

Endococcus janae, a new species from Peru on *Acarospora rhabarbarina*

KERRY KNUDSEN¹

ABSTRACT. – *Endococcus janae* is described from *Acarospora rhabarbarina* in Peru. It has 4-spored asci and differs from other the 4-spored species, *E. zahlbrucknerellae* and *E. variabilis*, in ascomata and spore size as well as host.

Keywords: lichenicolous fungi, Dothideales, Ascomycota.

INTRODUCTION

The lichenicolous genus *Endococcus* comprises at least thirty-eight species (Halici et al. 2007), most of which have a narrow host spectrum. Three species have recently been described (Hawksworth & Itturriaga 2006; Brackel and Kocourková 2006; Halici et al. 2007). Important work in understanding the genus was done by Hawksworth (1979) and Triebel (1989). Some species concepts are apparently too artificial, including too broad a difference in ascomata and spore size, as well as too wide a range of hosts (Sérusiaux et al. 1999; Kocourková 2000; Halici et al. 2007). The genus is in need of revision.

METHOD

Sections were prepared by hand and examined in water, 10% KOH, and I (Lugol). Amyloid reactions were tested in I and I with pre-treatment with KOH (K/I). Ascospore measurements were made in water; extreme values are given in parentheses. Ascospore measurements are indicated as (minimum-) $s \pm$ mean (-maximum), followed by the number of measurements (n); the length/breadth ratio of ascospores is indicated as l/b and given in the same way.

THE NEW SPECIES

Endococcus janae K. Knudsen *sp. nov.*

MYCOBANK #511450

PLATE 1, FIGURES 1-4.

Fungus lichenicola in thallis lichenis Acarospora rhabarbarina. Endococcus species insignis ascomatibus immersis vel semi-immersis, subsphaericis, 125–190µm altis, 120–150 latis, ascis 4–sporis, ascosporis brunneis, 1-septatis, (14–)15–15.8(–18) x (6–) 6.4–6.8(–9)µm.

TYPE: PERU: Ica, western foothills of Andes 36–40 km E of Nazca on road to Puquio, on thallus of *Acarospora rhabarbarina*, rhyolite, 2000–2250 m, *Weber & Kohn*, L-66453 (COLO, holotype).

¹KERRY KNUDSEN – Herbarium, Dept. of Botany & Plant Sciences, University of California, Riverside, California, 92521, U.S.A. – e-mail: kk999@msn.com.

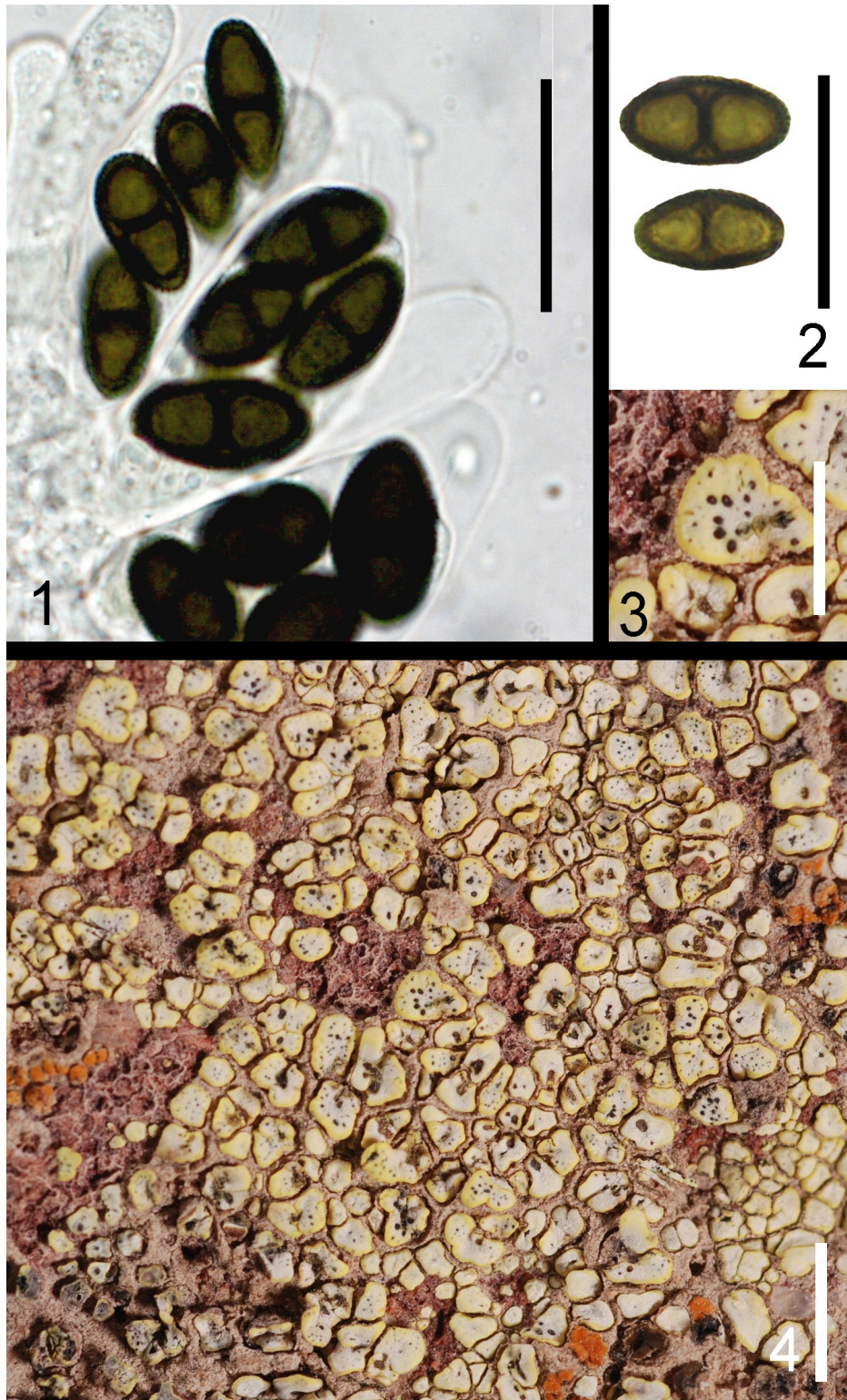


Plate 1. Figure 1, 4-spored asci of *Endococcus janae* (scale bar = 20 μ m). **Figure 2**, detail of ascospores (scale bar = 20 μ m). **Figure 3**, detail of areole of *A. rhabarbarina* showing infection of *E. janae* (scale bar = 2mm). **Figure 4**, holotype of *E. janae* (scale bar = 4mm).

DESCRIPTION. – Lichenicolous fungus growing on the areoles or squamules of the host, the yellow *Acarospora rhabarbarina* Hue, suppressing apothecia production of the host. **Ascomata** perithecioid, arising singly, up to twenty or more per areole or squamule, immersed to erumpent, subglobose, appanate, black and somewhat shiny, with the ostiolar part up to 35 μm wide, with no other visible sign of infection, 125–190 μm tall, 120–150 μm wide; wall *ca.* 15–20 μm thick, dark brown in upper part, hyaline to lightly reddish brown in lower half, of multiple compressed layers, cells hard to discern, mostly 1 μm wide, up to 10 μm long, K–. **Hamathecium** of periphysoids, lining ostiolar canal and upper part of ascomatal cavity, brown near ostiolar area to hyaline in upper part of ascomatal cavity, simple, or basally branched, or branched in upper third, 25–30 μm in length, cells 3–4 μm long, 2–3(–4) μm wide; central cavity with hymenial gel and asci, I+orange, K/I+ blue; **Asci** arising from in base and lower sides of ascomatal cavity, sessile, densely-packed, subcylindrical, internal apical beak evident, four-spored (very rarely with five or six spores), 45–50(–60) x 14–16 μm , fissitunicate, K/I–; **Ascospores** uniseriate or distichously arranged in asci, ellipsoid, golden brown and simple when young, becoming one-septate and dark brown at maturity, (14–)15–15.8(–18) x (6–) 6.4–6.8(–9) μm ($n=100$), l/b (1.6–)1.9–2.7(–3.0), not constricted at septum, with one or several small oil drops or without, the wall 0.5–1 μm thick, dark, ornamented, septum in mature spores dark, 0.5–1.0 μm thick, though sometimes thinner, no gelatinous perispore evident; **Conidiomata**, not observed.

ETYMOLOGY. – The species is named in honor of my colleague, friend, and my future wife Jana Kocourková, who has a special love for the genus *Endococcus* which led to our fortuitous meeting through *Opuscula Philolichenum*.

DISCUSSION. – Currently only one species of *Endococcus* is recognized as occurring on *Acarospora*, *Endococcus stigma* (Körb.) Stizenb. (Triebel 1989; Kainz & Triebel 2004). *Endococcus stigma* is treated in this paper as having ascomata 150–250 μm in diameter, 8-spored asci, and ovoid to broadly ovoid ascospores, with thick ornamented walls, strongly attenuated apices, cells equal, mostly 12–16(–20) x 6–7(–8) μm , becoming constricted at septum in older ascospores, with l/b 2.4 or less (Kainz & Triebel 2004; Knudsen & Kocourková 2007). *Endococcus stigma* has somewhat larger ascomata size than *E. janae* (150–250 μm vs. 125–190 μm), and overlapping ascospore size [12–16(–20) x 6–7(–8) μm vs. (14–)15–15.8(–18) x (6–) 6.4–6.8(–9) μm] with *E. janae* having usually longer and broader ascospores. *Endococcus janae* differs from *E. stigma* in having 4-spored asci instead of 8-spored asci as well as having spores with rounded or blunt apices rather than attenuated apices. Another taxon on *Acarospora* with 4-spored asci was reported from the Canary Islands with soleiform ascospores with strongly attenuated apices and included by Hafellner (2002) in *E. stigma* s. lat. *Endococcus janae* differs from Hafellner’s taxon in not having soleiform spores with strongly attenuated apices.

Only two described species are known to have 4-spores per ascus, *E. zahlbrucknerellae* (Henssen) D. Hawksw. (Hawksworth 1979; Henssen 1977), which occurs on *Zahlbrucknerella calcarea* (Herre) Herre, and *E. variabilis* Halici, Kocourk. & Diederich (Halici et al 2007), which occurs on *Staurothele areolata* (Ach.) Lettau. Both species differ by their host selection from *E. janae* as well as size. *Endococcus zahlbrucknerellae* has smaller ascomata than *E. janae* ($\leq 100\mu\text{m}$ vs. 125–190 μm), shorter ascospores (12–15 μm vs. (14–)15–15.8(–18) μm), and produces galls. *Endococcus variabilis* has larger ascomata than *E. janae* (230–260 μm vs. 125–190 μm) and has slightly broader spores (6.5–7.5 μm vs. 6.4–6.8 μm), which overlap in size.

In studying over two hundred specimens of *Acarospora* from South America (Knudsen et al. 2008) and numerous specimens of *Acarospora* from North America (Knudsen 2007), so far I have found only this single incidental collection of *E. janae* from Peru. I have decided to publish this species to encourage the recognition and further collection of specimens of *E. janae*. Its known host, *A. rhabarbarina*, is wide-spread in Argentina, Bolivia, Chile, and Peru but is rare in North America in southern Arizona and California and is expected in Mexico. *Endococcus janae* probably occurs on other species of the genus.

ACKNOWLEDGMENTS

I thank Javier Eayo and David Hawksworth for their reviews, Paul Diederich for his comments, Jana Kocourková for discussions, James Lendemer for the images, and Tim Hogan at COLO for his always quick and courteous help.

LITERATURE CITED

- Brackel, W. von, and J. Kocourková. 2006. *Endococcus karlstadtensis* sp. nov. und weitere Funde von flechtenbewohnenden Pilzen in Bayern - Beitrag zu einer Checkliste II. Berichte der Bayerischen Botanischen Gesellschaft, 76: 5–32.
- Halfellner, J. 2002. Bemerkenswerte Funde von Flechten und lichenicolen Pilzen auf makaronesischen Inseln VI. Über einige Neufunde. Fritschiana, 36: 11–17.
- Halici, M.G., J. Kocourková, and P. Diederich. 2007. *Endococcus variabilis*, a new species on *Staurothele areolata*. Mycotaxon, 100: 337–342.
- Hawksworth, D.L. 1979. Studies in the genus *Endococcus* (Ascomycotina, Dothideales). Botaniska Notiser 132: 283–290.
- Hawksworth, D.L., and T. Iturriaga. 2006. Lichenicolous fungi described from Antarctica and the sub-Antarctic islands by Carroll W. Dodge (1895–1988). Antarctic Science, 18(3): 291–301.
- Henssen, A. 1977. The genus *Zahlbrucknerella*. Lichenologist, 9: 17–46.
- Kainz, C., and D. Triebel. 2004. *Endococcus*. In: Nash, T.H., III, Ryan, B.D. Diederich, P., Gries, C., Bungartz, F. (eds.): Lichen Flora of the Greater Sonoran Desert Region, Vol. 2. Lichens Unlimited, Arizona State University, Tempe, Arizona, pp. 648–651.
- Knudsen, K. 2007 [2008]. *Acarospora*, pp. 1–38, In Nash III, T. H., Gries, C., Bungartz, F., Lichen Flora of the Greater Sonoran Desert Region, Vol. 3, Lichens Unlimited, Arizona State University, Tempe, Arizona.
- Knudsen, K., J.A. Elix, and V. Reeb. 2008. A preliminary study of the genera *Acarospora* and *Pleopsidium* in South America. Opuscula Philolichenum, 5: 1–22.
- Knudsen, K., and J. Kocourková. 2007. Noteworthy collections. New lichenicolous fungi from California. Crossosoma, 33 (1): 39–40.
- Kocourková, J. 2000. Lichenicolous fungi of the Czech Republic. (The first commented checklist). Acta Mus. Nat. Pragae, Ser. B., 55: 59–169.
- Sérusiaux E., P. Diederich, A.M. Brand, and P. van den Boom. 1999. New or interesting lichens and lichenicolous fungi from Belgium and Luxembourg. VIII. *Lejeunia*, new series, 162: 1–95.
- Triebel, D. 1989. Lecideicole Ascomyceten. Eine Revision der obligat lichenicolen Ascomyceten auf lecideoiden Flechten. Bibliotheca Lichenologica, No. 35. J. Cramer, Berlin-Stuttgart. 278 pp.