

Determination of Differences in Heat Tolerance of Exotic Coconut (*Cocos mrcifera* L.) Cultivars by *In vitro* Pollen Germination

K.P.I. Madushani¹, A.D. Nainanayake², L.P. Vidhana Arachchi¹

Department of Export Agriculture, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka

² *Plant Physiology Division, Coconut Research Institute, Lunuwila, Sri Lanka*

Different germplasm accessions available at Coconut Research Institute of Sri Lanka have been used for developing new crosses with favorable characteristics such as high yielding potential and resistance to abiotic stresses. Some crosses which were developed using exotic pollens have been evaluated using some physiological traits yet some important flower characteristics have not been assessed. As nut is the main economically important component of coconut, it is essential to evaluate the reproductive performance of such new hybrids. Successful fruit set in coconut depends on several reproductive processes. These processes heavily depend on environmental conditions. Along with the phenomenon of global warming, it is imperative to identify the potential of new exotic hybrids which can withstand high temperatures. The pollen germination response was quantified in order to determine the differences in heat tolerance and to determine cardinal temperatures of four exotic coconut cultivars by *in vitro* pollen germination. Newly developed exotic hybrids namely TBGD, TRIT, TTMRD and TTAGT planted in the Middeniya Research Center were used. Pollens were collected from six palms from each hybrid. Pollen germination percentage was recorded after incubation for 20 hours in artificial growth media under different temperatures range from 22 °C to 40 °C. Quadratic model best described the response of pollen germination to temperature. All hybrids reached maximum pollen germination mostly in the range of 26 °C — 32 °C. The monthly mean cardinal temperatures over hybrids ranged from 18.52-23.09 °C, 22.08-32.73 °C, 36.91-56.42 °C for TBGD, 16.92-21.71 °C, 22.15-31.80 °C, 40.44-43.62 °C for TRIT, 8.89-21.53 °C, 28.71-31.84 °C, 40.3648.53 °C for TTAGT and 18.11-21.54 °C, 29.43-32.44 °C, 39.99-43.91 °C for TTMRD. It is evident from the results that all exotic hybrids have a wider temperature adaptability than most of the commercially grown cultivars in Sri Lanka.

Keywords: Cardinal temperatures, Exotic hybrids, Heat stress