International Journal of Agriculture and Development Studies (IJADS)
2022, Vol. 2, Issue 1, pp. 1-8

www.ecejournals.org

Fenugreek Varieties Adaptation Trail

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Abstract

This research was conducted in 2014 cropping season both in rain feed and irrigation in Northern Ethiopia of Ofla Woreda. Two fenugreek varieties (challa and Hunda-01) and one local cultivar were tested in the specific site of Fala and Awuliga kebeles under irrigation and rain feed. It was undertaken to evaluate the performance of improved fenugreek varieties in the study area. The trial was laid out in Randomized Complete Block Design with three replications with a net plot size of 2mx1m. Though the phenology (flowering and maturity days) and growth performance showed significant variation for both rain feed and irrigation seasons, seed yield/ha was significantly influenced only by the irrigation season. However, the two improved fenugreek varieties were not significantly influenced with regard to seed yield in both production seasons except Hunda-01 matured earlier than compared to challa. The improved varieties Hunda-01 and challa provided significantly superior seed yield of 41.91qt/ha and 37.11 qt/ha respectively for irrigation production. All the three varieties did not show seed yield variation in the rain feed fenugreek production. Therefore, fenugreek producing farmers of the study area could use the improved variety Hunda-01 for irrigation fenugreek production since it matures earlier with maximum seed yield as well as they could use local fenugreek cultivar for rain feed fenugreek production as it is characterized with early maturation and maximum seed yield and is well adapted to the study area.

Key words: Fenugreek, variety, yield

1. INTRODUCTION

The crop fenugreek (*Trigonella foenum-graecum* L.) is an annual legume crop which belong to the family Fabaceae and is often cultivated in India, Mediterranean region and North Africa (Acharya *et al.,* 2011, 2010). It is annual crop with autogamous flowers occasionally attracted for insects. It is indigenous to countries on the Eastern parts of the Mediterranean, although widely cultivated in India, Egypt, Ethiopia, Morocco and occasionally in England (Davoud *et al.,* 2010).

Fenugreek cultivation and its economic importance in the Ethiopian agriculture date back to a long period of history (Beyene, 1965). The principal use of fenugreek in Ethiopia are a rotation crop, it improves both the soil structure and fertility, flavoring of the traditional bread, maintains soft texture of "*tef-injera*" in cooler zones of the country where the latter is a staple food (Jemal, 1998). The other additional advantage of fenugreek is the wide variety of its uses at different crop stages such as green manuring, leaf vegetable and seed production for the international market of condiments or feed (Beyene, 1965). Its seed is highly demanded at market and thus it can give high economic value for growers as well the country.

The production distribution of fenugreek in Ethiopia is nearly similar to those of other cool season food legumes such as fababean, field pea, lentils, chickpea, and grass pea, etc. Improving this crop production and productivity is a means opening a new vista of market opportunity in the face of the ever expanding world trade for the country in general and for the resource-poor farmer in particular. Fenugreek grows in the Dega and weina-dega agro-ecology of Ethiopia in general and in high lands of southern zone of Tigray in particular.. Even though the highland area of southern Tigray is suitable for fenugreek production and its cultivation history lasts many years. Farmers have been produced in a very small strip of land using low yielding local varieties as the result of low research attention. Therefore, this research is initiated to adapt improved fenugreek varieties in the study area

Objectives

To adapt and evaluate the yield and yield performance improved fenugreek varieties in the study area

2. MATERIALS AND METHODS

2.1. Description of the study Area

This research is undertaken in Ofla Woreda of rain feed season of 2020 G.C. Ofla woreda is one of the five woredas of southern zone of Tigray. The woreda is located on the geographic coordinates of 12031' North Latitude and 39033' East Longitude. The altitude varies between 1700-2800 m a.s.l. The mean annual temperature of the study area is 22^{o}c with minimum and maximum temperature of 6^{o}c and 30^{o}c respectively (Ofla wereda BoARD, 2009). Fluvisol and Vertisols are the major soil types dominantly found in the area while on sloping land with dissected plain and medium gradient escarpment land Leptosols are more dominant covering 56% and 66% of the respectively landforms (Amanuel, 2015).

2.2. Treatments and Experimental Design

In this experiment two improved fenugreek varieties (hunda -01 and Challa) and one local cultivar were evaluated. The trail was under taken in both rain feed and irrigation seasons of 2014 in Falla and Awuligara kebeles of Ofla Woreda. The trial was laid down in *randomized complete block design (*RCBD) with three replications with a net plot size of 2 m by 1 m. A spacing of 20 cm between row and recommended fertilizer rate for the crop was applied during planting.

2.3. Data collection

Phenology data (days to maturity and flowering) were collected from the entire plots observation. Growth and yield data also were collected from the bet plot.

2.4. Data analysis

Analysis of variance was performed following the procedure of Gomez and Gomez (1984). Varieties showed significant difference were subjected to Duncan's multiple range tests for mean separation at 5% level of significance using Genstate version 13.

3. RESULTS AND DISCUSSIONS

3.1. Days to flowering and maturity

A very highly significant ($P<0.001$) and significant ($p<0.05$) difference was observed on days to 50 % flowering and days to maturity (Table 2) under irrigation and rain feed respectively. The two season result revealed that local fenugreek cultivar flowered earlier for both growing seasons (57 days and 63 days for irrigation and rain feed production respectively). Similarly, the significantly affected earlier maturity time (114 and 106 days) for irrigation and rain feed production were observed. Late flowering time followed by Hunda-01 (64 days) was also recorded from the variety Challa (67 days) (Table 1). In the same way, the maturity time was affected by flowering time influence and it followed the same significant pattern. This might be due to that the earlier flowering time could result earlier maturity and vis versa for late flowering time. Million (2012) also reported that among different genotypes evaluated Challa variety was fourth in maturity earliness.

3.2. Plant height

The two season result for performance of plant height was influenced by the varietal difference as presented in (Table 1). The three varieties showed a significant ($P<0.05$) deference and a very highly significant ($P<0.001$) difference on plant height under irrigation and rain feed conditions respectively. However, the maximum plant height under irrigation recorded from Challa variety (43.47cm) was not significantly different from the medium plant height (39.13cm) observed from Hunda-01. For rain feed production, the highest and varietal influenced plant height was obtained from Challa (42.81cm) followed by Hunda-01(35.89cm). The local fenugreek cultivar provided the shortest plant height (26.67cm) in this trail.

3.3. Seed yield (qt/ha)

The seed yield (qt/ha) performance of the varieties in the study area showed significant ($p<0.5$) deference for irrigated production; but not for rain feed production (Table 1). Accordingly, the

maximum and minimum productivity for irrigated fenugreek production was recorded with the improved Hunda-01(41.91 qt/ha). However, this maximum seed yield did not show variation with the productivity of the improved Challa fenugreek variety which provided about 37.11 qt/ha. The lowest and varietal influenced seed yield was also obtained from local cultivar (16.82 qt/ha). On the other hand, the rain feed fenugreek seed yield productivity of 43.47 qt/ha, 41.95 qt/ha and 37.07 qt/ha obtained from Hunda-01and Challa improved varieties and local cultivar respectively were not significantly affected. This could be due to that the local cultivar might be adapted well in the area than the improved varieties. Million (2012) who compared the performance of different accessions with improved varieties also obtained about 27 percent of accessions provided better seed yield than the improved varieties.

Table 1. Phenology, growth and yield performance of fenugreek varieties in Ofla woreda

Treatment	Days to flowing		Days to maturity		Plant height (cm)		seed Yield qt/ha	
	2014 Irrigation	2014 Rain feed	2014 Irrigation	2014 Rain feed	2014 Irrigation	2014 Rain feed	2014 Irrigation	2014 Rain feed
Challa	67[a]	71.67[a]	121.0[a]	124.3[a]	43.47[a]	42.81[a]	37.11[a]	41.95a
Hunda-01	64[b]	68.33[a]	117.0[ab]	120.3[b]	39.13[a]	35.89[b]	41.91[a]	43.47[a]
Local	57[c]	63.00[b]	106.0[c]	114.7[c]	27.73[b]	26.67[c]	16.82[b]	37.07[a]
LSD (5%)	10.2	2.449	11.5	3.294	9.9103	2.998	10.093	NS
CV (%)	1.9	1.6	0.6	1.2	11.87	3.8	13.94	13.3

4. SUMMARY AND RECOMMENDATION

Fenugreek commonly grows in the highland areas of southern zone of Tigray under irrigation and rain fed. Its seed is highly demanded at market and thus it can give high economic value for growers and farmers considered the as cash crop. Even though the highland area of southern Tigray is suitable for fenugreek production most farmers have been produced in a very small strip of land using low yielding local varieties. For irrigation production, farmers in the study area should use Hunda-01 since it was matured earlier than the Challa variety with equivalent productivity. In contrary, fenugreek producing farmers could use their local cultivar for rain feed season as it matured early without providing maximum yield similar with the improved varieties.

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