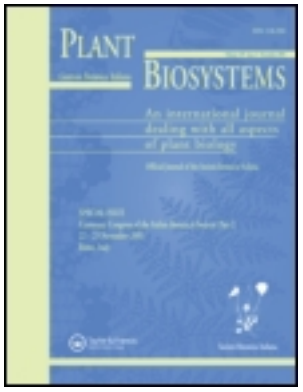

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Nomenclatural novelties and taxonomic notes in *Battandiera* Maire (Ornithogaloideae, Hyacinthaceae)

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Abstract
In the framework of a taxonomic revision of *Battandiera*, we present two nomenclatural changes in the genus. *Urginea angolensis* is the priority name for *Battandiera pulchra* (*Ornithogalum pulchrum*), and therefore, the new combination of *Battandiera angolensis* is required. *Ornithogalum recurvum*, a taxon that has been considered as a synonym of *Battandiera stapffii* (*Ornithogalum stapffii*) in some taxonomic revisions, is accepted as a valid species on the basis of peculiar morphological characters, and therefore, the new combination of *Battandiera recurva* is required. Comments on the recently described species *Albuca gariepensis* are given.

Keywords: *Battandiera, Battandiera angolensis, Battandiera pulchra, Battandiera recurva, Albuca gariepensis, combinations*

Introduction

Battandiera Maire is a genus with eight species of bulbous plants belonging to Hyacinthaceae subfam. Ornithogaloideae. These taxa mostly occur in desert or very arid environments, its highest diversity being found in southern Africa, especially in Namibia, with two disjunct species in East Africa (*Battandiera donaldsonii* (Rendle) Mart.-Azorín, M.B.Crespo & Juan) and north-western Africa (*Battandiera amoena* (Batt.) Maire; *cf*. Martínez-Azorín et al. 2011). *Battandiera* is characterized by actinomorphic flowers; tepals white or yellowish-green, with a green or brownish longitudinal band visible on both sides (rarely indistinct but with darker medial aggregated nerves evident when dried), spreading or rarely reflexed, free or shortly fused into a tube ≤ 5 mm long; filaments linear-acuminate or ovate-acuminate, sometimes with quadrate basal expansions or shortly adnate to the perianth; ovary ovoid or oblong-globose, trigonous or trilobate, sometimes stipitate or expanded at the base into a six-lobed disc; capsule deeply trilobate with narrow lobes, often widely quadrate in outline, wider than long, truncate at the apex or emarginate, with darker transversal nerves; seeds large, discoid, flat, horizontally stacked and uniseriate in each locule, with angled and polygonal or slightly undulate testa cells (*cf*. Martínez-Azorín et al. 2011).

Generic circumscription in Ornithogaloideae has been a matter of controversy in recent decades, with several different taxonomic proposals (*cf*. Speta 1998; Manning et al. 2004; Manning et al. 2009). The most recent comprehensive study in the group (*cf*. Martínez-Azorín et al. 2011), based on morphological generic circumscriptions, accepts 19 distinct genera. In contrast, earlier molecular studies based exclusively on plastid DNA regions accept only four genera (Manning et al. 2009). As discussed by Martínez-Azorín et al. (2011), this approach complicates generic circumscription in other related subfamilies of Hyacinthaceae, indeed in the petaloid monocotyledons as a group. Moreover, as shown from the phylogenetic study based on nuclear DNA regions (*cf*. Martínez-Azorín et al. 2011), *Battandiera* is sister to *Dipcadi Medik.*, and therefore, its inclusion in *Albuca L.* sensu Manning et al. (2009) would be contrary to monophyly. Accordingly, acceptance of *Battandiera* as an independent genus, which also has a characteristic biogeography, is favoured here.

Battandiera was described by Maire (1926) to include a single species, *B. amoena*. He compared

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that species with those of *Ornithogalum L.*, *Urginea Steinh.*, *Albuca* and *Dipcadi*, and concluded that *Battandiera* showed a combination of characters not present in any of these related genera. Fruits and seeds resemble those of *Dipcadi*, but flowers are close to those of typical *Ornithogalum*. Maire (1926) was correct since phylogenetic analyses show the inclusion of *Battandiera* in tribe Albuceae (*cf*. Martínez-Azorín et al. 2011), a fact that is supported by the tepals with a green band mostly visible on both sides and the flattened seeds. Although seeds somewhat resemble those of Urgineoideae, differences exist in testa structure that warrant segregation of both groups.

Our current research is focused on the taxonomic revision of *Battandiera*. In this context, we report here some nomenclatural adjustments as well as taxonomic notes on this genus. First, *Urginea angolensis* Baker corresponds to the traditional concept of *Battandiera pulchra* (Schinz) Martínez-Azorín, M.B. Crespo & Juan (*Ornithogalum pulchrum* Schinz), therefore having priority and a new combination being required to accommodate it in *Battandiera*. Second, previous comprehensive revisions of the group include *Ornithogalum recurvum* Oberm. as a synonym of *Battandiera stapffii* (Schinz) Mart.-Azorín, M.B.Crespo & Juan (*cf*. Obermeyer, 1978) or is not treated at all (*cf*. Müller-Doblies & Müller-Doblies 1996). We now accept *O. recurvum* as a valid species on the basis of its peculiar morphology, and a new combination for that species is presented here. Finally, some comments on the recently described *Albuca gariepensis* J.C.Manning & Goldblatt, which is closely related to *B. stapffii*, are given.

Materials and methods

Morphological studies were mostly undertaken on herbarium collections at BOL, BNRH, GRA, J, K, KEI, KMG, NBG, NH, NU, PEU, PRE, PUC, UFH and WIND (acronyms according to Thiers, 2013). Populations of *Battandiera* have been studied in Morocco, South Africa and Namibia between 2005 and 2011. Authors of cited taxa follow IPNI (2013).

New combinations

Battandiera angolensis (Baker) Mart.-Azorín & M.B.Crespo **comb. nov.** ≡ *Urginea angolensis* Baker in J. Bot. 12: 364 (1874), basion. (Lectotype [here designated]: Angola, Ambriz, 02-1873. *Monteiro* s.n. (K400581!). Fig. 1

= *Urginea comosa* Welw. ex Baker in Trans. Linn. Soc. London, Bot. 1(5): 247 (1878).

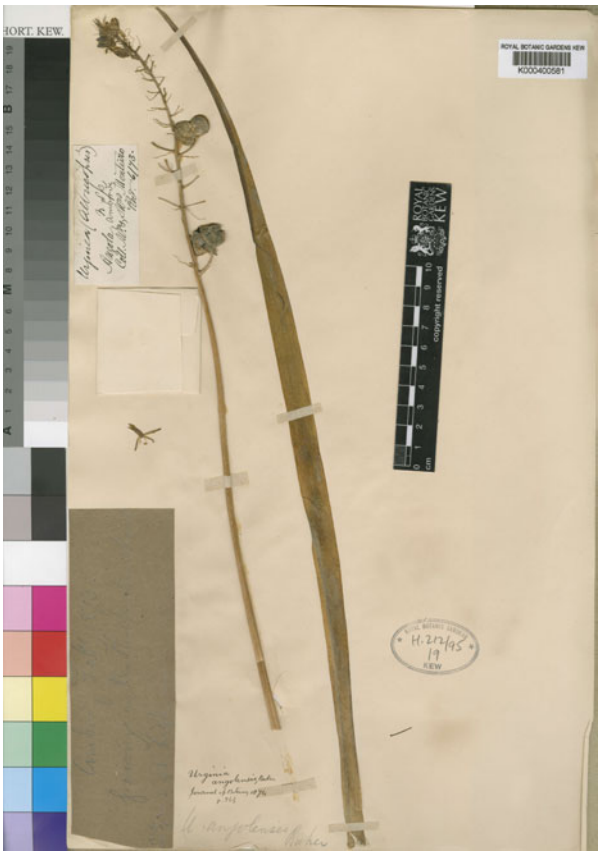

Figure 1. Lectotype of *B. angolensis* (Baker) Mart.-Azorín & M.B. Crespo (K400581).

= *Ornithogalum pulchrum* Schinz in Verh. Bot. Ver. Brandenburg 31: 221 (1890) = *Urginea pulchra* (Schinz) Sölch in Mitt. Bot. Staatssamml. München 4: 73 (1961) = *Albuca pulchra* (Schinz) J.C.Manning & Goldblatt in Taxon 58(1): 92 (2009) = *Battandiera pulchra* (Schinz) Mart.-Azorín, M.B.Crespo & Juan in Ann. Bot. (Oxford) 107(1): 26 (2011).
= *Urginea dimorphantha* Baker in Bull. Herb. Boissier Ser. 2. 3: 663 (1903).

O. pulchrum was described by Schinz (1890) based on one of his collections from East Ondongua in Namibia. Later, authors (*cf*. Leighton, 1944; Obermeyer, 1961; Sölch et al. 1970; Obermeyer, 1978; Müller-Doblies & Müller-Doblies 1996) accepted this species and included two heterotypic synonyms: *Urginea comosa* Welw. ex Baker described from "*Mossamedes et Huilla, in pascuis sylvaticis humidiusculis inter Lopollo et Monino*" in Angola (*cf*. Baker, 1878) and *Urginea dimorphantha* Baker from Ondongua, Namibia (*cf*. Baker, 1903). *U. comosa* was presented as the earliest name for that species; however, as commented by Obermeyer (1978), the existence of the name *Ornithogalum comosum* L. did not allow transfer to *Ornithogalum*, *O. pulchrum* being the priority name for that taxon. This fact was overlooked in recent works (*cf*. Manning et al. 2009; Martínez-Azorín et al. 2011), in which *O. pulchrum*

was combined in *Albuca* and *Battandiera*, respectively. Nonetheless, after our taxonomic studies in Urgineoideae, we realized that *B. pulchra* is conspecific to *U. angolensis* Baker. This latter species was described by Baker (1874) from "*Angola, in ditione Ambriz in silvis, Monteiro! (Herb. Kew.)*". The original description included interesting data such as "*Bracteae lineari subulatae persistentes pedicellis subaequilongae, basi nullo modo calcaratae*" or "*Capsula sessilis 5-6 lin. longa, 8-9 lin. lata, profunde obtuse trilobata, seminibus in loculo 12-20 magnis discoideis*", fitting perfectly the current concept of *B. pulchra* and not *Urginea* sensu lato. Moreover, the original material deposited at Kew (Figure 1) includes a single sheet (K400581) which is selected here as the obligate lectotype of the species. It shows only a leaf and a single long racemose inflorescence with a plumose apex, bracts mostly longer than pedicels and not spurred, and capsules and seeds fitting those of the genus *Battandiera*. Therefore, all these data justify the new combination proposed above. It is remarkable to note that most of the synonyms of *Battandiera angolensis* were described in the genus *Urginea*, most probably due to its large, flattened, discoid seeds, resembling those of subfamily Urgineoideae. This fact demonstrates the uncertainty regarding generic placement of those plants in the past, and in some way supports its recognition as an independent genus within Ornithogaloideae. *B. angolensis* is known to occur in Angola, northern Namibia, Botswana, Zimbabwe and tropical east Africa (*cf*. Obermeyer, 1978). The disjunct east African populations show only slight morphological differences, and they are preliminarily accepted here as an independent species named *B. donaldsonii* (Rendle) Mart.-Azorín, M.B.Crespo & Juan. However, further studies are needed to clarify its taxonomic status.

Battandiera recurva (Oberm.) Mart.-Azorín & M.B.Crespo **comb. nov.** ≡ *Ornithogalum recurvum* Oberm. in Bothalia 10(2): 357 (1971), basion. – (Holotype: South West Africa [Namibia], 1712 (Posto Velho): Kaokoveld, banks of the Kunene River at long. 1226, lat. 1715, among rocks in mountains, 17-08-1956, *Story* 5848 (PRE64226!). Fig. 2

O. recurvum was described from cultivated plants collected on the Kunene river banks in the Kaokoveld, north-eastern Namibia, the type of which is currently housed at PRE (Figure 2). In the protologue, Obermeyer (1971) observes that it is "very near to *O. stapffii* but the plant is larger, with the larger and broader leaves forming a distinct upright rosette, and the recurved perianth". Sölch et al. (1970) accepted that species, by that time still

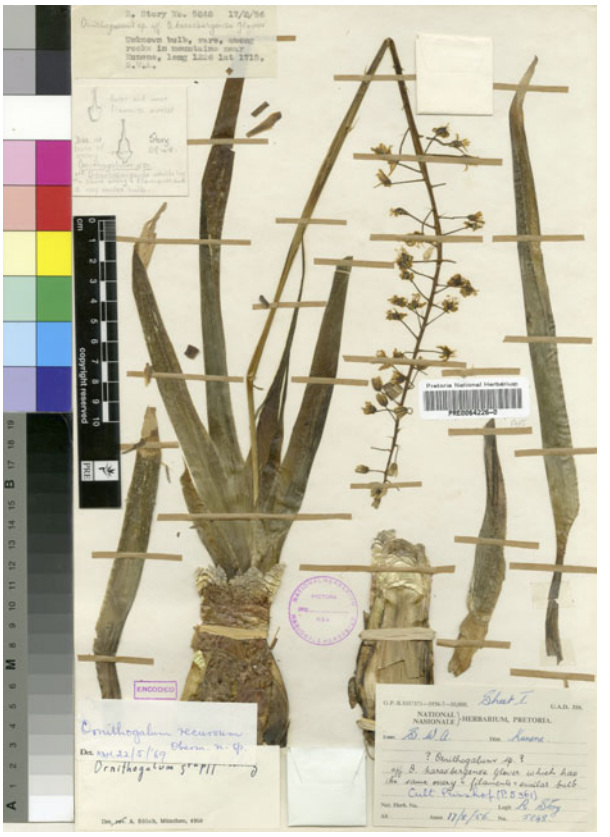

Figure 2. Holotype of *Battandiera recurva* (Oberm.) Mart.-Azorín & M.B.Crespo (PRE64226).

unpublished, as independent from *Ornithogalum stapffii*, giving a number of morphological differences. However, a few years later, Obermeyer (1978), in her taxonomic revision of *Ornithogalum* in Southern Africa, merged *O. recurvum* in the variable *O. stapffii*, including five further synonyms. She commented that this species "appears to be one of the commonest and most variable species" and added that "cultivated plants have the peduncle much exserted and the perianth-segments completely recurved, but this must be due to unnatural conditions". Surprisingly, Müller Doblies and Müller-Doblies (1996) did not mention *O. recurvum*. However, evidence exists that natural populations show strongly recurved perianth segments (*cf*. Manning et al. 2009, Figure 2(A) as *Albuca stapffii*), which together with its taller habit, longer and narrow inflorescence and wider leaves supports its acceptance as an independent species. Therefore, it is here combined in *Battandiera*.

The status of *A. gariepensis*

A. gariepensis has been recently described as a new species from the central portion of the Orange River in the Northern Cape Province of South Africa, occurring in the Kakamas, Upington and Kenhardt

areas (*cf*. Manning & Goldblatt 2011). It was based on collections usually named *Ornithogalum tenuifolium* subsp. *aridum Oberm.* (= *Stellarioides arida* (Oberm.) Speta), but their large wide and retuse capsules and the large discoid seeds led Manning and Goldblatt (2011) to describe a new species in *Albuca* subg. *Namibiogalum* (= *Battandiera* sensu Martínez-Azorín et al. 2011). Manning and Goldblatt (2011) compared their new species with those of *Battandiera* (*B. seineri* (Engl. & K.Krause) Mart.-Azorín, M.B. Crespo & Juan, *B. rautanenii* (Schinz) Mart.-Azorín, M.B.Crespo & Juan and *B. stapffii*) and even *Ornithogalum toxicarium* C.Archer & R.H.Archer. The new *A. gariepensis* was characterized by its leaves linear-canaliculate, numerose, much longer than the short inflorescence; flowers 14–20 mm in diameter; pedicels 8–10 mm long; filaments abruptly expanded at the base into quadrate wings; ovary stipitate and slightly widened above the stipe and capsule deeply three-lobed with discoid seeds. All these characters, especially regarding flower structure, fit very well with the current concept of *B. stapffii*. However, Manning and Goldblatt (2011) supported their new species on the basis of its ovary slightly widened above the stipe whilst the ovary in *Ornithogalum stapffii* and *O. rautanenii Schinz* is abruptly expanded above the stipe into a six-lobed disc. This slight difference appears at first sight a weak character to accept an independent species from the current concept of *B. stapffii*, since we have observed considerable variation in basal lobes of the ovary among populations. Furthermore, this latter species includes several synonyms and it is very variable in morphology as said before (*cf*. Obermeyer, 1978). Among those synonyms, *Ornithogalum breviscapum* F. M.Leight. and *O. karasbergense* R.Glover were described from south-eastern Namibia, being adjacent to the area where *A. gariepensis* occurs. Moreover, the study of the type collections of *Ornithogalum juttae K.Krause*, *O. karasbergense* or *O. breviscapum* shows that they do not differ considerably from *A. gariepensis*. A detailed taxonomic revision of this species complex is, however, still needed.

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