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EFFECT OF SOWING TIME AND RAINFALL DISTRIBUTION ON YIELD OF RAINFED GROUNDNUT (*ARACHIS HYPOGEA* L.) IN SOUTHERN AGRO- CLIMATIC ZONE OF ANDHRA PRADESH

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ABSTRACT

A field experiment was conducted during *Kharif*, 2005 at RARS, Tirupati on alfisols with two groundnut varieties (Vemana and TPT-4) sown at three different times (II FN of June, I FN of July and II FN of July). Varieties did not exert significant influence on yield and yield attributes of groundnut. Among the three times of sowing, crop sown during 1st fort night (I FN) of June recorded higher yield and yield attributes over the other two dates of sowing.

INTRODUCTION

Groundnut is the predominant oilseed crop in Southern Agro climatic zone of Andhra Pradesh. The crop is generally sown between 15 June and 15 July, depending on the normal onset of monsoon. However, the erratic onset of monsoon and commencement of sowing rains, some times force the farmers to sow the crop late in the season. Yield variation in rainfed groundnut can be attributed to rainfall variability i.e. amount and distribution of rainfall. The effectiveness of rainfall in crop production depends mainly on commencement of sowing rains and amount and distribution of rainfall during the season (Sahu *et al.*, 2004). The rainfall in Chittoor district is erratic with high variability from season to season. The selection of cultivar for particular sowing time is also an important factor for adoption by the farmers.

Hence, the present experiment is conducted to study the behaviour of rainfed groundnut under different sowing dates with different cultivars.

MATERIAL AND METHODS

Field experiments were conducted on sandy loam soils of Regional Agricultural Research Station, Tirupati (13.27^0 N, 79.36^0 E, 189 m MSL) during *Kharif*, 2005. The experiment was laid out in randomized block design and the treatments included two genotypes namely TPT-4 and Vemana and three times of sowing (II FN of June, I FN of July and II FN of July i.e., 30 June, 15 July and 28 July, respectively). Size of the gross plot was 40 m^2 and net plot was 28.88 m^2. Spacing adopted was 30 X 10 cm. Recommended dose of fertilizers (20 N, 40 P_2O_5, 50 K_20 kg/ha) were applied to the crop as basal and 500 kg gypsum/ha was applied at flowering stage. Weather data for the experimental period was recorded at S.V.Agricultural College meteorological observatory (Class 'A' as per IMD, Pune). The crop period was divided into five growth phases P_1 (sowing to 50% flowering), P_2 (50% flowering to peg initiation), P_3 (peg initiation to pod initiation), P_4 (pod initiation to maturity), P_5 (sowing to maturity) and the duration of different phenophases in different dates of sowing was given in Table-4.

RESULTS AND DISCUSSION

Results indicated that yield and yield attributes of groundnut during rainy season were significantly influenced by times of sowing. Varieties did not exert significant influence on yield and yield attributes of groundnut (Table1). Due to changing weather variables, different sowing times altered the yield and yield components significantly except shelling percentage. Total pods/plant and filled pods/plant were significantly higher with 30 June sowings than the other two times of sowing. But 100-pod weight was significantly higher with 30 June sowings over 28 July sowings and it was on par with 15 July sowings (Table-1). Where as 100 - kernel weight was significantly superior to 30 June sowings over the other two times of sowing. Different times of sowing did not alter shelling percentage significantly.

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TABLE 1 : Yield and yield attributes of groundnut varieties as affected by different dates of sowing during *Kharif*, 2005

Dates of sowing	Yield kg/ha	Total pods/ plant	No. offilled pods/plant	100 pod weight (g)	100 kernel wt (g)	Shelling %
30-6-05	625	12.1	8.4	74.1	30.7	72.9
15-7-05	571	10.8	7.5	70.2	27.7	71.1
28-7-05	374	6.6	5.6	64.2	26.5	70.2
CD 5%	174.3	1.1	0.7	6.8	2.6	NS
Varieties						
TPT-4	511	8.2	6.2	74.0	29.3	69.5
K-134	536	11.0	8.4	65.1	27.7	73.3
CD 5%	NS	1.63	0.68	NS	NS	NS
Interaction	NS	NS	NS	NS	NS	NS

TABLE 2: Rainfall (mm) distribution during different phenophases of crop during different dates of sowing

Dates of sowing	Phenophases				
	P1	P2	P3	P4	P5
D1 (30.6.05)	151.8	7.8	0.0	134.8	294.4
D2 (15.7.05)	193.2	28.8	21.4	707.1	950.5
D3 (28.7.05)	38.6	34.2	18.8	751.1	842.7

Higher pod yield of groundnut (625 kg/ ha) was obtained with June 30 sowing, and it was on par with 15 July sowing and significantly superior over July 28 sowing. Higher pod yield with June 30 sowings may be due to higher number of filled pods/plant and higher100-pod weight. The optimum time of sowing rainfed groundnut in this tract is between 15 June and 15 July. But during *Kharif*, 2005 the pod yields of groundnut were reduced after 30 June, the reason might be due to the rainfall pattern during the season. During South West Monsoon period, deficit rainfall was received over the decennial mean, deficit being29.7 %. But during North East Monsoon period excess rainfall (60.5 %) was received when compared to decennial rainfall. Thus during 2005, the rainfall distribution is highly erratic. Rainfall distribution at different phenophases of crop during different dates of sowing is given in Table-2. Severe infestation of sucking pests (thrips and jassids) was observed in first date of sowing (D1).

Cloudy weather and continuous rains from October to December coincided with the pod development and maturity stages of D_2 and D_3 sowings. This cloudy weather and excess rains resulted in poor filling of pods, hence resulted in pops and low yields in D_3 sowings (374 kg/ha only). Crop duration was also extended in D_2 and D_3 sowings due to continuous and excess rains during later stages of crop growth. June 30 sown crop has attained maturity in about 95 days, where as it took 131 and 127 days to attain maturity in D_2 and D_3 sowings, respectively (Table-3). The effect of rainfall was greater on vegetative development under late sown conditions. Similar results were also reported by Krishnamurthy *et al.*, (2002). Hence, during *Kharif*, 2005 timely sowing during second fortnight of June has resulted in good yields compared to delayed sowings. Sahu *et al.*, (2004) also reported that timely sowing resulted in good and moderate yields, where as late sowing resulted in low yields.

Simple correlations were worked out between weather parameters and different phenophases and pod yield of groundnut (Table4). Significant positive correlation existed between pod yield and total rainfall and total

TABLE 3: Duration of different crop growth stages in different dates of sowing

Phenophases	Dates of sowing		
	D_1	D_2	D_3
Date of sowing	30.6.05	15.7.05	28.7.05
Date of germination	7.7.05	22.7.05	3.8.05
Date of initiation of flowering	21.7.05	16.8.05	18.8.05
Date of 50% flowering	25.7.05	21.8.05	23.8.05
Date of peg initiation	31.7.05	28.8.05	30.8.05
Date of pod initiation	8.8.05	4.9.05	6.9.05
Date of harvest	2.10.05	24.11.05	2.12.05

TABLE 4: Correlation coefficients between weather parameters during different phenophases and pod yield of groundnut

Weather Parameters	P_1	P_2	P_3	P_4	P_5
Tmax	-0.89**	-0.49	-0.66	0.72	0.82**
Tmin	0.14	0.97**	0.66	0.75	0.71
RH-1	0.52	-0.82**	-0.74	-0.71	-0.72
RH-2	0.12	-0.07	-0.66	0.66	-0.66
RF	0.88**	-0.79	-0.57	-0.71	-0.54
RD	0.52	-0.97	-0.66	-0.7	0.7
SSH	0.99**	0.66	-0.72	-0.87**	0.99**
EVP	-0.94**	0.76	0.63	-0.66	0.76
Tmean	-0.52	-0.43	0.66	0.75	0.74

sunshine hours during P_1 stage, mean minimum temperature during P_2 stage and mean maximum temperature and total sunshine hours from sowing to maturity. Mean maximum temperature, mean evaporation during P_1 stage, RH I and rainy days during P_2 stage and sunshine hours during P_4 stage had significant negative correlation with pod yield. Reddy and Reddy (2003), also confirmed that mean maximum temperature had significant negative correlation with yield and yield attributes of groundnut.

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