

**EFFECT OF LEVELS AND TIME OF
APPLICATION OF NITROGEN AND GYPSUM
ON PERFORMANCE OF GROUNDNUT
(*Arachis hypoagaea. L*) IN REGOSOL IN
VANTHARUMOLAI**

BY

GUNASINGAM KARNAN

A RESEARCH REPORT SUBMITTED IN PARTIAL
FULFILMENT OF THE REQUIREMENTS
FOR THE ADVANCED COURSE

IN

FIELD CROP PRODUCTION

FOR

**THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE
FACULTY OF AGRICULTURE
EASTERN UNIVERSITY - SRI LANKA**

1998



FAG98

 Project Report
 Library - EUSL



APPROVED BY

K. D. Harris
Mrs.K.D. Harris
 SUPERVISOR
 Co-ordinator
 Division of Crop Science
 Faculty of Agriculture
 Eastern University
 Sri Lanka
 Date : *16/2/99*

S. Raveendranath
Dr.S.Raveendranath
 (HEAD/AGRONOMY)
 Senior Lecturer
 Faculty of Agriculture
 Eastern University
 Chenkalady
 Sri Lanka
 Date : *16/2/99*

35876

PROCESSED
 Main Lib
 Insect Library/EUSL

ABSTRACT

An experiment was conducted during the period July to October 1998, at the Agronomy farm of Faculty of Agriculture, Eastern University, to study the effect of levels of nitrogen and gypsum on performance of groundnut, in sandy regosols.

The experiment tested four levels of nitrogen (0, 30, 45 & 60 kg /ha) and two levels of gypsum (500 & 750 kg /ha). A uniform application of 15 kg N /ha, 45 kg K₂O and 60 kg P₂O₅ /ha was made as basal dressing. Top dressing was done at the rate of 15 kg N /ha as single, double and triple split doses.

The LAI and dry weight of leaves were correlated with each other, both parameters at early stages of growth were influenced by the application of different levels of nitrogen and gypsum. The rate of 45 kg N /ha + 750 kg gypsum /ha and 30 kg N /ha + 750 kg gypsum /ha showed significantly ($P=0.05$) higher LAI and dry weight of leaves than other treatments at 45 DAP. Treatment with 60 kg N /ha + 500 kg gypsum /ha and 45 kg N /ha + 750 kg gypsum /ha showed significantly ($P=0.05$) higher in LAI and dry weight of leaves than 0 and 60 kg N /ha with 750 kg gypsum /ha at 75 DAP. The application of different treatments did not have influence on both LAI and dry weights of leaves at 125 DAP. The dry matter accumulation showed increase trend between 45 to 75 DAP and declined there after.

Dry weight of stems and roots were influenced by different level of treatments at early stage (45DAP) of growth that not in later stages. The treatment 30 kg N /ha + 750 kg gypsum /ha was significantly ($P=0.05$) higher in dry weight of stems than other treatments. The treatments at 30 kg N /ha and 45 kg N /ha with 750 kg gypsum /ha were significantly ($P=0.05$) higher than treatments at 0 kg N /ha and 30 kg N /ha with 500 kg gypsum /ha in dry weight of roots at 45 DAP.

Pod yield showed response to different levels of nitrogen and gypsum application. Treatment at 45 kg N /ha + 750 kg gypsum /ha was significantly ($P=0.05$) higher in pod yield than 0 kg N /ha + 750 kg gypsum /ha and 30 kg N + 500 kg gypsum /ha. Level of gypsum increased from 30 to 60 kg N /ha increased the pod yield. Pod yield

of 45 kg N /ha + 750 kg gypsum /ha was higher by 44.4 % than 30 kg N /ha + 500 kg gypsum /ha.

Different levels of nitrogen and gypsum during the growth period did not influence pod number. The treatments with 0 kg N /ha 750 kg gypsum /ha and 30 kg N /ha + 500 kg gypsum /ha that produced lowest dry weight of pods at both 45 and 75 DAP. At 75 DAP the treatments 45 kg N /ha and 60 kg N /ha with 500 kg gypsum /ha were significantly ($P=0.05$) higher in dry weight of pods than 30 kg N /ha + 500 kg gypsum /ha and 0 kg N /ha + 750 kg gypsum /ha. The dry weight of pods at 125 DAP did not influence by different level of nitrogen and gypsum.

Different levels of nitrogen and gypsum did not have influence on dry weight of nodules at early stages of growth but later and influence was noticed (125 DAP). The treatments with 45 kg N /ha at both levels of gypsum were significantly higher in dry weight of nodules than 0 kg N /ha + 500 kg gypsum /ha. Number of nodules was respond in and with treatments throughout the stages of growth.

Different levels of treatments did not influence the shelling percentage. The treatments influenced the hundred kernel weight and the treatments with 30 kg N /ha + 500 kg gypsum /ha gave lowest hundred kernel weight which was significantly ($P=0.05$) different from other treatments.

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	ABSTRACT	I
	ACKNOWLEDGEMENT	III
	TABLE OF CONTENTS	IV
	LIST OF FIGURES	VII
	LIST OF TABLES	VIII
CHAPTER - I	INTRODUCTION	1
CHAPTER - II	REVIEW OF LITERATURE	4
	2.1 Variety Walawe	4
	2.2 Effect of nutrients	5
	2.3 Effect of nitrogen	7
	2.3.1 Effect on vegetative growth	8
	2.3.2 Effect on root growth and nodulation	9
	2.3.3 Effect on yield and components	10
	2.3.4 Effect on shelling percentage and hundred kernel weight	11
	2.4 Effect of Calcium	12
	2.4.1 Effect on vegetative growth	14
	2.4.2 Effect on root growth and nodulation	15
	2.4.3 Effect on yield and yield components	15
	2.4.4 Effect on shelling percentage and hundred kernel weight	17

3.1 Location and soil	18
3.2 Climate	18
3.3 Species and variety of groundnut	18
3.4 Experiment	18
3.4.1 Statistical design	20
3.4.2 Plot size	21
3.4.3 Guard rows	21
3.4.4 Spacing	21
3.4.5 Agronomic practices	21
3.4.5.1 Land preparation	21
3.4.5.2 Planting	21
3.4.6 Cultural practices	21
3.4.6.1 Gap filling	21
3.4.6.2 Fertilizer application	22
3.4.6.3 Watering	22
3.4.6.4 Earthing up and gypsum application	22
3.4.6.5 Pest and disease control	22
3.4.6.6 Weed control	23
3.5 Soil analysis	23
3.6 Growth measurements	23
3.6.1 Sampling design	24
3.6.2 Weight of plant parts	25
3.6.3 Leaf area	25
3.6.4 Number of effective nodules per plant	25
3.6.5 Yield components	25
3.6.5.1 Pod yield	25
3.6.5.2 Number of pods per plant	25
3.6.5.3 Shelling percentage	26
3.6.5.4 Hundred kernel weight	26

CHAPTER - IV	RESULTS AND DISCUSSION	27
	4.1 Major plant parts	27
	4.1.1 Leaf area	27
	4.1.2 Dry weight of leaves	28
	4.1.3 Dry weight of stem	31
	4.1.4 Dry weight of roots	33
	4.1.5 Dry weight of nodules	35
	4.1.6 Number of nodules	37
	4.2 Economically important parts	40
	4.2.1 Dry weight of pods	40
	4.2.2 Number of pods	43
	4.2.3 Shelling percentage	43
	4.2.4 Hundred kernel weight	46
	4.3 Pod yield	48
CHAPTER - V	CONCLUSION	50
	REFERENCES	52
	APPENDICES	
	APPENDIX I	
	APPENDIX II	
	APPENDIX III	
	APPENDIX IV	
	APPENDIX V	
	APPENDIX VI	