

Phylogenetic Relationship of Tropical Asian *Ardisia* and Relatives (*Primulaceae*) Shows Non-monophyly of Recognized Genera and Subgenera

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(Accepted on February 3, 2019)

The most comprehensive phylogenetic tree showing relationships among the large tropical genus *Ardisia* and related genera of subfamily *Myrsinoideae* (*Primulaceae*), based on nucleotide sequences of the nuclear ribosomal internal transcribed spacer (nrITS) region from 177 samples predominantly from the Neotropics, East Asia, Indo-China and Malesia is presented. Bayesian and maximum likelihood analyses showed that *A. opegrapha* and *Labisia* consecutively branched off at the basal nodes of the tree, and the remaining taxa can be divided into two major clades. Other related genera were scattered in the two clades and formed clades with members of *Ardisia*. Thus, *Ardisia* is not monophyletic as currently circumscribed. The phylogenetic tree also indicated that the traditional subgeneric circumscription only partially reflects the phylogenetic relationship within *Ardisia*. The results clearly suggest the need for revising the generic and subgeneric circumscription of *Ardisia* and its relatives.

Key words: *Ardisia*, *Ericales*, Malesia, *Myrsinoideae*, nrITS, phylogeny, *Primulaceae*.

MY721 (FU), 610, LC440173; *Ar. pubicalyx* Miq. var. *collinsiae* (H.R.Fletcher) C.M.Hu, CAM, C903 (FU), 261, LC440147; CHI, Wang2007221 (IBSC), –, MF926216; *Ar. smaragdinoidea* Yahara & Tagane, CAM, C1694 (FU), 412, LC440170; *Ar. solanacea* Roxb., PM, FRI70341 (KEP), 45387*, LC440216; *Ar. tenera* Mez, CHI, Wang2007239 (IBSC), –, MF682172; *Ar. waitakii* C.M.Hu, CHI, Wang2007223 (IBSC), –, MF926230. ***Badula*** Juss.: *B. balfouriana* (Kuntze) Mez, MAU, Bone 56 (TCD), –, HE590600; *B. barthesia* (Lam.) A.DC., RUN, UMR 5174 (REU), –, HE590601; *B. borbonica* A.DC., RUN, TDNA:077 (–), –, HF548930; *B. grammisticta* (Cordem.) Coode, RUN, TDNA:530 (–), –, HF548934; *B. nitida* (M.J.E.Coode) Coode, RUN, LR514 (REU), –, HE590642. ***Discocalyx*** Mez: *D. schlechteri* K.Schum., PNG, SAJ0003 (BISH), 159, LC440185; *Discocalyx* sp., PNG, Baker 826 (K), 45203*, LC440186; *Discocalyx* sp., PNG, SAJ0255 (BISH), 161, LC440184. ***Fittingia*** Mez: *F. conferta* (S. Moore) Sleumer, PNG, SAJ1370 (BISH), 164, LC440193. ***Hymenandra*** A.DC.: *H. beamanii* B.C.Stone, SBH, SAN157135 (SAN), 498, LC440196; *H. rosea* B.C.Stone, SBH, SAN155243 (SAN), 45323a*, LC440195. ***Labisia*** Lindl.: *L. pumila* (Blume) Mez, SING, MS79 (K), 197, LC440212; SUM, IS265 (FU), 398, LC440190; SWK, S104079 (SAN), 531, LC440198.

Oncostemum A.Juss.: *O. acuminatum* Mez, MAD, Nevers 11611 (CAS), –, HE590659; *O. elephantipes* H.Perrier, MAD, Nevers 1155 (CAS), –, HE590667; *O. forsythii* Mez, MAD, Fritsch1640 (CAS), –, HE590675; *O. gracile* Mez, MAD, Fritsch 1736 (CAS), –, HE590671; *O. nervosum* Baker, MAD, Fritsch 1505 (CAS), –, HE590677; *Oncostemum* sp., MAD, TDNA:475 (–), –, HF548945; MAD, TDNA:503 (–), –, HF548947. ***Sadiria*** Mez: *Sa. longistyla* Ze H.Wang & H.Peng, CHI, WZH201705_001 (KUN), –, LT964874. ***Systellantha*** B.C.Stone: *Sy. brookeae* B.C.Stone, SBH, SAN157322 (SAN), 497, LC440215. ***Tetrardisia*** Mez: *T. corneri* Furtado, PM, FRI73543 (KEP), 470, LC440219.

Outgroup. *Embelia* Burm.f.: *E. amentacea* C.B.Clarke, PM, FRI57778 (KEP), 45444*, LC440188; *E. pergamacea* A.DC., PM, FRI64012 (KEP), 45421*, LC440187; *E. ribes* Burm.f., PM, FRI73606 (KEP), 45448*, LC440189. ***Myrsine*** L.: *M. cacuminum* (Mez) Pipoly, PNG, SAJ1255 (BISH), 179, LC440208; *M. rhombata* (P.Royen) Pipoly, PNG, SAJ1261 (BISH), 180, LC440209; *M. stolonifera* (Koidz.) Walker, VNM, V4870 (FU), 604, LC440207. ***Pleiomis*** A.DC.: *P. canariensis* (Willd.) A.DC., SPN, JM_Fernandez-Palacios et al. s.n. (–), –, KJ189026; SPN, Marrero & Caujap s.n. (–), –, KJ189027.

A.Julius^{a,b}, J.S.Gutiérrez-Ortega^a, S.Sabran^c, 田金秀一郎^d, 内貴章世^e, D.Darnaedi^f, M.M.Aung^g, V.S.Dang^h, N.V.Ngoc^{d,l}, H.T.Binh^{d,l}, 綿野泰行^a, T.M.A.Utteridge^j, 梶田 忠^{c,k}: 熱帯アジア産ヤブコウジ属 *Ardisia* (サクラソウ科) およびその近縁属の分子系統解析により示された属および亜属の非単系統性

熱帯アジア産ヤブコウジ属 *Ardisia* (サクラソウ科) について、これまでで最も包括的な分子系統解析を実施した。主に東南アジア、インドシナ半島およびマレーシア域から採集された 111 サンプルについて核 DNA の ITS 領域の塩基配列を決定し、GenBank から得た 66 配列と合わせて、ベイズ法及び最尤法を用いて系統解析を行ったところ、内群の基部で *Ar. opegrapha* と *Labisia* のそれぞれがまず分岐した後に、残りは大きく 2 つのクレードに分かれる系統樹が得られ、ヤブコウジ属が単系統では無いことなどが明らかになった。また、系統樹内では部分的に従来の亜属の単系統性が支持されたものの、亜属の分類を再検討する必要性が示された。

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