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Growth and Yield of Groundnut in Coastal Agro Ecosystem of Guntur District in Andhra Pradesh

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ABSTRACT

A field experiment was conducted during *kharif*, 2019 on sandy clay soil of Agricultural College Farm, Bapatla, to evaluate the response of groundnut varieties to dates of sowing. The experiment was laid out in a factorial and replicated thrice with nine treatments comprising of three sowing dates (2nd Fortnight of July, 1st Fortnight of August and 2nd Fortnight of August) and three varieties (V_1-Dharani, V_2-Nithya haritha, and V_3-TAG-24). Impact of varied sowing windows along with different varieties was found significant on growth parameters and yield attributes of groundnut.Results revealed that growth parameters (plant height, drymatter production (DMP) (kg ha^{-1}) and number of branches $plant^{-1}$ and yield attributes (No of pods $plant^{-1}$, kernel per pod and haulm yield (kg ha^{-1}) of groundnut was recorded significantly higher values with the crop sown on 2nd FN of July (1st Date of sowing) with the variety TAG-24 (V_3).

Keywords: *Dates of sowing, Growth parameters, Varieties and Yield attributes.*

Groundnut (*Arachis hypogaea* L.) is a grain legume, tropical and subtropical leguminous herb with annual growing habit, Generally called peas or bean, indigenous of South America. It is foremost important oilseed and accessory food crop, as well as supreme soil amendment with an N content of 7.8 %

Among all the oilseed crops, groundnut holds fourth place in our country. In India, groundnut is grown in an area of 85 lakh hectares, whereas the production was 84 lakh tones. In Andhra Pradesh, groundnut is cultivated in an area of 9.2 lakh hectares, Especially in *kharif*, the area is confined to 6.6 lakh ha.

In Andhra Pradesh, sowing of groundnut commence as early as the 2nd FN of May and extends up to 1st FN of August. Optimum sowing dates accommodate favorable temperature to achieve maximum yield. The sowing date describe the environmental conditions to whichthat crop will be exposed in key moments of its developmental sequence (e.g., critical periods for yield and quality components.). Different sowing dates might expose the crop to different environmental conditions at the time of pod filling. The better combinations of sowing date and variety for the farm chosen assures which that the varietiey arrive the anthesis at the optimum time for that particular location, So varietal selection with the combination of date of sowing is too play utmost important role to achive high groundnut production.(Ragavalli *et al*., 2019)

Ideal time of sowing is one of the primary agronomic operation that has an immense influence on the productivity of groundnut especially in India, due to widely fluctuating agro climatic conditions.

Groundnut is generally grown under *rabi* in sandy soils around Bapatla of Guntur district, AP. In order to determine the sowing date and variety in coastal agro ecosystem of Guntur district in Andhra Pradesh during *kharif* season the present experiment was conducted.

MATERIALS AND METHODS

A field experiment was conducted during *kharif* 2019 at Agricultural College Farm, Bapatla in orchard block, Field No.9 situated at 15º 54' N latitude, 80º 25' E longitude and at an altitude of 5.49 m above mean sea level. It is 8 km away from Bay of Bengal in Krishna Agro Climatic Zone of Andhra Pradesh, India.

The experiment was laid out in randomized block design with three replications and with nine treatments in *kharif*2019. Varieties Dharani, Nithyaharitha and TAG-24 were selected as a test crop. The experiment comprised nine treatment combinations and three sowing windows (2nd FN of July, 1st FN of August and 2nd FN of August)

The soil of the experimental site was sandy clay in texture, neutral (6.8 pH) in reaction, low in organic carbon (0.35%), available nitrogen (210 kg ha^{-1}), medium in phosphorus (23 kg ha^{-1}) and available potassium (278 kg ha^{-1}).The crop was fertilized with the soil test based fertilizer (STBR) of 25 kg N ha^{-1}, 40 kg P_2O_5 ha^{-1} and 50 kg K_2O ha^{-1} placed in furrows after sowing. The source for N, P and K were., urea, SSP and MOP, respectively. Sulphur was applied in the form of gypsum which was applied to all the plots uniformly at the time flowering.

RESULTS AND DISCUSSION

Growth Parameters

Data in Table 1 revealed that plant height (cm) at harvest, number of branches $plant^{-1}$ (at harvest) and drymatter accumulation (30 DAS, 60 DAS and at harvest) differed significantly with different dates of sowing

Among the dates of sowing the crop sown on 2nd FN of July reached maximum plant height, higher number of branches per plant and highest drymatter accumulation than other dates of sowing.

Plant height

Data about the plant height of groundnut (at 30, 60, 90 and at harvest)as governed by sowing windows and varieties was furnished in Table 1. The data mention that plant height was significantly governed by varieties and sowing windows, on the other hand their interacrtion was not exhibit any significant effect.

With respect to 30 DAS, Significantly taller plants (21 cm) were seen with crop sown on 2nd FN of July (D_1) (21 cm) which remained statistically at par with 1st FN of August (D_2) (20 cm) and significantly superior to 2nd FN of August (D_3) (11 cm)

Depressed plant height in late sowing as a result of shorter growing period. It was previously mentioned by the findings of Ahmed et al., (1992).

Drymatter production (Kg ha^{-1})

The data on drymatter production at 30, 60, 90 ant harvest were presented in table 4.1 dates of sowing significantly influence the drymatter accumulation whereas varieties exhibit significant effect only at 90 and at maturity but their interaction was found significant.

At 30 DAS significantly maximum drymatter Was recorded with sowing on 2nd fortnight of july (D1) (1340 kg ha^{-1}) while it was remained stastically on par with 1st fortnight of august (D2) (1173 kg ha^{-1}) similar trend was observed at harvest also.

Table 1. Influence of dates of sowing on growth, yield and yield parameters of groundnut varieties

Treatment	Plant height (cm)			Branches plant-1	Drymatter production Kg ha^{-1}			No of pod /Plant	No of seed /pod	Pod yield (kg /ha)	Haulm yield	Harvest index	Shelling %
	at 30 DAS	at 60 DAS	at Harvest	at harvest	at 30 DAS	at 60 DAS	at harvest						
Varieties													
Dharani (V_1)	15	32	42	5.8	996	6343	9087	13	2	1930	3513	35.3	68.3
Nithyaharitha (V_2)	17	34	45	6.1	1040	6607	9780	16	2	2138	2138	36.2	70.2
TAG-24 (V_3)	20	39	51	7.6	1059	6610	10918	20	2.2	2381	4067	36.8	75.7
SEm	0.8	1.5	1.7	0.3	56.7	317.9	352.3	0.9	0.1	88.5	112.5	0.6	1.9
CD (p=0.05)	2	4	5	0.9	NS	NS	1056	2.7	NS	265.5	337	NS	5.9
Dates of sowing													
2nd fortnight of July (D_1)	21	40	51	8.4	1340	7240	11069	21	2.3	2442	3804	39	77.4
1st fortnight of August (D_2)	20	38	47	5.5	1173	6288	10018	16	2	2174	3756	36.6	70.5
2nd fortnight of August (D_3)	11	26	40	5	581	6033	8699	12	1.8	1833	3748	32.6	66.3
SEm	0.8	1.5	1.7	0.3	56.7	317.9	352.3	0.9	0.1	88.5	112.5	0.6	1.9
CD (p=0.05)	2	4	5	0.9	170	953	1056	2.7	NS	265.5	NS	2.2	5.9
Interaction (DxV)													
SEm	1.4	2.6	2.9	0.5	98.2	550.6	610	1.5	0.2	153.4	196	1.1	3.4
CD (p=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
CV (%)	14.3	13	11	14.3	16	14.6	10.6	16.3	19.4	19.4	8.9	5.7	8.3

Number of branches plant^{-1}

Data presented in Table 1 shows that the number of branches per plant was significant governed by varieties and dates of sowing, although not significant for their interaction.

Among the dates of sowing signifiocances higher number of branches was noticed with the crop sown on 2nd fortnight of July (D1) (8.4) followed by 1st fortnight of August (D2) (5.5) and 2nd fortnight of August (D3) (5)

This may be due to the right distribution of rainfall at the time of critical crop growth stage and long day situation exhibit the crop to better sunlight for longer duration that develop more photosynthates for growth of the plant, in the course of early sown condition. Introduction of crop to the short day situation prohibit the vegetative growth. (Meena*et al*. 2015).

Yield attributes and Yield

Maximum number of pods per plant (21), number of seed per pod (2.3) and maximum seed index (42.8) and shelling % (77.4%) were recorded when groundnut crop sown during 2nd fortnight of July (D1) and was significantly superior to all the other dates of sowing

Among the varieties highest number of pods per plant (20), seeds per pod (2.2), seed index (42) shelling % (75.7) were recorded with variety TAG-24 (V3)

Decrement in test weight of delayed sowing might be associated with drop in the rate of phloem transport from source to sink portion for deposition of photosynthates whereas delayed sowing encourage higher temperature as well as higher rate of photorespiration. Banik*et al*. (2009)

Early sowing would procure greater pod yield as a result of better vegetative growth and that translocate more photosynthates from source into sink and escape moisture stress at critical growth stage in comparison with delayed sowing. Raagavalli*et al*. (2019).

Canavar and Kynak (2010) also stated that short-day situation shorten crop growth period and the improper condition like absence of rainfall at delayed sowing are unfavorable for growth of crop because of stressed condition and ultimately reduces pod yield.

CONCLUSION

Among the groundnut varieties, TAG-24 (V3) performance was superior to Dharani (V1) and Nithyaharitha (V2) as it has responded well to the changes in sowing dates by utilizing weather elements as non-monetary inputs in producing potential yields (2381 kg ha-1). Among the three dates of sowings tested, 2ndfortnight of july (D1) recorded higher values of growth parameters, yield attributes and yield of groundnut

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