

## ABSTRACT

The research aims to study local tree species and utilization for village woodlot plantation in the Royal Project in Chiang Mai Province. The research includes four subjects: 1) Studying the growth of potential tree species at each elevation level area. Seven tree species that meet the needs of the community, were found in the local area and provided more than 2 benefits were selected including *Castanopsis acuminatissima*, *Betula alnoides*, *Duabanga grandiflora*, *Magnolia garrettii*, *Phyllanthus emblica*, *Zanthoxylum limonella* and chestnut tree (*Sterculia monosperma*) which the Royal Project Foundation wanted to promote. The total of 5 species was planted in each elevation level area. The low elevation area was located in Mae Tha Nua Royal Project Development Center (490 meters above mean sea level) planted *Xylia xylocarpa*, *Magnolia garrettii*, *Zanthoxylum limonella*, *Phyllanthus emblica* and *Sterculia monosperma*, the medium elevation area was located in Thung Luang Royal Project Development Center (930 meters above mean sea level) planted *Magnolia garrettii*, *Betula alnoides*, *Phyllanthus emblica*, *Duabanga grandiflora* and *Sterculia monosperma*, and the high elevation area was located in Mae Hae Royal Project Development Center (1,150 meters above mean sea level) planted *Magnolia garrettii*, *Castanopsis acuminatissima*, *Phyllanthus emblica*, *Betula alnoides* and *Sterculia monosperma*. The trees were planted according to the statistical design of experiment plots in the total of 1.35 rai per area. 2) Surveying seed mother trees in the Royal Project as followed: Mae Tha Nua Royal Project surveyed *Castanopsis acuminatissima*, *Duabanga grandiflora* and *Phyllanthus emblica*, Thung Luang Royal Project surveyed *Betula alnoides*, *Schima wallichii* and *Phyllanthus emblica* and Mae Hae Royal Project surveyed *Betula alnoides*, *Schima wallichii* and *Zanthoxylum limonella*. Eleven criteria were used in the selection of suitable trees and trees with the highest score were selected to be the seed mother trees. 3) Studying of seed characteristics and the effect of planting media on seedling growth were conducted on 4 species; *Phyllanthus emblica*, *Sterculia monosperma*, *Schima wallichii* and *Strychnos axillaris*. Seed testing were studied in the laboratory of Faculty of Forestry and

planting media were studied in nursery at Bamboo Center, the Royal Project, Chiang Mai Province. 4) Studying of mechanical and energy properties of household-use wood and firewood were conducted on 3 species; *Xylia xylocarpa*, *Phyllanthus emblica* and *Magnolia garrettii*, with age approximately 15 years old. Sampling trees were studied at the laboratory of Faculty of Forestry.

The results showed that the survival rate of most 1 month-old trees was up to 90 percent except *Sterculia monosperma* and *Betula alnoides*. *Sterculia monosperma* planted in low and medium elevation level areas showed the survival rates of 70.4 and 79.6 percent, respectively, while *Betula alnoides* planted in medium elevation level area showed the survival rate of 86.1 percent. For the growth in diameter and the height of trees, the results were differences depending on the initial size of seedlings.

For selection of tree species for seed collection, *Betula alnoides* and *Schima wallichii* were found to be suitable in Thung Luang Royal Project. It was excellent in the number of 7 and 4, respectively. *Phyllanthus emblica* found score very good of 2 trees. The Mae Hae Royal Project, *Betula alnoides* are found suitable for seed tree in excellent condition and has a very good number of three tree species. *Schima wallichii* and *Zanthoxylum limonella* were found to be very good, 11 and 2, respectively. Mae Tha Nuea Royal Project, *Duabanga grandiflora* and *Phyllanthus emblica* found 2 and 1 were excellent respectively. *Castanopsis cuminatifolia*, *Duabanga grandiflora* and *Phyllanthus emblica* found in very good score in 6, 11 and 8, respectively.

For seed testing, *Phyllanthus emblica*, *Schima wallichii*, *Strychnos axillaris* and *Castanea mollissima* contained the moisture contents at 10.09, 6.34, 12.15 and 99.55 percent, respectively. An average seed width were 2.97, 6.28, 1.74 and 25.67 mm, an average seed length were 5.82, 16.65, 3.04 and 29.15 mm, and an average of thickness of seeds within species were 2.91, 0.63, 0.10 and 18.38 mm, respectively. Seed weight per 1,000 seeds of each tree species were 18.0, 5.85, 0.17 and 8,002.62 g, respectively. The germination rate within 30 day-observation were 37.0, 5.0, 7.0 and 55.5 percent, respectively. For studying potential of media for seedling

production in the first 3 months, the results showed that the growth of *Phyllanthus emblica* *Castanea mollissima* and *Xylia xylocarpa* seedlings planted in forest soil was better than that planted in forest soil mixed with coconut flake and forest soil mixed with rice husk and ash.

For wood properties study, *Xylia xylocarpa* was high strength wood with high natural durability. It is suitable for use as construction such as floor, beam and column in household and wooden bridge. *Phyllanthus emblica* and *Magnolia garetii* were medium strength woods with low natural durability. They can be used as wooden construction after chemical treatment to improve their properties. As firewood, the heating values of *Magnolia garetii*, *Xylia xylocarpa*, and *Phyllanthus emblica* were 4,656.15, 4,593.89 and 4,440.44 calories, respectively. As wood charcoal, the heating values were 7,837.64 7,564.66 and 7,133.60 calories for *Magnolia garetii*, *Xylia xylocarpa*, and *Phyllanthus emblica*, respectively. For construction use, *Xylia xylocarpa* was suitable but *Phyllanthus emblica* and *Manolia garetii* was treated chemicals to improve natural durability. For firewood and charcoal application, these three species were suitable for wood residues such wood chip, wood slabs and sawdust.