Evaluation of the Survival of *Dendrobium crumenatum* Swartz. Pollen Stored at Different Temperatures

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Dendrobiums have a high demand in the Sri Lankan floriculture industry as cut flowers and potted plants. Most Dendrobium cultivars found in the Sri Lankan market are imported from countries like Thailand, Singapore and Malaysia. Development of new cultivars and commercial cultivation of orchids has become a billion-dollar profitable industry in the world. In order to uplift the local orchid industry, cultivars with Sri Lankan identity should be developed. As Sri Lankan Dendrobiums have high floral diversity with economically important characters like fragrance, patterns and shapes, such characters could be introduced to the popular cultivars through breeding programs. Pollinia of these species and cultivars may not be always available throughout the year. Therefore, a suitable pollen storage method that maintains pollen viability and germinability, should be developed. The objective of this study was to develop a pollen preservation technique for *Dendrobium crumenatum* (E: Pigeon orchid, S: Sudu pareyi mal) by storing at different temperatures in order to use them in breeding programs. Pollen were collected into 0.2 mL tubes from fully opened fresh flowers at the onset of the anthesis around 7.00 – 8.00 am in July 2019. A set of pollen was dried in silica for 24 hours before storage and the other set was directly stored at -80 °C, -20 °C, -1 °C, 9 °C and 28 °C temperatures. Cryopreservation of pollen at -80 °C and -20 °C were also conducted in modified Murashige and Skoog medium (pH 5.7). Treatments were performed in triplicates. Samples of stored pollen were removed after 1, 3, 7, 14, 30 and 60 days and *in vitro* germinability and viability were tested in 10% sucrose and 2,3,5-Triphenyltetrazolium chloride (TTC) respectively. To confirm pollen viability and germinability, pollen of *D. crumenatum* stored at 9 °C were used in controlled cross pollination with Dendrobium 'Pink Stripe,' Dendrobium 'Sonia Red' and Dendrobium 'Pink New Splash'. *D. crumenatum* had 54.97±12.22 % germinability and 76.0±4.58 % viability prior to storage. Pollen stored at subzero temperatures or subjected to cryopreservation lost viability and germinability. Pollen stored at 9 °C without drying, were viable for 14 days and produced pollen tubes (8.63±0.71 %). Although, percent *in vitro* germination of *D. crumenatum* pollen reduced to less than 20% after 7 days of storage (19.57±6.55 %) at 9 °C, pollination of stored pollen resulted in fruit set in Dendrobium 'Pink Stripe,' and Dendrobium 'Pink New Splash'. This study found that seasonally flowering *D. crumenatum* pollen can be stored for short periods at 9 °C while maintaining their viability and germinability and can be used for cross pollination in breeding programs. However, subzero temperatures and cryopreservation may not be appropriate for storage of *D. crumenatum* pollen.

Keywords: Cross pollination; Cryopreservation; *Dendrobium crumenatum*; Pollen viability; Subzero temperatures

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