

Pyrenocarpous lichens from Tanzania and Kenya

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Abstract – The corticolous and saxicolous pyrenocarpous crustose lichen species from Kenya and Tanzania were investigated. In total, 32 species could be identified, most of which are new to the respective countries. Some of these were not yet reported from tropical Africa, but so far only known from e.g. the Canary Isles. The following 12 species are apparently reported for the first time from Africa: *Anisomeridium terminatum*, *Mycocrothelia confusa*, *Polymeridium contendens*, *Porina mastoidiza*, *P. subinterstes*, *P. tetralocularis*, *Pyrenula acutalis*, *P. dermatodes*, *P. laetior*, *P. pyrenuloides*, *P. quassiaecola*, and *Verrucaria praetermissa*. *Thelenella modesta* is reported for the first time from the Southern Hemisphere.

INTRODUCTION

The crustose lichen flora of East Africa is still poorly investigated, although the macrolichen flora is among the best known in any tropical area (Swinscow & Krog 1988).

The Uluguru Mts. and Udzungwa Mts. are two parts of the Eastern Arc, a very old mountain chain stretching from Taita Hills in Kenya through most of eastern Tanzania and including also the better known Usambara Mts. These mountains, raising to around 2500 m above sea level, separated by deep valleys and partly covered by virgin forest in their upper parts and disturbed forest in the lower parts, are known for a great degree of endemism of plants and animals. It was therefore of interest to study also the lichen flora of these mountains. The present paper presents the pyrenocarpous lichen taxa found in the area. A few pyrenocarpous lichens from other areas, mostly forests and bushlands, in Kenya and Tanzania are also reported.

MATERIALS AND METHODS

The core of the material treated was collected in the Uluguru Mts. (1996-1999), Udzungwa Mts. (1996, 1999, 2003), Pugu Hills (1996-2000) and Changwahela 1997-2000) in Tanzania and the Ngong Hills in Kenya (1988, 2000, 2001),

during intensive collecting trips by the first author. Further collections are from various, incompletely investigated places in both countries. All specimens are kept in C (not cited), with one duplicate of every species in herb. Aptroot (ABL, not cited separately) and some in the herbarium of Department of Botany, University of Dar Es Salaam. All lichens were collected by the first author and identified by the second author.

The abbreviations UDZ, ULU, LIV, NGO & PUG indicate the mountain ranges in which the species has been found.

The numbers with prefix K or TZ indicate Alstrup's collecting numbers, with K for Kenya and TZ for Tanzania.

When an identification was uncertain due to the absence of mature ascospores, the suffix (cf.) is used. A few synonyms which are in current or recent use have been added for cross-reference.

For each species the identified specimens are mentioned, as well as the collecting localities and the habitat. Most specimens are from unidentified tree bark, with the exception of the *Verrucaria* and a few specimens of *Porina tetracerae* that are growing on rock. Furthermore the known world distribution is indicated, and usually also the published records from Africa. Information on occurrences in Africa was mostly obtained from papers cited in the references, but also from the website by Feuerer & Rambold: Global diversity of lichens (<http://www.biologie.uni-hamburg.de/checklists/>).

COLLECTING LOCALITIES

Tanzania:

Bagamoyo district, Mapinga Village, **Changwahela**, 06° 31'S, 39° 04'E, alt. 0-5 m.
Mangrove and dune shrubs.

Dar Es Salaam district, University of **Dar Es Salaam** campus, alt. C. 100 m.
Ornamental trees.

Iringa district, Udzungwa Mts., **Idete**, 08°10'S, 36° 01'E, alt. 1600-1700 m.
Roadbrink and planted trees in rural area.

Iringa District, Udzungwa Mts., **Ilutile**, 08° 12'S, 35° 58'E, alt. 1900 m. Mountain rain forest.

Iringa district, Udzungwa Mts., **Itonya Forest**, 08° 12'S, 36° 02'E, alt. 1500-1700 m.
Mountain rain forest.

Iringa district, Udzungwa Mts., between **Kivulamo** and Idunda villages, 08° 08'S, 36° 04'E, 1600-1700 m. Mountain rain forest.

Morogoro district, Uluguru Mts., **Luhangalo Plateau**, 07° 07'S, 37° 35-38'E, alt. 2200-2500 m. Remnants of mountain rain forest, freestanding trees, soil and cliffs.

Morogoro district, Udzungwa Mts., **Luhega Forest Reserve**, c. 08° 25'S, 36° 00-10'E, alt. 300-900 m. Mountain rain forest.

Morogoro district, **Luhembe River**, c. 10 km S Mikumi, 07° 29'S, 37° 02'E, alt. 350 m. Cliffs and trees along river.

Iringa district, Udzungwa Mts., **Massisiwe Forest**, c. 08° 23'S, 36° 01'E, 2200-2500 m. Mountain rain forest.

Kyela district, Livingstone Mts., **Matema Beach**. Mountain forest on slope towards Lake Nyassa.

Bagamoyo district. Peninsula opposite **Mbeganiff**, shrubs in dune vegetation, 1-5 m.

Morogoro district, Uluguru Mts., **Morogoro**, c. 06° 18'S, 37° 40'W. Forested valley at outskirts of town.

Kissarawe district, **Pugu Hills**, c. 06° 54'S, 39° 05'E, alt. 300 m. Mountain forest.

Morogoro district, Udzungwa Mts., **Sanje Waterfall**, c. 07° 43'S, 36° 55'E. Mountain rain forest.

Kenya:

Kitui district, **Kyalungwa**, 13.6 km N of Mwingi, inselberg.

Kitui district, 5 km S of **Mutito** on road to Zombe. Semi-arid bushland.

Nairobi, **Ngong Hills**. C. 01° 24'S, 36° 36'E. Shrubs, rocks and remnants of mountain forest.

THE SPECIES

Anisomeridium tamarindi (Fée) R.C. Harris.

Changwahela TZ4073 p.p., Dar TZ5560, TZ5563, Mutito K1560. Coastal + lowland shrub.

A pantropical species, in Africa so far known from Angola, Cameroon and South Africa (Harris, 1995).

Anisomeridium terminatum (Nyl.) R.C. Harris

Changwahela TZ4045, TZ4048 p.p. Coastal.

A pantropical species, not known so far from Africa (Harris, 1995).

Mycomicrothelia confusa D. Hawksw.

Luhega Forest, TZ2108. Mountain forest (UDZ).

One of the very few European-Macaronesian species of this genus of mostly pantropical taxa, not known so far from Africa; known in Macaronesia only from the Azores (Berger & Aptroot, 2003).

Polymeridium albocinereum (Krempelh.) R.C. Harris

Changwahela TZ4044a & TZ4072 p.p. Coastal. Growing mixed with the next species.

A pantropical species, already known from Tanzania (Harris, 1993).

Polymeridium contendens (Nyl.) R.C. Harris

Changwahela, TZ4044 & TZ4072 p.p. Coastal. Growing mixed with the preceding species.

Apparently a pantropical species, not known so far from Africa, but reported from tropical America and Asia (Aptroot *et al.*, 1997).

Porina atlantica (Erichs.) Jørg. (= *P. guaranitica* Malme)

Changwahela TZ4046, Sanje Waterfall TZ3635. Coastal + mountain forest (UDZ).

A predominantly neotropical species, in Africa so far known only from the Canary Isles (McCarthy, 2003).

Porina mastoidea (Ach.) Müll. Arg.

Massisiwe Forest TZ1150 & TZ1147, Itonya Forest TZ1896, Luhega Forest TZ2209(cf), Idete, TZ564b(cf). Mountain forests (UDZ).

A pantropical species, already known from Tanzania (McCarthy, 2003).

Porina mastoidiza (Nyl.) Müll. Arg.

Sanje Waterfall, TZ3634. Mountain forest (UDZ).

A rarely reported predominantly neotropical species, not known so far from Africa (McCarthy, 2003).

Porina nucula Ach.

Ilutile TZ793, Pugu Hills TZ2561 & TZ2559, Luhega Forest TZ2057, Mbeganiff TZ3567(cf). Coastal + mountain forests (UDZ+ PUG).

A pantropical species, in Africa e.g. known from Guinea, Sao Thomé and the Canary Isles (McCarthy, 2003).

Porina subinterstes (Nyl.) Müll. Arg. (= *P. curtula* Malme)

Luhega Forest TZ2055 & TZ2060. Mountain forests (UDZ).

Apparently a pantropical species, not known so far from Africa, but widespread in Asia and South America (McCarthy, 2003).

Porina tetracerae (Afz. in Ach.) Müll. Arg.

Kivulamo TZ1573, Luhega Forest TZ2059, TZ2058(cf), TZ2056 & TZ1990, Sanje Waterfall TZ3632, TZ3637(cf) & TZ3636, Pugu Hills TZ2493 & TZ2470(cf), Changwahela TZ4049, Massisiwe Forest TZ1125, TZ1119(cf) & TZ1155, Luhangalo Plateau TZ3431, Ilutila TZ652 & TZ794(cf), Morogoro TZ3419, Matema Beach TZ3492(cf) & TZ3494. Widespread in coastal and mountain forests. By far the most common pyrenocarpous lichen in the area, both on tree bark and on rock (UDZ, ULU, LIV, PUG, NGO).

A pantropical species, already known from Tanzania (McCarthy, 2003).

Porina tetralocularis Aptroot

Kivulamo TZ1571. Mountain forest (UDZ).

A rarely reported neotropical species, not known so far from Africa (McCarthy, 2003).

Pseudopyrenula diluta (Fée) Müll. Arg. s.s.

Kivulamo TZ1572 & TZ1575. Mountain forest (UDZ).

A pantropical species, in Africa so far known from Cameroon, Guinea and Ivory Coast (Harris, 1998).

Pseudopyrenula subnudata Müll. Arg. (= *P. diluta* var. *degenerans* Vainio)

Pugu Hill TZ2557, Luhangalo Plateau TZ2944. Mountain forest (PUG, ULU).

A pantropical species, in Africa so far known from Cameroon, Sierra Leone and Zaire (Harris 1998). It is recognized at species level because it shows a different distribution range from the preceding taxon, being generally more common, but less so e.g. in Macaronesia and even absent from Europe, although it is subsumed in it as a variety by Harris (1998).

Psoroglaena cubensis Müll. Arg.

Luhangalo Plateau TZ2947. Mountain forest (ULU).

A pantropical species, in Africa so far known from Kenya and the Seychelles (Eriksson, 1992).

Pyrenula acutalis R.C. Harris

Luhangalo Plateau TZ2948. Mountain forest (ULU).

Apparently a pantropical species, not known so far from Africa (Harris, 1989).

Pyrenula confinis (Nyl.) R.C. Harris

Ngong Hills, K354, Changwahela TZ4073 p.p. Coastal + mountain forest (NGO).

A pantropical species, not yet reported from Kenya or Tanzania (Harris, 1989).

Pyrenula concatervans (Nyl.) R.C. Harris

Changwahela TZ4145, Luhembe River TZ2435. Coastal + riverine forest.

A pantropical species, not yet reported from Tanzania (Harris, 1989).

Pyrenula dermatodes (Borrer) Schaerer

Luhangalo Plateau TZ2946. Mountain forest (ULU).

A paleotropical species common in Europe and Asia but not known so far from Africa; known in Macaronesia only from the Azores and Madeira (Hafellner, 1995).

Pyrenula laetior Müll. Arg.

Changwahela TZ4048a, Pugu Hills TZ2562 & TZ2492(cf). Coastal + low mountain forest (PUG).

A neotropical species, not known so far from Africa (Harris, 1995).

Pyrenula macularis (Zahlbr.) R.C. Harris

Mbeganiif TZ3566, Matema Beach TZ3493. Coastal + mountain forest (LIV).

A pantropical species, in Africa so far known from Madagascar and South Africa (Harris, 1989).

Pyrenula mamillana (Ach.) Trevisan

Sanje Waterfall TZ3633, Luhega Forest TZ2320a. Mountain forest (UDZ).

A pantropical species, not yet reported from Tanzania (Harris, 1995).

Pyrenula microcarpa Müll. Arg. (= *P. cinerea* Zahlbr.)

Luhangalo Plateau TZ3221. Mountain Forest (ULU).

A pantropical species, in Africa so far known from South Africa (Harris, 1995).

Pyrenula ochraceoflava (Nyl.) R.C. Harris

Dar TZ5545, Kyalungwa K1573. In bushland.

A pantropical species, not yet reported from Kenya (Harris, 1989).

Pyrenula parvinuclea (Meyen & Flotow) Aptroot

Changwahela TZ4148. Coastal.

A paleotropical species, not yet reported from Tanzania (Aptroot *et al.*, 1997).

Pyrenula pyrenuloides (Mont.) R.C. Harris s. lat.

Ilutile TZ861. Mountain Forest (UDZ).

A predominantly neotropical species, not known so far from Africa (Harris, 1989).

Pyrenula quassiaecola Fée

Changwahela TZ4050, Luhega Forest TZ2210, Matema Beach TZ3495, Luhangalo Plateau TZ2943. Coastal + mountain forests (UDZ, ULU, LIV).

Apparently a pantropical species, common in tropical America and Asia, not known so far from Africa (Harris, 1989).

Pyrenula santensis (Nyl.) Müll. Arg.

Luhega Forest TZ2321. Mountain forest (UDZ).

A pantropical species, not yet reported from Tanzania (Harris, 1995).

Strigula phaea (Ach.) R.C. Harris

Ilutite TZ677a, 677b & 676. Mountain forest (UDZ).

Apparently a nearly cosmopolitan species, reported from America, Europe and Asia, in Africa so far only known from the Canary Isles (Roux & Sérusiaux, 2004).

Thelenella modesta (Nyl.) Nyl.

Morogoro TZ3418, Sanje Waterfall TZ3631. Low mountain forest (ULU, UDZ).

This species seems to be widespread on the Northern Hemisphere; in Africa so far known only from subtropical North Africa. The present records seem to be the first from the Southern Hemisphere (Mayrhofer, 1987).

Trypethelium tropicum (Ach.) Müll. Arg.

Luhega Forest TZ2320. Mountain Forest (UDZ).

A pantropical species, in Africa e.g. known from Sierra Leone (Harris, 1986).

Verrucaria praetermissa (Trevisan) Anzi

Ilutite, TZ733 & TZ793a. Mountain forest (UDZ).

Apparently a nearly cosmopolitan species, reported from America, Europe, Asia and Australia, but not known so far from Africa (McCarthy, 2001).

DISCUSSION

Pyrenocarpous lichens are mostly inconspicuous, although they are a common element in especially the corticolous lichen flora of tropical forests. In shaded forests, many tree trunks are fully covered by various species, mostly *Porina* and *Pyrenula*, giving the tree bark, which would have been brown if bare, their characteristic green colour.

Many pyrenocarpous lichen species are widespread and to be found in suitable habitats all over the tropics. The fact that so many species are here reported for the first time from Kenya, Tanzania or even from the whole of Africa rather reflects the spurious attention the group has received here in the past.

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