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## Complete mitochondrial genomes and phylogenetic relationships of the genera *Nephila* and *Trichonephila* (Araneae, Araneoidea)

Hoi-Sen Yong<sup>1</sup>, Sze-Looi Song<sup>2,3</sup>✉, Kah-Ooi Chua<sup>1</sup>, I. Wayan Suana<sup>4</sup>,  
Prapathip Eamsobhana<sup>5</sup>, Ji Tan<sup>6</sup>, Phaik-Eem Lim<sup>3</sup> & Kok-Gan Chan<sup>1,7</sup>

Spiders of the genera *Nephila* and *Trichonephila* are large orb-weaving spiders. In view of the lack of study on the mitogenome of these genera, and the conflicting systematic status, we sequenced (by next generation sequencing) and annotated the complete mitogenomes of *N. pilipes*, *T. antipodiana* and *T. vitiana* (previously *N. vitiana*) to determine their features and phylogenetic relationship. Most of the tRNAs have aberrant clover-leaf secondary structure. Based on 13 protein-coding genes (PCGs) and 15 mitochondrial genes (13 PCGs and two rRNA genes), *Nephila* and *Trichonephila* form a clade distinctly separated from the other araneid subfamilies/genera. *T. antipodiana* forms a lineage with *T. vitiana* in the subclade containing also *T. clavata*, while *N. pilipes* forms a sister clade to *Trichonephila*. The taxon *vitiana* is therefore a member of the genus *Trichonephila* and not *Nephila* as currently recognized. Studies on the mitogenomes of other *Nephila* and *Trichonephila* species and related taxa are needed to provide a potentially more robust phylogeny and systematics.

Spiders of the genus *Nephila* Leach, 1815 and genus *Trichonephila* Dahl 1911 are members of the family Nephilidae<sup>1</sup> or subfamily Nephilinae of Araneidae<sup>2</sup>. Before the taxonomic treatment by Kuntner et al.<sup>1</sup>, *Trichonephila* species were traditionally treated as members of the genus *Nephila*. *Nephila* and *Trichonephila* are large orb-weaving spiders, with *Trichonephila komaci*<sup>3</sup> being the largest species ranging from some 33–40 mm in total length<sup>3</sup>. At different times, they have been treated as members of the family Nephilidae<sup>1,4,5</sup>, and members of the subfamily Nephilinae within the family Araneidae<sup>2,6,7</sup>.

Kuntner et al.<sup>1</sup> listed two species of *Nephila* and 12 species of *Trichonephila*. In contrast, the World Spider Catalog<sup>2</sup> recorded 10 species of *Nephila* and 12 species of *Trichonephila*. Recently, a new species *Nephila nandinia* has been described from Bangladesh<sup>8</sup>. Kuntner et al.<sup>1,9</sup> did not include the taxon *Nephila vitiana* (Walckenaer, 1847) in their studies. *N. vitiana* was treated as a valid species by Harvey et al.<sup>4</sup> and listed as an accepted species in the World Spider Catalog, version 21.5<sup>2</sup>. It is morphologically very similar to *Trichonephila antipodiana* (Walckenaer, 1841). Both taxa exhibit similar abdominal (opisthosomal) colour polymorphism in the adult females<sup>10,11</sup>. Furthermore, the juvenile spiders in both species possess very different colour patterns from the adults. However, adult female *N. vitiana* is easily distinguished from other members of the *T. antipodiana* species-group by the possession of a red-brown sternum<sup>4,12</sup>.

*Nephila pilipes* (Fabricius, 1793) is distributed from India to China, Vietnam, Philippines, and Australia<sup>2</sup>. *T. antipodiana* occurs in China, Philippines to New Guinea, Solomon Islands, and Australia (Queensland), whereas *N. vitiana* (*T. vitiana* in the present study) is confined to Indonesia, Fiji, and Tonga<sup>2</sup>.

<sup>1</sup>Institute of Biological Sciences, Faculty of Science, University of Malaya, 50603 Kuala Lumpur, Malaysia. <sup>2</sup>Institute for Advanced Studies, University of Malaya, 50603 Kuala Lumpur, Malaysia. <sup>3</sup>Institute of Ocean and Earth Sciences, University of Malaya, 50603 Kuala Lumpur, Malaysia. <sup>4</sup>Faculty of Science and Mathematics, Mataram University, Mataram, Indonesia. <sup>5</sup>Department of Parasitology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand. <sup>6</sup>Department of Agricultural and Food Science, Universiti Tunku Abdul Rahman, 31900 Kampar, Perak, Malaysia. <sup>7</sup>Guangdong Provincial Key Laboratory of Marine Biology, Institute of Marine Sciences, Shantou University, Shantou 515063, China. ✉email: szelooi@um.edu.my