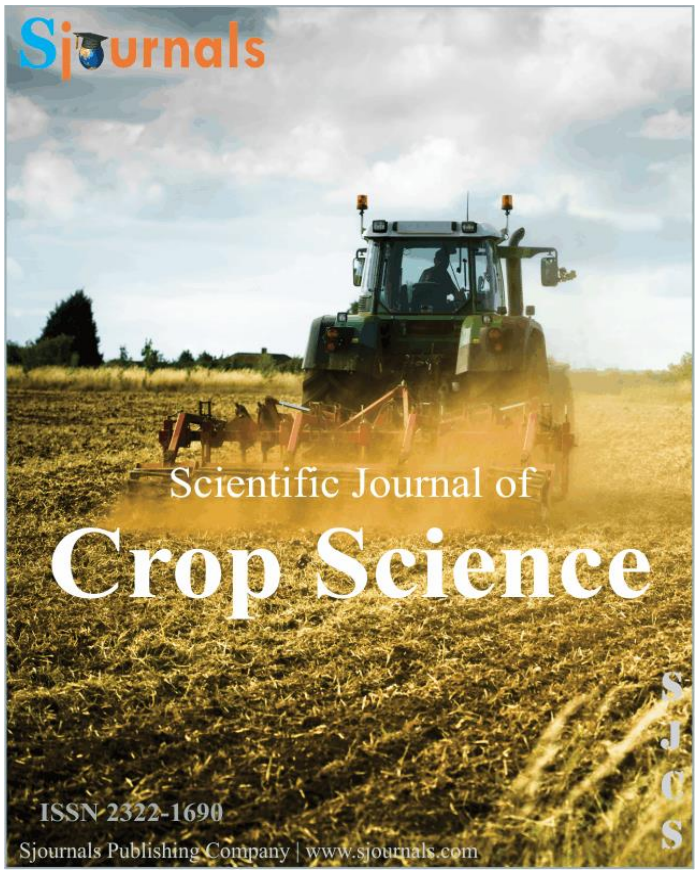

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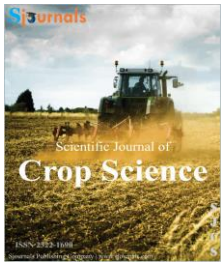

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Original article

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

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ABSTRACT

Pre-extension demonstration of improved black cumin varieties was conducted in Goro and Ginnir districts of Bale zone. The main objective of the study was to demonstrate and evaluate recently released (Gemechis and Soressa) varieties 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 Soressa variety performed better than the other varieties followed by Gemechis, local and Dirshaye varieties with an average yield of 15.125qtha^{-1}, 14.57qtha^{-1}, 11.145qtha^{-1} and 10.125qtha^{-1} respectively. Furthermore, this variety was selected by farmers. Thus, Soressa variety was recommended for further scaling up.

1. Introduction

Black cumin (*Nigella sativa* L.) belongs to the family *Ranunculaceae*. It is native to the Mediterranean region

and it has been used for thousands of years by various cultures and civilizations. Naturally it grows in Mediterranean region of Turkey and Cyprus. This crop is distributed from its origin to India, Syria, Lebanon, Israel and South Europe, Bangladesh, Turkey, Middle-East and the Mediterranean basin (Datta et al., 2012).

In Ethiopia, black cumin is the second cash crop exported next to ginger among spices. This shows that there is a wide scope for black cumin production. Ethiopia has about 12% share in the world market. However, 99% of the produce is consumed locally (Yimam et al., 2015). Due to the increased demand of black cumin seed for local consumption and other uses, such as oil and oleoresin for medicinal purposes, its export market, it is one of the potential crops for diversification and income generation for smaller land holdings.

Goro and Ginnir districts of Bale zone is known for its production potential of spices. A total of 5,750ha land is covered with Black cumin every year (BZADO Office, 2015). 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 overcome the gap between current production and consumption levels high yielding, disease tolerant/resistant and stable variety/ies that can meet increasing demand of spice market, improve the income and livelihood of farmers should be developed. Accordingly, two improved black cumin varieties (Gemechis and Soressa) recently released by SARC in 2015/16 with full recommended packages for production. Gemechis has 17-19.6qt/ha yield potential, 10.3% yield advantage over standard check (Darbera). Soressa has 18-21.45qt/ha yield potential, 20.7% yield advantage over standard check (Darbera). Thus, undertaking participatory demonstration, evaluation, validation and dissemination of improved black cumin technologies with the participation of farmers and other stakeholders for sustainable production and productivity is paramount.

1.1. Objectives

- ✓ To demonstrate and evaluate improved black cumin varieties under farmers' condition.
- ✓ To create awareness on the importance of improved black cumin 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 black cumin 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.

2.2. Site and farmers' selection

Goro and Ginnir districts were selected purposely 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 were selected.

2.3. Materials used and field design

Two recently released black cumin varieties (Gemechis and Soressa) with one standard check (Dirshaye) and one local check were planted on selected farmers' land with simple plot design (10m x 10m) in 2017/2018 main cropping season. The varieties were treated with full recommended black cumin production and management packages.

SARC was the source of agricultural inputs. Hosting farmers provided their land. Farm preparations were carried out by trial/hosting farmers, whereas land leveling, planting, first and second weeding, follow up and visit, harvesting, threshing were handled and managed by SARC. Depending on weed infestation, two effective weeding were applied.

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 black cumin 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	Soressa	14.5	15.93	15.215	+36.52%	3.89
2	Gemechis	13.75	15.39	14.57	+30.73%	3.68
3	Dirshaye	9.76	10.67	10.215	-8.345%	2.30
4	Local	8.25	14.04	11.145	-	2.60

The result of demonstration shows that Soressa variety provide the highest yield (14.5qtha^{-1} and 15.93qtha^{-1} at Goro and Ginnir respectively) at all demonstration sites followed by Gemechis (13.75qtha^{-1} and 14.39qtha^{-1} at Goro and Ginnir respectively). The local variety gave the lowest yield at Goro while Dirshaye gave the lowest yield at Ginnir sites. Soressa, Gemechis and Dirshaye have yield advantage of +36.52%, +30.73% and -8.345% over the local check respectively. The cost benefit analysis ratio shows that Soressa variety has the highest net return (3.89) and Dirshaye variety has the lowest net return (2.30). Gemechis and Local varieties has the net return of 3.68 and 2.60 respectively.

3.2. Farmers' preference to demonstrated varieties

The farmers' preferences toward the demonstrated varieties were assessed by enhancing them to reflect their preference to varietal attributes by setting their own varietal selection criteria.

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	4th
B	A								3	6th
C	C	C							4	1st
D	D	D	C						5	2nd
E	A	B	C	D					1	9th
F	A	B	C	D	F				3	7th
G	A	G	C	D	G	G			7	5th
H	A	B	C	D	H	F	G		0	8th

A= Branch/Plant, B= Disease Tolerance, C= Drought Tolerance, D= Early Maturity, E= Plant Height, F= Seed Quality, G= Seed/Branch, H= Uniformity.

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

No	Varieties	Rank	Reasons
1	Gemechis	2nd	Early, maturing, good seed quality, disease tolerant, medium seed/branch, medium branch/plant and medium plant and good uniformity.
2	Dirshaye	4th	Susceptible to disease, it is not drought tolerant, it lacks uniformity, few number of branch/plant, few number of seed/branch.
3	Soressa	1st	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.
4	Local check	3rd	Small number of branches and seed/plant, medium crop stand and susceptible to disease.

4. Conclusion

Pre extension demonstration and evaluation of black cumin varieties was carried out on representative trial farmers' fields. Two improved varieties viz. Gemechis, Soressa and Dirshaye were demonstrated, evaluated and compared against the farmers' variety. Accordingly Soressa is the high yielder followed by Gemechis and local varieties.

Moreover, Soressa 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. Based on these facts, Soressa variety was recommended for further scaling up.

References

Bale Zone Agriculture Development Office, 2015. Annual Report (Unpublished), Bale-Robe.

Datta, A.K., Saha, A., Bhattacharya, A., Mandal, A., Paul, R., Sengupta, S., 2012. Black cumin (*Nigella sativa* L.): A review. Department of Botany Cytogenetics and Plant Breeding Kalyani University. J. Plant Dev. Sci., 4(1), 1-43.

Yimam, E., Nebiyu, A., Ali Mohammed, I., Getachew, M., 2015. Effect of nitrogen and phosphorus fertilizers on growth, yield and yield components of black cumin (*Nigella sativa* L.) at Konta district, south west Ethiopia. J. Agron., 14(3), 112-120.

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