

Kanjana Popromsree 2006: Provenance Variation on Certain Characteristics and *In Situ* Gene Conservation Forest of Merkus Pine (*Pinus merkusii* Jungh. & de Vriese). Master of Science (Forestry), Major Field: Silviculture, Department of Silviculture. Thesis Advisor: Associate Professor Suree Bhumibhamon, D.F. 90 pages. ISBN 974-16-2183-3

The main aims of this investigation were to study provenance variation on certain characteristics of Merkus pine in provenance trials in Chiang Mai Province. The main idea was to recheck whether Surin provenance is remained as the superior provenance and this may indicated strongly to the importance of the study of *in situ* gene conservation forest at Nong Khu, Surin Province. The present study also included the study on the stand characteristics, certain morphological characteristics and genetic variation of Merkus pine in the *in situ* gene conservation forest. In addition, the concepts of villagers on forest conservation were interviewed. It is possible to evaluate genetic loss of Merkus pine in the *in situ* gene conservation forest.

The survival percentages and certain morphological characteristics, including total height, diameter at breast height, diameter at ground level, length of clear bole and crown diameter were studied. It was found that Northeastern provenance (Nos. 1019 and 1020) especially Surin provenance performed the best characteristics. Surin provenance still remains as the best provenance though it was tested in the Northern region.

As regards stand structure, it was found that the forest had moderate diversity level. The highest IVI of trees in the forest was *Dipterocarpus obtusifolius*. While Merkus pine, which was the most dominance and importance species in the past, became the second in the list of the importance species. In contrast, the vertical structure of the forest kept original characteristic performance which comprised of the three layers but species changed in each layer. Though, Merkus pine was still an emergent species of the forest. Study in the *in situ* gene conservation stand of Merkus pine in Surin showed critical status of Merkus pine. Merkus pine (4,601 trees) in 1983 was disturbed and remained only 960 trees in the year 2005. Seriously, the existing Merkus pine (2005) was remained as a small amount of trees. Furthermore, they were still damaged by debarking, uprooting, fire burning, flood affecting, and other factors. The most factors affecting the genetic losses are human. Furthermore, Merkus pine had relatively poor natural regeneration. Fortunately, the result of analysis on genetic variation of Merkus pine in the forest, it was found that its H_o was quite high. Nevertheless, the species had been threatening with many factors, which can reduce its genetic variation. Furthermore, the pine had also been facing with scarcity of pollen available for fertilization of ovules during the flowering time due to low population density. In addition, most Merkus pine trees are over-mature and produce less flowers and seeds. Those occurrences are however affects to high empty seed bearing. A consequence is genetic loss occurrence on the pine in this forest. Chance of genetic variation reduction of Merkus pine is able to occur in the forest. This will give more risk due to inbreeding depression.

The villagers from 6 villages nearby had strong influenced on the existing of the remaining pine forest. The people participation activities required workshops and the need of youth program to consider the importance of pine trees. Furthermore, intensive management practices should be conducted for improving the forest structure and sustaining the *in situ* gene conservation Merkus pine forest.

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Student's signature

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