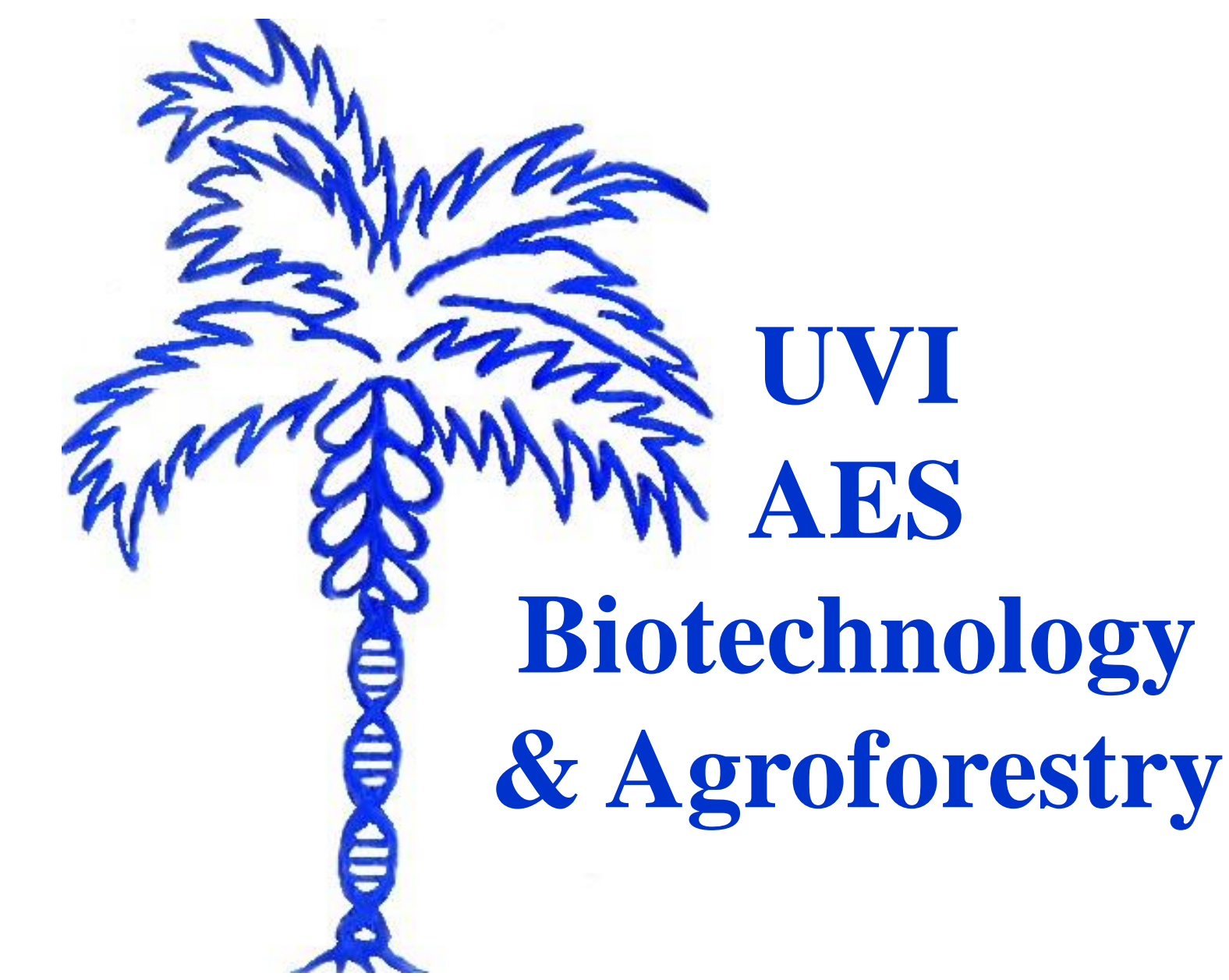




Predicting Harvest Date from Sorrel Bud and Calyx Measurements

Shamali Dennerly and Thomas W. Zimmerman

University of the Virgin Islands Agricultural Experiment Station RR#1 Box 10,000, Kingshill, VI 00850



Introduction

Sorrel (*Hibiscus sabdariffa*), is a tropical plant grown in the Virgin Islands for its red fleshy calyx and used during the holiday season. Sorrel is a both traditional and seasonal drink throughout the Caribbean. The Calyxes can be used as beverage, when boiled in water. The juice from the calyxes' is known to be a rich source of vitamin C, containing anthocyanins and other antioxidants. Breeding work at UVI-AES has developed sorrel varieties to extend the season normally December through January to October through May. The objective was to measure sorrel bud and calyx development and use it to predict days to harvest the calyxes. Three inbred varieties and two hybrids were used.

Materials and Methods

Five sorrel varieties TTB, 100, 128xK, KDN and Tx245 were sowed into seedling trays in January 2015. Plants were watered daily and later transplanted to 1.5 gallon pots until they obtained a height of 2 feet (Fig. 1). They were then transplanted into 5 gallons pots using pro-mix soil mixed with native topsoil to keep to soil from drying out quickly. The plants were staked with a 3 ft stake and fertilized weekly with a complete fertilizer. A 5 ft stake was added to support the growth after 3 weeks. When floral buds appeared, the buds were labeled and measured with a caliper using millimeters. Three sequential floral buds were tagged on six plants of each variety. Length and width measurements of the flower buds were taken bi-weekly, when flowers emerged calyx development began and measurements were recorded until it stopped growing in size for a week. Sorrel was harvested in April. Seed development occurs at this point were the width of the floral bud expands. Data was analyzed using a regression model.



Figure 1. Sorrel plants prior to transplanting to larger pots (left). Close up of developing floral buds (right).



Figure 2. Young Sorrel floral buds length measured when they appeared (left). Measuring calyx width on a flowering sorrel (right).

Results and Discussion

The KDN sorrel variety was the first to induced flower buds early due to its day neutral characteristic at about 1 ft in height. The other four varieties induced flower buds two weeks later. Anthesis began between days 17-22 of floral development. From a 4 mm bud length, it took 17 days to grow to a length of 25 mm when anthesis occurs for KDN, TTB and Tx245 (Fig. 3). Both 128xK and 100 required 21 day to anthesis from 4 mm long bud (Figure 3). The rate of bud growth averaged 1 mm per day to anthesis. At and after anthesis, the calyx length increased an average of 2 mm per day until the calyx reached full harvestable size (Fig. 4). However, varietal differences in calyx size determines the days postanthesis to harvest. Variety KDN had mature size harvestable calyxes eight days after flowering while larger calyx varieties 128xK and Tx245 required three weeks from anthesis to obtain the full calyx size (Fig. 4). The sorrel fruit began to grow twice as fast after flowering. Duke and duCellier (1993) reported that calyxes ripen about three weeks after the start of flowering. Our results indicate that variety has a strong influence determining when to harvest that ranged from 8 to 21 days. Flower bud length can be used to determine time to flower but the variety determines final calyx size and harvest date. However, if one knows the varieties fruit development characteristics and final calyx length, the size of the bud can be used to predict harvest date. For variety KDN, there is no added benefit leaving the calyx on the plant a week after flowering since no great calyx size is obtained. KDN calyxes reach marketable size in a week while varieties TTB and 100 require two weeks and the hybrids 128xK and Tx245 need three weeks.

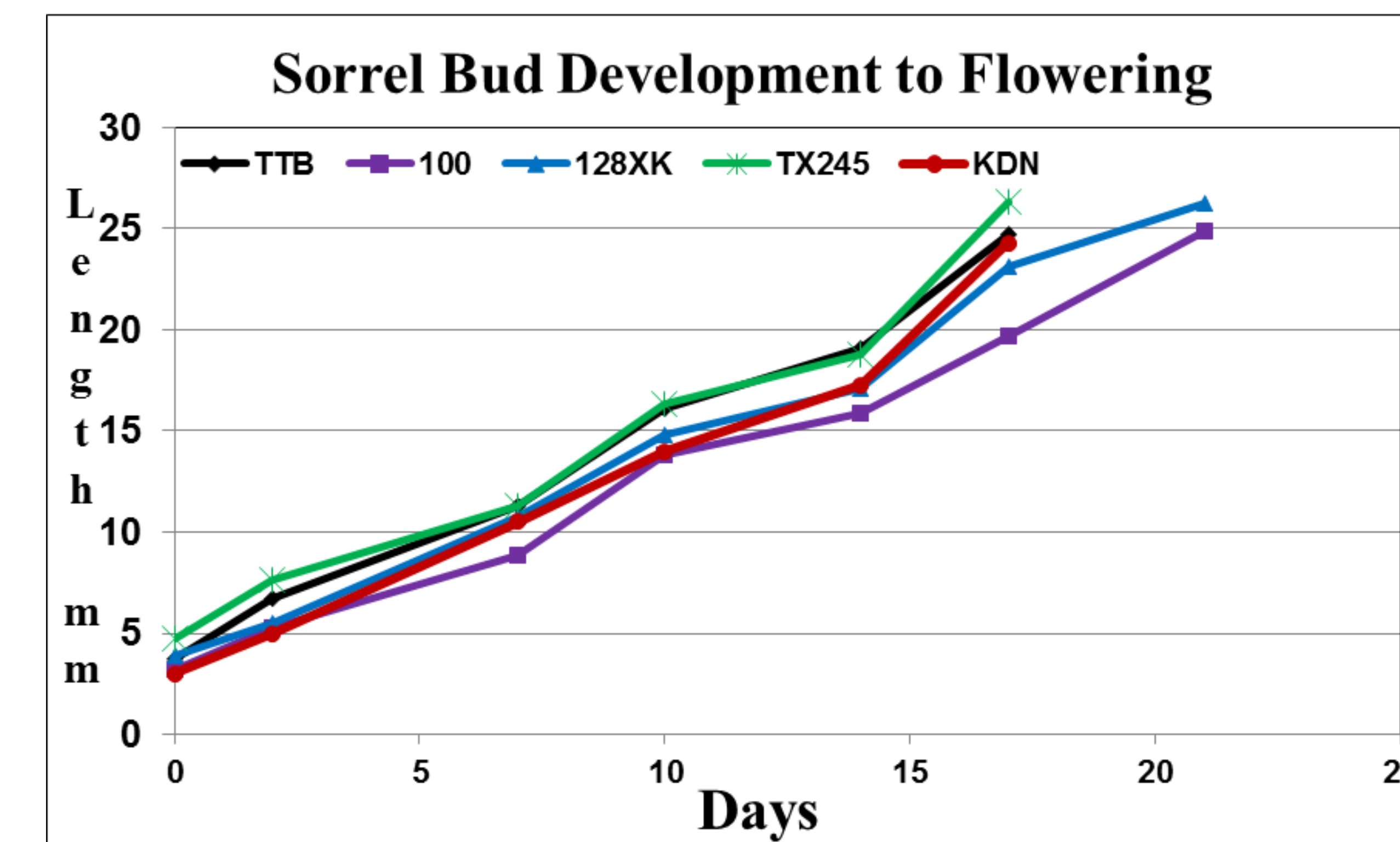


Figure 3. Length of floral buds over time to anthesis.

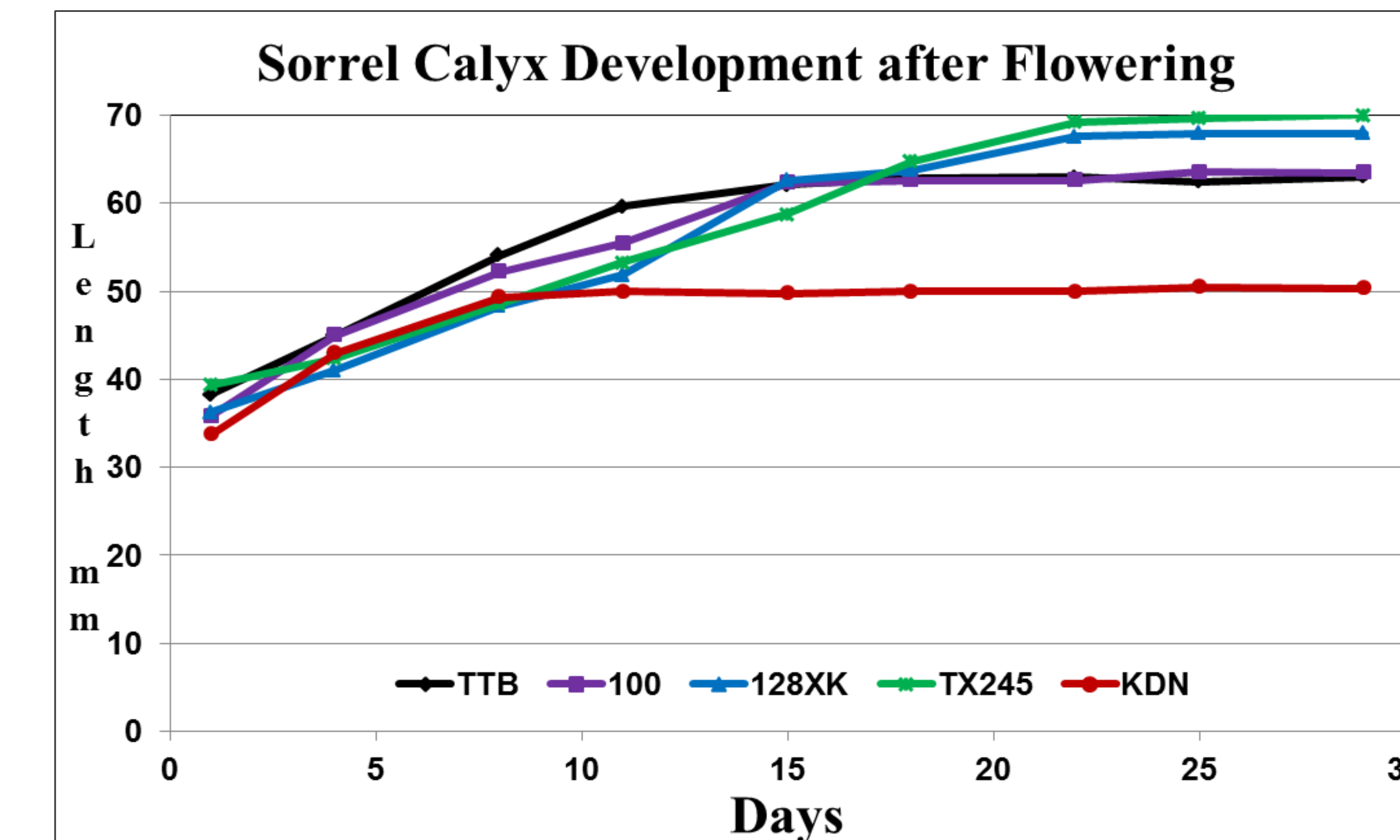


Figure 4. Length of floral calyxes over time from anthesis to harvestable size.

Conclusion

January planting of sorrel resulted in floral induction within a month after germination due to the short-day photoperiod. Both developing floral bud length and width can be used to predict flowering and harvest date for these sorrel varieties. This can be used by growers to plan the harvest and determine marketing potential.

Literature Cited

Duke, J.A. and duCellier, J.L. (1993). CRC handbook of alternative cash crops. CRC Press, Boca Raton, FL, USA. 536 pp.

Acknowledgement

The research for this project was supported by grants from the USDA-NIFA-Insular Islands 250439-6470-310 and USDA-NIFA-Hatch 201054-6470-310 programs.