EVALUATION OF SOIL FERTILITY STATUS FOR AGRICULTURAL FARM STATIONS AT SHALAKAN AND EL-BOSTAN

By

TAKI IBRAHIMA MMADI ISLAM
B.Sc. Agric. Sc. (Soil Science), Al-Azhar University, 2005

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This thesis for M.Sc. degree has been approved by:

Dr. Hatem Abdel-Wahab El Attar .....

Prof. Emeritus of Soil Science, Faculty of Agriculture, Alex.University

Dr. Adel El-Sayed El-Leboudi .....

Prof. Emeritus of Soil Science, Faculty of Agriculture, Ain Shams University

Dr. Abdel-Samad Salem Ismaiel Hegazy .....

Prof. Emeritus of Soil Science, Faculty of Agriculture, Ain Shams University

Dr. Mohammed Saifeldeen Abd-Elwahed .....

Assistant Prof. of Soil Science, Faculty of Agriculture, Ain Shams University

Date of Examination: / / 2016

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Under the Supervision of:

Dr. Abdel-Samad Salem Ismaiel Hegazy

Prof. Emeritus of Soil Science, Department of Soil Science, Faculty of Agriculture, Ain Shams University (Principal Supervisor)

Dr. Mohammed Saifeldeen Abd-Elwahed

Assistant Prof. of Soil Science, Department of Soil Science, Faculty of Agriculture, Ain Shams University

Dr. Manal Mubarak Mohamed

Lecturer of Soil Science, Department of Soil Science, Faculty of Agriculture, Ain Shams University

ABSTRACT

Taki Ibrahima Mmadi Islam: Evaluation of soil fertility status for agricultural farm stations Shalakan and El-Bostan. Unpublished M.Sc. Thesis, Department of Soil Science, Faculty of Agriculture, Ain Shams University, 2016.

The aim of the present study is to assess and map the fertility status in the two farm stations of Faculty of agriculture, Ain Shams University. Shalakan farm station in Qualubia Governorate represents old alluvial soils and El-Bostan farm station in El-Behera Governorate represents sandy soils. Thirty soil samples; 20 surface and 10 subsurface, were collected from each studied farm. The sample points were recorded with the global positioning system GPS and mapped. Both soil physical and chemical properties were determined. The chemically available macro and micronutrients; N, P, K, Fe, Mn, Zn and Cu, were measured in both studied locations. Finally, the GIS used to produce a map for each studied nutrient. Shalakan soils showed deficiency of available nitrogen status across the whole farm. However, the P, K, Fe, Zn, Mn, and Cu showed a clear adequacy across the whole farm area. In general, these soils can be classified as moderate to high fertility soil. El-Bostan soils showed that most of the farm area, 94.8%, has less than 7.0 ppm available nitrogen, which could be explained by the low amount of organic matter in those soils. The available phosphorus shows that the total farm has medium amounts, where the values ranged between 6.9 to 8.7 ppm. However, the distribution of available K status shows a clear low values distributed along the whole farm where 93.5 % of the total area has below 170 ppm available K. Furthermore, El-Bostan farm area has high amounts of chemically available iron and manganese; but has low amounts of copper and zinc.

Key words: Soil fertility status, available nutrients Shalakan farm, El-Bostan Farm, and critical limits of macro and micro nutrients.

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1. INTRODUCTION

Soil fertility is a complex feature of soils related to plant nutrients management. It is component of overall soil productivity that deals with available nutrient status, and its ability to release nutrients out of own reserves and through external applications for crop production. In permanent agricultural system, soil fertility is maintained through applications of manure, other organic materials, inorganic fertilizers, lime and the inclusion of legumes in the cropping systems. Similarly, low soil fertility is recognized as an important constraint to increased food production and farm income in many parts of world.

Fertile soil is the foundation of a sustainable agricultural system but poor farming practices expose soil to fertility reduction which reflects on production. To help farmers increase soil fertility and improve the sustainable productivity, we need to evaluate the soil fertility. Soil test-based fertility management is an effective tool for increasing productivity of agricultural soil **Iftikar *et al*., (2010).** Improvement of the physical, chemical characteristics and increased crop production of cultivated soil is needed. Texture, bulk density, saturation percentage (SP), field capacity, wilting point and available water as well as pH, OM, CEC, available N, P and K as well as Fe, Mn, Zn and Cu status are of importance .

In fact, precision agricultural practices are based on the use of revolutionary technology such as Global Position Systems (GPS) and Geographic Information Systems (GIS). The use of GIS indicates correct position of each soil or plant sample taken in the field; produced soil fertility maps and GIS ease the handling of the data, allowing both graphical representation of variability of measure parameters and analysis. The present study is carried out in two locations, the first location is Shalakan Farm Station located at South Delta in El-Kanater El-

khirya Qualubia Governorate; it represents the alluvial soil, with area covering 198 Fadden (82 hectare); while the second location is El-Bostan Farm Station, located at Nubaria region, north of Cairo-Alex. Desert road El-Behera Governorate; it represents the sandy soil. This area covers 55 Fadden (23 hectare). The main objectives of this study were assessment of the Soil Fertility Status for both farms Stations of Faculty of Agriculture (Shalakan and El-Bostan), determine the available nutritional nutrients using chemical methods and prepare soil fertility maps using GIS for N, P, K, Fe, Mn, Zn and Cu in the studied sites.

Finally, the aim of the current work is to evaluate and map the fertility status in the two Faculty of Agriculture, Ain Shams University farm stations. Shalakan farm station in Qualubia Governorate represent old alluvial soils and El-Bostan farm station in El-Behera Governorate represents sandy soils.