

New or interesting saxicolous *Pertusaria* species (*Pertusariales*: *Pertusariaceae*) from Zimbabwe

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Abstract: The new saxicolous species *P. clericii* Messuti & A. W. Archer is described. The following two taxa are reported for the first time from Africa: *P. petrophyes* C. Knight and *P. subventosa* var. *deficiens* A. W. Archer & Elix. A brief description of each species is given together with notes on their chemistry, distribution, ecology and taxonomy.

Key words: south-eastern Africa

Introduction

Pertusaria in Africa has not yet been the subject of a comprehensive treatment. There are, however, scattered records of *Pertusaria* species from the continent in the literature (Vainio 1901, 1926; Stizenberger 1890; Crombie 1876; Mueller 1890; Doidge, 1950, 1964; Harper & Letcher 1966, 1967; Letcher *et al.* 1969; Becker 2002) and studies are currently in progress on the genus in Central Africa (Congo/Kivu, Rwanda and Burundi) (E. Fischer, pers. comm.). Many of the *Pertusaria* species recorded from Africa are also found elsewhere, for example, in Australia, Papua New Guinea, New Zealand, Brazil, Paraguay and, Uruguay (Archer 1997).

Examination of several recent collections of *Pertusaria* from Zimbabwe has revealed a new species and two new records for Africa.

Materials and Methods

The study is based on the Becker collections deposited in F and KÖLN. All material was examined using standard light microscope techniques and a range of mounting media (water, KOH and Lugol's iodine). Sections 16–20 µm thick were cut using a freezing microtome. Spore measurements were made in water at × 1000 magnification and only well-developed ascospores lying outside the asci were measured. Colour reactions (spots test) were tested using standard methods (Orange *et al.* 2001). Routine chemical analyses were carried out using standard methods of thin layer chromatography (TLC) (Culberson 1972) and gradient-elution high performance liquid chromatography (HPLC) (Lumbsch 2002).

The New Species

Pertusaria clericii Messuti & A. W. Archer

Similis *Pertusaria tejocotensis*, sed lichexanthonium continens et ascis octosporis differt.

Typus: Africa, Zimbabwe, Chivurumuti, near Arcturus, 17°48'53"S, 31°19'8"E, 14 August 1993, U. Becker 217081 (F—holotypus).

(Fig. 1A)

Thallus yellowish grey, creamy grey to pale olive-green, moderately thick, deeply areolate to rimose areolate, saxicolous, surface smooth and dull; lacking isidia and soredia.

Apothecia verruciform, verrucae conspicuous, abundant, concolorous with the thallus, hemispherical, subglobose to flattened, often

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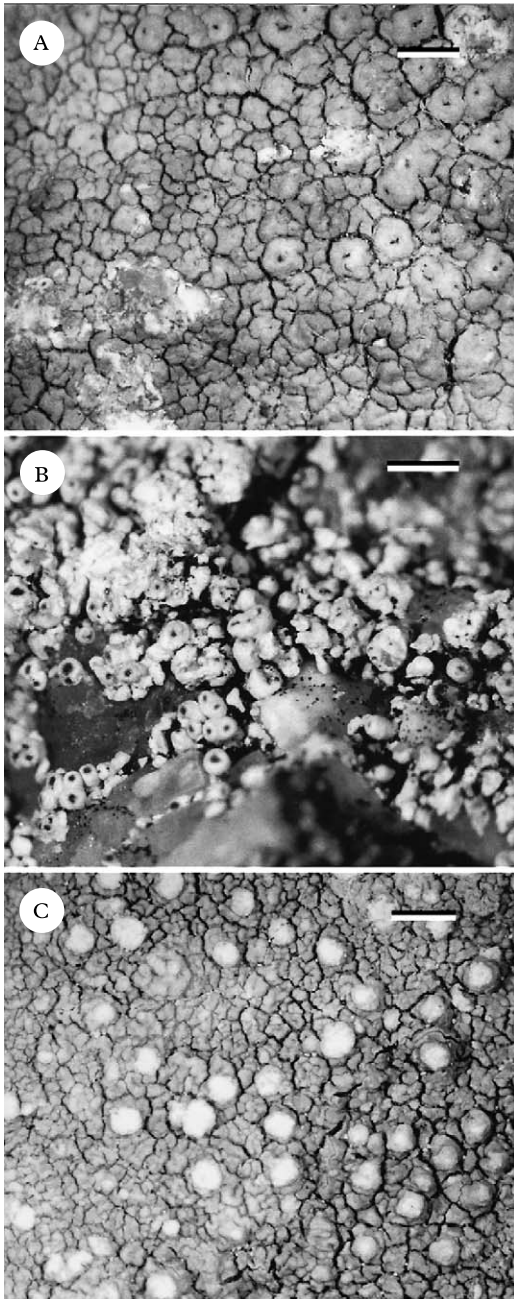


FIG. 1. Morphology of *Pertusaria* taxa. A, *P. clercii* (Becker 217081, F—holotype); B, *P. petrophytes* (Becker 250102, F); C, *P. subventosa* var. *deficiens* (Becker 214032, F). Scales: A–C=1 mm.

deformed, with the centre sometimes depressed, scattered to crowded, rarely confluent (2–4), (0.45–)0.64–1.2 mm diam.; ostioles black, punctiform, disc-like, level to sunken, 1–2(–3) per verruca. *Ascospores* 8 per ascus, imbricate uniseriate, double walled, smooth, ellipsoid, (48–)60–70 μm long, 22–28(–36) μm wide, double wall c. 4–6 (–10) μm thick.

Pycnidia not seen.

Chemistry. K–, C–, KC–, Pd–, UV–. Major substance: lichexanthone; minor substances: 2-*O*-methylconfluentenic acid; trace: planaic acid and an unidentified substance. Lichexanthone is present in the medulla in this species (J. A. Elix, pers. comm.).

Etymology. Named after our colleague Dr Phillipe Clerc in recognition of his invaluable help with the identification of African lichens during UB's PhD study.

Notes. *Pertusaria clercii* is characterized by verruciform apothecia, asci with eight imbricate uniseriate ascospores, and the presence of lichexanthone as the major substance. The new species resembles the saxicolous species *P. tejocotensis* de Lesd. (= *Pertusaria arizonica* Dibben, see Dibben 1980: 84) which occurs in western North America. That species contains confluent, planaic, and thiophanic acids as major substances, apothecia verruciform with white pruinose ostioles to form a pseudolecanorate disc, and has 4 spores per ascus, (31–)44(–60) \times (52–)81(–114) μm (Dibben 1980; Lumbsch *et al.* 1999).

Habitat and distribution. The new species grows on granite in inselberg areas with severe habitat loss or degradation where there is intensive farm work (Becker 2002) at an elevation of 1420 m, with an annual rainfall of 1000 mm to 1200 mm. It is known only from the type locality. *Pertusaria clercii* was accompanied by *Acarospora citrina* (Taylor) Zahlbr., *Caloplaca cinnabarina* (Ach.) Zahlbr., *Dermaticum thunbergii* (Ach.) Nyl., *Dimelaena oreina* (Ach.)

Norman, *Peltula* spp., *Peltula subventosa* var. *deficiens*, *Toninia bumanna* (Nyl.) Zahlbr. and *Usnea* spp. (Becker 2002).

New records

Pertusaria petrophyes C. Knight

in *Trans. Linn. Soc. Lond. Ser. 2*, 2: 47 (1881); *Pertusaria leucoxantha* Müll. Arg., *Bull. Herb. Boissier* 3: 637 (1895).

(Fig. 1B)

Thallus pale fawn or pale dull yellowish green, thin to effuse, verrucose, saxicolous, surface smooth and dull; lacking isidia and soredia. Verrucae numerous, slightly flattened hemispherical with constricted bases, scattered to crowded, single to rarely confluent (2–5), 0.22–0.5 mm tall, 0.19–0.64 mm diam.

Apothecia and *ascospores* not seen.

Pycnidia conspicuous, resembling immature apothecia in the tips of the verrucae; ostioles black, punctiform, disc-like, level to sunken, 1 per verruca, numerous, immersed, 0.064–0.13 mm diam; conidia simple, straight, 5–8 × 1 µm.

Chemistry. K–, KC+ weak orange, C– or C+ weak orange, Pd–. Major substances: thiophanic acid (sometimes sub-major) and 2-*O*-methylperlatolic acid; minor substances: 2-*O*-methyldivaricatic acid and 2-chloro-6-*O*-methylnorlichexanthone (sometimes trace); traces: 4-chloro-6-*O*-methylnorlichexanthone, perlatolic acid and lichexanthone (J. A. Elix, pers. comm.).

Notes. *Pertusaria petrophyes* is characterized by asci with eight ascospores and the presence of thiophanic and 2-*O*-methylperlatolic acids (Archer 1997). However, no apothecia or ascospores were seen in the African material and the specimen has been tentatively identified by the unusual chemistry, which has so far been found only in *P. petrophyes* and the similar corticolous *P. xylophyes* A. W. Archer (Archer 1997).

Habitat and distribution. *Pertusaria petrophyes* grows on granite in afro-montane grassland at an elevation of 2290 m, and with precipitation of 1600 to 2000 mm. The species has been reported from eastern Australia, Lord Howe Island, New Zealand and Papua New Guinea at elevations up to 500 m and growing only on sandstone (Archer 1997). This is the first report from Africa.

Specimen examined. **Africa**: Zimbabwe: Stanhope Block, near Nyanga, 18°11'6"S, 32°46'0"E, 1994, U. Becker 250102 (F).

Pertusaria subventosa var. *deficiens* A.W. Archer & Elix

in *Mycotaxon* 49: 146 (1993).

Thallus off-white to greyish white, thick, areolate to rimose-areolate, saxicolous, surface smooth, sorediate, lacking isidia. *Soralia* white, conspicuous, numerous, scattered to confluent, subspherical, rarely eroded, sometimes slightly stipitate, 0.2–0.8(–1) mm diam.

Apothecia and *ascospores* not seen.

Pycnidia not seen.

(Fig. 1C)

Chemistry. K–, KC+ violet, C–, Pd–, UV+ yellow. Major substances: picrolichenic acid and lichexanthone.

Notes. *Pertusaria subventosa* var. *deficiens* is one of the three varieties of *Pertusaria subventosa* that are morphologically identical but differ in their chemistry. It is characterized by K– soralia and the absence of thamnolic and hypothamnolic acids which are present in the other two varieties respectively. The species was previously reported as *P. subventosa* Malme (Becker 2002).

Habitat and distribution. *Pertusaria subventosa* var. *deficiens* grows on granite at three localities in the inselberg area of Zimbabwe. The variety was commonly collected in open, exposed and disturbed areas at an elevation of c. 1220–1420 m, with an annual

precipitation range between 800–1200 mm. It was found growing with *P. clericii* and *P. ventosa*, and species from other genera such as *Acarospora*, *Caloplaca*, *Peltula*, *Usnea*, and *Xanthoparmelia* (Becker 2002). It also occurs in Australia and Uruguay (Archer 1993, 1997). This is the first record of the variety from Africa.

Selected specimens examined. Africa: Zimbabwe: near Banket, 17°28'3"S, 30°28'2"E, 1993, U. Becker 213242, 213243 (F); Eastern Highlands, near Domboshawa, 17°37'S, 31°09'E, 1993, U. Becker 214032, 214063, 214127 (F); Chivurumuti, near Arcturus, 17°48'53"S, 31°19'8"E, 1993, U. Becker 217081 (F).

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