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NEW AND INTERESTING LABOULBENIALES FROM BRAZIL

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ABSTRACT

Two new species of Laboulbeniales are described: *Laboulbenia parasyphraeae*, parasitic on *Parasyphraea* sp. (Coleoptera, Chrysomelidae, Alticinae), and *L. skelleyi*, parasitic on *Pselaphacus rubricatus* and *P. signatus* (Coleoptera, Erotylidae). Other recorded species are *Chaetomyces pinophili*, *Chitonomyces aurantiacus*, *Corethromyces ophitis*, *Dimorphomyces platensis*, *Dioicomyces anthici*, *D. cf. notoxi*, *Hesperomyces coccinelloides*, *Hydrophilomyces rhynchophorus*, *Laboulbenia arnaudii*, *L. funeralis*, *L. pachystoma*, and *L. systemae*. Six “morphospecies” of *Chitonomyces* (*C. appendiculatus*, *C. hyalinus*, *C. prolongatus*, *C. simplex*, *C. uncinatus*, and *C. cf. zonatus*) parasitic on a single species of *Laccophilus* (Dytiscidae) are also reported.

Key words: Ascomycetes, Brazil, *Chitonomyces*, Coleoptera, insect parasites, Laboulbeniales, taxonomy.

INTRODUCTION

Despite widespread recognition as a “megadiversity country” (McNeely et al. 1990) and the recent publication of an impressive fungal checklist listing over 4600 names (DaSilva and Minter 1995), the fungi of Brazil remain very imprecisely known. Of particular note, given the unquestioned diversity of prospective hosts in this country, are the entomogenous fungi. In keeping with patterns of diversity from other regions, it is likely that the most diverse group of entomogenous fungi in Brazil will be the Laboulbeniales. To date approximately 100 species of these arthropod-associated fungi, the majority occurring on beetles, have been recorded in the literature from Brazil. More recently our own fieldwork has resulted in the addition of 18 species associated with flies (Bergonzo et al. 2004). Here, we document the occurrence of an additional 13 species associated with beetles, two of which are described as new. Furthermore, we take the opportunity to report on recent collections of representatives of the genus *Chitonomyces* on *Laccophilus*, and discuss the patterns of occurrence of fungal thalli in relation to the position of growth on the host integument. Although we have refrained from formally synonymizing some of these taxa, we provide further clues supporting the hypothesis that they are “growth forms” (sensu Scheloske 1976) of a single species, rather than distinct species.

MATERIALS AND METHODS

Most insects were collected in the field by the authors using standard entomological techniques. Insects were stored in 70% ethyl alcohol for transport to the laboratory, where they were carefully examined with a dissecting microscope. Parasitic fungi were removed from the hosts and mounted on permanent slides according to Benjamin (1971). Holotypes of the new species are deposited in the Botanical Museum in Florence (FI). All the other slides are provisionally held in the collection of the junior author and will be deposited in FI.

TAXONOMY

CHAETOMYCES PINOPHILI Thaxter

Fig. 7

Known distribution and hosts.—This parasite was described on *Pinophilus latipes* Erichson (Staphylinidae) from the United States and was subsequently recorded on *Pinophilus* sp. from Nicaragua and *P. suffusus* Erichson from Argentina (Thaxter 1931). It has been also reported from Bolivia (as *Dimeromyces borellii* Colla) on an unidentified member of the Staphylinidae (Colla 1926).

New record.—CEARÁ: on the abdominal setae of a single specimen of *Pinophilus* sp., collected on the banks of an artificial pond near Riacho Ema, along the road BR 222 (S03°43.5', W038°42.0'), 13 Oct 1997, E. Bergonzo & W. Rossi.

Remarks.—The Brazilian specimens are in good condition and perfectly match the original description.

CHITONOMYCES AURANTIACUS Thaxter

Fig. 1

Known distribution and hosts.—This fungus is known only from the type series, which was found on the distal portion of the right elytron of a few specimens of *Desmopachria convexa* Aubé (Dytiscidae) from the USA (Thaxter 1902).

New record.—CEARÁ: on the distal portion of the elytra of two male specimens of *Desmopachria (Pachriodesma) varians* Wehncke collected in the Jaguaribe River, near Limoeiro do Norte (S05°09.2', W038°07.4'), 25 Sep 1998, E. Bergonzo & W. Rossi.

Remarks.—In the Brazilian specimens the transverse striation is extended to the distal portion of the receptacle, and the perithecial tip is slightly curved inwards; all other characters perfectly agree with the original description.

CHITONOMYCES APPENDICULATUS (Thaxter) Thaxter

Fig. 3a

CHITONOMYCES HYALINUS (Thaxter) Thaxter

Fig. 5

CHITONOMYCES PROLONGATUS Thaxter

Fig. 4

CHITONOMYCES SIMPLEX (Thaxter) Thaxter

Fig. 2

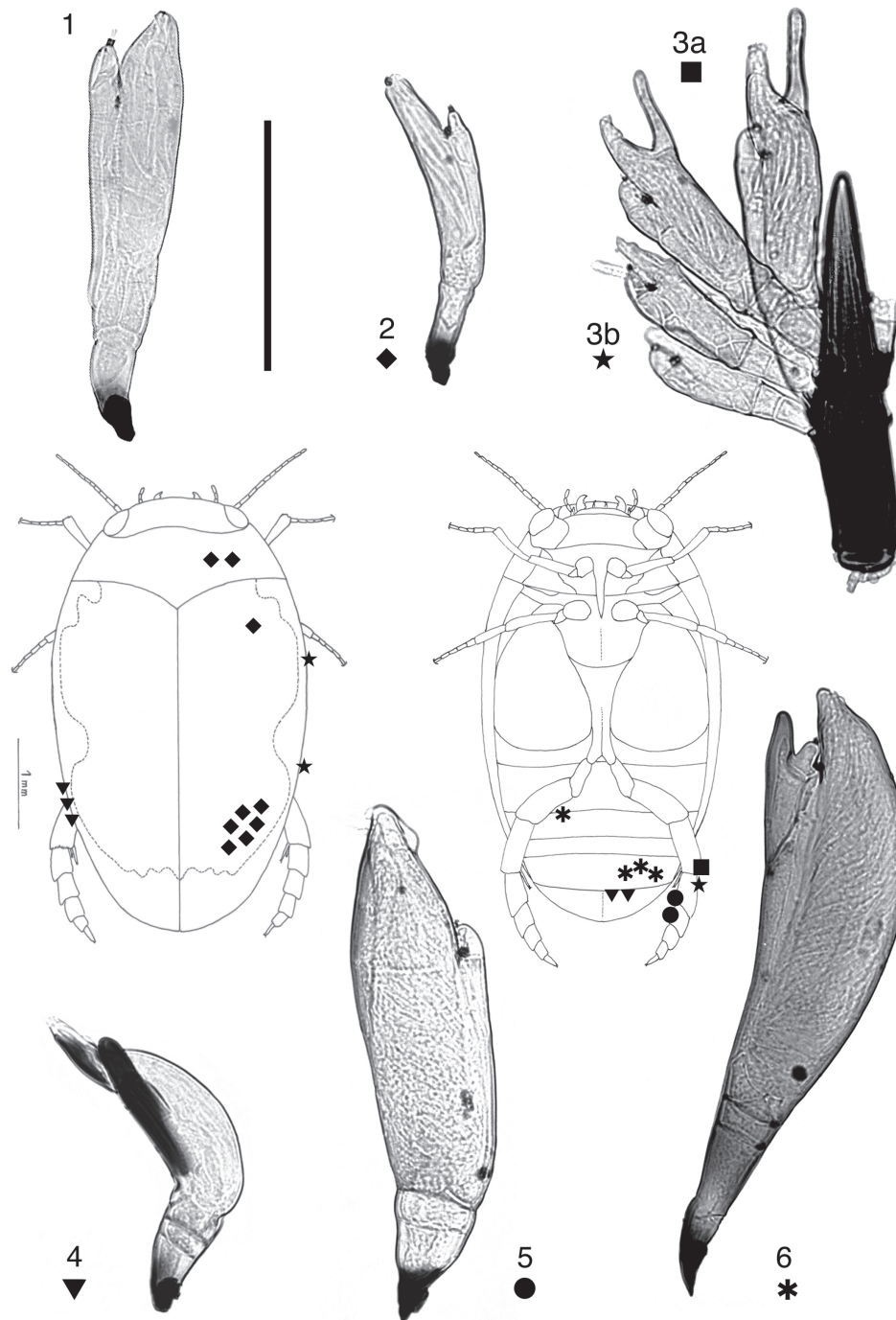


Fig. 1–6. *Chitonomyces* spp.—1. *C. aurantiacus* from *Desmopachria (Pachriodesma) varians*.—2–6. *Chitonomyces* spp. and their distribution on the body of their insect host, *Laccophilus* sp.—2. *C. simplex*.—3a. *C. appendiculatus*.—3b. *C. cf. zonatus*.—4. *C. prolongatus*.—5. *C. hyalinus*.—6. *C. uncinatus*. (Bar = 50 μ m).

CHITONOMYCES UNCINATUS (Thaxter) Thaxter
CHITONOMYCES cf. ZONATUS Thaxter

Known distribution and hosts.—The species of *Chitonomyces* reported above were described from different parts of the body of *Laccophilus* spp. from the USA (Thaxter 1895, 1902, 1924), with the exception of *Chitonomyces zonatus*, which was found in China on *Laccophilus parvulus* Aubé, *L. solutus* Sharp and *L. sharpi* Régimbart (Thaxter 1926). Later, *Chitonomyces*

Fig. 6
Fig. 3b

appendiculatus, *C. hyalinus*, *C. simplex*, and *C. uncinatus* were found also in Central America (Thaxter 1924). The parts of the host occupied by these parasites were reported as follows: *C. appendiculatus* on the anterior legs; *C. hyalinus* on the tips of posterior legs; *C. prolongatus* on the margin of the left elytron; *C. simplex* on the middle and distal half of the right elytron; *C. uncinatus* on the inferior surface of the abdomen; *C. zonatus* on the margin of left elytron and on the tarsi of mid- and posterior legs.

New record.—CEARÁ: on various parts of the body of six specimens (three males and three females) of *Laccophilus fasciatus* Aubé collected in a pond of the Rio Jaguaribe near Limoeiro do Norte (S05°09.2', W038°07.4'), 25 Sep 1998, E. Bergonzo & W. Rossi. In particular, *Chitonomyces appendiculatus* was found on a spine at the distal end of the left posterior leg of a male; *C. hyalinus* was found on the tarsi of the left posterior leg of two specimens (one male and one female); *C. prolongatus* was found on the margin of the left elytron of five hosts (two males and three females; in one case a few thalli were also found on the inferior surface of the abdomen); *C. simplex* was found on all six host insects on the distal half of the right elytron, with the exception of a male bearing these parasites on the right portion of the pronotum; *C. uncinatus* was found on the inferior surface of the abdomen of the three males; the parasites referred to *C. zonatus* with some uncertainty were found on the margin of the right elytron of two specimens (one male and one female) and on a spine at the distal end of the left posterior leg of a male (together with *C. appendiculatus*). As many as five different “morphospecies” were found on a single host, with a minimum of two. The distribution of these *Chitonomyces* species on the body of their insect host are depicted in Fig. 2–6.

Remarks.—We find it very difficult to believe that the observed parasites, although quite different morphologically, belong to different species displaying “position specificity” (sensu Benjamin and Shanor 1952). Among other things, it would be very difficult to explain the transmission of the spores of such “species” as *C. simplex* from an elytron to another elytron, or of *C. uncinatus* from the ventral portion of the abdomen to a similar area of another host. We think that these parasites represent different “growth forms” (sensu Scheloske 1976) of a single species. The whole question can be solved by means of molecular analyses.

CORETHROMYCES OPHITIS Thaxter

Fig. 11

Known distribution and hosts.—This species is only known from Argentina, where it was found on *Ophites fauveli* Lynch (Staphylinidae) (Thaxter 1931).

New record.—CEARÁ: on various parts of the body of three specimens of *Ophites bergonzoii* Drugmand collected along a torrent between Baturité and Guaramiranga (S04°17.3', W038°55.9'), 720 m, 8 Oct 1997, E. Bergonzo & W. Rossi.

Remarks.—The abundant Brazilian material corresponds closely with the original description with the exception of the pigmentation of the receptacle, which is dark but not opaque.

DIMORPHOMYCES PLATENSIS Spegazzini

Fig. 12

Known distribution and hosts.—On *Apocellus* spp. (Staphylinidae) in Argentina, Uruguay, Guatemala, and Bolivia (Spegazzini 1917; Thaxter 1924; Weir & Rossi 2001).

New record.—CEARÁ: on various parts of the body of a few specimens of *Apocellus* sp. collected around a swamp near Itiaçaba (S04°40.4', W37°50.0'), 24 Sep 1998, E. Bergonzo & W. Rossi.

Remarks.—The Brazilian specimens display considerable polymorphism, thus confirming the synonymy between *Dimorphomyces platensis*, *D. vulgatissimus* Spegazzini, and *D. furcatus* Thaxter (Weir and Rossi 2001).

DIOICOMYCES ANTHICI Thaxter

Fig. 15

Known distribution and hosts.—Reported in many countries from all over the world except Australia on various species and genera of the family Anthicidae (Santamaria 2002).

New record.—CEARÁ: on the median femur of a single specimen of *Cyclodinus* sp. collected around the Lagoa de Precabura near Messejana (S03°48.4', W38°26.8'), 9 Oct 1997, E. Bergonzo & W. Rossi.

Remarks.—The Brazilian specimens fall within the great variability of the species.

DIOICOMYCES cf. NOTOXI Thaxter

Fig. 13, 14

Known distribution and hosts.—This parasite is known only from the type series, which was found on *Notoxus eximius* Champion (Anthicidae) from Guatemala (Thaxter 1931).

New record.—CEARÁ: on the elytra and abdomen of two specimens of *Acanthinus unituberculatus* (Pic) collected along the shores of Riacho do Lagamar near Pacajus (S04°13.6', W38°28.7'), 26 Sep 1998, E. Bergonzo & W. Rossi.

Remarks.—The male thalli perfectly agree with the original description and differ from those of *Dioicomycetes anthici* in having a strictly terminal antheridial efferent tube (Fig. 14). In the Brazilian female thalli (Fig. 13) the brownish tinge of the primary appendage extends to the outer sides of cells I and II, which are much paler in the type series.

HESPEROMYCES COCCINELLOIDES (Thaxter) Thaxter

Fig. 10

Known distribution and hosts.—On “minute coccinellid allied to *Scymnus*” from the West Indies (Grenada, Trinidad, and Jamaica), the Philippines, and Borneo (Thaxter 1917); on *Scymnus tardus* Mulsant from Panama (Thaxter 1931); on an unidentified coccinellid from the USA (Benjamin 1989); on *Scymnus* sp. from Spain (Santamaria 1995).

New record.—CEARÁ: on a single specimen of *Diomus seminulus* Mulsant collected around the Cana Brava lake, near Guaramiranga (S04°14.6', W038°57.6'), 815 m, 1 Dec 1998, E. Bergonzo.

Remarks.—*Diomus* was once considered a subgenus of *Scymnus*. Although the two are now regarded as separate genera, they are obviously related.

HYDROPHILOMYCES RHYNCHOPHORUS (Thaxter) Thaxter

Fig. 8, 9

Known distribution and hosts.—Described from the USA on *Phaenonotum exstriatum* (Say) (Hydrophilidae) (Thaxter 1908); it has been reported also from Argentina (sub *Ecteinomyces lumbricoides* Spegazzini) on *Phaenonotum spegazzinii* Bruch (Spegazzini 1917).

New record.—CEARÁ: on the internal margin of the elytra of a specimen of *Phaenostoma posticatum* (Sharp) collected on the submerged vegetation of the Cana Brava lake, near Guaramiranga (S04°14.6', W038°57.6'), 815 m, 8–10 Oct 1997, E. Bergonzo; on the elytral margin, abdomen and posterior legs of a specimen of the same host insect collected under the submerged stones of a torrent between Baturité and Guaramiranga (S04°17.3', W038°55.9'), 720 m, 8 Oct 1997, E. Bergonzo & W. Rossi.

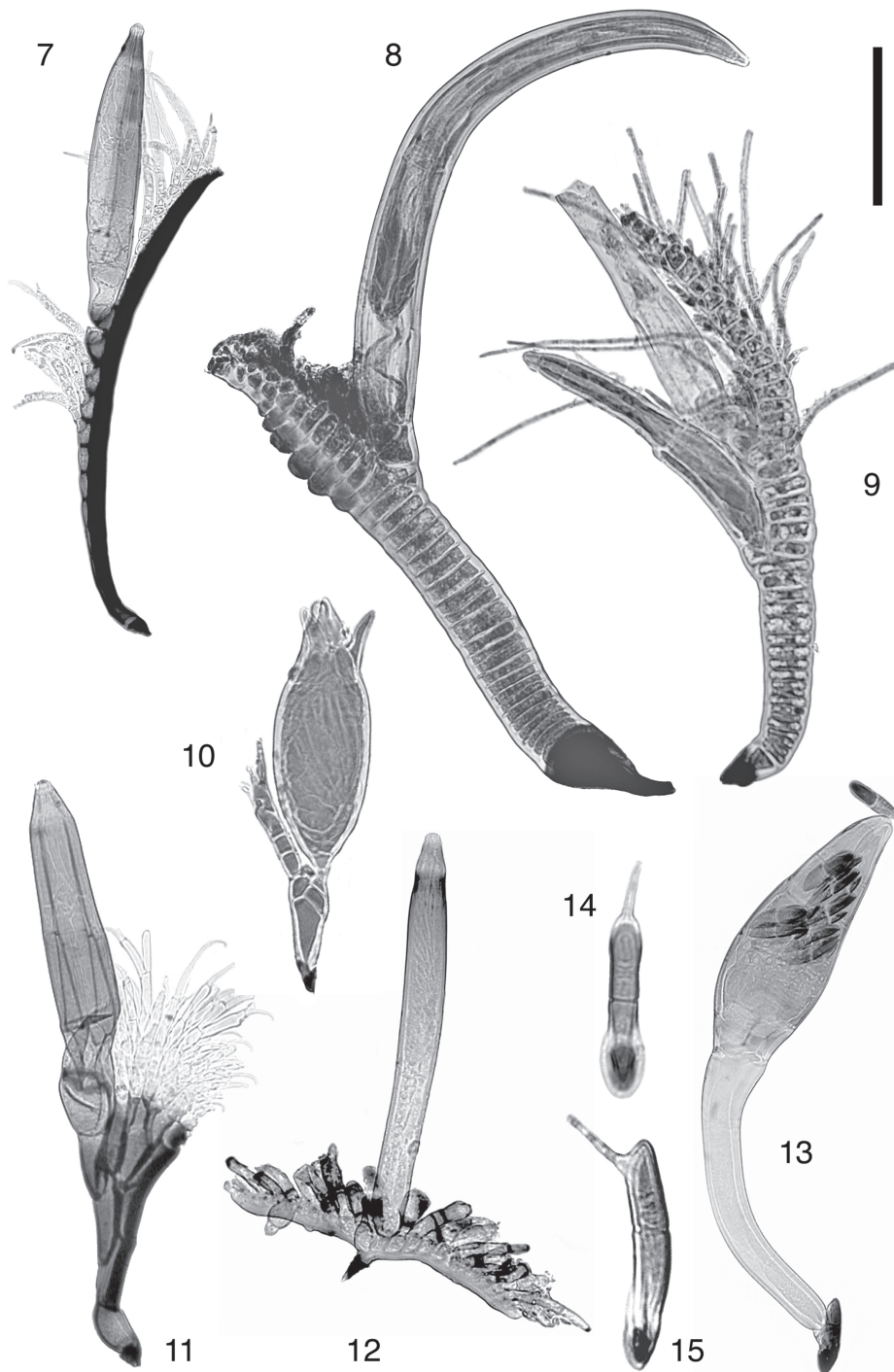


Fig. 7–15. Species of miscellaneous genera in Laboulbeniales.—7. *Chaetomyces pinophili*.—8, 9. *Hydrophilomyces rhynchophorus*.—8. Fully mature thallus.—9. Young thallus.—10. *Hesperomyces coccinelloides*.—11. *Corethromyces ophitis*.—12. *Dimorphomyces platensis*.—13, 14. *Dioicomycetes* cf. *notoxi*.—13. Female thallus.—14. Male thallus.—15. *Dioicomycetes anthici*, male thallus. (Fig. 7–9, 11–13: bar = 90 μ m; Fig. 10: bar = 50 μ m; Fig. 14, 15: bar = 30 μ m).

Remarks.—The Brazilian parasites are not identical with those reported on *Phaenonotum* spp. in North and South America. However, the variability observed among the specimens found on different parts of the body of *Phaenostoma* and the uncertainty about the distinctness of the various species described from *Phaenonotum* dissuade us from describing a new species.

LABOULBENIA ARNAUDII Balazuc

Fig. 20

Known distribution and hosts.—This species is known only from the type series, which was found on *Goniadera* sp. (Tenebrionidae) in French Guiana (Balazuc 1986).

New record.—AMAZONAS: on the elytra and the pronotum of a female specimen of *Strongylium* sp. (Tenebrionidae),



Fig. 16–23. *Laboulbenia* spp.—16–18. *Laboulbenia funeralis*.—16. Typical thallus from elytral margin.—17. Thallus from legs.—18. Thallus from distal portion of right elytron.—19, 20. *Laboulbenia pachystoma*.—19. Thallus from fore legs.—20. Thallus from elytra.—21. *Laboulbenia skelleyi*, sp. nov., from the type slide.—22. *Laboulbenia arnaudii*.—23. *Laboulbenia parasyphraeae*, sp. nov., from the type slide. (Bar = 100 μ m).

collected by means of a flight trap near Lake Januari (S03°20', W060°17'), 23 Aug 1991, Adis leg.

Remarks.—This species is characterized by the short, stout habit and the spreading branchlets of the appendages. Although found on a different host genus, the Brazilian specimens closely correspond to the original description,

except that Balazuc's illustration shows a longer series of short, constricted cells in the lower part of the appendage.

LABOULBENIA FUNERALIS Thaxter

Fig. 16–18

Known distribution and hosts.—Notwithstanding two old, likely erroneous records from Europe, this species seems to be

exclusively American; it has been reported from Argentina, Bolivia, the United States and, doubtfully, from Brazil (Balazuc 1971; Weir and Rossi 2001).

New records.—CEARÁ: on various specimens of *Neogyrinus gibbus* (Aubé) collected in a torrent between Baturité and Guarimiranga (S04°17.3', W038°55.9'), 720 m, 8 Oct 1997 and 28 Sep 1998, E. Bergonzo & W. Rossi. PARANÁ: on the elytra of a male specimen of *N. chalybeus* (Perty), on the elytra of a female specimen of *N. gibbus*, and on the elytra and median legs of a male specimen of *N. gibbus* collected in a torrent near the Foz do Iguaçu waterfalls, 25 Jan 1994, W. Rossi.

Remarks.—As in other Laboulbeniales, such as *Laboulbenia richardiana* recently described (Rossi and Kotrba 2004), *L. funeralis* displays a high degree of polymorphism depending on the area of the host body where it grows. The “typical” form described by Thaxter (1912) and subsequently recorded and illustrated by Spegazzini (1917) and Balazuc (1971), is found on the elytral margin (Fig. 16). The thalli observed on the legs are almost straight, with the basal cell longer and broader than the suprabasal, the perithecium much shorter, and cell *V* extending upwards along the inner margin of the perithecium (Fig. 17). The most striking and diverse thalli are found on the distal portion of the right elytron: these have a sigmoid habit and have a swanlike shape if viewed upside down (Fig. 18). The latter form was the most common in Ceará. Surprisingly, Thaxter (1912) wrote about *L. funeralis*: “This species ... seems constant in specimens from a considerable number of different individuals ...”.

LABOULBENIA PACHYSTOMA Spegazzini Fig. 21, 22

Known distribution and hosts.—This species was described from specimens found on the elytra of various unidentified Gyrinidae from northern Argentina (Spegazzini 1912, 1917) and has not been recorded since.

New record.—PARANÁ: on the elytral margin and on the anterior legs of a male specimen of *Gyretes brunnescens* Ochs collected in a torrent near the Foz do Iguaçu waterfalls, 25 Jan 1994, W. Rossi.

Remarks.—The Brazilian thalli observed on the elytra (Fig. 22) agree fairly well with the description and the drawing given by Spegazzini, the upper portion of the perithecium only being slightly more tapered; also the conspicuous, dark, rounded spot reported as a distinctive character of *Laboulbenia pachystoma* is always present in these specimens. However, the parasites found on the anterior legs differ consistently from these for the much more slender habit and for the cell *V* adnate to the perithecial upper portion (Fig. 21).

Laboulbenia pachystoma is closely related to *L. guerinii* Robin, from which it differs mainly in having a much more inflated perithecium.

Laboulbenia parasyphraeae W.Rossi et Bergonzo, sp. nov. Fig. 23

Fungus griseus, perithecio fuscior, basali cellula receptaculi dilutior. Basalis ac suprabasalis cellulae varie elongatae, prima plerumque longior quam secunda. Cellulae *III* ac *IV* connatae, unam cellulam longiorem quam latiorefficientes. Cellula *V* parva ac

elongata. Psallium insolenter angustum ac elatum, interdum subquadratum. Exterior appendix constans e magna basali cellula seriem, brevium, rigidorum, falcatorum ramulorum gignente. Interior appendix constans e minima basali cellula duos ramulos ferente in 2–3 antheridia lagoenae instar desinentes. Perithecium ovatum, indistincto apice, inaequalibus labiis, quorum interiora, magis prominentia ac rotundata, in fusca area insistunt. Tota longitudo 161–312 µm; perithecium 80–119 × 37–60 µm; antheridiorum longitudo 16–22 µm; appendicum maxima longitudo 80 µm; ascosporae 46–54 µm. Parasitus Parasyphraeae sp. in Brasiliae regione Ceara vulgo appellata.

Gray colored, with the perithecium darker and the basal cell much paler. Basal and suprabasal cells variously elongate, the former being always longer than the latter. Cells *III* and *IV* combined into a single cell that is taller than it is broad. Cell *V* small and elongate. Insertion cell unusually narrow and tall, sometimes even squarish in outline. Outer appendage consisting of a large, irregular, externally blackened basal cell, which gives rise from a deeply blackened area of insertion to an antero-posterior series of short, stout, stiff, falcate, externally brownish, simple branchlets. The inner appendage consists of a very small basal cell producing a branch on either side, whose lower cell is usually dark with blackish septa, ending with 2–3 bottle-shaped antheridia. A similar branchlet bearing antheridia is frequently found also amid the branchlets of the outer appendage. Perithecium ovoid with a not well distinguished tip, the lips strongly unequal, the inner usually much more prominent, rounded distally, subtended by a dark suffusion. Total length 161–312 µm; perithecium 80–119 × 37–60 µm; length of antheridia 16–22 µm; longest appendage, from insertion cell to tip 80 µm; ascospores 46–54 µm.

Holotype.—BRAZIL: CEARÁ, at the apex of the elytra and of the abdomen of a specimen of *Parasyphraea* sp. (Coleoptera, Chrysomelidae, Alticinae) collected around the Cana Brava lake, near Guarimiranga (S04°14.6', W038°57.6'), 815 m, 8–10 Oct 1997, E. Bergonzo & W. Rossi, no. 2235 (FI).

Remarks.—Dimensions of the thalli are quite variable: the longest specimens were found on the upper, distal portion of the abdomen, the shortest on the elytra, near the tip.

Among the various species of *Laboulbenia* parasitic on Chrysomelidae, the one more closely related to *L. parasyphraeae* seems to be *L. cristatella* Thaxter (1914). The two species share the undivided cell *III* + *IV*, the narrow and tall insertion cell, and the arrangement of the branchlets of the outer appendage. However, in *L. cristatella* these branchlets are much longer and the color of the thalli is much paler.

The specimen identified as *L. lacticae* Thaxter depicted in Fig. 20 of Weir & Beakes (1996: 127) very likely belongs to *L. parasyphraeae*. *Laboulbenia lacticae* has cells *III* and *IV* clearly separated (see Fig. 8 in Weir and Rossi 2001: 177).

Laboulbenia dorstii Balazuc (1975b) is quite similar to *L. cristatella* and seems to be a synonym of the latter.

Laboulbenia skelleyi W.Rossi et Bergonzo, sp. nov. Fig. 21

Receptaculum helvolum, cellulae *IV* externa parte fuscior, interdum etiam cellulae *III*; perithecium griseum, dorsuali parte superne dilutior, ventrali vero atra; perithecii apex ater, in minima hyalina labia desinens. Habitus brevis ac compactus. Cellula *V* parva, fere triangula, inter perithecium et psallium parum protuberans. Psallium obliquum, crassum, cellulis *IV* + *V* clare brevius. Exterior appendix

elongata, ordine cellularum, quarum basalis paulo longior quam latior, confecta. Interior appendix constans e paulo brevior quam latiore basali cellula, subquadrata cellulam sustinenti, ex qua duo elongati ac simplices ramuli oriuntur. Perithecium parvum, ad medium parum inflatum, tertia parte usque ad dimidiam solutum, ad validum, truncatum, obliquum apicem gradatim extenuatum. Longitudo a pede usque ad perithecii apicem: 170–285 μm . Perithecium: 35–60 \times 85–130 μm . Appendicum maxima longitudo: 390 μm . Ascospores: 62–82 μm . Parasitus *Pselaphaci rubricati* in Brasilia.

Receptacle dirty yellow to pale brown, with a darker shade on the outer portion of cell *IV*, sometimes extending to cell *III*; perithecium grayish, with the upper portion paler on the inner side, blackish on the outer; perithecial tip black, opaque, with hyaline apex. Habit short and stout. Cell *V* small, subtriangular, slightly protruding between the perithecium and the insertion cell, which is oblique, thick, and distinctly narrower than cell *IV* and *V*. Outer appendage elongate, composed of a linear series of superposed cells, the basal of which is slightly longer than broad. Inner appendage composed of a basal cell slightly shorter than broad, followed by an isodiametric suprabasal cell, above which the appendage forks in two simple, long branchlets. Perithecium one half to one third free from the receptacle, relatively small, slightly inflated in the middle, gradually and unevenly tapering to the broad, blunt, oblique apex. Length from foot to tip of perithecium: 170–285 μm . Perithecium: 35–60 \times 85–130 μm . Longest appendage: 390 μm . Ascospores: 62–82 μm .

Holotype.—BRAZIL: RONDÔNIA, on the elytra and the epipleura of *Pselaphacus rubricatus* (Herbst) (Erotylidae) collected 62 km SW Ariquemes nr. Faz. Rancho Grande, 4–16 Nov 1997, *J. E. Eger*, no. 2291a (FI).

Isotypes.—Same data as the type, on pronotum and legs (no. 2291b), and on prosternum and antennae (no. 2291c) of the same host insect.

Paratypes.—Same data as the type, on pronotum, elytra and abdomen of a different specimen of *Pselaphacus rubricatus*, no. 2292. COSTA RICA: on various parts of the body of *Pselaphacus signatus* Guérin-Méneville, Prov. Guanacaste, P. N. Guanacaste, lado SO Vol. Cacao, Est. Cacao, alt. 800–1600 m, 12–17 Aug 1993, *F. A. Quesada*, no. 2289; on various parts of the body of *P. signatus*, Prov. Puntarenas, Reserva Biol. Carara, Est. Quebrada Bonita, alt. 50 m, 10–28 Aug 1992, *R. Guzman*, no. 2290.

Etymology.—Named after Paul Skelley, distinguished student of the Erotylidae.

Remarks.—To date only three species of *Laboulbenia* have been reported on American Erotylidae. These are *Laboulbenia scaphidomorphi* Spegazzini, described on *Scaphidomorphus bosci* Guérin-Méneville from Panama (Spegazzini 1915), *Laboulbenia parvula* Thaxter, recorded on *Brachysphaenus bimaculatus* (Fabricius) from Brazil (Colla 1926), and *Laboulbenia encaustis* K. Sugiyama et T. Majewski, described on *Encaustes praenobilis* Lewis from Ecuador (Sugiyama and Majewski 1987).

Laboulbenia scaphidomorphi is quite a variable species (pers. obs.): however, it differs consistently from the new species in the pigmentation of the perithecium, in the branching of the inner appendage, and in the position of the insertion cell, that is always joined to the perithecium.

Laboulbenia parvula was originally described on ground beetles (Carabidae) from North America (Thaxter 1892) and its presence on Erotylidae is unlikely. It bears some resemblance to the new species in general habit, but has an almost entirely free perithecium and a branched outer appendage.

Laboulbenia encaustis differs from *Laboulbenia skellei* in having the perithecium free from the receptacle for 3/4 of its length and the inner appendage consisting of very short branchlets. It should be noted that either the name of the host insect or the collecting place are wrong, since *Encaustes praenobilis* is only found in Eastern Asia.

The only other species of *Laboulbenia* reported on Erotylidae so far is *L. nesitidis* Balazuc, parasitic on *Nesitis sexnotata* (Wied.) from Malaysia; this Asian species differs from *L. skellei* in having a branched outer appendage and a much more elongate receptacle (Balazuc 1975a).

LABOULBENIA SYSTEMAE Spegazzini (1917)

Fig. 19

Known distribution and hosts.—Described on *Systema testaceovittata* Clark (Chrysomelidae, Alticinae) from Argentina and recently recorded from Bolivia on *S. s-littera* (L.) (Weir and Rossi 2001).

New record.—CEARÁ: on the mesosternum of a specimen of *Systema s-littera* collected around the Cana Brava lake, near Guaramiranga (S04°14.6', W038°57.6'), 815 m, 8–10 Oct 1997, E. Bergonzo & W. Rossi; on various parts of the body of a male specimen of *S. s-littera* collected on plants near the shore of the Açude de Fleixeras near Meruoca (S03°31.8', W040°28.1'), 650 m, 15 Oct 1999, E. Bergonzo & W. Rossi.

Remarks.—*Laboulbenia systemae* is closely related to *L. homophoetae* (Spegazzini) Thaxter. The two species can be distinguished only by the appendages. These are composed of long and slender branches in the latter species, while in the former the same are shorter, stiff, and much darker at the base.

It is worth mentioning that while the specimen of *Systema s-littera* from Açude de Fleixeras was immature, its integument being not completely sclerified, the thalli of the parasite were fully mature. This means that Laboulbeniales can reach maturity in a relatively short time, which can be estimated to be about a couple of weeks.

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