

**STUDIES OF CONSUMPTIVE USE AND IRRIGATION  
SCHEDULING IN RELATION TO NITROGEN  
FERTILIZATION ON WHEAT YIELD**

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## ABSTRACT

The objective of this investigation is to study the effect of irrigation regime and nitrogen fertilization level on wheat morpho-physiological behaviour, stomata behaviour; yield, and yield attributes. However, due consideration was given to study water relations including water consumptive use (WUE), yield response factor to water deficit ( $K_y$ ) and water use efficiency (WUE) under field conditions.

I-Irrigation regime treatments :

a)-Control where plants received five irrigations.  
(Water duty = 1100 m<sup>3</sup>/fed.)

b)-Skipping treatments where plants received four irrigations and skipping one irrigation either at tillering, heading, milk-ripe or dough-ripe stage, i.e. water duty was 935, 880, 825 and 770 m<sup>3</sup>/fed., respectively.

II-Nitrogen fertilizer was applied using urea (46%) at rates of 40, 60, and 80 Kg./fed.

Results revealed that skipping an irrigation decreased significantly most of the morpho-physiological traits of wheat plants, also reduced yield attributes, i.e. plant height, No. of tillers and spikes/plant, spike length/main stem and grain yield/plant. Therefore, grain and straw yield/fed., biological yield/fed., harvest index, seed index and crude protein content were significantly decreased by exposing wheat plants to water stress. Proline content in the uppermost leaf significantly increased, whereas, No. of stomata/mm<sup>2</sup>, longitudinal distances between stomata and transverse distance between stomata rows considerably decreased as soil moisture stress increased.

Nitrogen fertilizer exerted a favourable effect on accelerating the wheat plants growth. Moreover, yield of grain and straw/fed., biological yield/fed., seed index and crude protein were increase significantly by increasing nitrogen doses.

Several significant differences on the morpho-physiological traits, yield attributes and yield of wheat plants were detected due to interaction effect where nitrogen amended the absence of irrigation afterwards.

Yield response factor (Ky) to water deficit was higher with skipping irrigation at tillering stage and lesser with skipping irrigation at dough ripe stage. However, water use efficiency (WUE) recorded the highest value when subjecting wheat plants to water stress at dough-ripe stage.

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## CONTENTS

INTRODUCTION.

REVIEW OF LITERATURE.

1- Water consumptive use and irrigation scheduling.....	4
a- Morpho-physiological characters.....	4
b- Yield and its components.....	4
c- Plant, soil-water relationship.....	11
d- Chemical compositions.....	13
2- Nitrogen fertilization.....	15
a- Morpho-physiological characters.....	15
b- Yield and its components.....	16
c- Chemical compositions.....	18
3- Consumptive use, irrigation and nitrogen fertilization.....	
relations.....	20
MATERIALS AND METHODS.....	25
RESULTS AND DISCUSSION.....	44
I- Morpho-physiological traits.....	44
1- Number of blades/plant.....	44
2- Fresh and dry weight of blades/plant (g.).....	49
3- Fresh and dry weight of stems+sheaths/plant (g.)....	56
4- The uppermost leaf area (cm <sup>2</sup> ).....	65
5- Proline content in the uppermost leaf (mg./g.D.w.)..	68

II- Stomata studies.....	76
1- Number of stomata per square millimeter.....	76
2- Distribution of stomata.....	86
III- Yield and its components:.....	90
(A) Yield attributes.....	90
1- Plant height (cm.).....	90
2- Number of tillers/plant.....	96
3- Number of spikes/plant.....	101
4- Spike length/main stem (cm.).....	107
5- Grains yield/plant (g.).....	113
(B) Yield of grains and straw (kg./fed.).....	119
IV- Grains properties.....	142
1- Seed index (1000-grains weight) g.....	142
2- Moisture and crude protein content.....	149
V- Water relations of wheat crop.....	157
1- Water content (Total, free and bound water).....	158
2- Water consumptive use or evapotranspiration (ET)....	169
3- Yield response factor ( $k_y$ ).....	173
4- Water use efficiency.....	176
SUMMARY.....	179
REFERENCES.....	192
ARABIC SUMMARY	

## List of Tables

<u>Table No.</u>	<u>Page No.</u>
(1) Mechanical and chemical analysis of the experimental site at Ain Shams Faculty of Agriculture Experimental Farm, Shoubra EL-Kheima, Kaliobeya Governorate. (Average of 1989/1990 and 1990/1991 seasons).....	27
(2) The monthly average of meteorological data.....	28
(3) Dates, number of days from sowing, rainfall, computed and actual amount of applied water and physiological stages of irrigation treatments in the two growing seasons (1989/1990 and 1991) of wheat.....	31
(4) Irrigation scheduling, computed and actual applied water (m <sup>3</sup> /fed.), relative water supply deficit (%) of water duty and rainfall in the two growing seasons (1989/1990 and 1990/1991) of wheat.....	32
(5) Sampling stage, number of samples, dates of sampling and number of days after sowing.....	35
(6) Effect of irrigation regime and nitrogen fertilization on some morphophysiological characters during tillering, heading, milk ripe and dough ripe stages, (Average of the two seasons, 1989/1990 and 1990/1991).....	45

- (7) The interaction effect of irrigation regime and nitrogen fertilization on fresh weight of blades/plant (g.) during dough ripe stage, (Average of the two seasons, 1989/1990 and 1990/1991)..... 53
  
- (8) The interaction effect of irrigation regime and nitrogen fertilization on dry weight of blades/plant (g), during milk ripe and dough ripe stages, (Average of the two seasons, 1989/1990 and 1990/1991).
  
- (9) Effect of irrigation regime and nitrogen fertilization on some morpho-physiological characters during tillering, heading, milk ripe and dough ripe stages, (Average of the two seasons, 1989/1990 and 1990/1991)..... 57
  
- (10) The interaction effect of irrigation regime and nitrogen fertilization on fresh weight of stems + sheaths/plant (g.), during tillering stage, (Average of the two seasons, 1989/1990 and 1990/1991)..... 62
  
- (11) The interaction effect of irrigation regime and nitrogen fertilization on dry weight of stems + sheath/plant (g.), during heading stage, (Average of the two seasons, 1989/1990 and 1990/1991)..... 64

- (12) Effect of irrigation regime and nitrogen fertilization during tillering, heading, milk ripe and dough ripe stages on proline content in the uppermost leaf blade in mg./g.D.W. (Average of the two seasons, 1989/1990 and 1990/1991)..... 69
- (13) The interaction effect of irrigation regime and nitrogen fertilization during, heading, milk ripe and dough ripe stages on proline content in the uppermost leaf blade in mg./g.D.W. (Average of the two seasons, 1989-1990 and 1990-1991)..... 75
- (14) Effect of irrigation regime on stomata number and distribution in the uppermost blade (Average of the two seasons, 1989/1990 and 1990/1991)..... 77
- (15) Effect of nitrogen fertilization on stomata number and distribution in the uppermost blade (Average of the two seasons, 1989/1990 and 1990/1991)..... 85
- (16) Effect of irrigation regime and nitrogen fertilization on morpho-physiological characteristics of wheat at harvest, (Average of 1989/1990 and 1990/1991 seasons)..... 91
- (17) The interaction effect of irrigation regime and nitrogen fertilization on number of tillers/plant, at harvest, (Average of 1989/1990 and 1990/1991 seasons)..... 100

- (18) The interaction effect of irrigation regime and nitrogen fertilization on number of spikes/plant, at harvest. (Average of 1989/1990 and 1990/1991 seasons)..... 105
- (19) The interaction effect of irrigation regime and nitrogen fertilization on length of main stem spike (cm.) (Average of 1989/1990 and 1990/1991 seasons)..... 111
- (20) The interaction effect of irrigation regime and nitrogen fertilization on grain yield/plant (g.), (Average of 1989/1990 and 1990/1991 seasons)..... 118
- (21) Effect of irrigation regime and nitrogen fertilization on yield of wheat. (Average of 1989/1990 and 1990/1991 seasons)..... 120
- (22) The interaction effect of irrigation regime and nitrogen fertilization on grain yield Kg./fed. (Average of 1989/1990 and 1990/1991 seasons)..... 134
- (23) The interaction effect of irrigation regime and nitrogen fertilization on straw yield Kg./fed. (Average of 1989/1990 and 1990/1991 seasons)..... 135
- (24) The interaction effect of irrigation regime and nitrogen fertilization on biological yield (Kg./fed.), (Average of 1989/1990 and 1990/1991 seasons)..... 136

(25)	The interaction effect of irrigation regime and nitrogen fertilization on harvest index (%), (Average of 1989/1990 and 1990/1991 seasons).....	137
(26)	Effect of irrigation regime and nitrogen fertilization on 1000-grains weight (g), grain moisture content (%) and grain crude protein content (%) of wheat. (Average of 1989/1991-1990/1991 seasons).....	143
(27)	The interaction effect of irrigation regime and nitrogen fertilization on 1000-grains weight (g.) (Average of 1989/1990 and 1990/1991 seasons).....	147
(28)	The interaction effect of irrigation regime and nitrogen fertilization on crude protein content of grains. (Average of 1989/1990 and 1990/1991 seasons).....	155
(29)	Effect of irrigation regime and nitrogen fertilization on free, bound, total water content (%) and relative bound water in the uppermost leaf blade, during, tillering, heading, milk ripe and dough ripe stages. (Average of the two seasons, 1989/1990 and 1990/1991).....	158

- (30) The interaction effect of irrigation regime and nitrogen fertilization on total water content (%) in the uppermost leaf blade, during milk ripe of grains stage. (Average of the two seasons, 1989/1990 and 1990/1991)..... 165
- (31) The interaction effect of irrigation regime and nitrogen fertilization on free water content (%) in the uppermost leaf blade, during milk ripe stage, (Average of the two seasons, 1989/1990 and 1990/1991)..... 166
- (32) The interaction effect of irrigation regime and nitrogen fertilization on bound water content (%) in flag leaf blade, during milk ripe of grains stage, (Average of the two seasons, 1989/1990 and 1990/1991)..... 167
- (33) The calculation of Blaney-Criddle method to reference evapotranspiration ( $E_{To}$ ) and consumptive use or crop evapotranspiration (ET) in mm/growing period (1989/-1990 and 1990/1991 seasons)..... 170-171
- (34) The effect of irrigation regime on water use efficiency (WUE), relative yield decrease, relative evapotranspiration and yield response factor ( $K_y$ ) in the two seasons (1989/1990 and 1990/1991)..... 174

## List of Plates and Figures

### Plate No.

- (1) Photomicrograph of upper leaf surface of the uppermost leaf of well irrigated wheat plants under 60 kg.N/fed. (Tillering stage sample)..... 78
- (2) Photomicrograph of upper leaf surface of the uppermost leaf of wheat plants water stressed at tillering stage under 60 kg.N/fed. (Tillering stage sample)..... 78
- (3) Photomicrograph of upper leaf surface of the uppermost leaf of well irrigated wheat plants (control) under 60 kg.N/fed. (Heading stage sample)..... 79
- (4) Photomicrograph of upper leaf surface of the uppermost leaf of wheat plants water stressed at tillering stage under 60 kg.N/fed. (Heading stage sample)..... 79
- (5) Photomicrograph of upper leaf surface of the uppermost leaf of wheat plants water-stressed at heading stage under 60 kg.N/fed. (Heading stage sample)..... 80