GENETIC STOCK

GU04(28) EO-2: A NOVEL INTERGENERIC HYBRID BETWEEN *ERIANTHUS PROCERUS* AND *SACCHARUM OFFICINARUM*

The narrow genetic base of sugarcane varieties has been a serious constraint in improving the productivity of the crop, despite sustained breeding efforts. Among the wild relatives of sugarcane, *Erianthus* spp. show greater promise for broadening the genetic base of sugarcane varieties due to their greater divergence with *Saccharum.* In view of this, efforts were made at ICAR-Sugarcane breeding institute, Coimbatore, India, to introgress *Erianthus* into *Saccharum* to develop genetic stocks with a broader and diverse genetic base. A novel intergeneric hybrid between *Erianthus procerus* and *Saccharum officinarum* was developed under the genetic base broadening programme at the Institute during 2004. The hybrid GU04(28) EO-2 was obtained from a cross between IND 90-776 *(E. procerus)* and PIO 96-435, an intraspecific hybrid of *S. officinarum*. The *Erianthus* parent shows good ratoonability, tolerance to abiotic stresses like drought and cold, and resistance to pests and diseases. Among the progenies from this cross, GU04(28) EO-2 was identified as a true hybrid through molecular marker analysis using genus-specific SSR and 5srDNA markers (Anonymous 2011). Markers from both *Erianthus* and *Saccharum* parents were present in the hybrid. The hybrid was characterized for agro-morphological traits, red rot resistance and drought tolerance.

Characterization of GU04(28) EO-2 for agro-morphological traits and drought tolerance

Morphologically, GU04(28) EO-2hybrid possesses traits of the parents with erect growth habit, purplish green canes, long internodes, prominent buds, tall and relatively thin canes, dark green leaves and a closed canopy (Fig. 1). The leaf sheath is pinkish, tightly clasping with medium waxiness and devoid of spines. The leaf blade joint is hairy on the upper surface extending to the midrib as in the Erianthus parent. The hybrid has a characteristic deltoid ligule and, unlike the *Erianthus* parent, a distinct green dewlap. The hybrid has been found to flower regularly at Coimbatore. The low pollen fertility of the hybrid (5.5%) allows it to be used as a safe female parent in introgression programmes. Back crossing of the hybrid with commercial varieties

Fig. 1. Morphological attributes of GU04(28) EO-2: (a) field stand (b) nodal region with prominent bud (c) ligule and hairy leaf joint

Table 1. Evaluation of GU04(28) EO-2 for stalk yield and juice quality traits

Hybrid/Clone	NMS* ('000/ ha)	Stalk weight (kg)	Stalk girth (cm)	Stalk height (cm)	Stalk yield (t/ha)#	Juice Brix (%)	Sucrose (%)	Purity (%)	CCS (%)
GU04(28) EO-2	160.00	0.70	1.30	220.00	112.0	13.92	8.20	58.90	4.31
Co 86032	92.60	1.15	2.90	200.00	106.5	21.18	18.77	88.60	13.00

*Number of millable stalks; # calculated yield

during the flowering season of 2013 produced viable progenies.

The hybrid was evaluated clonally along with commercial checks during 2013-14 (Table 1). The hybrid recorded a higher shoot population (1,60,000/ha) but was relatively thin with a low average stalk weight of 0.700 kg. The hybrid yielded over 100 t/ha of harvestable stalks. The juice quality of the hybrid was intermediate compared to the parents with a juice brix of 13.92% and sucrose% juice of 8.20. When evaluated for red rot resistance by CCT method (Mohanraj et al. 1997) using *Cf*671 and *Cf*94012 isolates, the hybrid was found to be resistant to the disease.

The hybrid was evaluated along with 19 other entries and commercial checks for drought tolerance during 2013-14 by imposing water stress from 60 days after planting till harvest by withholding irrigation (Anonymous 2014). GU04(28) EO-2 recorded the lowest drought susceptibility index (DSI) of 0.13 and the highest drought tolerance efficiency (93.99%) among the entries. The hybrid thus has potential as a source for drought tolerance.

Registration as genetic stock

GU04(28) EO-2 is a unique hybrid as it is from a rare combination involving *Erianthus* as the female parent. The hybrid was registered as a unique germplasm (IC0612056; INGR15032) with the National Bureau of Plant Genetic Resources, New Delhi, during August 2015.The hybrid had shown good yield potential, though the sucrose content was in the intermediate range. It is drought tolerant and also resistant to red rot disease. Most importantly, it has *Erianthus* cytoplasm and could serve as a potential genetic stock for diversifying the genetic base of sugarcane varieties at both cytoplasmic and genomic levels.

References

Anonymous (2011) Annual Report 2010-11. Sugarcane Breeding Institute, Coimbatore. pp. 31.

Anonymous (2014) Annual Report 2013-14. Sugarcane Breeding Institute, Coimbatore. pp. 48.

Mohanraj D, Padmanabhan P, Alexander KC,Viswanathan R (1997) Sugarcane screening for red rot resistance. Sugarcane 3:18-23.

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