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

BY

MOHAMED ALI KASHABAH ADAM

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By

MOHAMED ALI KASHABAH ADAM

B.Sc.(Agronomy), El-Minia Univ.,1981

M.Sc. (Agronomy), El-Minia Univ.,1984

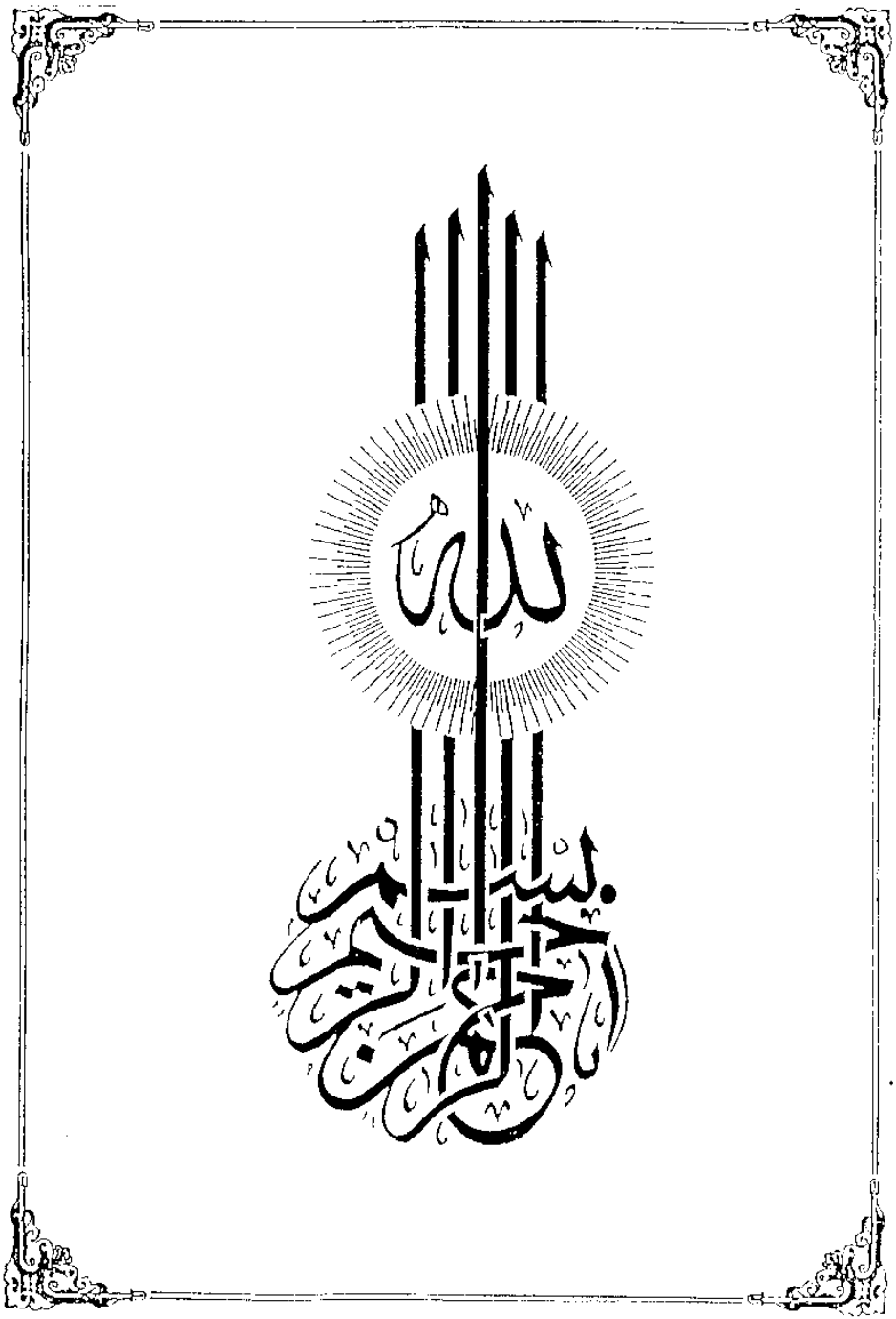
This thesis for Ph.D. degree has been approved by:

Prof.Dr.A.M.Abd El-Wahab
Prof.of Agronomy and Vice President of Suize Canal University.

Prof.Dr.Olfat H.El-Bagoury
Prof.of Agronomy,Fac.of Agric. Ain Shams University.

Prof.Dr.A.A.Abd El-Gawad
Prof.of Agronomy,Fac.of Agric. Ain Shams University.
(Supervising Committee)

Date of examination /6/ 9 /1992.



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By

MOHAMMED ALI KASHABAH ADAM

B.Sc.Agric.,El-MINIA Univ.,1981

M.Sc.Agric. (Agronomy) El-MINIA Univ.,1984

Under the supervision of:

Prof.Dr.A.A.Abd EL-Gawad

Prof. of agronomy, Ain Shams Univ.

Prof.Dr.N emat A. Noureldin.

Prof. and head of agronomy, Ain Shams Univ.

Prof.Dr.M.A.Ashoub.

Prof. of agronomy, Ain Shams Univ.

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 (Ky) and water use efficiency (WUE) under field conditions.

I-Irrigation regime treatments :

a)-Control where plants received five irrigations. (Water duty = 1100 m3/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^3/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^2, 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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