Using of non-traditional soil conditioners for improving properties and productivity of calcareous soils (Maryut area)

Mohamed Saleh Abd El-Aziz Mohamed

5. SUMMARYA field experiment was carried out at Maryut Experimental Station of desert Research Center using two successive crops (wheat and sorghum), on each season, winter 2004/2005 followed by summer 2005) to assess the effect of non-traditional soil conditioners on properties and productivity of calcareous soil. The conditioners tested were FYM (10 and 20 m3/fed), rice straw compost ((10 and 20 m3/fed), Al-Obour compost (10 and 20 m3/fed) cheese whey (105 and 210 m3/fed) which was added in one or two equal doses. The obtained results could be summarized as follows:1. Effect of soil conditioner on soil physical properties:qThe values of soil bulk density were decreased due to the additives of soil conditioners after wheat and sorghum. The highest decrease in bulk density was achieved due to the application of rice straw compost at a rate of 20 m3/fed (RSC2).qTotal soil porosity values were markedly increased due to application of the soil conditioners. The increments were pronounced with the higher application rate. RSC2 was the soil conditioner of the most pronounced effect on total soil porosity.qSoil moisture retained at both field capacity and wilting point increased due to the application of soil conditioners RSC2 was the most effective treatment in this concern.qAvailable water of calcareous soil was increased with the addition of soil treatments after both wheat or sorghum, rice straw compost at a rate of 20 m3/fed and farmyard manure at a rate of 20 m3/fed were superior to all the other treatments.qWater stable aggregates of the investigated soil gradually increased after either wheat or sorghum. The highest values were associated with cheese whey addition at a rate of 210 m3/fed.5. Summary 127qMean weight diameter (MWD) of soil aggregates progressively increased with the application of soil conditioners. The increment was higher after sorghum crop than that after wheat. CW2a superior to all the other treatments.2. Effect of soil conditioners on soil chemical properties:qThe application of soil conditioners to the soil caused slight decreases in soil pH values especially at the high rate, after both wheat and sorghum. Cheese whey at a rate of 210 m3/fed whether in one or two equal doses, was the treatment of the highest effect on soil pH.qThe applied conditioner decrease decreased EC values after wheat and sorghum. According to the decrements in EC values the used soil conditioners could be arranged in the following descending order: ALC1> CW2b> CW1a> CW1b.qAddition of soil conditioners increased soil organic matter content. The increment was higher after sorghum than wheat. Rice straw compost at a rate of 20 m3/fed and Al-Obour compost at a rate of 20 m3/fed, were superior to all the other treatments.3. Effect of soil conditioners on soil contents of macro and micro -nutritive elementsqThe values of available N, P and K increased due to application of the used conditioners, cheese whey at rate 210 m3/fed applied in two equal doses, was more effective in increasing N, P and K in the studied soil after harvesting of wheat and sorghum crops.qAvailable micronutrients i.e. Fe, Mn, Zn and Cu increased due to application of the different soil conditioners. Cheese whey at a rate of 210 m3/fed at two equal doses (CW2b) was the more efficient than the other treatment.5. Summary 1284. Effect of soil conditioners on soil microbiological activities: CO2 evolution was favorably affected by both the type and/or rate of the applied soil conditioners after the harvesting of wheat or sorghum crops. The CW2b treatment gave the highest value of the evoluted of CO2 evolution comparing with othertreatments.5. Effect of soil

conditioners on wheat and sorghum yields:qGrain and straw yields of wheat were increased due to application of the used soil conditioners as compared with the corresponding once of the control. The increase reached maximum levels due to application of cheese whey at a rate of 210 m3/fed (CW2b) and rice straw compost at a rate of 20m3/fed (RSC2).qAddition of all soil conditioners increased the dry weight of sorghum in both two cuts. CW2b treatment could maximize sorghum yield as compared with the other soil conditioners.6. Effect of soil conditioners on macro and micronutritive elements concentration in plants:qAddition of all soil conditioners increased N, P, K, Fe, Mn, Zn and Cu concentration in wheat grains and the two sorghum cuts.7. Economic evaluation:from the economical point of view, it can be concluded that the application of cheese whey at rate of 210 m3/fed (CW2b) is the best management practice on wheat and sorghum yield undercalcareous soil (Maryut area).5. Summary 129