

**EFFECT OF WATER STRESS ON WHEAT CROP  
USING NEUTRON SCATTERING  
TECHNIQUE**

By

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## ABSTRACT

**Amina Sayed Saad Mostafa: Effect of Water Stress on Wheat Crop Using Neutron Scattering Technique. Unpublished M.Sc. Thesis, Department of Agricultural Engineering, Faculty of Agriculture, Ain Shams University, 2017.**

A field experiment was conducted at the Experimental Farm of Soil and Water Research Department, Nuclear Research Center, Atomic Energy Authority, Egypt. The objectives of this study is to estimate water stress coefficient ( $K_s$ ) and optimize the irrigation requirements of wheat crop (*Triticum Aestivum L.*) variety Misr2 cultivated in semi-arid climate conditions under trickle irrigation system in sandy soil. The field experiment was conducted under four different irrigation water regimes, the treatments  $T_2$ ,  $T_3$  and  $T_4$  received 80, 60 and 40%, respectively, of the irrigation applied in treatment  $T_1$  which was 100% form recommended  $ET_c$ . The effect of the four water levels on wheat crop was investigated during the growing season where soil moisture content and depletion were monitored by neutron moisture meter. The results of this study showed that the crop evapotranspiration ( $ET_c$ ) were 509.2, 407.4, 305.5 and 203.7 mm/season, while the total actual evapotranspiration ( $ET_a$ ) were 441.90, 353.60, 262.20 and 179.10 mm/season for 100, 80, 60 and 40% treatments, respectively. Water stress coefficient ( $K_s$ ), water use efficiency (WUE) and wheat yield were estimated and evaluated for all irrigation treatments. The maximum crop yield (4.48 tons  $ha^{-1}$ ) presented at 0.92 ( $K_s$ ) of  $T_1$  with low value of WUE (0.88  $kg\ m^{-3}$ ), while the highest effect of  $K_s$  occurred in  $T_4$  (0.74) with the lowest yield value (3.14 tons  $ha^{-1}$ ) and highest value of WUE (1.54  $kg\ m^{-3}$ ).

**Keywords:** Evapotranspiration, Water stress coefficient, Neutron moisture meter, Wheat crop, Water use efficiency.



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## **CONTENTS**

<b>Item</b>	<b>Page</b>
<b>LIST OF TABLES</b>	<b>IV</b>
<b>LIST OF FIGUERS</b>	<b>V</b>
<b>LIST OF ABBREVIATIONS</b>	<b>VI</b>
<b>1. INTRODUCTION</b>	<b>1</b>
<b>2. REVIEW OF LITERATURE</b>	<b>3</b>
2.1. Water scarcity in Egypt	3
2.2. Prospective needs for water resources	5
2.3. Water management	5
2.4. Crop water requirements	7
2.4.1. Evapotranspiration	8
2.4.2. Reference evapotranspiration ( $ET_o$ )	11
2.4.3. Crop coefficient ( $K_c$ )	12
2.4.4. Crop evapotranspiration under standard conditions ( $ET_c$ )	13
2.4.5. Crop evapotranspiration under non-standard conditions ( $ET_{c\ adj}$ )	15
2.4.6. Water stress coefficient ( $K_s$ )	15
2.4.7. Soil water balance	16
2.4.8. Determination of actual evapotranspiration ( $ET_a$ )	17
2.5. Neutron scattering method	18
2.6. Irrigation scheduling	20
2.7. Trickle irrigation system	21
2.8. Water stress	23
2.8.1. Effect of water stress on wheat crop	25
2.9. Wheat as strategically crop	26
2.9.1. Water requirements of wheat crop	28
2.9.2. Water use efficiency (WUE), irrigation water use efficiency (IWUE) and water productivity (WP)	30



<b>3. MATERIALS AND METHODS</b>	<b>33</b>
3.1. Experimental site	33
3.2. Soil and water analysis	33
3.2.1. Physical analysis of soil	33
3.2.2. Chemical analysis of soil	34
3.2.3. Chemical analysis of irrigation water	35
3.3. Meteorological data	36
3.4. Water application regimes	38
3.5. Experimental design and statistical analysis	38
3.6. Irrigation scheduling	39
3.7. The cultivated crop	39
3.8. The fertilization strategy	39
3.9. Irrigation system	40
3.9.1. Hydraulic evaluation of the used system	40
3.9.1.1. Emitter flow rate versus pressure	40
3.9.1.2. Emission uniformity (EU) of the trickle irrigation system	41
3.10. Crop water requirements	41
3.10.1. Reference evapotranspiration ( $ET_o$ )	41
3.10.2. Crop coefficient ( $K_c$ )	42
3.10.3. Crop evapotranspiration ( $ET_c$ )	44
3.10.3.1. Crop evapotranspiration under standard conditions ( $ET_c$ )	44
3.10.3.2. Crop evapotranspiration under non standard conditions ( $ET_{c\ adj}$ )	44
3.10.4. Water stress coefficient ( $K_s$ )	45
3.10.5. Soil water balance	46
3.10.6. Actual evapotranspiration ( $ET_a$ )	47
3.11. Field calibration curves from 30 to 90 cm depth of neutron moisture meter	47

### III

3.12. Water use efficiency (WUE), irrigation water use efficiency (IWUE) and water productivity (WP)	50
3.13. Wheat crop traits assessment	50
<b>4. RESULTS AND DISCUSSION</b>	<b>52</b>
4.1. Emission uniformity (EU) of the trickle irrigation system	52
4.2. Emitter flow rate versus pressure	53
4.3. Reference evapotranspiration ( $ET_o$ )	53
4.4. Crop coefficient ( $K_c$ )	54
4.5. Crop evapotranspiration under standard conditions ( $ET_c$ )	56
4.6. Water stress coefficient ( $K_s$ )	58
4.6.1. Effect of water stress on soil characteristics after harvesting	59
4.7. Actual evapotranspiration ( $ET_a$ )	61
4.8. Crop evapotranspiration under non standard conditions ( $ET_{c\ adj}$ )	63
4.9. Wheat yield	65
4.10. Water use efficiency (WUE), irrigation water use efficiency (IWUE) and water productivity (WP)	66
4.11. Measurements of plant high for wheat crop during growing season	68
4.12. Measurements of wheat crop after harvest	68
<b>5. SUMMARY</b>	<b>70</b>
<b>6. CONCLUSION</b>	<b>73</b>
<b>7. REFERENCES</b>	<b>75</b>
<b>8. APPENDIX</b>	<b>95</b>
<b>ARABIC SUMMARY</b>	



## LIST OF TABLES

Table	Page
1. Some physical characteristics of the experimental soil	35
2. Some chemical characteristics of soil and irrigation water	36
3. Weather data of Inshas area during the growing season of (2014-2105)	37
4. Values of recommended crop coefficient $K_c$ for all growth stages of wheat crop	44
5. Values of recommended and estimated crop coefficient $K_c$ for all growth stages of wheat crop during the growing season (2014 - 2015)	56
6. Values of reference and crop evapotranspiration for all growth stages of wheat crop during the growing season (2014 - 2015)	57
7. Effect of water stress on some soil chemical characteristics for wheat crop after harvesting season of (2014-2105)	60
8. Values of actual evapotranspiration ( $ET_a$ ) of wheat crop for all growth stages during the growing season (2014 - 2015)	62
9. The values of crop evapotranspiration ( $ET_c$ ) and adjustable crop evapotranspiration ( $ET_{c\ adj}$ ) of wheat crop for all growth stages during the growing season (2014 - 2015).	64
10. Measurements of plant high (cm) for wheat crop during growing season (2014-2015)	68
11. Measurements of some characteristics for wheat crop after harvest	69



## LIST OF FIGURES

Figure	Page
1. Layout of wheat crop experiment, irrigation treatments and irrigation system	39
2. Linear regression equations of neutron calibration curves for the soil moisture content at different soil depths	50
3. Discharger of emitters to evaluate EU of the trickle irrigation system	52
4. The relation between the pressure head (m) and the emitter discharge ( $l\ h^{-1}$ ).	53
5. Values of reference evapotranspiration ( $ET_o$ ) for all growth stages of wheat season (2014 - 2015)	54
6. Recommended and estimated values of crop coefficient ( $K_c$ ) under different growth stages for wheat crop	55
7. Water stress coefficient ( $K_s$ ) under different growth stages for wheat crop	58
8. Wheat yield as affected by different irrigation water regimes	65
9. Water use efficiency (WUE) ), irrigation water use efficiency (IWUE) and water productivity (WP) of wheat crop as affected by different irrigation water regimes	67

