



## The lichen flora of Rwanda: an annotated checklist

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CHRISTINA BOCK, MARKUS HAUCK &amp; EBERHARD FISCHER

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### Abstract

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A first compilation of the lichen flora of Rwanda, east-central Africa, is provided. A total of 178 lichenized fungi and four lichenicolous fungi is included. *Pyrrhospora russula* is new to Africa. Thirty-three further species are first records for Rwanda, viz. *Arthonia cinnabarina*, *Candelariella xanthostigma*, *Canoparmelia ecaperata*, *C. somaliensis*, *Collema pulcellum*, *Dirinaria confluens*, *Flavoparmelia subamplexa*, *Graphis scripta*, *Heterodermia japonica*, *H. podocarpa*, *Hyperphyscia syncolla*, *Leptogium adpressum*, *L. azureum*, *L. cyanescens*, *Parmelinella wallichiana*, *Parmotrema permutatum*, *Physcia aipolia*, *P. erumpens*, *P. krogiae*, *P. poncinsii*, *Pyxine cocoes*, *P. katendei*, *P. petricola*, *P. reticulata*, *P. subcinerea*, *Ramalina calcarata*, *R. disparata*, *R. pusiola*, *R. subpusilla*, *Usnea complanata*, *U. dasaea*, *U. himantodes* and *U. perhispidella*.

Key words: lichen diversity, lichenized fungi, lichenicolous fungi, central Africa.

### Introduction

Like most areas of the African continent, the lichen flora of Rwanda is insufficiently studied. After the first records from Rwandan lichens by Lindau (1911), recent studies primarily were done by the Belgian scientists J. Lambinon & E. Sérusiaux (Lambinon & Sérusiaux 1977, 1983, Sérusiaux 1978, 1979, 1981, 1984a-b, 1989, Lambinon & al. 1981, Sérusiaux & Diederich 2005, Sérusiaux & al. 2006) and from E. Fischer and co-workers (Biedinger & Fischer 1996, Bock & Hauck 2005, Elix & al. 2005, Killmann & Fischer 2005, Sérusiaux & al. 2005). While Swinscow & Krog (1988) provided an excellent compilation of the macrolichen flora of the East African countries Ethiopia, Uganda, Kenya and Tanzania, any compilation of the lichen flora of Rwanda was lacking so far. Therefore, a checklist of the lichens of Rwanda is given in the present paper. Remarkably, not a single lichen record has been published from Byumba province in northern Rwanda. In general, many groups of Rwandan lichens are still largely unstudied. Four species of lichenicolous fungi are included in the list, though the state of knowledge is extremely scanty for this group of organisms (Diederich 1996, Aptroot & al. 1997, Sérusiaux & Diederich 2005).

## Material and methods

Regionalisation follows Rwanda's twelve administrative provinces valid until 2005. These provinces include Ruhengeri, Byumba, Umutare, Gisenyi, Kibuye, Gitarama, Kigali Ngali, Kigali City, Kibungo, Cyangugu, Gikongoro and Butare. This classification was preferred over the current administrative organization in five provinces (Kigali, North, South, West, East) introduced in 2006, as the older classification allows a more exact localization. Specimens cited in the list are so far not reported elsewhere and deposited in the private herbarium of C. Bock (presently at GOET). New records for Rwanda are designated by an asterisk (\*), new records for Africa with two asterisks (\*\*) preceding the taxon name. Lichenicolous fungi are marked with a plus sign (+). An online version of the present paper will be published and updated in future at <http://www.checklists.de>.

## The lichens and lichenicolous fungi known from Rwanda

*Anzia afromontana* R. Sant. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).

*Arthonia cyanea* Müll. Arg. – Gisenyi: Gikungu (Sérusiaux 1984b).

\**Arthonia cinnabarina* (DC.) Wallr. – Umutare: Akagera National Park, SW Lac Ihema, 1°55'S, 30°42'E, 1311 m, on *Canthium* sp., 20.10.2003, C. Bock. – *A. cinnabarina* is known from all continents except Antarctica. Previous findings from Africa include Morocco (Egea 1996), the Canary Islands and Madeira (Hafellner 1995), Somalia (Alstrup & Aptroot 1994) and South Africa (Doidge 1950).

*Bacidia griseoalba* Lindau – Cyangugu/Gikongoro: Nyungwe Forest (Lindau 1911). – Only known from the type locality.

*Buellia argilliseda* Zahlbr. – Gitarama: Nyavarongo River (Lindau 1911, as *B. argillacea* Lindau, non (Bellardi) Stein). – Only known from the type locality.

*Buellia disciformis* (Fr.) Mudd – Gitarama: Nyavarongo River (Lindau 1911, as *B. parasema* De Not.).

*Buellia stellulata* (Tayl.) Mudd. – Gitarama: Nyavarongo River (Lindau 1911).

*Bulbothrix hypochraea* (Vain.) Hale – Umutare: Akagera National Park, Mt Mutumba, tree savanna on quartzite rocks, 1°36'S, 30°39'E, 1652 m, 19.10.2003, C. Bock. – Butare: Butare city area (Killmann & Fischer 2005).

*Bulbothrix isidiza* (Nyl.) Hale – Butare: Butare city area (Killmann & Fischer 2005).

*Bulbothrix pustulata* (Hale) Hale – Ruhengeri: Rugera, Uwagahunga (Sérusiaux 1984a).

*Bulbothrix sensibilis* (Steiner & Zahlbr.) Hale – Butare: Butare city area (Killmann & Fischer 2005).

*Bunodophoron melanocarpum* (Sw.) Wedin – Ruhengeri: Virunga Volcanoes. – Cyangugu: Nyungwe Forest. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).

*Calicium trabinellum* Ach. – Ruhengeri: Virunga Volcanoes (Tibell 1981).

*Caloplaca ferruginea* (Huds.) Th. Fr. – Butare city area (Killmann & Fischer 2005).

*Candelaria concolor* (Dicks.) Stein – Umutare: Akagera National Park. – Kigali: Kininya. – Butare: Butare city area (Killmann & Fischer 2005).

*Candelaria fibrosa* (Fr.) Müll. Arg. – Butare: Butare city area (Killmann & Fischer 2005).

\**Candelariella xanthostigma* (Ach.) Lettau – Umutare: Akagera National Park, dry forest near Lake Ihema, 1°52'S, 30°44'E, 1349 m, on *Acacia* sp., 18.10.2003, C. Bock. – *C. xanthostigma* was in Africa so far known from the north, namely from the Canary Islands (Hafellner 1995) and Cape Verde Islands (Follmann & Mies 1988), Morocco (Burgaz & al. 2002), Algeria (Van Haluwyn & al. 1994; Alonso & Egea 2003) and Tunisia (Seaward 1996).

*Canoparmelia aptata* (Kremp.) Elix & Hale – Butare: Kanzi Hill at Nyaruhengeri (Killmann & Fischer 2005).

*Canoparmelia crozalsiana* (de Lesd.) Elix & Hale – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005). – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock.

- \**Canoparmelia ecaperata* (Müll. Arg.) Elix & Hale – Umutare: Akagera National Park, 1°53'S, 30°42'E, 1558 m, tree savanna, 18.10.2003, C. Bock. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock. – *C. ecaperata* is a pantropical species with a wide distribution in Africa (Hale 1976).
- Canoparmelia nairobiensis* (J. Steiner & Zahlbr.) Elix & Hale – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005). – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock. – Butare: Butare city area (Killmann & Fischer 2005).
- \**Canoparmelia somaliensis* (Müll. Arg.) Elix & Hale – Umutare: Akagera National Park, 1°37'S, 30°39'E, 1652 m, on *Ficus* sp., 19.10.2003, C. Bock. – *C. somaliensis* is an eastern African species hitherto known from Somalia, Uganda, Kenya, Tanzania, Zambia and Madagascar (Swinscow & Krog 1988).
- Canoparmelia texana* (Tuck.) Elix & Hale – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on bamboo and *Cupressus lusitanica*, 25.9.2003, C. Bock. – Butare: Butare city area (Killmann & Fischer 2005).
- Catillaria alba* Coppins & Vězda – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- Cetrariastrum sorocheilum* (Vain.) W. L. Culb. & C. F. Culb. – Ruhengeri: Virunga Volcanoes. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Cetrariastrum vexans* (Zahlbr.) W. L. Culb. & C. F. Culb. – Ruhengeri: Virunga Volcanoes. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Chaenotheca chrysocephala* (Ach.) Th. Fr. – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- Chaenotheca furfuracea* (L.) Tibell – Ruhengeri: Virunga Volcanoes (Tibell 1981, Killmann & Fischer 2005).
- Chaenotheca stemonea* (Ach.) Müll. Arg. – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- Chaenotheca trichialis* (Ach.) Th. Fr. – Ruhengeri: Virunga Volcanoes (Tibell 1981).
- Chrysothrix xanthina* (Vain.) Kalb – Ruhengeri: Virunga Volcanoes. – Umutare: roads Butare to Kizinga and Bubare to Nyagatare. – Butare: Butare city area. – Kibungu: Mpanga Peninsula (Killmann & Fischer 2005).
- Cladonia diplotypa* Nyl. – Swinscow & Krog (1988) report the species from Rwanda without further data.
- Cladonia pyxidata* (L.) Hoffm. s.l. – Ruhengeri: Virunga Volcanoes (Lindau 1911, as *C. pyxidata* var. *chlorophaea* (Sommerf.) Flörke).
- Coccocarpia erythroxyli* (Spreng.) Swinscow & Krog – Cyangugu: Nyungwe Forest (Sérusiaux 1981).
- Coccocarpia palmicola* (Spreng.) Arv. & D. J. Galloway – Cyangugu: Nyungwe Forest (Sérusiaux 1981).
- Coccocarpia pellita* (Ach.) Müll. Arg. – Ruhengeri: Virunga Volcanoes (Sérusiaux 1981).
- \**Collema pulcellum* var. *subnigrescens* (Müll. Arg.) Degel. – Umutare, Akagera National Park, SW Lake Ihema, 1°55'S, 30°43'E, c. 1312 m, dry forest, on *Boscia* sp., 20.10.2003, C. Bock. – The taxon is widespread in the tropical and subtropical parts of Asia, Africa and, more rarely, in North and Central America. African records are from Guinea, Ghana, Eritrea, Ethiopia, Socotra, R. D. Congo, Uganda, Kenya, Angola and Zimbabwe (Degelius 1974).
- Dermatocarpon aequinoctiale* (Hochst.) Müll. Arg. – Gikongoro: Nyungwe Forest (Lindau 1911).
- Dibaeis holstii* (Müll. Arg.) Kalb & Gierl – Gikongoro: Nyungwe Forest. – Butare: Gatobwe valley near border to Burundi (Killmann & Fischer 2005).
- Diploschistes scruposus* (Schreb.) Norm. – Gitarama: Nyavarongo (Lindau 1911).
- Dirinaria applanata* (Fée) D. D. Awashti – Umutare: Akagera National Park, 1°55'S, 30°42'E, 1369 m, dry forest, 18.10.2003, C. Bock. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock. – Cyangugu: Nyungwe Forest. – Butare: Butare city area (Killmann & Fischer 2005).

- Dirinaria complicata* D. D. Awasthi – Kibungu: Akagera Region, Mpanga, between Lake Cyambwe and Lake Mpanga (Killmann & Fischer 2005).
- \**Dirinaria confluens* (Fr.) D. D. Awasthi – Umutare: Akagera National Park, dry forest at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Nuxia floribunda* and *Ficus natalensis*, 19.10.2003, C. Bock. – *D. confluens* is a pantropical species. Its distribution in Africa includes Ethiopia, R.D. Congo, Uganda, Kenya, Tanzania, Zimbabwe, Mozambique and South Africa (Awasthi 1975, Swinscow & Krog 1988).
- Dirinaria picta* (Sw.) Clem. – Gitarama: Nyavarongo River (Lindau 1911).
- Echinoplaca furcata* Sérus. – Cyangugu: Nyungwe Forest (Sérusiaux 1989).
- Erioderma meiocarpum* Nyl. – The species is mentioned for Rwanda by Swinscow & Krog (1988) without further data.
- Everniopsis trulla* (Ach.) Nyl. – Cyangugu: Nyungwe Forest. – Gikongoro: Rugera; Gisovu (Lambinon & Sérusiaux 1977).
- Fellhanera lambinonii* (Sérus.) Lücking & Sérus. – Kibungu: Rusumo, Akagera valley (Sérusiaux 1978, as *Bacidia lambinonii* Sérus.).
- \**Flavoparmelia subamplexa* (Hale) Hale – Kigali: Kininya, c. 1500 m, on *Euphorbia candellabrum*, 3.10.2003, C. Bock. – Hale (1976) and Swinscow & Krog (1988) reported the species from Uganda and Zimbabwe so far. The present record is based on the first fertile collection of *F. subamplexa*. The apothecia are 0.2–0.7 mm in diameter and have sorediate margins. Ascospores are 15–24 × 7–13 µm; the hymenium reacts K+ yellow.
- Flavopunctelia flaventior* (Stirt.) Hale – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- \**Graphis scripta* (L.) Ach. – Umutare: Akagera National Park, dry forest near Lake Ihema, 1°52'S, 30°44'E, 1349 m, on *Acacia* sp., C. Bock. – Though Staiger (2002) restricts the use of the name *G. scripta* to temperate collections, the present specimen is assigned to *G. scripta* because no diagnostic characters separating our collection from *G. scripta* could be found (and are not given by Staiger 2002 either).
- Graphis tetralocularis* C. Bock & Hauck – Umutare: Akagera National Park (Bock & Hauck 2005). – Only known from the type locality.
- Gyalideopsis cochlearifera* Lücking & Sérus. – Cyangugu: Nyungwe Forest (Lücking & Sérusiaux 1998).
- Haematomma puniceum* (Ach.) A. Massal. – Cyangugu/Gikongoro: Nyungwe Forest (Lindau 1911).
- Heterodermia comosa* (Eschw.) Follm. & Redón – Umutare: Akagera National Park, dry forest near Lake Ihema, 1°52'S, 30°44'E, 1349 m, 18.10.2003, C. Bock. – Kibungu: Akagera Region; Akagera National Park; Rusumo; Lake Ihema (Killmann & Fischer 2005). – Kigali Ngali: Bugesera (Biedinger & Fischer 1996). – Kibuye: Lake Kivu. – Butare: Butare city area; Ntyazo; Gakoma (Killmann & Fischer 2005).
- Heterodermia diademata* (Tayl.) D. D. Awasthi – Umutare: Akagera National Park, dry forest SW Lake Ihema, 1°55'S, 30°42'E, 1311 m, 20.10.2003, C. Bock. – Kigali Ngali: Bugesera (Biedinger & Fischer 1996).
- Heterodermia hypochraea* (Vain.) Swinscow & Krog – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Heterodermia hypoleuca* (Mühl.) Trev. – Umutare: Akagera National Park, Mt Mutumba, 1°39'S, 30°40'E, 1474 m, dry forest, 19.10.2003, C. Bock. – Butare: Butare city area. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Heterodermia isidiophora* (Vain.) D. D. Awasthi – Kigali Ngali: Bugesera (Biedinger & Fischer 1996).
- \**Heterodermia japonica* (M. Satô) Swinscow & Krog – Umutare: Akagera National Park, dry forest at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, dead tree, 19.10.2003, C. Bock. – Widespread in Africa including Madeira, the Canary Islands, the Cape Verde Islands, Ethiopia, Uganda, Kenya, Tanzania, the Seychelles and South Africa (Follmann & Mies 1986, Swins-

cow & Krog 1988, Hafellner 1995, Seaward & Aptroot 2006). The delimitation of the taxon follows Swinscow & Krog (1988).

*Heterodermia leucomelos* (L.) Poelt – Kibungo: Akagera National Park. – Kigali Ngali: Bugesera (Biedinger & Fischer 1996). – Umutare: Akagera National Park, dry forest SW Lake Ihema, 1°55'S, 30°42'E, 1369 m, on *Haplocoelum gallaense*, 19.10.2003, C. Bock. – Gikongoro: Nyungwe Forest (Lindau 1911).

*Heterodermia loriformis* (Kurok.) Swinscow & Krog – Kigali Ngali: Bugesera (Biedinger & Fischer 1996).

*Heterodermia lutescens* (Kurok.) Follm. – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).

*Heterodermia obscurata* (Nyl.) Trev. – Umutare: Akagera National Park. – Cyangugu: Lake Kivu. – Butare: Butare city area (Killmann & Fischer 2005).

\**Heterodermia podocarpa* (Bél.) D. D. Awasthi – Umutare: Akagera National Park, dry forest at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Acacia* sp., 19.10.2003, C. Bock. – *H. podocarpa* is a pantropical species; African records include collections from Ethiopia, Uganda, Kenya, Tanzania and South Africa (Doidge 1950, Swinscow & Krog 1988).

*Heterodermia speciosa* (Wulfen) Trev. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock. – Umutare: Akagera National Park, dry forest SW Lake Ihema, 1°55'S, 30°42'E, 1311 m, C. Bock. – Butare: Butare city area (Killmann & Fischer 2005).

*Heterodermia vulgaris* (Vain.) Follm. & Redón – Butare: Butare city area (Killmann & Fischer 2005).

\**Hyperphyscia syncolla* (Nyl.) Kalb – Umutare: Akagera National Park, Mt Mutumba, 1°37'S, 30°39'E, 1652 m, tree savanna, on *Ficus* sp., 19.10.2003, C. Bock. *H. syncolla* is widespread in the neotropics as well as in eastern and southern Africa with records from Sudan, Uganda, Kenya, Somalia, Tanzania, South Africa, the Seychelles and Madagascar (Swinscow & Krog 1988, Thomas 1996, Elshafie & Sipman 1999, Seaward & Aptroot 2006).

*Hypogymnia physodes* (L.) Nyl. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).

*Hypotrachyna chlorina* (Müll. Arg.) Hale – Gisenyi: Sebeya valley W Gikungu (Sérusiaux 1984a).

*Hypotrachyna ducalis* (Jatta) Hale – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).

*Hypotrachyna massartii* (Hue) Hale – Ruhengeri: Virunga Volcanoes. – Gitarama: Cyangugu/Gikongoro: Nyungwe Forest (Lambinon & Sérusiaux 1983).

*Hypotrachyna neodissecta* (Hale) Hale – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).

*Hypotrachyna rwandensis* Elix & al. – Gikongoro: Nyungwe Forest (Elix & al. 2005). – Only known from the type locality.

+*Lambinonia strigulae* Sérus. & Diederich – Cyangugu: Nyungwe Forest (Sérusiaux & Diederich 2005).

*Lecanora lateritica* Lindau – Gitarama: Nyavarongo River (Lindau 1911). – Only known from the type locality.

*Lecanora lateriticola* Lindau – Gitarama: Nyavarongo River (Lindau 1911). – Only known from the type locality.

*Lecanora lateritigena* Lindau – Gitarama: Nyavarongo River (Lindau 1911). – Only known from the type locality.

*Lecanora callopismoides* Müll. Arg. – Cyangugu/Gikongoro: Nyungwe Forest (Lindau 1911). – Taxonomy unclear.

*Lecanora expallens* Ach. – Gitarama: Nyavarongo River (Lindau 1911).

*Lecanora poliothallina* Lindau – Gitarama: Nyavarongo River (Lindau 1911). – Only known from the type locality.

*Lecidea argillicola* Lindau – Gitarama: Nyavarongo River (Lindau 1911). – Only known from the type locality.

- Leprocaulon arbuscula* (Nyl.) Nyl. – Cyangugu: Nyungwe Forest; Kamiranzovu (Lambinon & al. 1981).
- \**Leptogium adpressum* Nyl. – Umutare: Akagera National Park, 1°53'S, 30°43'E, c. 1300 m, tree savanna, on *Ficus natalensis*, 18.10.2003, *C. Bock*; dry forest in gully at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Nuxia floribunda*, 19.10.2003, *C. Bock*. – So far known from Ethiopia, Uganda, Kenya, Tanzania and South Africa (Doidge 1950, Swinscow & Krog 1988).
- \**Leptogium azureum* (Ach.) Mont. – Umutare: Akagera National Park, dry forest in gully at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Haplocoelum gallaense*, 19.10.2003, *C. Bock*. – Previous records from Africa are from Ethiopia, Uganda, Kenya, Tanzania, the Seychelles and South Africa (Swinscow & Krog 1988, Galloway 1995, Seaward & Aptroot 2006).
- \**Leptogium cyanescens* (Pers.) Körb. – Umutare: Akagera National Park, dry forest near Lake Ihema, 1°52'S, 30°44'E, 1349 m, on *Lananea stuhlmannii* and *Ficus natalensis*, 18.10.2003, *C. Bock*. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica* and *Ficus thoningii*, 25.9.2003, *C. Bock*. – The hitherto known African distribution includes Madeira and the Canary Islands (Hafellner 1995), Morocco (Egea 1996), Ethiopia, Uganda, Kenya, Tanzania (Swinscow & Krog 1988), the Seychelles (Seaward & Aptroot 2006) and Angola (Tavares 1953).
- Leptogium phyllocarpum* (Pers.) Mont. – Umutare: Akagera National Park, dry forest in gully at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Papea capensis*, 19.10.2003, *C. Bock*. – Gisenyi: Gishwati Forest; Gikungu. – Gikongoro: Nyungwe Forest. – Butare: Butare city area; Gakoma, S Muyaga (Killmann & Fischer 2005).
- Lobaria discolor* (Bory) Hue – Cyangugu/Gikongoro: Nyungwe Forest (Biedinger & Fischer 1996).
- Lobaria pulmonaria* (L.) Hoffm. – Gisenyi: Sebeya valley; Bikeneko valley. – Kibuye: Gisovu (Sérusiaux 1981). – Cyangugu/Gikongoro: Nyungwe Forest (Lindau 1911, Sérusiaux 1981).
- Lobaria retigera* (Bory) Trev. – Gisenyi: Gikungu. – Ruhengeri: Virunga Volcanoes. – Cyangugu: Mt Uwintashya. – Gikongoro: Nyungwe Forest (Sérusiaux 1981).
- Nephroma tropicum* (Müll. Arg.) Zahlbr. – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).
- Normandina pulchella* (Borr.) Nyl. – Ruhengeri: Virunga Volcanoes. – Cyangugu: Nyungwe Forest (Lambinon & Sérusiaux 1977). – Kigali Ngali: Bugesera (Biedinger & Fischer 1996).
- Nyungwea pallida* Sérus. & al. – Cyangugu: Nyungwe Forest (Sérusiaux & al. 2006).
- Pannaria rubiginosa* (Thunb.) Del. – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- \**Parmelinella wallichiana* (Tayl.) Elix & Hale – Umutare: Akagera National Park, tree savanna, 1°53'S, 30°43'E, 1562 m, on *Ficus natalensis*, 18.10.2003, *C. Bock*. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, 25.9.2003, *C. Bock*. – *P. wallichiana* is known from eastern and southern Africa, Asia and Australia (Elix & Hale 1987). Previous records from Africa include Ethiopia, Uganda, Kenya, Tanzania, Zimbabwe, Angola, the Seychelles and Madagascar (Hale 1976, Swinscow & Krog 1988, Aptroot 1990, Seaward & Aptroot 2006).
- Parmelinopsis horrescens* (Tayl.) Elix & Hale – Gkongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Parmotrema abessinicum* (Kremp.) Hale – Umutare: Akagera National Park, dense tree savanna W Lake Hago, on *Ziziphus* sp., 1°40'S, 30°41'E, 1320 m, 19.10.2003, *C. Bock*. – Butare: Butare city area (Killmann & Fischer 2005).
- Parmotrema afrocatratum* Elix & al. – Butare: Butare city area (Elix & al. 2005) – Only known from the type locality.
- Parmotrema andinum* (Müll. Arg.) Hale – Umutare: Akagera National Park, Mt Mutumba, 1°37'S, 30°39'E, 1652 m, quartzite rocks, 19.10.2003, *C. Bock*; dry forest SW Lake Ihema, 1°55'S, 30°42'E, 1369 m, 18.10.2003, *C. Bock*. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003 *C. Bock*. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).

- Parmotrema austrosinense* (Zahlbr.) Hale – Umutare: Akagera National Park, Lake Ihema, 1°53'S, 30°45'E, 1374 m, on *Ziziphus* sp. and *Acacia senegal*, 18.10.2003, C. Bock. – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia candelabrum* and *Cupressus lusitanica*, 25.9.-2003, C. Bock. – Gikongoro: Nyungwe Forest. – Butare: Butare city area (Killmann & Fischer 2005).
- Parmotrema bangii* (Vain.) Hale – Gisenyi: Gikungu, Bikeneko valley (Sérusiaux 1984a).
- Parmotrema clavuliferum* (Räsänen) Streimann – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Parmotrema cooperi* (J. Steiner & Zahlbr.) Sérus. – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005). – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, 25.9.2003, C. Bock.
- Parmotrema crinitum* (Ach.) M. Choisy – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Parmotrema cristiferum* (Tayl.) Hale – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005). – Umutare: Akagera National Park, tree savanna near park entrance, 1°53'S, 30°43'E, c. 1300 m, on *Ficus natalensis*, 18.10.2003, C. Bock; NW Lake Hago, 1°39'S, 30°40'E, 1392 m, on *Nuxia floribunda*, 19.10.2003 C. Bock. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia tirucalli*, 27.9.2003, C. Bock.
- Parmotrema defectum* (Hale) Hale – Kibungo: Akagera Region, Nyarubuye (Killmann & Fischer 2005).
- Parmotrema eunetum* (Stirt.) Hale – Umutare: Akagera National Park (Lambinon & Sérusiaux 1983).
- Parmotrema gardneri* (C. W. Dodge) Sérus. – Butare: Butare city area (Sérusiaux 1983).
- Parmotrema hababianum* (Gyeln.) Hale – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, C. Bock. – Umutare: Akagera National Park, dry forest at Lake Ihema, 1°52'S, 30°44'E, 1349 m, on *Acacia* sp., 18.10.2003, C. Bock. – Butare: Butare city area (Killmann & Fischer 2005).
- Parmotrema lambinonii* Sérus. – Gikongoro: Nyungwe Forest (Sérusiaux 1984a).
- Parmotrema mellissii* (C. W. Dodge) Hale – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Parmotrema neotropicum* Kurok. – Butare: Butare city area (Killmann & Fischer 2005).
- \**Parmotrema permutatum* (Stirt.) Hale – Umutare: Akagera National Park, SW Lake Ihema, 1°55'S, 30°42'E, 1369 m, dry forest, on *Haplocoelum gallaense*, 18.10.2003, C. Bock. – Hitherto reported for Africa from Ethiopia, Uganda, Kenya, Tanzania and Madagascar (Swinscow & Krog 1988, Aptroot 1991).
- Parmotrema poolii* (C. W. Dodge) Krog & Swinscow – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).
- Parmotrema pseudeunetum* Sérus. – Kibungo: Akagera National Park (Sérusiaux 1984a).
- Parmotrema pseudograyanum* (Hale) Sérus. – Gisenyi: Gakoma (Sérusiaux 1984a).
- Parmotrema ravum* (Krog & Swinscow) Sérus. – Kibungo: Akagera National Park (Sérusiaux 1984a).
- Parmotrema reticulatum* (Tayl.) M. Choisy – Butare: Butare city area; Gatobwe valley (Killmann & Fischer 2005).
- Parmotrema soyauxii* (Müll. Arg.) Hale – Kibungo: Akagera Region, near Ntaruka (Killmann & Fischer 2005).
- Parmotrema subhanningtonianum* Sérus. – Butare: Butare Arboretum (Sérusiaux 1984a).
- Parmotrema tinctorum* (Nyl.) Hale – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Ficus thoningii*, 26.9.2003 C. Bock. – Umutare: Akagera National Park, 1°55'S, 30°42'E, 1369 m, dry forest, on *Nuxia floribunda*, 18.10.2003, C. Bock. – Cyangugu: Nyungwe Forest. – Butare: Butare city area (Killmann & Fischer 2005).
- Phaeophyscia hispidula* (Ach.) Moberg – Kigali: Kininya. – Butare: Butare city area (Killmann & Fischer 2005).
- \**Physcia aipolia* (Humb.) Fűrnr. – Umutare: Akagera National Park, 1°52'S, 30°44'E, 1349 m, 18.10.2003, C. Bock. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*,



- 25.9.2003, *C. Bock*. – Previously reported for Africa from Madeira and the Canary Islands (Hafellner 1995), Morocco (Egea 1996), Algeria (Van Haluwyn & al. 1994), Tunisia (Werner 1951), Sudan (Elshafie & Sipman 1999), Ethiopia, Uganda, Kenya, Tanzania (Swinscow & Krog 1988), the Seychelles (Seaward & Aptroot 2006) and South Africa (Doidge 1950).
- \**Physcia erumpens* Moberg – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Ficus thoningii*, 26.9.2003, *C. Bock*. – In Africa, *P. erumpens* was hitherto known from Ethiopia, Kenya and Tanzania (Moberg 1986). Other records are from Italy and Portugal (Moberg 1989), California (Robertson & Robertson 2000) and Argentina (Scutari 1990).
- \**Physcia krogiae* Moberg – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitana*, 25.9.2003, *C. Bock*. – The hitherto known African distribution of *P. krogiae* includes Ethiopia, Uganda, Kenya and Tanzania (Moberg 1986).
- \**Physcia poncinsii* Hue – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on *Cupressus lusitanica*, 25.9.2003, *C. Bock*. – Umutare: Akagera National Park, 1°52'S, 30°44'E, 1349 m, dry forest, on *Acacia* sp., 18.10.2003, *C. Bock*. – Moberg (1986) and Swinscow & Krog (1988) reported *P. poncinsii* from Ethiopia, Uganda, Kenya and Tanzania.
- Physcia verrucosa* Moberg – Cyangugu/Gikongoro: Nyungwe Forest (Biedinger & Fischer 1996).
- Placopsis parellina* (Nyl.) I. M. Lamb – Ruhengeri: Virunga Volcanoes (Lambinon & Sérusiaux 1977).
- Pleopsisidium chlorophanum* (Wahlenb.) Zopf – Gitarama: Nyavarongo (Lindau 1911, as *Acarospora chlorophana* (Wahlenb.) A. Massal.).
- Pseudocyphellaria aurata* (Ach.) Vain. – Cyangugu: Nyungwe Forest. – Umutare: Kagitumba (Killmann & Fischer 2005).
- Pseudocyphellaria clathrata* (De Not.) Malme – Butare: Butare city area (Killmann & Fischer 2005).
- Pseudocyphellaria crocata* (L.) Vain. – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Pseudocyphellaria intricata* (Del.) Vain. – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).
- Punctelia rudecta* (Ach.) Krog – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- \*\**Pyrrhospora russula* (Ach.) Haf. – Umutare: Akagera National Park, Lake Ihema, 1°52'S, 30°44'E, dry forest, on *Acacia* sp. and *Nuxia floribunda*, 1349 m, 18.10.2003, *C. Bock*. – *P. russula* is widespread in the tropics and subtropics of Asia as well as of North, Central and South America (Awasthi 1991, Kalb & Hafellner 1992, Hafellner 1993, Aptroot & al. 1997, Brodo & al. 2001, Wolseley & al. 2002) and is here reported for the first time from the African continent.
- \**Pyxine cocolos* (Sw.) Nyl. – Umutare: Akagera National Park, 1°53'S, 30°43'E, c. 1500 m, tree savanna, on *Ficus natalensis*, 18.10.2003, *C. Bock*; dry forest at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Nuxia* sp., 19.10.2003, *C. Bock*. – *P. cocolos* is widespread in Africa and has been reported from Madeira and the Canary Islands (Østhaugen & Krog 1976, Hafellner 1995), the Cape Verde Islands (Follmann & Sánchez-Pinto 1987), Sudan (Elshafie & Sipman 1999), Somalia (Alstrup & Aptroot 1994), Socotra (Mies 2001), Ethiopia, Uganda, Kenya, Tanzania (Swinscow & Krog 1988), the Seychelles (Seaward & Aptroot 2006) and South Africa (Doidge 1950).
- \**Pyxine katendei* Swinscow & Krog – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, on dead wood, 26.9.2003, *C. Bock*. – So far only known from Ethiopia, Kenya and Tanzania (Swinscow & Krog 1975).
- \**Pyxine petricola* Nyl. var. *petricola* – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, 26.9.2003, *C. Bock*. – Pantropical; in Africa hitherto known only from Ethiopia, Uganda, Kenya and Tanzania (Swinscow & Krog 1988).
- \**Pyxine reticulata* (Vain.) Vain. – Umutare: Akagera National Park, tree savanna near park entrance, 1°53'S, 30°43'E, c. 1500 m, on *Ficus natalensis*, 18.10.2003, *C. Bock*; dry forest in gully at Mt Mutumba, 1°39'S, 30°40'E, 1474 m, on *Nuxia floribunda*, 19.10.2003, *C. Bock*. –

- Hitherto reported for Africa from Ethiopia, Uganda, Kenya, Tanzania, the Seychelles and Angola (Swinscow & Krog 1975, 1988, Seaward & Aptroot 2006).
- \**Pyxine subcinerea* Stirt. – Kigali: Kininya, 1°55'S, 30°6'E, c. 1500 m, 26.9.2003, *C. Bock*. – Umutare: Akagera National Park, Mt Mutumba, 1°39'S, 30°40'E, 1474 m, dry forest, on *Nuxia floribunda*, 19.10.2003, *C. Bock*; dry forest SW Lake Ihema, 1°55'S, 30°43'E, 1311 m, on *Haplocoelum gallaense*, 20.10.2003, *C. Bock*. – Previous findings in Africa include Madeira and the Canary Islands (Østhagen & Krog 1976, Hafellner 1995) as well as Ethiopia, Uganda, Kenya, Tanzania, the Seychelles and Angola (Swinsow & Krog 1975, 1988, Seaward & Aptroot 2006).
- Ramalina africana* (Stein) C. W. Dodge – Gisenyi: Gishwati Forest, Sebeya valley. – Kibungo: Akagera National Park (Killmann & Fischer 2005). – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Ficus thoningii* and *Erythrina abyssinica*, 26.9.2003, *C. Bock*. – Umutare: Akagera National Park, fishing camp near Lake Ihema, 1°52'S, 30°45'E, 1321 m, tree savanna, on *Acacia senegal*, 18.10.2003, *C. Bock*. – Butare: Butare city area; Ntyazo; Gakoma S Muyaga community (Killmann & Fischer 2005).
- \**Ramalina calcarata* Krog & Swinscow – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia tirucalli*, 26.9.2003, *C. Bock*. – The hitherto known distribution in Africa includes Ethiopia, Uganda, Kenya and Tanzania (Krog & Swinscow 1974, Swinscow & Krog 1988).
- Ramalina celastri* (Spreng.) Krog & Swinscow – Ruhengeri: Virunga Volcanoes. – Gisenyi: Gitamara (Lambinon & Sérusiaux 1983). – Umutare: Akagera National Park, Lake Hage, 1°43'S, 30°44'E, 1328 m, on *Combretum molle*, 19.10.2003, *C. Bock*. – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Ficus thoningii*, 26.9.2003, *C. Bock*. – Cyangugu: Nyungewe Forest; S Lake Kivu (Lambinon & Sérusiaux 1983).
- \**Ramalina disparata* Krog & Swinscow – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia tirucalli*, 28.9.2003, *C. Bock*. – *R. disparata* was described from Ethiopia and has been otherwise known from Uganda, Kenya and Tanzania (Krog & Swinscow 1976; Swinscow & Krog 1988).
- Ramalina fimbriata* Krog & Swinscow – Ruhengeri: Virunga Volcanoes (Lambinon & Sérusiaux 1983).
- Ramalina hoehneliana* Müll. Arg. – Buyumba: Akagera Region, Kagitumba. – Umutare: Nyagatare. – Gisenyi: Gishwati Forest. – Gitarama: Kamonyi (Killmann & Fischer 2005). – Kigali Ngali: Bugesera (Biedinger & Fischer 1996).
- \**Ramalina pusiola* Müll. Arg. – Umutare: Akagera National Park, Lake Hago, 1°43'S, 30°44'E, 1328 m, tree savanna, on *Carissa edulis*, 19.10.2003, *C. Bock*. – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Hibiscus* sp., 27.9.2003, *C. Bock*. – Krog & Swinscow (1974) and Swinscow & Krog (1988) reported *R. pusiola* from Ethiopia, Uganda, Kenya and Tanzania.
- Ramalina reducta* Krog & Swinscow – Gikongoro: Nyungwe Forest (Killmann & Fischer 2005).
- Ramalina roesleri* (Schaer.) Hue – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005).
- Ramalina subpusilla* (Nyl.) Krog & Swinscow – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia tirucalli*, 27.9.2003, *C. Bock*. – Previous records from Africa include Madeira and the Canary Islands (Hafellner 1995) as well as Ethiopia and Kenya (Krog & Swinscow 1974, 1976, Swinscow & Krog 1988).
- +*Roselliniella africana* Diederich – Ruhengeri: Virunga Volcanoes (Aptroot & al. 1997).
- Solorina simensis* Flotow – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- +*Sphinctrina tubiformis* A. Massal. – Umutare/Kibungo: Akagera National Park (Tibell 1981).
- Stereocaulon anomalum* I. M. Lamb – Kibuye: Rutsiro (Sérusiaux 1979).
- Stereocaulon atlanticum* (I. M. Lamb) I. M. Lamb – Ruhengeri: Virunga Volcanoes (Sérusiaux 1979).
- Stereocaulon claviceps* Th. Fr. – Swinscow & Krog (1988) report *S. claviceps* from Rwanda without details on the locality.

- Stereocaulon foliolosum* var. *botryophorum* (Müll. Arg.) I. M. Lamb – Ruhengeri: Virunga Volcanoes (Sérusiaux 1979).
- Stereocaulon meyeri* Stein – Ruhengeri: Virunga Volcanoes (Sérusiaux 1979).
- Stereocaulon nigromaculatum* Duvign. – Ruhengeri: Virunga Volcanoes. Kibuye: Rutsiro. – Cyangugu: Nyungwe Forest (Sérusiaux 1979).
- Stereocaulon pomiferum* Duvign. – Ruhengeri: Virunga Volcanoes (Sérusiaux 1979).
- Stereocaulon ramulosum* (Sw.) Räschel – Ruhengeri: Virunga Volcanoes (Sérusiaux 1979).
- Stereocaulon vulcani* (Bory) Ach. – Gisenyi: Gikungu (Sérusiaux 1979).
- Sticta ambavillaria* (Bory) Ach. – Cyangugu/Gikongoro: Nyungwe forest (Lindau 1911).
- Sticta fuliginosa* (Dicks.) Ach. – Ruhengeri: Virunga Volcanoes. – Gisenyi: Gishwati Forest. Cyangugu: Nyungwe Forest. – Butare: Butare city area (Killmann & Fischer 2005).
- Sticta limbata* (Sm.) Ach. – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- Sticta weigeli* (Ach.) Vain. – Ruhengeri: Virunga Volcanoes. – Cyangugu: Nyungwe Forest (Killmann & Fischer 2005). – Butare: Butare city area (Diederich 1996)
- Teloschistes chrysophthalmus* (L.) Th. Fr. – Ruhengeri: Lake Bulera NE Ruhengeri (Almborn 1989).
- Teloschistes exilis* (Michx.) Vain. – Umutare/Kibungo: Akagera National Park (Almborn 1989).
- Teloschistes flavicans* (Sw.) Norman – Gisenyi: Gishwati Forest. – Gikongoro: Nyungwe Forest. – Cyangugu: Rugera, Uwagahunga valley. – Umutare: Akagera National Park (Killmann & Fischer 2005). – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Euphorbia tirucalli*, 2.10.2003, C. Bock.
- Teloschistes hypoglaucus* (Nyl.) Zahlbr. – Ruhengeri: Virunga Volcanoes (Killmann & Fischer 2005).
- Teloschistes perrugosus* Müll. Arg. – Umutare: Akagera National Park, Lake Ihema, 1°55'S, 30°42'E, 1369 m, dry forest, on *Strychnos usambarensis*, 18.10.2003, C. Bock. – Butare: Butare city area (Almborn 1989).
- Thelotrema lepadinum* (Ach.) Ach. – Cyangugu/Gikongoro: Nyungwe Forest (Lindau 1911).
- +*Tremella stictae* Diederich – Butare: Butare city area (Diederich 1996).
- Tylophoron moderatum* Nyl. – Gisenyi: Gikungu, Rwaza (Tibell 1981).
- Tylophoron protrudens* Nyl. – Cyangugu: Nyungwe Forest (Tibell 1981).
- Umbilicaria aprina* Nyl. – Ruhengeri: Virunga Volcanoes (Lindau 1911, as *Gyrophora aprina* (Nyl.) Müll. Arg.).
- \**Usnea complanata* (Müll. Arg.) Mot. – Umutare: Akagera National Park, Lake Ihema, 1°52'S, 30°45'E, 1321 m, tree savanna, on *Acacia senegal* and *Canthium lactescens*, 18.10.2003. – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Ficus* sp., 28.9.2003, C. Bock. – The hitherto known African distribution includes Sudan (Elshafie & Sipman 1999), Ethiopia, Uganda, Kenya and Tanzania (Swinscow & Krog 1988).
- \**Usnea dasaea* Stirt. – Umutare: Akagera National Park, SW Lake Ihema, 1°55'S, 30°42'E, 1369 m, dry forest, on *Haplocoelum gallaense* and on *Canthium* sp., 18.10.2003, C. Bock; dry forest SW Lake Ihema. – *U. undulata* is apparently widespread in Africa and has been hitherto known from Madeira, Ethiopia, Uganda, Kenya, Tanzania (Swinscow & Krog 1988), Angola, Zimbabwe (Motyka 1938), South Africa (Doidge 1950) and Madagascar (Aptroot 1990).
- Usnea exasperata* (Müll. Arg.) Mot. – Recorded from Rwanda by Krog & Swinscow (1988) without further data.
- \**Usnea himantodes* Stirt. – Umutare: Akagera National Park, SW Lake Ihema, 1°55'S, 30°43'E, 1311 m, dry forest, on *Croton* sp., 20.10.2003, C. Bock. – Hitherto known from R.D. Congo, Uganda, Kenya, Tanzania and Madagascar under the name *U. gigas* Mot. (Swinscow & Krog 1988), which has been synonymised with *U. himantodes* by Stevens (1990).
- \**Usnea perhispidella* J. Steiner – Umutare: Akagera National Park, SW Lake Ihema, 1°55'S, 30°42'E, 1369 m, dry forest, on *Canthium lactescens* and *Ziziphus* sp., 18.10.2003, C. Bock. – Kigali: Kinyi, 1°55'S, 30°6'E, c. 1500 m, on *Ficus* sp., 26.9.2003, C. Bock. – Hitherto known from Uganda, Kenya, Tanzania (Swinscow & Krog 1988) and Madagascar (Aptroot 1990).
- Xanthoparmelia subramigera* (Gyeln.) Hale – Kibungo: Nyarubuye (Killmann & Fischer 2005).

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