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Research Article

PERFORMANCE ASSESSMENT OF DIFFERENT INDIGENOUS GENOTYPES OF FRENCH BEAN DURING *RABI* SEASON UNDER TUENSANG DISTRICT

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Abstract: A field experiment was conducted at Krishi Vigyan Kendra demonstration farm under Tuensang district, Nagaland during *Rabi* season of 2018 to compare growth and yield contributing characters of twenty-one different indigenous genotypes of Frenchbean (Kholar). The experiment was carried out in randomized block design with three replications. Seed yields varied significantly among the genotypes. The result revealed that number of pods per plant, number of seed per pod and pod length are related to seed yield. The highest seed yield was recorded in genotype G_{17} (16.88) followed by genotype G_{15}(16.68). Significantly longest length of pod (19.83 cm) was also obtained from genotype (T_{17}) which was followed by genotype T_{10} (17.83 cm). Maximum number of pods per plants (59.33) was recorded from genotype (G_6) which was statistically significant over other genotypes. The highest 100 seed weight was recorded in genotype G_{17} (51.40). The highest plant height was recorded in G_{18} (251cm) while the lowest plant height was recorded in G_4 (34.67cm). The study revealed that Genotype G_5, G_{11}, G_{15}, G_{17} and G_{19} significantly out yielded other local genotypes with higher seed yield potential.

Keywords: *French bean (Kholar), Performance, Genotypes, Characters, Seed yield*

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Introduction

French bean (*Phaseolus vulgaris* L), locally known as Rajmah or Kholar is an important and highly profitable, leguminous' vegetable pulse crop in Nagaland. It has been reported that a large number of indigenous French bean germplasm are found in Nagaland. Among the pulses, this is a major crop cultivated especially in Tuensang districts. The whole area of the district is 1,728 sq.km (approx). The district is inhabited by four major tribes, the Changs, the Yimchunger, the Khiamumgans and the Sangtams. Nagaland French bean also known as Kholar belongs to the family 'Fabaceae' and Genus of 'Phaseolus. 'Kholar' the local name for French beans or 'rajma' has been the 'manna' to generation of the Yimchunger Naga tribe living in Tuensang district. It is an important. In Tuensang district, it is grows at an altitude ranging from 700msl to 1371m. The cultivable area under Kholar bean is around 2.35 ha with production of 1263kg/ha and productivity of 2.97t/ha. In Tuensang 'Kholar 'is grown extensively in the Shamator-Chessore belt of Tuensang district. It is the pulse or main source of sustenance and livelihood for many families in the district. During Mid-winter season, the hill ranges can be dotted with Kholar fields. An estimated of annual yield of Kholar in Shamator-Chenore belt alone is 250-330 metric tons. The best sowing of season for Kholar is fortnight of August. The crop is harvested from November and till January. Most Kholar farmers are now adopting mix sowing to out loss from failure of a particular variety in that season. Farmers generally cultivate local genotypes based on colour, shape, seed size and taste preference. There are about 21 varieties of Kholar grown in the region with vernacular name (in Yimchunger dialect) to each variety, like 'Jepshiak (pure yellow), 'Aphimbae' (flying), 'Moho' (dog's lives) etc. Among the local varieties 'Jepshiak' comes on top of the price list for its unique flavor. 'Aphimbae', the small white bean which becomes slippery after it is carried is believed to have medicinal value and is recommended as post –surgery diet as well as for replenishing bone marrow. 'Moho"is so named as the crimson pods of Moho are so enticing that thieves or strangers cannot resist the urge the urge to pluck them.

Materials and Methods

A field experiment was conducted at Krishi Vigyan Kendra, Tuensang during *Rabi* season of 2018. Tuensang has two unique climatic situations, the lower ranges experiences sub-tropical climatic situation and the higher ranges which extents upto an altitude 1700 to 2300msl.The climate of the district falls under sub-tropical type in the low land areas while higher areas have temperate climate. The annual rainfall is 1700-2300 mm and the maximum and minimum temperature recorded 25 to 30 and 11.78 degree centigrade respectively. The soil is clay loam soil with PH range from 5.00 to 6.5.

Table-1 *Details of genotypes*

Genotypes	Seed Colour	Seed size and shape
G_1	Kholar light maroon stripe	Bold
G_2	Kholar dark maroon stripe	Bold
G_3	Kholar reddish	Kidney shape
G_4	Kholar red large	bold
G_5	Kholar purple	bold
G_6	Kholar dark purple	bold
G_7	Kholar pink stripe	Small, circular
G_8	Kholar white	small
G_9	Kholar dark brown stripe	Medium, round
G_{10}	Kholar white	Small, flat
G_{11}	Kholar yellow	Small, ovate
G_{12}	Kholar white with red patch	bold
G_{13}	Kholar dark red	medium
G_{14}	Kholar black,	Bold, flat
G_{15}	Kholar brown	medium
G_{16}	Kholar maroon tinged	Small, round
G_{17}	Kholar light brown with maroon stripe	bold, flat
G_{18}	Kholar White	Medium
G_{19}	Large yellow seed,	Bold, round
G_{20}	Kholar brown beans type,	Medium, flat
G_{21}	Kholar brown	small

G=genotypes, Kholar=vernacular name of French bean

Table-2 *Yield attributes and yield of French Bean as influenced by different Genotypes*

Genotypes	No. of pods/plant	Length of Pod(cm)	Plant height(cm)	Number of seeds per pod	100 seed weight (gm)	Seed yield (q/ha)
$GTsg_1$	43.33	15.67	166.8	6.22	32.4	11.9
$GTsg_2$	23.33	15.33	123.87	5.58	31.4	9.86
$GTsg_3$	24	10.67	38.87	5.24	48	13
$GTsg_4$	17.67	17.5	34.67	7.26	42.6	12.78
$GTsg_5$	23.33	13.5	145.53	7.23	47.6	15.22
$GTsg_6$	59.33	12.33	169.73	5.66	37.9	12.33
$GTsg_7$	20	16	95.93	7.24	42.3	10.68
$GTsg_8$	52.33	10.67	150.33	5.88	19.36	12.16
$GTsg_9$	33.67	11.33	111.27	5.2	46.5	15.28
$GTsg_{10}$	20.33	17.83	37.27	4.8	31.5	11.41
$GTsg_{11}$	28.67	15.5	111.47	6.82	47.5	16.02
$GTsg_{12}$	24	11.2	118.07	5.2	39.03	12.2
$GTsg_{13}$	31.67	14.33	186.87	6.7	47.5	12
$GTsg_{14}$	32.33	11.83	174.6	5.3	46.9	12.4
$GTsg_{15}$	46	14.67	235.93	6.8	52.3	16.68
$GTsg_{16}$	24	17.17	187.27	5.68	49.5	13
$GTsg_{17}$	44.67	19.83	199.8	8.1	51.4	16.88
$GTsg_{18}$	24	14	251	5.6	39.09	9.21
$GTsg_{19}$	31.33	11.83	103.8	5.24	53.4	16.68
$GTsg_{20}$	24	15.67	151.53	5.68	34.2	10.48
$GTsg_{21}$	24	15.33	134.8	4.7	48.6	11.06
SEm±	3.28	4	2.59	0.17	0.46	0.26
CD (P=0.05)	5.36	0.64	6.75	0.56	1.57	0.68

The experiment was laid out in a Randomized Block Design with three replications. Twenty-one different locally available genotypes of French bean (Kholar), [Table-1] were sown on fortnight of August 2018 at a spacing of 45cm x 30cm. The crop was raised under rain fed condition and all necessary observations were recorded on five randomly selected plants from each plot.

Results and Discussions

Yield Attributes

It was observed that plant height was significantly influenced by different genotypes of local cultivar. The highest plant height was recorded in G_{18} (251cm) while the lowest plant height was recorded in G_4 (34.67cm). It also observed varying responses of the genotypes to number of pods per plant, Maximum number of pods per plants (59.33) was recorded from genotype (G_6) which was statistically significant over other genotypes. Lowest number of pods per plant (17.67) was recorded from genotype (G_4). Similar results were observed by Mozumder *et al*. (1996) [1], Mehra and Singh (2012) [2] and Akhilesh *et al*. (2013) [3]. Significantly longest length of pod (19.83 cm) was also obtained from genotype (T_{17}) which was followed by genotype T_{10} (17.83 cm). Similar findings were observed by Mozumder *et al*. (1996) and Nazrul *et al*. (2016) [4] in pod length. It was observed that highest number of seeds per pod was recorded in genotype G_{17} (8.1) followed by G4 (7.26). Similar result has been reported by Noor *et al*. (2014) [5]. The highest 100 seed weight was recorded in genotype G_{17} (51.40) and the lowest in G_2 (31.40). Genotypic variation in 100- seed weight was also observed by Muthuramu *et al*. (2015) [6] and Singh *et al*. 2014 [7].

Yield

Significant variations among the genotypes were observed with respect to grain yield. The result revealed that number of pods per plant, number of seed per pod and pod length are related to seed yield, similar findings was observed by Supongmar *et al*.(2015) [8]. The highest seed yield was recorded in genotype G_{17} (16.88) followed by genotype G_{15} (16.68). The higher seed yield recorded from genotype might be due to maximum number of pods per plant and 100-seed weight. Similar result was reported by Singh *et al*. (2014) and Nazrul *et al*. (2016).

Conclusion

The study revealed that Genotype G_5, G_{11}, G_{15}, and G_{17} and G_{19} significantly out yielded other local genotypes. In some genotypes it was observed that other yield contributing characters are more but yield is less, this might be due do variation in seed size and other environmental factors. These local genotypes of French bean are much preferred by local people and farmers because of bold seed type and taste preference and are very popular in the district and state as well. Therefore, it could be suggested to plant breeders and other researcher to carry out breeding programmes for further improvement and varietal development for increasing seed yield and higher economic return for the farmers.

Application of research: The findings can be put for further investigation in breeding programmes and analysed for further documentation and improvement in yield in Kholar genotypes in Tuensang district, Nagaland.

Research Category: Indigenous Genotypes

Abbreviations: G=Genotypes,
Jepshiak, 'Aphimbae, 'Moho' =Local names of Kholar

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Study area / Sample Collection: Krishi Vigyan Kendra, Tuensang

Cultivar / Variety name: French bean (*Phaseolus vulgaris* L)

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.
Ethical Committee Approval Number: Nil

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