

hossam maghraby



بسم الله الرحمن الرحيم



hossam maghraby



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



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شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



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بالرسالة صفحات
لم ترد بالأصل



**ASSESSMENT OF THE CHARACTERISTICS OF THE
HEAVY CLAY SOILS UNDER VARIOUS MANAGEMENT
SYSTEMS**

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BY

IBRAHIM SAID RAHIM

B.Sc. Agric. (Soil Sci.), Cairo Univ. 1983

M.Sc. Agric. (Soil Sci.), Cairo Univ. 1993

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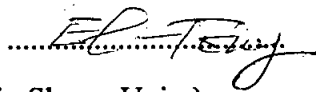
This thesis for ph.D. degree has been approved by:

Prof. Dr. Fouad Hanna Soliman



(Professor of Soil Science, Fac. of Agric., Cairo Univ.)

Prof. Dr. El-Tony Mohamed Ali



(Professor of Soil Science, Fac. of Agric., Ain Shams Univ.)

Prof. Dr. Mahmoud Talha El- Maghraby



(Professor of Soil Science, Fac. of Agric., Ain Shams Univ.)

Date of Examination: 17/2/1999

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Under the supervision of:

Prof. Dr. Mahmoud Talha El-Maghraby

(Professor of Soil Science, Fac., of Agric., Ain Shams Univ.)

Prof. Dr. El-Hassnaa Abu-gabal Mohamed

(Professor of Soil Science, Fac., of Agric., Ain Shams Univ.)

Prof. Dr. Fawkia Labib Bahna

(Professor and Head of Soils and Water Use Dept.,
National Research Centre).

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Abstract

Ibrahim Said Rahim. Assessment of the characteristics of the heavy clay soils under various management systems. Unpublished Ph. D. Thesis, University of Ain Shams, Faculty of Agriculture, Department of Soil Science, 1999.

The main objective of this research work is to recognize and assess the impact of various management systems on the main features of the Vertisols in Egypt.

The Vertisols are characterized by brownish black colour, clayey texture, mostly blocky structure. In the subsurface layer, the angular and subangular blocky with shiny faces and slickensides are very clear. The gilgai features appear on soil surfaces of some profiles. Also the surface cracking are observed in the sites which cultivated with sugar cane and citrus.

The organic matter content are generally low. Some profiles under citrus and intercropping contain relatively considerable amounts of carbonates and mostly free of salinity. These Vertisols are classified into the subgroups of Typic Haplosterts, Typic Haplotorrerts and Typic Calcitorrerts. The surface layers are characterized by high contents of total nitrogen in most crop rotations. All the analysed soil samples have adequate content of available phosphorus regardless of crop type. Most of the profiles under consideration have medium to poor content of available potassium. The Vertisols under investigation, contain relatively high content of amorphous iron and manganese oxides. The cropping systems have no distinct role on the content of these oxides.

The obtained results show that bulk density to increase by depth in most profiles. The lowest values of bulk density are observed in the profile of sugar cane, while the highest figures are found in the profiles under intercropping and citrus.

The high values of penetration resistance are in citrus site while the lowest values are in the soil under cotton. There is a positive significant relationship between penetration resistance and total water stable aggregates.

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The lowest value of hydraulic conductivity was obtained in the deep layer of rice profile, while the highest values were obtained in sugar cane profile. There is a significant negative correlation between hydraulic conductivity and bulk density, clay content, while positive correlation with total porosity.

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The highest figures of available water were found in the profile under rice rotation compared with both intercropping and citrus cultivation.

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The highest values of water stable aggregates were recorded in profiles under citrus cultivation, while the lowest figure were found in the profiles under intercropping cultivation. The values of water stable aggregates increase with depth. There is a highly significant positive correlation between water stable aggregates and both clay content and penetration resistance.

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The description of soil thin section show that the microstructure is moderately to strongly developed. The dominant structure type is angular blocky. The coarse material is micro grains and the fine materials is clay, medium and fine silt mixed with organic matter and amorphous (Fe+Mn). Many forms of fresh organic residues and amorphous fine organic materials. Different types of voids seem as vughs, chambers and many short planes. There are many pedofeatures as nodules have different sizes of calcareous materials, some large (Fe + Mn) and complex dark nodules of $\text{CaCO}_3 + (\text{Fe} + \text{Mn})$.

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The impact of cropping systems on the main characteristics were evaluated through statistical analysis (LSD). There is a significant difference between the water stable aggregates in cotton profiles and the intercropping profiles. The bulk density values are greatly influenced by the type of cropping pattern. There are significant differences between the penetration resistance of cotton profile and each of citrus, intercropping and vegetables profiles.

Key words: Vertisols - physical - morphology - micromorphology
- management systems.