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Performance of contingent crops under deferred sowing in transitional plain of luni basin in Western Rajasthan

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ABSTRACT

A field experiment was conducted during *Kharif* season of 2020-21 at Agricultural Research Station, Keshwana, Jalore, Agriculture University, Jodhpur (Rajasthan) with an objective to find out the appropriate date of sowing of major contingent crop for the area with respect to late-early onset monsoon. Factorial Randomized Complete Block Design with three replications was being used during this study. The treatments consists of three sowing window *viz;*15 July, 25 July, 4 August and four contingent crop *viz*., Mungbean (F1), Mothbean (F2), Sesamum (F3), Clusterbean (F4). The study revealed that Mungbean have better performance during July 15nd , July 25st and August 4th realizing higher yield (740, 429 and 280 kg ha^{-1}, respectively) as compared to Clusterbean, Mothbean, and sesamum.Mungbean is the best suitable contingent crop for deferred sowing condition in the transitional plain of *luni* basin of Western Rajasthan

Key words: *Contingent crops, Mungbean, Mothbean, Clusterbean.*

Introduction

The people of arid and semi-arid zones live on the margins of scarcity. A crises is not impending rather crises have been recurrent. About two third of Indian population depends on agricultural activities for their livelihood and rainfed agriculture comprises about 55 % of the net cultivated area, contributing about 39 % to the Indian agriculture production. About 87 % of coarse cereals and pulses, 55% of upland rice, 70 % of oilseed and around 65 % area of cotton area under rainfed agriculture (Nagaraj, 2013). In western Rajasthan, a part of Indian arid zone, there is acute shortage of good quality of water for drinking as well as for irrigation. Cultivation of crop in dryland area faces various socio economic and bio physical related constraints. Rainfed agriculture encounter with low productivity due to weather abnormalities, nutritional imbalance, water and soil constraints. South west monsoon is one of the major water supplier to rainfed agriculture. The amount of rainfall, intensity of rainfall and the distribution of rainfall are the critical rainfall factor to decide crop productivity. Considering these factors there is urgent need of time to select crop with most appropriate growing season to get full utilization of rainfall in such area. Drought has a significant impact on agricultural, ecological and socio-economic spheres. Poor and delayed monsoon, high temperature and insufficient water resources lead to recur-

rent drought in the Luni River basin located in the rain-shadow zone of western India (Bhuiyan and Kogan, 2010). The productivity in dryland area differs from region to region and particularly climate play very important role in deciding availability of moisture to the crops (Guled *et al.,* 2013). Indisputably, the rainfed farming would continue to occupy avital role in Indian farming for a long time to come (Venkateswarlu *et al.,* 2011). Hence, this study was helpful to find out the suitable contingent crop and their performance under deferred sowing condition in Western Rajasthan

Materials and Methods

A field experiment was conducted during *Kharif* season of 2020-21 at Agricultural Research Station, Keshwana, Jalore, Agriculture University, Jodhpur (Rajasthan) with an objective to find out the appropriate date of sowing of major contingent crop of the area with respect to late-early onset monsoon. The experiment site is situated in transitional plain of *luni* basin (IIB) agroclimatic zone of Rajasthan which is located 25^0 25′ 58.86ˆN latitude and 72^0 29′ 72.6ˆE Longitude at an altitude of 149.9 m mean sea level. The soil of experiment site was sandy loam with low in available carban (0.06%) with neutral in reaction with pH value 7.6. The experiment was conducted in Factorial Randomized Block Design with three replications. Three main plot treatments (Sowing Date) *viz*; 15 July, 25 July, 4 August and four Sub plot treatments (Contingent crop) *viz.,* Mungbean (F1), Mothbean (F2), Sesamum (F3), Clusterbean (F4). All the necessary plant protection and agronomic measures were practiced as recommended for transitional plain of *luni* basin (IIB). Mungbean variety GM 4, Mothbean Variety RMO-435, Clusterbean Variety –RGC 1033, and Sesamum Variety RT-351 were sown in row of 30 cm apart with respective date of sowing. A total of 22.5 mm rainfall was received with couple of rainy days during the crop season (2020-2021). The data obtained on various parameters were subjected to analysis of variance (ANOVA). The level of significance used in 'F' test was at 5%. The critical diference (CD) values are given in the table at 5% level of significance (Gomez and Gomez, 1984).

Results and Discussion

The observation from the study revealed that the sowing of Mungbean on 15 July have maximum plant growth (Table 1), significantly higher grain yield as compare to another sowing window. However, plant height, branches per plant and pod per plant remains on a par with 25 July sowing window. In the contingent crop, Mungbean performed significantly superior over all the selected crop for the regions. Delayed dates of sowing caused drop in growth parameters which may be due to unfavourable weather conditions to the plants as well as high temperature which might have caused in lower rate of photosynthesis and reduced accumulation of food materials (Vikramarjun *et al.,* 2019)

The interaction between the sowing window and contingent crops with respect to grain yield was found to be significant (Table 2). The sowing of Mungbean at 15 July (normal sowing) remained

Table 1. Yield and yield attributes of different crop types

Treatment	Plant height (cm)	Branches/ plant	Pod/capsule/ plant	Grain Yield ($kgplot^{-1}$)	Grain Yield ($kgha^{-1}$)
A. Sowing Window					
15 July	69	4.1	49	0.888	740
25 July	61	3.7	37	0.516	429
4 August	40	2.1	20	0.337	280
SEm±	7.8	0.39	5.0	0.005	4.5
CD	23	1.6	15	0.016	13
B. Contingent Crops					
Munngbean	58	4.0	42	0.958	798
Mothbean	34	2.5	27	0.298	258
Sesame	62	2.7	33	0.544	453
Clusterbean	74	4.1	41	0.520	434
SEm±	9.0	0.45	5.8	0.006	27
CD	26	1.3	NS	0.018	5.1

Table 2. Interaction effect between sowing window and contigent crop in terms of grain yield per plot (kg/ha)

Contingent crop sowing window	Munngbean	Mothbean	Sesame	Clusterbean
15 July	1152	462	686	661
25 july	762	177	406	372
4 Auguest	481	106	0.322	268
SEm±	8.9			
CD (P=0.05)	26			

significantly superior in all the sowing dates. In case of deferred sowing (25 July), Mungbean also performed significantly superior over 4th august sowing window. Sowing after 4th august lower the yield and plant growth significantly (Table 2).

The reason of increase in yield of contingent crops was due to the early sowing of crops have the benefit of favourable soil moisture, day length and temperature which help to crops to express "their full potentiality" (Vikramarjun *et al.*, 2019). As a result higher grain yield was obtained with early sowing than that of delayed sowing. The poor yield in deferred sowing was attributed to more exposure of biotic and abiotic stresses viz., high temperature, moisture stress, and decreased moisture availability and moisture stress that resulted in lesser total dry matter production and its translocation from vegetative parts to reproductive structures. It was attributed to reduced heights of plant, number of branches per plant, pod per plants as well as poor translocation from source to sink with delayed sowing. Similar results were reported by Patnaik, 1968 and Rao *et al.*, 1991 and Vikramarjun *et al.*, 2019.

Conclusion

According to this study it can be concluded that a good monsoon helps in maintaining vegetation health during following seasons. So in case of rainfall received in during first fortnight of July (up to 15 July) short duration crop varieties can be uses for sowing. Mungbean yield is profitable significantly in both 15thJuly and 25 July sowing condition but afterwards yield was not profitable significantly. Delayed sowing of crop will not give significant yield.Among all the contingent crop, Moongbean performed significantly superior over all the contigent crops. After moongbean, sesame performed significantly superior over the Mothbean and Clusterbean.

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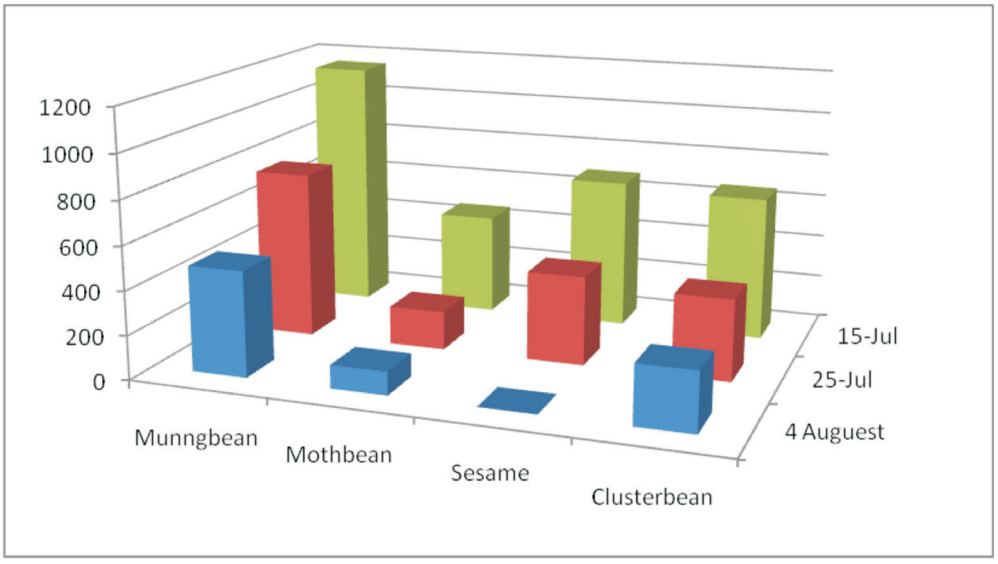

Yield of different contingent crop as affected by sowing date

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