

# DEDICATION

To my parents,

Wife,

Daughters,

Sons,

Brothers,

And Sisters,

With love.

Sami

# ACKNOWLEDGMENTS

Above all I render my thanks to the merciful ALLAH who offers me all things to accomplish this study.

I wish to express my sincere gratitude and appreciation to my supervisors: Professor Yassin Mohammed Ibrahim Dagash and Professor Sami Mohammed Tambal for their invaluable guidance and help during the stages of the practical work and preparation of this study.

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# ABSTRACT

The experiment was conducted during the successive seasons of 2008/2009 and 2009/2010 at the Farm of the Faculty of Agricultural Sciences, University of Dongola, Northern State, Sudan.

The aim of this experiment was to study the effect of fertilizer doses, types and application methods on the growth and grain yield of wheat (*Triticum aestivum* L.). The study was conducted on high terrace soil (Aridisols) in the Northern State.

Experimental method was a split-split plot with four replications. The main plot was composed of two methods of fertilizer application (broadcasting and banding) in randomized complete block design (RCBD). Subplots consisted of two types of compound fertilizers {Urea (46% N) + Triple super phosphate (46% P<sub>2</sub>O<sub>5</sub>) (23-23-0)} and Nitrophoska (18-18-5). Sub-subplots consisted of four doses of each fertilizer (0, 43, 86 and 129 Kg N and P<sub>2</sub>O<sub>5</sub> /ha).

Growth parameters of wheat which were investigated in this study were plant height, number of tillers per meter square, leaf area index (LAI), days to 50% heading and days to 95% maturity.

Yield components were number of grains per spike (G/S), thousand grains weight (TGW), spike index (SI), grain yield (t/ha) and harvest index (HI).

The general trend was that the increase in fertilizer dose significantly increased the plant height, number of tillers per meter square, leaf area index, but there were no significant difference in days to heading and days to maturity also there were highly significant effects in the second season on number of grains per spike. There was no significant difference in thousand grains weight and spike index between the fertilizer doses in both seasons.

The statistical analysis showed that the increase in fertilizer doses significantly increased grain yield in both seasons, but they significantly decreased harvest index.

Generally there were no significant differences in growth parameters and yield components between the fertilizer types and between the application methods.

The grain yield showed significant positive correlations with plant height, Leaf area index, number of tillers per meter square and number of grains per spike.

## ملخص الدراسة

أجريت التجربة خلال الموسمين المتعاقبين 2008/2009 و 2009/2010 بمزرعة كلية العلوم الزراعية، جامعة دنقلا، الولاية الشمالية، السودان.

الهدف من هذه التجربة هو دراسة تأثير جرعة السماد، نوع السماد وطريقة الاضافة علي نمو و انتاجية القمح.

أجريت الدراسة علي أراضي التروس العليا (رتبة الاراضي الجافة) بشمال السودان.

صممت التجربة باستخدام طريقة القطع المنشقة المنشقة بأربعة مكررات. أحتوت القطع الرئيسية علي طريقتين لاضافة السماد (النثر والاضافة الموضعية) وزعتا بطريقة القطاعات العشوائية الكاملة. احتوت القطع الفرعية علي نوعين من الأسمدة المركبة { (اليوريا (46% نيتروجين) + السيوبر فوسفيت الثلاثي (46% خامس أكسيد الفسفور)(0-23-23)) والنيتروفوسكا (5-18-18)}. احتوت القطع الفرعية الفرعية علي أربع جرعات ( للنتروجين والفسفور) من السمادين (0، 43، 86 و 129 كجم/هكتار).

مقاييس النمو الخضري التي تم دراستها في هذا البحث شملت: طول النبات، عددالخلف في المتر المربع، دليل مساحة الورقة، عدد الأيام اللازمة لظهور 50% من السنابل و عدد الأيام اللازمة لنضج 95% من المحصول

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أوضحت النتائج أن الزيادة في جرعة السماد أدت الي زيادة معنوية في كل من: طول النبات، عددالخلف في المتر المربع، دليل مساحة



الورقة، بينما لم يكن هنالك تأثير علي عدد الأيام اللازمة لظهور  
50% من السنابل أو عدد الأيام اللازمة لنضج 95% من المحصول  
أثر إختلاف الجرعات السمادية تأثيراً معنوياً علي عدد الحبوب في  
السنبله خلال الموسم الثاني لكنه لم يؤثر علي وزن الألف حبه  
ودليل السنبله  
أوضح تحليل التباين أن زيادة الجرعة السمادية قد أدت الي زيادة  
معنوية جداً في إنتاجية الحبوب خلال الموسمين لكنها أدت الي  
نقصان معنوي في دليل الحصاد  
أوضحت النتائج عدم وجود أي فروقات معنوية علي مقاييس النمو  
الخصري ومقاييس الانتاجية بين أنواع الاسمدة المستخدمة أو طرق  
إضافة السماد  
كان هنالك إرتباط معنوي وموجب بين إنتاجية الحبوب وكل من  
طول النبات ودليل مساحة الورقة وعدد الخلف في المتر المربع  
وعدد الحبوب في السنبله