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Research Article

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Seasonal Influence on Seed Yield of Jute (*Corchorus capsularis* L.) under Krishna Agro-Climatic Conditions of Andhra Pradesh

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ABSTRACT

A field experiment was conducted at Regional Agricultural Research Station, Lam farm, Guntur-34, to study the Seasonal influence on seed yield of jute under rabi sowings in Krishna agro-climatic zone of Andhra Pradesh during rabi 2010-11 and 2011-12. The treatments consisted of combination of two factors viz., four sowing windows (2nd FN of September, 1st of FN of October, 2nd FN of October and 1st of FN of November) and two varieties (JRO-524 and JRO-8324). The rainfall of 457.4 mm with 18 rainy days was received by crop sown on 2nd FN of September and the lowest (247.2 mm in 8 rainy days) was received by the crop sown on 1st FN of October. Due to variation in sowing dates, plant height, number of branches, number of pods/plant, pod length and seed yield were affected greatly. Correlation coefficient between growth, yield and its components and agrometeorological parameter were calculated and parameters showing statistically significant correlation. Rainfall, rainy days, mean minimum temperature, mean RH2 had shown significantly negative correlation while mean maximum temperature, mean sun shine hours, mean RH2, wind speed and pan evaporation had shown positive correlation on yield and yield parameters. Both JRO-524 and JRO-8324 recorded maximum seed yield in respect of the crop sown on 1st FN of November followed by 2 FN of October.

Key words: *Agro climatic environment, weather parameters, jute, correlation coefficient.*

INTRODUCTION

Jute is generally grown for fiber purpose in eastern states of India. West Bengal is leading in area, production and productivity. It is being cultivated by the farmers as a fiber crop due to the advantage of dynamic cropping pattern, large number of jute mills and availability of large water bodies. The effort on seed production is very meager in and around the eastern states of India. Eastern states are depending on Bihar, Assam and Andhra Pradesh for certified seed material. Hence, lot of scope is there to improve the economy of rainfed farmers of Andhra Pradesh by taking the advantage of jute seed production in different seasons. Jute plant requires high temperature with minimum of 27 ^{0}C and optimum 34 ^{0}C during entire crop growth period. The relative humidity required is ranging from 80-90 %. The jute plant need evenly distributed rainfall of 170 to 200 cm and it can be cultivated in all soils except soil with high salt content (Jute in India, 2009). Hence, there is a possibility to take the *rabi* jute for seed production, there by improve the economy of the farmer. The information on *rabi* jute sowings are megre in and around the Krishna zone. Therefore, present investigation was initiated to study the Seasonal influence on seed yield of jute under *rabi* sowings in Krishna agro-climatic zone of Andhra Pradesh during *rabi.*

MATERIALS AND METHODS

Field experiment was conducted at Regional Agricultural Research Station, Lamfarm, which is located 8 KM away from Guntur town, It is located 64 km to the north and west of the Bay of Bengal. It is approximately 1,600 km to south of the national capital, New Delhi and 266 kilometers south east of state capital, Hyderabad. Guntur is located at 16^{01}22 N 80^{0}162 Ey$^{''}$p/ y$^{''}$p 16.20^{0}N 80.27 Ey$^{''}$p/ 16.20; 80.27.

It has average elevation of 33 meters from MSL and situated on the plains. The Guntur area economy has an agricultural component that is internationally known for its exports of cotton, chillies and tobacco. The Guntur region is one of the most fertile areas in India. With the river Krishna flowing to the north of the district, the area has many farmlands. The climate is sub-tropical with major part of rainfall concentrated June to September (SW monsoon). The mean annual rainfall is around 921.6 mm. The soils of the experimental area are broadly classified as black cotton soils are neutral to slightly alkaline in reaction (pH 7.8 to 8.2), low to medium in organic carbon content (0-0.51%), low in available N (220 kg/ha), medium to high in available P (58.7 kg/ha) and medium to high in available K (125-500 kg/ha). The experiment was conducted during 2011-12 and 2012-13 at Regional Agricultural Research Station, Lam under Krishna agro climatic zone of Andhra Pradesh. The treatments consist of four sowing dates and two varieties replicated four times in split plot design. Daily agro meteorological data from Agricultural Meteorological Field Unit of RARS, Lam was collected during crop growth period. The weather parameters mean maximum, mean minimum temperatures, mean relative humidity, rainfall, sunshine hours, wind speed and pan evaporation were correlated with plant height (cm), number of branches/plant, number of pods/plant, pod length (cm) and seed yield of jute.

RESULTS

Agro-climatic environment

Agro-climatic indices prevailing during crop growth have been shown in Table.1. During crop period, an amount of 457.4 mm in eighteen rainy days (2nd FN of September), 247.2 mm in eight rainy days (1st FN of October), 362.2 mm in nine rainy days (2nd FN of October) and 325.5 mm in five rainy days (1st FN of November) respectively were received during crop growth period. Among the sowing windows 1st FN sowing window received maximum amount of rainfall and lowest was recorded with 1st FN of October. The mean maximum temperature was around 31.0 ^{0}C, minimum temperature ranged from 19.0 to 20.2 ^{0}C, sunshine hours ranged from 5.8 to 6.0, mean morning relative humidity (RH1) ranged from 94-95%, evening ranged from 55-60%, wind speed ranged from 2.8 to kmph and pan evaporation ranged from 3.7 to 4.0mm respectively.

Table 1. Agro-climatic environment of jute under different sowing windows at AMFU, RARS, Lam

Sowing window	Total rainfall (mm)	Total rainy days	Mean max T (^{o}C)	Mean min T (^{o}C)	SSH (h/d)	Mean RHI (%)	Mean RH2 (%)	Wind speed (kmph)	PAN evaporation (mm)
2nd FN of September	457.4	18	31.0	20.2	5.8	94	60	2.8	3.7
1st of FN of October	247.2	8	31.0	19.0	6.0	95	57	3.0	4.0
2nd FN of October	362.2	9	31.0	19.0	6.0	95	57	3.0	4.0
1st of FN of November	325.5	5	31.0	19.0	6.0	95	55	3.0	4.0

Growth, yield, yield components and crop weather relation

Variation in sowing windows of jute under Krishna agro-climatic zone greatly affected the plant height, number of branches/plant number of pods/plant, pod length, seeds/pod and yield. The both the varieties viz., JRO-524 and JRO-8324 sown on 1st FN of November resulted in maximum plant height, number of branches/plant, number of pods/plant, pod length, seeds/pod and yield followed by 2nd FN of October sowing. Correlation coefficient between yield and yield parameters and agro meteorological parameters were calculated and these parameters showed statically significant correlation (Table 2&3). The response of jute to dates of sowing indicated that October to November are the ideal for taking *rabi* jute sowing in the Krishna agro-climatic condition of Andhra Pradesh. The yield reduction to the extent of 49 was noticed in JRO-524 and 83 per cent in JRO-8324 when sowing was taken before 2nd FN of October.

Similar response was observed with Bt cotton to dates of sowing and these results akins to Hallikeri and Halemani (2008) and Ratnam *et al* (2014)

Crop weather relationship was carried by correlation studies. Correlation coefficient between growth, yield and its components and agrometeorological parameter were calculated and parameters showing statistically significant correlation. Rainfall, rainy days, mean minimum temperature, mean RH2 had shown significantly negative correlation and mean maximum temperature, mean sun shine hours, mean RH2, wind speed and pan evaporation had shown positive correlation on yield and yield parameters. Bothe JRO-524 and JRO-8324 recorded maximum seed yield and other yield attributes sown on 1st FN of November followed by 2 FN of October. (Table 3)

Table 2: Effect of dates of sowing on growth, yield and yield parameter of jute

Sowing window	Plant height (cm)		No. of branches/plant		No. of pods /plant		Pod length (cm)		Seeds/pod		Seed Yield kg/ha	
	JRO-524	JRO-8324	JRO-524	JRO-8324	JRO-524	JRO-8324	JRO-524	JRO-8324	JRO-524	JRO-8324	JRO-524	JRO-8324
2nd FN of September	65.1	61.3	2.1	1.2	20	13	6.7	6.4	161	147	467.7	379.0
1st of FN of October	65.7	67.3	2.5	3.1	21	20	6.6	7.0	161	184	1004.2	862.2
2nd FN of October	65.7	67.3	2.5	3.1	21	22	6.7	7.1	162	185	1005.2	861.4
1st of FN of November	70.1	67.5	3.5	3.4	28	23	7.3	7.2	198	194	1162.5	1074.0

Table 3: Correlation coefficient between growth, yield and yield attributes and agro meteorological parameters of jute

yield and yield parameters	Weather parameters								
	Rainfall (mm)	Rainy days	Temperature ^{0}C		Mean SSH	Mean RH1	Mean RH2	Mean Wind speed (kmph)	Mean PAN Evaporation (mm/day)
			Mean Max	Mean minimum					
Variety 1: JRO-524									
plant height (cm)	-0.272	-0.689	-0.446	-0.446	0.446	0.446	-0.806	0.446	0.446
Branches	-0.424	-0.818	-0.614	-0.614	0.614	0.614	-0.907	0.614	0.614
No of pods/plant	-0.276	-0.693	-0.451	-0.451	0.451	0.451	-0.809	0.451	0.451
Pod length (cm)	-0.041	-0.521	-0.260	-0.260	0.260	0.260	-0.669	0.260	0.260
No of seeds/pod	-0.171	-0.604	-0.345	-0.345	0.345	0.345	-0.736	0.345	0.345
yield	-0.782	-0.996	-0.970	-0.970	0.970	0.970	-0.974	0.970	0.970
Variety 2: JRO-834									
Branches	-0.831	-0.961	-1.000	-1.000	1.000	1.000	-0.903	1.000	1.000
No of pods/plant	-0.811	-0.985	-0.990	-0.990	0.990	0.990	-0.945	0.990	0.990
Pod length (cm)	-0.682	-0.964	-0.961	-0.961	0.961	0.961	-0.950	0.961	0.961
No of seeds/pod	-0.730	-0.978	-0.974	-0.974	0.974	0.974	-0.956	0.974	0.974
seeds/pod	-0.781	-0.992	-0.976	-0.976	0.976	0.976	-0.967	0.976	0.976
yield	-0.748	-0.996	-0.940	-0.940	0.940	0.940	-0.992	0.940	0.940

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