

## Some lichenicolous fungi from Guatemala, with the description of a new species

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**Abstract:** ETAYO, J. & VAN DEN BOOM, P. P. G. 2006. Some lichenicolous fungi from Guatemala, with the description of a new species. – *Herzogia* 19: 191–197.

Twenty three species of lichenicolous fungi are reported from Guatemala. Localities as well as notes on morphology and taxonomy are given. *Capronia guatemalense* on *Parmotrema* is described as new to science. A key to *Abrothallus* on *Usnea* is provided. The anamorph of *Anisomeridium polypori* is reported as lichenicolous for the second time.

**Zusammenfassung:** ETAYO, J. & VAN DEN BOOM, P. P. G. 2006. Einige lichenicole Pilze von Guatemala, und Beschreibung einer neuen Art. – *Herzogia* 19: 191–197.

Dreiundzwanzig Arten lichenicoler Pilze werden von Guatemala gemeldet. Anmerkungen zur Taxonomie, Morphologie und Verbreitung werden gegeben. *Capronia guatemalense* auf *Parmotrema* wird neu beschrieben. Ein Schlüssel für *Abrothallus* auf *Usnea* wird präsentiert. Das Anamorph von *Anisomeridium polypori* wird zum zweiten Mal als lichenicol gemeldet.

**Key words:** Lichens, mycoflora of Guatemala, *Abrothallus*, *Capronia*, Central America, new records, biodiversity.

### Introduction

Only a very few literature reports of lichens from Guatemala exist. Two publications, dealing explicitly with foliicolous lichens of Guatemala, are known (BARILLAS & LÜCKING 1992) and BARILLAS et al. (1993). A compilation of mainly these literature records is presented on Internet (FEUERER 2005). It is evident that the flora of lichens and lichenicolous fungi of this country is very poorly known. As far as we know, no papers dealing exclusively with lichenicolous fungi from Guatemala have ever been published. In summer 2004, the second author and his wife made a fieldtrip to Guatemala and collected lichens and lichenicolous fungi in three main localities: area of Quetzaltenango, situated in the western part of the country, which is strongly volcanic, the area of Guatemala City (central in the mountain area), and the area of Coban which has some places with a tropical rainforest character. Most specimens of lichenicolous fungi collected during that trip could be identified, and are presented in an annotated list.

### Material and methods

This study is based on material of c. 40 specimens of lichenicolous fungi, collected in Guatemala by P. & B. van den Boom in 2004. All specimens have been studied by conventional macro- and microscopical techniques with hand-cut sections of the material, and mounted in water, 10 % KOH and Lugol'reagent (1 %). Spore sizes have been measured in water. Specimens are held in the herbarium of the second author with some duplicates in the herbarium of the first

author. The holotype of *Capronia guatemalense* is deposited in B. All localities examined are provided with geographical coordinates based on GPS.

## Species list

### *Abrothallus caeruleus* Kotte

[= ?*A. tulasnei* M.S.Cole & D.Hawksw.]

Our sample, growing on an isidiate *Xanthoparmelia* agrees with the description of *A. tulasnei* from North America except in the height of the hymenium that is smaller in the Guatemala material (40–50  $\mu\text{m}$ ). An interesting feature of our sample is the paraplechtenchymatic hypothecium with cells of 5–10  $\mu\text{m}$ . It is known from Europe, North America (U.S.A.) and South America (Bolivia), so this is the first record for Central America.

Guatemala: S of Quezaltenango, S of Llano del Pinal, N slope of volcano Santa María, path among small agriculture fields, 91°32.9'W/14°47.1'N, 2500 m, on *Xanthoparmelia* on rock, 23.VII.2004, P. & B. van den Boom 32955 (hb. van den Boom).

### *Abrothallus chrysanthus* J.Steiner

Recently ETAYO & OSORIO (2004) restudied *Abrothallus usneae* Rabenh. ex Stein in Cohn. This species differs from *A. chrysanthus* in larger apothecia and a hymenium that is violet-brown with violet granules, instead of yellowish without granules, and with larger spores of (11–)12–13(–14)  $\times$  4.5–6  $\mu\text{m}$ , instead of 8–10  $\times$  3–4.5  $\mu\text{m}$  in *A. chrysanthus*. Type material of *A. chrysanthus* from the Steiner herbarium has not been found in W or WU, but as the type is known from Europe (Austria, Tirol), we have compared our specimen with several European and Macaronesian samples. First record from Central America.

Guatemala: Baja Verapaz, SSE of Coban, SE of Purulhá, Biotopo Mario Dary Rivera (Biotopo del Quetzal), “Moss Trail”, NE exposed slope with tropical rain forest, 90°13.6'W/15°13.5'N, 1850 m, on *Usnea*, 1.VIII.2004, P. & B. van den Boom 33451 (hb. van den Boom).

## Key of *Abrothallus* on *Usnea*

- |    |   |   |
|----|---|---|
| 1  | Apothecia 0.25–0.50 mm diam., hymenium 55–65 $\mu\text{m}$ thick, violet-brown, with violet granules, spores (11–)12–13(–14) $\times$ 4.5–6 $\mu\text{m}$ ..... | <b>2</b>  |
| 1* | Apothecia 0.12–0.35 mm, hymenium 50–55 $\mu\text{m}$ , yellowish, without violet granules, spores 8–10 $\times$ 3–4.5 $\mu\text{m}$ .....                       | <b><i>A. chrysanthus</i></b>                                  |
| 2  | Asci 8-spored .....   | <b><i>A. usneae</i> var. <i>usneae</i></b>                    |
| 2* | Asci 4-spored .....   | <b><i>A. usneae</i> var. <i>tetraspora</i></b> Etayo & Osorio |

### *Abrothallus hypotrachynae* Etayo & Diederich

This species was originally described from Colombia, Brazil and the Dominican Republic (ETAYO 2002b). Most probably it is common in Central and South America. New to Guatemala.

Guatemala: Quezaltenango, SSE of Quezaltenango, S of Zunil, Fuentes Georginas, near swimming-pool, path along a rock-face, 91°28.8'W/14°45.48'N, 2400 m, on *Hypotrachyna* sp. on vertical facing rock, 21.VII.2004, P. & B. van den Boom 32759 (hb. van den Boom).

### *Ampullifera* sp.

No conidia were detected, but many hyphopodia of 4–5  $\mu\text{m}$  diam. with a long and curved beak.

Guatemala: Quezaltenango, SSE of Quezaltenango, S of Zunil, Fuentes Georginas, near swimming-pool, path along a rock-face, 91°28.8'W/14°45.4'N, 2400 m, on a sterile lichen on a small tree, 26.VII.2004, P. & B. van den Boom 32115 (hb. van den Boom).

### *Anisomeridium polypori* (Ellis & Everh.) M.E.Barr

[= *Sarcinulella banksiae* B.Sutton & Alcorn]

We only found the anamorph of this species, with typical pointed pycnidia and with a cirrus of conidia, growing as a lichenicolous lichen below the cortex of a dead *Sticta*. We have examined another sam-

ple of this parasitic behaviour from the Pyrenees on a decaying thallus of *Megalospora tuberculosa* (ETAYO 2002a). New record for Central America.

Guatemala: Quezaltenango, SSE of Quezaltenango, S of Zunil, Fuentes Georginas, near swimming-pool, path along a rock-face, 91°28.8'W/14°45.4'N, 2400 m, on dead *Sticta weigelii* on vertical facing rock, 21.VII.2004, P. & B. van den Boom 32792 (hb. van den Boom).

#### *Arthonia almquistii* Vain.

The specimen contains very small aggregated ascomata of 0.05–0.15 mm diam. with a brown epihymenium and hypothecium. It has small spores which are typical for this species. According to KOCOURKOVÁ (2000) this species is growing on *Amygdalaria*, *Farnoldia*, *Koerberiella*, *Lecidea*, *Porpidia* and *Trapelia*. First record from Central America.

Guatemala: Quezaltenango, SSE of Quezaltenango, S of Zunil, Fuentes Georginas, near swimming-pool, path along a rock-face, 91°28.8'W/14°45.4'N, 2400 m, on *Trapelia coarctata* on vertical facing rock, 21.VII.2004, P. & B. van den Boom 32799 (hb. van den Boom).

#### *Arthonia digitospora* Etayo

*A. digitospora* was known from Colombia (ETAYO 2002b) and described from a grey *Sticta* similar to “*S. dufourii*”. In Guatemala, we found *A. digitospora* also on an unidentified species of *Sticta* with a greyish thallus. Ascomata are old, black and convex; they grow laminally or especially in the border of thallus. In this old state a zone below the hymenium, including algae and thallus of the host is brown or blackish. First record for Central America.

Guatemala: Baja Verapaz, SSE of Coban, SE of Purulhá, Biotopo Mario Dary Rivera (Biotopo del Quetzal), “Moss Trail”, NE exposed slope with tropical rain forest, 90°13.6'W/15°13.5'N, 1700 m, on “*Sticta cf. dufourii*”?, 1.VIII.2004, P. & B. van den Boom 33368 (hb. van den Boom).

#### *Capronia guatemalense* Etayo & P.Boom sp. nov.

(Fig. 1)

Fungus lichenicola in thallo Parmotrematis. Ascomata immersa vel erumpentia, solitaria vel aggregata, nigra, 120–150 µm diam.; setae non septatae, rectae, nigrae, 50–90 × 3–5 µm; asci octospori, clavati; ascosporae biseriatae, muriformes, brunneae, 22–27 × 9–11.5 µm.

Type: Guatemala: Baja Verapaz, SSE of Coban, SE of Purulhá, Biotopo Mario Dary Rivera (Biotopo del Quetzal), “Moss Trail”, NE exposed slope with tropical rain forest, 90°13.9'W/15°13.2'N, 1850 m, on dead *Parmotrema*, 1.VIII.2004, P. & B. van den Boom 33426 (B – holotype; hb. Etayo, hb van den Boom – isotypes).

Ascomata perithecioid, ostiolate, 120–150 µm diam., globose, black, dispersed to aggregated by 2–4, initially immersed, breaking through the cortex of the host thallus; setae dark brown, aseptate, simple, thick-walled, 50–90 × 3–5 (4 in the middle) µm; perithecial wall c. 15 µm thick, of textura angularis, dark brown, with cells of 4–10 µm diam. Basal vegetative hyphae brown, long, thin-walled, septate, each cell 7–14 × 2–2.5 µm. Hamathecium absent at maturity; centrum I–; asci clavate, bitunicate, wall apically thickened, epiplasma I+ orange, 8-spored, 90–100 × 18–21 µm; ascospores biseriatae, muriform, with 7 transversal and (0–)1–3 longitudinal septa, hardly constricted at the septa, not halonate, brownish since the beginning, 22–27 × 9–11.5 µm.

Notes: *Capronia guatemalense* grows in the thallus of a poorly developed specimen of the Parmeliaceae, most probably belonging to the genus *Parmotrema*, first immersed, becoming erumpent. Curiously it seems to be able to grow on dead bryophytes below the lichen. When growing on the lichen, a majority of the thalline hyphae are immersed in the host but when muscicolous they are external, longer and possibly holding the perithecia to the substrat.

*Capronia hypotrachynae* Etayo & Diederich (ETAYO & DIEDERICH 1998) has larger perithecia of 130–200 µm diam., smaller spores (12–19 × 5.5–7.5 µm), submuriform with a smaller number of septa, and smaller setae (5–35 × 3–4 µm). The lignicolous *C. acutisetata* G.J.Samuels (MÜLLER et al. 1987) has similar spores, slightly wider (11–14 µm) in larger ascomata (190–220 µm) and with shorter setas (25–45 × 4–5 µm).

A key to lichenicolous *Capronia* species in South America including six species is given by ETAYO (2002b). *C. guatemalense* differs from the other species keyed out by its muriform and larger spores.

#### *Cercidospora caudata* Kernst.

According to the recent checklist of SANTESSON et al. (2004), *C. caudata* and *C. xanthoriae* (Wedd.) R.Sant. are synonyms of *C. epicarphinea* (Nyl.) Grube & Hafellner. However in NAVARRO-ROSINÉS et al. (2004), *C. caudata* is treated as a separated species and recorded for the south-western part of North

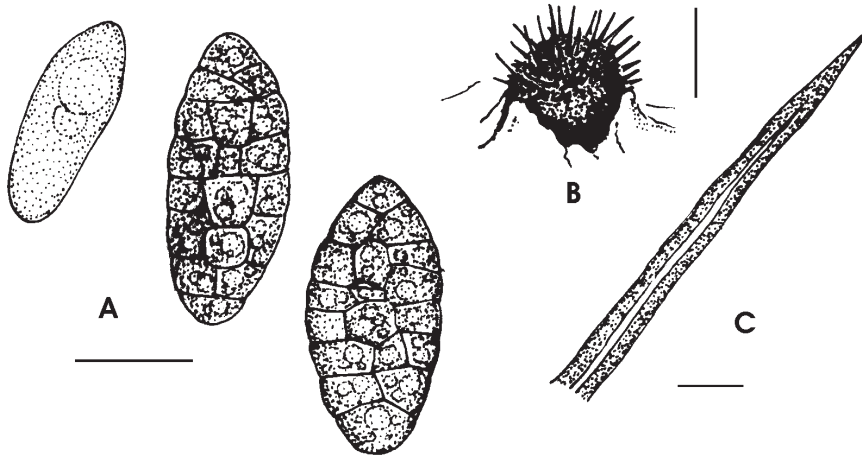


Fig. 1. *Capronia guatemalense* (holotype). A – ascospores, B – ascoma, C – seta. Scale: A, C = 10  $\mu$ m, B = 100  $\mu$ m.

America including north-western Mexico. The species is also widely distributed in Europe (TRIEBEL et al. 1991).

Guatemala: Chimaltenango, NNW of Guatemala ciudad, Mixco Viejo, stones among Maya monuments, 90°39.7'W/14°52.4'N, 870 m, on a small saxicolous *Caloplaca*, 28.VII.2004, R. Barillas, P. & B. van den Boom 33207 (hb. van den Boom).

***Cornutispora lichenicola*** D.Hawksw. & B.Sutton

*C. lichenicola* is known from a wide range of host genera and known from all continents except Asia (DIEDERICH 2003). The nearest locality is in Mexico, Baja California Sur. First record for Guatemala.

Guatemala: Quezaltenango, WSW of Quezaltenango, San Martín, SE of the village, along path to Laguna Chicabal, mixed forest on NW slope, 91°38.8'W/14°48.2'N, 2700 m, on decaying *Lecanora*, 22.VIII.2004, P. & B. van den Boom 32836 (hb. van den Boom).

***Karschia talcophila*** (Flot.) Körb.

This species is widely distributed in Europe (KOCOURKOVÁ 2000). ETAYO (2002b) recorded it in Colombia and DIEDERICH (2003) from three localities of North America and Mexico (Sonoran region).

Guatemala: San Marcos, NW of Quezaltenango, NNW of San Marcos, along trail from San Sebastián to top of volcano Tajumulco, on ENE slope, above the small village El Rodeo, 91°51.3'W/15°02.9'N, 3150 m, on *Diploschistes* on horizontal soil, 25.VII.2004, P. & B. van den Boom 33076 (hb. van den Boom).

***Lambinonia strigulae*** (Elenkin & Woron.) Sérusiaux & Diederich

This species has recently been studied by SÉRUSIAUX & DIEDERICH (2005). It forms discrete sporodochia on *Strigula* thallus, perithecia and pycnidia. It is known from Africa, Europe, Eurasia (Caucasian area of Georgia and Russia), Macaronesia and the pantropical area of the West Indies. First record from Continental America.

Guatemala: Alta Verapaz, Coban, centre of the city, garden of hotel, mixed trees and shrubs, 90°22.5'W/15°28.2'N, 1310 m, on leaf of shrub, on *Strigula* sp., 31.VII.2004, P. & B. van den Boom 33342 (hb. van den Boom).

***Lichenconium cargillianum*** (Linds.) D.Hawksw.

[= ?*Coniothyrium ramalinae* Vouaux]

This species was known from Europe, Mexico, New Zealand and the USA on several genera of lichens, including *Ramalina yemensis* (COLE & HAWKSWORTH 2004) from Mexico (type-material of *Coniothyrium ramalinae*). First record from Central America.

Guatemala: Sacatepéquez, NE of Antigua Guatemala, park Florencia, 90°42.1'W/14°34.1'N, 1800 m, on *Ramalina* on *Quercus*, 6.VIII.2004, R. Barillas, P. & B. van den Boom 33628 (hb. van den Boom).

***Lichenocodium erodens*** M.S.Christ. & D.Hawksw.

This is a very common species known from a wide range of host genera. It is known from Europe, North and South America (DIEDERICH 2003). First record for Central America.

Guatemala: Quezaltenango, WSW of Quezaltenango, San Martín, SE of village, along path to Laguna Chicabal, mixed forest on NW slope, 91°38.8'W/14°48.2'N, 2700 m, on decaying *Lecanora*, 22.VII.2004, P. & B. van den Boom 32883 (hb. van den Boom).

***Milospium graphideorum*** (Nyl.) D.Hawksw.

We found this species covering a white, sterile lichen with *Trentepohlia* in a community with *Opegrapha* spp. It is similar to some Columbian and Pyrenean samples, which does not form clear sporodochia but irregular small patches (ETAYO 2002a). In South America it was known from Colombia and Paraguay (ETAYO 2002b).

Guatemala: Alta Verapaz, Coban, 2 km SW of the city, Vivero Verapaz, orchid garden dominated by tree-ferns, 90°23.3'W/15°27.6'N, 1330 m, on steril crust, 30.VII.2004, P. & B. van den Boom 33238 (hb. van den Boom).

***Opegrapha melanospila*** Müll.Arg.

This species, confined to *Parmotrema* and *Rimelia*, is known from Australia, Brazil, China, the Dominican Republic, Socotra (Yemen), USA and Venezuela (type) (DIEDERICH 2003). Furthermore, the *Opegrapha* sp. on *Parmotrema*, mentioned in ETAYO (2002b), recorded from Colombia, belongs here as well. We report *O. melanospila* here for the first time from Colombia and Guatemala.

Guatemala: Alta Verapaz, E of Coban, San Pedro Carcha, Balneario Las Islas, hill along waterfall, 90°18.5'W/15°28.0'N, 1325 m, on decaying *Rimelia reticulata*, 31 July 2004, P. & B. van den Boom 33270 (hb. van den Boom). Ibid., NW of city, forest (national park) "Las Victorias", 90°22.8'W/15°28.4'N, 1320 m, on decaying *Rimelia reticulata*, 3.VIII.2004, P. & B. van den Boom 33481 (hb. van den Boom).

Colombia: Nariño, Munic. Pasto, corregimiento El Encano, Parque Natural Tunguragua, SE Lago La Cocha (Guamués), 1.04°N/77.08°W, c. 2700 m, 30.VII.1998, S. Churchill, O. Duque, J. Etayo, J. Muñoz & P. Sánchez 15789 (hb. Etayo).

***Phaeosporobolus alpinus*** R.Sant., Alstrup & D.Hawksw.

*P. alpinus* covers large areas of a decaying *Lecanora* thallus. We cannot find differences with the original description based on material growing on *Ochrolechia* (ALSTRUP & HAWKSWORTH 1990). First record from Central America.

Guatemala: Quezaltenango, WSW of Quezaltenango, San Martín, SE of village, along path to Laguna Chicabal, mixed forest on NW slope, 91°38.8'W/14°48.2'N, 2700 m, on decaying *Lecanora*, 22.VII.2004, P. & B. van den Boom 32836 (hb. van den Boom).

***Phoma cytospora*** (Vouaux) D.Hawksw.

First record from Central America of this species that was previously known from Europe and North America, growing on species of Parmeliaceae.

Guatemala: Chimaltenango, NNW of Guatemala ciudad, Mixco Viejo, scattered mixed trees, 90°39.7'W/14°52.4'N, 870 m, on *Canoparmelia* on *Enterolobium cyclocarpum*, 28.VII.2004, R. Barillas, P. & B. van den Boom 33164 (hb. van den Boom).

***Pronectria angulospora*** Etayo

ROSSMAN et al. (1999) stated that *P. angulospora* (growing on *Heterodermia*) is synonymous with *P. leptaleae* (J.Steiner) Lowen (on *Physcia*). In fact these two species have completely different spores as mentioned in ETAYO (2002b) and DIEDERICH (2003). First record from Central America.

Guatemala: Sacatepéquez, NE of Antigua Guatemala, park Florencia, 90°42.1'W/14°34.1'N, 1800 m, on *Heterodermia* on *Quercus*, 6.VIII.2004, R. Barillas, P. & B. van den Boom 33618 (hb. van den Boom).

***Pronectria leptaleoides*** Etayo

This species was recently described from Colombia and Ecuador (ETAYO 2002b), and seems to be not rare in the Neotropics. First record from Central America.

Guatemala: S of Quezaltenango, S of Llano del Pinal, N slope of volcano Santa María, path among small agriculture fields, 91°33.3'W/14°46.6'N, 2700 m, on *Leptogium* on mature *Alnus arguta*, 23.VII.2004, P. & B. van den Boom 32978 (hb. van den Boom).

***Skyttea caesii*** Diederich & Etayo

The type of this species grows on *Mycoblastus caesius* (DIEDERICH & ETAYO 2000). These authors included some more records, slightly different from the type, as well as some growing on sterile unidentified lichens. Our sample from Guatemala differs from the type in larger apothecia 120–250 µm diam. with a larger pore (50–150 µm), but asci and spores are similar. It was growing on a crust of an unknown genus, with lecideoid apothecia and ellipsoid spores of c. 15–16 × 8 µm. New to Central America.

Guatemala: Quezaltenango, WSW of Quezaltenango, San Martín, SE of village, along path to Laguna Chicabal, mixed forest on NW slope, 91°38.8'W/14°48.2'N, 2700 m, on an unidentified epiphytic crust, 22.VII.2004, P. & B. van den Boom 32847 (hb. van den Boom).

***Skyttea lecanorae*** Diederich & Etayo

*S. lecanorae* was known in America from Canada, USA, Argentina and Uruguay (DIEDERICH & ETAYO 2000). This is the first record from Central America.

Guatemala: Alta Verapaz, E of Coban, San Pedro Carcha, Balneario Las Islas, hill along and above a waterfall, 90°18.5'W/15°28.0'N, 1325 m, on a sterile crust, probably *Lecanora* on *Acer*, 31.VII.2004, P. & B. van den Boom 33273 (hb. van den Boom).

***Spirographa fusisporella*** (Nyl.) Zahlbr.

We found this species mixed with *Cornutispora lichenicola* and *Phaeosporobolus alpinus* on the same corticolous *Lecanora*. It is known from North and South America, Europe and Australia. This is the first record from Central America.

Guatemala: Quezaltenango, WSW of Quezaltenango, San Martín, SE of village, along path to Laguna Chicabal, mixed forest on NW slope, 91°38.8'W/14°48.2'N, 2700 m, on dead *Lecanora*, 22.VII.2004, P. & B. van den Boom 32836, 32886 (hb. van den Boom).

***Tremella stictae*** Diederich

This species was known from Brazil and Colombia (ETAYO 2002b, DIEDERICH 2003) in South America, Africa (Rwanda) and Asia (DIEDERICH 1996). First record from Central America.

Guatemala: Alta Verapaz, Coban, 2 km SW of the city, Vivero Verapaz, orchid garden, dominated by tree-ferns, 90°23.3'W/15°27.6'N, 1330 m, on *Sticta weigeli* on tree-fern, 30.VII.2004, P. & B. van den Boom 33211 (hb. van den Boom).

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