

## Standardization of Sowing Dates of French bean in Tirap District of Arunachal Pradesh

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### ABSTRACT

*French bean is a ubiquitous vegetable in the northeast part of India. In the Tirap district of Arunachal Pradesh, no experiment was conducted regarding the standardization of sowing time. In this view, KVK Tirap conducted a field trial during 2017-18 at the Krishi Vigyan Kendra-Tirap, Deomali Arunachal Pradesh farm. The four treatments (different dates of sowing- 7<sup>th</sup> October, 15<sup>th</sup> October, 23<sup>rd</sup> October and 30<sup>th</sup> October) and one variety- Pusa Parvati used the following simple Randomized Block Design (R.B.D.). The maximum plant height (43.57 cm), no of branches/plant ( 8.82), days to flowering ( 43.95 ), pods /plant ( 41.43), seeds/pod ( 7.78), pods length ( 16.54 cm), days to seed maturity ( 47) and yield of the green pod ( 124.33 q/ha) were recorded with T3 While the worst data were recorded with T1.*

**Keywords:** Standardization, French bean sowing time.

### INTRODUCTION

French bean is a highly nutritious as well as rich source of protein. It fetches the highest price among all pulses; thus, it is the remunerative crop for farmers. It has a high potential yield ranging from 12-15 t/ha of green pods and 3 tonnes/ha seeds in plains. Earlier in Tirap, Changlang and Lodging districts of Arunachal Pradesh, it was cultivated as a Rabi seasonal crop. Still, after the release of photo-thermo insensitive varieties, it's cultivating almost throughout the year.

The date of sowing and good variety are the most important factors in the various agronomic practices for harnessing potential yield (Amanullah et al., 2002). The sowing times have marked effects on the growth and yield of most crops in different parts of the world as delay in sowing beyond the optimum time usually results in yield reduction (Vange & Obi, 2006). The time of sowing related to any crop; depends on environmental conditions required for its good growth and development without involving additional costs and varies according to cultivars.

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It is a critical factor in determining the environmental conditions at planting, anthesis, pod filling and drying, especially during the rainy season and hence, important in determining the success of the crop in maximizing seed yield (Dapaah et al., 2000).

Green et al. 1985 reported that delay in sowing beyond the optimum date resulted in a progressive reduction in the crop's potential yield. Several varieties of bush beans differ in their optimum sowing dates and period of maturity. Hence, the positive effect of environmental factors on growth and yield could be harnessed if the information on the optimum time of sowing is made available (Moniruzzaman et al., 2007) along with a suitable variety.

No systematic research has been done, particularly in bush beans, to determine the effect of sowing dates on quality seed formation and seed yield of different varieties under the Eastern Part of Arunachal Pradesh. Beans have traditionally been grown in the region and have massive potential for commercial cultivation. Suitable sowing times need to be determined (Bozoglu et al., 2007). Considering the importance of genotypes and sowing time as key factors in determining the yield and seed quality, the experiments reported in this investigation standardize the Influence on time of sowing among bush beans seed yield and its attributes along with quality seed parameters.

## MATERIALS AND METHODS

The field trial was conducted at the farm of Krishi Vigyan Kendra- Tirap, Deomali Arunachal Pradesh (Latitude: 27.16, longitude: 95.48) during two consecutive year- 2017 and 2018. The four treatments (different dates of sowing- 7<sup>th</sup> October, 15<sup>th</sup> October, 23<sup>rd</sup> October and 30<sup>th</sup> October) and one variety- Pusa Parvati was used following simple Randomized Block Design (R.B.D.). The seeds were sown on the raised beds of 3.6 m x 3 m size with spacing of 45 cm (row to row) x 20 cm (plant to plant) and 5 cm depth. The field was ploughed 3 times and planking was done during the last ploughing. The FYM @ 10 kg/m<sup>2</sup> were applied during the last ploughing. The N:P:K:: 30:40:20 kg/ha were used. The 50% amount of Nitrogen and 100 % amount of Phosphorus & Potash respectively were applied as basal dose and remaining half amount of nitrogen applied during flowering. The crop was well managed for optimum growth and yield. Two manual weeding @ 30 DAS and 50 DAS was followed for weed free growth of the experiment. For data's recording, ten randomly selected plants were selected randomly for each parameters - Germination %, Plant height cm (40 DAS), no of Branches/plant, Days required to flowering, Pods per plant, Seeds per pod, Pod length (cm), Days of seed maturity and Green Pod yield ( q/ha). The germination % was recorded with paper method having three replicates of 100 seeds at 12% moisture level.

## RESULT AND DISCUSSION

**Table: 1. Sowing date effect's on germination, plant height and branches of French bean**

Treatments (Date of sowing)	Germination %			Plant height cm ( 40 DAS)			Branches/plant		
	2017	2018	Pooled	2017	2018	Pooled	2017	2018	Pooled
T1 (7 October)	83.78	87.42	85.6	36.07	40.76	38.41	7.01	7.88	7.44
T2 (15 October)	82.21	85.59	83.9	38.89	41.62	40.25	7.99	8.24	8.12
T3 (23 October)	80.86	83.26	82.6	44.28	42.86	43.57	8.65	8.99	8.82
T4 (30 October)	81.84	83.93	82.88	35.49	39.41	37.45	6.62	7.86	7.24
CD (P<0.05)	NS	NS	NS	1.27	1.48	1.37	NS	NS	NS

DAS- date after sowing

The different sowing dates recorded significant differences in plant height. T3 recorded the maximum plant height (43.57 cm) followed by T2 (40.25 cm) meanwhile, T4

recorded the minimum plant height (37.45 cm). In other words, shorter internodes were recorded with T4 compared to others (Table: 1). The result shows a progressive tendency in

plant height from 7<sup>th</sup> October to 23<sup>rd</sup> October sowing dates; while the 30<sup>th</sup> October sowing date decreases the plant height. This is directly related to temperature. The average temperature (day and night) from the first week of November did not favour the plant's

growth. Meanwhile, the other parameters like germination and branches/plant were recorded as non-significant in both years- 2017, 2018 and in pooled way too. Daapah et al. (2000) reported that higher yields were recorded with mid to late sown bean's crops too.

**Table: 2. Sowing date' effect on days of flowering, pods/ plant and seeds/ pod of French bean**

Treatments (Date of sowing)	Days to flowering			Pods per plant			Seeds per pod		
	2017	2018	Pooled	2017	2018	Pooled	2017	2018	Pooled
T1 (7 October)	47.89	48.24	45.6	30.68	32.81	31.74	5.43	5.98	5.70
T2 (15 October)	48.90	50.64	49.47	32.86	34.39	33.62	6.12	6.76	6.44
T3 (23 October)	43.02	44.87	43.95	40.36	42.51	41.43	7.58	7.99	7.78
T4 (30 October)	46.89	48.32	44.94	34.88	37.82	36.35	7.04	7.35	7.19
CD (P<0.05)	0.46	0.38	0.42	2.87	2.18	2.53	0.39	0.35	0.37

The days of flowering was reported to be significantly influenced by four different dates of sowings Table: 2. The minimum days (pooled: 43.95 days) to flowering reported with the sowing date of T3 (23<sup>rd</sup> October), followed by T4 (pooled: 44.94 days, 30<sup>th</sup> October sowing date). Meanwhile, the maximum days (pooled: 49.47) were recorded with T2 (15<sup>th</sup> October sowing date). Similarly,

T3 yielded the maximum number of pod (41.43) per plant and seeds per pod (7.78) followed by T4 (36.35 and 7.19 respectively); meanwhile, the minimum was recorded with T1 (31.74 and 5.70 respectively). Venkata et al. observed significant variation among all yield attributing characters due to different dates of sowing. Jana (2005) also confirmed similar results.

**Table: 3. Effect of sowing dates on pod length, days of seeds maturity and yield of French bean**

Treatments (Date of sowing)	Pod length (cm)			Days of seed maturity			Green Pod yield ( q/ha)		
	2017	2018	Pooled	2017	2018	Pooled	2017	2018	Pooled
T1 (7 October)	11.57	12.80	12.19	55	52	54.5	84.27	88.96	86.62
T2 (15 October)	12.90	13.21	13.15	48	53	50.5	94.87	91.04	92.96
T3 (23 October)	15.42	17.67	16.54	46	48	47.0	128.82	119.84	124.33
T4 (30 October)	14.92	16.73	15.83	49	51	50.0	99.36	89.24	94.30
CD (P<0.05)	0.76	0.82	0.79	1.76	1.80	1.78	9.57	6.12	7.84

The maximum pod length (pooled: 16.54 cm) were observed with T3 followed by T4 (pooled: 15.83 cm) while minimum (pooled: 12.19 cm) recorded with T1. Similarly the best result regarding days of seed maturity (Pooled: 48 days) and green pod's yield (pooled: 124.33 q/ha) recorded with T3 followed by T4 (pooled: 50 days and 94.30 q/ha respectively) meanwhile the poorest results ((pooled: 54.5 days and 88.62 q/ha respectively) reported with T1.

The results show that early sowing was directly influenced by higher temperature and humidity, which resulted in poor yield in

every parameter. Every week delay in sowing resulting positive result in all qualitative & quantitative parameters. It could have an ideal temperature to facilitate the optimum growth & development environment, which results in progressive yield. Moniruzzaman et al. (2007) also reported the maximum yield and other characteristics with sowing dated of 1<sup>st</sup> week of November. Yoldas and Esiyok (2007) also confirmed similar results.

## CONCLUSION

Overall, T3 (23<sup>rd</sup> October's sowing date) recorded the best in all parameters followed by

T4 (30<sup>th</sup> October) while T1 (7<sup>th</sup> October) was poorer in all parameters. The Krishi Vigyan Kendra, Tirap has widely disseminated this result among the farming community in the district. And now it has covered approx. 90 % area (270 ha) of French bean cultivation. So, this effort has made a significant increase in total productivity of French bean cultivation in the Tirap district of Arunachal Pradesh.

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#### Conflict of Interest:

The author declares no conflict of interest.

#### Author's contribution

The trial was designed and conducted by first author, data analyzed by second author, result & discussion part completed by third author and references collected by fourth author. Finally all the writing work and correction done by first author.

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