

**Sudan University of Science and  
Technology**

**College of Graduate Studies**

**Effect of Sowing date and Nitrogen rate on Yield ,  
Yield Components and Nitrogen use of efficiency  
of Sorghum ( *Sorghum bicolor* (Moench ) L.) under  
irrigation**

تأثير ميعاد الزراعة ومستويات النيتروجين على  
الإنتاجية ومكوناتها وكفاءة إستخدام النيتروجين فى  
الذرة الرفيعة تحت ظروف الري

**A Thesis Submitted in Fulfillment of the  
Requirement for the Degree of (Ph .D ) in  
Agronomy**

**By**

**Adam AbdElgader Dow Elbit Azrag**

**Supervisor : Professor Dr. Yassin Mohammed Ibrahim Dagash**

**Co- Supervisor : Dr. Samia Osman Yagoub**

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(Moench ) L .) under irrigation**

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## DEDICATION

*In the name of Allah the Merciful, the  
Compassionate with thank to my Allah*

*I dedicate this work to :*

*The soul of my father and Allah bless him*

*My Intimate Mother*

*My Brothers and sisters*

*My Tender Love Wife (Safa)*

*My Children ( Ibrahim and Ibtihaj )*

*My friends*

*With love*

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## Abstract

A field experiment was conducted for two seasons at the college of Agricultural studies, Sudan University of Science and Technology in Khartoum (Shambat ), during summer season of 2012 /2013, to study the effects of sowing date , nitrogen rate and nitrogen use efficiency on yield of sorghum (*sorghum bicolor* L.). The cultivar used was Wad Ahmed . The experiment was laid in split plot arrangement in a randomized complete block design (RCBD) with three replications . The main plots were four sowing date on 1<sup>st</sup> July (S<sub>1</sub>), 15<sup>th</sup> July (S<sub>2</sub>) ,1<sup>st</sup> August (S<sub>3</sub>) and 15<sup>th</sup> August (S<sub>4</sub>) . Subplots were four nitrogen rates : control (No) , 45 Kg N/ha (N1),90 Kg N/ha (N2) and 135 Kg N/ha (N3) . Growth parameters studied were plant height, leaves number /plant and leaf area . Yield components studied were length of head, weight of seeds /plant, 100.seeds weight, grain yield, harvest index and nitrogen use efficiency . The results showed that sowing date had significant effect on leaf area, harvest index in both seasons, leaves number/ plant and grain yield in season one, length of head and weight of 100seeds in season two . Application of fertilizer resulted in significant effect on grain yield and nitrogen use efficiency in both seasons, leaves number in season two .



## ملخص الدراسة

أجريت تجربة حقلية بكلية الدراسات الزراعية -جامعة السودان للعلوم والتكنولوجيا في الخرطوم(شمبات) في العروة الصيفية في موسمي ٢٠١٢م و٢٠١٣م لدراسة تأثير ميعاد الزراعة ومستويات النتروجين على الإنتاجية وكفاءة استخدام النتروجين في الذرة الرفيعة واستخدم الصنف ود أحمد في التجربة ونفذت التجربة بطريقة القطعة المنشقة بالتصميم العشوائى ذو القطاعات العشوائية الكاملة والتكرار الثلاثى. أحتوت القطع الرئيسية على أربعة تواريخ زراعية هي الأول من يوليو و١٥ يوليو والأول من أغسطس و١٥ أغسطس. و احتوت القطع الفرعية على أربعة مستويات من النتروجين وهى الشاهد و٤٥ كيلوجرام نيتروجين / للهكتار و٩٥ كيلوجرام نيتروجين / للهكتار و١٣٥ كيلوجرام نيتروجين / للهكتار.معايير النمو التى درست كانت طول النبات وعدد الأوراق على النبات ومساحة سطح الورقة ، كما درست مكونات الانتاجية وهى طول القندول ، ووزن البذور في النبات ، ووزن الـ ١٠٠ حبة ، وإنتاج الغلة للهكتار ، ودليل الحصاد وحساب كفاءة استخدام النتروجين.

اظهرت النتائج أن تاريخ الزراعة كان له تأثير معنوى على مساحة الورقة ودليل الحصاد فى الموسمين ، وعدد الأوراق على النبات وإنتاجية البذور في الموسم الأول ، وطول القندول ووزن ١٠٠ حبة في الموسم الثانى .

إضافة السماد ادت إلى اختلافات معنوية فى إنتاجية البذور و كفاءة استخدام النتروجين في الموسمين ، وعدد الأوراق على النبات في الموسم الثانى .