per Leaf node in Sesame Plant (*Sesamum indicum* L.) under Field Condition

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Introduction

Sesame (*Sesamum indicum* L.) belongs to pedaliaceae family and is one of the most important oilseed crops that will grow in relatively dry region. Each leaf node will have one capsule but in some sesame ecotypes the number of capsule per leaf node can increase (Langham and Wiemers, 2002). Factors such as agricultural operations, growing substrates and variety affect yield and harvest index. Iron is one of the main micronutrient that can affect growth and development (Miller *et al.,* 1982). This research was conducted to study the effects of leaf nutrition on the number of capsules per leaf node of sesame.

Materials and Methods

In order to study the effects of leaf nutrition on the number of capsules per leaf node in sesame plant (*sesamum indicum* L.), an experimental was conducted at Khorasan Razavi Agricultural Education Center, Iran, 1n 2014. This study was done as a factorial arrangement with two factors, kind of seed and the concentrations of ferrous sulphate on the basis completely randomized block design with three replications. The first factor was two seed types (one type has been taken from leaf node with three capsules and the other seeds were taken from leaf node with one capsule in sesame plant). The second factor was three concentration of ferrous sulphate (0, 50 and 100 ppm) that applied in %50 vegetation, flowering and capsule phase. Morphological and yield components traits were measured. Data were analyzed with MSTAT-C software and means comparison were done with Duncan multiple range test in 5 percent probability.

Results and Discussion

The first factor (type of seed) showed significant difference on height, length of branch, fresh and dry shoot weight, dry weight of capsule, number capsules per plant, 1000 seed weight and seed weight per plant. Plants growing from the seeds with three capsules in leaf node (Cap2) had the maximum height with 88.2 cm that was 20% more than plants that growth from seeds with one capsule in leaf node (Cap1). The maximum seed weight per plant also obtained from Cap2. The application of ferrous sulphate concentration with 50 ppm increased the number of three capsule nodes in plant but 100 ppm ferrous sulphate had the lowest three capsule nodes per plant. The results of interaction treatments showed that using of 50 ppm ferrous sulphate in Cap2 treatment had the maximum plant height with 89.9 cm. In two treatments Cap1 and Cap2 applying ferrous sulphate concentration with 50 ppm had the maximum number capsule per plant with 84.7 and 88.3 capsule per plant, respectively.

This study showed that biosynthesis of plant metabolite was controlled not only by genetic but also by environmental conditions. Iron is an important component in many plant metabolisms such as chlorophyll and tylakoid synthesis and in development of chloroplast. Goos and Johanson, (2000) showed that two foliar applications of iron compounds (Fe-EDDHA) increased yield in three soybean genotypes. Jana and Jahangir (1987) suggested that using of iron micronutrient with 0.1 ppm produced maximum height in bean. It seems that particular properties of Iron such as Redox properties, capable to establish complex with different ligands, a component of electron transport system and take part in many enzymes structure had important roles in plant

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metabolism and application of suitable amount can increase growth and yield of plant.

Conclusions

The results showed that foliar application of ferrous sulphate can increase the number of capsules per leaf node as using of 50 ppm ferrous sulfate in plants that grow up from seeds with three capsules in leaf node (Cap2) produced the most multiple capsule percent in leaf node. Maximum seed weight per plant with amount 13.2 $g.plant^{-1}$ was obtained from applying 50 ppm ferrous sulfate in Cap2 plants. Positive and significant correlation was found between seed weight and multiple capsule percent in leaf node (r=0.82**) and with shoot dry weight (r=0.80**). In addition, the results showed that ferrous sulfate can increase the number of capsules per leaf node.

Keywords: Height, Leaf node capsule, Seed weight, Three capsules

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