

Editor's comments:

I recommend **minor revision**. Although the authors improved the ms substantially. Authors particularly pay attention to **re-write abstract and conclusion section** for more clarity to readers. Second important point is, author must include **soil characteristics of experimental site** along with meteorological data.

Author's feedback:

ABSTRACT

Sorghum (*Sorghum bicolor* (L). Moench) is an important staple food crop produced essentially under rainfed conditions in Mali. To preserve and exploit sorghum genetic diversity, germplasm collection was undertaken in 1978 across Mali. During this germplasm evaluation in 1982, a particular guinea sorghum cultivar from Chegue village in north western Mali, recorded as CSM63, was identified for its earliness and photoperiod insensitivity. This cultivar was unfortunately segregating not only for a testa presence, which is detrimental to Tô color and nutritional quality, but also for flowering time and plant height. Field screening coupled with the potassium hydroxide and bleach (KOH: B) tests were performed to eliminate testa while maintaining CSM63 agronomic values. Overall objectives were to trace history of CSM63 native population, screen for testa absence and define its favorable cropping zone. Field experiments were conducted at the Cinzana Agronomic Research Station (SRAC) while laboratory tests for testa absence and cooking quality were conducted at Sotuba Food Technology Laboratory (LTA) in Mali. Two thousand (2000) plants from original CSM63 population were grown in a complete isolation from other sorghum varieties to select 288 panicles for testa absence. For yield trial, a completely randomized block design was used with 3 replications. After series of selfing, a pure new line (CSM63-18-1AF) was identified without a testa with similar maturity, grain yield, better Tô color and nutritional values than the original CSM63. The new line was named CSM63E and its cropping zones were delimited beyond its center of origin. CSM63E was released for large scale production by Institut d'Economie Rurale (IER) and registered in National and West African Countries Regional Sorghum Catalogs. The adopted name is Jakunbe (prevent drought) in Bambara language) by farmers. Jakunbe is the number one certified sorghum seed produced in Mali in 2016 in term of quantity. Cropping both Jakunbe and late maturing varieties beyond isohyets 700 mm exposes farmers to yield losses caused by non-proper environment. Keywords: Sorghum, testa, collection, nutritional values.

5. CONCLUSION

Combined field screening and laboratory tests were efficient to eliminate testa in a sorghum cultivar in Mali. A pure line, CSM63E-18-1AF (CSM63E), was identified and released. The derived line and its original population are within same early maturity group. Derived line expresses better Tô color and nutritional values and is cropped beyond its center of origin with 400 mm of rainfall to 700 mm. This pure line has become an alternative solution for farmer to overcome drought and be more resilient. CSM63E is the number one certified sorghum seed produced in Mali. Cropping zone of CSM63E was defined, beyond which farmers are exposed to poor harvest, grain quality and specially damage due midge for late maturing sorghum varieties. This variety is grown outside Mali in West Africa Sahelian zone for its earliness and improved processed food qualities, thus overcoming hunger. Strong contribution from extension agents and NGOs are recommended to help farmers to maintain their seed genetic purity. Good agronomic practices and value added products coming from the improved cultivar can contribute to poverty alleviation in rural zones in west Africa.

3.1 Environmental conditions at the experimental site

The Cinzana Agricultural Research Station (SRAC) is five km from the Cinzana village. SRAC is located in the Sahelian zone of Mali (Figure 3) with geographic coordinates of 13°15' N; 5°58' W and 265 m of altitude. SRAC is 45 km from its regional capital, Ségou. It has mono-modal rainfall pattern with distinct rainy season in summer accounting on average for 690 mm. Mean annual maximal temperature is 35.6

°C and minimal is 19.3 °C (Figure 1) with a maximum day length of 12h47. Maximum temperatures are recorded from April to May and the minimum from December to February. The climate is characterized by an inter-annual variability of rainfall, turbulent high intensity, and irregular intra-season rains. The soil is classified as a leached tropical ferruginous soil with spots and concretions for the Station and loamy-sand type with pH varying from 5.5 to 6 (slightly acid) at the experiment site.