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New records of lichen genera *Agonimia* and *Baeomyces* (Ascomycota) from India

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ABSTRACT

Upreti D. K., Mishra G. K. & Nayaka S. 2013. New records of lichen genera *Agonimia* and *Baeomyces* (Ascomycota) from India. Geophytology 43(1): 69-73.

Agonimia tristicula (Nyl.) Zahlbr. and *Baeomyces carneus* (Retz.) Flörke, two squamulose lichens, are described as new records for Indian lichen biota. Both the species are collected from eastern Himalaya in Arunachal Pradesh. Genus *Agonimia* is also a new record for India.

Key-words: Lichenized fungi, *Agonimia, Baeomyces*, taxonomy, Arunachal Pradesh.

INTRODUCTION

Eastern Himalayan region has unique topography and climate which support luxuriance and abundance of different plant groups in the area including lichens. In north eastern India, Arunachal Pradesh is bestowed with peculiar lichen diversity having more affinities with the Sino-Japanese elements. Owing to the difficult and remote terrains, the lichen flora of most of the districts is not explored so far. Recently, the lichen explorations in some districts of the state were carried out which resulted in the discovery of new or otherwise interesting lichen taxa (Ahti & Upreti 2004, Singh et al. 2005, Dubey et al. 2007, Singh & Singh 2012). In the present study, two squamulose lichens are described from Arunachal Pradesh as new records for the Indian lichen flora.

MATERIAL AND METHOD

The specimens are examined morphologically, anatomically and chemically. The morphological studies were carried out with the help of Leica stereo zoom microscope EZ4. The anatomical details were studied in thin hand-cut sections of apothecia and thallus mounted in water; cotton blue, 5% KOH and iodine were used for the hamathecial reactions and observed under a compound microscope. The chemical spot tests and TLC (system A) were carried out following the methods by Walker and James (1980) and Orange et al. (2001).

TAXONOMIC DESCRIPTION

Family: Verrucariaceae

Genus: *Agonimia*

Agonimia tristicula (Nyl.) Zahlbr., Österr. bot. Z. 59: 351. 1909. –*Verrucaria tristicula* Nyl., Flora 48: 356. 1865.

Plate 1, figures A-D

Description: Thallus terricolous, squamulose; squamules minute, crowded, adnate to ascending, flat to convex, roundish to elongate, 0.1–0.5 mm long and 0.1–0.3 mm wide; upper surface rough, greyish brown to greenish brown or dark brown to black; lower

surface pale, ecorticated; algal cells distributed throughout the thallus, chlorococcoid, cells rounded up to 0.5 µm. Soredia and isidia absent; cortex paraplectenchymatous throughout, with no distinct cortices. Perithecia prominent, black, barrel-shaped with plicate rugose outer surface, 0.4–0.5 mm diam., in between or overgrown by squamules; exciple 3–layered, the outer dark brown and inner two pale to colourless, 120–160 µm thick; hymenium colourless, oil globules absent; paraphyses simple or sparingly branched, up to 2 µm thick; asci clavate, 1–2 spored, 150–155 × 55–70 µm; ascospores hyaline to brownish, elongate to ellipsoid, muriform, (53–) 67–75(–120) × 30–50 µm; pycnidia rare, small, black, ca. 65 × 40 µm; conidia bacilliform, about 2–3 × 0.5–0.7 µm.

Chemistry: Medulla K–, C–, PD–, KC–, UV–; No lichen substance in TLC.

Specimen examined: India: Arunachal Pradesh, West Kameng district, Sela Pass, alt. 4221 m, on mosses over soil, 12.11.2008, D. K. Upreti, U. Dubey, R. Khare & G. K. Mishra 08-009421 (LWG).

Remarks: Out of 13 species of the genus *Agonimia, A. tristicula* has a worldwide distribution (Kashiwadani 2008, Muggia et al. 2009). *Agonimia tristicula* is characterized by the minute adnate to ascending squamules and muriform spores. It is close to *A. opuntiella* (Buschardt & Poelt) Vêzda, in having minute squamules and muriform spores but the latter species differs in having bud like hyaline cortical hairs on squamules. The species is close to *A. flabelliformis* Halda et al. in having muriform spores but latter species differs in having flabelliform squamules. *A. tristicula,* earlier reported from Europe, Macaronesia, North America, Pacific Island (Sérusiaux et al. 1999, Coppins & James 1978, Aptroot et al. 1997, Nash et al. 2001, Orange 2009), is a new record for India. It is so far known only from the subalpine region of Arunachal Pradesh found growing on soil in association with mosses at an altitude of 4221 m.

Family: Baeomycetaceae

Genus: *Baeomyces*

Baeomyces carneus (Retz.) Flörke, Deutschl. Lich. 8:16. 1821. – *Lichen ericetorum a. carneum* Retz., Flor. Scond. Prodr. 224. 1779.

Plate 2, figures A-D

Description: Thallus saxicolous, squamulose; squamules adnate to ascending, flat or convex, 0.2–2 × 0.2–0.7 mm diam.; upper surface whitish grey to pale green or green; lower surface ecorticated; soredia and isidia lacking; algal cells globose or ellipsoid, 14 × 11 µm; cortex partly of vertical paraplectenchyma and partly forming a vertical decomposed layer, the hyphae leptodermatous, 1.7–2.2 µm. Apothecia sessile or subsessile to long stipitate up to 5 mm tall, flattened or cylindrical, fissured, sometimes greenish and corticated at the base, inner layer composed of parallel thick walled hyphae and containing many algal cells; disc flat or convex up to 2 mm diam., the edges sometimes refluxed, reddish brown or pale dull pink, sometimes slightly pruinose, the pale margin disappearing; exciple poorly developed; hymenium hyaline to brownish, 70–100 µm; paraphyses slender, slightly branched at the tips, tips scarcely thickened, 1-3 µm thick; asci cylindrical, 8–spored, 60–75 × 5–8 µm; ascospores simple, hyaline, uniseriate or the apical ones biseriate or 1-septate, 3–12 × 2–3 µm; pycnidia absent; conidia ellipsoid, 2–4 × 0.5–1 µm.

Chemistry: Thallus K + yellow turning red, C–, PD+ yellow to orange, KC–, UV–; norstictic acid present in TLC.

Specimens examined: India: Arunachal Pradesh, Upper Siang district, Jengging, Near Circuit House, alt. 900 m, on rock of vertical slope, 18.11.2008, D. K. Upreti, U. Dubey, R. Khare & G. K. Mishra 08-009319/A, 08-009319, 08-009296 (LWG); 30.10.2007, U. Dubey s.n. (LWG).

Remarks: The genus is closely related to *Dibaeis* but differs in having coloured apothecia, amyloidy of hymenium and ascus type (Frey 1933, Thomson 1967). Out of ca. 150 species of *Baeomyces*, India is represented by three species. *B. placophyllus* Ach., also known from India, differs from *B. carneus* in having stictic acid and UV + bright orange reaction. *B. calciola* W. Wastson, *B. incarnata* Th. Fr. & Graewe and *B. nidarosiensis* (Kint) P. M. Jørg & Vzda also show resemblance to *B. carneus*. Both *B. incarnata* and *B. calciola* differ in having bigger,

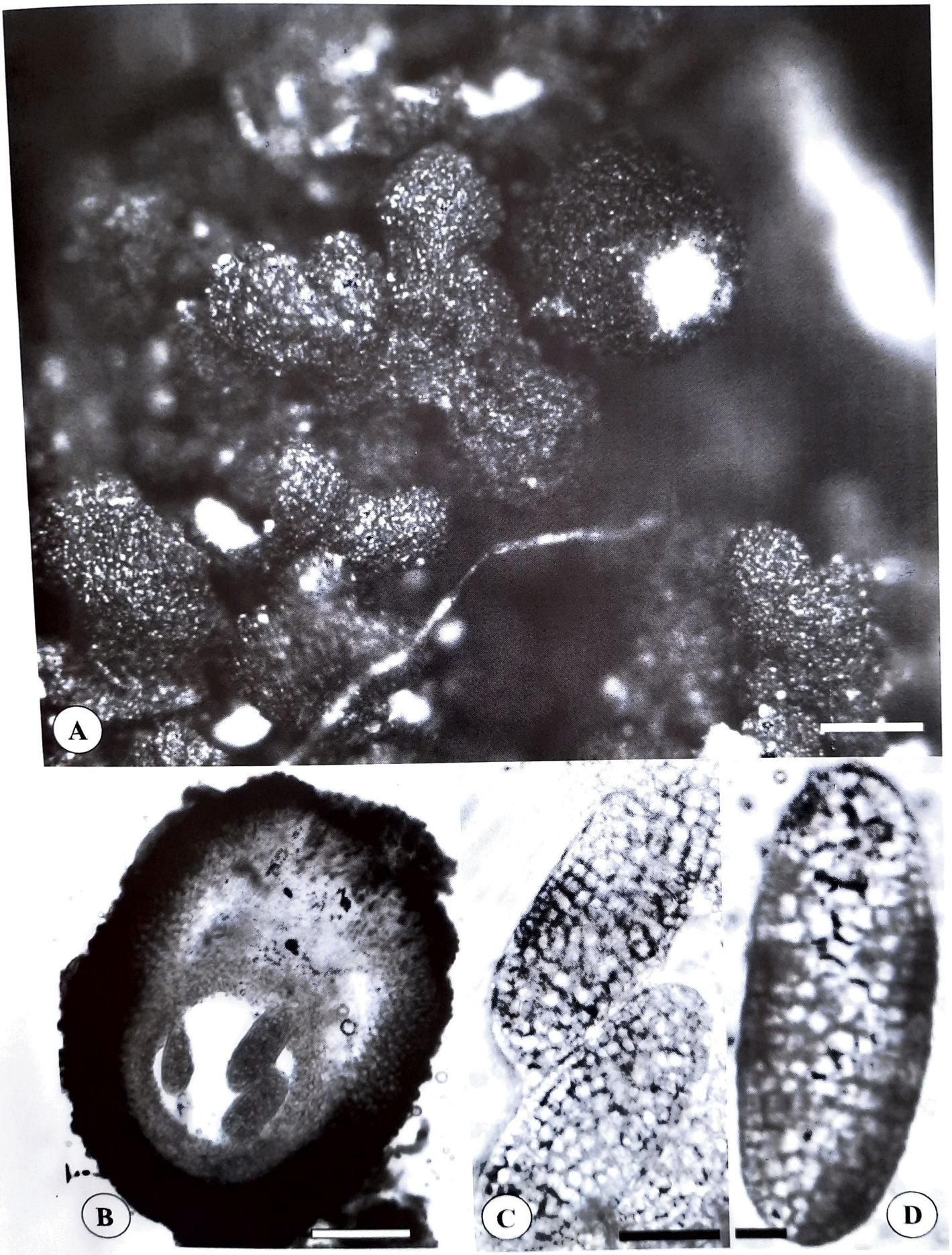

Plate 1

A-D. *Agonimia tristicula*. A. Thallus and perithecia morphology. B. Cross section of perithecia. C. Asceus with ascospores. D. Ascospore. Scale: A = 1 mm, B = 20 µm, C = 10 µm, D = 5 µm.

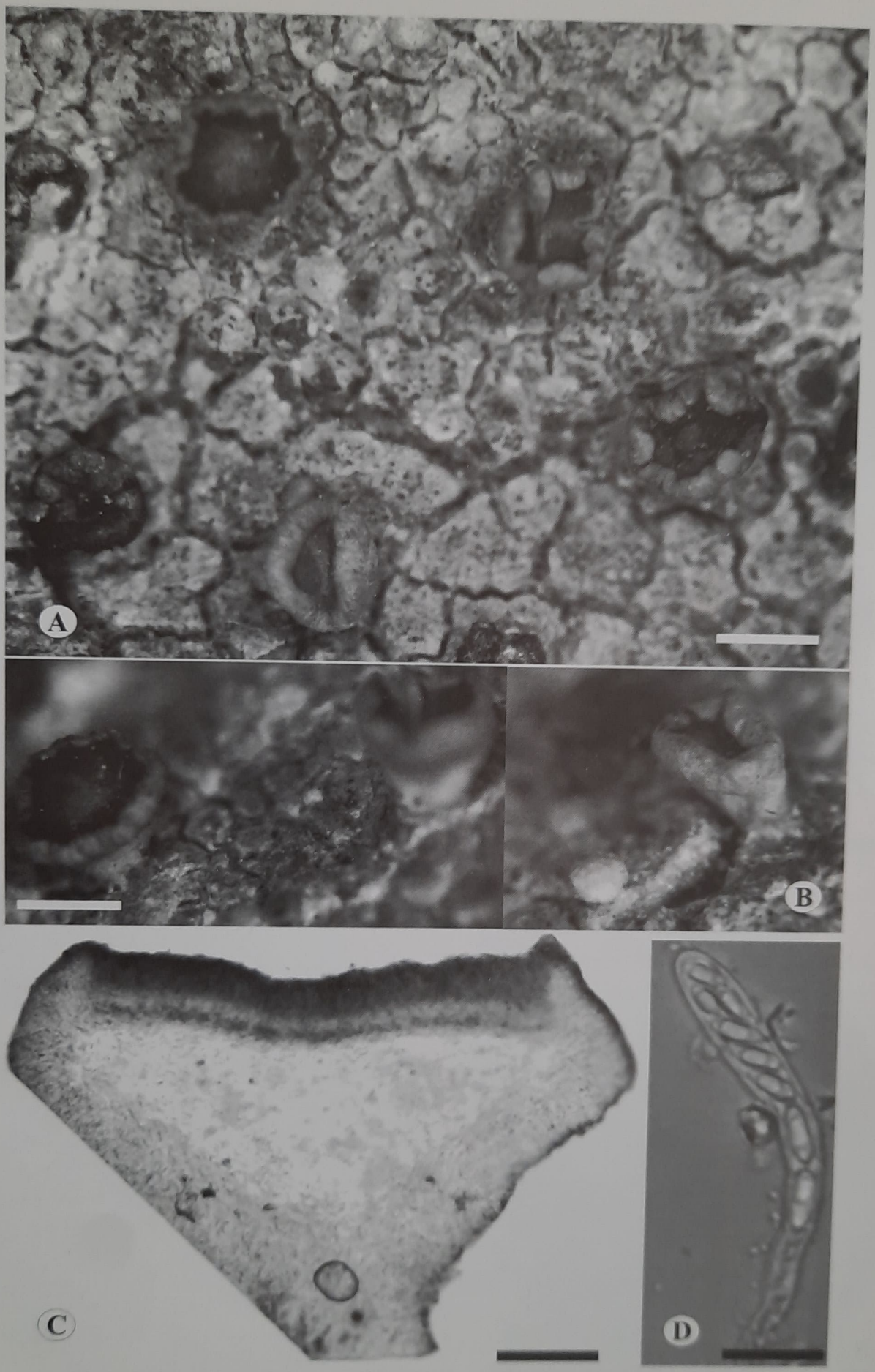

Plate 2

A-D. *Baeomyces carneus.* A. Thallus and apothecial morphology. B. Apothecia with stipe. C. Cross section of apothecia. D. Ascus with ascospores. Scale: A = 3 mm, B = 1 mm, C = 10 µm, D = 5 µm.

multiseptate, 120–160 × 3–4 µm and 50–75 × 3–7 µm sized spores respectively while *B. nidarosiensis* differs in having muriform spores. The species, earlier reported from West Indies, Philippines, Hawaii and New Zealand by Thomson (1967), is a new record for India. It is so far known only from the temperate region of Arunachal Pradesh found growing on rock between the altitudes of 900 and 1000 m.

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REFERENCES

Ahti T. & Upreti D. K. 2004. The new species of *Cladonia* from the Himalayas. Bibliotheca Lichenologica 88: 9-13.

Aptroot A., Diederich P., Sérusiaux E. & Sipman H. J. M. 1997. Lichens and lichenicolous fungi from New Guinea. Bibliotheca Lichenologica 64: 1-220.

Coppins B. J. & James P. W. 1978. New or interesting British lichens II. Lichenologist 10: 179-207.

Dubey U., Upreti D. K. & Rout J. 2007. Lichen flora of Along town, West Siang district, Arunachal Pradesh. Phytotaxonomy 7: 21-26.

Frey E. 1933. Cladoniaceae (under Ausschluss der Gattung *Cladonia*). Umbilicariaceae. Rabenh. Krypt-Fl. 9, 4(1): 1-426.

Kashiwadani H. 2008. Lichenes Minus Cogniti Exsiccati Fasc. 15 (Nos. 351–375). Tokyo: National Science Museum.

Muggia L., Gueidan C., Perlmutter G. B., Eriksson O. E. & Grube M. 2009. Molecular data confirm the position of *Flakea papillata* in the Verrucariaceae. Bryologist 112: 538–543.

Nash T. H., Ryan B. D., Gries C. & Bugartz F. (Editors) 2001. Lichen Flora of the Greater Sonoran Desert Region. Vol 1. Tempe, AZ.

Orange A. 2009. *Psoroglaena* Müll. Arg. (1891). In: Smith C. W. et al. (Editors) - The Lichens of Great Britain and Ireland: 765. London: British Lichen Society.

Orange A., James P. W. & White F. J. 2001. Microchemical methods for the identification of lichens. British Lichen Society.

Sérusiaux E, Diederich P, Brand AM & Boom Pvd, 1999. New or interesting lichens and lichenicolous fungi from Belgium and Luxembourg VIII. Lejeunia N.S. 162: 1-95.

Singh K. P. & Singh P. 2012. A new species of *Pyrgillus* from India. Lichenologist 44(6): 773-776.

Sinha G. P., Pinokiyo & Upreti D. K. 2005. Pyrenocarpous lichens from Arunachal Pradesh, India. Phytotaxonomy 5: 134-139.

Thomson J. W. 1967. The lichen genus *Baeomyces* in North America, north of Mexico. Bryologist 70: 285-298.

Walker F. J. & James P. W. 1980. A revised guide to microchemical techniques for the identification of lichen products. Bull. Brit. Lich. Soc. 46(Suppl.): 13–29.