

**POSSIBLE INFLUENCE OF FLOWER CARBOHYDRATES ON THE FLOWER QUALITY OF COCONUT IN RESPONSE TO VARIATIONS IN WATER AVAILABILITY PRIOR TO FLOWER OPENING**

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Drought and high temperature prior to and during the early flowering stage may affect reproductive organs and processes of coconut. It is hypothesized that climatic factors especially during the two month period prior to flower opening, could influence flower quality and yield of coconut in a changing climate. This study assessed the influence of climatic variability, mainly temperature and rainfall, during the final stage of inflorescence development on carbohydrates of pollen and female flowers at receptive stage and on pollen germination. Furthermore, the influence of heat stress on pollen germination was also quantified. Pollen germination and pollen tube elongation at 28° and 34 °C and the concentration of total soluble sugars (TSS) and starch of male and female flowers were measured with samples collected from seven coconut genotypes (TT, TSR, DGT, TDB, DBT, DGSR and DBSR) at Panadure estate, Wanathawilluwa during three months from August to October, 2013.

There were significant month x genotype interaction effects on TSS and starch of both male and female flowers. This showed that the flower carbohydrates of different genotypes responded differently to the climatic variation during the three-month period. In male flowers, starch concentration showed reductions of varying magnitudes during October in all genotypes. However, a corresponding increase in TSS in October was shown only in DGSR and DBSR. In female flowers, a reduction of starch in October was shown in only some genotypes (i.e. DGT and TDB). However, none of the genotypes showed increases in TSS during October. No significant correlations were shown between TSS and starch concentrations in either of the two flower types during any of the months. A majority of genotypes showed significant reductions in germination of pollen collected in all three months when the temperature increased from 28° to 34 °C. However, the magnitude of reductions differed significantly between different genotypes and months. Notably, the genotype TSR (i.e. a cross of Tall x San Ramon) showed a comparatively higher pollen germination % at 34 °C in all three months and a lower % reduction due to heat stress in all months except October during which DBSR showed the highest germination % and the lowest % reduction. Pollen germination at 28 °C (which is closer to the temperatures experienced by the palms from which pollen was collected) showed a significant ( $p = 0.0186$ ) negative correlation ( $r = -0.508$ ) with anther starch concentration. However, no significant correlation was observed with anther TSS. Results of this study supported the following hypothesis. Low rainfall ( $< 10 \text{ mm month}^{-1}$ ) during the month immediately prior to flower opening in combination with adequate rainfall ( $>50 \text{ mm month}^{-1}$ ) in the preceding month could lead to conversion of starch to TSS, which in turn, would be used in respiration to generate the energy requirement for adequate pollen germination.