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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 epicalyx 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 calyxes from the F\textsubscript{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\textsubscript{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\textsubscript{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\textsubscript{1} and KxT F\textsubscript{4} had the same average calyx length which was significantly longer than the hybrid TxK F\textsubscript{1} line. The calyx width among these hybrids was not statistically different. The epicalyx or spur length for the KxT F\textsubscript{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\textsubscript{1} hybrid KxT and the selected F\textsubscript{4} TxK sorrel calyxes had longer calyxes than F\textsubscript{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.

REFERENCES


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.