Phytotaxa 232 (1): 001–078
www.mapress.com/phytotaxa/

Monograph

ISSN 1179-3155 (print edition)
PHYTOTAXA
ISSN 1179-3163 (online edition)

http://dx.doi.org/10.11646/phytotaxa.232.1.1

PHYTOTAXA

232

Can a rainbow consist of a single colour?

A new comprehensive generic arrangement of the '*Iris sensu latissimo*' clade (Iridaceae), congruent with morphology and molecular data

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Magnolia Press
Auckland, New Zealand

Accepted by Lorenzo Peruzzi: 9 Sept. 2015; published: 28 Oct. 2015

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(*Phytotaxa* 232)

78 pp.; 30 cm.

28 October 2015

ISBN 978-1-77557-817-8 (paperback)

ISBN 978-1-77557-818-5 (Online edition)

FIRST PUBLISHED IN 2015 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: magnolia@mapress.com

http://www.mapress.com/phytotaxa/

ISSN 1179-3155 (Print edition)

ISSN 1179-3163 (Online edition)

"Si les fleurs de chacun de ces genres nous rappellent à
première vue le périanthe des *Iris,* nous voyons qu'ils
en diffèrent cependant par leurs racines, la forme et l'insertion
des feuilles, l'inflorescence, la structure des graines, et qu'il n'est
plus permis de les réunir sous une même appellation,
ainsi qu'on le fait encore depuis Linné."
(Decaisne 1874)

Abstract

When treated in a broad sense, *Iris* (the 'rainbow-flowers') is one of the most diverse and well-known genera in the Asparagales. However, recent conventional phylogenetic and three-taxon statement re-treatments of the molecular data (cpDNA) for the irises ('*Iris sensu latissimo*' clade) showed that the obtained patterns of relationships appeared to be fully congruent to the narrow taxonomical arrangement of *Iris* (*sensu stricto*) to include only the bearded irises. Given this, we propose a new taxonomic arrangement of the rainbow-flowers with at least 25 previously recognised infrageneric taxa here accepted at the generic rank, of which 19 have already been treated as separate genera by different authors in the past. Morphological, phytochemical, karyological, distributional and molecular data are discussed which support the newly proposed system. Five genera and one section are described as new, 1 genus is amended, and 114 new nomenclatural combinations (2 genera, 3 sections, 1 series, 86 species, 14 varieties and 8 nothospecies) are established to accommodate the accepted names to the new generic system. Morphological descriptions and nomenclatural types are reported for each accepted genus, with types of four genera being designated here for the first time. Tentative distribution maps of relevant taxa, and illustrations of the most reliable morphological characters are included for the accepted genera. Principal synonyms and publication details are shown, and accepted infrageneric taxa are only referred to when previous information is not available. A key is also reported for genera identification. Our proposal mostly accords with the traditional distinction of groups currently in use by horticulturists, and it is favoured against an alternative treatment of an expanded *Iris* which renders a highly heterogeneous genus.

Key words: Asparagales, cpDNA phylogeny, generic circumscriptions, Iridaceae, *Iris*, nomenclature, plant geography, taxonomy

Introduction

In a broad sense, *Iris* Linnaeus (1753: 38) is one of the most diverse and well-known genera in Asparagales, with approximately 250–300 species widespread in the Northern Hemisphere (Goldblatt *et al*. 1998). Due to its popularity in the horticultural trade, this group has significant economic impact, and also includes some outstanding model systems in evolutionary biology, particularly those used for studying hybridization and speciation in plants (see Anderson 1949, among others). However, the taxonomy of the irises ('rainbow-flowers') remains complicated.

Linnaeus (1753) defined *Iris* (*sensu lato*) to include other segregates that had usually been regarded as independent by previous authors such as Bauhin & Cherler (1651), Dodoens (1583) or Tournefort (1719). However, almost contemporaneously Miller (1754, 1768), as well as later Adanson (1763), Decaisne (1874), Fourreau (1869), Medikus (1790), Parlatore (1854, 1860), Reichenbach (1841) or Trattinnick (1817) among others, challenged Linnaeus's treatment by accepting segregation of additional genera (see Rodionenko 1961, 1994, 2005, 2006b, 2007, 2008, Kamelin 1973, Shneer 1999, Mavrodiev & Alexeev 2003, Mavrodiev 2010, Crespo 2011, 2012, Crespo *et al.* 2013, 2014, Martínez-Rodríguez & Crespo 2013, Mavrodiev *et al.* 2014). Morphological evidence has been shown to argue for separating from *Iris* (*sensu stricto*) genera such as *Alatavia* Rodionenko (1999: 103), *Chamaeiris* Medikus (1790: 417), *Cryptobasis* Nevski (1937: 331), *Eremiris* (Spach 1846a: 32) Rodionenko (2006a: 1707), *Hermodactylus* Miller (1754: without pagination), *Iridodictyum* Rodionenko (1961: 201), *Juno* Trattinnick (1817: 135), *Limniris* (Tausch 1823: without pagination) Reichenbach (1841: 43), *Sclerosiphon* Nevski (1937: 331), *Siphonostylis* Schulze (1965: 331), and *Xiphion* Miller (1754: without pagination). They all constitute easily defined taxonomic units, among which hybridization is not known to occur in nature, aside from one to a few potentially credible cases such as *Iris* ×*neumayeri* Janch. ex Holub (1993: 106)