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## RESEARCH ARTICLE

**Effect of cultivars and weed management on quality, nutrient content and uptake in late sown groundnut.**

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**Abstract**

A field experiment was conducted during *kharif* season of 2010 to study the effect of cultivars and weed management on late sown groundnut productivity. The experiment comprising of 16 treatment combinations (4 cultivars (TG-37A, Malika, HNG-10 and Local) and 4 weed control treatments (Weedy check, Weed free, Pendimethalin 1.0 kg ha<sup>-1</sup> and Pendimethalin 1.0 kg ha<sup>-1</sup> with one hand weeding at 35 DAS), replicated four times was laid out in split plot design. Maximum uptake of nitrogen and phosphorus, higher net return (49882 Rs. ha<sup>-1</sup>) and Benefit cost ratio (B: C) recorded in cultivar HNG-10. Maximum and significantly higher shelling percentage was recorded in Malika cultivar. Oil yield and economies was obtaining in weed free treatment, which was significantly higher as compared to Pendimethalin at 1 kg ha<sup>-1</sup> treatment; however, it was statistically at par with Pendimethalin at 1 kg ha<sup>-1</sup> + HW 35 DAS treatment.

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**Introduction:-**

Groundnut (*Arachis hypogaea* L.) is an annual legume crop, belongs to family Leguminosae commonly known as peanut, earthnut, monkey nut and goobers. It grown in tropical and sub-tropical regions. Groundnut in India has low productivity and high cost of production. Among different agronomic practices, weed menace and lack of proper cultivation are one of the serious bottlenecks for increasing the yield. Weed competition causes reduction in pod yield by about 17-84 % depending upon season Singh *et al.* (1992) and Murthy *et al.* (1994). In view of slow growth habit of the peanut plants, mechanical control of weeds becomes difficult due to continuous rains and increasing cost and scarcity of labour. Under these situations the chemical control of weeds is found to be effective and economical in the initial stages of growth. However, the use of herbicide alone may not be answer to the problem associated with manual weeding (Bhale *et al.*, 2012). Thus the appropriate choice for weed control in groundnut crop would be combination of cultural and herbicidal control to boost-up the productivity. For stepping up food production, the country involves more intensive cropping resulting in the problem of suitable cultivars for normal as well as late sown conditions, which may fit in the cropping systems. Groundnut is generally sown either too early in the month of April or too late in month of July to avoid dust storm that may hamper germination. Research work on late sown groundnut in the region is meagre. So an attempt is made to assess the efficiency of different groundnut cultivars under late sown conditions. Keeping in view of the above considerations an experiment entitled: Effect of cultivars and weed management on quality, nutrient content and uptake in late sown groundnut in North Western Rajasthan was under taken.

**Materials and methods:-**

A field experiment was conducted at Agronomy farm, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University; Bikaner during *kharif* 2010. The soil was sandy loam in texture, low in organic carbon (0.08%) and available Nitrogen (86.4 kg ha<sup>-1</sup>), medium in Phosphorus (21.9 kg ha<sup>-1</sup>) and high in Potassium (234.0 kg ha<sup>-1</sup>) with pH of 8.5. There were 16 treatments consisting of 4 treatments of cultivar (TG-37A, Malika, HNG-10 and Local) and 4 weed control treatments (weedy check, weed free by hand 3 times in growing period, pendimethalin 1 kg ha<sup>-1</sup>, and pendimethalin 1 kg ha<sup>-1</sup> with one hand weeding (HW) at 35 DAS). The treatments were laid out in split plot design

replicated four times. Groundnut seeds were sown on 4 July, 2010 in lines spaced 30 cm by “*ker*” method in open furrow. A uniform basal dose of N (30 kg ha<sup>-1</sup>) and P (60 kg ha<sup>-1</sup>) were drilled before sowing. Oil content in kernel was determined by Soxhlet apparatus using petroleum ether (60-80°C). (A.O.A.C.1960). Protein percent in kernel was calculated by multiplying nitrogen percentage in kernel by the factor of 6.25 (A.O.A.C., 1960).

$$\text{Crude protein (\%)} = \text{N content in kernel (\%)} \times 6.25$$

Estimation of nitrogen and phosphorus contents, samples of kernel, haulm and shell were taken at the time of threshing, oven dried its and make powder with willey mill than estimation of nitrogen and phosphorus content by using standard methods as:

Nitrogen: Nessler’s reagent colorimetric method (Snell and Snell, 1939)

Phosphorus: Vanado-molybdo-phosphoric yellow colour method (Jackson, 1973). The uptake of nitrogen and phosphorus by kernel and haulm was estimated by using the following formula.

$$\text{Nutrient (kg ha}^{-1}\text{)} \quad \text{Uptake} = \frac{\text{Nutrient content (\%)} \text{ in seed/ haulm} \quad \text{X} \quad \text{Seed/haulm yield (kg ha}^{-1}\text{)}}{100}$$

Statistical analysis in accordance with the “Analysis of variance” technique suggested by Fisher (1950) for split plot design. The critical difference (CD) for the treatment comparisons were worked out wherever the variance ratio (F test) was found significant at 5 per cent level of probability.

### Results and discussion:-

Nitrogen, phosphorus content in groundnut pod and haulm were not influenced statistically by cultivars. However, maximum uptake of nitrogen and phosphorus in pod were recorded in cultivar HNG-10 but maximum uptake of total nitrogen and total phosphorus in haulm was recorded in cultivar Malika and it was significantly higher over other cultivars. This may due to higher plant dry weight and haulm yield. Lower uptake of N and P were recorded in TG-37A. There was no significant difference was observed among weed control treatments for N and P content in pod and haulm. The N and P uptake by crop and haulm was significantly higher in weeded treatments. Weed free treatment had significantly higher N and P content in pods and haulm, while pre emergence application of Pendimethalin 1 kg ha<sup>-1</sup> + HW at 35 DAS occupied prime position in this respect. The increase in uptake of nutrients can be attributed to increased pod and haulm yield under relatively weed free condition. Similar results had been reported by Madhu *et al.* (2006)

Maximum shelling percentage was recorded in Malika cultivar which had significantly higher shelling percentage as compared to all other cultivars. HNG-10 cultivar had significantly lower shelling percentage as compared to TG-37A and Local. HNG-10 cultivar recorded the higher oil content and oil yield over all other cultivars. These findings are in conformity with the finding of Devkumar and Gajendra (1998) and maximum oil yield was obtained in weed free treatment, which was significantly higher as compared to pendimethalin at 1 kg ha<sup>-1</sup> treatment, however, it was statistically at par with pendimethalin at 1 kg ha<sup>-1</sup> + HW 35 DAS treatment. Crude protein was not significantly differed among cultivars and weed control treatments. HNG-10 cultivar gave significantly higher net return (49882 Rs. ha<sup>-1</sup>) and B:C over Malika cultivar, but statically at par with TG-37A. This may due to higher pod and kernel yield found in this cultivar compared to others. Ravisankar *et al.* (2010) reported similar results

All the weed control measures recorded higher B:C ratio over weedy check. Weed free treatment (49408 Rs ha<sup>-1</sup>) followed by Pendimethalin 1 kg ha<sup>-1</sup> + HW at 35 DAS was found to be most remunerative treatments, as it gave highest B:C and net returns. Bhondave *et al.* (2009), Madhu *et al.* (2006), Solanki *et al.* (2005) also recorded highest net returns in weed free plot followed by application of Pendimethalin 1 kg ha<sup>-1</sup> + HW at 35 DAS.

**Table 1. Effect of cultivars and weed management on oil content, shelling % Oil yield and crude protein of groundnut**

Treatments	Shelling (%)	Oil content (%)	Oil yield (kg ha <sup>-1</sup> )	Crude protein (%)
TG-37A	69.61	49.21	996	26.09
Malika	70.31	48.81	760	26.02
HNG-10	66.22	49.91	1071	26.45
Local	68.59	48.00	956	26.01
S.Em±	0.18	0.07	25	0.55
CD (5%)	0.51	0.21	74	NS
<b>Weed Management</b>				
Control	68.05	48.53	759	26.95
Weed free	69.32	49.31	1069.5	25.78
Pendimethalin 1.0 kg ha <sup>-1</sup>	68.32	48.82	935	26.21
Pendimethalin 1.0 kg ha <sup>-1</sup> +HW at 35 DAS	69.04	49.16	1019	25.62
S.Em±	0.27	0.10	23.45	0.68
CD (5%)	0.80	NS	68.46	NS

NS= Non-significant

**Table 2. Effect of cultivars and weed management on nutrient content and uptake in groundnut**

Treatments	N content %		P content %		N uptake (kg ha <sup>-1</sup> )		P uptake (kg ha <sup>-1</sup> )	
	Pod	Haulm	Pod	Haulm	Pod	haulm	Pod	Haulm
TG-37A	4.08	1.35	0.41	0.23	117.91	39.80	13.62	13.77
Malika	4.18	1.33	0.47	0.22	82.11	63.11	10.23	22.41
HNG-10	4.23	1.38	0.46	0.25	159.71	59.77	16.82	19.31
Local	4.14	1.43	0.46	0.23	127.31	54.61	15.13	17.13
S.Em±	0.10	0.04	0.02	0.01	3.41	1.11	0.50	0.55
CD (5%)	NS	NS	NS	NS	9.81	3.23	1.46	1.62
<b>Weed Management</b>								
Control	4.00	1.29	0.41	0.18	91.42	42.21	10.71	13.75
Weed free	4.29	1.46	0.48	0.27	139.00	62.64	15.19	21.40
Pendimethalin 1.0 kg ha <sup>-1</sup>	4.13	1.34	0.45	0.23	127.92	53.53	12.37	18.02
Pendimethalin +HW at 35 DAS	4.19	1.41	0.46	0.25	129.08	58.55	14.59	19.75
S.Em±	0.08	0.05	0.02	0.01	3.45	1.83	0.40	0.60
CD (5%)	NS	NS	NS	NS	10.08	5.33	1.18	1.76

DAS= Days after sowing, NS= Non-significant, Interaction , HW= Hand weeding CxW = NS

**Table 3. Effect of cultivars and weed management on oil content, shelling % oil yield and crude protein of groundnut**

Treatments	Total nutrients uptake by plant kg ha <sup>-1</sup>		Net return (Rs ha <sup>-1</sup> )	B:C ratio
	Total N	Total P		
TG-37A	156.66	27.60	42510	3.77
Malika	145.21	31.71	31714	2.96
HNG-10	217.81	36.61	49882	4.24
Local	180.82	31.21	44313	3.91
S.Em±	3.52	1.0	2865	-
CD (5%)	10.28	2.9	8363	-
<b>Weed Management</b>				
Control	133.04	23.25	32421	3.42
Weed free	201.13	37.72	49408	3.96
Pendimethalin 1.0 kg ha <sup>-1</sup>	179.69	32.21	42546	3.81
Pendimethalin 1.0 kg ha <sup>-1</sup> +HW at 35 DAS	186.64	34.04	44044	3.70
S.Em±	3.88	0.93	1899	-
CD (5%)	11.31	2.71	5542	-

DAS= Days after sowing

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