Effect of Applying Calcium and Zinc on vegetative Characteristics of Strawberry "Aromas"

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Abstract
Strawberry (*Fragaria × ananassa Duch*) is one of the small fruits and belongs to temperate zone and it is very favorite among consumer because of good taste and different combination of food. In this study effect of spraying calcium and zinc on vegetative characteristics of strawberry (aromas species) was investigated. Treatments were incloding spraying calcium and zinc (1/1000 ml each of them) and also control treatment. for study and comparison of treatments effects, one control experimental plant without treatment also involved. Foliage spraying treatment of calcium take place in packing fruit stage and zinc in flowering stage. This study had done in completely randomized design with 12 treatments and repeated 4 times. Applying calcium resulted in most runner number and it was significant but there was not any significance for zinc. There was no significant difference observed in number of branch crown and leave.

Key words: Strawberry, Foliar application, Calcium, Zinc, qualitative characteries.

INTRODUCTION:
One of the methods of plant nutrient minerals, is foliar feeding. In this method, the speed and efficiency of the plant required elements are relatively in high. When deficiency symptoms are observed, provide quick nutrient branches, leaves, or fruits, or when the roots are essential for various reasons, including environmental conditions can not absorb nutrients well, spray with a suitable solution. Foliar feeding of some elements such as boron, manganese, zinc and iron in calcareous soils of our country is better than soil consume. Calcium is involved in the formation and increasing protein within the mitochondria. According to the role of mitochondria in aerobic respiration and absorbing nutrients therefore we can conclude that the direct relationship between the amount of calcium and nutrient uptake by plants. Calcium uptake by the plant is used both by the mass diffusion. Fertilizer containing zinc can activate enzyme systems, metabolic activity increases energy production, protein synthesis and carbohydrate levels in leaf development, observed in the end is resulting in an increase in biomass. Lack of zinc influences on production of hormons especially Indole acetic acid. Zinc deficiency decreases the concentration of Indole acetic acid, consequently, reduced elongation of the branches. Zinc deficiency may also decreases the concentration of gibberellin in plant. Study results showed that foliar spraying microelements incloding iron is useful for early growth and establishment of cold runner in soilless culture. In addition, foliar spraying at the beginning and middle of the harvest season, increased fruit yield and Brix index, which is probably due to the improved speed of deployment

and increased leaf area. The young strawberry plants have been established through the runner system to produce new roots and leaves need energy to be controlled carefully in terms of flowers and fruits, in this case the foliar application of minerals on the leaves during the roots formation is useful.

MATERIALS AND METHODS:

The experiments in greenhouse whit 1200 m area soilless culture systems in Saman city in 22 km northeast of Shahrekord and 85 km of west province of Esfahan performed. The study was performed in randomized complete block design with 3 treatments and 4 replicates and a total of 12 plots, each plot consists of a pot with 4 aromas strawberry plant pot with a distance of 30 cm apart were placed in 2 rows. Medium to be ready containing 30% coco peat and 70% perlite with an inch of washed sand in the bottom of the pot. Before planting, beds with fungicide and shrubs to prevent disease with concentration of 2 per thousand Benomyl fungicide were disinfected for 15 minutes. Nutrient was applied with purely mechanical and plumbing systems. The method of adding elements to be sprayed. Treatments were including applying calcium and zinc on each was 1 per thousand concentration and control. Calcium treatment was performed in the set up of fruit and zinc on the flowering stage. Measured was as number of roots, leaves, and runner. The experimental design was completely randomized, and data analysis was done by SPSS software.

RESULTS AND DISCUSSION:

Analysis of variance table application of foliar calcium had a significant effect on the level of 0/5% of the number of stems. According to shape 1 foliar calcium increased and foliar zinc reduce the number of leaves but did not make a significant difference. The comparison (Figure 2) foliar application of zinc and calcium did not significantly different. The number of runner increased by calcium foliar elements and significantly different from control but zinc spraying did not make a significant differenc. Calcium has the role as a secondary message sending signals in response to environmental changes and regulate plant growth and development in terms. Calcium deficiency in strawberry starts burning in new leaf margin. Calcium deficiency in the leaves causes yellowing and loss of leaves. Above proof impact on increasing the quantity of the vegetative characteristics. Zinc is involved in chlorophyll formation, production of hormone auxin, protein and carbohydrates synthesis and in the development of leaf surfaces. Symptoms of zinc deficiency in small fruiting and grape was appeared at first in the leaves at the end of the main branches and in summer on the clean side leaves of trees. This leaves a much smaller size than usual as it is called stubborn. In terms of the lack of zinc, fruit set do not pack very well, cluster is incomplete. The present experiment was conducted in hydroponic nutrient solutions and complete certain and one reason that the use of these elements made not a significant impact on traits is for completely spraying and different reaction of different varieties to environmental conditions and nutrient and dose for each of the element. Numerous studies that have been performed to investigate the effect of nitrogen levels on growth and yield of strawberry showed cultivars had different responses.

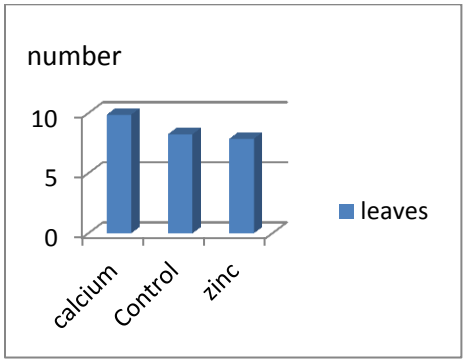

Fig 1_ The mean effect of treatment on leaves

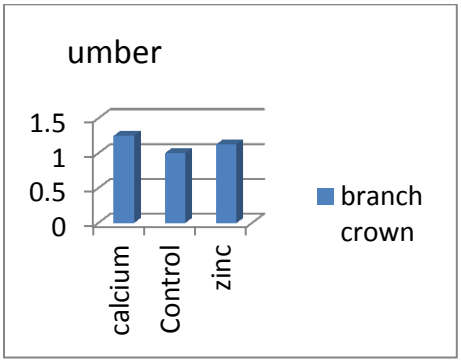

fig 2_ The mean effect of treatment on branch crown

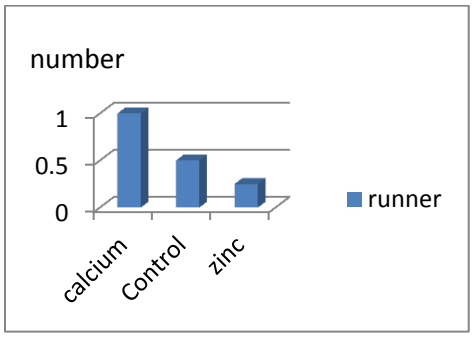

fig 3_ The mean effect of treatment on runner

REFERENCES :

بهنامیان م، مسیحا س. 1384. توتفرنگی. تبریز: انتشارات ستوده، 120ص.
خوشگفتارمنش ا. 1386. مبانی تغذیه گیاه. چاپ اول. مرکز نشر دانشگاه صنعتی اصفهان، 453ص.

Asrey R, Jain R K, Singh R. 2004. Effect of pre-harvest chemical treatment on shelf life of chandler strawberry (Fragaria × ananasa). Indian Journal Agriculthure Science. 74: 485-487.

Chaturvedi OP, Singh AK, Tripathi VK, Dixit AK. 2003. Effect of zinc and iron on growth, yield and quality of strawberry cv. chandler. ISHS Acta Horticulture 696: VII International Symposium on Temperate Zone Fruits in the Tropics and Subtropics - Part Two.

Jarosz Z, Konopinska J. 2010. Effect of substrate type and Nitrogen fertilization upon yielding and chemical composition of "Elasanta" strawberry cultivar grown in unheated foil tunnel. Acta Scinence, hortorum Cultus a, (1): 87-96.

Kaya C, Kimak M, Higgs D, Saltali K. 2002. Supplementary calcium enhances plants growth and fruit yield in strawberry caltivars grown at high (NaCl) salinity. Scentia Morticalturae . (1): 65_74.

Khayyat M, Mahmoodabadi MR, Khayyat AR, Rajaee S. 2008. Evaluation of Manganese, Boron, Potassium, Calcium and Zinc Effects on Yield and Fruit Quality of Barberry (Berberis vulgaris L.) Plants. Horticulture Environmtal Biotechnology, 49(5):1-5.

Lamarre M, Lareau MJ. 1997. Influence of nitrogen, potassium and magnesium fertilization on day-neutralstrawberries in Quebec. Acta Horticulture, 439: 701-704

Morgan L. 2005. Hydroponic Strawberry Production. (NZ)LTD,120 p.

Scalzo J, Capocasa F, Palandrani A, Battino M, Mezzetti B. 2003. Quality and nutritional value in strawberry breeding and cultivar evaluation. Acta Horticultural, 620:61-64.

Singh R, Sharma RR, Tyagi SK. 2007. Pre-harvest foliar application of calcium and boron influences physiological disorders, fruit yield and quality of strawberry (Fragaria × ananassa Duch). Scientia Horticulture, 112(2): 215-220.

Tabatabaei SJ, Fatemi LS, Fallahi E. 2006. Effect of ammonium: nitrate ration on yield, calcium concentration and photosynthesis rate in strawberry. Jornal of Plant Nutrition, 29(7): 1273-1285.

Taghavi, TS, Babalar M, Ebadi A, Ebrahimzadeh H, Asgari MA. 2004. Effect of nitrate to ammonium ratio on yield and nitrogen metabolism of strawberry (Faragaria×Ananassa cv. Selva). International J. Agric. Biol, 6(6): 994-997.