

PERFORMANCE OF SHORT - DURATION  
GROUNDNUT (*ARACHIS HYPOGAEA* L ) GENOTYPES  
ON REGOSOLS IN EASTERN SRI LANKA

BY

KANDASAMY RAMESH



A RESERACH REPORT  
SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIRMENTS FOR THE ADVANCED COUSE

IN

AGRICULTURAL BIOLOGY

FOR

THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE  
FACULTY OF AGRICULTURE  
EASTERN UNIVERSITY, SRI LANKA  
CHENKALADY.

001-4/64/353 596  
RAM

1997

APPROVED  
BY



Project Report  
Library - EUSL



*V. Arulnandhy*

Dr.V.Arulnandhy,  
(Supervisor)  
Senior Lecturer and Plant Breeder,  
Division of Agricultural Biology,  
Faculty of Agriculture,  
Eastern University, Sri Lanka.  
Chenkalady.

Date: 23.01.98

*T. Mahendran*

Dr(Mrs) T.Mahendran,  
Head/Dept. of Agronomy,  
Faculty of Agriculture,  
Eastern University, Sri Lanka.  
Chenkalady.

29344

Date: 23/01/98

## ABSTRACT

A field experiment was carried out at the Agricultural farm of the Eastern University, Chenkalady during the period of June to September 1997 to evaluate the morpho-agronomic characters of seven groundnut genotypes. The objective was to identify the most suitable short duration groundnut genotypes to be grown on regosols under the conditions prevailing in Eastern Sri Lanka.

Seven groundnut genotypes were evaluated along with MI-1 as the check variety. All the varieties were planted in a Randomized Complete Block Design (RCBD) with three replicates and were managed under the recommended cultural practices.

The measurements and observations were made from the day of planting to final harvest. The data were collected on, Nitrogen content of the soil after planting, at 45<sup>th</sup> day and at 75<sup>th</sup> day; Days to 1<sup>st</sup> and 75% emergence, abnormal plants at final plant stand; Seed vigour; Days to 1<sup>st</sup> and 75% flowering; Number of effective nodules per plant; Number of pods per plant; Days to maturity; Disease score on Rust and Leaf spot; Leaf size and shape; pod yield; shelling percentage; Hundred seed weight; Percentage sound mature seeds; Ovules in pods; Seed appearance and uniformity; and also the Fat and Protein content and yield .

The genotypes tested in the study showed significant differences in growth parameters such as 75% germination; Seed vigour; Days to 1<sup>st</sup> and 75% flowering and also in number of effective nodules per plant; and yield components such as number of pods per plant; Pod yield; Shelling percentage; Hundred seed weight; Percentage sound mature seeds; Ovules in pods; Fat and protein percentage; Fat and protein yield.

The phenotypic variations were found to exist in many characters of agronomic importance and therefore selection may be positively approached for the desirable characters with importance given to yield and adaptability. Based on the selection criteria, the genotypes I CGV 91114, ICGV 91112 , ICGV 91124 and ICGV 92269 showed promise in many agronomic characters especially; Disease score, Pod producing capacity, Shelling percentage, Seed vigour, Fat and protein content, Hundred seed weight and pod yield, and were found to be significantly superior than the check variety MI-1 as far as these characters are concerned. Hence, it is found that genotypes ICGV 91114, ICGV 91124, ICGV 91112 and ICGV 92269 are the most suitable genotypes suited to grow on regosols, and under conditions prevailing in the Eastern Srilanka during the yala with irrigation.

	Page
CONTENTS	
Abstract	I
Acknowledgement	III
Contents	IV
List of tables	VII
List of figures	VIII
<b>Chapter 1 Introduction</b>	
1.1. General	1
1.2. Economic products and uses	2
1.3. Importance of groundnut	3
1.3.1. In the World	5
1.3.2. In Asia	6
1.3.3. In Sri Lanka	7
1.4. Production constraints	9
1.4.1. Justification	10
1.5. Objective of the study	11
<b>Chapter 2 Review of Literature</b>	
2.1. Classification	12
2.1.1. Fastigiata	12
2.1.2. Hyphogaea	13
2.2. Botany	13
2.3. Dormancy	15
2.3.1. Break seed dormancy	16
2.4. Mineral nutrition	18
2.5. Nitrogen fixation	20
2.6. Groundnut diseases	21
2.6.1. Biotic diseases	22
2.6.1.1. Early and late leaf spot	22
2.6.1.2. Rust	23
2.6.1.3. Other biotic diseases	24
2.6.2. Abiotic diseases	24
2.6.3. Genetic disorder	24
2.6.4. Drought stress	25
2.6.5. Other harmful organisms	25
2.7. International Crop Research Institute for Semi-Arid Tropics (ICRISAT)	27
2.8. Germplasm resources	29
2.9. Tissue culture approach in groundnut	30
2.10. Resistance cultivars and Genetic improvement	31
2.11. Yield improvement	32

## Chapter 3 Materials and methods

3.1. Location	35
3.2. Climate	35
3.3. Varieties of groundnut used as treatment	36
3.4. Statistical design and field lay-out	37
3.4.1. Plot size	37
3.4.1. Crop spacing	37
3.4.3. Guard rows	42
3.5. Agronomic practices	42
3.5.1. Land preparation	42
3.5.2. Fertilizer and manure application	43
3.5.2.1. Manure application	43
3.5.2.2. Fertilizer application	43
3.5.2.2(a). Basal application	43
3.5.2.2(b). Top dressing	44
3.5.3. Seed treatment	44
3.5.4. Planting	44
3.5.5. Watering	45
3.5.6. Weed control	45
3.5.7. Earthing up	45
3.5.8. Pest and Disease control	46
3.5.8.1. Pest control	46
3.5.8.2. Disease control	46
3.6. Measurement and observations	46
3.6.1. Soil nitrogen	46
3.6.2. Days to emergence	47
3.6.3. Seed vigour	47
3.6.4. Days to flowering	47
3.6.5. Number of effective nodules per plant	48
3.6.6. Number of pods per plant	48
3.6.7. Days to Maturity	48
3.6.8. Pod yield	48
3.6.9. Disease score	49
3.6.10. Leaf size and shape	49
3.7. Estimation of quality characters	49
3.7.1. Shelling percentage	49
3.7.2. Hundred seed weight	50
3.7.3. Percentage of sound mature seeds	50
3.7.4. Ovules in pods	50
3.7.5. Fat and Protein content	51
3.7.6. Seed appearance and uniformity	51
3.8. Statistical analysis	51

## Chapter 4 Result and Discussion

4.1. Soil nitrogen	52
4.2. Days to first and 75% emergence	53
4.2(a). Abnormal plants at final plant stand	53
4.3. Seed vigour	54
4.4. Days to first and 75% flowering	56
4.5. Number of effective nodules per plant	58
4.6. Number of pods per plants	59
4.7. Days to Maturity	61
4.8. Disease score	61
4.8(a). Genetic disorder	63
4.9. Leaf size and shape	64
4.10. Pod yield	64
4.11. Shelling percentage	74
4.12. Hundred seed weight	75
4.13. Percentage sound mature seeds	75
4.14. Ovules in pods	77
4.15. Seed appearance and uniformity	80
4.16. Fat and Protein content	80

Chapter 5 Summary and conclusion	86
----------------------------------	----

Bibliography	90
--------------	----