

Contributions to the Lichen Flora of East Africa *Pseudocyphellaria* and *Sticta*

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Abstract. A total of 91 specimens of *Pseudocyphellaria* and 135 specimens of *Sticta* were studied from various collections of T. Pócs and his colleagues. Six *Pseudocyphellaria* (*P. argyracea*, *P. aurata*, *P. clathrata*, *P. crocata*, *P. dozyana*, *P. intricata*) and 10 *Sticta* species (*S. ambavillaria*, *S. dichotoma*, *S. fuliginosa*, *S. limbata*, *S. macrophylla*, *S. orbicularis*, *S. sublimbata*, *S. tomentosa*, *S. variabilis*, *S. weigeli*) were identified from specimens collected in the 1970s, 1980s and early 1990s.

Keywords: East Africa, lichenised fungi, *Pseudocyphellaria*, *Sticta*

Introduction

Pseudocyphellaria and *Sticta* are relatively well-known genera among foliose lichens. They include very attractive species also in East Africa favoured by collectors. The key on East African macrolichens by SWINSCOW & KROG (1988), also the studies on *Pseudocyphellaria* of Southern Hemisphere (GALLOWAY 1988, 1992, 1994, GALLOWAY & ARVICSSON 1990) makes it easier to identify them. Useful notes on the nomenclature of *Sticta* were published by (GALLOWAY 1995). The most recent publication on this field is the treatment of the Australian representatives of these genera (GALLOWAY 2001, GALLOWAY et al. 2001).

Specimens of *Pseudocyphellaria* and *Sticta* collected in the 1970s, 1980s and early 1990s from various East African regions accumulated in the Lichen Herbarium VBI at Vácrátót. The bulk of the specimens were collected by T. Pócs (Eger) and myself in Tanzania. There were also specimens from Comoro Islands, Kenya, Madagascar, Rwanda, Uganda and Zaire. This material included specimens collected in the framework of the Usambara and Nguru Rain Forest Research Projects, the Eötvös L. University (Budapest) student expedition and the Bryotrop expedition in Zaire. Part of this mate-

rial has already been identified by H. Krog (Oslo), 8 specimens by T. Pócs (Eger) 2 specimens by D. J. Galloway (London) and one specimen by L. Lőkös (Budapest). Specimens of O were kindly sent on loan for the sake of this treatment. A smaller Zaire collection by F. Müller (Halle) was also kindly provided. The Author during her Royal Society Postdoctoral Fellowship in the Natural History Museum London had an opportunity to study these valuable collections in 1992.

For a general characterisation of the investigated geographical areas (Fig. 1) a few papers can be suggested from the literature. The forest flora and vegetation in two of the old crystalline mountains was investigated from various aspects in the last decades. In the Uluguru mountains bioclimatic studies were also carried out with special attention to the amount of precipitation and water retention by epiphytic cover in mossy forests (PÓCS 1974).

A comprehensive study has been prepared about the Usambara mountains, Tanzania (IVERSEN 1991a, 1991b). It treats the history of botanical research, geography, geology, pedology and climate of the Usambaras in details. Main vegetation types occurring in the Usambara mountains are those which can be found also in the whole currently lichenologically studied East African areas:

Forests: lowland evergreen forests, dry lowland evergreen forests, submontane evergreen forests, wet montane evergreen forests, dry montane evergreen forests, montane mist forests (cloud forests, mossy forests, elfin forests), ericaceous scrub forests, riverine forests; Woodlands: semi-deciduous woodlands ("savannas"), bushlands and thickets; Grasslands: grasslands and wooded grasslands, *Pteridium* heath, swamps, rocky outcrops; Induced vegetation: plantation forests, cultivated areas. Of course vegetation types for higher elevations (such as subalpine vegetation, paramo, alpine zone with rocks (lava rocks) and pebbles) must be added to the above vegetation types, characteristic for Kilimanjaro Mts., Ngorongoro Crater in Tanzania or Mt. Elgon in Kenya (HEDBERG 1957). A chapter on lichen habitats is also found in SWINSCOW & KROG (1988).

The phytogeographical division of Africa is presented in the light of more than 100 years history (IVERSEN 1991a, 1991b). Phytogeographical analysis and affinities of the higher plant vegetation is discussed. Special attention is made to the human influence on the vegetation.

A part of the results on foliicolous lichens of the above collections has already been published (FARKAS 1987, 1988, 1991).

The correlation between tropical African and Asian bryofloras was studied by (PÓCS 1976). The Bryotrop project concentrates on several ecological factors important for the distribution of bryophytes. Papers has already

been published on the result of this project contain useful information also on the ecological conditions for lichens (e.g. FRAHM 1990).

Preliminary results of the Mt. Elgon student expedition concerning to the epiphytic vegetation of *Senecio barbatipes* (giant groundsel) has been analysed by (PÓCS & SZABÓ 1992). Their analysis is based also on lichen specimens collected together with *Pseudocyphellaria* and *Sticta* species listed in this paper.

Recently a poster was presented on Lobariaceae of Mauritius and La Reunion mentioning interesting results based on c. 400 freshly collected specimens (HOLM et al. 2002).

Materials and methods

A total of 91 specimens of *Pseudocyphellaria* and 135 specimens of *Sticta* were studied from various collections mentioned in the introduction. All specimens found in VBI, EGR or HALLE, duplicates if any deposited in the following herbaria: BM, B, O, UPS, SUA. Detailed citation of locality data for each specimens is found under the characterisation (habitat data analysed concerning to geographical distribution, elevation and substrate features) of each species. For identification dissecting microscope and stereo research light microscope (Wilds) were used, handsections were prepared. The usual process of thin layer chromatography was applied following (WHITE & JAMES 1985). The number of specimens in our study is not enough for a comprehensive taxonomic treatment (e.g. solving problems suggested by (HOLM et al. 2002). So the "rather broad view of the limits of taxa" sensu (GALLOWAY 1994) is also applied here. For distributions in the Palaeotropics see also (GALLOWAY 1994).

Pseudocyphellaria

1. *Pseudocyphellaria argyracea* (Delise) Vainio, *Hedwigia* 37: 34 (1898).

P. argyracea is one of the most frequent species of the genus in the investigated localities in E-Africa. In Comoro Islands, Madagascar and Tanzania it was found in various forest types between 750 and 2300 m altitude, most frequently in submontane, montane or montane mossy forests. Usually it grows on bark of tree trunks, branches or twigs, seldom on decayed trunks. From higher elevations it was collected also on rocks, in lower elevation in Madagascar it was found on *Pandanus* leaves. Most of the records are origi-

nating from natural habitats of forest reserves, there are only two specimens collected in degraded forests.

Specimens (40) examined: COMORO. Ngazidja (Grande Comore) Island. Degraded rainforest on the W slope of Kartala volcano, at 700–860 m altitude, above Mvouni village. With many *Psidium cattleianum* naturalised in the shrub layer. Corticolous, at 750 m alt. 16 March 1991, T. Pócs 9150/O, det. H. Krog (EGR). — Ngazidja (Grande Comore) Island. Ericaceous heath (*Philippia* forest and bush) on the W slope of Kartala summit at 1300–2300 m altitude, above the forest line, subalpine type. Corticolous. 19–20 March 1991, T. Pócs 9159/BW, det. H. Krog (EGR). — MADAGASCAR. Reserve Forestiere Andasibe, 100 km E of Antananarivo. Montane rainforest on granitic ground, at 920–990 m alt. E of the “Station de Pisciculture”, with *Ocotea*, *Pandanus*, *Memecylon* spp. Corticolous. 15–16 March 1990, T. Pócs, with R. E. Magill & C. Lafarge-England 90103/W, det. H. Krog (EGR). — Reserve Forestiere Andasibe (Perinet) 100 km E of Antananarivo, 1.5 km W of the railway station. Degraded montane rainforest at 930–990 m alt. Foliicolous, on *Pandanus* leaves. 17 March 1990, T. Pócs, with R. E. Magill & C. Lafarge-England 90106/Y, det. H. Krog (EGR). — TANZANIA. Nguru Mts. in Morogoro District. Submontane rainforest in the S branch of Divue Valley: 1 km W of Mlaguzi village, at 1000–1300 m alt. Saxicolous. 23–24 September 1989, T. Pócs with D. Emmrich 89224/CW, det. E. Farkas (VBI). — Submontane evergreen forest in the valley below Maskati Mission. Wet, half-shady, rocky habitat, at 1400–1500 m alt. Saxicolous. 17–18 March 1988, S. & T. Pócs 88043/LA, det. E. Farkas (VBI). — Nguru Ya Ndege Hill NNW of Morogoro town. Dry evergreen forest, mist effected, rich in epiphytes, on the N ridge, at 1100 m alt. Corticolous. 22 October 1988, T. Pócs & E. Knox 88251/BB, det. E. Farkas (VBI), ramicolous, corticolous. 22 October 1988, T. Pócs & E. Knox 88251/D, det. T. Pócs (VBI, BM, B, UPS, SUA). — S-Pare Mts. in Same District. Montane evergreen forests at Chuva and on the plateau of Ranji, at 1740–1900 m alt. The forest patches are restricted to the valleys. Corticolous. 4 December 1989, T. Pócs with Helsinki University 89249/D, det. E. Farkas (VBI). — Uluguru Mts. Mwere Valley above Morogoro town. Submontane rainforest, at 1450–1550 m alt. Lignicolous, 28 November 1986, T. Pócs, E. Farkas, P. Geissler, S. T. Iversen, M. Steiner, R. P. C. Temu 86158/LB, det. E. Farkas (VBI, BM). — Tanga Region, East Usambara Mts. Amani. On (partly planted) trees of the Botanic Garden and experimental *Maesopsis* plantations S of the village, at 900–950 m alt. Corticolous. 20 February 1987, T. Pócs 87040/X, det. H. Krog (VBI, BM), det. E. Farkas (VBI). — Kwamkoro Forest Reserve. SE of Kwamkoro Tea Estate. Intermediate rain forest of *Ocotea usambarensis*, *Cephalosphaera* sp. at 900–1030 m alt. Corticolous. 28 October 1986, E. Farkas 86214/L, det. E. Farkas (VBI, BM, UPS, SUA). — Lutindi F. R. Wet, mossy submontane rainforest of the Nilo Peak area, at 1250–1450 m alt. Corticolous. 11 May 1987, S. T. Iversen, E. Persson & B. Petterson 87123/O, det. E. Farkas (VBI). — Former Marvera Forest Reserve E of Marvera Tea Estate, 6 km NE of Amani. Very degraded forest fragment with Cardamom and other plantations, at 1000–1180 m alt. Corticolous. 12 November 1986, E. Farkas, T. Pócs 86244/CG, det. E. Farkas (VBI).

— West Usambara Mts. E summit of Baga I. Forest Reserve. Microphyllous, dry evergreen forest, at 1800 m alt. Corticolous. 2 March 1984, T. Pócs 8419/IA, det. H. Krog (VBI). — Lushoto District. Montane evergreen forest 5 km E of Mgwashi village, on the W slopes of Gonja Hill, at 1600–1700 m alt. Corticolous. 17 October 1988, T. Pócs & H. Krog 88205/BD, det. H. Krog (VBI, BM, B, O, UPS, SUA), rupicolous (VBI, BM, B, O). — Mazumbai University Forest Reserve. Mossy elfin forest and *Philippia* heath on the rocky ridge of Sagara, at 1850–1980 m alt. Corticolous. 23 February 1982, T. Pócs 6960/U, det. H. Krog (VBI). — Mazumbai University Forest Reserve. Montane mossy forest, ericaceous heath and rock cliffs of Sagara Ridge, at 1800–1900 m alt. Rupicolous. 2 February 1985, T. Pócs 8531/F, det. H. Krog (VBI), T. Pócs 8531/EA, det. H. Krog (VBI, O). — Shagayu Forest Reserve. Intermediate rainforests on the S slopes of Kwas-hemhambu and riverine forest along the tributary of Uмба river, at 1400–1750 m alt. Corticolous, 20 October 1986, E. Farkas 86201/M, det. E. Farkas (VBI).

2. *Pseudocyphellaria aurata* (Ach.) Vainio, Etude Lich. Brésil 1: 183 (1890).

P. aurata was found in Madagascar, Tanzania and Zaire. It was collected from 700 to 2650 m elevation, most frequently at about 1000 m. It prefers humid, mist effected woodlands, riverine forests. Corticolous, also ramicolous, seldom lignicolous on various phorophytes (e.g. on *Agauria*, *Euphorbia*). In Zaire it was found on leaves. It prefers natural circumstances, but tolerates conditions of a degraded forest, too.

Specimens (27) examined: MADAGASCAR. Reserve Forestiere Andasibe (Permet) 100 km E of Antananarivo. Montane rainforest 500 m E of the railway station, on the W slope of ridge, at 920–1010 m alt., near the aerial. Ramicolous. 17 March 1990, T. Pócs, with R. E. Magill & C. Lafarge-England 90108/T, det. H. Krog (EGR). — TANZANIA. NW Kilimanjaro, above Lerang Wa village, at the NW edge of Shira Plateau. Low canopy forest below the forest line dominated by *Podocarpus latifolius*, *Hagenia* and *Pittosporum viridiflorum*, at 2600–2650 m alt. Corticolous/lignicolous. 5 June 1990, T. Pócs & J. Linden 90124/D, det. E. Farkas (VBI). — N part of Marera Forest N of Karatu. Degraded dry semideciduous forest on the N leading ridge, at 1700–1800 m alt. Ramicolous. 25 January 1989, T. Pócs & S. Chuwa 89041/E, det. H. Krog (VBI, BM, B). — Mbulu Highlands and District. Marang Forest Reserve 7 km E of Daudi village. Mesic evergreen montane forest with *Casearia battiscombei*, *Xymalos* and *Olea capensis*, at 1900 m alt. Ramicolous. 30 May 1990, T. Pócs, II. Sjöholm, J. Linden & L. J. K. Ghula 90088/VB, det. E. Farkas (VBI). — Mindu Hill WSW of Morogoro town. Dry evergreen forest in the rocky ravine leading to the top on the E slope (N from the path), at 1000 m alt. Ramicolous. 21 September 1988, T. Pócs & D. Kayambazinthu 88187/L, det. T. Pócs (VBI, BM). — Mindu Hill WSW of Morogoro town. Mist effected miombo (*Brachystegia*) woodland on the SE slope, 900–1200 m alt. Corticolous. 5 June 1988, T.

Pócs, R. Ochyra & H. Bednarek 88101/B, det. E. Farkas (VBI, BM). — Ngorongoro Cons. Area. SE outer slopes of Ngorongoro Crater. Evergreen riverine forest with *Ilex mitis* and *Hagenia*, *Podocarpus milanjanus*, *Prunus africanus* in the valley leading to S from Rotian Glade, at 2000–2100 m alt. Ramicolous. 18 January 1989, T. Pócs & S. Chuwa 89027/Z, det. H. Krog (VBI, BM, B, O, UPS, SUA). — Nguru ya Ndege Hill NNW of Morogoro town. Mist effected miombo woodland on the N ridge near Mkundi village, at 900–1000 m alt. Corticolous. 22 October 1988, T. Pócs & E. Knox 88250/O, det. T. Pócs (VBI). — Nguru ya Ndege Hill NNW of Morogoro town. Dry evergreen forest, mist effected, rich in epiphytes, on the N ridge, at 1100 m alt. Corticolous. 22 October 1988, T. Pócs & E. Knox 88251/H, det. T. Pócs (VBI, B). — S-Pare Mts. in Same District. Montane evergreen forests at Chuva and on the plateau of Ranji, at 1700–1900 m alt. The forest patches are restricted to the valleys. Corticolous. 4 December 1989, T. Pócs 89249/M, det. E. Farkas (VBI). — Uluguru Mts, Kitulanghalo Forest Reserve ENE of Morogoro Rain dry evergreen forest on the E slopes below summit, at 700 m alt. (Corticolous/ramicolous?) 8 December 1985, T. Pócs 8562/E, det. E. Farkas (VBI). — Tanga Region, East Usambara Mts., Amani. Forest Reserve behind the “Forest Houses”. Submontane rain forest at 950 m alt. On bark. 19 February 1982, T. Pócs 6946/LA, det. H. Krog (VBI). — East Usambara Mts. Lutindi F. R. Wet, mossy submontane rainforest of the Nilo Peak area at 1250–1450 m alt. Ramicolous. 11 May 1987, S. T. Iversen, E. Persson & B. Petterson 87123/ZA, det. H. Krog (VBI). — Tanga Region, West Usambara Mts. *Euphorbia nyikae* woodland with rock outcrops on the NE slopes below Baga I. F. R. SW of Mzinga village, at 1500 m alt. Corticolous on *Euphorbia nyikae*. 2 March 1984, T. Pócs 8418/N, det. H. Krog (VBI). — West Usambara Mts. On the isolated peak between Kwagoroto summit and Mazumbai village. Mosaic of grassland, *Philippia* heath and dry elfin forest (*Agauria* and *Myrica*), at 1850 m alt. Corticolous on *Agauria*. 23 February 1984, T. Pócs 8404/Q, det. H. Krog (VBI). — ZAIRE. Prov. Kivu Umgebung Goma Lac Vert 15 km NW Ort 1550 m NN. (Epiphytisch) 25 August 1991, F. Müller Z 107, det. E. Farkas (HALLE), F. Müller Z 109, det. E. Farkas (HALLE).

3. *Pseudocyphellaria clathrata* (de Not.) Malme, Ark. Bot. 26A(14): 9 (1935).

It was collected only from 3 localities of Tanzania (Image Mountains, Mbulu Highlands, Ngorongoro Crater). All from high elevation (1900–2100 m), from montane evergreen forests. Ramicolous.

Specimens (4) examined: TANZANIA. Image Mountains in Iringa Region. Montane mesic evergreen forest with many *Phoenix reclinata* on the sharp S ridge at 1900–2000 m alt. Ramicolous. 28 October 1988, B. & T. Pócs 88265/OA, det. E. Farkas (VBI). — Mbulu Highlands and District. Marang Forest Reserve 7 km E of Daudi village. Mesic evergreen montane forest with *Casearia battiscombei*, *Xymalos* and *Olea capensis*, at 1900 m alt. Ramicolous on *Olea*. 30 May 1990, T. Pócs, II. Sjöholm, J. Linden & L. J.

K. Ghula 90088/VA, det. E. Farkas (VBI). — SE outer slopes of Ngorongoro Crater. Evergreen riverine forest with *Ilex mitis* and *Hagenia*, *Podocarpus milanjanus*, *Prunus africanus* in the valley leading to S from Rotian Glade, at 2000–2100 m alt. Ramicolous. 18 January 1989, T. Pócs & A. Chuwa 89027/Z, det. H. Krog (VBI, BM).

4. *Pseudocyphellaria crocata* (L.) Vainio, *Hedwigia* 37: 34 (1898).

P. crocata was collected from Kenya, Rwanda, Tanzania and Zaire. It grows among humid conditions of elfin forests, mist effected miombo woodland and paramo vegetation. It was collected from 800 m to 3840 m (Mt. Elgon) altitude. Corticolous, also ramicolous.

Specimens (15) examined: KENYA. Mt. Elgon National Park in the E side of the caldera, at 3800–3900 m alt. *Giant Senecio barbatipes* paramo with dense *Alchemilla elgonensis* undergrowth and *Lobelia telekii*, *Euryops elgonensis*. On volcanic cliff at 3840 m alt. (Corticolous?) 15–17 January 1992, T. Pócs & A. Szabó 9218/EM, det. E. Farkas (VBI, EGR). — RWANDA, Nyungwe (former Rugege) Forest Reserve in Gikongoro Pref. *Erica rugegensis* heath with scattered *Hagenia* trees and *Andropogon shirensis* grassland patches at 2420 m, 02°31'34" S, 29°21'21" E. Ramicolous, on *Hagenia abyssinica*. 11–12 August 1991, E. Fischer & T. Pócs 91102/B, det. H. Krog (EGR). — TANZANIA. Mindu Hill WSW of Morogoro town. Dry evergreen forest in the rocky ravine leading to the top on the E slope (N from the path), at 1000 m alt. Ramicolous. 21 September 1988, T. Pócs & D. Kayambazinthu 88187/P, det. T. Pócs (VBI). — Nguru Ya Ndege Hill N of Morogoro town. Miombo woodland on the SW ridge dominated by *Brachystegia* spp. & *Julbernardia globiflora* at 800–1100 m alt. on quartzitic soil. Ramicolous. 20 April 1986, T. Pócs & J. B. Hall 8646/N, det. E. Farkas (VBI, BM). — Nguru Ya Ndege Hill NNW of Morogoro town. Dry evergreen forest, mist effected, rich in epiphytes, on the N ridge, at 1100 m alt. Corticolous. 22 October 1988, T. Pócs & E. Knox 88251/C, det. T. Pócs (VBI, BM, B, UPS, SUA). — East Usambara Mts. Amani. On (partly planted) trees of the Botanic Garden and experimental *Maesopsis* plantations S of the village, at 900–950 m alt. Corticolous. 15 February 1987, T. Pócs 87040/Y, det. E. Farkas (VBI). — West Usambara Mts., Shagayu F. R. Mossy cloud forest 2 km SW of the Shagein peak, on a summit at 2000–2150 m alt. Corticolous. 15 March 1984, A. Borhidi 8445/S, det. H. Krog (VBI, O). — ZAIRE. Prov. Kivu, Umgebung Goma, Lac Vert 15 km NW Ort 1550 mNN. (Epiphytisch) 25 August 1991, F. Müller Z 111, det. E. Farkas (HALLE).

5. *Pseudocyphellaria dozyana* (Mont. et v. d. Bosch) D. Galloway, *Lichenologist* 17: 304 (1985).

Two specimen were found in the Tanzanian collection of T. Pócs, one

of them already published by (GALLOWAY 1994). It grows on bark in mist effected dry evergreen forests at 1100–1250 m altitude.

Specimens (2) examined: TANZANIA. Nguru Ya Ndege Hill NNW of Morogoro town. Dry evergreen forest, mist effected, rich in epiphytes, on the N ridge at 1100 m alt. Corticolous. 22 October 1988, T. Pócs & E. Knox 88251/BA, det. E. Farkas (VBI). — Uluguru Mts., Mindu Hill WSW of Morogoro town. Mist effected *Uapaca kirkii* woodland on the S end of the main ridge at 1250 m. Very rich in epiphytic and terricolous bryophytes. Corticolous. 5 June 1988, T. Pócs, R. Ochyra & H. Bednarek 88102/AO, det. D. J. Galloway (BM).

6. *Pseudocyphellaria intricata* (Delise) Vainio, *Hedwigia* 37: 36 (1989).

It was found in Tanzania and Zaire at 1100 m and 2100–2260 m altitude. Both are corticolous in montane and montane elfin forest.

Specimens (3) examined: TANZANIA. Ukaguru Mts. in Kilosa District. Elfin forest on the Mamwira summits at 2100–2260 m alt. Corticolous. 12 February 1988, T. Pócs, T. R. A. Minja, V. R. Nsolomo & A. Persson 88016/BL, det. E. Farkas (VBI, BM). — ZAIRE. Prov. Kivu, Pinga, 96 km NW Goma, Flusstal 4 km NN of Ort Bergregenwald, 1100 mNN on Brückenholz. 18–23 August 1991, F. Müller Z 66, det. E. Farkas (HALLE).

STICTA

1. *Sticta ambavillaria* (Bory) Ach., *Lich. Univ.*, p. 455 (1810).

It is the most frequent *Sticta* species of the investigated localities of East Africa. It was collected frequently from high elevation (2000–3800 m) localities of Kenya, Tanzania and Zaire. It grows in montane elfin forest, subalpine paramo vegetation, in *Erica*, *Philippia* heath and *Podocarpus* forest, also in secondary grassland communities. Ramicolous or corticolous, also found on soil covered rocks.

Specimens (35) examined: KENYA. Mount Elgon National Park on the ESE slopes. Secondary grassland with scattered Ericaceae or open *Erica arborea* stand replacing evergreen mist forest after fires, on the SE slope of Chemwote, at 3200–3300 m alt. Corticolous. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/AGA, det. E. Farkas (EGR), on *Erica* bark. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/DB, det. T. Pócs (VBI). — Mount Elgon National Park on the ESE slopes. *Erica arborea* forest on the S slope of Mt. Chemwote, at 3250–3350 m. On *Erica arborea* bark. 12 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9215/CA, det. E. Farkas (EGR). — Mount Elgon National Park on the ESE slopes. In a depression on the E slope of Chemwote, around a spring at 3250 m. Giant groundsel (*Se-*

senecio johnstonii) and bamboo (*Arundinaria alpina*). On giant *Senecio* and on *Atrocrania* bark. 22 January 1992, T. Pócs & A. Szabó 9228/K, det. E. Farkas (EGR). — Mount Elgon National Park on the ESE slopes. Mossy mist forest in Kimothon valley on the SE slope of Chemwote, with *Rapanea melanophloeos*, *Prunus africana*, *Hagenia*, *Afrocrania*, *Dombeya goetzenii*, *Pittosporum viridiflorum*, at 3200 m alt. Corticolous. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9210/X, det. E. Farkas (EGR). — Mount Elgon National Park, in the E side of the caldera, at 3800–3900 m alt. Giant *Senecio barbatipes* paramo with dense *Alchemilla elgonensis* undergrowth and *Lobelia telekii*, *Euryops elgonensis*. On earth covered rocks. 15–17 January 1992, T. Pócs & A. Szabó 9218/EL, det. E. Farkas (VBI). — TANZANIA. Arusha National Park, Meru Crater. Subalpine *Erica(-Agauria)* stand around and above Kitito Camp, at 2480–2600 m. Ramicolous. 16–18 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88301/K, det. H. Krog (VBI, BM, B). — Kilimanjaro Mts. Marangu Route. Subalpine *Erica arborea* forest around Mandara Hut, at 2600–2850 m. On *Erica arborea*. 19, 22 May 1989, T. Pócs & S. Orbán 89145/CB, det. H. Krog (VBI, BM, B, O, UPS, SUA). — Kilimanjaro Mts. Marangu Route. Gorge with *Senecios* below Horombo Hut, at 3750–3800 m alt. On *Erica arborea*. 20 May 1989, T. Pócs & S. Orbán 89149/AB, det. H. Krog (VBI, BM, O, UPS, SUA). — Kilimanjaro Mts. NE slope of Mawenzi. WSW of Tarakea village, N side of Nesikiria River. *Erica arborea* giant heath at 2580–2600 m alt. (4–6 m tall). Corticolous. 1 February 1990, T. Pócs with M. Jhatta & J. Linden 90022/AC, det. E. Farkas (VBI). — Kilimanjaro Mts. Mweka Route. Subalpine *Erica arborea* heath (2–3 m tall) around Mweka Base Hut, at 2900–3030 m alt. Ramicolous on *Erica arborea* at 3100 m. 9 June 1990, T. Pócs, with D. Harrison & J. M. Mushy 90130/PA, det. E. Farkas (VBI). — Kilimanjaro Mts. Mweka Route. Wet ericaceous heath with lava rocks near Mweka Base Hut in Charongo Valley, at 2900–3000 m alt. Corticolous on *Erica arborea*. 5–6 March 1985, T. Pócs 6995/D, det. H. Krog (VBI). — W slope of Mount Meru. Subalpine *Erica arborea-Stoebe kilimanjarica* bush with giant *Senecio* and *Lobelia deckenii* on S facing slope of a valley above Laikinoi, at 3210 m altitude (plot 11). Lignicolous. 15 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88299/O, det. H. Krog (VBI, BM, B). — Ngorongoro Conservation Area. S crater rim. Glade with scattered trees near Rhino Lodge, at 2200 m alt. Corticolous. 29 November 1988, T. Pócs 88270/X, det. H. Krog (VBI). — Ngorongoro Conservation Area. Embagai Crater. E slopes of the main summit along the NW rim. Subalpine *Anthospermum-Stoebe-Artemisia* bush, at 2900–3100 m alt. Ramicolous. 3 December 1988, T. Pócs & S. Chuwa 88285/TB, det. H. Krog (VBI). — Mbeya Region. Poroto Mts. In montane rainforest on the way to Ngozi crater at the SE edge of Poroto Forest Reserve W of Isongole village, at 2000 m alt. Corticolous. 14 April 1989, E. Farkas, S. et T. Pócs 89128/LC, det. E. Farkas (VBI, BM, UPS, SUA). — Poroto Mts. On the N slope of Mt. Rungwe SE of Isongole village in Ericaceous heath just above the natural forest line at 2400 m alt. Lignicolous. 15 April 1989, E. Farkas 89130/LB, det. E. Farkas (VBI, BM). — ZAIRE. Kahuzi-Biega National Park NW from Bukavu town in Kivu Province. *Podocarpus* forest, bamboo thicket and *Philippia* heath

on the small islet of "Lushanja" bog, SW from Camp Biega, at 2400 m alt. On bark of *Agauria* tree. 1 September 1991, T. Pócs 91142/AA, det. H. Krog (EGR).

Sticta cyphellulata (Müll. Arg.) Hue, Nouv. Archs Mus. Hist. nat., Paris, Sér. 4, 3: 99 (1901) — see under *S. orbicularis*

2. *Sticta dichotoma* (Bory) Delise, Mém. Soc. linn. Normandie 2: p. 107 (1825).

S. dichotoma has three records from Madagascar and one from Tanzania. It was collected from submontane, montane and elfin forests between 920 and 1400 m elevations. It grows on bark or tree trunks and branches.

Specimens (6) examined: MADAGASCAR. Prov. Antsiranana. Reserve Intégrale Nationale de Marojezy. Closed, shady montane rainforest in the valleys around Camp II, at 1350–1400 m alt. Corticolous. 26–27 March 1990, T. Pócs, A. Randrianasolo, R. E. Magill & C. Lafarge-England 90115/A, det. D. J. Galloway (VBI, BM). — Prov. Antsiranana. Reserve Intégrale Nationale de Marojezy. Elfin forest on the ridge between Camp II and III, at 1000–1400 (exceptionally to 1800) m. On bark at 1370 m alt. 26–28 March 1990, T. Pócs, C. Lafarge-England, R. E. Magill & A. Randrianasolo 90114/AU, det. H. Krog (EGR). — Reserve Forestière Andasibe (Perinet) 100 km E of Antananarivo. Montane rainforest 500 m E of the railway station, on the W slope of ridge, at 920–1010 m alt., near the aerial. Ramicolous. 17 March 1990, T. Pócs, with R. E. Magill & C. Lafarge-England 90108/H, det. H. Krog (EGR). — TANZANIA. Tanga Region, SW from West Usambara Mts. Submontane rain forest on the plateau of Mafi Hill, near the headwaters of Kwalukonge stream, at 1000–1300 m alt. Ramicolous. 27–28 January 1985, T. Pócs 8522/D, det. H. Krog (VBI, O).

3. *Sticta fuliginosa* (Hoffm.) Ach., Meth. Lich., p. 280 (1803).

It was collected from high elevation (1900–3900 m) vegetation types (montane forest, subalpine bush, paramo) from Kenya and Tanzania. It was found mostly on twigs, also on lava rock and decayed trunks.

Specimens (11) examined: KENYA. Mount Elgon National Park, in the E side of the caldera, at 3800–3900 m alt. Giant *Senecio barbatipes* paramo with dense *Alchemilla elgonensis* undergrowth and *Lobelia telekii*, *Euryops elgonensis*. On twigs of *Euryops elgonensis*. 15–17 January 1992, T. Pócs & A. Szabó 9218/CW, det. E. Farkas (VBI). — Mount Elgon National Park on the ESE slopes. Streambed stones and boulders along Kimothon River at 3200 m altitude, accompanied by giant *Senecio johnstonii*, *Hypericum keniense*, *Conyza vernonioides*. On lava cliff. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9211/BD, det. E. Farkas (EGR), T. Pócs, M. S. Chuah, E. M. Kungu & students 9211/BZ, det. E. Farkas (EGR). — Mount Elgon National Park, ESE slope. Rocky gorge of Kimothon River between Koroborte and Chemwote

summits, with subalpine ericaceous vegetation, at 3300–3360 m altitude. On rotting wood. 25 January 1992, T. Pócs, E. M. Kungu & A. Szabó 9230/H, det. E. Farkas (VBI). — TANZANIA. Arusha National Park, Meru Crater. Subalpine *Erica(-Agauria)* stand around and above Kitito Camp, at 2480–2600 m alt. Ramicolous. 16–18 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88301/I, det. H. Krog (VBI). — Mbulu Highlands and District. Marang Forest Reserve, 7 km E of Daudi village. Mesic evergreen montane forest with *Casearia battiscombei*, *Xymalos* and *Olea capensis*. Alt. 1900 m. Ramicolous. 30 May 1990, T. Pócs, H. Sjöholm, J. Linden & L. J. K. Ghula 90088/U, det. E. Farkas (VBI). — Ngorongoro Conservation Area. Embagai Crater. E slopes of the main summit along the NW rim. Subalpine *Anthospermum-Stoebe-Artemisia* bush, at 2900–3100 m alt. Ramicolous. 3 December 1988, T. Pócs & S. Chuwa 88285/TA, det. H. Krog (VBI). — Ngorongoro Conservation Area. E side of the mean Oldeani summit. High altitude *Hagenia* forest at the timberline with *Agauria salicifolia* and *Pittosporum viridiflora*, at 3200 m alt. Ramicolous. 2 January 1989, T. Pócs 89005/KA, det. H. Krog (VBI), T. Pócs 89005/KBa, det. H. Krog (VBI). — Ngorongoro Conservation Area. SW edge of Ngorongoro Crater, inner slope. *Catha edulis* (Celastraceae) bush, xeric type, open. (Plot No. 892 just below Wildlife Lodge), at 2040 m alt. Rupicolous (ramicolous). 8 January 1989, T. Pócs 89010/AN, det. H. Krog (VBI).

4. *Sticta limbata* (Sm.) Ach., Meth. Lich., p. 280 (1803).

It was found in high elevations (2350–3600 m) in Kenya, Tanzania and Uganda. It occurred in the following vegetation types: evergreen forests, subalpine vegetation, *Erica*, *Philippia* heath and secondary grassland. Ramicolous, corticolous, also on volcanic rocks.

Specimens (19) examined: KENYA. Mount Elgon National Park on the ESE slopes. Secondary grassland with scattered Ericaceae or open *Erica arborea* stand replacing evergreen mist forest after fires, on the SE slope of Chemwote, at 3200–3300 m alt. (Corticolous?) 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/AG, det. E. Farkas (EGR), T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/C, det. E. Farkas (EGR), on *Erica* bark. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/DA, det. E. Farkas (VBI), T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/DBB, det. E. Farkas (EGR). — Mount Elgon National Park on the ESE slopes. *Erica arborea* forest on the S slope of Mt. Chemwote at 3250–3350 m. On *Erica arborea* bark. 12 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9215/CB, det. E. Farkas (EGR), T. Pócs, M. S. Chuah, E. M. Kungu and students 9215/M, det. E. Farkas (EGR). — TANZANIA. Kilimanjaro Mts., Umbwe Route, ericaceous heath with scattered giant *Senecio kilimanjari* trees at 3000–3300 m alt. Corticolous on *Erica arborea*. 2 March 1985, T. Pócs 6986/E, det. H. Krog (VBI, O). — Meru Mts. W slope, along Olkakola route. Subalpine, open *Hagenia abyssinica* forest intermixed with *Stoebe kilimandscharica* bush at 3100 m alt. Ramicolous, epiphyte on *Philippia*.

25 May 1986, T., S., A. & B. Pócs 8666/T, det. E. Farkas (VBI, BM). — W slope of Mount Meru. Subalpine *Erica arborea-Stoebe kilimanjarica* bush with giant *Senecio* and *Lobelia deckenii* on S facing slope of a valley above Laikinoi, at 3210 m altitude (plot 11). On *Erica arborea*. 15 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88299/I, det. E. Farkas (VBI, BM, B, UPS, SUA). — Ngorongoro Conservation Area, E side of the mean Oldeani summit. High altitude *Hagenia* forest at the timberline with *Agauria salicifolia* and *Pittosporum viridiflora*, at 3200 m alt. Ramicolous. 2 January 1989, T. Pócs 89005/KBb, det. H. Krog (VBI). — North Pare Mts. in Mwangi District. Mesic evergreen forest with submontane character at the S end of Kindoroko Forest Res. dominated by *Newtonia buchananii* and *Albizia gummifera*. Corticolous. 27 January 1990, T. Pócs, with F. Mioga & P. Tetty 90017/L, det. E. Farkas (VBI). — S Uluguru Mts. in Morogoro District. E edge of Lukwangule Plateau. Open granitic rocks of the gorge at Mgeta River falls, at 2350–2380 m alt. Saxicolous. 8–9 June 1988, T. Pócs, R. Ochyra & H. Bednarek 88109/Q, det. E. Farkas (VBI). — UGANDA. Around the Hot Springs in the Suam Valley. NE part of the caldera of Mount Elgon. Humid gorge and cliffs effected by steam and surrounded by *Senecio johnstonii* moorland at 3600 m. On volcanic rocks. 16 January 1992, M. S. Chuah, E. M. Kungu, J. Adam & B. Pócs 9220/AD, det. L. Lőkös (VBI).

5. *Sticta macrophylla* Bory in Delise, Mém. Soc. linn. Normandie 2: 110 (1825).

It has a single collection from an elfin forest in Madagascar at 1300 m altitude. It was collected from tree bark.

Specimen (1) examined: MADAGASCAR. Prov. Antsiranana. Reserve Integrale Nationale de Marojezy. Elfin forest on the ridge between Camp II and III, at 1000–1400 (exceptionally to 1800) m. Corticolous, at 1300 m alt. 26–28 March 1990, T. Pócs, C. Lafarge-England, R. E. Magill & A. Randrianasolo 90114/AW, det. H. Krog (EGR).

6. *Sticta orbicularis* (Braun) Hue, Anns Jard. bot. Buitenz. 17: 193 (1901). (*S>cyphellulata?*)

It has three collection from relatively high elevations (2200–2960 m) in Tanzania. It grows on rocks and twigs in montane evergreen and subalpine rocky vegetation.

Specimens (5) examined: TANZANIA. Kilimanjaro Mts. Subalpine streamside vegetation along the rocky side of Makoia River below Machame Hut, at 2960 m alt. Rupicolous. 5 April 1984, T. Pócs 6979/T, det. H. Krog (VBI, O). — Kilimanjaro Mts. NE slope of Mawenzi WSW of Tarakea village Nesikiria river gorge at 2600–2700 m alt. With *Senecio johnstonii* and *Lobelia deckenii*. Rupicolous. 31 January 1990, T. Pócs with K. Mjatta & J. Linden 90023/G, det. E. Farkas (VBI, BM). — Tanga Region, West

Usambara Mts. Mist effected, relatively dry evergreen forest on the rocky summit of Ndamanyiru range, 2200–2270 m. Ramicolous. 13 February 1985, T. Pócs 8547/KA, det. H. Krog (VBI).

7. *Sticta sublimbata* (Steiner) Swinscow et Krog, in Galloway, N. Z. J. Bot. 21: 198 (1983).

It was collected from one locality from Kenya and two localities from Tanzania between 1400 and 2300 m elevations. It grows on various substrates (corticolous, ramicolous, saxicolous) and in various vegetation types (montane rainforest with elfin forest patches, coffee-banana plantations, secondary grassland communities) tolerating also the human impact.

Specimens (6) examined: KENYA: Mount Elgon National Park on the ESE slopes. Secondary grassland with scattered Ericaceae or open *Erica arborea* stand replacing evergreen mist forest after fires, on the SE slope of Chemwote, at 3200–3300 m alt. (Corticolous?) 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/AS, det. E. Farkas (VBI). — TANZANIA. S-Pare Mts. in Same District. Coffee-banana plantations with many avocado and other shade trees above Mbagu Manka village, at 1400–1600 m. Saxicolous. 4–5 December 1989, T. Pócs with Helsinki University 89247/H, det. E. Farkas (VBI). — West-Usambara Mts. Shagayu Forest Reserve. Upper part of the Mt. Kwashembambu with montane rainforests and patches of elfin forest at 1750–1900 m alt. Corticolous. 20 October 1986, E. Farkas 86202/K, det. E. Farkas (VBI, BM, UPS, SUA).

8. *Sticta tomentosa* (Swartz) Ach., Meth. Lich., p. 279 (1803).

S. tomentosa was collected from 1 locality in Kenya and 2 localities in Tanzania. It lives in high elevations between 2000 and 3300 m. Found in montane rainforest, secondary grassland with *Erica arborea* on open granitic rocks and on bark.

Specimens (6) examined: KENYA. Mount Elgon National Park on the ESE slopes. Secondary grassland with scattered Ericaceae or open *Erica arborea* stand replacing evergreen mist forest after fires, on the SE slope of Chemwote, at 3200–3300 m alt. On *Erica* bark. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/DBA, det. E. Farkas (EGR). — TANZANIA. Mbeya Region. Poroto Mts. In montane rainforest on the way to Ngozi crater at the SE edge of Poroto Forest Reserve W of Isongole village, at 2000 m alt. Corticolous. 14 April 1989, E. Farkas, S. et T. Pócs 89128/LA, det. E. Farkas (VBI, BM, UPS, SUA). — S Uluguru Mts. in Morogoro District. E edge of Lukwangule Plateau. Open granitic rocks of the gorge at Mgeta River falls, at 2350–2380 m alt. On shady rocks. 8–9 June 1988, T. Pócs, R. Ochyra & H. Bednarek 88109/EB, det. E. Farkas (VBI).

9. *Sticta variabilis* Ach., Lich. Univ., p. 455 (1810) (syn. *S. papyracea* Delise, Mém. Soc. linn. Normandie 2: 104 (1825).

S. variabilis was found in several localities in Tanzania in rainforests, submontane, montane, montane mossy forest between 1550 and 2570 m altitude. It also occurred in paramo vegetation at 3800–3900 m on Mt. Elgon, Kenya. All records are corticolous or ramicolous.

Specimens (24) examined: KENYA. Mount Elgon National Park, in the E side of the caldera, at 3800–3900 m alt. Giant *Senecio barbatipes* paramo with dense *Alchemilla elgonensis* undergrowth and *Lobelia telekii*, *Euryops elgonensis*. On *Senecio* bark. 15–17 January 1992, T. Pócs & A. Szabó 9218/AF, det. E. Farkas (VBI). — TANZANIA. Arusha National Park, Meru Crater. Subalpine *Erica arborea* bush above Ngare Nanyuki Falls, at 2570 m alt. Corticolous on *Erica arborea*. 17 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88305/O, det. E. Farkas (VBI). — North Pare Mts. in Mwanza District. Kindoroko Forest Reserve. E ridge, W of Ndorwe village. Montane mossy forest composed of relatively small trees (6–10 m) with tree ferns, at 2020 m alt. Corticolous. 4 May 1990, T. Pócs, with F. N. R. Mioga 90072/O, det. E. Farkas (VBI). — Uluguru Mts. Montane mossy forest on Palata Ridge between 1800–1900 m alt. Corticolous. 27 November 1986, E. Farkas 86157/A, det. E. Farkas (VBI, BM, O, UPS, SUA). — East Usambara Mts. Kwamkoro Forest Reserve. SE of Kwamkoro Tea Estate. Intermediate rain forest of *Ocotea usambarensis*, *Cephalosphaera* sp. at 900–1030 m alt. Corticolous. 28 October 1986, E. Farkas 86214/YA, det. E. Farkas (VBI). — Tanga Region, West Usambara Mts. in Lushoto District. Submontane rainforest with dominant *Newtonia buchananii* and *Aningeria adolfi-friderici* around Kambi Falls, SW of Mazumbai Station, at 1550–1650 m. Ramicolous. 21 May 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88077/F, det. T. Pócs (VBI, BM). — West Usambara Mts. in Lushoto District. Montane evergreen forest 5 km E of Mgwashi village, on the W slopes of Gonja Hill, at 1600–1700 m alt. Corticolous. 17 October 1988, T. Pócs & H. Krog 88205/BB, det. H. Krog (VBI, BM, B). — West Usambara Mts. Mazumbai. Montane rainforest around Kambi Falls, at 1600–1750 m alt. Ramicolous. 8 December 1989, T. Pócs, with Helsinki University 89256/F, det. E. Farkas (VBI). — West Usambara Mts., Shagayu F. R. Mossy cloud forest 2 km SW of the Shagein peak, on a summit at 2000–2150 m alt. Corticolous. 15 March 1984, A. Borhidi 8445/G, det. H. Krog (VBI, O). — West Usambara Mts. Shagayu Forest Reserve. Road side and forest edge, SE range of Shagein at 1850–1950 m alt. Corticolous. 21–22 October 1986, E. Farkas 86204/G, det. E. Farkas (VBI). — West Usambara Mts. Shagayu Forest Reserve. SE range of Shagein. Montane evergreen forest at 1850–2050 m alt. Corticolous. 22 October 1986, T. Pócs 86205/D, det. E. Farkas (VBI). — West Usambara Mts. Shagayu Forest Reserve. Summit 2.5 km S of the main peak of Shagein, in elfin forest more or less mossy type with many epiphytes, at 2100 m alt. Corticolous. 22 October 1986, E. Farkas, T. Pócs 86206/GA, det. E. Farkas (VBI, BM, UPS, SUA).

10. *Sticta weigelii* (Ach.) Vainio, Acta Soc. Fauna Flora Fenn. 7(7): 189 (1890).

One of the most frequent *Sticta* species in this material. Found in Kenya, Tanzania and Zaire between 1250 and 3600 m elevations in various vegetation types from submontane, montane zones to subalpine paramo vegetation, *Erica*, *Philippia* heath, also in secondary grassland communities. It covers various substrate types, corticolous, ramicolous, also grows on rocks and decayed trunks.

Specimens (21) examined: KENYA. Mount Elgon National Park on the ESE slopes. Secondary grassland with scattered Ericaceae or open *Erica arborea* stand replacing evergreen mist forest after fires, on the SE slope of Chemwote, at 3200–3300 m alt. On *Erica* bark. 11–27 January 1992, T. Pócs, M. S. Chuah, E. M. Kungu and students 9212/BX, det. E. Farkas (VBI). — Mount Elgon National Park, in the E side of the caldera, at 3800–3900 m alt. *Giant Senecio barbatipes* paramo with dense *Alchemilla elgonensis* undergrowth and *Lobelia telekii*, *Euryops elgonensis*. On *Senecio* bark. 15–17 January 1992, T. Pócs & A. Szabó 9218/BH, det. E. Farkas (VBI). — TANZANIA. Arusha National Park, Meru Crater. Subalpine *Stoebe-Erica* bush with scattered *Agauria* and *Juniperus* trees on the crater floor, at 2570 m alt. Corticolous on *Agauria*. 17 December 1988, T. Pócs & Helsinki Univ. Bot. Dept. 88303/F, det. H. Krog (VBI, B, UPS, SUA). — Kilimanjaro Mts. Shira Route. Montane evergreen forest at 2600 m alt. near to the forestline, dominated by *Nuzia congesta*, *Podocarpus latifolius*, *P. falcatus*, *Juniperus excelsa*, *Hagenia*. Corticolous. 17 February 1990, T. Pócs, with J. Linden 90028/E, det. E. Farkas (VBI). — Kilimanjaro Mts. Mweka Route. Subalpine *Erica arborea* heath (2–3 m tall) around Mweka Base Hut, at 2900–3030 m alt. Ramicolous on *Erica arborea*, at 3100 m. 9 June 1990, T. Pócs, with D. Harrison & J. M. Mushy 90130/PB, det. E. Farkas (VBI). — Kilimanjaro Mts. Subalpine *Philippia* heath along Machame Route, near and above the hut, at 3000–3600 m alt. Corticolous on *Erica arborea*. 5–6 April 1984, T. Pócs 6978/W, det. H. Krog (VBI, O). — Kilimanjaro Mts. Ericaceous heath above the Machame Hut at 3050 m alt. Corticolous on *Erica arborea*. 8–9 August 1986, T. Pócs & B. O. van Zanten 86130/AE, det. E. Farkas (VBI, BM). — Mindu Hill WSW of Morogoro town. Mist effected *Uapaca kirkii* woodland on the S end of the main ridge at 1250 m. Very rich in epiphytic and terricolous bryophytes. Corticolous. 5 June 1988, T. Pócs, R. Ochyra & H. Bednarek 88102/AP, det. E. Farkas (VBI). — Nguru Mountains in Morogoro District. Submontane evergreen forest in the valley below Maskati Mission. Wet, half-shady, rocky habitat at 1400–1500 m alt. Saxicolous. 17–18 March 1988, S. & T. Pócs 88043/LB, det. E. Farkas (VBI). — Nguru Ya Ndege Hill NNW of Morogoro town. Submontane rainforest on 1300 m alt., dominated by *Newtonia buchananii*. Corticolous. 22 October 1988, T. Pócs & E. Knox 88252/Q, det. E. Farkas (VBI, BM). — Mbeya Region. Poroto Mts. In montane rainforest on the way to Ngozi crater at the SE edge of Poroto Forest Reserve W of Isongole village, at 2000 m alt. Corticolous. 14

April 1989, E. Farkas, S. & T. Pócs 89128/LB, det. E. Farkas (VBI). — Poroto Mts. On the N slope of Mt. Rungwe SE of Isongole village in Ericaceous heath just above the natural forest line at 2400 m alt. Lignicolous. 15 April 1989, E. Farkas 89130/LA, det. E. Farkas (VBI). — S Uluguru Mts. Montane forest on the W escarpment of Lukwangule Plateau near Ulindi rocks, at 2250–2300 m alt. (Corticulous/ramicolous?) 14 March 1986, T. Pócs 8628, det. E. Farkas (VBI). — S Uluguru Mts. in Morogoro District. E edge of Lukwangule Plateau. Open granitic rocks of the gorge at Mgeta River falls, at 2350–2380 m alt. On shady rocks. 8–9 June 1988, T. Pócs, R. Ochyra & H. Bednarek 88109/EA, det. E. Farkas (VBI). — ZAIRE. Kahuzi-Biega National Park NW from Bukavu town in Kivu Province. *Podocarpus* forest, bamboo thicket and *Philippia* heath on the small islet of “Lushanja” bog, SW from Camp Biega, at 2400 m alt. On bark of Agauria tree. 1 September 1991, T. Pócs 91142/AB, det. H. Krog (VBI).

***Sticta weigelii* var. *xanthotropa* (Krempelh.) Hue, Nouv. Archs Mus. Hist. nat., Paris, Sér. 4, 3: 96 (1901).**

S. weigelii var. *xanthotropa* lives in lower elevation than *S. weigelii*, at 900–1200 m. It was found in a Tanzanian dry evergreen forest on rocks.

Specimen (1) examined: TANZANIA. Tanga Region, SW from West Usambara Mts. Sclerophyllous, dry evergreen forest on the N ridge of Mafi Hill, at 900–1200 m alt. Saxicolous. 28 January 1985, T. Pócs 8523/F, det. H. Krog (VBI).

Remarks on distribution data

Six species of *Pseudocyphellaria* and 10 species of *Sticta* were identified in the presented collections.

Pseudocyphellaria grows in a relatively lower elevation range, in understorey of shady rainforests compared to *Sticta*. The latter more often was collected from elevations higher than 3000 m above sea level where due to the more open subalpine or alpine, often rocky vegetation types lichens meet different light conditions and also often changing relative humidity. Figure 2 presenting the elevation range of each species of the two genera treated in this paper is in a good correlation with the one published by (GALLOWAY & ARVIDSSON 1990). *Pseudocyphellaria* species also occur in Ecuador found in comparable elevation range with the East African species.

It would be worth to investigate the correlation further between the photobiont content and the elevation range of the species. These records suggest that occurrence in higher altitudes than 3000 m might correlate with blue-green alga (cyanobacteria) as primary photobiont. *Sticta* species occurring in higher elevations containing cyanobacteria usually. Those *Sticta* species (*S. dichotoma*, *S. variabilis*) which have green alga as a primary

photobiont were found also in lower elevations. Similarly *Pseudocyphellaria crocata* living with cyanobacteria in symbiosis grows also above 3000 m.

Concerning to the substrate a similar observation can be made. Species with cyanobacteria grow more often on rocks and decayed trunks, thin twigs of *Erica arborea* (found more typically in higher elevations) while other species with green alga photobiont grow usually on bark of tree trunks and thick branches and twigs.

There is a remarkable difference between the two genera in chemical contents too. While *Pseudocyphellaria* is rich in various chemical substances, pigments, triterpenoids, *Sticta* is almost entirely in lack of any chemicals. What can be the role of the various chemicals and the lack of substances in the various distribution patterns of the *Pseudocyphellaria* and *Sticta* species?

There are attempts to study the ecophysiology of these groups (e.g. (GREEN & LANGE 1991, GREEN et al. 1991). Still it needs further careful studies, precise experimental works, higher knowledge of biochemistry and ecophysiology of lichenized fungi.

One might think that both the taxonomic groups and the geographic area presented here are overcollected compared to others. However for the better knowledge of the infraspecific or infrageneric variation both the study of freshly collected specimens and the study of former herbarium materials with new methods (e.g. the application of the recently so popular molecular techniques) is necessary. Tropical rainforests are probably the most endangered of all natural vegetation types. Would it be possible to collect lichens presented in this paper today? This unanswered question helps us to understand the importance of the collecting activity of T. Pócs and others.

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Fig. 1. The investigated areas. Names of countries visited indicated on the map of Africa: Comoro Islands, Kenya, Madagascar, Rwanda (R), Tanzania, Uganda, Zaire.

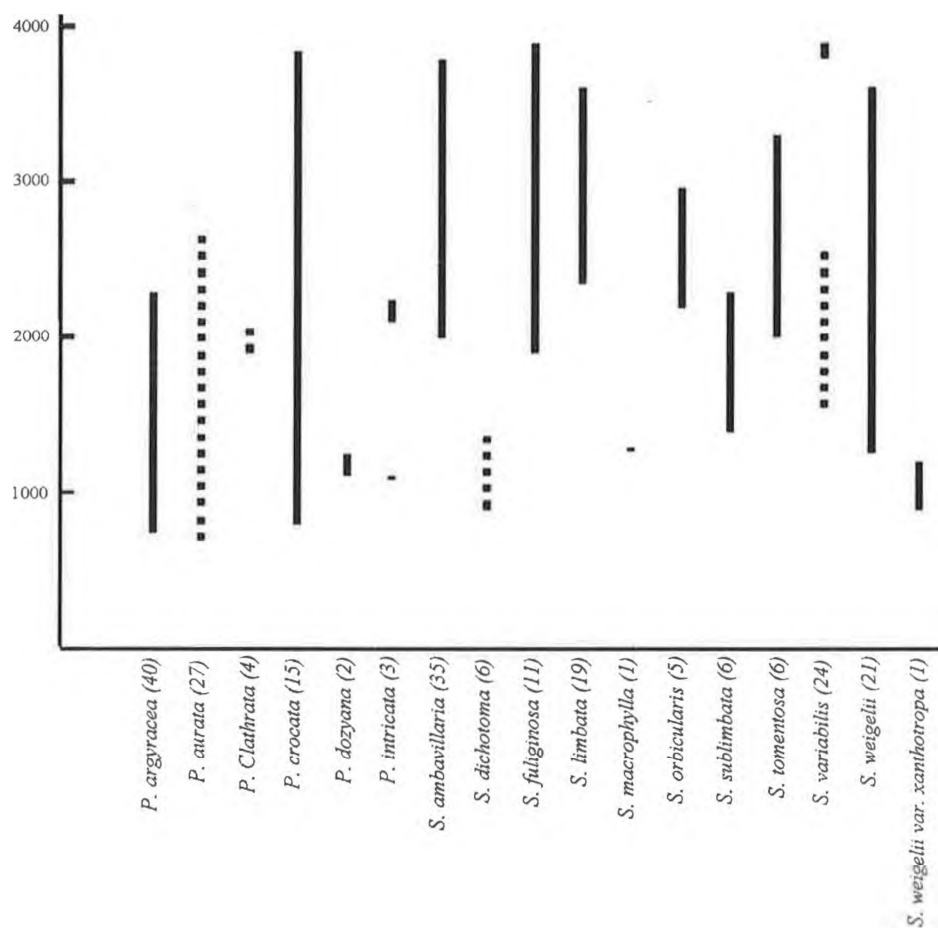
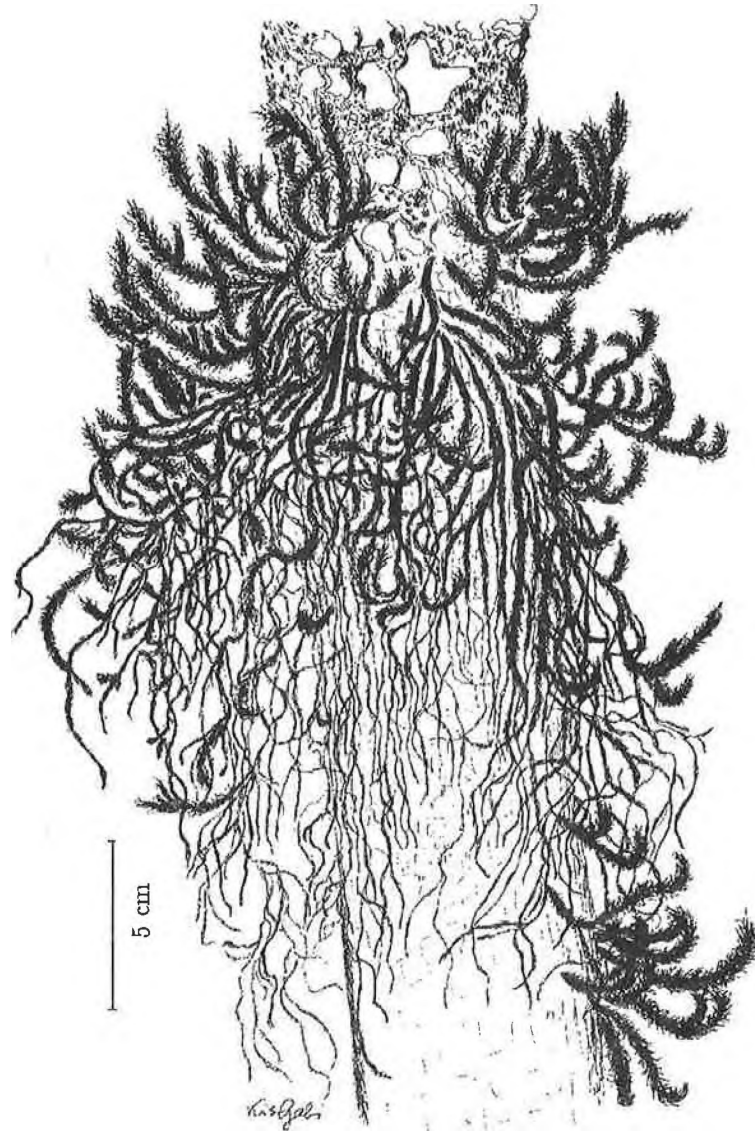


Fig. 2. Altitudinal distribution of species of *Pseudocyphellaria* (6) and *Sticta* (10) in East Africa, based on collections presented here. Number of specimens investigated given in brackets. Photobiont type is indicated: continuous line = cyanobacterium, dotted line = green alga.



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Neorutenbergia usagarae (Dix.) **Biz. & Pócs**, 1974.

Acta Acad. Paed. Agriensis, Eger, n. s. 12: 444.

Tanzania, South Pare Mts.

Coll.: T. Pócs, D. Harrison, H. Györi & Y. S. Mialla 90084/G (EGR)