SUMMARY

This work aims at studying and evaluating the physical and chemical properties of the different soil types of Kaluobia govenorate and define the relation between the fertility status of total and DTPA extractable Fe, Mn, Zn, Cu, Pb, Mo, and Cd and some soil variables

So, seventeen soil profiles were selected to represent the main soil types of El- Kaluobia goverenorate . These soil profiles were morphologically described and their physical , chemical and fertility status were evaluated . The obtained data could be summarized in the following .

1- Physical properties :

A- SOIL TEXTURE :-

Soil texture varies widely from one profile to another and even in the subsequent layers of the same profile. Data reveal that soil texture . ranges from sand to clay. Soil of Abu El- Ghait, El- Munira, Shiblanga, Qaha, Sindiyun, Qalyub , Nawa, Kafr Shibin , Abu Zabal (profile 14) are of fine texture (clay or clay loam) throughout their entire depth. Soils of Sandanhor (profile 6) and Kafr Saad (profile 4) are of medium texture (sandy clay loam) , while the other profiles are coarse- textured (sand, sandy loam and / or loamy sand . The wide variation in the textural grades in fact reflect variation in the mode of sedimentation pattern by which these soils have been formed .

B- ORGANIC MATTER CONTENT :

Organic matter content is very low, not exceeding 2.3 %. The low content of organic matter is common feature in the arid regions due to the high oxidation potential sustaining arid climatic conditions.

C- CALCIUM CARBONATE CONTENT

Calcium carbonate content is very low and ranges from 0.1 % to 6.1 %. The vertical distribution of $CaCO_3$ content does not obey any specific pattern with depth.

2- Chemical properties

A- SOIL REACTION (pH).

Soil reaction is quite variable from one profile to another. pH values ranges from 7.1 to 8.3 , i. e, neutral to mildly alkaline . Soil reaction are true reflection of the prevailing aridity and soil chemical composition .

B- TOTAL SALINITY

The soils are non saline as their ECe value are below 4 dSm^{-1} except for the surface layer of profiles 15 which is slightly saline (ECe 5.8 dSm^{-1}) .

C- SOLUBLE CATIONS AND ANIONS

Soluble cations are usually dominated with Na^+ followed by Ca^{++} and / or Mg^{++} , while K^+ constitutes the lest abundant soluble cations. The anionic composition is dominated with Cl^- and / or HCO_3^- followed by soluble SO_4^- with an entire absence of CO_3^- ions ,

E- CATION EXCHANGE CAPACITY

Cation exchange capacity values range from 1.2 and 50.9me/100g soil, depending on soil texture and clay content .

MICRO NUTIENTS STATUS IN THE STUDIED SOILS :-

1- Iron

Total iron content ranged from 10200 and 66000 ppm. The corresponding computed weighted mean (W) of total Fe varies widely between 12936.36 and 60716 ppm. Trend (T) indicate that the soils of profiles 6, 8, 11 and 14 display the highest symmetry . Specific range (R) of total Fe indicate that the soil materials of profiles 6, 8, 10, 11, 12 and 14 are homageneous whereas other profiles are heterogeneous. Highly significant positive correlations were found between total Fe and each of silt % , $CaCO_3$ and clay % and negatively highly significantly correlation were found with sand%. DTPA extractable Fe ranged from 4.4 to 18.5 ppm. The studied soil profiles display adequate quantities of available Fe. DTPA extractable Fe was positively highly significantly correlated with silt % and clay % and negatively highly significantly correlated with sand % .

2- Manganese

Total manganese content ranges from 0.5 to 985 ppm. The wide range of total Mn in the studied soils can be attributed to the difference in the type and nature of soil materials . Weighted mean of total Mn ranges between 126.2 and 877.4 ppm. Trend (T) indicates that the soils of profiles 1, 5, 6, 10, 11, 14, and 16 are highly symmetrical ones. Specific range indicates that the soil materials of profiles 1, 5, 8, 9, 10, 11 and 15 are homogeneous where as the other profiles are heterogeneous. Total Mn was positively highly

significantly correlated with $CaCO_3$, O.M.%, CEC, silt % and clay % and negatively highly significantly correlated with sand % and negatively significantly correlated with pH.

The DTPA extractable Mn ranged from 0.4 to 9.5 ppm. According to the critical levels of available Mn by Soltanpour and Schwab (1977) , the results indicate that samples beloning to low and adequate level groups 9.9 % and 90.1 % , respectively . Negatively highly significant positive correlations were established between DTPA extractable Mn and pH.

3- Zinc

Total Zinc content ranged from 32.0 to 159.0 ppm. Weighted mean (W) of Zn ranges between 38.7 and 151.1 ppm. Trend, (T) of the soils of profiles 1, 2, 3, 6, 8, 9, 10, 12, 14 and 16 are more symmetrical than the other profiles. Specific range (R) shows that the soil materials of profiles 2, 3, 6, 12 and 16 are homogeneous whereas, the soil materials of the other profiles are heterogeneous. The abtained correlation coefficients indicate that total Zn has positively highly significantly correlated with $CaCO_3$ % , O. M.% , EC, silt % and clay % , and has a highly significant negative correlation with sand % .

DTPA- extractable Zn varies between 0.3 to 4.2 ppm depending on soil texture. The results indicate that the soils belonging to adequate and marginaly Zn groups. DTPA extractable Zn was positively highly significantly correlated with $CaCo_3$ % , O.M%, silt % , caly % and C.E.C and negarively highly significantly correlated with sand % .

COPPER

Total copper content in the studied soils ranges between 17.7 and 97.5 ppm. Weighted mean of total Cu ranges from 12.09 to 66.96

ppm Trend (T) values of total Cu in the soils of profiles 1,2 and 9 are more symmetrical. The specific range (R) indicates that the soils of profiles 1, 2, 3, 5, 6, 8, 11, 13 and 15 are formed of homogeneous soil materials, whereas the other profiles are constituted from heterogenous soil materials Highly significant postive correlations were established between total Cu and $CaCO_3$, CEC , silt% and clay % and anegative highly significant correlation between total Cu and sand % .

DTPA extractable Cu varies from 1.1 to 9.9 ppm with an increases in the surfaces layers . The index levels of DTPA extractable Cu indicate that the studied soil contents of available Cu are high. The DTPA extractable Cu was positively highly significantly correlated with each of $CaCO_3$, O.M % and CEC. and positively significantly correlated with silt %, and clay %. On the other hand, available Cu correlated negatively and highly significantly with sand %.

MOLYBDENUM

Total Mo content in the studied soil profiles varies widely from 2.9 to 21.4 ppm Weighted mean (W) of total Mo ranges between 5.4 and 18.2 ppm. Treand (T) indicateds that the soil profiles 1, 6, 8, 10, 12, and 14 are more symmetric than the other profiles. Specific range (R) of total Mo ranges between 0.14 and 1.93. Total Mo was positively significantly correlated with O.M%, CEC, silt%, and clay% and negatively significantly correlated with sand%.

DTPA extractable Mo ranged from 0.02 to 1.24 ppm. The vertical distribution of DTPA extractable Mo indicates a relative increase of Mo in the top surface layers . The obtained coefficients indicate that DTPA extr. Mo was negatively correlated with ECe.