

SHORT COMMUNICATION**ORNAMENTAL CHEWING CANES****K. Chandran*, M. Nisha and P.P. Gireesan****Abstract**

Sugarcane is mainly grown for commercial sugar and for its by-products like molasses, ethanol, press mud and for co generation of power. The present day cultivated sugarcane are complex hybrids tailor made for commercial sugar with high yield, disease resistance, high sucrose content and with maximum juice extraction. During the breeding and selection process the chewing quality, the attractive rind colour and stripeness that were predominant in the 'noble' canes have been lost. This paper discusses the potential of the noble cane collection for ornamental and chewing purpose. The study revealed that among the striped clones the Creoula Rayada, Striped Mauritius, Chittan, Louisiana striped, Rayada, Preanger striped, 57 NG 149 and 57 NG 172 have the potential as ornamental chewing canes with beautiful rind and among the clones with purple coloured leaves 28 NG 13, IJ 76-552, IJ 76-556 and NG 77-117 were with better sucrose content and CCS yield.

Key words : chewing, sugarcane, saccharum

Saccharum officinarum a large tropical grass originated from Papua New Guinea was grown by the natives of this region as ornamental plant and as chewing cane in home gardens. These cultivated garden canes are known for their ornamental value besides the soft rind, juicy, sweet and thick canes. During 1920's the Dutch Scientists coined the term 'Noble Cane' to describe this species with bizarre morphological and agronomical characteristics which have the ability to 'ennoble' wild inferior forms of *Saccharum* by hybridization. The attractive rind colour, stripes and purple pigmented leaves makes *S.officinarum* as a good ornamental plant coupled with remarkable food value. Hackel (1889) divided *S.officinarum* into three groups 'genium' with yellow-green sugarcane, 'violaceum' with purple coloured leaves and 'litteratum' (yellow green rind with red stripe). Though this classification

was not much useful for breeders it is very useful for ascertaining the ornamental value of it.

The wide and exclusive use of this species in the early periods in Papua can be realised from the quotes of Wallace (1894) that the "aborigines of Papua were half live on it and feed their pigs as well". Chewing for sweet raw juice was the primary mode of consumption before the discovery of crystallization of sugar during the Gupta dynasty, around 350 AD and the invention of rollers. The aborigines were attracted by the colour and chewing qualities and hence their selection was mainly towards a soft rind with high juice content and sweetness (Artschwager and Brandes 1958). It is reported that some of the genotypes like Purple Mauritius, B 208 and Fiji B possessed special qualities for chewing viz., soft rind, high juice content and sweetness (Thirumala Rao 1954).

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Saccharum officinarum clone “Pele Smoke” an ornamental sugarcane along with Purple sugarcane, Burgunda sugarcane, Black magic, Akoki and Hawaiian Sugar plants were marketed as ornamental plants to a limited extent. Less popularity of sugarcane as an ornamental plant may be due to lack of modern varieties with attractive rind stripe and/or pigmentation and unavailability of the noble canes under cultivation. However, literature shows that the primitive tribes in New Guinea were attracted towards bright and unbelievable array of colours of these *S. officinarum* plants that might have resulted in brilliant attractive coloured and striped varieties which are characteristics of Papuan garden canes (Stevenson 1965). Hence the present study was conducted to understand the potential of the *S.officinarum* clones for ornamental and chewing purpose.

The 110 *S.officinarum* clones with rind stripes and 10 clones with purple leaves from the world collection of sugarcane germplasm maintained



Fig. 1. A collage of noble cane stalks

at ICAR-SBI Research centre were observed for cane morphological characters and quality traits. The germplasm field is located at Kannur, Kerala, India (11°52 N, 75°25 E, 11m MSL, mean annual rainfall 3500 mm). The clones were maintained in single row of 6ft long with a spacing of 90 cm between rows. Cultural practices of cultivated sugarcane are adopted for germplasm maintenance. The morphological features were observed at 8th month of the crop and the quality traits at 7th month and 10th month.



Fig. 2. Prominent rind stripes in *S.officinarum*

The world collection of sugarcane germplasm housed at ICAR-Sugarcane Breeding Institute Research Centre Kannur possess 757 accessions of *S.officinarum* with varied rind colour, stripes, distinct internodes and leaf colour indicating their potential for exploiting the ornamental value (Fig 1). Among these accessions 110 clones have vertical rind stripes with different combination of primary and secondary colours as yellows, reds, greens, purples etc in varying intensities and 10 clones with purple leaves. The prominence of stripes and intensity of various colour was also noticed in several clones. Among them, Green primary colour with purple stripes as in NC 104 (Fig 2A), Purple primary colour with yellowish green stripes as in NG 77-67 (Fig 2B), Red primary colour with Dark purple stripes as in Cavengerie 972 (Fig 2C), Yellowish green with Green stripes as in 57 NG 243 (Fig 2D), Yellowish brown with Dark purple stripes as in Governor (fig 3A) etc are the main types of rind stripes observed in this collection.

In sugarcane NMC and stalk thickness or single cane weight is positively correlated with the yield of the crop. In canes with striped rind the number of millable canes had range from 6 to 41, stalk thickness 1.76cm to 3.7 cm, stalk length 179cm to 358cm and single cane weight ranging from 0.3kg to 2.7kg. The brix at 7th month was ranging from 11.1 to 21.6%, at 10th month 11.8 to 21.9% and sucrose at 10th month 5.5 to 20.5%. It indicate that the sugar accumulation is reaching almost maximum at 7th month and it can be used as chewing canes from 7th month onwards. The clone 51NG 131(fig 3B) had rind stripes and peculiar tumescent curved internodes which make it as a beautiful ornamental plant. Among the striped canes, Creoula Rayada (20.9%) , Striped Mauritius (18.8%), Chittan (18.8%), Louisiana striped (18.3%), Rayada (18.3%), Preanger striped (17.4%) , 57 NG 149 (17.2%) and 57 NG 172(17%) are some of the genotypes with ornamental value and with high sucrose content in the juice which makes them amenable for chewing purpose.

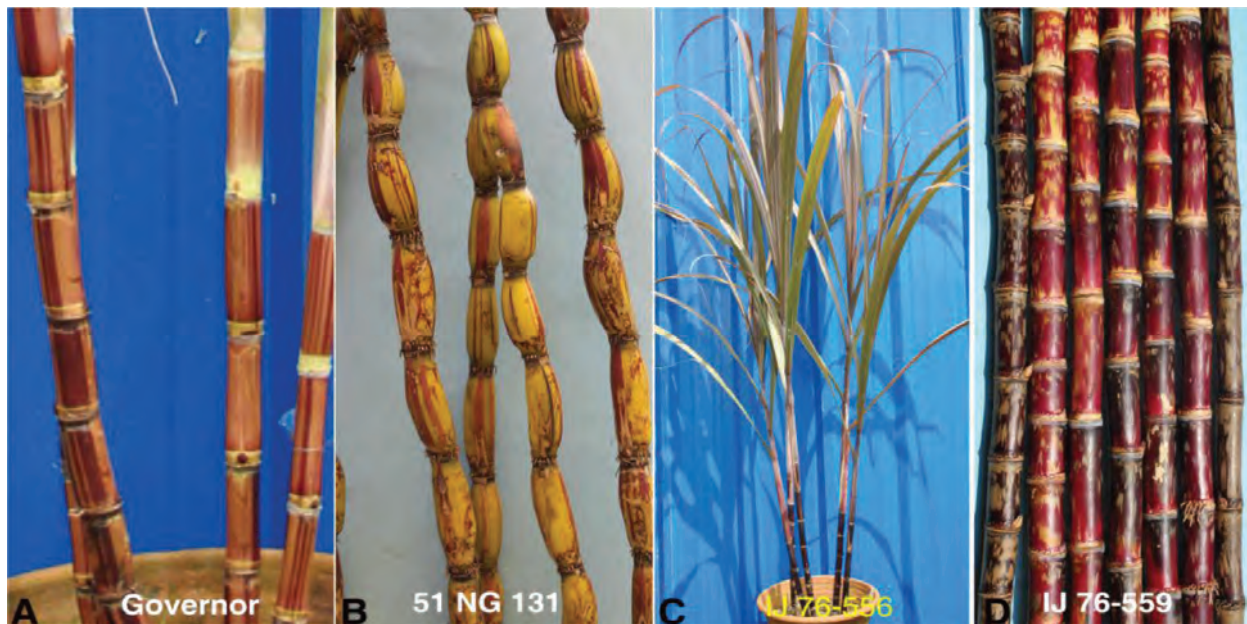


Fig. 3. Cane and leaf variants in *S.officinarum* clones

The accessions with purple coloured leaves were, BOETOTA BILATOE, IRENG MALANG, 28 NG 13, 51 NG 142, IJ 76 314, IJ 76 522, IJ 76 556 (Fig 3C), IK 76 29, IK 76 65 and NG 77 117 which is also an unique morphological trait of aesthetic value. These genotypes invariably possess attractive dark purple colour rind. In case of the clone IJ 76-559, the weather marks forms beautiful ornamentation (Fig 3D) further adding to its aesthetic appeal. In the purple leaved clones, the leaf length ranged from 129 to 167 cm with a leaf width of 3.6 to 5 cm. The cane thickness ranged from 1.7cm (IJ 76-552) to 2.02cm (IJ 76-552), cane length 149 (IK 76-29) to 309cm (51 NG 142), brix 10.6% (IK 76-29 to 20.24 (51 NG 142), sucrose 6.08% (IK 76-65) to 12.74 (51 NG 142), single cane weight 0.35kg (IK 76-29) to 1.08kg (NG 77-117). Among the clones with purple leaves, 28 NG 13, IJ 76-552, IJ 76-556 and NG 77-117 were better for CCS yield. Initially, the tender leaves are completely purple but later change to greenish purple on maturity. None of these clones with purple coloured leaves are flowering types and hence transferring of this trait and further studies on its inheritance is not available. However, a leaf mutant with greenish purple leaf was reported in *S.edule* clones (Premachandran 1994) and he suggested that the leaf colour trait might have developed as a result of transposable elements activity on gene acting on anthocyanin synthesis. In purple leaved clones the sugar content was relatively low (6.08 to 12.7%) compared to other *S.officinarum* clones.

In India only 1% of cane produced is used for chewing and juice extraction. The consumption of chewing canes for Pongal alone in Tamil Nadu is estimated at about 90,000 to 1 lakh tonnes. The importance of chewing cane and the demand for

them on festive occasions like pongal in the states of Tamil Nadu, Andhra Pradesh, Telengana and Karnataka offers great scope in identification of ornamental chewing canes. Tanjavore district in Tamil Nadu cultivate chewing canes in 200 acres during festival time (source: The Hindu, December 27, 2012). In Nigeria soft cane production has accounted for about 60% of total sugarcane production over the years (Wayagari et. al. 1999). It has been estimated that an area of 18,000 hectares out of 25,000-35,000 hectares is under soft cane cultivation (Nmadu et al. 2013) which shows the growing importance of chewing cane.

Across the globe, growing of chewing sugarcane as ornamental plant is gaining importance and clones like Florida Red, Java Green, Green canes with red stripes, ribbon canes are being raised for beautiful landscapes. In an earlier study the variety waxy red and some improved lines of *S.officinarum* (PIO 90-196, PIO 90-99, PIO 90-224, PIO 88-136 and PIO 88-76) were identified as promising canes for chewing purpose (Rakkiyappan et al. 2003). However, the aesthetic appeal for ornamental purpose was not considered in their studies.

The ornamental chewing canes can be easily grown in house hold and even in pots which make them good ornamental edible plant as delicious as they are decorative. These evidences indicates that there is a good potential for soft chewing canes and the added ornamental value can increase the demand and pave new way for additional income.

Acknowledgement

We thank the Director, Sugarcane Breeding Institute, Coimbatore and Head, Division of Crop Improvement for providing facilities, support and encouragement.

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