

IMPACT OF GIRDLE MICRO-SPRINKLER IRRIGATION SYSTEM ON THE POLLEN QUALITY OF COCONUT (*Cocos nucifera* L.) IN THE DRY ZONE OF SRI LANKA

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High temperature and water scarcity in the dry zone of Sri Lanka reduce coconut production by affecting pollen quality, leading to reduced fruit set, size, and quality. The girdle micro-sprinkler system (GMIS), which uses water efficiently, can lower canopy temperature by spraying water as a fine mist when positioned near the canopy. This study assessed the impact of GMIS on pollen viability, pollen germination, fruit set, and soil properties of coconut in the dry zone of Sri Lanka. Tree-by-tree variation was evaluated under two treatments: with GMIS and without GMIS (control), each with ten replicates. Canopy and floral temperature, as well as relative humidity, were measured weekly. The number of bunches, nuts, fallen button nuts, and unopened inflorescences per tree were counted biweekly. Pollen viability and germination were assessed at four temperatures (26°C, 28°C, 30°C, and 32°C). Data were analyzed using the mixed effect model in R Studio. Canopy temperature, floral temperature, and relative humidity showed no significant differences between treatments, possibly due to rain interruptions during the research period. There were no significant differences in the number of bunches, nuts, or unopened inflorescences between treatments, yet they were slightly high in coconut with GMIS. Pollen germination was significantly reduced under non-irrigated conditions, likely due to inadequate sugar accumulation at high temperatures. These findings confirm that the GMIS improves pollen quality that enhance germination. The optimal pollen germination occurred at 32°C for both treatments. Soil pH and EC were 8.1 and 142 $\mu\text{S cm}^{-1}$ in the irrigated treatment, compared to 7.9 and 128 $\mu\text{S cm}^{-1}$ in the non-irrigated treatment. Rainfall during the experiment alleviated drought conditions, potentially influencing the results. Thus, repeating the study under more severe drought conditions is recommended to obtain more reliable findings.

Keywords: Ambient temperature, Button nuts, Drought, Pollen germination, Pollen viability