Int.J.Curr.Microbiol.App.Sci (2020) *9*(12): 863-867

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 9 Number 12 (2020)**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2020.912.103

Evaluation of Groundnut Cultivars under Late Sown Conditions

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Keywords
Groundnut Cultivars under Late Sown Conditions

Article Info

Accepted:
10 November 2020
Available Online:
10 December 2020

A B S T R A C T

Field experiment was conducted at Agricultural Research Station, Kadiri, ANGRAU to study the influence of sowing windows on growth and yield of groundnut genotypes under rainfed conditions during *Kharif* season of 2011-12, 2012-13 and 2013-14 on sandy loam soil. Four groundnut genotypes *viz.*, Kadiri-4, Kadiri-5, Kadiri-6 and Vemana were evaluated under four sowing windows *viz.*, (D1: onset of monsoon, D2: 7 days after onset of monsoon, D3: 14 days after onset of monsoon, D4: 21 days after onset of monsoon). The experiment was laid out in Split plot Design and replicated thrice. Pooled results over three years of study revealed that among four varieties studied mean pod yield of K-4, K-6 and Vemana are at par compared to K-5. Among different dates of sowing, pod yields were significantly higher with sowing upto first week of August (D1 & D2) and further delay in sowing time significantly reduced the pod yields. Pod yields of all the varieties reduced with delay in sowing time except K-4. Its pod, haulm yield increased with delay in sowing time. This reveals that K-4 seems to be promising for delayed sowings.

Introduction

Groundnut is an important oilseed crop of India, occupying about 7.0 million hectare area, scattered over 260 districts of 12 states. Groundnut shall continue to be an important oil seed crop for the semi-arid regions if the projected demand of oils and fats has to be mat with sustainability. In dry land agriculture, farmers have limited choice for sowing time, but in irrigated situation sowing time is one of the most important non-monetary inputs affecting yield of crops (Sardana and Kandhol, 2007). Kabadagi and Bala (2010) worked together in different climatic conditions including present one and sowing time and genotypes responds very well to variant climatic conditions. In southern parts of India, onset of S.W. Monsoon is usually delayed and farmers could not sow the Groundnut crop before 2nd week of July. Sowings will be taken up even in 1st week of August with the receipt of meagre rains which resulted poor yields. Selection of suitable variety for such late sown conditions may avoid the complete crop loss. Hence this experiment is proposed.

Materials and Methods

The field experiment was conducted with four varieties (K-4, Kadiri-5, Kadiri-6 and Vemana) sown under four dates (onset of monsoon, 7 days after onset of monsoon, 14

days after onset of monsoon, 21 days after onset of monsoon) in split plot design with 3 replications during *kharif,* 2011 to 2013 under rainfed situation at Agricultural research station, Kadiri. The soil of the experimental site was sandy loam and nutrients were applied @ 20-40-50 kg NPK ha^{-1} in the form of urea, SSP and MOP respectively along with 10 t of farm yard manure. Biometric observations were recorded by selected five plants from each plot randomly and marked with proper rotations. These plants were harvested at maturity separately for assessing individual plant yield. The growth parameters and yield parameters were studied. Pod and haulm yield was recorded from the net plot discarding 60 cm plot at all four sides. The data recorded on various parameters of crop was subjected to statistical scrutiny by the method of analysis of variance as outlined by Panse and Sukhatme (1985). Statistical significance was tested by 'F' value at 5 per cent level of probability and wherever the 'F' value was found significant, critical difference (CD) was worked out at 5 per cent level of probability and the values are furnished. The treatment difference that were non significant are denoted as NS (Table 1–4).

Results and Discussion

Kharif, 2011

Four cultivars namely K-4, K-5, K-6 and Vemana were evaluated under four dates of sowing. Among different cultivars, Vemana recorded highest mean pod yield (604 kg ha^{-1}) which was significantly superior to K-5 but on par with K-4 and K-6. Yield attributes also followed the similar trend. Among the different dates of sowing, except K-4, all the cultivars resulted higher pod and haulm yields with D1 and decreased with delay in the sowing time. The rate of decrease in yield due to delayed sowing is more with Vemana compared to K-6. Pod yield, haulm yield and yield attributes of Vemana, K-6 and K-5 didn't differ significantly due to delayed sowing up to 11-8-2006 and later on decreased significantly. The trend of K-4 is quite dissimilar. Its pod yield, haulm yield and yield attributes were increased with delay in sowing time, D4 being the maximum. Hence, this experiment reveals that K-4 seems to be promising for delayed sowings. However, K-6 appears to be relatively stable cultivar even under delayed sowings and Vemana showing its drought tolerance with its highest mean pod yield.

Kharif, 2012

Different cultivars under different dates of sowing exerted significant influence on the economical yield and yield attributes of rainfed groundnut. Pod yield of K-5, K-6 and Vemana significantly decreased with delay in sowing time from 22-7-2012 onwards. The rate of decrease in pod and haulm yield is observed to be same in all varieties except K-4. The trend of K-4 variety is quite dissimilar. Its pod, haulm yield increased with delay in sowing time. This reveals that K-4 seems to be promising for delayed sowings. Higher 100 pod weight, 100 kernel weight was with K-6 variety sown in first date of sowing and the shelling % and SMK% of different varieties did not influenced significantly due to sowing time.

Kharif, 2013

Among varieties, Vemana has recorded significantly higher mean pod yield (739 kg ha^{-1}), which was on par with K-4 and K-6. Mean pod yield over different dates decreased with delay in sowing time, the highest being with D1 (800 kg ha^{-1}), which was on par with D2 and significantly superior over D3 and D4.

Table.1 Pod and haulm yield of groundnut cultivars as influenced by different sowing dates

Treatments	Pod Yield (kg ha^{-1})				Haulm yield (kg ha^{-1})			
	2011	2012	2013	Pooled Mean	2011	2012	2013	Pooled Mean
Main Plots:								
V1: K-4	591	963	689	748	997	1288	1344	1210
V2: K-5	364	957	607	643	984	1618	1753	1452
V3: K-6	515	959	660	711	1060	1372	1760	1397
V4: Vemana	604	931	739	758	1712	1715	1826	1751
CV %	16.5	26.3	18.3	16.1	24.1	10.1	26.1	17.5
SEm ±	49.0	102.2	51.0	44.1	114.9	61.9	128.8	94.7
CD at 5 %	120	NS	126	108	282	151	318	232
Sub Plots:								
D1: onset of monsoon	545	1041	800	795	1290	1462	1845	1532
D2: 7 days to D1	515	998	774	762	1177	1854	1642	1558
D3: 14 days to D1	534	864	567	655	1158	1323	1628	1370
D4: 21 days to D1	480	907	553	647	1077	1354	1569	1333
CV %	17.3	24.5	19.0	18.6	16.2	11.1	18.2	15.2
SEm ±	36.6	95.1	53.4	50.3	77.3	67.8	57.5	62.2
CD at 5 %	NS	NS	132	123	159	140	142	152
Interaction (VxD)	151	NS	148	168	318	280	322	218

Table.2 Number of pods/plant and yield attributes of groundnut cultivars as influenced by different sowing dates

Treatments	Number of pods/plant				Hundred pod weight				Shelling %			
	2006	2007	2008	Pooled Mean	2006	2007	2008	Pooled Mean	2006	2007	2008	Pooled Mean
Main Plots:												
V1: K-4	9.4	11.1	9.9	10.1	71.0	73.1	59.1	67.7	71.7	75.5	65.9	71.0
V2: K-5	7.4	12.9	7.7	9.3	70.4	70.8	58.5	66.6	66.8	74.8	69.1	70.2
V3: K-6	8.2	11.3	8.0	9.2	81.6	85.8	66.8	78.1	68.6	76.0	69.4	71.3
V4: Vemana	11.0	11.9	9.2	10.7	71.2	71.3	60.5	67.7	72.0	77.5	69.6	73.0
CV %	19.0	25.2	18.6	21.8	8.7	12.3	9.2	11.6	3.4	4.8	5.2	6.7
SEm ±	0.85	1.21	1.1	0.97	2.61	3.83	2.51	2.91	0.96	1.49	1.13	1.05
CD at 5 %	2.1	3.0	NS	NS	6.4	9.4	6.2	7.2	2.4	3.6	2.8	2.6
Sub Plots:												
D1: onset of monsoon	10.2	14.2	9.3	11.2	76.2	82.2	64.9	74.4	70.5	75.0	69.0	71.5
D2: 7 days to D1	9.0	15.1	9.0	11.0	74.4	77.1	61.0	70.8	70.3	75.1	68.7	71.4
D3: 14 days to D1	8.6	9.1	8.9	8.9	71.7	72.0	59.9	67.9	70.1	77.5	68.8	72.1
D4: 21 days to D1	8.2	8.8	7.6	8.2	71.8	69.7	59.0	66.8	68.1	76.2	67.5	70.6
CV %	20.3	16.9	18.6	17.8	8.8	9.5	11.6	10.6	2.5	5.1	16.5	13.6
SEm ±	0.75	0.82	0.89	0.77	2.64	2.96	1.70	2.54	0.72	1.59	0.93	0.73
CD at 5 %	1.5	1.7	NS	1.9	5.5	6.1	4.2	6.3	1.5	3.3	NS	NS
Interaction (VxD)	3.1	3.4	2.6	2.9	10.9	12.2	5.4	7.1	3.0	6.6	2.9	3.1

Table.3 Two way table showing the pod yield of groundnut cultivars as influenced by different sowing dates (Pooled for 3 years)

	D1	D2	D3	D4	Mean
V1: K-4	644	755	744	848	748
V2: K-5	799	675	565	530	642
V3: K-6	811	798	607	631	712
V4: Vemana	927	821	706	580	759
Mean	795	762	656	647	--
CD(P=0.05) : V=108, D=123, V x D=168, D x V=176					

Table.4 Reduction in pooled pod yield (%) of groundnut cultivars due to delay in sowing time

	D1	D2	D3	D4
V1: K-4	--	+ 17.2	+ 15.5	+ 31.7
V2: K-5	--	- 15.5	- 29.3	- 33.7
V3: K-6	--	- 1.6	- 25.2	- 22.2
V4: Vemana	--	- 11.4	- 23.6	- 37.4
Mean	--	- 4.2	17.5	- 18.6

The interaction effect is also significant. Pod yield of all the varieties is on par with first and second date of sowing, higher being with second date for K-4 and Vemana while, with first date with K-5 and Vemana. Highest mean haulm yield was recorded with K-4 at first date of sowing. Number pods per plant did not varied significantly either due to dates of sowing or due to varieties. Higher hundred pod & kernel weight, shelling percentage and SMK was with K-6 at first date of sowing. Incidence of PSND also significantly varied due to varieties and dates of sowing. PSND incidence was significantly higher with earlier sowings and decreased with delay in sowing time. Among varieties, highest and lowest incidence was observed with K-5 and Vemana respectively.

Pooled results and conclusions

Pooled results over three years of study revealed that among four varieties studied mean pod yield of K-4, K-6 and Vemana are at par compared to K-5. Among different dates of sowing, pod yields were significantly higher with sowing upto first week of August (D1 & D2) and further delay in sowing time significantly reduced the pod yields. The interaction effect is also significant. Pod yield of all the varieties is on par with first and second date of sowing, higher being with second date. Pod yields of all the varieties reduced with delay in sowing time except K-4. Its pod, haulm yield increased with delay in sowing time. This reveals that K-4 seems to be promising for delayed sowings. Incidence of PSND also significantly varied due to varieties and dates of sowing. PSND incidence was significantly higher with earlier sowings and decreased with delay in sowing time. Among varieties, highest and lowest incidence was observed with K-5 and Vemana respectively. Hence from this study, it can be concluded that second fort night of July is the best time for *Kharif* groundnut in Kadiri region with Vemana, K-4 and K-6 varieties. K-4 is the promising variety for late sown conditions. This might be due to the combination of genetic character and also the

optimum weather conditions during the crop growth. Similar results were reported by Mohite *et al.,* (2017).

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How to cite this article:

Sampath Kumar, D. 2020. Evaluation of Groundnut Cultivars under Late Sown Conditions. *Int.J.Curr.Microbiol.App.Sci.* 9(12): 863-867. doi: https://doi.org/10.20546/ijcmas.2020.912.103