

ABSTRACT

72 taxa of the genus *Alpinia* from Peninsular Malaysia representing section *Alpinia* and section *Allughas* (Smith, 1990) were collected and sequenced with two primers namely nuclear ribosomal DNA of internal transcribed spacer region (ITS) and partial chloroplast maturase K gene (*matK*) gene. Both ITS and *matK* trees in this study reaffirm the polyphyletic nature of the *Alpinia* species and revealed that the grouping of the *Alpinia* species from Peninsular Malaysia reflects some degree of similarity with that of Rangsiruji *et al.* 2000b and Kress's *et al.* 2005 phylogeny, and in most part, incongruent with Smith's 1990 infrageneric classification. This study reaffirms that *A. oxymitra* is closely related to either Clade IV (the *Zerumbet* clade) or Clade V (the *Eubractea* clade) of Kress *et al.* 2005 phylogeny. Based on morphology and the phylogenetic trees, newly described *A. suriana* is closely related with *A. rafflesiana*, thus suggests possible hybridisation between *A. rafflesiana* and *A. javanica*. In addition, it is clear from the internal transcribed spacer (ITS) and maturase K (*matK*) phylogenetic results in this study that the *Rafflesiana* clade (represented by subclade VIa and subclade VIb -Fig. 3.3 and Fig. 3.4) is distinct as the species that belong to the section *Allughas* subsection *Allughas sensu* Smith (1990) formed a natural grouping; comprising only of the Peninsular Malaysian *Alpinia* species. Interestingly, *A. scabra* (section *Alpinia* subsection *Presleia*, Smith 1990) is a sister taxa to the *Rafflesiana* clade, strongly supported by the molecular analyses of both ITS and *matK* consensus trees. However, relationship of some *Alpinia* species from the ITS data within the *Rafflesiana* clade varies from that obtained from *matK* data. Incongruence among the ITS and *matK* data suggests possible hybridisation or introgression between closely related species or the species may have shared ancestral polymorphisms.

ABSTRAK

72 taxa daripada genus *Alpinia* di Semenanjung Malaysia yang mewakili seksyen *Alpinia* dan seksyen *Allughas* (Smith, 1990) telah di kutip dan dianalisis secara molekular menggunakan ‘internal transcribed spacer region’ (ITS) dan sebahagian daripada gen kloroplas ‘maturase K’ (*matK*). Keputusan daripada data ITS dan *matK* membuktikan bahawa spesis *Alpinia* adalah polifiletik dan menunjukkan bahawa pengkelompokan spesis *Alpinia* di Semenanjung Malaysia adalah lebih kurang sama dengan kajian sebelumnya yang dijalankan oleh Rangsiruji *et al.* 2000b dan Kress *et al.* 2005, dan secara amnya bercanggah dengan pengelasan Smith, 1990. Keputusan turut menunjukkan bahawa *A. oxymitra* mungkin berkait-rapat dengan spesis-spesis *Alpinia* di klad IV (klad *Zerumbet*) atau klad V (klad *Eubracteae*). Hasil dari kajian morfologi dan filogenetik menunjukkan bahawa *A. suriana*, spesis yang baru, berkemungkinan merupakan kacukan antara *A. rafflesiana* dan *A. javanica*. Selain dari itu, data daripada ITS dan *matK* (Fig. 3.3 & Fig. 3.4) jelas menunjukkan bahawa klad *Rafflesiana* (yang diwakili oleh subklad VIa dan subklad VIb merangkumi spesis *Alpinia* dari Semenanjung Malaysia sahaja (dikelaskan dalam seksyen *Allughas* subseksyen *Allughas* dalam pengelasan Smith, 1990). Menariknya, *A. scabra* (dari seksyen *Alpinia* subseksyen *Presleia*) didapati terkelompok dekat dengan (‘sister taxa’) klad *Rafflesiana*. Walaubagaimanapun, hubungan kait diantara beberapa spesis *Alpinia* dalam klad *Rafflesiana* berdasarkan data ITS berbeza daripada *matK*. Percanggahan antara data ITS dan *matK* menunjukkan kemungkinan wujudnya pengacukan atau introgresi diantara spesis yang berkait rapat atau spesis yang berkenaan mungkin berkongsi keturunan/ asal usul yang sama.