Sirisak Soontornyatrara 2014: Genetic Diversity Assestment of Physic Nut (*Jatropha curcas* L.) Based on Morpho-agronomic Characters and DNA Markers. Doctor of Philosophy (Agronomy), Major Field: Agronomy , Department of Agronomy. Thesis Advisor: Associate Professor Prapa Sripichitt, D.Agr. 94 pages.

Physic nut or *Jatropha curcas* L. is an oil crop widely distributed in the tropics with biofuel crop potential. This study was conducted to assess the genetic diversity of *J. curcas* germplasm collected from throughout Thailand and from other six countries. Other four *Jatropha* species were included in this study using AFLP and ISSR markers. The results clearly showed that *J. curcas* germplasm was very low in genetic diversity. Genetic similarity values estimated between *J. curcas* ranged from 0.8428 to 1.00 with an average of 0.9955. The result from UPGMA cluster analysis showed that almost all *J. curcas* samples were grouped into cluster 1, while a sample from USA formed separated cluster 2. This result indicated that the germplasms from other countries, preferably from the center of origin of this species, should be introduced to broaden genetic diversity of *J. curcas* in Thailand. The genetic relationship between *J. curcas* and other four related species was also observed. The result showed that *J. integerrima* was genetically more close to *J. curcas* than the others, while the highest value of genetic distance was found between *J. curcas* and *J. gossypifolia*. In addition, The genetic diversity of *J. curcas* germplasm was also evaluated by 8 morphological and 23 agronomical characters. The results on morphological characterization showed that germplasm had extremely low diversity. All samples could be divided into two groups. Almost all samples (127 accessions) were clustered into group 1, while sample no. J23 was formed separated group 2. Based on agronomic characterization, *J. curcas* germplasm had high diversity. Correlation analysis of the agronomic characters was also performed and the results indicated that the characters of the seed yield had positive correlation with all characters, except the number of days to flowering. The data on agronomic characters was subjected to principle component analysis (PCA). The first two principle components accounted for 61.73% and 10.13% (a total of 71.86%) of the total variation. The PCA two dimensional graph showed that most of the accessions were scattered and could not be clearly identified as group. However, some accessions which had unique characteristics were obviously distinguished. Interestingly, the accession no. J117 had several good agronomic characteristics and was considered to be a promising germplasm variety.

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