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Registration of Early Maturing "Erer" Sorghum (*Sorghum bicolor (L.) Moench*) Variety

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Short Communication

ABSTRACT

"Erer" with pedigree designation of 3443-2- OP X P9403 is sorghum variety was released in 2021 for Eastern part of Oromia specifically, Fadis and Babile districts and other similar agro-ecologies of Ethiopia. The variety was developed and released by Oromia Agricultural Research institute, Fadis Agricultural Research Center. Originally it was obtained from Melkasa Agricultural Research Center of Sorghum Research Program which was crossed material followed by screening method. The regional variety trial was done at two locations of Fadis research station and Erer sub-station for three years (2016-2019). From the genotypes evaluated Erer variety recorded high grain yield, large biomass and stay green traits than the standard check Dekeba and other genotypes. Mean grain yield of Erer ranged from 49 to 51 Qt ha-1 on research field, and 34 to 40 Qt ha-1 on farmers' field. Finally, 'Erer' released as superior sorghum variety East Hararghe low lands and similar agro ecologies in 2021.

Keywords: Sorghum; erer; variety verification.

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1. INTRODUCTION

Sorghum (*Sorghum bicolor* (L.) Moench)) is the fifth-largest cereal crop in the world, behind maize, rice, wheat, and barley [1]. It is an important crop for food security in sub-Saharan Africa, where 300 million people rely on it. It is grown in marginal, semi-arid, and drought-prone areas where other crops cannot reliably thrive [2]. It is in third place behind wheat and maize in terms of productivity per hectare and area cultivated [3]. Sorghum in Ethiopia thrives in lowland regions with high temperatures and little rain.

It gives the nation food, animal feed and alcoholic drinks [4]. Sorghum is primarily used in Ethiopia to make Injera, a type of leavened bread that makes up 10% of the country's daily calorie intake [5]. In addition to the grain, sorghum straw is a crucial component of animal nutrition (). Due to its versatility and capacity to thrive in harsh growing conditions, sorghum will continue to feed the world's growing population, supporting the lives of millions of subsistence farmers [6]. Additionally, due to shifting global climate trends and a rise in the use of marginal lands for agriculture, sorghum will be the crop of the future [7]. Hence, variety development considered dual purpose interest both grain and biomass yield.

The most crucial tool in plant breeding is the exploitation of genetic variability, which must be deduced from phenotypic expression. The main methods in the sorghum breeding program of the Oromia Agricultural Research Institute (OARI) of Fadis Agricultural Research Center (FARC) include the development of early maturing and drought-tolerant varieties with high yielder and large biomass trait. The crop has a significant potential in the eastern portion of Ethiopia, especially in East Hararghe, where it serves as a reliable source of food for local farmers. However, farmers are growing a native sorghum type that takes a long time to mature and is very vulnerable to drought and Striga weeds. One of the main causes of the area's low agricultural production and productivity is the lack of improved varieties that are high yielding, resistant to drought, and have broad adaptability. Therefore, the current study was initiated to test and release early maturing sorghum genotypes that are stable, high yielding, and adaptive for the East Hararghe lowland, mid altitude and similar agro ecologies of the region.

2. VARIETAL ORIGIN/PEDIGREE AND EVALUATION

Early maturing sorghum variety "Erer (2005MI5081)" was created and released by Oromia Agricultural Research Institute (OARI), Fadis Agricultural Research Center (FARC) for East Hararghe lowland, mid-altitude, and related Agro-ecologies. The genotype was first derived from the pedigree breeding program through crossing of landraces with early maturing elite breeding lines and improved varieties. The genotype was selected based on the overall field performance and adaptation to the targeted environment. It was assessed in several locations around Ethiopia [8] and specifically performed at the study sites (Babile and Fadis). Over the course of three years (2016/17–2019/20), five different genotypes were tested in two locations in the Babile and Fadis districts for yield and early maturing against one standard check called 'Dakaba'. Two promising genotypes, 2005MI5081 and IESV92168-DL, were planted on 10 x 10 m^2 at six different locations for a variety verification study in 2020 for evaluation. In 2021, "Erer" (2005MI5081) was officially recognized as the best sorghum variety for the lowland and mid-altitude agroecologies of East Hararghe.

3. AGRONOMIC AND MORPHOLOGICAL CHARACTERISTICS OF ERER

The "*Erer*" sorghum variety matures quickly (135–141 days), contains white, creamy seeds, and grows to a height of 180–200 cm on the plant. The "Erer" sorghum variety (Table 1) had 30 grams of 1000 seed weight, sweet juice stack, and remained green.

4. YIELD PERFORMANCE

"Erer (2005MI5081)" shown exceptional yielding capacity, with mean grain yields of 4.9 to 5.1 t ha^{-1} on the farmers' field and 3.4 to 4.0 t ha^{-1} on farmers' fields (Table 1). The novel variety's grain yield was roughly 18.75% higher than that of the common check Dakaba.

Table 1. Newly released Sorghum variety's morphological and agronomic characteristics

Variety Name	Erer (2005MI5081) 3443-2-OP/P9403
Agronomic and Morphological Characteristics	Fadis, Babile and others similar agro-ecologies
Adaptation areas:	
Altitude (m.a.s.l)	<1700 m
Rain fall (mm)	400 mm-700 mm
Seed rate (kgha^{-1})	8-10 kg ha^{-1}
Planting date:	Early June to Mid June
Spacing(cm)	15-20 between plant & 75 between rows
Crop reaction to weeds	*
Fertilizer rate(kg/ha)	
NPS (at planting)	100
Urea (at tillering)	100
Days to flowering	84
Days to maturity	141
Plant height (cm)	180-200
Panicle appearance	Semi-compact and erect
Crop reaction to major sorghum disease	*
1000 seed weight(g)	30
Seed color	White (creamy white)
Yields (Qt/ha)	
Research field	49-51
Farmers' field	34-40
Year of release	2021
Breeder/maintainer	FARC/IQQO

** Tolerant to Striga weeds (Striga hermonthica) and sorghum disease (anthracnose)*

5. ADAPTATION AND AGRONOMIC RECOMMENDATION

"Erer" is early maturing sorghum variety released for East Hararghe low lands, Eastern Ethiopia and similar agro ecologies. It is well adapted to altitude of 1300 -1700 m.a.s.l with annual rainfall 400 – 700 mm. Recommended fertilizer rate for "*Erer"* sorghum variety is 100 kg ha^{-1} NPS which is applied at planting and 100 kg ha^{-1} UREA which is applied 35-40 days after planting and the spacing between rows and plants is 75 and 15-20 cm respectively.

6. CONCLUSION AND RECOMMENDATION

Based on early maturity, high biomass (big stalk), staying green, and high grain production, the "Erer" sorghum variety was released for Eastern Oromia in particular, for East Hararghe (Babile and Fadis districts), and related agro-ecologies. Therefore, smallholder farmers and investors in East Hararghe and other similar agro ecologies across the nation could cultivate the 'Erer' sorghum variety in a profitable and sustainable manner.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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