99-102

Indian J. Hill Farmg. 14 (1) : 99 — 102 2001

GROWTH PATTERN AND YIELD POTENTIAL OF LOCAL CULTIVARS OF FRENCHBEAN (*PHASEOLUS VULGARIS* L.) UNDER MID HILLS OF MEGHALAYA

D.P. Patel, G. C. Munda and N. P. Singh
Division of Agronomy
ICAR Research Complex for NEH Region
Umiam – 793 103, Meghalaya, India

ABSTRACT

A field experiment was conducted under rainfed mid-hill conditions during the *kharif* seasons of 1998 and 1999 at the ICAR Research Complex for NEH Region, Research farm Umiam (980 m msl), Meghalaya to evaluate the growth pattern and yield potential of local cultivars of frenchbean. Out of five genotypes assessed, Meghalaya Local selection significantly produced more root length, number of pods per plant, seeds per pod, seed yield (q/ha), biomass per plant and harvest index. The plants of Meghalaya Local Selection and Local Purple Pod were taller, Local Purple Pod and Manipuri were early and long duration genotypes, respectively.

INTRODUCTION

Frenchbean (*Phaseolus vulgaris* L.) is an important and highly profitable vegetable crop of North-Eastern Hill (NEH) region. Generally, it is cultivated for vegetable purpose in all the North-Eastern States including Sikkim. Frenchbean occupies an important position among various *kharif* pulses and vegetable crops grown in temperate hills of India at an altitude ranging from 700 m to 2500 m (Joshi and Rana, 1995). Cultivation of frenchbean in NEH region assumes greater significance in view of increasing demands of green vegetables. As a vegetable crop, frenchbean is a short duration crop and would be useful in increasing the cropping intensity which is very low in this region. Keeping all these factors in view, an experiment was conducted under rainfed conditions in upland mid hills of Meghalaya to evaluate the growth pattern and yield potential of five local cultivars of frenchbean.

MATERIALS AND METHODS

A field experiment was conducted during the *kharif* (rainy) seasons of 1998 and 1999 at the ICAR Research Complex for NEH Region, Research Farm, Umiam (980 m msl), Meghalaya under rainfed conditions. The soil of the experimental field was red laterite in texture having pH

5.6 and total nitrogen 460 kh/ha, available phosphorus 10.5 kg/ha and exchangeable potassium 443 kg/ha. The experiment was laid out in a randomized block design with 5 local cultivars of pole type frenchbean (Local Purple Pod, Meghalaya Local, Naga Local, Manipuri and Meghalaya Local selection) in 4 replications. The crop was sown on 14th August in 1998 and on 26th August in 1999 @ 60 kg seed/ha at a spacing of 30 cm x 10cm. All the cultivars were fertilized with 60 kg N/ha, 60 kg P_2O_5/ha and 40 kg K_2O/ha through urea, single super phosphate and muriate of potash, respectively. Half dose of N and full dose of P_2O_5 and K_2O were applied as basal at the time of sowing and remaining ½ dose of N was applied at flowering stage. Growth pattern, yield attributes and yield were recorded for comparison among the cultivars under test.

RESULTS AND DISCUSSION

Growth pattern

Average plant height was higher in 1998 as compared to 1999 in all the cultivars except Meghalaya Local Selection (Table 1). Plant height did not show any significant difference in 1998 but during 1999, Local Purple Pod and Meghalaya Local Selection produced significantly taller plants followed by Naga Local. The cultivars also differed in growth of roots. Significantly higher root length was found in Meghalaya Local Selection follwed by Local Purple Pod as compared to Naga Local and Manipuri in 1998. However, Manipuri produced significantly highest root length in 1999 than other varieties. Variety Meghalaya Local Section and Meghalaya Local produced significantly more nodules / plant at flowering stage than Local Purple Pod and Naga Local in 1998 where as Meghalaya Local Selection produced significantly highest nodules / plant as compared to other varieties except Manipuri in 1999. Variety Local Purple Pod took significantly minimum period to come into flowering during both the years as compared to other varieties. Manipuri took longer duration to come into flowering than all other varieties under test. In general, Local Purple Pod and Manipuri took little longer duration to mature. All the varieties took longer duration for maturity in 1999 because of drop in temperature during the grain filling stage. Leaf number/plant was found significantly less in variety Local Purple Pod than all other varieties during both the years except Meghalaya Local Selection, which was at par with Local purple Pod.

Yield attributes and yield

Variety Meghalaya Local produced highest number of pods/plant and the lowest was observed with Local Purple Pod (Table 2). However, Naga Local, Manipuri, and Meghalaya Local Selection did not show any significant difference in number of pods / plant. Significantly highest pod length was observed in Local Purple Pod and lowest in Meghalaya Local in both the years. Maximum seeds/pod was recorded in Local Purple Pod followed by Meghalaya Local Selection during both the years and remained significantly higher than other varieties. 100 seed weight(g) was found maximum in Manipuri in both the years. Cultivars Naga Local and Meghalaya Local Selection also performed well in 100 seed weight compared to other cultivars. Biomass and Seed yield/plant (g) did not show any significant difference in 1998 but in 1999 it was found significantly higher in Naga Local followed by Meghalaya Local Selection. Variety Meghalaya Local Selection produced highest harvest index followed by Naga Local as

compared to all other varieties under test. Minimum harvest index was found with Local Purple pod.

Average seed yield of frenchbean cultivars in 1998 was higher than 1999. This might be due to late planting in 1999. Meghalaya Local Selection produced highest seed yield (17.0 q/ha and 15.4 q/ha) during both the years as compared to all other varieties but remained at par with Meghalaya Local in 1998. Local Purple Pod produced lowest seed yield (7.9 q/ha and 6.4 q/ha) during both the year of experimentation. Pooled data on seed yield indicate that Meghalaya Local Selection ranked first by producing significantly highest seed yield (16.1 q/ha) and remained at par with Meghalaya Local (14.8 q/ha).Patel *et. al.*, (2000) reported higher yield of Meghalaya Local Selection and Meghalaya Local. Ahlawat (1995) reported similar yield level of frenchbean sown during October under irrigated conditions of northern India. Cultivar Local Purple Pod produced the lowest seed yield (7.2 q/ha). The yield increase in Meghalaya Local Selection was mainly due to production of more pods/plant, higher number of seeds/pod, greater seed yield/plant and 100 seed weight as compared to most of the varieties under the mid hills conditions of Meghalaya (Anonymous, 1999). The study indicated that frenchbean cultivars Meghalaya Local Selection and Meghalaya Local were found suitable for cultivation under rainfed conditions in mid hills of Meghalaya.

REFERENCES

Ahlawat, I.P.S. (1995), Response of frenchbean *(Phaseolus vulgaris)* genotypes to dates of sowing. Indian J. Agron. 40 : 117-119.

Anonymous. (1999). Annual report, ICAR Res. Complex for NEH Region, Umiam, Meghalaya.

Joshi, B. D. and Rana, R.S. (1995), NBPGR, Shimla Science Monograph No. 5, pp-2.

Patel, D.P., Munda, G.C. and Singh, N. P. (2000), Frenchbean – Technology for increasing productivity in NEH region. J. North Eastern Council 20 : 3-6.

Table 1. Growth pattern of frenchbean under rainfed mid hills of Meghalaya

Cultivars	Plant height (cm)		Root length (cm)		Nodules/Plant (40 DAS)		Days to 50% Flowering		Days to maturity		Leaf No. / plant	
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999
Local Purple Pod	323.5	308.3	14.2	11.7	21.5	17.5	30.2	31.0	86.0	106.0	16.5	15.7
Meghalaya Local	301.7	261.0	13.0	13.7	50.0	72.0	33.5	34.0	81.2	101.0	21.2	18.2
Naga Local	298.5	288.6	9.3	8.5	26.2	30.0	34.0	34.5	82.0	101.5	21.0	19.0
Manipuri	268.4	253.2	9.1	24.2	32.7	127.2	36.2	35.2	81.0	105.0	22.1	19.2
Meghalaya Local Selection	294.2	298.1	14.6	14.0	58.2	147.0	33.5	34.2	80.5	101.0	18.5	18.7
C.D. (0.05)	NS	33.0	4.3	2.8	18.4	64.0	1.4	1.8	1.8	1.9	3.6	1.7

Table 2. Yield attributes and seed yield of frenchbean under rainfed mid hills of Meghalaya

Cultivars	Pods/plant		pod length /plant (cm)		Seeds/pod		100 seed weight (g)		Seed yield/ plant (g)		Biomass/ plant (g)		H.I.		Yield (q/ha)		Pooled mean
	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	
Local Purple Pod	6.5	5.3	17.5	18.0	7.4	8.2	29.7	28.4	13.5	11.4	24.0	20.4	0.567	0.562	7.9	6.4	7.2
Meghalaya Local	11.0	10.0	11.7	1.6	6.0	6.4	26.4	26.2	15.0	14.2	24.2	22.4	0.607	0.623	16.5	13.1	14.8
Naga Local	8.5	9.0	14.5	14.5	6.4	6.6	31.2	27.4	16.5	18.3	25.6	28.7	0.645	0.637	15.6	12.6	14.1
Manipuri	8.5	8.2	13.2	15.1	5.4	6.4	32.0	31.7	14.2	15.0	23.2	25.7	0.607	0.580	12.2	11.1	11.7
Meghalaya Local Selection	9.5	9.2	14.5	146	7.3	7.4	30.2	30.1	19.0	17.6	28.1	27.1	0.674	0.653	17.0	15.4	16.1
C.D. (0.05)	1.4	1.0	1.8	0.9	1.1	0.6	0.9	1.2	NS	3.2	NS	4.7	0.049	0.024	1.5	1.8	1.4