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PERFORMANCE OF GROUNDNUT (*ARACHIS HYPOGAEA* L.) AS INFLUENCED BY VARIOUS RESOURCE CONSTRAINTS

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ABSTRACT

Groundnut the "king of oilseeds" is grown on area of 4.60 million hectares with the production of 4.8 million tonnes during the year 2014-15. Among the various agronomic practices, fertilizer, weeding and plant protection play important role in maximizing the pod yield. Keeping in view all the facts, the study of performance of groundnut as influenced by resource constraints was formulated in RBD design in three replications with 8 different treatments. The results in the present investigation revealed significant differences in respect of pod yield for all the treatments studied. Among the different treatments, highest pod yield was recorded by the treatment T_1 (1149 kg/ha) with 3.08 B:C ratio followed by T_3 (1135 kg/ha, 3.24 BC ratio) and T_5 (722 kg/ha, 2.10 BC ratio) and lowest yield recorded by T_8 (447 kg/ha).

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is an important major oilseed crop of India. Among the nine oilseeds, namely, groundnut, rapeseed-mustard, soybean, sunflower, safflower, sesame, niger, castor and linseed, groundnut is the second largest oilseed in India in terms of production and area (Thamaraikannan *et al*., 2009). For increasing the production of crop, the use of different components such as application of fertilizers, plant protection measures and weed control are the major components. Farmers are neglecting the application of fertilizers, use of plant protection measure and weed control due to paucity of funds and lack of knowledge (Patil *et al*., 2003). No data are available on this aspect that how much is reduction in yield due to individual or in combination of these factors. The present investigation was therefore, undertaken on heavy deep black soils under heavy rainfall conditions, to gather the information on these factors.

MATERIALS AND METHODS

The field experiment was conducted on Groundnut (*Arachis hypogaea* L.) cv. GG-2 at Regional Rice Research Station, NAU, Vyara (Gujarat), India during three consecutive *kharif* seasons from 2011 to 2013. Total eight treatments comprised as full package as per recommendation, T_1 - Fertilizer (T_2), T_1 – Plant Protection (T_3), T_1 – Weeding (T_4), T_1 - Fertilizer + Plant Protection (T_5), T_1 - Fertilizer + Weeding (T_6), T_1 – Plant Protection + Weeding (T_7) and T_1 – Fertilizer + Plant Protection + Weeding (T_8), were tested in randomized complete block design with three replications. Groundnut was sown @ 100 kg seed/ha in rows 60 cm apart and 15 cm plant to plant spacing. As per recommended dose (12.5:25:00 NPK) of the fertilizer, nitrogen was applied as urea and phosphorus as DAP. 100% N and 100% P was applied as basal dose. All other treatments were imposed as per the schedule and methodologies given above to specific plots.

RESULTS AND DISCUSSION

The data presented in Table 1 revealed that the pod yield (kg/ha) was highest (1149 kg) in the full package treatment (100% RDF + Weeding + Plant Protection) as compared to all other treatments. The full package significantly influenced the pod yield in all the three years of experimentation and the same was reflected in the pooled analysis. The increase in pod yield with full package of practices over the absolute control (T_8) was 99.0, 119.7 and 383.6 per cent in the three years of

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Table 1. Effect of various factors on pod yield

Sr. No.	Treatment details	Pod yield (kg ha^{-1})			Pooled mean (kg ha^{-1})
		2011	2012	2013	
1.	T_1=FT+WD+PP	1216	1081	1151	1149
		(99.0)	(119.7)	(383.6)	
2.	T_2= T_1-FT	718	884	906	836
		(17.5)	(79.7)	(280.7)	
3.	T_3= T_1-PP	1139	1195	1071	1135
		(86.4)	(142.9)	(350.0)	
4.	T_4= T_1-WD	658	528	801	662
		(7.7)	(7.3)	(236.6)	
5.	T_5= T_1-FT+PP	938	832	395	722
		(53.5)	(69.1)	(66.0)	
6.	T_6=T_1- FT+WD	721	630	380	577
		(18.0)	(28.0)	(59.7)	
7.	T_7=T_1-PP +WD	706	511	295	504
		(15.5)	(3.9)	(23.9)	
8.	T_8= T_1-FT+WD+PP	611	492	238	447
General mean		838	769	655	754
SE±/ha		55.1	42.8	29.4	89.3
CD at 5% level		167	130	89	271.0
C.V%		11.39	9.64	7.78	10.10

FT: Fertilizer, WD: Weeding, PP: Plant protection

(Figure in parentheses indicate the percentage increase over the absolute control *i.e.* T_8)

Table 2. Influence on ancillary traits related to groundnut production under resource constraints

S. No	Treatment	Plant height(cm)	100 Pod wt. (gm)	100 kernel wt (gm)	Shelling %
1.	T_1=FT+WD+PP	35	85	48	70
2.	T_2= T_1-FT	26	80	42	66
3.	T_3= T_1-PP	32	83	47	68
4.	T_4= T_1-WD	33	80	44	64
5.	T_5= T_1-FT+PP	25	75	41	65
6.	T_6=T_1- FT+WD	27	74	40	63
7.	T_7=T_1-PP +WD	28	77	43	61
8.	T_8= T_1-FT+WD+PP	24	72	35	60

Table 3. Economics of Groundnut production under resource constraints

S. No	Treatment	Pod yield (kg/ha)	Cost of cultivation (Rs/ha)	Gross monetary returns (Rs/ha)	Net monetary returns (Rs/ha)	B:C ratio
1.	T_1=FT+WD+PP	1149	29850	91920	62070	3.08
2.	T_2= T_1-FT	836	27500	66880	39380	2.43
3.	T_3= T_1-PP	1135	28050	90800	62750	3.24
4.	T_4= T_1-WD	662	25000	52960	27960	2.12
5.	T_5= T_1-FT+PP	722	27500	57760	30260	2.10
6.	T_6=T_1- FT+WD	577	23500	46160	22660	1.96
7.	T_7=T_1-PP +WD	504	22000	40320	18320	1.83
8.	T_8= T_1-FT+WD+PP	447	19000	35760	16760	1.88
	General mean	754				
	SE(m)±	89.3				
	CD 5%	271.0				
	CV%	10.10				

experimentation. Similar results were observed by Reddy *et al.* (1986) and Patil (1987), in safflower and also by Saini and Dhillon (1985), in groundnut. The treatment T_3 (T_1-Plant protection) was recorded 1135 kg pod yield per ha which was at par with the treatment T_1. However the treatment T_2 (T_1-Fertilizer) was at par with treatment T_5 (T_1-FT+PP) but significantly less than that of T_1. Pooled data of three years showed that the treatment T_8 i.e. no use of fertilizers, plant protection and weed control, gave the lowest seed yield (447 kg ha^{-1}), while the full package treatment was significantly superior to all the treatments (1149 kg ha^{-1}) for pod yield. Similar results were observed by Patil *et al.* (2003) in safflower. The treatment T_7 (T_1-Plant protection+ Weeding) gave significantly lowest seed yield (504 kg ha^{-1}) over all the treatments except treatment T_8 which indicates that no use of weeding along with non following of the plant protection measures proved to be crucial in reducing the pod yield in groundnut crop. The data presented in Table 2 revealed that the ancillary traits like plant height, pod weight, kernel weight and shelling per cent are also affected by the various treatments. The data presented in Table 3 revealed that the highest gross monetary return of Rs 91920 ha^{-1} was observed in full package treatment (T_1) followed by the treatment T_3(T_1-PP). However lowest gross return was recorded in treatment T_8 *i.e.* Rs. 35760 ha^{-1}. The present investigation was aimed to minimized the expensive cultivation practices and find out the most appropriate treatment combination. The economic status of each treatment was determined by considering the cost of inputs used and gross returns (Table 3). The treatment T_1 which includes all the improved cultivation practices recorded

highest gross monetary returns (GMR Rs. 91920 ha^{-1}) followed by T_3 (Rs. 90800) and T_2 (Rs. 66880) which suggest increase in GMR due to integration of all resources used during cultivation whereas increase in net monetary return (NMR) is due to increase in GMR (Patil *et al.,* 2003 and Dwiwedi and Rawat, 2013). Significantly highest net monetary return was obtained by practice of full package (Rs.62070) over all treatments. Lowest net monetary return Rs.16760 ha^{-1} was recorded by treatment T_8. Similar results were observed by Jagtap *et al.* (2014) in niger. Benefit cost ratio refers to monetary gain over each rupee of investment under the particular treatment. The treatment T_3 (T_1- Plant Protection) was recorded maximum profitability (3.24) followed by T_1 (3.08), T_2 (2.43) and T_4 (2.12) respectively. These results are in conformity with findings of Yadav *et al.* (2008) and Sharma and Kewat (1994). Thus it was revealed from the present investigation that integration of proper treatment combinations will definitely increase the pod yield (kg/ha) and profitability of groundnut crop with reducing costly cultivation practices.

REFERENCES

Dwivedi, B.S. and A.K. Rawat, 2013. Nutrient management technology for niger *Guizotia abyssinica* L. F.) crop in tribal areas. *Plant Archives* Vol. 13(2):809-813.

Jagtap, P.K., P.B. Sandipan and M.C. Patel, 2014. Performance of niger (*Guizotia abyssinica* l. cass.) as influenced by variousresource constraints. *International Journal of Current Research.* Vol. 6(8):8234-8235.

Patil, P.S. 1987. Safflower book published by Mahatma Phule Agril. University Zonal Research Station, Solapur, M.S. pp.23.

Patil, B.B., M.T. Ingavale and K.K. Mangave, 2003. Optimization of safflower production under resource constraints. *Madras agric. J.* 90(10-12): 731-733

Reddy, Y.Y.R. 1986. Economics of recommended practices for oilseed crops in dry land farming. *J. Oilseeds Resh*. 3: 51-59.

Saini, J.S. and A.S. Dhillon, 1985. Yield and quality of groundnut as affected by some production factors. *J.Oilseeds*. 2: 50-56.

Sharma, R.S. and M.L. Kewat, 1994. Effect of sowing date and fertilizer on yield attributes and seed yield of niger (*Guizotia abyssinica*) under rainfed condition. *Indian Journal of Agronomy*. 39: 148-150.

Thamaraikannan, M., G. Palaniappan and S. Dharmalingam, 2009. Groundnut: The king of oilseeds. Market Survey.19-23.

Yadav, R.A, Mathuria, O.P., Singh, H.P., Yadav, M.P. and Naushad Khan, 2008. Optimization of sesame yield under resource constraints. *Plant Archives.* Vol. 8 (2):999-1001.

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