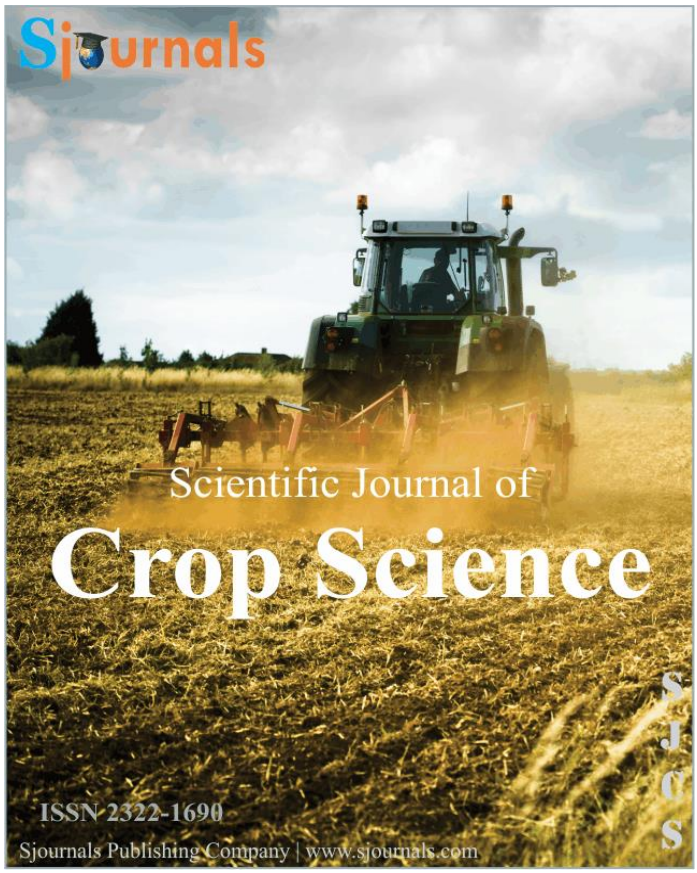
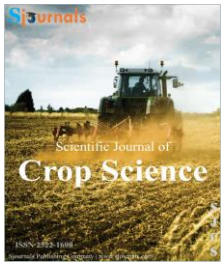


Sjournals
Scientific Journals
Scientific Journal of Crop Science (2020) 9(2) 397-400
ISSN 2322-1690
doi: 10.14196/sjcs.v9i2.313



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Original article

Pre-extension demonstration of improved fenugreek varieties in Bale zone, southeastern Oromia, Ethiopia

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ARTICLE INFO

Article history,
Received 12 February 2020
Accepted 13 March 2020
Available online 20 March 2020
iThenticate screening 14 February 2020
English editing 11 March 2020
Quality control 18 March 2020

Keywords,
Fenugreek technology
Farmers' preference
Selection criteria
FRG approach
Variety evaluation

ABSTRACT

Pre-extension demonstration of improved fenugreek varieties was conducted in Goro and Ginnir districts of Bale zone. The main objective of the study was to demonstrate and evaluate recently released (Burka) variety along with standard and local checks. The demonstration was under taken on single plot of 10mx10m area for each variety with row planting, recommended full package. Mini-field day involving different stakeholders was organized at each respective site. Yield data per plot was recorded and analysed using descriptive statistics, while farmers' preference to the demonstrated varieties was identified using focused group discussion and summarized using pair wise ranking methods. The demonstration result revealed that Hundaol variety performed better than the other varieties followed by Burka and Local varieties with an average yield of 11.44 qtha^{-1}, 9.3 qtha^{-1}, and 8.175 qtha^{-1} respectively. Furthermore, Hundaol and Burka varieties were selected by farmers. Thus, Hundaol and Burka varieties were recommended for further scaling up.

1. Introduction

Ethiopia is a homeland for many spices, such as korerima, long red pepper, Black cumin, white cumin, coriander, fenugreek, turmeric, sage, cinnamon, and ginger (ACP, 2010). Fenugreek seeds can be a good

supplement to cereals because of its high protein (25%), lysine (5.7 g/16 g N), soluble (20%) and insoluble (28%) dietary fiber besides being rich in calcium, iron and betacarotene (Tamiru et al., 2018).

Fenugreek (*Trigonella foenum-graecum* L.) is one of the most important seed spice crops in Ethiopia in general and in the mid-altitudes of Bale in particular. Fenugreek covers about 34,603.35ha of land in Ethiopia with a total annual production of 454,807.61 quintals in 2016/17 (2009) with the average production of 13.14 in main season. Similarly, in Bale, 12,888.00 ha of land was covered by fenugreek and a total of 47,239.86 quintals of grain was produced in 2015/16 cropping season (CSA, 2017).

Goro and Ginnir districts of Bale zone is known for its production potential of spices. A total of 1,515ha land is covered with Fenugreek every year (BZADO Office, 2015). In Bale, 47,239.86 quintals of fenugreek grain was produced in 2016/17 cropping season (CSA, 2016). It is mainly produced by small holder farmers for commercial purpose. In spite of its importance and the potential available in the area, the crop was not utilized due to a shortage of improved varieties and crop management packages. In order to solve this problem Sinana Agricultural Research center is making endeavors on developing high yielding, disease tolerant/resistant and stable variety/ies that can meet increasing demand of spice market, improve the income and livelihood of farmers are very important.

As a result one improved fenugreek variety (Burka) recently released by SARC in 2015/16 with full recommended packages for production. Burka has 20-22.21qt/ha yield potential, 40.4% yield advantage over standard check. Thus, undertaking participatory demonstration, evaluation, validation and dissemination of improved fenugreek technologies with the participation of farmers and other stakeholders for sustainable production and productivity is paramount important.

1.1. Objectives

- ✓ To demonstrate and evaluate recently released fenugreek varieties under farmers' management condition.
- ✓ To create awareness on the importance of improved fenugreek varieties.
- ✓ To evaluate the cost-benefit ratio (income gained) of the demonstrated varieties.
- ✓ To select the best performing variety/ies with farmers' participation and recommend widely selected improved fenugreek variety/ies for further pre-scaling up activity.

2. Materials and methods

2.1. Description of the study area

The activity was carried out in Goro and Ginnir districts of Bale zone, Oromia National Regional State (ONRS), Ethiopia. Bale zone is among the 20 Administrative zones located in south eastern parts of Oromia, Ethiopia. The districts were selected purposively based on their potential to fenugreek production.

2.2. Site and farmers' selection

Goro and Ginnir districts were purposively based on the potential of the crop. Two PAs from Goro and three PAs from Ginnir were also selected purposefully based on their accessibility and production potential of the crop. Farmers were selected based on having sufficient land and willingness. Accordingly, one representative trial farmer from each PA was selected.

2.3. Materials used and field design

An improved recently released fenugreek variety (Burka) with one standard check (Hunda'ol) and one local check were planted on selected farmers' land with simple plot design (10m x 10m) in the main cropping season with recommended full package. Two effective weeding were done.

2.4. Data type and method of data collection

Both qualitative and quantitative data were collected using appropriate data collection methods such as direct field observation/measurements, key informant interview and focused group discussion (FGD). Yield data per plot in all locations were recorded. Farmers' preference to the demonstrated varieties (likes and dislikes, which is the base for plant breeding process and perceptions towards the performance of the technologies) was identified.

2.5. Data analysis

SPSS was used as statistical package (descriptive statistics was used to analyze the data). Pair wise ranking matrix was used to rank the varieties in order of their importance.

3. Results and discussion

3.1. Yield performance of demonstrated varieties

The yield of demonstrated varieties of fenugreek were analyzed using simple descriptive statistics like mean. Accordingly, the mean yield obtained from Goro and Ginnir were summarized in the graph below.

Table 1
Yield performance of demonstrated varieties.

No	Variety	Yield obtained (Qt/ha)			Yield advantage over farmers' variety (Local)	Net return
		Goro	Ginnir	Mean		
1	Burka	8.1	10.5	9.3	13.76%	0.56
2	Hundaol	10.95	11.925	11.44	30.73	0.86
3	Local	6.75	9.6	8.175	-	0.34

Among the demonstrated fenugreek varieties Hundaol gave the highest yield across all demonstration sites (10.95qt/ha at Goro and 11.925qt/ha at Ginnir) followed by Burka (8.1qt/ha at Goro and 10.5qt/ha at Ginnir). The local variety provide the lowest yield at all locations (6.75qt/ha at Goro and 9.6qt/ha at Ginnir). The Yield advantage of Hundaol and Burka over local check is 30.73 % and 13.76% respectively. The result also showed that, Hundaol variety has the highest net return (0.86) followed by Burka variety (0.56) and Local variety has the lowest net return (0.34).

Table 2
Pair wise ranking result to rank variety traits in order of importance.

Variety Traits	A	B	C	D	E	F	G	H	Frequency	Rank
A									5	2nd
B	B								3	4th
C	A	C							4	5th
D	A	D	D						5	2nd
E	A	B	C	D					1	7th
F	A	F	C	D	F				3	5th
G	G	G	G	G	G	G			7	1st
H	A	B	C	D	E	F	G		0	8th

A= Tillering, B= Disease Tolerance, C= Pods per Plant, D= Seeds/Plant, E= Seed Color (Market), F= Crop Stand, G= Overall Yield, H= Seed Size.

Table 3
Rank of the varieties based on farmers' selection criteria.

No	Varieties	Rank	Reasons
1	Hundaol	1st	High number of tillers, high pods/plant, disease tolerant, attractive seed color, plump seed, good plant height and early maturity.
2	Burka	2nd	Medium number of tillers, medium pods/plant, medium seed/pod, it is morphologically good and late maturing.
3	Local check	3rd	Susceptible to disease and lodging, few numbers of tillers, few number of pods/plant and seed/pod.

4. Conclusion

Pre extension demonstration and evaluation of fenugreek technologies was carried out on farmers' field. Improved varieties viz. Burka and Hundaol were demonstrated, evaluated and compared against the farmers' variety. The mean yield of the varieties was analyzed using simple descriptive statistics. Accordingly, Hundaol is the high yielder followed by Burka and local variety.

Moreover, Hundaol was selected by participant farmers in all districts due it is drought tolerant, high number of branch/plant, high number of seed/branch, disease tolerant, good uniformity, good plant height, good seed quality and good crop stand followed by Burka which has medium number of tillers, medium pods/plant, medium seed/pod, it is morphologically good and late maturing. Based on these facts, Hundaol and Burka varieties were recommended for further scaling up.

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How to cite this article: Gadissa, B., Biftu, A., Sida, A., 2020. Pre-extension demonstration of improved fenugreek varieties in Bale zone, southeastern Oromia, Ethiopia. Scientific Journal of Crop Science, 9(2), 397-400.