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**EFFECT OF ADDITION OF FERTILIZERS AND SOME SOIL AMENDMENTS ON IMPROVING SOME PROPERTIES OF SALT AFFECTED SOILS**

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**ABSTRACT**

The effect of some soil amendments, i.e , gypsum (G) and sulphur (S) alone or with farmyard manure (FYM) and nitrogen fertilizer as anhydrous ammonia at different levels, i.e., 60, 80 or 100 Kg N / fed. With wheat and 100, 120, or 140 N / fed. with maize on some properties of saline alkali soil as well as wheat and maize crop production grown on Rahill farm at El-Fayoum Governorate was studied . The obtained results can be summarized as follows:

- 1- Application of different soil amendments significantly increased all wheat and maize plant growth characters at different growth stages, i.e, plant height and dry weight / plant as well as yield and its components, i.e., grain, straw or stalk and protein yield as well as plant height and grain index. The treatment of (G) with (FYM) surpassed the other treatments.
- 2- Plant height and dry weight / plant of all wheat or maize plant parts at the studied different growth stages as well as wheat or maize yield and its components significantly increased by increasing nitrogen levels as anhydrous ammonia; however, 100-grain weight of maize was n't affected by nitrogen fertilizer .
- 3- The interaction between soil amendments and nitrogen fertilizer had no significant effect on wheat or maize plant growth characters along with grain and straw or stalk yield; protein yield of wheat, however, significantly increased by the treatment of (G) and (FYM) combined with addition of ammonia at the rate of 100 Kg N / fed.

- 4- N, P, K, Fe and Zn contents / plant at different growth stages and those contents in grain and straw of wheat or maize significantly increased by application of soil amendments. The highest increase was achieved by the treatment of (G) with (FYM).
- 5- Increasing nitrogen levels caused a significant increase in N, P and K contents /plant at the studied different growth stages as well as contents in grains and straw or stalk of wheat or maize; the highest significant increase in Fe at 90 days as well as Fe and Zn contents in grains and straw of wheat were gained at the level of 80 Kg N / fed.; however, Fe content in grain of maize which was the highest by using 120 Kg N /fed.
- 6- The addition of soil amendments improved most studied soil chemical properties; pH, EC, both soluble and exchangeable  $\text{Na}^+$  and  $\text{mg}^{++}$  ; soluble  $\text{HCO}_3^-$ ,  $\text{Cl}^-$  and  $\text{SO}_4^{--}$  as well as ESP and EMgP decreased, both soluble and Ex. $\text{Ca}^{++}$ , Ex.  $\text{K}^+$  as well as ECaP and EKP being increased. Also, soil amendments; increased the availability of N, P, K, Fe and Zn; the effect of (G) with (FYM) was more pronounced.
- 7- Nitrogen added as ammonia at any level did n,t show clear effect on most soil chemical properties along the studied agricultural season; the availability of the tested nutrients increased by such applied ammonia especially at the level of 100 Kg N /fed..
- 8- The interaction effect gave the same trend regarding the studied soil chemical properties due to the individual effect of soil amendments. The treatment of G + FYM with 100 Kg N / fed. gave the highest values of soil available nutrients. The trend of such available nutrients due to the effect the experimental treatments was nearly the same after either wheat or maize harvesting.

## المستخلص

### تأثير إضافة الأسمدة وبعض محسنات التربة على تحسين بعض خواص الأراضي المتأثرة بالملوحة

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أقيمت تجربتان حقليتان في أرض عزبة رحيل بالقرب من بحيرة قارون محافظة الفيوم لدراسة تأثير بعض محسنات التربة (جبس- كبريت زراعى منفردة أو مختلطة مع السماد البلدى) والتسميد الأمونيا الغازية (٨٢% أزوت) على صفات الأراضي المتأثرة بالملوحة (ملحية-قلوية) والنمو الخضري والمحصول للقمح والذرة.

يمكن تلخيص النتائج المتحصل عليها:

- أدت إضافة محسنات التربة المختلفة إلى زيادة معنوية في (طول النبات – الوزن الجاف / للنبات) للقمح والذرة في جميع مراحل النمو تحت الدراسة وأيضا المحصول (الحبوب والقش أو الحطب) ومكوناته (طول النبات – دليل الحبة) وكذلك محصول البروتين وكانت أفضل معاملة هي الجبس مع السماد البلدى العضوى .
- زادت الصفات السابقة للقمح والذرة زيادة معنوية بزيادة التسميد النتروجينى بالأمونيا الغازية. بينما لم يتأثر وزن ال ١٠٠ حبة في الذرة بالتسميد الأزوتى.
- لم يكن التفاعل بين محسنات التربة والتسميد النتروجينى تأثيرا معنويا على صفات النمو المدروسة و محصول الحبوب والقش و الحطب ومحصول البروتين في القمح والذرة.
- محتوى النبات من الأزوت والفوسفور والبوتاسيوم والحديد والزنك في مراحل النمو المختلفة وأيضا محتوى الحبوب والقش أو الحطب في القمح والذرة زادت معنويا بإضافة محسنات التربة . وكانت أعلى زيادة مع الجبس والسماد البلدى العضوى.
- محتوى النبات من الأزوت والفوسفور والبوتاسيوم في جمع مراحل النمو تحت الدراسة ومحتوى الحبوب والقش أو الحطب للقمح والذرة زادت معنوية بزيادة معدلات التسميد الأزوتى. وكانت أعلى زيادة معنوية في محتوى الحديد عند ٩٠ يوم وأيضا في محتوى الحديد والزنك في الحبوب والقش للقمح مع ٨٠ كجم أزوت / فدان و أعلى زيادة معنوية في محتوى الحديد في حبوب الذرة مع ١٢٠ كجم أزوت / فدان.
- أدت إضافة محسنات التربة المختلفة إلى تحسين معظم خواص التربة الكيميائية تحت الدراسة وزيادة تيسر العناصر الغذائية من الأزوت والفوسفور والبوتاسيوم والحديد والزنك. وكانت أعلى قيم لتلك العناصر الميسرة مع استخدام الجبس أو الكبريت مع السماد البلدى العضوى.
- لم يكن هناك تأثير واضح لاستخدام الأمونيا على معظم خواص التربة الكيميائية، بينما زاد تيسر العناصر الغذائية تحت الدراسة وكان أفضل معدل ١٠٠ كجم / فدان خاصة مع عنصرى الأزوت والفوسفور.
- تأثير التفاعل بين محسنات التربة والأمونيا هو نفس اتجاه التأثير الفردى لمحسنات التربة , وأدى استخدام الجبس مع السماد البلدى العضوى مع إضافة الأمونيا بمعدل ١٠٠ كجم أزوت / فدان إلى أعلى قيم من العناصر الغذائية الميسرة .
- بصفة عامة انخفضت قيم العناصر الغذائية بعد حصاد الذرة مقارنة بها بعد حصاد القمح.

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## ABBREVIATIONS

<b>Ca<sup>++</sup></b>	Calcium
<b>CEC</b>	Cations Exchangeable Capacity
<b>Cl<sup>-</sup></b>	Chloride
<b>Cm</b>	Centimeters
<b>CO<sub>3</sub><sup>--</sup></b>	Carbonate
<b>Cu</b>	Copper
<b>dS/m</b>	Deci-Siemens per meter
<b>EC</b>	Electrical Conductivity
<b>ESP</b>	Exchangeable sodium percentage
<b>K<sup>+</sup></b>	Potassium
<b>Ex.CaP</b>	Exchangeable calcium percentage
<b>Ex.MgP</b>	Exchangeable magnesium percentage
<b>Ex.KP</b>	Exchangeable potassium percentage
<b>FAO</b>	Food and Agriculture Organization of the United Nation
<b>Fe</b>	Iron
<b>Fed</b>	Fedden
<b>FYM</b>	Farmyard manure
<b>G</b>	Gypsum
<b>gm</b>	Grams
<b>GR</b>	Gypsum Requirements
<b>HCO<sub>3</sub><sup>-</sup></b>	Bicarbonate
<b>Kg</b>	Kilo grams
<b>Mg<sup>++</sup></b>	Magnesium
<b>mg</b>	Millie grams
<b>N</b>	Nitrogen
<b>Na<sup>+</sup></b>	Sodium

<b>OM</b>	Organic matter
<b>P</b>	Phosphorus
<b>pH</b>	Soil Reaction
<b>PPM</b>	Parts per Million
<b>S</b>	Sulphur
<b>SAR</b>	Sodium Adsorption Ratio
<b>SR</b>	Sulphur Requirements
<b>SO<sub>4</sub><sup>2-</sup></b>	Sulfate
<b>Ton</b>	Tons
<b>Zn</b>	Zinc