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Edited by
Thomas W. Zimmmerman, Stafford M.A. Crossman,
Errol Chichester and Wilfredo Colón

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SORREL HYBRIDS: FRUIT SIZE EVALUATION

Thomas W. Zimmerman, Kalunda J. Cuffy, Carlos Montilla and Stafford M.A. Crossman, University of the Virgin Islands Agricultural Experiment Station, RR#1 Box, 10,000, Kingshill, VI, 00850 Email: tzimmer@uvi.edu

Abstract: Sorrel (*Hibiscus sabdariffa*) also known as Roselle, is in the malvaceae family and popular in the Caribbean as a seasonal beverage. The objective of the research was to compare sorrel F_1 and F_4 hybrids as it relates to calyx length, width and spur size. The deep colored fleshy calyces were collected and evaluated from KxT F_1 and TxK F_1 and F_4 lines that were field established in June. Overall the TxK hybrids had darker fruit then the KxT lines. Varieties TxK F_1 and KxT F_1 had the same fruit length which was significantly longer than the hybrid TxK F_4 line. The calyx width among these hybrids was not statistically different. The epicalyx or spur length for the KxT F_1 line was significantly longer than the TxK lines. Hybrid vigor was evident in the F_1 lines for fruit length but is diluted by the F_4 generation. This research was supported by USDA-Hatch and USDA-NIFA-Insular Tropical Grant funds.

Keywords: Roselle, *Hibiscus sabdariffa*, Breeding

INTRODUCTION

Sorrel, *Hibiscus sabdariffa* also known as Roselle, Red sorrel, Jamaican sorrel, Indian sorrel, Guinea sorrel, sour-sour, Jelly okra, Lemon bush, Karkade, Florida cranberry, etc. (James, 2012) is a fruit in the hibiscus family commonly used to make juices and teas as well as jams, jellies and several other items around the world. Sorrel is high in calcium, potassium and vitamin A and C (Martinez, 2011). The flowers, fruits and leaves of the sorrel are edible. The most common sorrel is the red that produces during the short day length. Prior to the initiation of a breeding program for sorrel, the extent of out crossing in this species in the western hemisphere was unknown. In addition, there was no information on possible natural cross-pollination between local Jamaican varieties grown adjacent to one another in small plots, although foraging by honey bees and other insects had been observed in fields planted with sorrel (Vaidya, 2000). Akpan (2000) reported an outcrossing rate of <1% in sorrel based on experiments conducted adjacent to breeding nurseries. The objective of the research was to compare sorrel F_1 and F_4 hybrids as it relates to calyx length, width and epicalix size.

MATERIALS AND METHODS:

In June 2013, the AES's Biotechnology program planted the sorrel seeds. The F_1 and F_4 sorrel hybrids were transplanted to the field July, 2013. A variety of tools and factors were used to conduct the research. A greenhouse was used to house the plants in their fragile adolescence, providing a safer and growth friendly environment. At the height of 6 cm, (two weeks from seed germination) they were transplanted to the field at 0.67m by 1m. Drip tape was used to water the plants regularly. At two week intervals, the fruits were harvested, counted and the calyx length, width and spur (epicalyx) length recorded. The field was weeded frequently, and fertigation was used to supply required nutrients. Fertigation is a combination of fertilizer and irrigation water.

RESULTS AND DISCUSSION

The size of calyxes from the F_1 sorrel hybrid KxT are shown in Figure 1. As seen in the graph, most of the plants yielded calyx averages that had a length of, or over 60 mm with the exception of 4 plants. KxT-4 had the highest average length of about 70 mm. In Fig 2. TxK F_1 is shown. Most of the calyx lengths for this hybrid were just below 50, but 3 plants did exceptionally well with lengths ranging from 65 to 75 mm. Fig. 3 shows the TxK F_4 hybrid; the lengths are roughly 60 mm. Overall the TxK hybrids had darker fruit than the KxT lines. As seen in Fig. 4, the varieties TxK F_1 and KxT F_4 had the same average calyx length which was significantly longer than the hybrid TxK F_1 line. The calyx width among these hybrids was not statistically different. The epicalyx or spur length for the KxT F_1 line was significantly longer than the TxK lines. Fig 5. shows employees of biotechnology, Henry Harris and Carlos Montilla harvesting the sorrel, as well as a close up of a sorrel calyx.

CONCLUSION

The F_1 hybrid KxT and the selected F_4 TxK sorrel calyxes had longer calyxes than F_1 TxK. Selection in successive generations can fix the characteristic of calyx length. Continued research is needed to determine hybrid combinations that will be more vigorous and productive to combine and set desirable characteristics.

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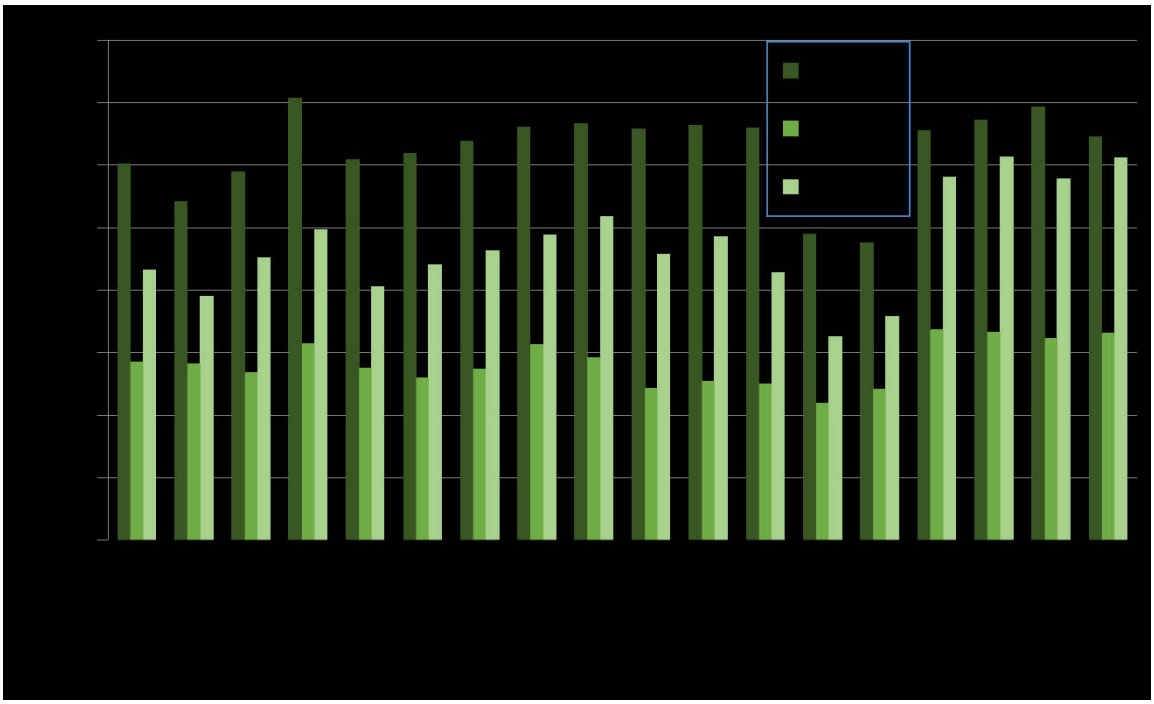

Fig. 1. Calyx measurements of Sorrel K x T F_1 hybrids.

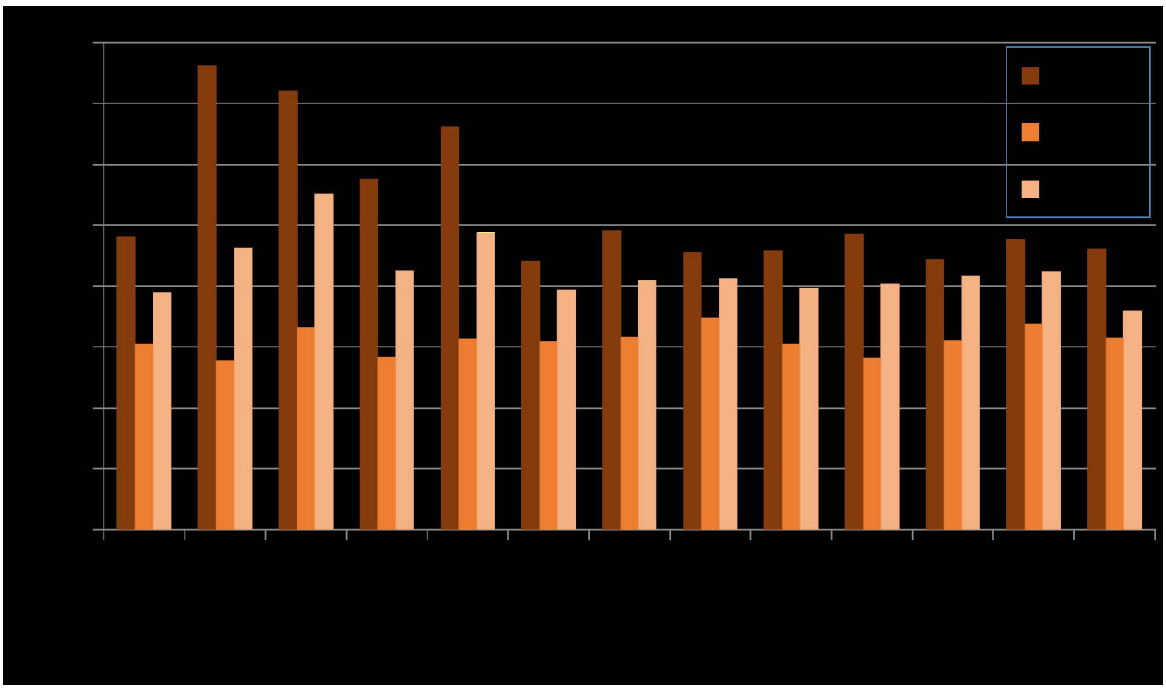

Fig. 2. Calyx measurements of Sorrel T x K F_1 hybrids.

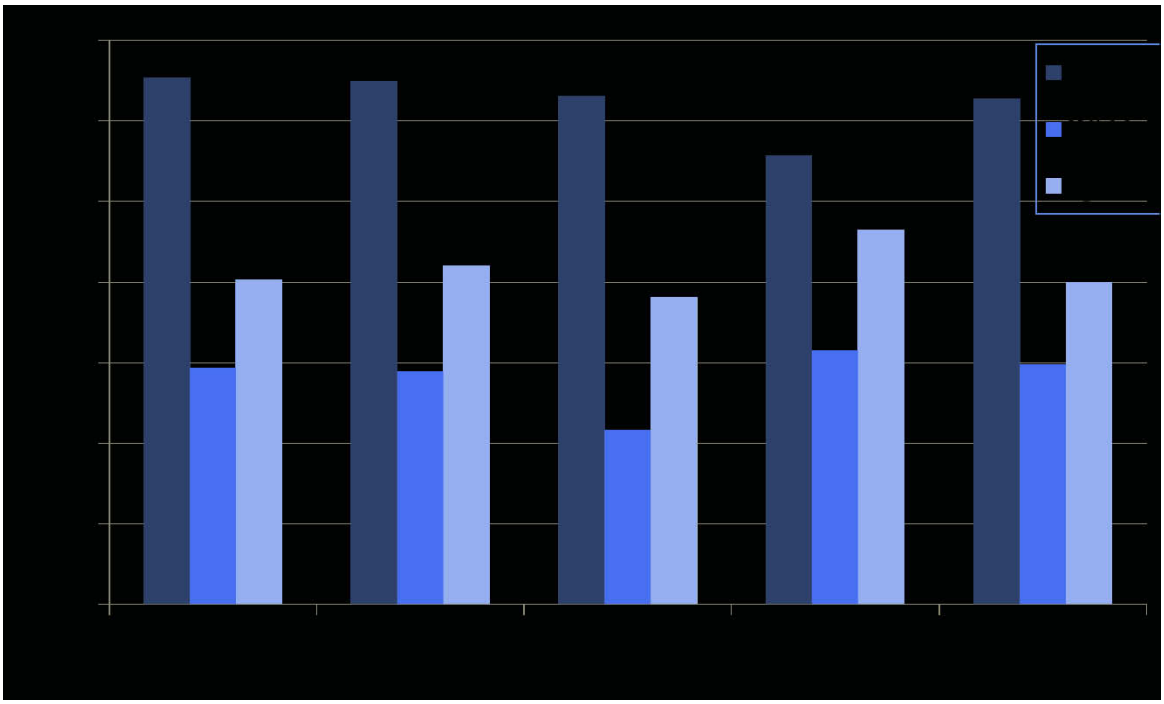

Fig. 3. Calyx measurements of Sorrel T x K F_4 hybrids.

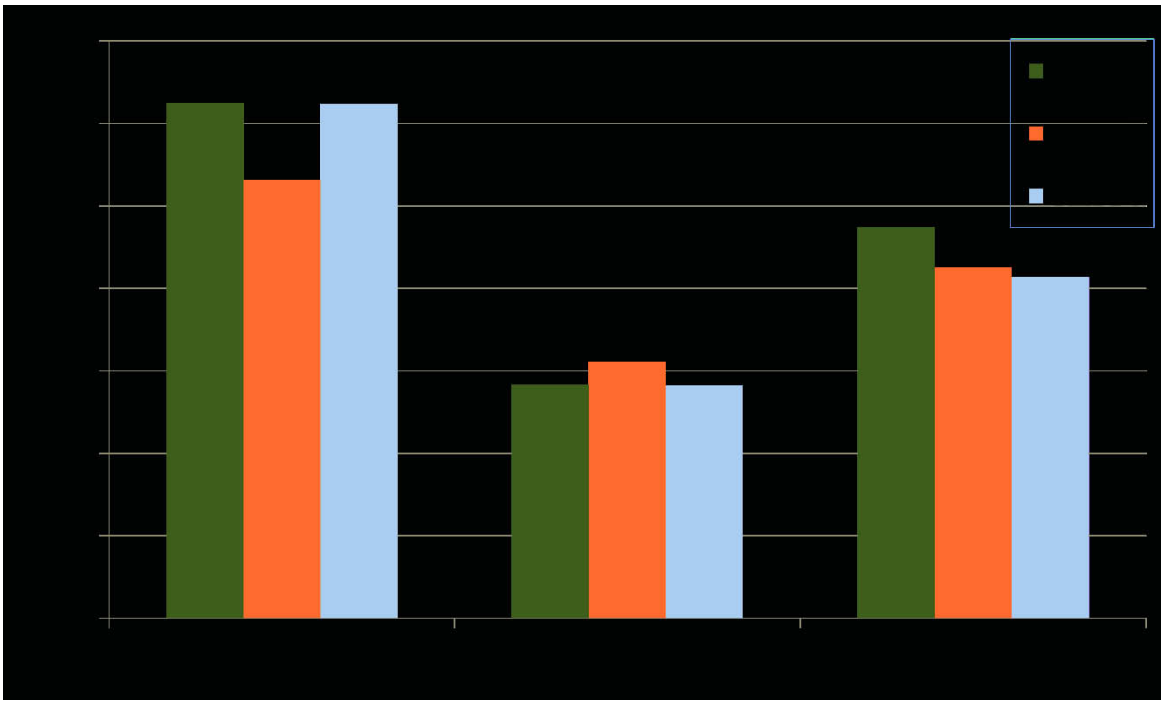

Fig. 4. Average Sorrel calyx sizes for the hybrids.

Fig. 6. Hybrid Sorrel harvest left and closeup of sorrel calyx and spur shaped epicalyx.