بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

STUDIES ON FACTORS AFFECTING IRON AVAILABILITY IN THE RHIZOSPHERE

By
KHALED SHABAAN ALY EL-HEDEK
B. Sc. Agric. (Soil Sci.), Ain Shams University, 1991

A thesis submitted in partial fulfillment

of
the requirements for the degree of
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in
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(Soil Science)

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Faculty of Agriculture
Ain Shams university

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APPROVAL SHEET

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ABSTRACT

Khaled Shabaan Aly El-Hedek, Studies on factors affecting iron availability in the rhizosphere. Unpublished Master of Science Thesis, University of Ain Shams, Faculty of Agriculture, Department of Soil Science, 2000.

This work was undertaken to study iron mobility and availability in the rhizosphere or non rhizosphere zone of Fe – efficient affected by root exudates, soil pH as well as $CaCO_3$ content and iron fertilization. Yield of Fe-efficient barley cultivars grown in the studies soil was evaluated. Secondly, root exudates and their content from amino and organic acids as well as phytosiderophores released from Fe-efficient barley cultivar treated with or without Fe and their effect on solublizing sparingly soluble Fe-phosphate were also studied. For this purpose, three experiments were conducted as follow: Two hydroponic experiments were carried out to select the most Fe efficient barley from five barley cultivars (*Hordeum vulgare L.*) namely Giza 123,124,125,126 and 128.Root exudates released from Fe-efficient barley cultivars were collected in pots containing $CaSO_4 .2H_2O$ (0.2 mM) and pH, amino acids, organic acids and phytosiderophores were determined. The third experiment was carried out under greenhouse conditions at Agriculture Research Center using non calcareous soil 5.8 % $CaCO_3$ from Sadat city *(Aridsols, Calcids, Haplocalcids,Fine-Loamy, Carbonatic, Thermic)* and calcareous soil 31% $CaCO_3$ from Burg El-Arab *(Aridsols, Calcids, Haplocalcids,Clayey, Carbonatic, Thermic)*. Thirty plastic pots

containing 30 kg soil sample for each were used for this experiment. Some pots cultivated with Fe-efficient barley and treated with zero, 10 ppm Fe as either $FeSO_4$ or Fe-EDTA while the others were not cultivated but treated also with either $FeSO_4$ or Fe-EDTA The $FeSO_4$ or Fe-EDTA were added in the center of the surface layer of each pot. After 124 days, The plants were harvested and soil samples were taken at different horizontal and vertical distances. The obtained results were indicated by following points:

Dry weights of barley shoots were increased with increasing the rate of iron supply from zero (control) up to 0.08m M/L Fe-EDTA; the shoots dry weights of the different barley cultivars could be arranged in the following order: Giza 125> Giza126> Giza128> Giza124>Giza123. Also, increasing the rate of iron supply from zero up to 0.08 mM Fe/L caused such increases in roots dry weight as the following order: Giza125=Giza126> Giza123=Giza124. However, either iron concentration or total uptakes of shoots were increased due to addition of 0.04 mM Fe/L with the highest increase for Giza 125 cultivar. Consequently, Giza 125 was selected as the most Fe-efficient cultivar compared to the other ones.

Total amounts of organic acids released by plant roots were higher than those of amino acids. However, iron deficiency caused such increase in the total amount of both organic acids and amino acids released by barley root compared with Fe-nondeficient plant; the increases reached 170 and 775%, respectively. Also, amounts of phytosiderophores released from barley roots under iron deficiency were significantly higher as compared with those of non deficient conditions, with a relative increases reached 4-fold.