

**WATER REQUIREMENT OF SOME WHEAT
CULTIVARS UNDER SANDY SOIL
CONDITIONS**

By

MOHAMED ALI ABDEL-KADER MOHAMED

B.Sc. Agric. Sc. (Agronomy), Ain Shams University, 2005

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

Dr. Gaber Abdel-Latef Sary

Prof. Emeritus of Agronomy, Faculty of Agriculture, Banha
University.

Dr. Hani Saber Saady

Associate Prof. of Agronomy, Faculty of Agriculture, Ain Shams
University.

Dr. Mohamed Fawzy Hamed

Prof. of Agronomy, Faculty of Agriculture, Ain Shams,
University.

Dr. Nemat Abdel-Aziz Noureldin

Prof. Emeritus of Agronomy, Faculty of Agriculture, Ain Shams
University.

Date of Examination: 9 / 11 /2010

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MOHAMED ALI ABDEL-KADER MOHAMED

B.Sc. Agric.Sc. (Agronomy), Ain Shams University, 2005

Under the supervision of:

Dr. Nemat Abdel-Aziz Noureldin

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

Dr. Mohamed Fawzy Hamed

Prof. of Agronomy, Department of Agronomy, Faculty of
Agriculture, Ain Shams University

Dr. Luca Bechini

Researcher, Department of Plant Production, Faculty of
Agriculture, Milan University

الاحتياج المائي لبعض اصناف من القمح تحت ظروف الارض الرملية

رسالة مقدمة من

محمد على عبد القادر محمد

بكالوريوس علوم زراعية (محاصيل) ، جامعة عين شمس ، 2005

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وقد تمت مناقشة الرسالة والموافقة عليها

اللجنة:

د. جابر عبد اللطيف سارى

أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة بنها

د. هانى صابر سعودى

أستاذ المحاصيل المساعد ، كلية الزراعة ، جامعة عين شمس

د. محمد فوزى حامد

أستاذ المحاصيل ، كلية الزراعة ، جامعة عين شمس

د. نعمت عبد العزيز نورالدين

أستاذ المحاصيل المتفرغ ، كلية الزراعة ، جامعة عين شمس

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والمناطق المتأثره بالملوحة)

لجنة الإشراف:

د. نعمت عبد العزيز نور الدين

أستاذ المحاصيل المتفرغ ، قسم المحاصيل ، كلية الزراعة ، جامعة عين شمس
(المشرف الرئيسي)

د. محمد فوزى حامد

أستاذ المحاصيل ، قسم المحاصيل ، كلية الزراعة ، جامعة عين شمس

د. لوكا بكينى

باحث بقسم إنتاج النبات ، جامعة ميلانو

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ABSTRACT

Mohamed Ali Abdel Kader: Water Requirement of Some Wheat Cultivars Under Sandy Soil Conditions. Unpublished M.Sc. Thesis, Arid Land Agricultural Graduate Studies and Research Institute, Faculty of Agriculture, Ain Shams University, 2010.

Drought is one of the environmental stress restricting wheat plant production, especially in the arid and semi-arid areas of Egypt. The objectives of this study were to (I) determine water requirement under sandy soil conditions and (II) investigate the effect of different water content on physiological response, chemical response and enzyme response (antioxidant enzymes), plant growth, yield, its attributes.

Two groups of experiments were carried out, the first was conducted to study physiological, chemical and enzyme responses to different water requirement levels i.e. 80% of reference evapotranspiration (ET_o) (1280 m³/Fad.), 100% ET_o (1600 m³/Fad.) and 120% ET_o (1920 m³/Fad.) at 28 days after sowing of wheat plant cultivars i.e. Sakha 93 and Giza 168) during season 2007/2008. The second conducted in lysimeters to determine and study the effect of water requirements i.e. 80% ET_o, 100% ET_o and 120% ET_o on growth, yield and its attributes under sandy soil conditions during two growing seasons 2006/2007 and 2007/2008, and the

The main results were as followed: (1) Root elongation of 28 days wheat plant of Sakha 93 cultivar was significantly increased by decreased water content surpassed those of Giza 168 cultivar. On the contrary, shoot elongation significantly increased by increasing the water content from 80% ET_o (1280 m³/Fad.) to 120% ET_o (1920 m³/Fad.) for both Sakha 93 and Giza 168 cultivars, (2) Root/shoot ratio of wheat 28 days after sowing decreased continuously and consistently by increasing water content for Sakha 93 and Giza 168 cultivars, on behave of superiority of Sakha 93 indicating the ability stress tolerance to water stress than Giza 168 cultivar,(3) There was a significant decrease in the total chlorophyll and

relative water content in leaf tissue by exposing 28 days wheat plant to low water content. on the contrary, electrolyte leakage % (EL), malondialdehyde, proline content and phenols content were increased for both cultivars by exposing to low water content but the (EL) percentage in Giza 168 surpassed that of Sakha 93, (4) Superoxide dismutase, ascorbate peroxidase, catalase and phenylalanine ammonialyase activities increased by irrigation at 80% ETo (1280 m³/Fad.) over these irrigated at 100% ETo (1600m³/Fad.), antioxidant enzymes for Sakha 93 was more than Giza 168 cultivar. (5) plant height, number of leaves/plant was comparatively decreased by reducing water content from 120% ETo (1920 m³/Fad.) to 80% ETo (1280 m³/Fad.) but the reduction % for Sakha 93 by decreasing water content from 100% ETo (1600 m³/Fad.) to 80% ETo (1280 m³/Fad.) was less than Giza 168 cultivar, (6) growth of Sakha 93 overcome Giza 168 growth under deficit water content i.e. 80% ETo (1280 m³/Fad.), (7) Increasing water content caused non-significant increase in spike No./plant for both cultivars,(8) Spike length, spike weight and No. of grains/spike of Sakha 93 cultivar surpassed that of Giza 168 at water stress (80% ETo), whereas opposite results were obtained at (120% ETo) in the first growing season (2006/2007) and spike weight/plant in second growing season (2007/2008),(9) There was a proportional relationship between different water requirement and grain yield/plant i.e. increased with increasing water requirement from 80% ETo (1280 m³/Fad.) to 100% ETo (1600 m³/Fad.) but the difference between 100% ETo (1600 m³/Fad.) and 120% ETo (1920 m³/Fad.) was not great enough to reach 5% level of significance, (10) water content by irrigation at 80% ETo (1280 m³/Fad.) during the entire growth period caused a reduction in grain yield/plant and 100 grain weight for Sakha 93 and Giza 168 by comparing to irrigation at 100% ETo (1600m³/Fad.).

Keywords:

wheat, water requirement, physiological, chemical, enzymes response. growth, yield.

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CONTENTS

LIST OF TABLES	III
LIST OF FIGURES	V
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
5. Physiological, chemical and enzymes responses to different water content	3
4. Effect of different water content on wheat growth	7
3. Effect of different water content on wheat yield	9
4. Response of wheat cultivars to water requirement	10
3. MATERIALS AND METHODS	14
1. The first group (plastic bags experiments)	14
2. The second group (lysimeter experiments)	15
4. RESULTS AND DISCUSSION	24
1. Physiological response of wheat cultivars to different water content	24
2. Chemical response of wheat cultivars to different water content	33
3. Enzyme response of wheat cultivars to different water content	39
5. Effect of different water content on growth of wheat cultivars	44
6. Effect of different water content on yield and its attributes of wheat cultivars	48

5. SUMMARY	60
6. REFERENCES	65
ARABIC SUMMARY	

LIST OF TABLES

No.	Table	Page
1	Soil moisture constants of experimental site.	19
2	Physical analysis of the experimental site	19
3	Chemical analysis of the experimental site	20
4	Meteorological data during the first and second growing seasons	21
5	Effect of different water content on root elongation (cm), shoot elongation (cm), total chlorophyll content, relative water content (RWC) % and electrolyte leakage (EL) % at 28 days after sowing for two wheat cultivars.	32
6	Effect of different water content on lipid peroxidation (malondialdehyde content (MDA)), phenols content, proline content at 28 days after sowing for two wheat cultivars.	38
7	Effect of different water content on antioxidative enzymes at 28 days after sowing for two wheat cultivars.	43
8	Effect of different water content on growth criteria of two wheat cultivars (Sakha 93 and Giza 168 cultivars) in two growing seasons (2006/2007 and 2007/2008).	47
9	Effect of different water content on number of spikes, number of tillers/plant and number of spikelets/spike of two wheat cultivars (Sakha 93 and Giza 168) in two growing seasons (2006/2007 and 2007/2008).	50
10	Effect of different water content on spike length, spike weight/plant and number of grains/spike of two wheat cultivars (Sakha 93 and Giza 168) in two growing seasons	53

(2006/2007 and 2007/2008).

- 11 Effect of different water content on grain yield/plant, weight of 100 grains and straw yield/plant of two wheat cultivars (Sakha 93 and Giza 168) in two growing seasons (2006/2007 and 2007/2008). 56
- 12 Effect of different water content on crop, tillering, harvest indexes and biological yield/plant of two wheat cultivars (Sakha 93 and Giza 168) in two growing seasons (2006/2007 and 2007/2008). 59

LIST OF FIGURES

No.	Fig	Page
1	Effect of different water content on root elongation (cm) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	25
2	Effect of different water content on shoot elongation (cm) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	26
3	Effect of different water content on chlorophyll (%) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	28
4	Effect of different water content on relative water content (RWC) (%) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	29
5	Effect of different water content on Electrolyte leakage (EL) (%) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	31
6	Effect of different water content on malondialdehyde (MDA) content ($\mu\text{Mol g}^{-1}\text{FW}$) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	34
7	Effect of different water content on phenolic compounds content ($\mu\text{g g}^{-1}\text{DW}$) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	35
8	Effect of different water content on proline content ($\mu\text{g g}^{-1}\text{FW}$) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	37
9	Effect of different water content on activity of superoxide dismutase (SOD) (IU. mg^{-1} protein) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93)	40

- 10 Effect of different water content on activity of ascorbate peroxidase (APX) (IU. mg¹ protein) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93). 41
- 11 Effect of different water content on activity of peroxidase activity (POD) (IU. mg⁻¹protein) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93) 41
- 12 Effect of different water content on activity of catalase (CAT) (IU. mg⁻¹protein) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93) 42
- 13 Effect of different water content on activity of phenyl alanine (PAL) (μ mol h⁻¹mg⁻¹protein) at 28 days after sowing for two wheat cultivars (Giza 168 and Sakha 93) 42