



## The reinstatement and rediagnosis of the madagascan genus *Rhodocodon* (Asparagaceae, Scilloideae), with validation and remarks on H. Perrier's taxa

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### Abstract

The genus *Rhodocodon* is here reinstated based on morphological, biogeographical and molecular evidence. On the basis of the work presented by H. Perrier de la Bâthie in Flora of Madagascar, one subgenus and ten species of *Rhodocodon* are validated here. Furthermore, *Rhodocodon madagascariensis* and *R. urGINEOIDES* are lectotypified, and *Hyacinthus cryptopodus* and *Urginea mascarenensis* are transferred to *Rhodocodon*. A complete morphological description for all 13 accepted species of *Rhodocodon* is provided, including data on biology, ecology and distribution. Furthermore, an identification key for the *Rhodocodon* species is presented.

Key words: flora, Hyacinthaceae, Urgineoideae, Madagascar, taxonomy, nomenclature

### Introduction

Hyacinthaceae sensu APG (2003) comprises ca. 700–1000 species of bulbous plants distributed through Africa and Europe extending to Asia, with only *Oziroë* Rafinesque (1837: 53), occurring in South America (Speta 1998a,b, APG 2003, Martínez-Azorín *et al.* 2014). Within this family four monophyletic clades were accepted as the subfamilies Hyacinthoideae, Ornithogaloideae, Oziroëoideae and Urgineoideae (Speta 1998b, Pfosser & Speta 1999, Manning *et al.* 2004, Martínez-Azorín *et al.* 2011). Alternatively Hyacinthaceae are treated as subfamily Scilloideae (part of Asparagaceae), and consequently the former subfamilies are reduced to the rank of tribe Hyacintheae, Ornithogaleae, Oziroëeae and Urgineae (APG 2009, Chase *et al.* 2009). However, we favour Hyacinthaceae at family rank based on morphology.

Generic circumscription in Hyacinthaceae subfam. Urgineoideae has been a matter of controversy for decades. On the one hand, an extremely broad concept has been proposed for Urgineoideae based on insufficient phylogenetic study (Manning *et al.* 2004), where only three genera are accepted for the whole subfamily; including the monotypic *Igidia* Speta (1998b: 70) (see further comments below), *Bowiea* Harvey ex Hooker (1867: t. 5619) with two species (Reid *et al.* 1990), and *Drimia* Jacquin (1797: 38) with about 100 species. The resulting expanded concept of *Drimia* introduces undue heterogeneity of flower and vegetative morphology, as morphologically well defined and traditionally accepted genera, such as *Litanthus* Harvey (1844: 314), *Rhadamanthus* Salisbury (1866: 37), *Rhodocodon* Baker (1881: 280), *Schizobasis* Baker (1873: 105), *Tenicroa* Rafinesque (1837: 52), *Thuranthos* Wright (1916: 233), and *Urginea* Steinhil (1834: 321) have been sunk into *Drimia* s.l. On the other hand, other authors (Speta 1998a, 1998b, 2001, Pfosser & Speta 2001) favoured a more analytical approach, in which 21 different genera were accepted, although Wetschnig (2007) excluded *Igidia* from Urgineoideae showing that it belongs to Ornithogaloideae. However, several of these genera in Urgineoideae have proved to be para- or polyphyletic (Pfosser & Speta 2001, 2004, Manning *et al.* 2004, Pfosser *et al.* 2012). Speta (1998a) also commented that ‘the definition of genera in this subfamily is often unsatisfactory’. A similar scenario is found in the sister subfamily Ornithogaloideae, where contrasting taxonomic treatments, using different approaches, were recently proposed (Speta 1998a, Manning *et al.* 2004, 2009, Martínez-Azorín *et al.* 2011). As shown by Martínez-Azorín *et al.* (2011), when informative plastid and nuclear DNA regions are targeted

## Identification Key for *Rhodocodon* species

1. Bulb scales distichously arranged; leaf solitary, blade lanceolate, petiole long sheathing the stem above the ground, with distinct red spots ..... **11. *R. monophyllus***
- Bulb scales spirally arranged; leaves 2 or more, with a different shape ..... 2
2. Leaves up to 4 mm wide ..... 3
- Leaves 5–50 mm wide ..... 4
3. Leaves up to 3, 25–45 cm long, canaliculated, spreading, flaccid ..... **10. *R. mascarenensis***
- Leaves more than 3 in mature plants, 3–10 cm long, not canaliculated, upright, rigid ..... **9. *R. linearifolius***
4. Pedicels up to 3 mm long; flowers erect to suberect, never nodding ..... **4. *R. cryptopodus***
- Pedicels 5–40 mm long; flowers nodding ..... 5
5. Flowers wider than long ..... **5. *R. cyathiformis***
- Flowers as long as or longer than wide ..... 6
6. Corolla subglobose, about as long as wide, 7–8 mm wide ..... **12. *R. rotundus***
- Corolla campanulate-urceolate, longer than wide, 2–6 mm wide ..... 7
7. Corolla urceolate-turbinate, with the widest part in the proximal third or at the middle; filaments papillate ..... **2. *R. calcicola***
- Corolla campanulate-urceolate, only slightly contracted at the top; filaments smooth ..... 8
8. Flowers 8–9 mm long; leaves somewhat distichously arranged; plant growing epiphytic in moss on trees or sometimes on rocky grounds ..... **13. *R. urgineoides***
- Flowers 4–6 mm long; leaves spirally arranged; plants not epiphytic ..... 9
9. Leaves 35–40 mm wide; flowers 5–7 × 4–6 mm; style 4–5 mm long ..... **3. *R. campanulatus***
- Leaves 7–25 mm wide; flowers 4–6 × 4–5 mm; style 1.5–3 mm long ..... 10
10. Raceme 4–12 cm long, with 9–30 flowers ..... 11
- Raceme 20–35 cm long, with 35–75 flowers ..... 12
11. Leaves absent at anthesis; flower white; anthers sagittate with a very long acute tip; ovary with 2–4 ovules per locule ..... **8. *R. intermedius***
- Leaves present at anthesis; flowers greenish or brownish; anthers sagittate without a long very acute tip, ovary with 8–10 ovules per locule ..... **1. *R. apiculatus***
12. Leaves 10–24 mm wide; bracteoles present; seeds fusiform, faceted, without a distinct raphe ..... **6. *R. floribundus***
- Leaves 4–9 mm wide; bracteoles absent; seeds ellipsoidal with a distinct, black raphe ..... **7. *R. graciliscapus***

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