Effect of some plasticulture and fertigation treatments on productivity and fruit quality of strawberry

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A green-house experiment was conducted in Agric. Res. Center, using wheat (Triticum aestivum L., cultivar Giza 168) as a monocotyledonous plant and faba bean (Vicia faba L., cultivar Nubaria 1) as a dicotyledonous plant grown on two-types of soils to : (1) investigate the possibility of increasing the agronomic use efficiency of applied micronutrient fertilizers (Fe, Zn and Mn in sulphate form), (2) study the mutual effect among Fe, Zn and Mn in soil and plants on growth, yield and nutrients uptake by wheat and bean plants. The obtained results could be summarized as follows :5.1. Effect of the applied micronutrients after 60 days from sowing.Concerning the non-calcareous and calcareous soils , the application of iron , manganese and zinc solely caused increases in dry matter yield . Also, the combinations of Fe-Mn , Fe-Zn , Mn-Zn and Fe-Mn-Zn caused the increases in dry matter yield.Application of Fe and Fe-Mn resulted insignificant increases in iron concentration compared to the controltreatment.Zinc concentration in bean and wheat plants tended to increase significantly due to applying Zn alone or in combination with Mn and /or Fe .Summary and Conclusion -107-There was a significant increase in Mn concentration in plants due to applying MnSO4 alone or with Zn and / or Fe as compared to the control treatment .The uptake values of Fe by bean and wheat plants grown on the non-calcareous and calcareous soils increased significantly owing to the application of Fe , Fe combined with Zn , Fe combined with both Mn and Fe combined with Mn and Zn as compared with its uptake in the control treatment.Also, values of Zn uptake by bean and wheat plants increased due to the application of Zn , Zn combined with Mn , Zn combined with Fe and Fe combined with Mn and Zn , contrary to application of Mn or Fe solely and Fe combined with Mn , which caused decreases in Zn uptake as compared with the corresponding uptake ones of the control .Although addition of Mn , Mn-Zn , Fe-Mn and Fe-Mn-Zn could increase Mn uptake Mn, yet addition of Zn or Fe solely and Fe-Zn resulted in decreases in Mn uptake by bean and wheat plants.Relative increases in AB-DTPA extractable Fe from the non-calcareous and calcareous soils as compared to that of the control occurred owing to the application of Fe, Fe-Zn, Fe-Mn and Fe-Mn-Zn . Application of Zn, Mn and Mn-Zn caused values of AB-DTPA extractable Fe to decrease as compared with that of the control .A green-house experiment was conducted in Agric. Res. Center, using wheat (Triticum aestivurn L., cultivar Giza 168) as a monocotyledonous plant and faba bean (Vicia faba L., cultivar Nubaria 1) as a dicotyledonous plant grown on two-types of soils to : (1) investigate the possibility of increasing the agronomic use efficiency of applied micronutrient fertilizers (Fe, Zn and Mn in sulphate form), (2) study the mutual effect among Fe, Zn and Mn in soil and plants on growth, yield and nutrients uptake by wheat and bean plants. The obtained results could besummarized as follows :5.1. Effect of the applied micronutrients after 60 days from sowing.Concerning the non-calcareous and calcareous soils , the application of iron , manganese and zinc solely caused increases in dry matter yield . Also, the combinations of Fe-Mn , Fe-Zn , Mn-Zn and Fe-Mn-Zn caused the increases in dry matter yield.Application of Fe and Fe-Mn resulted insignificant increases in iron concentration compared to the controltreatment.Zinc concentration in bean and wheat plants tended to increase significantly due to applying Zn alone or in combination with Mn and /or Fe .Summary and Conclusion -107-There was a significant increase

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Application of Zn, Mn and Mn-Zn caused values of AB-DTPA extractable Fe to decrease as compared withthat of the control .Summary and Conclusion -108-AB-DTPA extractable Zn showed the highest value owing to the application of Zn solely. On the other hand, application of Mn-Fe caused values of extractable Zn to decrease as compared with that of the control .With regard to AB-DTPA extractable Mn in the soils treated with different micronutrients, there were remarkable increases in AB-DTPA extractable Mn due to Mn , Mn-Zn , Mn-Fe and Fe-Mn-Zn treatments.5.2. Effect of the applied micronutrients after 120 days fromsowing.Application of Fe combined with Mn and Zn resulted in the highest straw , pods and seed yields of bean as compared with the control.Dry yields of straw and grains and dry weight of 100 grains of wheat plants grown on the non-calcareous and calcareous soils increased significantly owing to addition of Fe,Mn and Zn.The concentrations of Fe in straw of bean plants grown on the non-calcareous and calcareous soils significantly increased due to addition of Fe alone or in combination with Mn or Zn .The addition of Zn , Zn-Mn and Zn-Fe increased concentrations of Zn in bean straw.Application of Mn solely or in combination with Fe or Zn caused its concentrations in straw to increase. However theaddition of Fe or and Zn significantly decreased Mn concentrations.Fe concentration in the straw of wheat plants grown on the non-calcareous and calcareous soils increased due to application of Fe only or in combination with Zn or Mn were increased as compared to those of the control treatment . Further more, zinc concentration in wheat straw tended to increase owing to applying Zn alone or with Mn and /or Fe . The relativeincreases in Zn concentration as a result of the used Zn, Zn-Mn and Zn-Fe treatments.Application of Mn combined with either Zn or Fe caused significant increases in Mn concentration.The uptake of Fe by straw of bean plants grown on the non-calcareous and calcareous soils increased significantly owing to addition of Fe , Fe-Zn , Fe-Mn and Fe-Mn-Zn treatments as compared with the control .Zn uptake values increased significantly due toapplication of Zn , Zn-Mn and Zn-Fe treatments as compared with the control treatment.Application of Mn , Fe , Fe-Mn and Fe-Mn-Zn causedrelative decreases in Zn uptake as compared with the control treatment .Summary and Conclusion -110-Application of Mn alone or combined with Fe and / or Zn enhanced significantly Mn uptake.The average values of Fe uptake by straw of wheat plants grown on the non-calcareous and calcareous soils were increased compared to those of the control .Zn uptake increased significantly owing to Zn application to the soil whether it was applied solely or together with Fe and /or Mn.Mn uptake values increased owing to its applicationsolely or with Fe and / or Zn .5.3. Micronutrients concentration and uptake by seeds of bean plants grown both the non-calcareous andcalcareous soils.The addition of Zn and /or Mn decreased significantly the concentration and uptake of Fe as compared with the control.The least obtained Zn uptake values by seeds were associated with the combined treatments of Fe-Mn and Fe-Mn-Zn .The addition of Fe and or Zn significantly decreased Mnconcentration and / or uptake .Summary and Conclusion -111-5.4. Micronutrient concentrations and uptake by grains of wheat plants grown on the non-calcareous andcalcareous soils.With regard to Fe application, it contributed to a remarkable significant increase in Fe concentration and uptake.Regarding the effect of Mn, addition of Mn increased significantly its concentration and uptake, while it decreased under application of Fe and or Zn.With regard to the effect of Zn, Zn concentration and uptake increased significantly owing to Zn application to the soil. Addition of Fe and Mn decreased significantly Zn content.5.5. Extractable

amounts of micronutrients in the soil at the end of the experiment.The lowest values of AB-DTPA extractable Fe were achieved owing to the combined application of Mn-Zn . Also, the sole application of either Zn or Mn caused AB—DTPA extractable Fe to be of lower concentrations than the corresponding one of the control treatments .On the other hand, application of Fe solely or in combination with either Zn or Mn or both of them resulted in higher AB—DTPA extractable Fe than the control treatment . The sole application of Mn and Fe as well as their combined application resulted in lower concentrations of AB—DTPA extractable Zn than that of the control treatment .