

Attachment V

“Induction of Insect Resistance in Orchids”

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Abstract

This project is a collaborative project involving Malaysia, Thailand, Indonesia and Japan. The main objective is to produce orchids resistant to insect infestation through mutagenesis. Exchanging orchid tissue culture materials among participating countries was done in the early phase of the collaboration. In addition to *D. mirbelliannum*, Malaysia also used *D. Sonia Red 17* and *D. jayakarta*, which were received from Thailand and Indonesia, respectively, as starting materials for mutagenesis. Protocorm-like bodies (PLB) of these species were subjected to both gamma and ion Beam irradiations. Following irradiation and five periodic subcultures, complete plantlets were regenerated. A portion of these plantlets was used for *in vitro* insect screening tests. The rest were transplanted into pots and grown to maturity until flowering. Flowering mutant plants were subsequently transferred to a glasshouse dedicated for insect breeding to screen for insect resistance. The severity of insect infestation on orchid flowers was analysed, and from this, an infestation severity index was developed. Plants that showed tolerance to infestation were identified and propagated. To date, 50 *D. mirbelliannum* lines irradiated with ion beams have been identified as potential mite tolerant mutants, whilst 2 *D.jayakarta* as potential thrip tolerant mutants.

Keywords: Orchid, insect resistance, gamma irradiation, ion beam, mutagenesis