

Nampech Chaiprasertsri 2015: Molecular Structure of Repetitive Element and Mitochondrial Genome Analysis in the Water Monitor Lizard (*Varanus salvator macromaculatus*, Platynta, Squamata). Master of Science (Genetics), Major Field: Genetics, Department of Genetics. Thesis Advisor: Mister Kornorn Srikulnath, Ph.D. 113 pages.

The complete mitochondrial genome of *V. salvator macromaculatus* and *V. salvator komaini* contained twenty-two tRNA genes, two rRNA genes, thirteen protein-coding genes, and two control regions. The gene arrangements in which genes from *ND6* gene to tRNA^{Pro} were extensively shuffled with duplicated control regions. These gene organizations belong to type 3 which was a specific feature of *V. salvator macromaculatus*, *V. salvator komaini*, *V. salvator* and *V. niloticus*. Sequence divergence of partial mitochondrial *ND2* and *COI* genes were conducted to provide DNA barcoding of six varanid lizards (*V. salvator macromaculatus*, *V. salvator komaini*, *V. rudicollis*, *V. dumerilii*, *V. nebolosus* and *V. bengalensis*) in Thailand. The overall mean sequence divergence was 13.2% for *ND2* and 10.5% for *COI*, indicating that the *ND2* barcode could be a better marker to identify varanid lizards. Karyological characterization of *V. salvator macromaculatus* was performed using conventional Giemsa staining. The karyotype was composed of 2 distinct components, 8 pairs of macrochromosome and 12 pairs of microchromosome, and the chromosomal constitution was $2n = 40$. Two novel repetitive DNA sequences, VSAREP1 and VSAREP2, were located at the C-positive heterochromatin in the pericentromeric region. These two sequences only hybridize to genomic DNA of *V. salvator macromaculatus*, but no signal was observed even for other squamate reptiles, including *V. exanthematicus*, which is a closely related species to *V. salvator macromaculatus*. The results suggest that these sequences were differentiated rapidly or were specifically amplified in the *V. salvator macromaculatus* genome.

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Thesis Advisor's signature

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