

FIRST RECORDS OF THE LICHEN *SEPTOTRAPELIA USNICA* (LECANORALES, ASCOMYCOTA) FROM WEST AFRICA

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Abstract. *Septotrapelia usnica* (Sipman) Kalb & Bungartz is reported as new for West Africa from Togo. Its taxonomy, distribution and habitat requirements are discussed. Notes on other usnic acid-containing leprose species are presented.

Key words: biogeography, *Lepraria*, lichenized fungi, *Nelsenium*, Pilocarpaceae

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The leprose growth form (i.e., thallus completely composed of granules held together by prothalline or hypothalline hyphae) has independently evolved in several lineages of Ascomycota, apparently as an adaptation to a particular ecological niche. In the past, species with such a thallus morphology were ascribed mostly to the genus *Lepraria* Ach., but recent molecular phylogenetic studies indicate that *Lepraria* is polyphyletic, and several taxa have been transferred to other genera such as *Andreiomyces* Hodkinson & Lendemer, *Botryolepraria* Canals *et al.*, *Caloplaca* Th. Fr., *Lecanora* Ach. and *Leprocaulon* Nyl. (e.g., Ekman & Tønsberg 2002; Grube *et al.* 2004; Nelsen *et al.* 2008; Kukwa & Pérez-Ortega 2010; Bungartz *et al.* 2013; Hodkinson & Lendemer 2013; Lendemer & Hodkinson 2013). This segregation is not finished yet and some species may represent further evolutionary lineages unrelated to *Lepraria* s.str. (Ekman & Tønsberg 2002; Nelsen *et al.* 2008).

Lepraria usnica Sipman is such a case. This lichen contains usnic acid and zeorin, and although morphologically it resembles other species of the genus *Lepraria* s.str. it was found to represent a leprarioid lineage within the family Pilocarpaceae (Lecanorales) (Nelsen *et al.* 2008), for which a new monotypic genus, *Nelsenium* Lendemer & Hod-

kinson, was recently introduced by Lendemer and Hodkinson (2013). This name became a synonym of *Septotrapelia* Aptroot & Chaves, however, as fertile material of *L. usnica* with apothecia was found in Ecuador, confirming its placement within this genus (Bungartz *et al.* 2013).

Septotrapelia usnica (Sipman) Kalb & Bungartz has been reported from scattered localities in the tropics, with two records from the southern part of the African mainland (Namibia, South Africa) (Sipman 2003, 2004; Elix 2006; Nelsen *et al.* 2008; Bungartz *et al.* 2013). In this paper we extend its known distribution to West Africa.

The material on which our study is based is deposited in KRAM and UGDA. Lichen metabolites necessary for determination of the species were identified using thin layer chromatography (TLC) in solvents A, B' and C, according to Orange *et al.* (2001).

Septotrapelia usnica (Sipman) Kalb & Bungartz in Bungartz *et al.*, Phytotaxa **150**(1): 11. 2013. – *Lepraria usnica* Sipman, Biblioth. Lichenol. **86**: 179. 2003. – *Nelsenium usnicum* (Sipman) Lendemer & Hodkinson, Mycologia **105**(4): 1013. 2013.

This is a crustose, mostly sterile, leprose species with very small marginal lobes (microsquamules).

These marginal lobes are irregular, up to *ca* 0.2 mm wide, with raised margins. The thallus spreads by dispersed or clustered granules which secondarily aggregate to a continuous layer. The granules are initially small, (40–)70–170(–200) μm in diameter, and soon become pseudocorticate, compact and very coarse to almost subsquamulose, (220–)245–420(–580) μm in diameter, then secondarily forming soredia (Sipman 2003, 2004; Bungartz *et al.* 2013).

SECONDARY CHEMISTRY. The species always produces usnic acid and zeorin in large quantities, and small to trace amounts of isousnic and placodiolic acids, contortin and some xanthonones (the latter detected only by HPLC) (Sipman 2003, 2004; Elix 2006). Based on the presence of some additional substances, Elix (2006) distinguished three chemotypes: the first with hopane-16 β ,22-diol (large or small amounts), the second with \pm roccellic acid (trace amount), and the third with atranorin and chloroatranorin (both in small amounts). Our specimen contained one spot of terpenoid at a high concentration. Most probably this spot represented hopane-16 β ,22-diol, but we hesitate to specify this terpenoid because we had no extract of it for comparison.

COMMENTS. *Septotrapelia usnica* can be mistaken for three species of *Lepraria* s.l. containing usnic acid and zeorin: *L. ecorticata* (J. R. Laundon) Kukwa, *L. leuckertiana* (Zedda) L. Saag and *L. straminea* Vain. *Lepraria ecorticata* develops elobate thalli without a medulla and prothallus, which consist of well separated granules, whereas the thalli of *L. leuckertiana* are cottony, obscurely lobed, with a thick medulla and granules intermixed with abundant medullary hyphae and not well separated. The Antarctic *L. straminea* differs in having corticated, coarse granules and its thallus resembles the *L. neglecta* group (Laundon 2003; Sipman 2003, 2004; Kukwa 2006; Saag *et al.* 2009; Osyczka *et al.* 2010; Flakus *et al.* 2011). All of these species are suspected to be unrelated to *Lepraria* s.str. but their phylogenetic position has not been resolved yet (Nelsen *et al.* 2008; Osyczka *et al.* 2010; Lendemer & Hodkinson 2013).

In addition to the above-mentioned three *Lepraria* s.l. species, two taxa of *Leprocaulon* with *Lepraria*-like thalli also contain usnic acid and zeorin: *Leprocaulon coriense* (Hue) Lendemer & Hodkinson [syn. *Lepraria coriensis* (Hue) Sipman] and *L. knudsenii* Lendemer & Hodkinson. *Leprocaulon coriense* has larger (>0.5 mm wide), regular and rounded lobes which are smooth near the margin, with more or less scattered granules in the center, and in addition to zeorin and usnic acids this species produces protodehydroconstipatic and constipatic acids (Laundon 2003; Sipman 2003, 2004; Elix 2006; Kukwa 2006; Saag *et al.* 2009; Flakus *et al.* 2011; Bungartz *et al.* 2013; Lendemer & Hodkinson 2013). The thallus of *Leprocaulon knudsenii* is always elobate and composed of granules of smaller size (30–81 μm diam.). The granules are initially isolated but later become aggregated but still visibly separate from each other (Lendemer & Hodkinson 2013).

ECOLOGY. The species usually is collected from rocks and soil but is also found rarely on tree bark. It grows in disturbed or undisturbed forests and open stands (grassland, roadsides, rocky outcrops) from dry to humid habitats (Sipman 2003, 2004; Bungartz *et al.* 2013).

In Togo, *Septotrapelia usnica* was found at two distant localities in the Togo Mountains (Chaîne du Togo). In the Kara Region it was found in the dry Sudanian savanna zone on artificially exposed NW-facing rock in a semi-shaded place under cover of a *Bombax costatum* Pellegr. & Vuill. tree (Fig. 1A & B). In the Plateaux Region, *S. usnica* was found in the Guinean forest-savanna mosaic zone on naturally exposed N-facing rock in a fully shaded and moderately moist place, forming a community with *Begonia rostrata* Welw. ex Hook.f. and *Selaginella* sp., two typically moisture- and shade-preferring plants (Fig. 1C & D).

DISTRIBUTION. *Septotrapelia usnica* is very widely distributed in the tropics and may consist of several cryptic species (Bungartz *et al.* 2013). Up to now it was recorded in Africa (Namibia, Seychelles and South Africa), Asia (Indonesia, Singapore and Sri Lanka), Australia, North America (El Salvador and Panama) and South America

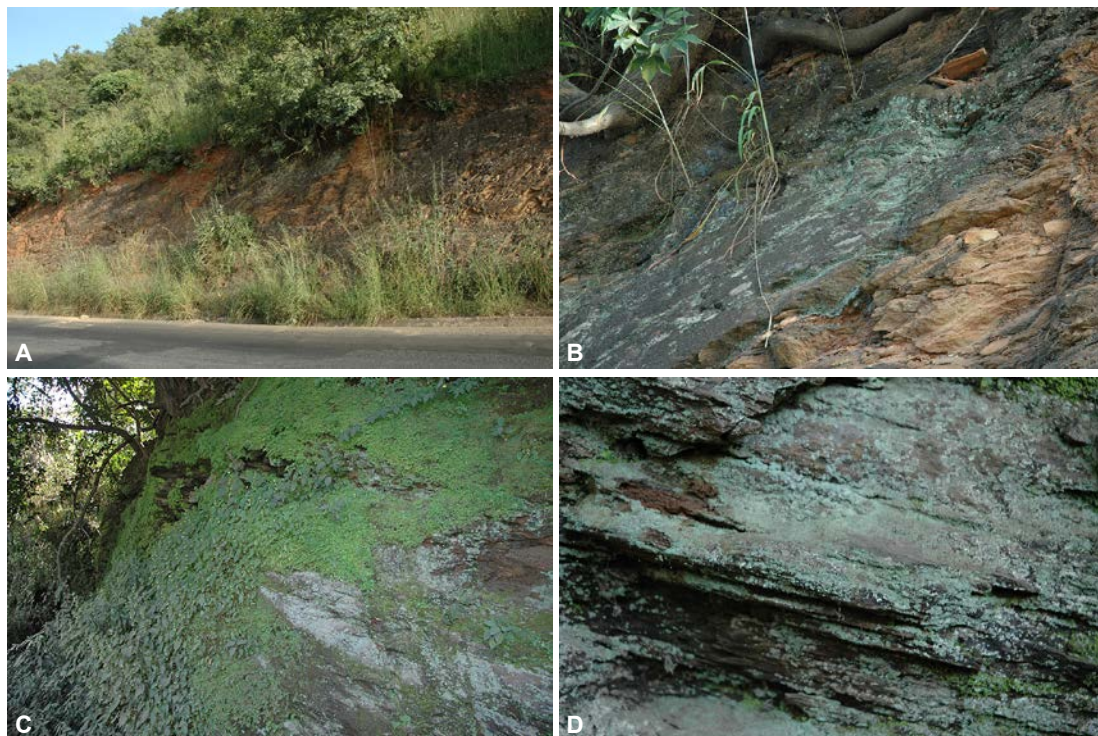


Fig. 1. Habitat and specimens of *Septotrapelia usnica* (Sipman) Kalb & Bungartz in Kara Region (A & B) and Plateaux Region (C & D), Togo. Photo M. Piątek.

(Colombia, continental Ecuador and Galapagos Islands) (Sipman 2003, 2004; Elix 2006; Nelsen *et al.* 2008; Bungartz *et al.* 2013), and South Atlantic Islands (Ascension Island, St Helena) (Aptroot 2008). In this paper the species is reported for the first time from Togo, from two localities. These records are the first from West Africa.

SPECIMENS EXAMINED. TOGO. KARA REGION: between Défalé and Kandé, ca 6 km SE of Kandé, 09°55'14.5"N, 01°05'44"E, elev. ca 325 m, on rock, 31 Oct. 2011, *M. Piątek s.n.* (KRAM L-65973, UGDA L-19023); PLATEAUX REGION: between Imoussa and Ounabe, ca 12 km W of Atakpamé, 07°33'36"N, 01°01'12"E, elev. ca 470 m, on rock, 4 Nov. 2011, *M. Piątek s.n.* (KRAM L-65974, UGDA L-19024).

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