

Response of thompson seedless grapevines to chemical and bio fertilization under middle sinai conditions

Abd El-Rhman Ibrahim El-Sayed

This study was conducted during the two successive seasons of 2000 and 2001 at El-Maghara Station, Sinai Governorate as a trial to study the effect of different nitrogen form i.e., slow release, fast release nitrogen fertilizers and biofertilizers on growth, leaf minerals content, fruiting and fruit quality of Thompson seedless grapevines. Ten-year-old Thompson seedless grapevines, nearly similar in growth vigour, healthy, planted at 3 x 3.5 m apart in a sandy soil were devoted for this investigation. Ninety-six Thompson seedless grapevines, received regularly the recommended horticultural practices were selected for this study. However, three factors were studied during the present investigation as follows: 1-Nitrogen fertilizer source: Response of vine growth, fruiting and fruit quality of Thompson seedless grapevines to four forms of nitrogen fertilizers namely (Ammonium sulphate and urea) as fast release nitrogen fertilizers and (Sulphur coated urea and Phosphorus coated urea) as slow release nitrogen fertilizer was investigated. According to the recommendation of Horticultural Institute, Ministry of Agriculture, Egypt, the most of actual nitrogen (g/vine/year) required to grape. Ammonium sulphate ($(\text{NH}_4)_2\text{SO}_4$ 20.6%). Urea ($\text{NH}_2\text{-O-NH}_2$ 46%N). Summary and Conclusion 135 Sulphur coated urea (SCU 41.0% N + 0.0 % S). Phosphorus coated urea (PCU 37.11% N). 2-Nitrogen fertilizer rates: Four rates of nitrogen fertilizers [40, 60, 80 and 100 g N/vine/year] application of the four tested nitrogen fertilizer forms i.e., fast release N-fertilizers (Ammonium sulphate and urea) and slow release N-fertilizers (SCU and PCU) were studied as follows: a)-fast release N-fertilizers was added four times at (February, April, June and August). b)-slow release N-fertilizers was added once time at vegetative growth start (February). All nitrogen fertilizer forms studied were applied in trench and digged in the soil during deep hand hoeing practice (about 5 cm depth). 3- Biofertilization (N-fixing bacteria): The remaining N-requirement for each vine was assumed to be partially satisfied through using N-fixing fertilizers. In the first week of March of each season, Thompson seedless grapevines were inoculated with Azotobacter chroococcum (1/2 liter per vine) two-liter liquid bacteria mixed with fifteen-liter tap water and applied in trenches. Irrigation was conducted after biofertilizer application. Consequently, this investigation is considered a factorial experiment included three factors (4 N-fertilizer forms x 4 N-biofertilizer proved to the most promising treatment in enhancing the previously mentioned vine fruiting parameters. Shortly, slow release N-fertilizers succeeded in enhancing fruit yield/vine (kg). Besides, fast release N-fertilizers increased number of cluster per vine. Increasing nitrogen fertilization rate from (80 and 100 g N/vine) with biofertilization Azotobacter chroococcum induced to the wanted effects on tree fruiting parameters. In addition, the different forms of slow release N-fertilizers particularly (SCU) with biofertilizers enhanced the previously mentioned fruiting parameters. 4- Fruit quality: Fruit quality parameters i.e., fruit weight, fruit diameters, juice volume, cluster number/vine, total soluble solids acidity, TSS/acidity and total sugar responded positively to slow release N-fertilizers rather than fast release N-fertilizers. Besides, the high rate of nitrogen fertilizers surpassed the low rate in enhancing the aforementioned fruit quality parameters. On the other hand, fruit quality parameters were greatly increased with slow release N-fertilizers at the higher rate (80g N/vine) of nitrogen application with biofertilizers Azotobacter chroococcum. Briefly, the

result of interaction between the different nitrogen fertilizer forms and rate of applications and biofertilizers *Azotobacter chroococcum* indicated that (SCU) applied at high rate with N-fixing bacteria proved to be the supplier interaction in enhancing the aforementioned fruit quality parameters. Summary and Conclusion¹³⁹ Consequently, upon the results of this study it is preferable to fertilize Thompson seedless grapevines with slow release N-fertilizers particularly sulphur coated urea or phosphorus coated urea at (80 and 100 g N/vine/year). *Azotobacter chroococcum* could be used as a form for fixing nitrogen in the soil which fertilized with organic manure rate of 15m³/feddan. Used of bacteria in combination with slow release N-fertilizers results encouraging yield and helps to keep the environment clean for coming generations