

**Effect of Phosphorus, Sulphur and Seaweed Sap on
Productivity of Chickpea (*Cicer arietinum* L.)**

चने (साइसर ऐरेटिनम एल.) की उत्पादकता पर फॉस्फोरस, गंधक
एवं समुद्रीखरपतवार रस का प्रभाव

SHANKAR LAL YADAV

Thesis

Doctor of Philosophy in Agriculture

(AGRONOMY)



2015

**Department of Agronomy
Rajasthan College of Agriculture
Maharana Pratap University of Agriculture and Technology
Udaipur-313001 (Raj.)**

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(AGRONOMY)



By

SHANKAR LAL YADAV

2015

**MAHARANA PRATAP UNIVERSITY OF AGRICULTURE AND
TECHNOLOGY, UDAIPUR
RAJASTHAN COLLEGE OF AGRICULTURE, UDAIPUR**

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Dated: 16/03/2015

This is to certify that **Mr. Shankar Lal Yadav** has successfully completed the Comprehensive Examination held on 07/06/2013 as required under the regulation for the degree of **Doctor of Philosophy in Agriculture.**

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Dated: 16/03/2015

This is to certify that the thesis entitled “**Effect of Phosphorus, Sulphur and Seaweed Sap on Productivity of Chickpea (*Cicer arietinum* L.)**” submitted for the degree of **Doctor of Philosophy in Agriculture** in the subject of **Agronomy**, embodies bonafide research work carried out by **Mr. Shankar Lal Yadav** under my guidance and supervision and that no part of this thesis has been submitted for any other degree. The assistance and help received during the course of investigation have been fully acknowledged. The draft of this thesis was also approved by the advisory committee on 13/03/2015.

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Dated: 03/07/2015

This is to certify that the thesis entitled “**Effect of Phosphorus, Sulphur and Seaweed Sap on Productivity of Chickpea (*Cicer arietinum* L.)**” submitted by **Mr. Shankar Lal Yadav** to the Maharana Pratap University of Agriculture and Technology, Udaipur in partial fulfilment of the requirements for the degree of **Doctor of Philosophy in Agriculture** in the subject of **Agronomy** after recommendation by the external examiner was defended by the candidate before the following members of the examination committee. The performance of the candidate in the oral examination on his thesis has been found satisfactory, we therefore, recommend that the thesis be approved.

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This is to certify that **Mr. Shankar Lal Yadav** of the **Department of Agronomy**, Rajasthan College of Agriculture, Udaipur has made all the corrections / modifications in the thesis entitled “**Effect of Phosphorus, Sulphur and Seaweed Sap on Productivity of Chickpea (*Cicer arietinum* L.)**” which were suggested by the external examiner and the advisory committee in the oral examination held on 03/07/2015. The final copies of the thesis duly bound and corrected were submitted on / /2015 are enclosed herewith for approval.

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(**Shankar Lal Yadav**)

ACRONYMS & ABBREVIATIONS

%	Per cent	LAI	Leaf area index
x^2	Chi-square test	Ltd.	Limited
°E	Degree East	m	Metre
⁻¹	Per	m ha	Million hectare
&	And	MSS	Mean Sum of Square
@	at the rate of	m ²	Square metre
₹	Rupees	Max.	Maximum
°N	North	mg	Milligram
ABA	Absciscic acid	Mg	Mega gram
AGR	Absolute growth rate	Min.	Minimum
ANOVA	Analysis of variance	ml	Millilitre
B:C	Benefit Cost ratio	mm	Millimetre
BMD	Biomass duration	MPUAT	Maharana Pratap University of Agriculture & Technology
C.D.	Critical difference	mt	Million tone
C.V.	Coefficient of variation	N	Nitrogen
CEC	Cation exchange capacity	N.S.	Non-significant
CGR	Crop growth rate	No.	Number
CSAUAT	Chandra Shekhar Azad University of Agriculture & Technilogy	O.C.	Organic carbon
cm	Centimetre	°C	Degree Celsius
d.f.	Degree of freedom	P/P ₂ O ₅	Phosphorus
DAP	Di ammonium Phosphate	ppm	Parts per million
DAS	Days after sowing	PSB	Phosphate Solubilizing Bacteria
DM	Dry matter	Pvt.	Private
DMA	Dry matter accumulation	q	Quintals
dS/m	deci Simon per metre	R	Replications
EC	Electrical conductivity	r	Correlation coefficient
<i>et al.</i>	(et alibi) and else where	RAU	Rajasthan Agricultural University
FAO	Food and Agriculture Organization	RDF	Recommended dose of fertilizer
Fig.	Figure	RGR	Relative growth rate
Fl oz	Fluid ounces	RH	Relative humidity
FYM	Farm yard manure	S	Sulphur
g	gramme	S.Em.±	Standard error mean
hrs	Hours	SEs	Seaweed extracts
ha	Hectare	SOV	Source of variance
HI	Harvest index	t	Tonne
i.e.	that is	Temp.	Temperature
IAA	Indol acetic acid	var.	Variety
ICMR	Indian council of medical research	v/v	Volume of volume
K/K ₂ O	Potassium	viz.	(Videlicet) Namely
kg	Kilogram	wt	Weight
km	Kilometre	Y	Year
l	Litre		