Participatory Demonstration of Improved Teff Variety in Habro and Oda Bultum Districts of West Hararghe Zone, Oromia Regional National State, Ethiopia

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INTRODUCTION

Agriculture in the Ethiopian economy prominently is the largest contributor to 50% of Gross Domestic Production (GDP) and employs 80% of the population’s. (CSA, 2011). Five major cereals namely Teff, wheat, maize, sorghum and barley are the core of Ethiopia’s agriculture and food economy, accounting for about three-quarters of total area cultivated (Alemayehu et al., 2011). Cereal contributes about 85% gross grain production (about 14 million tons), maize constituted 23 %, following by teff (19%) during the cropping season of 2012/13 Teff is among the major cereals of Ethiopia, occupying about 2.6 million hectares of land which is more than any other major cereals such as maize (16%), sorghum (14%) and wheat (13%) (CSA, 2011).

According to Miller D.(2010) teff is adapted to environments ranging from drought stress to water logged soil conditions and diverse soil types. Teff is classified as a C4 plant which is genetically adapted for growth in hot dry climates. In addition, Hailu and Peat, (1996) pointed out that teff is adapted to diverse agro-ecological regions of Ethiopia and grows well under stress environments better than other cereals. Because of this, it is said to be a “low-risk” crop for farmers. Seyfu, (1993) showed that teff grown from sea level up to 2800 m.a.s.l, under various rainfall, temperature and soil regimes. However, for better performance, it requires an altitude of 1800-2100 m.a.s.l., annual rain fall of 750-850 mm, and a temperature range of 10 °C- 27 °C. It is predominantly cultivated on sandy loam to black clay soils.

Keywords: Improved Variety, Kuncho Variety, Local check, Habro and Oda Bultum district
Ethiopian farmers grow teff for different purpose, which mainly attributed to the socio-economic, cultural and agronomic benefits (Seyfu, 1993). Teff is a highly valued crop and is primarily grown for its grain that is used for preparing injera, which is a staple and very popular food in the national diet of Ethiopians. It can also be used in many other food products such as kitta, anebaberro, porridge and alcoholic beverage such as tella and katikala (Hallu et al., 2003). In addition, its high price in the market, reduction of post harvest management cost, fewer disease and pest problems and sustained demand from consumer, are some of the specific merits that makes teff important and preferred by farmers (Seyfu, 1993).

Ethiopia’s crop agriculture in general, and the cereals sub-sector in particular, face serious challenges. Despite the aforementioned importance and large coverage area of teff, its productivity is low due to different factors such as lack of high yielding cultivars, poor management practices, weed, water lodging, low moisture and low fertility conditions. The average national yield of teff is less than one ton per hectare (CSA, 2011). Teff is among the major cereal crops grown next to sorghum and maize for food and market purpose in West Hararghe Zone. Even though some varieties of teff have been released in Ethiopia, most of them were not demonstrated and evaluated around drought prone areas. Hence, farmers of the study areas used their own variety (Local Variety) which is low yielder and susceptible to different diseases and weeds. Therefore, this activity was specifically initiated to demonstrate improved teff variety under farmer’s condition through their participation.

MATERIALS AND METHODS

The experiment was conducted during 2013 cropping seasons at Habro and Oda Bultum districts. Habro district has an altitude range from 1600-2400 m.a.s.l. and annual rainfall of 650 mm and 1000 mm while the average temperature of the district is 18°C. The dominant soil type of the district is Black sandy and loam. Oda Bultum district located at altitude of 1600-2400 m.a.s.l. and annual rainfall of 900 mm and 1100 mm while the average temperature of the district is 19.5°C. The dominant soil type of the district is loam and clay soil (Aman and Anteneh, 2010).

Site and farmers selection was done in participatory way with district Agricultural Office and experts working on cereal production. Accordingly, Kebeles were selected based on potential production of teff among others. Similarly, farmers selection were done with collaboration of agricultural Office experts, Kebele official and Developmental Agent by considering different selection criteria’s like farmers interest to the technology, model farmers and managing the field as required. Accordingly, a total of six (6) farmers were selected from both districts (three farmers from each district).

Kuncho teff variety and local check were evaluated for their yield performance with full participation of farmers in the study areas. The trial was laid out on 10mx10m area for each variety with a gross area of 100 m². Planting was done by broadcasting at seed rate of 25 kg ha⁻¹. Fertilizer was applied at the rate of 50/50 kg/ha N and P₂O₅, respectively. Weeding and plowing and other management practices were done as required. Data on grain yield (kg/ha) on plot basis were collected and subjected to statistical analysis using SPSS version 20 software. Paired sample t-test was used to observe the yield significance between the varieties. Farmer’s preference were collected and analyzed by using simple ranking method in accordance with the given value (De Boel and Thijssen, 2007). The formula of ranking method used was specified as:

$$\text{Rank} = \frac{\sum N}{n}$$

Where N, is value given by group of farmers for each variety based on the selection criteria and n is number of selection criteria used by farmers.

RESULT AND DISCUSSION

Performances of Demonstration under Farmer’s Condition

The mean yield of local check was 13.4 and that of improved variety was found to be 15.4 with standard deviation of 1.4 and 1.6, respectively in terms of kg ha⁻¹. The mean yield of local check was less than that of kuncho which indicated that using improved variety enhance the yield harvest of farmers from their land. As shown in Table 2 the paired t-test value shows that, there is statistically significant mean difference between the yield of local check and improved variety (Kuncho) at less than 1% probability level.

The result of the study revealed that demonstrations of improved teff variety of kuncho recorded the higher grain yield (1800 kg ha⁻¹) compared to local check (1200 kg ha⁻¹). The percentage increase in the yield of improved variety over local check was 50%. This result indicated that using improved variety of kuncho was more advantageous for farmers (Table 3).

Farmers Preference on the Varieties

Farmers set out main selection criteria in order to rank the variety. These criteria include seed color, early maturity, straw biomass, resistance to lodging and
Table 1. Summary of selected kebele, farmers and area covered by experiment

<table>
<thead>
<tr>
<th>Districts Name</th>
<th>Kebele</th>
<th>No. of trail farmers</th>
<th>Area covered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habro</td>
<td>Wacu-Bedada</td>
<td>1</td>
<td>100m² area of land was used for each varieties on each farmers field</td>
</tr>
<tr>
<td></td>
<td>Lugo</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Oda-Bultum</td>
<td>Burka-Misoma</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bekenisa</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Paired sample t-test value of the varieties (N=6)

<table>
<thead>
<tr>
<th>Variety</th>
<th>Mean</th>
<th>St. deviation</th>
<th>t-value</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local check</td>
<td>13.4</td>
<td>1.4</td>
<td>4.7***</td>
<td>0.005</td>
</tr>
<tr>
<td>Kuncho</td>
<td>15.4</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, indicate significance at less than 1% probability level

Table 3. Summery of yield performance of the varieties

<table>
<thead>
<tr>
<th>Variables</th>
<th>Yield (Kg ha⁻¹)</th>
<th>Yield difference (Kg ha⁻¹)</th>
<th>Yield increase over local check (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Check</td>
<td>1200</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Improved tef(Kuncho)</td>
<td>1800</td>
<td>600</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Our Computation, (2013)

Table 4. Farmer's preference criteria on the varieties

<table>
<thead>
<tr>
<th>Variety</th>
<th>Selection criteria( score out of 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seed color</td>
</tr>
<tr>
<td>Local check</td>
<td>3</td>
</tr>
<tr>
<td>Kuncho</td>
<td>4.5</td>
</tr>
</tbody>
</table>


tolerant to drought. Based on the selection criteria, farmers indicated that Kuncho teff was preferred by trail farmers and other neighbour farmers during field day organized on farmer’s field. The mean scores of farmers’ selection criteria ranged from 2 (local variety) to 4.75 (Kuncho variety). The highest score (4.75) recorded for resistance to lodging for Kuncho and 2 for local variety. However, the score in terms of early maturity for both varieties were the same (3.5). In general improved variety (Kuncho) get higher score in all parameters than local check and selected as 1st by farmers.

Feed shortage is the critical problems in the study area and farmers consider the biomass of the variety to feed their animals during feed shortage. Therefore, kuncho variety had high biomass, resistance to lodging and very white seed color than the local which fit the interest of farmers (Table 4). Similar, study conducted by Kebebew et.al, (2011) indicated that kuncho teff has high biomass, very white seed color and resistance to lodging than other teff verities released earlier.

CONCLUSION AND RECOMMENDATION

Teff is among major cereal crops grown next to sorghum and maize for food and market purpose in Ethiopia in general and west Hararghe zone specifically. Hence, this study conducted to evaluate yield performance of kuncho variety under farmer’s condition. The result of paired t-test revealed that there is yield difference between improved and local varieties in terms of grain yield and showed grain yield advantage over the local check by 50% with similar management. On the other hand ranking analysis also indicated that kuncho variety was preferred by its seed color, resistance to lodging and tolerant to drought under farmer’s condition. Therefore, this variety was recommended for production at west Hararghe Zone.
and similar agro ecological conditions to improve teff production and productivity.

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REFERENCES


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