EFFECT OF ORGANIC AND BIOFERTILIZATION ON GROWTH, YIELD, FRUIT QUALITY AND LEAF MINERAL CONTENT OF SUPERIOR GRAPEVINES

By

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B.Sc. Agric. (Hort.), Fac. of Agric., South of Valley University, (2000)

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ABSTRACT

Ahmed Abd Elraheem Mohamed: Effect of Organic and Biofertilization on Growth, Yield, Fruit Quality and Leaf Mineral Content of Superior Grapevines Unpublished M.Sc. Thesis, Department of Horticulture Faculty of Agriculture, Ain Shams University, 2015

This investigation was carried out through two successive seasons (2012 and 2013) in a private grapevine orchard located at 76 kilometer from Cairo on the desert road to Alexandria, Egypt on five years- old Superior grapevines budded on salt creek rootstock grown in a sandy loam soil. Planting distance was 2 X 3 meters apart under drip irrigation system with well water, the vines were cane-pruned and trellised by the modified "Baron" system. The aim of this study was to examine the possibility of saving nitrogen requirement by using organic and biological nitrogen fertilizers comepletely instead of mineral nitrogen fertilizers. Mineral nitrogen fertilization was applied as “ammonium nitrate” (33.5% N) by the rate 60 kg actual N/fed about (85.7 g/N/vine) as a control treatment. The experiment included two sources of organic manure (compost and chicken manure) each organic source consisted of four levels (100%, suboptimal levels 75%, 50% and 25%) meaning, addition of (60, 45, 30 and 15 kg actual N/fed), respectively and four levels of biofertilizer Nitrobein (0, 9, 12 and 15 ml/vine). Thus the experiment consists of 9 treatments arranged as a randomized complete block design. Each treatment included three replicates and each represented by three vines. Results showed that, the best values of yield, fruit quality and petioles macro and micronutrient content in most cases were observed by T9 (mineral treatment) equaled by chicken manure treatment especially T6 (75% chicken manure + 9 ml Nitrobein). All organic manure treatments gave lower significant values of berry juice nitrate and nitrite content compared with T9 (mineral treatment). Therefore, Superior grapevine production in Egypt can rely on organic manure as an

alternative to mineral fertilization and could be reduce 25% from actual nitrogen addition. Chicken manure might be used as most available and economic substitute for compost with increasing in yield, fruit quality and nutrients status as well as reducing environmental pollution and the best treatment was (75% chicken manure + 9 ml Nitrobein).

Key words: Chicken manure - compost- fruit quality - Nitrobein- Superior grapevine- Yield

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1. INTRODUCTION

Grape (***Vitis vinifera*** L.) is considered the first major fruit crop in its production all over the world. In Egypt, grapes rank second among fruit crops while citrus being the first according to the statistics of the **M.A.L.R. (2013)** amounted to the cultivated area in Egypt 188.543 Fed. produced about 1378815 tons. Superior grapevine cultivar is considered a prime and popular grapevine cultivar, successfully grown under Egypt conditions. It ripens early in the last week of May under sandy soil conditions. In addition, it has a greater potentiality for exportation to foreign markets due to its early ripening and this reduces competition.

Nitrogen (N) is an essential constituent of all living creatures. Without N we would not exist, simply because nitrogen is one of the major plant nutrients, being a part of protein, enzymes, amino acids, polypeptides and many other biochemical compounds in plant system i.e. encouraging cell division and the development tissue **(Mengel and Kirkby, 1987).** At the same time it would be incorrect to state that the use of mineral N is without problems. It is definitely not. First, once applied, N is easily lost to the wider environment, regardless whether it stems from industrial fertilizers or from recycled "natural" products. Lost N can have negative impacts on the quality of air and water, as it is associated with the formation of smog and tropospheric ozone, global warming effects, depletion of stratospheric ozone and negatively affects the quality of ground water and surface water. Lost N can thus have a serious impact on the health of plants, animals and men, on the quality of ecosystems and, in the end, on biodiversity (**Erisman *et al.*,2011)** and**(Sutton *et al.*,2011).** Global-level mineral N losses to the environment from mineral fertilizer use are currently 36 mill. t yr^{-1}, worth USD 11 700 mill. and with adverse environmental impacts (**Rabindra** . ***et al.*,2002).** Increased mineral-nitrogen use is needed to ensure food security. However, its application has to be planned in a scientific manner that optimizes its use and ensures productivity improvements. In addition to measures to