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CARIBBEAN FOOD CROPS SOCIETY

50

**Fiftieth
Annual Meeting 2014**

**St. Thomas, United States Virgin Islands
Volume L**

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SORREL HYBRIDS: FRUIT SIZE EVALUATION

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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 F₁ and F₄ hybrids as it relates to calyx length, width and spur size. The deep colored fleshy calyces were collected and evaluated from KxT F₁ and TxK F₁ and F₄ lines that were field established in June. Overall the TxK hybrids had darker fruit then the KxT lines. Varieties TxK F₁ and KxT F₁ had the same fruit length which was significantly longer than the hybrid TxK F₄ line. The calyx width among these hybrids was not statistically different. The epicalyx or spur length for the KxT F₁ line was significantly longer than the TxK lines. Hybrid vigor was evident in the F₁ lines for fruit length but is diluted by the F₄ 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 F₁ and F₄ 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 F₁ and F₄ 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 calyces from the F₁ 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 F₁ 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 F₄ 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 F₁ and KxT F₄ had the same average calyx length which was significantly longer than the hybrid TxK F₁ line. The calyx width among these hybrids was not statistically different. The epicalyx or spur length for the KxT F₁ 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 F₁ hybrid KxT and the selected F₄ TxK sorrel calyces had longer calyces than F₁ 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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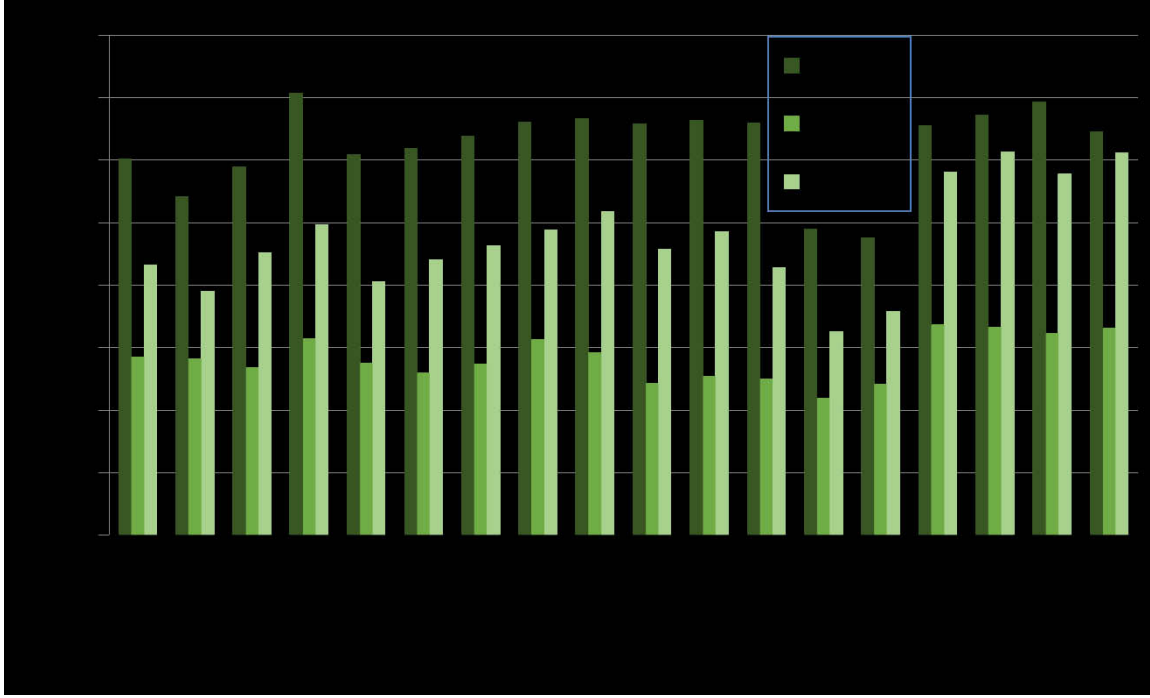


Fig. 1. Calyx measurements of Sorrel K x T F₁ hybrids.

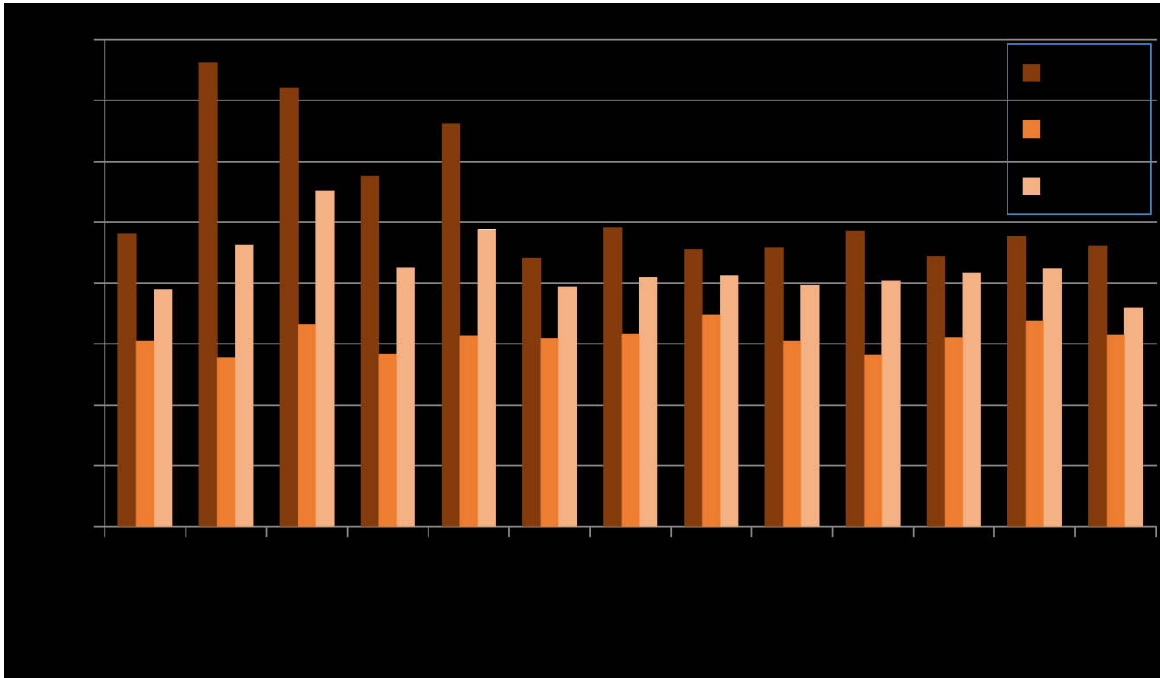


Fig. 2. Calyx measurements of Sorrel T x K F₁ hybrids.

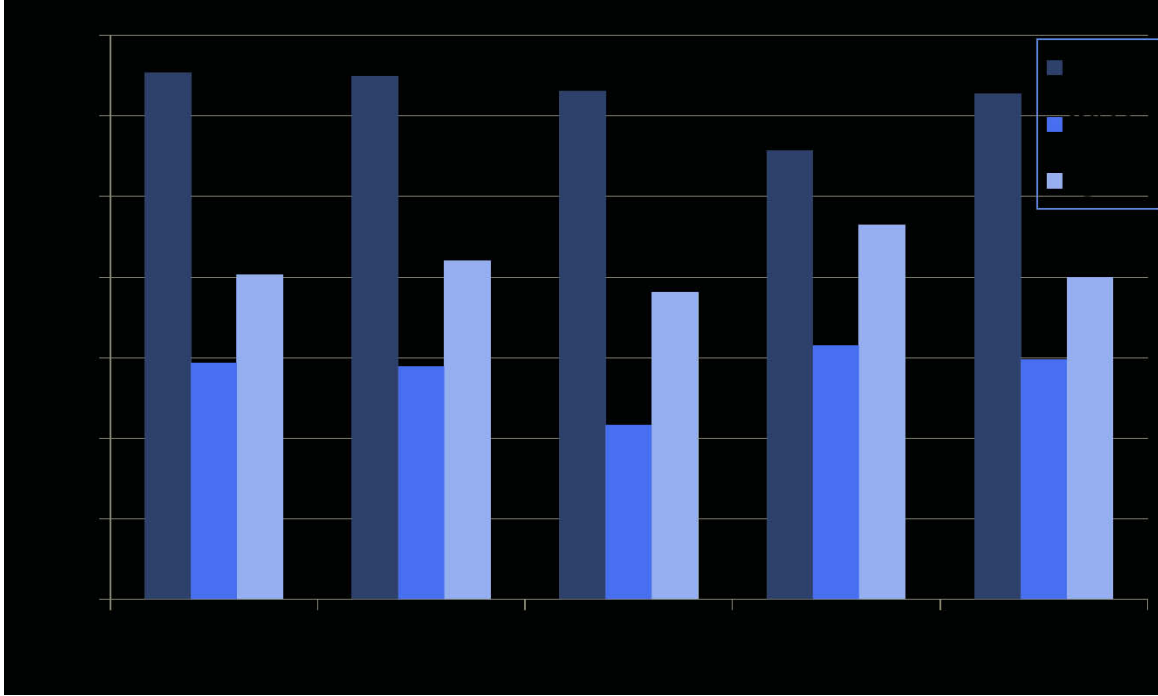


Fig. 3. Calyx measurements of Sorrel T x K F₄ hybrids.

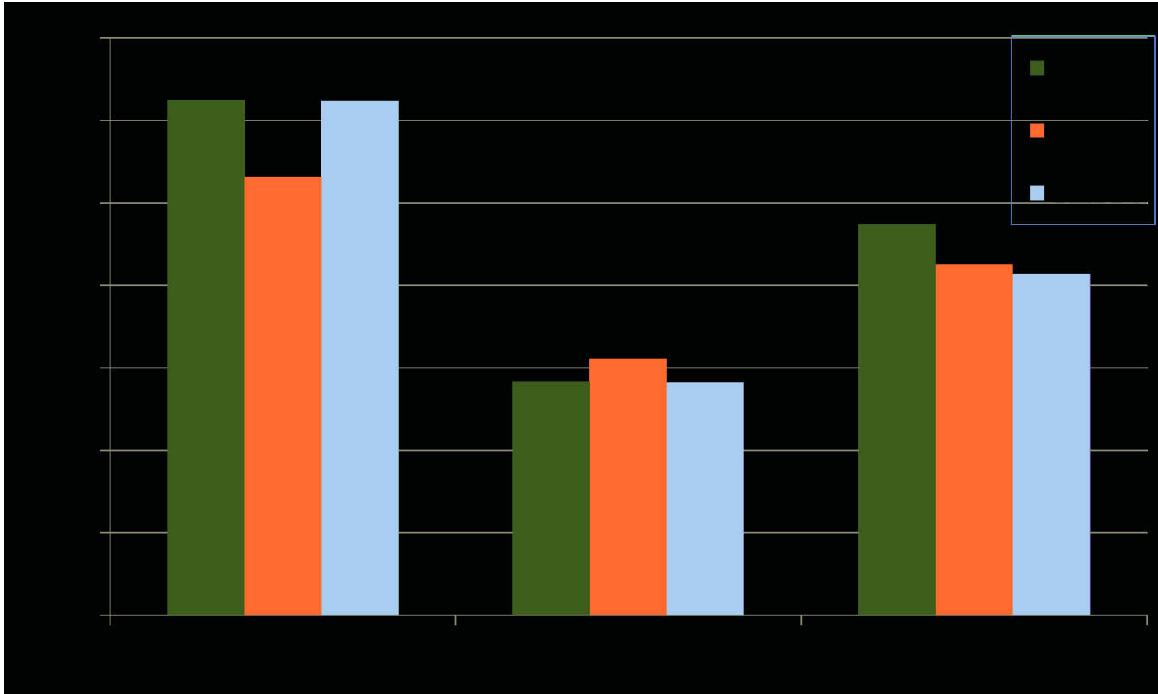


Fig. 4. Average Sorrel calyx sizes for the hybrids.



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