

Jamejira Longpichai 2008: Breeding of Yellow Flower Petunia for Rain Tolerance and Vegetative Propagating Type. Master of Science (Agriculture), Major Field: Horticulture, Department of Horticulture. Thesis Advisor: Associate Professor Thunya Taychasinpitak, M.Sc. 78 pages.

Hybrid petunia line improvement of yellow flower tolerated to environment stress developed from yellow color petunia cultivar and 7-trailing lines characterized as saturated soil tolerance using conventional cross-breeding technique with 4-randomized selection cycles and crossing, was conducted. The first set of five combination hybrid plants was originated from Jumbo Light Yellow as maternal line to cross with five male parent varieties of trailing petunia including Cherry Surf, Pink Surf, White Surf, Pink Wave and Easy Wave White cultivars. Consequently, the second set of three combination hybrid plants originated from three maternal lines of trailing petunia including Pink Surf, Red Surf and Easy Wave Cherry were cross with the male parent of Jumbo Light Yellow. The one hundred seeds of each eight combination hybrids, were selected by seed vigor ability for the next generation of breeding program. In particular, four plants of second-generation were selected from the first-generation and randomly crossed to produce the second-generation plant. Over the next generation (fourth-generation) with single combination was used to screen high efficiency of vegetative production and stress tolerance characteristics. The result indicated that significantly yellow color more increasing in first-generation, second, third and fourth, than the Jumbo Light Yellow by 25.3, 44.2, 100 and 100% was observed respectively. The first generation had more segregation genetic on number of day to first flowering, plant height, plant width and flower diameter than other generation, with average of 66.6 days, 17.3, 18.8 and 4.3 cm respectively. Furthermore, the result revealed that ability of vegetative propagated material of number 1 to 5 hybrid petunias was 77.9, 85.7, 80.0, 57.1 and 72.7% respectively and they exhibited more yellow flower equivalent to Jumbo Light Yellow cultivar. Finally, randomize selection of high percentage of vegetative propagated efficiency and the average of the first day of cutting propagated to the first flower bloom was 23.1 days.

These 4<sup>th</sup> generation plants selected was tested at biochemical level for their tolerance to high humidity soil of favored damping-off endemic. The results showed that petunia hybrid number 1 and 3 increased amount of phenolic compound accumulation at 2<sup>nd</sup> and 3<sup>rd</sup> day, that exhibited highest level at 4<sup>th</sup> day with 99.9 and 91.9  $\mu\text{g catechol mg}^{-1}\text{protein}$  after treated soil with high humidity stress. Moreover, peroxidase activity levels, the defense-related enzyme enhanced immediately in 2<sup>nd</sup> day and reached peak level within 3<sup>rd</sup> and 4<sup>th</sup> day after plants stressed with saturated soil with highest enzyme activity level of 1.1 and 1.2  $\text{min}^{-1}\text{mg}^{-1}\text{protein}$  obtained. The accumulation of both biochemical compounds marked petunia hybrid no.1 and no.3 similar to stress tolerance variety, White Surf. The results clearly show that yellow color and stress tolerance characteristic of hybrid petunia developed can be extended by crossing and selection in this study.

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Thesis Advisor's signature

