

Registration of “*Chemeda* and *Gemedi*” Sorghum Varieties

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Abstract: *Chemeda* (BRC-ACC#18) and *Gemedi* (BRC-ACC#5) sorghum varieties were released in 2013 for western Oromia specifically for Bako, Gute, Biloboshe and similar mid altitude areas. The accessions were collected purposely from western Oromia to get traits like weevil resistance and the creamy seed color that is preferred for making the local pancake bread Injera. These pipeline genotypes along with other test genotypes and the local check were evaluated across three three locations (Bako, Gute and Biloboshe) for two years (2011 and 2012). *Chemeda* and *Gemedi* out yielded the local check by 10 and 14%, respectively. The *Chemeda* variety showed the least index of susceptibility to weevil attack and/or damage and hence it was resistant to the insect pest; but the *Gemedi* variety was categorized as moderately resistant to the pest. Both *Chemeda* and *Gemedi* varieties showed resistance to anthracnose and leaf blight which are a major threat to sorghum production in the study areas and their vicinities.

Keywords: Accessions; Genotypes; *Sorghum bicolor*

1. Introduction

Sorghum [(*Sorghum bicolor* L.) Moench] is an important cereal crop in Oromia Region ranking 3rd in area cultivated to cereals and 4th in total production. The area under sorghum production is estimated to be 0.74 million hectares (ha) with a total production and average yield of 1.63 million tons (t) and 2.19 t ha⁻¹, respectively, in Oromia (CSA, 2012). Based on its importance to the area, Bako Agricultural Research Center collected different accessions purposely from western Oromia in order to address farmers’ preference for weevil resistance and creamy color. Therefore, *Chemeda* and *Gemedi* varieties were released for this region and similar agro ecologies.

2. Varietal Origin/Pedigree and Evaluation

Chemeda and *Gemedi* with the collection names of BRC-ACC#18 and BRC-ACC#5 were collected from western Oromia, Illugelan District of West Shoa Zone and from Biloboshe District of East Wollega Zone, respectively. These varieties along with other test genotypes and the local check, were evaluated across three test locations (Bako, Gute and Biloboshe) for two years (2011 and 2012).

3. Agronomic and Morphological Characteristics

Chemeda (BRC-ACC#18) and *Gemedi* (BRC-ACC#5) sorghum varieties have creamy and light yellow colors, respectively. They have sweet juicy stacks. *Chemeda* and *Gemedi* sorghum varieties had 1000 seed weights of 19 and 22 g, respectively (Table 1).

4. Yield Performance

The varieties showed higher mean yield over the local check and other tested genotypes. *Chemeda*, *Gemedi* and the local check gave an average grain yield of 3.2, 3.3 and 2.9 t ha⁻¹ on research stations and 2.5, 2.8 and 2.3 t ha⁻¹ on farmers’ fields, respectively (Table 1). *Chemeda* and *Gemedi* out-yielded the local check by about 10 and 14%, respectively.

5. Stability of Performance/Adaptation

The Eberhart and Russel (1966) model was used to estimate the stability of genotypes over the tested environments. A total of 13 genotypes and one local check were included in the multi-location evaluations. An ideally stable genotype has the highest average grain yield, a regression coefficient (b_i) value of approximately one and mean square deviation from regression (s^2_{di}) values close to zero (Eberhart and Russell, 1966; Becker and Leon, 1988). To this end, *Chemeda* and *Gemedi* gave higher mean yield and the regression coefficient (b_i) did not differ significantly from unity showing that the varieties were not sensitive to the environmental changes and give better grain yield.

6. Reaction to Major Diseases

Anthracnoses (*Colletotrichum graminicola*), leaf blights (*Exserbilum turcicum*), and covered and loose smut are among the major bottleneck for sorghum production in western Oromia. Providentially, these two varieties revealed resistance to the above mentioned diseases throughout the study periods (Table 1).

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Table 1. Agronomic/morphological characteristics of sorghum varieties, *Chemeda*, *Gemedi* and *Local check*

Characteristics	<i>Chemeda</i>	<i>Gemedi</i>	Local check
Adaptation area	Bako, Gute, Biloboshe and similar areas		
Altitude (masl)	1500-1900		
Rainfall (mm)	1100-1200		
Fertilizer rate			
Nitrogen (kg N ha ⁻¹)	41		
Phosphorus (kg P ₂ O ₅ ha ⁻¹)	46		
Fertilizer application time	Nitrogen applied in split: first split which is 1/2 of the total dose at planting stage and the second split, which is 1/2 of the total dose at 35 Days after planting, whereas, the whole dose Phosphorous was applied at planting		
Fertilizer application method	Drilled in rows and mixed with soil to avoid direct contact with seed		
Planting and/or seeding	The seed drilled in rows and thinned to adjust plant population		
Planting date	Late April to early May		
Seed rate (kg ha ⁻¹)	10		
Row spacing (cm)	75		
Plant spacing (cm)	15		
Weeding frequency	3-4 times depending on weed infestation		
Days to heading/flowering	120	115	128
Days to maturity	180	175	198
Plant height (cm)	411	409	414
Inflorescence compactness	Loose	Loose	Loose
1000 kernel weight (g)	19.3	22.0	22.7
Shattering character	Non-shattering	Non-shattering	Non-shattering
Stalk juiciness	Juicy	Juicy	Non-juicy
Seed color	Creamy	Light yellow	Light yellow
Crop pest reaction (1-9 scale)			
Leaf blight	2	2	4
Anthracnose	2	3	4
Yield (tons ha ⁻¹)			
Research field	3.2	3.3	2.9
Farmers' field	2.5	2.8	2.3
Mean	2.9	3.1	2.6
Year of release	2013	2013	

Masl = Meters above sea level

7. Quality Analysis/Attributes

The *Chemeda* sorghum variety with creamy color was preferred by farmers and consumers due to its color and resistance to weevil attacks.

8. Conclusions

Chemeda and *Gemedi* sorghum varieties were released for western Oromia (Bako, Gute and Biloboshe) areas and similar agro-ecologies based on their higher grain yield, ideal grain color particularly *Chemeda* (creamy), well preferred to make *Injera*. Such varieties fetch higher market prices as compared to other varieties due to the preferred creamy white seed color and hence could improve income of smallholder farmers cultivating the crop in the study areas and their vicinities. In addition, these two varieties were found to be tolerant to weevil and could be stored for longer time as compared to the other sorghum varieties.

9. Acknowledgments

The authors want to acknowledge Oromia Agricultural Research Institute for funding the research. The authors also express their gratitude to all staff members of the Cereal Technology Generation Team of the Bako Agricultural Research Center for the execution of the experiment.

10. References

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