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Study on crop weather relationship in cowpea (*Vigna unguiculata*) under different sowing dates and varieties in Allahabad conditions

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Abstract
A field experiment was conducted during the *Kharif* season 2015 at the Crop Research Farm, Department of Environmental Science, SHIATS, Allahabad (U.P.) to concluded the experiment on the title study on crop weather relationship in cowpea under different sowing dates and varieties in Allahabad on growth, yield and growing degree days of cowpea (*Vigna unguiculata*) in factorial Randomized Block Design with nine treatment combinations and replicated thrice. The results revealed that highest plant height (61.10 cm), number of branches (6.55). Yield and yield attributes *viz.*, number of pods plant^{-1} (21.58), grains pod^{-1} (10.75), pod length (18 cm), Test weight (150g), seed yield (1482.50 kg ha^{-1}), straw yield (2797.75 kg ha^{-1}), were highest recorded in treatment T_3 (Variety Kashi Unnati + 2nd August DOS).

Keywords: Sowing date, cowpea, *Vigna unguiculata*

Introduction
Cowpea is called as vegetable meat due to high amount of protein in grain with better biological value on dry weight basis. On dry weight basis, cowpea grain contains 23.4 per cent protein, 1.8 per cent fat and 60.3 per cent carbohydrates and it is rich source of calcium and iron (Gupta, 1988) [2]. Cowpea is one of common names in English: cowpea, bachapin bean, black-eyed pea. There are usually 8-20 seeds per pod. Seeds vary considerably in size, shape and colour. They are relatively large, 2-12 mm long and weigh 5-30g/100 seeds. Cowpea is considered more tolerant to drought than soybean or mung bean because of its tendency to form a deep taproot. It has a competitive niche in sandy soils and does not tolerate excessively wet conditions and should not be grown on poorly drained soils. One of the most remarkable things about cowpea is that it thrives in dry environments.

Based on FAO data and correspondence with scientists in different countries, annual cowpea production has increased from about 0.87 million tons in 1961 to 1.2 million tons in 1981 to 2.4million tons in 1991, to more than 6.3million tons in 2011. The major increases have been in Niger, Nigeria, Mali, Burkina Faso, Senegal, Tanzania, Uganda, Congo, Myanmar, India, and Brazil.

The cowpea is grown worldwide with an estimated cultivation area of about 12 to 14 million hectares annually and an annual worldwide production of over 4.5 million metric tons *(*Singh *et al.*, 2002). India is one of the major countries contributing cowpea production in the World. It is grown for its green pods, dry seeds and forage which are used for food and feed.

The cowpea is grown in 10 million hectares with the productivity of 387 kg/ha (FAO, 2004). The cowpea is grown in an area of about 3.9 million hectares with the productivity of 567 kg per ha. The cowpea is grown on about 0.5 million ha with an average productivity of 600 to 750 kg grains/ha in India. (Ahlawat and Shivakumar, 2005) [1].

The advances of science and technology have resulted mastery of many problems of the farmers, but not all of them have been solved. Weather and climate have not yet been brought under human control. Indeed, only a beginning has been made in the matter of its application in agriculture through weather forecasting and yield prediction. Because of weather, yields of even adopted crops fluctuate immensely each year despite all other inputs being optimum. Most of the crops are adapted to very specific localities and the crop yields suffer periodically. These variations are very delicate and are only partly explainable in terms of weather. About 80 per cent of phenotypic variability in plants may highly be attributed to the uncontrolled environment. The climatic factors can be used as a tool in the analysis of the processes of plant growth and development.

Plant growth and development are integrated responses to many agro- meteorological factors. These factors are affected by climate, soil and often a complex interaction of both.

Crop production in an environment is a function of many variables, out of which weather is the most important. Among weather variables temperature and rainfall are the most important factors, which affect the growth, productivity and adaptability of crops (Wallies *et al*, 1980) [7].

Materials and Methods

The experiment was carried out during *Kharif* season 2015 at Crop Research Farm, Department of Environmental Science, School of Forestry and Environment, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad (U.P.), which is located at $25^0$24' 42" N latitude, 81^0 50' 56" E longitude and 98 m altitude above the mean sea level. This area is situated on the right side of the river Yamuna by the side of Allahabad Rewa Road about 5 km away from Allahabad city. It consists of three sowing date 2nd August, 12th August, 22nd August and three varieties Gomati, Kashi Kanchan, Kashi Unnati. The soil was sandy loam in texture, the pH of the soil was slightly alkaline in reaction (7.4), it was low in organic carbon (0.32 %), low in available nitrogen content (188.3 kg ha^{-1}), medium in available phosphorus (34.5 kg ha^{-1}), low in available potassium (87.3 kg ha^{-1}) and low in available sulphur (6 ppm) contents. Treatments were T_1-(D_1+V_1) @ 2nd August DOS + Variety- Gomati, T_2 - (D_1+V_2) @ 2nd August DOS + Variety- Kashi Kanchan, T_3-(D_1+V_3) @ 2nd August DOS + Variety- Kashi Unnati, T_4 - (D_2+V_1) @ 12th August DOS + Variety- Gomati, T_5-(D_2+V_2) 12th August DOS + Variety- Kashi Kanchan, T_6- (D_2+V_3) @ 12th August DOS + Variety- Kashi Unnati, T_7-(D_3+V_1) @ 22nd August DOS + Variety- Gomati, T_8 - (D_3+V_2) @ 22nd August DOS + Variety- Kashi Kanchan, T_9-(D_3+V_3) @ 22nd August DOS + Variety- Kashi Unnati**.**

Interaction effects of three different varieties and sowing date on yields attributes and yield of cowpea

The interaction effects of different varieties and sowing dates on number of branches $plant^{-1}$, pods $plant^{-1}$, grains pod^{-1}, pod length, straw yield, and test weight was non-significant. The highest number of branches, pods, grains, pod length, straw yield and test weight recorded 6.55, 21.58, 10.75, 18cm, 2797.75kg/ha, 150g respectively in T_3- 2nd August DOS + variety- Kashi Unnati.

The interaction effects of different varities and sowing date on number of seed yield was significant. The highest seed yield recorded 1482.50kg ha^{-1} in T_3- 2nd August DOS + variety- Kashi Unnati. The decrease in seed yield of cowpea with late date of sowing also reported by Yadav (2003) [8]. The first week of August is best for sowing in compare to second and third week of August. Ravinder and singh (1998) [5], Taipodia and Nabam (2011) [3], Patange *et al.* (2006) [4].

Table 1: Interaction table on effect of different varieties and different sowing dates on growth and yield of cowpea (*Vigna unguiculata)*

Treatment Combination	Plant height (cm) at different physiological stages				Number of branches	Number of pods $plant^{-1}$	Number of grains pod^{-1}	Pod length (cm)
	Branching	Flowering	Pod development	Pod maturity	At maturity	At maturity	At maturity	At maturity
T_1 : V. Gomati + 2nd August DOS	18.78	38.70	54.10	58.60	5.88	18.58	9.75	17.33
T_2 : V. Kashi Kanchan + 2ndAugust DOS	19.70	39.75	54.78	59.75	6.13	19.65	10.25	17.40
T_3 : V. Kashi Unnati + 2nd August DOS	22.03	42.20	56.20	61.10	6.55	21.58	10.75	18.00
T_4 : V. Gomati + 12th August DOS	18.30	38.30	53.40	58.35	5.63	17.88	9.25	15.50
T_5 : V. Kashi Kanchan +12th August DOS	19.20	39.20	54.20	59.28	5.88	18.65	9.75	16.00
T_6 : V. Kashi Unnati + 12th August DOS	20.25	40.25	55.25	60.20	6.23	20.65	10.75	17.00
T_7 : V. Gomati + 22nd August DOS	17.55	37.55	52.55	57.55	5.30	15.83	7.75	15.10
T_8 : V. Kashi Kanchan + 22nd August DOS	18.50	38.25	53.25	58.25	5.48	17.58	8.50	15.50
T_9 : V. Kashi Unnati + 22nd August DOS	19.68	39.68	54.68	59.65	5.88	18.65	9.50	15.85
F- test	NS	NS	NS	NS	NS	NS	NS	NS
S. Em (±)	0.44	0.92	1.32	1.44	0.14	0.45	0.22	0.38
C. D. at 5%	-	-	-	-	-	-	-	-

Table 2: Interaction table on effect of different varieties and different sowing dates on yield and yield attributes of cowpea

Treatment combinations	Seed yield (q ha^{-1})	Straw yield (q ha^{-1})	Test Weight (gm)
T_1 : Variety Gomati + 2nd August DOS	12.75	24.22	126.00
T_2 : Variety Kashi Kanchan + 2nd August DOS	13.38	23.51	137.00
T_3 : Variety Kashi Unnati + 2nd August DOS	14.82	27.97	150.00
T_4 : Variety Gomati + 12th August DOS	12.25	22.05	115.00
T_5 : Variety Kashi Kanchan +12th August DOS	12.88	21.37	130.00
T_6 : Variety Kashi Unnati + 12th August DOS	14.33	25.80	143.00
T_7 : Variety Gomati + 05 August DOS	11.75	21.15	109.00
T_8 : Variety Kashi Kanchan + 05 August DOS	12.38	20.37	120.00
T_9 : Variety Kashi Unnati + 05 August DOS	13.66	24.90	135.00
F- test	S	NS	NS
S. Em (±)	0.19	52.98	3.00
C. D. at 5%	0.58	-	-

Conclusion

Results of our study showed that date of sowing of 2nd August for Kashi Unnati variety of cowpea was best in terms of plant height, plant population per $2m^2$ area; number of pods, seeds, pod length, pod yield, grain yield & straw yield. The same combination of sowing date and variety showed the best cost benefit ratio in cowpea. On the basis of agrometeorological indiceslike growing degree days (GDD), photo thermal units (PTU), heliothermal units (HTU) and heat use efficiency (HUE) and heat unit requirement Kashi Unnati variety of cowpea performed best on sowing date of 2nd August.

Therefore, it can be concluded that to get the better growth and yields, Kashi Unnati variety of cowpea should be sown in second August under Allahabad weather conditions.

References

1. Ahlawat IPS, Shivkumar BG. Kharif Pulses. In text book of field crops production. Dr. Rajendra Prasad (Eds.),

Indian concil of agriculture research, New Delhi, India. 2005.
2. Gupta YP. Pulse crops. *In*: Nutritive Value of Pulses. (Eds. B. Baldev, S. Ramanujam and H.K Jain), 1988, 563.
3. Taipodia R, Nabam AT. Impact of time of sowing, spacing and seed rate on growth and yield of cowpea. IOSR Journal of agriculture, bolume. 2013; 4:61-68.
4. Patange MJ, Lad NG, Shinde SA, Dhange SJ. Dry matter accumulation pod and seed yield of frenchbean as influenced by different dates of sowing and varieties during Kharif. International Jounal of Agricultural Sciences volume. 2012; 8:135-137.
5. Ravinder K, Singh NP. Effect of date of sowing on growth and yield of cowpea [*Vigna unguiculata* (L.) walp]. Legume Research. 1998; 21 (1):54-56.
6. Singh AK, Singh SS. Effect of planting dates, nitrogen and phosphorus levels on yield contributing factors in French bean. Legume Research. 2000; 23:33-36.
7. Wallies ES, Byth DE, Saxena OP. Flowering response of thirty seven early rainfedsoyabean (*Glycine max*). In proc. Int. Symp. On Pigeonpea.15-19 Dec, ICRISAT, Hyderabad. 1980, 143-150.
8. YADAV GL. Effect of sowing time, row spacing and seed rate on yield of cowpea under rainfed condition. Indian Journal of Pulses Research. 2003; 16(2):157-158.