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DISTRIBUTION OF HUMIC AND FULVIC ACIDS IN ALLUVIAL AND CALCAREOUS SOILS

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ABSTRACT:

This study was carried out to study the content and vertical distribution of organic matter, humic and fulvic acids within different layers of soil profile so six soil profiles were taken from different locations. The first three profiles were taken from Kafer El-Sheikh Governorate varied in their salinity and alkalinity. These locations were Teba 1 Village and Teba 7 Village of El-Hamoul Center and Kafer Elâ€“Marazka Village of Kaleen Center. The other three profiles were taken from different three location of El-Amiria Center varied in their content of calcium carbonate (CaCO3)The locations of the latter three profiles were located in Maryout Research Station, Hosha 13, 18 and El-Amiria (Alexandria Governorate). The first three soil profiles represented the alluvial soils and the others were represented the calcareous soils. The obtained data show that, the soil contents of humic acids were decreased with the increase of soil depth but the content of fulvic acid was increased with the increase of soil depth up to 80 cm and decreased at more depth. The content of both humic and fulvic acids in alluvial soil profiles was higher than that found in calcareous soil profiles. Also, the content of humic acids in alluvial and calcareous soils was higher than that of fulvic acids.The content of both total acidity and functional groups of humic and fulvic acids in alluvial and calcareous soils were decrease of with increaseing of the soil depth and generally the value of total acidity and function groups in fulvic acids were higher than those of humic acids.

Key words: Humic acid, Fulvic acid, Distribution, Total acidity, Functional groups, Alluvial and calcareous s

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WATER INFILTRATION AND STORAGE IN SOILS UNDER SURFACE IRRIGATION

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ABSTRACT:

Water storage and infiltration under surface irrigation are evaluated based on initial soil water content and inflow rate. For that purpose, a field experiment was conducted using fruitful grown grape in northern Egypt at Shibin El-Kom in 2008 grape season to evaluate water storage and conductivity under partially wetted furrow irrigation compared to traditional border irrigation as a control method. Two irrigation treatments were wet and dry conditions in which water applied when available soil water (ASW) reduced to 35% and 50%, respectively. Coefficient of variation was 6.2 and 10.2% for wet and dry treatments, respectively, under furrow systems comparing with 8.5% in border. Water was deeply percolated as 11.9 and 18.9% for wet and dry furrow treatments with no deficit, respectively, compared with 11.1% for control with 5.5% deficit percentage. Application efficiency achieved as 86.2% for wet furrow irrigation that achieved high grape yield (12.9 ton/feddan).

Key words: Surface irrigation, grape, soil water storage and infiltration, water use efficiency, irrigation eva

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HEAVY METALS POLLUTION ASSESMENT IN SANDY SOILS IRRIGATED WITH SEWAGE WATER

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ABSTRACT:

Seven heavy metals (Cd, Cu, Fe, Cu, Mn, Ni, Pb and Zn) were analyzed in Soil samples. The results showed that the total content of heavy elements in the soil ranged from 2.02 to 2.74 mg / kg for cadmium, from 159.785 to 248.77 mg / kg of copper, from 4546 to 7268.55 mg / kg of iron, from 65.43 to 226.89 mg / kg of manganese, from 41.89 to 57.06 mg / kg of nickel, from 55.51 to 72.46 mg / kg of lead, from 105.428 to 190.82 mg / kg of zinc. Results indicated that the concentration of the Cd is in the critical, the concentration of Cu is higher than critical level and Mn, Ni, Pb and Zn concentrations were in the permissible levels. Enrichment Factors (EF) of the heavy metals in soil calculated ranged from 0.362 to 1.52. The Geo-accumulation Index (Igeo) calculated gave values indicating no pollution in sandy soil and ranged from -1.052 to -0.619. While the Contamination factor (Cf) ranged form 0.84 to 1.26, on the other hand Cd, Fe and Pb were described as moderate contamination while other metals described as low contamination. Degree of contamination (Cd) ranged from 0.85 to 1.35 with an average 0.95 these values were nil to very low degree of contamination.

Key words: Heavy metal, Soil, Enrichment factor (EF), Geoaccumulation Index (Igeo), Contamination factor (Cf) a

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THE COMBINED EFFECT OF PHOSPHATE FERTILIZATION AND IRRIGATION WATER SALINITY ON THE CALCAREOUS SOILS PRODUCTIVITY

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ABSTRACT:

This experiment was carried out on five calcareous soils varied in their content of CaCO3 (%) and other soil properties to study the effect of individual and combined applications levels of phosphate fetilization and irrigation water salinity and sodicity on some properties of these soils and its productivity . A pot experiment was carried out in split split plot design with three replicates, where the main plots pluts were the used calcareous soils, the sub plots were application rates of P fertilization and the sub sub plots were irrigation water salinity and sodicity levels .The tested P levels were 0, 50, 100 and 200% of recommended dose (RD) for barley(300Kg superphosphate / fed) which used as tested plant. Five irrigation water sources varied in their salinity and sodicity levels were used in this study . The obtained data show a clear increase of soil content of both total soluble salts and soluble ions with irrigation by the tested saline water and also with the increase of added P. The obtained dry matter yield of both straw and grains of barley plant were decreased with the increase of irrigation water salinity and sodicity . The decrease associated with the increase of water sodicity levels were higher than that resulted from the increase of water salinity levels . On the other hand , increasing of added P resulted in an increase of obtained dry matter yield . The high dry mater yield was found in the soils irrigated with tap water at P level of 200% of RD . Also , the obtained dry matter yield was greatly affected by the studied calcareous soils properties. Straw and grains of barley plants content of N, P and K was greatly affected by the studied treatments and soil properties.This content was decreased with the increase of irrigation water salinity or sodicity, where it was varied widely with P fertilization . The significant levels of relationships between the content of these nutrients and soil properties were varied from nutrient to another.

Key words: Water quality, Phosphate fertilization, Calcareous soil, Barley, Soil properties and Nutrients conte

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INFLUENCE OF GYPSUM AND MANURE ON SOME PROPERTIES OF ALKALI SOIL AND GROWTH OF PEPPER PLANTS

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ABSTRACT:

A pot experiment was conducted to investigate the effect of gypsum (natural chemical amendment) and biogas manure (natural organic fertilizer) and their interaction on plant growth of pepper plants grown on alkali soils, some physical and chemical properties, yield and its components and some vegetative characteristics. The obtained results could be summarized as follows: Application of gypsum from 3, 6 to 9 ton/feddan (corresponding to 50, 100 to 150% of soil gypsum requirements "G.R") caused a decrease in bulk density, pH, electrical conductivity (EC), and exchangeable Na+ and Mg++, as well as ESP of the alkali soil used. The rate of decrease in each of these parameters was parallel to the application level of gypsum, from 50 to 150% of G.R. While, total porosity, cation exchangeable capacity (CEC) and exchangeable Ca++ and K+ increased above the control. Such increases were more pronounced with 150% G.R. (highest dose) Slight variations in organic matter (O.M.) content were detected due to application of gypsum amendments. Addition of biogas manure (at the rates of 1, 2, & 3 ton/fed.) had a little effect on reducing the values of each of bulk density, pH, EC, Exchangeable cations and ESP. While total porosity, O.M and CEC increased considerably with 3 ton/feddan biogas manure. Coapplication of gypsum and biogas manure, specially at the highest rates of both, showed a positive effect, which was more pronounced in case of EC parameter. Dry matter yield of green pepper, planted in such alkali soil, significantly increased after the soil was treated with gypsum up to 150% of G.R, at the three stages of growth (vegetative, flowering and harvest e.g. 45, 60 & 90 days of planting). Application the increasing rates of biogas manure significantly increased both the dry matter and crop yield of pepper plants grown, each cultivation season. Interaction of gypsum and biogas manure gave a significantly positive effect on plant growth at all levels applied of both amendments. Application of gypsum up to 9 ton/feddan (150% of G.R) significantly increased each of plant height, leaf area,

Chlorophylls “a” & “b”, total chlorophyll (“a” + “b”), vit. “C”, total soluble solids (TSS), number of fruits (pods) per plant, average fruit weight per plant and total yield of green pepper plants in both growth seasons, as compared with the unamended plants. All of the studied vegetative characteristics increased progressively with increasing the levels of gypsum as a natural inorganic chemical amendment for alkali soil. Plant height, leaf area, chlorophylls “a” & “b”, total chlorophyll (“a” + “b”), vit. “C”, TSS, No. of fruits / plant, average fruit weight per plant and total crop yield of pepper plants increased progressively and significantly with increasing the rate of biogas manure up to 3 ton/feddan. Coaddition of gypsum and biogas manure revealed a highly positive effect on all plant characters under study, in the two seasons. The best values for yield and its components were obtained by application of biogas manure at its highest rate, i.e., 3 ton/feddan.

Key words: Soil amendments, biogas manure, pepper plants, vegetable crops, alkali soil.