



Massonia citrina (Hyacinthaceae, Hyacinthoideae)—a new species from the Western Cape Province (South Africa)

MICHAEL PINTER^{1*}, ANDREAS BRUDERMANN¹, MANUEL B. CRESPO², GERFRIED DEUTSCH¹, MARIO MARTÍNEZ-AZORÍN^{1,2}, UTE MÜLLER-DOBLIES³, DIETRICH MÜLLER-DOBLIES³, MARTIN PFOSSER⁴ & WOLFGANG WETSCHNIG¹

¹ Institute of Plant Science, Karl-Franzens-University Graz, Holteigasse 6, A-8010, Graz, Austria;
E-mail: michael.pinter@edu.uni-graz.at

² CIBIO (Instituto Universitario de la Biodiversidad), Universidad de Alicante, P. O. Box 99, E-03080 Alicante, Spain.

³ Institut für Biologie / Systematische Botanik und Pflanzengeographie der Freien Universität Berlin, Altensteinstr. 6, D-14195 Berlin, Deutschland, Germany

⁴ Biocenter Linz, J.-W.-Klein-Str. 73, A-4040 Linz, Austria.

*author for correspondence

Abstract

In the course of a taxonomic revision of the genus *Massonia* Houtt., *Massonia citrina* M.Pinter, Deutsch, U.Müll.-Doblies & D.Müll.-Doblies, a new species of this genus from the Western Cape Province (South Africa), is here described. This species is similar to members of the *M. depressa* group, but it can be easily distinguished by its yellow filaments and style and the longer perigone-filament tube. A complete morphological description of the new species is presented.

Key words: Asparagaceae, Flora of Southern Africa, Hyacintheae, Massonieae, Scilloideae, Taxonomy

Introduction

The family Hyacinthaceae consists of about 700–900 species. They are mainly distributed in Africa, Europe and southwestern Asia, with a single small genus—*Oziroë* Rafinesque (1837: 53)—in South America (Speta 1998a, b, APG 2003). Within this family four monophyletic clades, filed as subfamilies Hyacinthoideae, Ornithogaloideae, Oziroëoideae and Urgineoideae, are accepted (Speta 1998a, Pfosser & Speta 1999, Manning *et al.* 2004).

Alternatively Hyacinthaceae is treated as subfamily Scilloideae of the Asparagaceae. In this case, the former subfamilies are reduced to tribes Hyacintheae, Ornithogaleae, Oziroëeae and Urgineae (APG 2009, Chase *et al.* 2009). However, mostly based on morphology, we prefer the treatment as Hyacinthaceae.

The Hyacinthoideae can be further divided into three tribes: Massonieae, Pseudoprosperae and Hyacintheae. The two former are distributed through sub-Saharan Africa, the Arabian Peninsula to India, while the latter occurs in Eurasia and northern Africa (Speta 1998a, b, Wetschnig *et al.* 2002, Pfosser *et al.* 2003, Manning *et al.* 2004). The generic treatment within the subfamily seems to be more or less stable. However, in some rather recent publications a new genus—*Namophila* U.Müller-Doblies & D.Müller-Doblies (1997: 77)—was described and some other genera were lumped into broader generic concepts (e.g. *Polyxena* Kunth (1843: 294) into *Lachenalia* J.Jacquin ex Murray (1784: 314), *Whiteheadia* Harvey (1868: 396) into *Massonia* Houttuyn (1780: 424), and *Drimiopsis* Lindley & Paxton (1851–1852: 73, fig.172) and *Resnova* Van der Merwe (1946: 46) into *Ledebouria* Roth (1821: 194) (cfr. Manning *et al.* 2004). By all means, the inventory of species within the Massonieae is not yet completed.

The genus *Massonia* was described based on a specimen sent to the Botanical Garden in Amsterdam by Carl Peter Thunberg. In the beginning, the new genus included a single species – *Massonia depressa* Houttuyn (1780: 424). Four years later, Panzer in the 11th volume of his „Des Ritters Carl von Linné [...] vollständiges Pflanzensystem [...]“, which is a translation with some additions of Houttuyn’s „Natuurlijke Historie“, lists three additional species (Panzer 1784). With the continuous exploration of South Africa, the number of species quickly increased. Baker (1897) already listed 33 species in his final treatment of the genus *Massonia*. In more recent papers of the last decades the number of species varies from only 6 (van der Merwe 2002, Manning & Goldblatt 2003, Summerfield 2004), to 8 (Jessop 1976), or up to 12 (Müller-Doblies & Müller-Doblies 1997).

So far about 80 species have been described in the genus *Massonia* (IPNI 2013), from which about 60 fit into its recent concept, whilst the remaining belong to genera such as *Daubenya* Lindley (1835: t.1813), *Lachenalia*, *Polyxena* and *Whiteheadia*. All of them are distributed in South Africa and the southwestern part of Namibia.

We assume here that *Massonia depressa* as treated by various authors (cfr. Jessop 1976, van der Merwe 2002) includes different taxa, as previously mentioned by other authors (cfr. Müller-Doblies & Müller-Doblies 1997). Some of these species were described and depicted long time ago by Jacquin (1791, 1804), though they were ignored and misunderstood by most authors. A first attempt to clarify some of these species was the correct identification of *M. pustulata* Jacquin (1791: 177) and the replacement of *M. pustulata* auct. non Jacq. by *M. longipes* Baker (1897: 411) (Wetschnig *et al.* 2012).

After studying living plants, at first sight related to the *Massonia depressa* complex, clear morphological evidence is shown below that allows description of a new species.

Materials and methods

The species and specimens examined in this study are listed in Table 1.

Seeds of the described new species were obtained from the company African Bulbs (www.africanbulbs.com) in October 2009 as “*Massonia* sp. yellow [Rooihoogte Pass]”. Plants were cultivated in a greenhouse and flowered in January 2012. Morphological measurements of flower parameters were performed on material fixed in Formalin-Acetic-Alcohol (FAA) from plants cultivated in the greenhouse. It is common knowledge that flowers obtained in a greenhouse keep the size and proportions of in situ flowers, as they are addressed to the fixed size of their pollinators, while green-house leaves may differ considerably from in situ leaves (Müller-Doblies & Müller-Doblies 2002: 547). In a more recent paper Wetschnig *et al.* (2012) tested again that flower morphology of greenhouse-cultivated plants did not differ from flowers collected in wild populations.

TABLE 1. List of investigated taxa in the present study, with voucher and locality information. All vouchers are deposited at LI (Herbarium Biocenter of the Upper Austrian Museums). Abbreviations: WW = Wolfgang Wetschnig, GD = Gerfried Deutsch

| Taxon | Voucher | Locality |
|--|------------|---------------------------|
| <i>Massonia depressa</i> Houtt. | WW03964 | ZAF: Leliefontein |
| <i>Massonia echinata</i> L.f. | WW03970 | ZAF: Vanrhyn’s Pass |
| <i>Massonia citrina</i> M.Pinter & <i>al. sp. nov.</i> | GD20091002 | ZAF: Rooihoogte Pass |
| <i>Massonia longipes</i> Baker | WW03979 | ZAF: Cape Infanta |
| | WW03983 | ZAF: DeHoop, Koppie Allen |
| <i>Massonia pustulata</i> Jacq. | WW01140 | ZAF: Swellendam |
| | WW03984 | ZAF: Napier |

Measurements listed under filament length are referring only to the free part and not to the whole length which is consisting of the perigone-filament-tube, the filament-tube and the free part of the filaments. Measurements of the leaves were performed on fresh leaves under natural conditions.

Description of the new species

Measurements of the main diagnostic characters of specimens examined in the present study are compared in Table 2.

Massonia citrina M.Pinter, Deutsch, U.Müll.-Doblies & D.Müll.-Doblies, *sp. nov.* (Fig. 1 A–D, Fig. 2 A)

Planta herbacea perennis. Bulbus ovoideus, tunicatus, 15–20 mm diam., tunicis papyraceis brunneis vestitus. Folia 2, decidua, ovoidea, acuta, glabra, (3.5–)6(–8) cm longa et (3–)7(11) cm lata, terrae adpressa, coaetanea, marginibus purpureis instructa. Perigonium pallide luteolum vel cremeo-albidum. Perigonii tubus 14 mm longus et 8×6 mm diam., fauce citrina. Segmenta reflexa, sigmoidea 9 mm longa et 4–5 mm lata, striis luteolis ad viridulis longitudinalibus ornata. Filamenta crassiuscula, attenuata, citrina, 10 mm longa, basibus in tubum brevissimum <1 mm altum connata. Antherae statu clauso 2 mm longae, oblongae. Ovarium 3 mm diam. et 9 mm longum. Stylus citrinus, 13 mm longus. Species propria Massoniae depressae similis, sed ab omnibus ceteris Massoniis colore filamentorum et styli laete citrino differt.

Type:—SOUTH AFRICA. Western Cape, 3319 (Worcester): Cape Winelands, Rooihoogte Pass (–DB), near Koo valley, cultivation no. GD20091002, flowering 22 January 2012, raised from in situ collected seeds received in October 2009 from Cameron McMaster (nursery African Bulbs), G. Deutsch 22 January 2012 s.n. (holotype LI!, isotype PRE!).

Herbaceous perennial plant. Bulb ovoid, tunicate, about 15–20 mm in diameter, inner living tunics white, covered by a coat of papery and brownish tunics. Leaves 2, deciduous, ovoid, acute, glabrous, about (3.5–)6(–8) × (3–)7(–11) cm, adpressed to the ground, coetaneous with the flowers, with purplish margins. Perigone lemon-coloured to cream-white, segments 9 mm long and 4–5 mm broad, reflexed with a sigmoid curve bearing a longitudinal yellowish to greenish band visible on both sides. Perigone-filament-tube 14 mm long and 8 × 6 mm in diam. Apex of the perigone-filament-tube lemon-coloured. Filaments rather fleshy, attenuate, lemon-coloured, 10 mm long, connate at the base ca. 1 mm, anthers 2 mm long, when closed, oblong. Ovary 9 × 3 mm, with shoulder, abruptly tapering into style, cross section triangular with rounded edges. Style lemon-coloured, slender, gradually tapering to the apex, 13 mm long.

Etymology:—Named after the bright-lemon-coloured filaments and style, which is the main character to separate it from other *Massonia* species (*citrinus* = lemon-coloured).

Distribution:—The new species is only known from a small area in the surroundings of the Rooihoogte Pass, Cape Winelands District, Western Cape.

Diagnostic characters and relationships:—*Massonia citrina* can easily be distinguished from all other species of the genus by its bright lemon-coloured filaments and style. The perigone-filament-tube is relatively long (14 mm) in comparison to that of *M. depressa* (11 mm in the specimen examined) and *M. longipes* (10–12 mm), although there are records of 20 mm in *M. depressa* (e.g. Vogel 1954). In comparison to *M. pustulata* (12–15 mm) it falls into the average values of this species. The considerable width of the tube throat is the most characteristic feature of the *Massonia depressa* group, as it gives access to the nectar for the exceptional pollinators, mice (Johnson *et al.* 2001). The width of the *M. citrina* perigone-filament-tube falls into the average range of the *M. depressa* group. Moreover the length of the filaments is shorter than in the other species examined in this study. Especially in comparison to *M. depressa*, the filament length of *M. citrina* is significantly shorter. With regard to *M. depressa*, *M. longipes* and *M. pustulata*, *M. citrina* shows a very short filament-tube, which is less than 1 mm long (see Fig. 2 and Table 2). Whereas in *M. citrina* the perigone-filament-tube is longer than the filaments, in *M. depressa*, *M. longipes* and *M. pustulata* this is inverted (see Table 2). The ovary of *M. citrina* is narrower and the style is much shorter than in *M. depressa* s.l. The leaves are glabrous and smaller than in all the other species examined, especially in comparison to *M. depressa*.

Due to the fact that *M. citrina* is easily morphologically distinguishable from *M. depressa*, *M. echinata* Linnaeus (1782: 193), *M. longipes* and *M. pustulata* by the lemon colour of its filaments and style, as well as its filament length, we are convinced that *M. citrina* is a species of its own, and that it is justified to separate it from *M. depressa*.

TABLE 2. Comparison of selected main characters of 7 specimens examined.

| | <i>M. citrina</i> (GD20091002) | <i>M. pustulata</i> (WW01140) | <i>M. longipes</i> (WW03984) | <i>M. longipes</i> (WW03979) | <i>M. depressa</i> (WW03964) | <i>M. echinata</i> (WW03970) |
|---|-----------------------------------|----------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Leaf length (cm) | (3.5-)6(-8) | 10 | 11.5 | 9 | 12 | 13.5 |
| Leaf width (cm) | (3-)7(-11) | 12 | 13 | 11 | 12 | (14-)15(-16) |
| Leaf pustulate (y/n) | n | y | y | y | n | n |
| Pustule number/cm ² | N/A | 170 | 115 | 27 | N/A | N/A |
| Pustule diameter (mm) | N/A | 0.5 | 0.7 | 1.1 | N/A | N/A |
| Perigone-filament-tube length (mm) | 14 | 12 | 15 | 12 | 11 | (8-)11(-14) |
| Perigone-filament-tube width (mm) | 8×6 | 5×7 | 9 | 5 | 7×9 | (2-)4 |
| Filament-tube/apex of perigone-filament-tube colour | yellow | bluish-green | bluish-green | pink | reddish-brown | white |
| Filament length (mm) | 10 | 16 | 17 | 17 | 18 | (9-)12 |
| Filament-tube length (mm) | <1 | 3 | 3 | 2 | 2 | absent |
| Anther length (mm) | 2 | 3 | 3 | 1 | (4-)5 | 2 |
| Anther colour | yellow | yellow | yellow | yellow | yellow | bluish-grey |
| Ovary length (mm) | 9 | 6 | 7 | 6 | 7 | (4-)5(-10) |
| Ovary width (mm) | 3 | 4 | 4.5 | 4 | 5 | 2 |
| Style length (mm) | 13 | 19 | 15 | 22 | 20 | (14-)15(-20) |

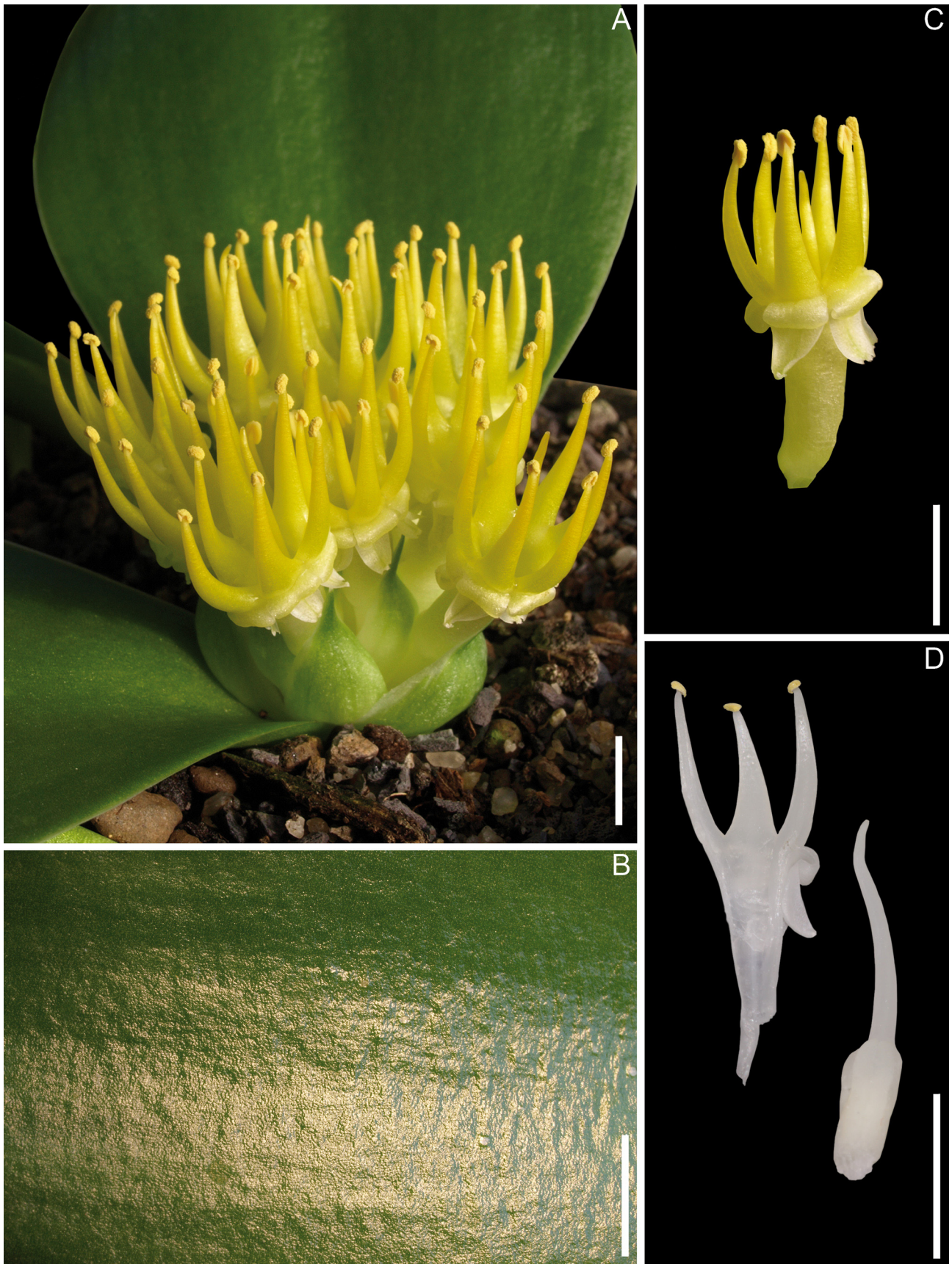


FIGURE 1. *Massonia citrina* M.Pinter, Deutsch, U.Müll.-Doblies & D.Müll.-Doblies (GD20091002). A. Inflorescence; B. Leaf surface; C. Flower; D. Opened flower (fixed in FAA). Scale bars A, C, D = 1 cm; B = 0.5 cm.

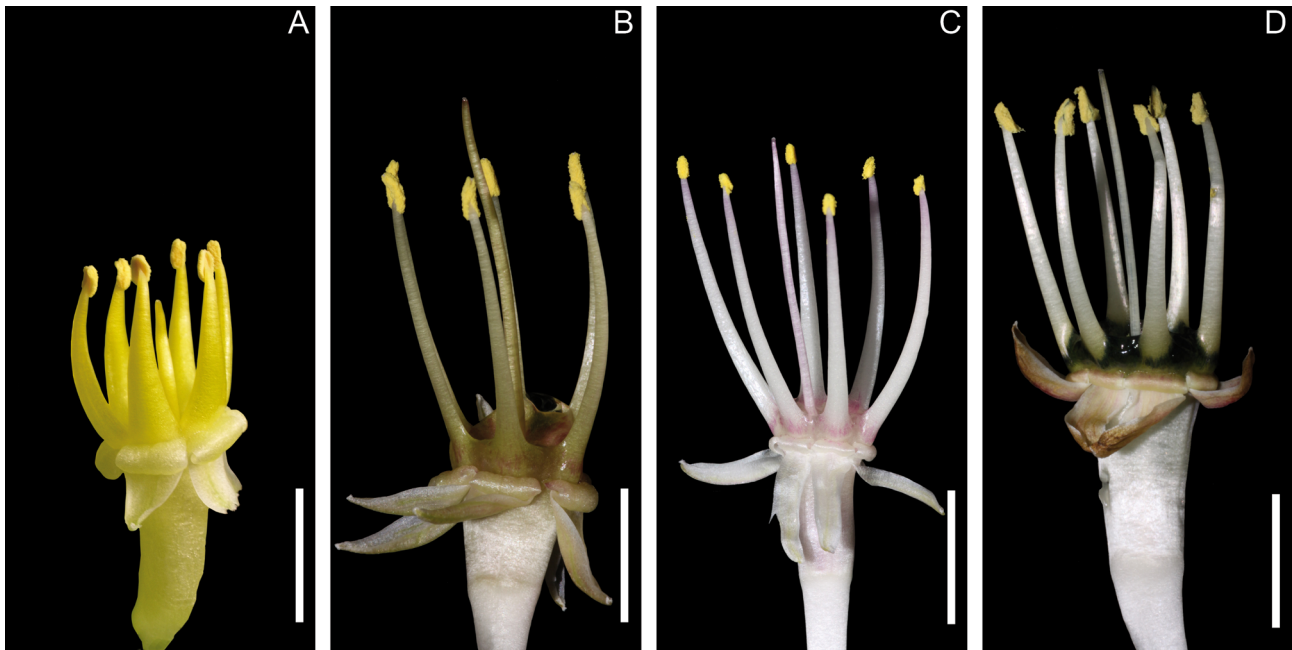


FIGURE 2. Comparison of flowers of four specimens examined. A. *Massonia citrina* (GD20091002); B. *M. depressa* (WW03964); C. *M. longipes* (WW03879); D. *M. pustulata* (WW03984). Scale bars A, B, C, D = 1 cm.

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