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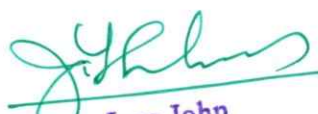


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**Cover Page of the Paper and Contents Page (Sl. No: 96)**



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## First Page of the Paper (Sl. No: 96)



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### Phylogenetic relationship of selected *Aristolochia* spp. with different generic segregates inferred using rbcL and matK genes

Soumya Murali, Rashmi TR and Francis MS

#### Abstract

The genus *Aristolochia* comes under the family Aristolochiaceae, a conspicuous family with distinctive and showy flowers positioned among the basal angiosperms. The taxonomic treatment of the genus *Aristolochia* is ambiguous. Several generic segregates have been proposed for the genus and most literatures propose four subgenera within two subtribes. The study focused on the relationship of *A. indica*, *A. tagala*, *A. ringens* and *A. krisagathra* with the different generic segregates. The sequencing was carried out using rbcL, matK, psbA-trnH, ITS and ITS2. However, only rbcL and matK were used to infer the relationship because of the lack of availability of sequences of psbA-trnH, ITS and ITS2 representing the different generic segregates. Both the neighbor joining trees constructed using rbcL and matK placed *A. krisagathra* as the sister taxon of *A. indica* with very high bootstrap values. *A. krisagathra*, *A. indica* and *A. tagala* forms a part of the subsection Podantherum and Diplolobus section along with *A. zollingeriana*, whereas the exotic *A. ringens* formed a part of Gymnolobus section.

**Keywords:** *A. krisagathra*, matK, rhodanthemum, rbcL

#### Introduction

The genus *Aristolochia* comprises about 120 or 400 to 500<sup>[1, 2]</sup> species depending on the differentiation within the subgenera. In India, only 8 species have been reported<sup>[3]</sup>. However, the proper documentation of the genus is not yet accomplished in India<sup>[4]</sup>. *Aristolochia* in Kerala is represented by three species *A. indica*, *A. tagala* and *A. krisagathra*<sup>[5]</sup>. The plants grow as perennial rhizomatous herbs or deciduous or evergreen shrubs and lianas.

*Aristolochia* has been treated in its broad sense by many authors<sup>[6-14]</sup>. The circumscription of the genus has been a significant taxonomic problem and is ambiguous. Several generic segregates have been proposed primarily based on floral and fruit characters such as the morphology of the gynostemium, the gross shape of the perianth, the dehiscence of fruits and the morphology of the seeds. Most literatures propose four subgenera within two sub-tribes<sup>[15-17]</sup>. The genus *Aristolochia* s.l. comes under the tribe Aristolochieae with two subtribes Isotrematiinae and Aristolochiinae. The subtribe Isotrematiinae encloses two subgenera *Endodeca* and *Isotrema*; Aristolochiinae subtribe with *Par Aristolochia* and *Aristolochia*.

Subgenus *Endodeca* includes herbaceous group in North America, with reduced subtending leaves, clasping bracts, short internodes in the laterals, and prostrate inflorescence<sup>[1, 12]</sup>. Subgenus *Isotrema* (= *Siphisia*) comprises of 70 species, 50 of which grow in Eastern Asia mainly the Sino-Japanese province. *Isotrema* has a primarily intercontinental Asia to North/Central America disjunct distribution. Within the genus *Aristolochia*, shrubs and shrub-like growth forms are limited to a handful of species recorded within *Isotrema*<sup>[13]</sup>, characterized by basally dehiscent capsules, a trilobed perianth tube and a gynostemium with three lobes each accompanying two anthers<sup>[18]</sup>. Sometimes, *Siphisia* is used for the combination of *Endodeca* and *Isotrema* or for *Isotrema* alone. Subgenus *Aristolochia* contains approximately 350 species of mostly woody tropical climbers, widely distributed and is characterized by an apically dehiscent capsule, lobes of the perianth unilaterally appressed in the bud breaking up into one to three segments, six or fewer lobes of the gynostemium, six or fewer anthers. They are morphologically quite diverse and several lower taxonomic ranks recognized<sup>[19, 20]</sup>. The subgenus *ParAristolochia* is the smallest group and proposed as the most primitive group in *Aristolochia* s.l. because of its morphological similarity to *Thottea* s.l.<sup>[10]</sup>. It has fleshy indehiscent fruits, a three-lobed perianth, valvate in bud, 6-12 lobes of gynostemium, 6-24 anthers.

~ 99 ~

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