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Three new species of Graphidaceae from tropical Africa

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Abstract

Three new species of Graphidaceae are described as new to science from tropical Africa: *Graphis aptrootiana* Van den Broeck, Lücking & Ertz and *Redingeria desseiniana* Van den Broeck, Lücking & Ertz from the Democratic Republic of the Congo, and *G. vandenboomiana* Ertz, Lücking & Van den Broeck from Reunion. A key is presented to all known species of *Redingeria*. The lichenicolous fungus *Etayoa trypethelii* is mentioned as new to Central Africa.

Key words: Democratic Republic of the Congo, *Graphis*, Palaeotropics, *Redingeria*, Reunion, taxonomy

Introduction

Graphidaceae, which is currently accepted to include the previously independent families Thelotremataceae (Mangold *et al.* 2008, Rivas Plata *et al.* 2012a), Gomphillaceae, Asterothyriaceae and Solorinellaceae (Baloch *et al.* 2010, Rivas Plata *et al.* 2012a, b), is the second largest family of lichenized fungi and the dominant element of lichen communities in tropical regions, with over 1800 accepted species (Staiger 2002, Frisch *et al.* 2006, Archer 2006, 2007, 2009, Lücking & Rivas Plata 2008, Lücking 2009, Lücking *et al.* 2008, 2009, Rivas Plata *et al.* 2008, 2012a, 2013, Mangold *et al.* 2009). However, taxonomical and floristic studies regarding the Graphidaceae of tropical Africa are still very rare. Almost all available studies are historical and date from before 1950 and often go back to the 19th century. Recently a revision of the African Thelotremataceae has been conducted leading to the acceptance of 94 species from this continent (Frisch *et al.* 2006). Afterwards world-wide keys were published for some of the theletremoid Graphidaceae (Rivas Plata *et al.* 2010) and for the genus *Graphis* (Lücking *et al.* 2009). But for the other genera the lichen biota of tropical Central Africa is very incompletely known.

In 2009 and 2010 a multidisciplinary project to study the biodiversity in the Democratic Republic of the Congo was established between several Belgian and Congolese institutions. Corticolous and foliicolous lichens were collected at several localities in the Congo River basin during this project. Afterwards, a follow-up project was established under the name COBIMFO with further lichens collected in 2012. The study of the foliicolous lichen biota already lead to a publication where six new species were described in addition to 53 species newly recorded for the Democratic Republic of the Congo (Van den Broeck *et al.* 2014). The aim of the present project is to describe new species of Graphidaceae discovered in the Democratic Republic of the Congo. In addition, one new species collected Reunion in 2003 by one of us is described here as well.

Material and Methods

Specimens were studied using a Wild M38 stereomicroscope and two Olympus CHR-TR45 and Olympus BX51 microscopes. Microscopical preparations were mounted in water, 5% KOH (K), and Lugol's reagent (1% I_2), either without (I) or with KOH pre-treatment (KI). Measurements of ascospores refer to material examined in water or in KOH, those of asci to material examined in KI. Secondary substances were identified by TLC and spot tests using

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Province: Bomane, fishing village at the Aruwimi River; secundary wood; 21 May 2010, *Van den Broeck 3751*, *3752* (BR). NE of Bomane, closed secondary forest near the Aruwimi River; 23 May 2010, *Van den Broeck 3831*, *3859* (BR). Jafira, upstream of Lieki at the other side of the river; 28 May 2010, *Van den Broeck 4012* (BR). Yangambi, Yangambi Biosphere Reserve; Oct 2012, *Van den Broeck 5598*, *5599* (BR).

The seven accepted species of *Redingeria* can be distinguished using the following key:

1 Ascospores submuriform; thallus UV+ bright yellow (lichexanthone major, otherwise no substances); ascomata round to lirellate, with broad disc filled with complex columella ..... ***R. microspora* (Zahlbr.) M. Cáceres & Lücking** (2012: 809)
- Ascospores 3-septate; thallus UV– or UV+ pale yellow to orange (lichexanthone minor or absent; hypoprotocetraric acid, psoromic acid or unknown substances present or substances absent); ascomata variable 2

2 Thallus ecorticate, farinose, UV+ pale orange; psoromic acid ..... ***R. desseiniana***
- Thallus corticate or if ecorticate, then smooth, UV– or UV+ pale yellow; hypoprotocetraric acid (major) and lichexanthone (minor) or no substances 3

3 Ascomata round, pore-like 4
- Ascomata irregular, rounded to lirellate (on the same thallus) 5

4 Hypoprotocetraric acid (major) and lichexanthone (minor), hence thallus UV+ pale yellow; pore with columella distinctly visible; Neotropics ..... ***R. krempelhuberi* (Redinger) Frisch** in Frisch *et al.* (2006: 413)
- No substances, thallus UV–; pore narrow, columella not distinctly visible; tropical Africa ..... ***R. deightonii* (C.W. Dodge) Frisch** in Frisch *et al.* (2006: 407)

5 Thallus ecorticate (but smooth), grey-green with bluish tinge; no substances, hence thallus UV–; ascospores 14–17 × 6–8 µm ..... ***R. glaucoglyphica* (Sipman) Frisch** in Frisch *et al.* (2006: 409)
- Thallus corticate, olive-green; hypoprotocetraric acid (major) and lichexanthone (minor), hence thallus UV+ pale yellow; ascospores 16–22 × 8–10 µm 6

6 Ascomata narrow, as if formed by numerous small, pore-like ascomata arranged in distinct lines, immersed, with whitish rim and hence strongly contrasting with surrounding thallus; thallus smooth ..... ***R. leiostoma* (Tuck.) Frisch** in Frisch *et al.* (2006: 416)
- Ascomata broad, with more or less exposed disc filled with complex columella, erumpent to prominent, with margin of thallus colour; thallus finely verrucose ..... ***R. glyphica* (Nyl.) Frisch** in Frisch *et al.* (2006: 411)

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