



جامعة الفيوم
كلية الزراعة
قسم الاراضي والمياه

ملخصات الابحاث المقدمة من الدكتور/ عبد الناصر أمين أحمد عبد الحفيظ

المتقدم للجنة العلمية الدائمة للأراضي والهندسة الزراعية لترقية الأساتذة المساعدين والأساتذة

البحث الثالث

Abdel-Hafeez, A. A. A. and Ewees, M. S. A., (2018). The effective role of vermicompost, elemental sulphur and ascorbic acid on tomato plants grown a new reclaimed calcareous soil at Fayoum Depression. Egypt. J. Soil Sci. Vol. 58, No. 2, pp.255 – 273.

الدور الفعال للمخصب العضوي والكبريت المعدني وحمض الاسكوربيك علي نباتات الطماطم النامية في ارض جيرية مستصلحة حديثا في منخفض الفيوم.

الملخص باللغة الانجليزية

Agricultural utilization of desert marginal soils at El Favoum Governorate edges is of importance to support the local farmer incomes, particularly under the best and suitable management practices of land and available water resources. A newly reclaimed soil encompassing by Eocene limestone at the eastern edge of Tamia district was a matter of concern in this work. It is a sandy clay loam in texture, moderately saline, non-sodic, and calcareous in nature with a subsurface diagnostic horizon of calcigypsic one, and classified as Typic Calcigypsid, fine loamy, mixed, heperthermic, moderately deep. According to a parametric system, it could be evaluated as moderately suitable (S2ws1s2s3n), with soil limitations of wetness, soil depth, salinity/alkalinity and CaCO₃ content, with an intensity degree for each, lies in the range of slight to moderate (rating = 90-80).

The soils of this area are generally suffering from a very low productivity may be due to their high contents of CaCO₃, low organic matter as well as a relatively high soil pH and soluble salts that might be reflected on nutrients availability and soil physical and chemical properties. Therefore, a field experiment was conducted on a newly reclaimed soil at the area of study during the two successive cultivation seasons of 2010-2011 and 2011-2012 using of tomato plants (*Lycopersicon esculentum*, c.v. 1077 hybrid) as test crop. Plots were distributed in a randomized complete blocks with three replicates and irrigated with the only available source in the area (mixture of the Nile water and drainage water at a ratio of 1:1). Treatments applied were planned in an attempted to improve soil properties with a minimat risk of chemical pollution as follow : vermicompost (cattle manure added to earthworms) as an organic manure was applied to the soil plots at four rates (0, 10, 15 and 20 m³ fed⁻¹) and elemental sulphur (i.e., agrochemical soil amendment) at four rates (i.e., 0, 50, 150 and 250 kg S fed⁻¹), while the rates of ascorbic acid were 0, 150 and 300 mgL⁻¹, in form of few drops of Tween-20 added to the spraying solution as a surfactant.

Data showed considerable responses for either vermicompost, elemental sulphur or ascorbic acid especially at their highest rates (20 m³ vermicompost/feddan + 250 kg sulphur /feddan + 300 mg L⁻¹ ascorbic acid/feddan) together were their positive response on the vegetative growth and flowering parameters of tomato plants, i.e., plant height, number of leaves/plant, thickness of stem/plant at soil surface, number of branches/plant, leaf area, number of inflorescences/plant, number of flowers/inflorescence, dry weight/plant, and chlorophyll a & b contents. Data also, showed great increases in essential nutrients uptake by tomato plants such as N, P, K, Fe, Mn and Zn due a role of vermicompost in improving: a) Soil hydro-physical and chemical properties, b) Released organic constituents of active groups such as fulvic and humic acids which have the ability to retain the essential plant nutrients in available chelate forms) and c) Soil biological conditions that enhancing mineralization of the released organic nutrients in available forms. On the other hand, it could be deduced that application of S as a soil amendment at a rate of 250 kg/fed is important to sustain soil productivity and to obtain economically best crop yield attributes under such a calcareous soil for avoiding direct restrictive effect of CaCO₃ on the nutrients released and their mobility towards plant roots.