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New and rare *Laboulbeniales* (*Ascomycetes*) from the Białowieża Forest (NE Poland)

TOMASZ MAJEWSKI

Department of Plant Pathology, Warsaw Agricultural University
Nowoursynowska 166, PL-02-787 Warszawa, Poland

M a j e w s k i T.: *New and rare Laboulbeniales (Ascomycetes) from the Białowieża Forest (NE Poland)*. Acta Mycol. 34 (1): 7–39, 1999.

This paper presents descriptions of some interesting species of the *Laboulbeniales* collected by the author in the Białowieża Forest and its foreland (NE Poland) in the period 1994–1998. Among them are 18 determined species new for Poland, four new for science (*Corethromyces bialowiezensis* sp.n. on *Tachyporus solutus*, *Cryptandromyces bryaxidis* sp.n. on *Bryaxis bulbifer*, *Euphoriomyces unilateralis* sp.n. on *Agathidium atrum*, and *Phaulomyces ptilii* sp.n. on *Ptilium affine*), and two or three species new for Europe (*Peyritschiella geminata* Thaxter, *Zodiomyces subseriatus* Thaxter and perhaps *Laboulbenia epithricis* Thaxter). Four species are probably new for science, but the collected material is too scanty to describe them. Additionally, details concerning morphology or systematic position of some species known already from Poland are supplemented. These data essentially complemented a recent description of Polish species of the group (M a j e w s k i 1994).

Key words: *Laboulbeniales*, *Corethromyces*, *Cryptandromyces*, *Euphoriomyces*, *Phaulomyces*, new species, Poland, Białowieża Forest.

INTRODUCTION

In 1994–1998 the author collected fungi of the order *Laboulbeniales* in the Białowieża Forest and its western foreland. The investigations aimed at learning the species composition of these fungi in the study area, their ecology and distribution. A complete analysis of these problems is being prepared for print (M a j e w s k i, mscr.). However, the collected material supplied numerous new data on the morphology and taxonomy of certain *Laboulbeniales* species, the most important of which are published in the present article. These data essentially complemented a recent description of Polish species of the group (M a j e w s k i 1994). In several cases it was possible

to complement the descriptions of species known from Poland, although most species mentioned in this study (marked*) are species new for Poland, recorded in latest years. Majewski (1994) reported 179 species identified in Poland, while at present their number increased to 198. Although this number is relatively high, it is certainly not definitive. This is indicated by reports on several unidentified species, which are waiting for more precise investigation after collecting richer material; such species are mentioned both in the present paper as well as in the Majewski (1994) study. An ecological characterisation of localities of species described in the present paper will be given in another publication (Majewski, mscr.).

All specimens described were collected in the fields by the present author and are in his collection, which is a property of KRAM. The present research was financed by the Committee for Scientific Research), grant no 6 P204 010 07.

DESCRIPTIONS OF SPECIES

Autoicomyces aquatilis (Picard) I. Tavares

On *Hydrochus carinatus* Germar (*Coleoptera, Hydrophilidae*): Białowieża, 9.5.1998 (TM 8134, 8136, 8138). Fig. 1: a-c.

Autoicomyces aquatilis occurs in two growth forms. The typical form grows on the lower part of thorax and abdomen and was frequently collected in Poland (Majewski 1994). The other form, the so called claw form, was described by Scheloske (1969) in Germany, and occurs between the claws at the ends of host's feet. It is undoubtedly rare and only recently recorded in Poland. The thalli of this claw form grew between the claws of anterior, middle and posterior left legs of males. They precisely resemble Scheloske's (1969) description: they are yellowish, 113–140 μm long, perithecia are 70–98 × 28–35 μm. Nearly all numerous thalli of the typical form found in the same place were located on the left side of sternites of thorax and abdomen of males and females.

Chaetarthriomyces crassappendicatus Scheloske

On *Chaetarthria seminulum* (Herbst) (*Col., Hydrophilidae*): Białowieża Forest, section 250C, 8.6.1996 (TM. 6768). Fig. 1: d.

At the coxa of a male untypical thalli were detected, a bit similar in their general shape to that of the other species of the genus, *Ch. flexatus* Thaxter (Thaxter 1931). Perithecium strongly externally arcuated, slightly asymmetric, upper receptacle-appendage axis composed of 10–12 elongated cells, its length up to 260 μm.

* ***Corethromyces bialowiezensis*** Majewski, sp. nova

Thallus succineus, 350–410 μm longus. Cellulae receptaculi elongatae. Cellula basalis appendicis isodiametrica, distaliter rotundata et castanea, axis superpositus sybhyalinus graciles phialides ferens. Perithecium 235–260 × 64–77 μm, pedunculatum, subfusiforme.

HOLOTYPUS: Poloniae, Białowieża, super *Tachypori soluti* Erichson, 14.5.1987, leg. T. Majewski (KRAM, No TM 3713).

Thallus mostly amber-brown, 350–410 μm long. Receptacle 90–108 μm long, composed of elongated cells, cell I longest. Appendage up to 75 μm long; basal cell isodiametric, darkened, its wall is distally rounded, dick and chestnut brown; all superposed cells nearly hyaline, forming simple few-celled axis with slender phialides. Stalk of perithecium composed of hyaline, elongated stalk cell, yellowish secondary stalk cell and one of the basal cells; perithecium 235–260 × 64–77 μm, with somewhat inflated, darker venter and slightly differentiated neck tapering to asymmetrical, blunt, yellowish apex.

On *Tachyporus solutus* Erichson (*Col., Staphylinidae, Tachyporinae*): Białowieża, meadow near forest (Białowieża National Park sect. 399), 14.5.1987 (TM. 3713 – HOLOTYPE). Fig. 1: e, f.

On upper abdomen surface of one host beetle seven mature thalli were detected. Their appendages were overmaturing and withered, but their simple structure is undoubted. The affinity of these thalli to the genus *Corethromyces* is proved by the following traits, characteristic for this genus (T a v a r e s 1985): perithecium with four wall cells in each vertical row, cells II and III superimposed, and more than one ascogenic cell. The location of antheridia on the appendage is unclear, however, it seems that there is a series of intercalary cells with terminal phialides.

The newly described species differs from the other species of the genus *Corethromyces* by its specific shape and dark colouring of basal cell of appendage, which contrasts with the rest of the appendage. The general shape of thalli and their darker colouring are probably most similar to those of *Corethromyces diochi* Thaxter (T h a x t e r 1931).

* ***Cryptandromyces bryaxidis*** Majewski, sp. nova

Thallus subhyalinus, 80–100 μm longus, gracilis. Cellulae receptaculi parvae, axis appendicis bis 80 μm longus, simplex, aliquot antheridia sessiles in medio vel supero parte gerens. Cellula pedunculi perithecii longa, cellulae basales leviter inflatae, perithecium non inflatum, elongatum, 30–45 × 10–15 μm.

HOLOTYPUS: Poloniae, Białowieża, sectio silvae 255C, super *Bryaxidis bulbiferis* (Reichenbach), 23.7.1998, leg. T. Majewski (KRAM, No TM 8665).

Thalli usually paired, nearly hyaline, 80–100 μm long. Cell I isodiametric or slightly elongated, cell II slightly elongated, cell III slightly flattened, smaller than cell II. Appendage simple, up to 80 μm long, its lower cells slightly

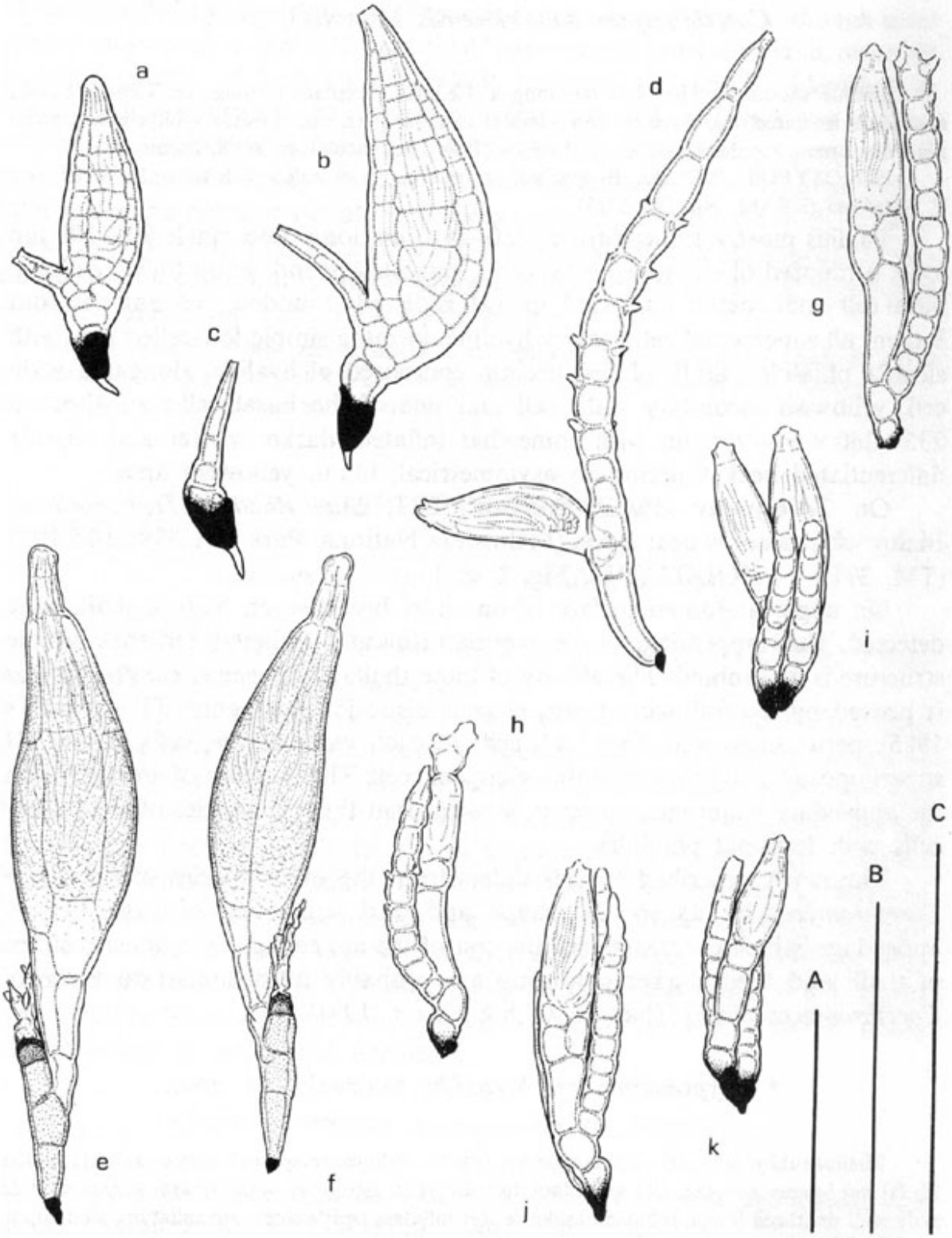

Fig. 1. *Autoicomyces aquatilis* (Picard) I.Tavares, claw form. a, b: mature thalli, c: young thallus (drawn from TM. 8138). *Chaetarthriomyces crassappendicatus* Scheloske. d: untypical thallus (from TM 6768). *Corethromyces bialowiezensis* Majewski. e, f: mature thalli (from TM 3713, holotype). *Cryptandromyces bryaxidis* Majewski. g: mature thallus, holotype, h: immature thallus, i-k: paired thalli (from TM 8665, 7951, 7949, 7950, 4847). Scale bars: 100 μm (A for e and f, B for a-c, C for g-k).

flattened, upper cells rather elongated; antheridia formed as sessile phialides on inner or outer side of some of cells in middle and upper region of appendage. Stalk cell of the perithecium elongated, basal cells isodiametric or elongated, somewhat swollen; perithecium 30–45 × 10–15 μm, slender, symmetrical, with not inflated venter (ca. as broad as basal cells complex) amd short, thick neck with small subapical teeth.

On *Bryaxis bulbifer* (Reichenbach) (*Col., Pselaphidae*): Białowieża National Park, sect. 256E, 16.6.1988 (TM 4178); ibid., sect. 256D, 14.5.1990 (TM 4847); ibid., sect. 255C, 23.7.1998 (TM 8665 – HOLOTYPE); ibid., sect. 345C, 28.9.1998 (TM 8959); Białowieża Forest, sect. 192C, 21.8.1997 (TM 7949–7952); ibid., sect. 541A, 8.6.1998 (TM 8440). Fig. 1: g-k.

Most thalli occurred in solitary pairs on abdominal tergites, infrequently on abdominal sternites, distal part of elytra and on legs. Holotype was found in *Carici elongatae-Alnetum*, in litter.

The species was described earlier (M a j e w s k i 1994) on the basis of scarce, immature material, and named *Cryptandromyces* sp. Later on, several mature, well developed thalli were collected. These thalli differ from *C. brachyglutae* J. Siemaszko et W. Siemaszko (S i e m a s z k o 1928) by their much smaller size, brighter colour, slender perithecium and appendage, whose cells are not strongly elongated and form phialides rather in the distal part. Similar thalli were recorded by S a n t a m a r i a (1989) in Spain on *Bryaxis* sp., but he named them as *Cryptandromyces brachyglutae*. It is not impossible that thalli collected in France by M a i r e (1916) on *Bryaxis longicornis* Leach [acc. to B a l a z u c (1973) this is *Bryaxis sanguinea* Reichenbach)] and named *Peyerimhoffiella elegans* Maire belong to the presently described species.

* *Dimorphomyces phloeoporae* Thaxter

Female thallus pale-brownish. Basal cell of receptacle up to 90 μm long, slightly arcuated, subtending a series of 6–11 obtriangular cells arranged obliquely. The first cell of the series (cell II) subtending tree-celled primary appendage; the two basal cells of the primary appendage isodiametric, the distal one narrow, darker, often disintegrating; the remaining cells of the series producing a perithecium or secondary asppendage alternately, or sometimes two appendages are produced successively. Perithecia 70–78 × 17–20 μm, 1–5 in number, but only 1–3 mature, with slightly inflated venter and asymmetrical, rounded apex. Secondary appendages up to 30 μm long, two-celled; the distal cell longer, darkened in the apical part.

Male thallus pale-brownish. Primary axis consisting of 5–6 cells, 43–48 μm long; the basal cell elongated, cells bearing antheridia, especially the second or third one, flattened, situated obliquely, two subdistal cells nearly

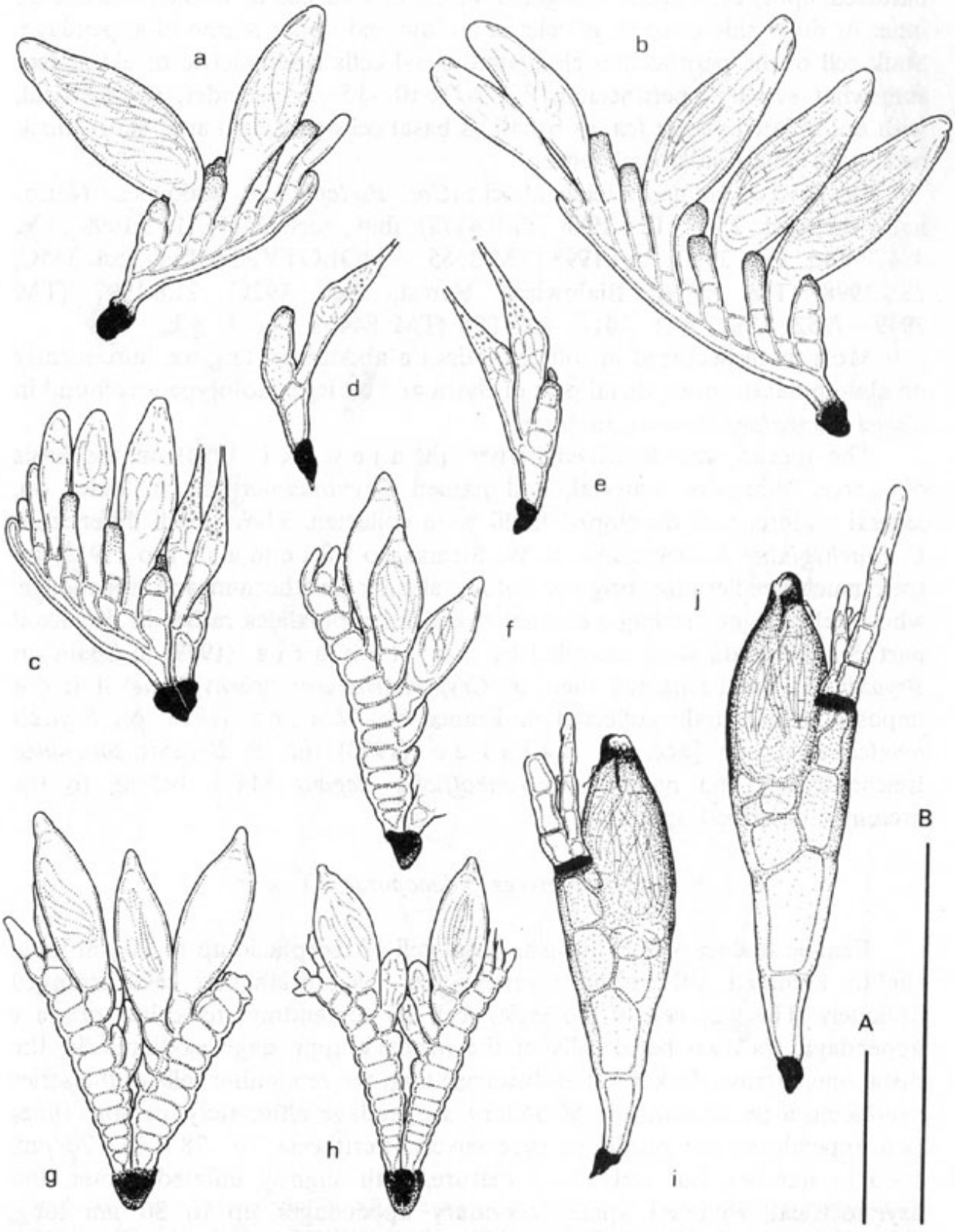

Fig. 2. *Dimorphomyces phloeoporae* Thaxter. a, b: mature female thalli, c: male and female thalli paired, d and e: male thalli (drawn from TM 5881 and 5882). *Euphoriomyces unilateralis* Majewski. f-h: mature thalli (f and g drawn from TM 4037, h from TM 7734, holotype). *Laboulbenia atlantica* Thaxter. i and j: mature thali (from TM 8273). Scale bars: 100 μm (A for i and j, B for a-h).

isodiametric, the distal one narrow, darker, often disintegrating. Antheridia one, not often two, exceptionally three per thallus, with straight long neck, 45–56 μm long (with stalk), 7–10 μ wide.

On *Phloeopora testacea* Mannerheim (*Col., Staphylinidae, Aleocharinae*): Krzywa (N of Orla), 24.5.1995 (TM 5880–5883). Fig. 2: a-e.

Thalli were detected on the lower part of abdomen and posterior leg of one host beetle.

This fungus is probably conspecific with *Dimorphomyces phloeoporae*, which was described (with the name of *D. Thleoporae*) by T h a x t e r (1900). Its sizes are bigger than those of typical specimens (their perithecia were 50 × 14 μm, lateral portion of thallus was 50 μm long), which, however, were not quite mature. Nevertheless, those of presently collected specimens that were not quite mature and had rather poorly developed thallus axis (e.g. Fig. 2c) are similar to T h a x t e r ' s (1908) figure and congruent with the description of the type. *Dimorphomyces phloeoporae* differs from *D. myrmedoniae* Thaxter, which is known also from Poland, in lack of dark septa in the axis of primary appendage, shape of its apical cell, and in having more inflated perithecia.

Dimorphomyces phloeoporae was described in Madeira and later not recorded. S a n t a m a r i a et al. (1991) reported it from Sweden, but cite T a v a r e s (1985) as the source, who only mentions (citing the unpublished B a l a z u c ' s index) about the occurrence of an undetermined *Dimorphomyces* representative in Sweden on *Phloeopora*. Of course, it is probable that the species was *D. phloeoporae*.

* ***Euphoriomyces unilateralis*** Majewski, sp. nova

Thalli binatim, 88–110 μm longi. Axis receptaculi et appendicis e 11–13 cellulis compositus, terminatus 2–3 phialidibus vel brevibus ramulis, sine ramulis secundariis. Perithecia 1–3, 35–48 × 14–20 μm, in internis lateribus binatis thallis genita.

HOLOTYPUS: Poloniae, Białowieża, sectio silvae 638D, super *Agathidii atri* (Paykull), 24.7.1997, leg. T. Majewski (KRAM, TM No. 7734).

Thalli paired, 88–110 μm long. Receptacle axis (up to the cell bearing uppermost, oldest perithecium), 48–60 μm long, composed of 8–10 cells; basal cell obtriangular, other cells flattened. Primary appendage axis is a prolongation of receptacle, composed of 3–4 flattened or isodiametric cells, its distal one or two cells bear few (2–3) phialides or short branchlets; no secondary branchlets arising from receptacle. Perithecia and their initials arising only on the internal sides of paired thalli; fully developed perithecia 1–3 in number, 35–48 × 14–20 μm, ovate or more elongate, with narrowed subapical part.

On *Agathidium atrum* (Paykull) (*Col., Leiodidae*): Białowieża Forest, sect. 638D, *Circaeo-Alnetum*, in litter, 24.7.1997 (TM 7734 – HOLOTYPE); Franulka near Miłosław, Poznań voivodeship, 1.5.1988 (TM 4037). Fig. 2: f-h.

Rare species, reported and described formerly as a doubtful form of *Euphoriomyces agathidii* (Maire) I. Tavares (M a j e w s k i 1994). New material detected in Białowieża Forest occasioned a new comparison of this fungus with other representatives of the genus *Euphoriomyces*, which was recently revised by S a n t a m a r i a (1991).

Euphoriomyces unilateralis decisevely differs from other representatives of its genus. Its characteristic traits are low number of branchlets at the top of the appendage and their lack below, and the development of perithecia in one series only on the internal sides of paired thalli.

* *Laboulbenia anoplogenii* Thaxter

Thallus pale brownish, 310–365 μm long. Receptacle stout or slender, 180–290 μm long; cell I 2–3 times longer than broad, cell II 1.5–3 times longer than broad, cell III 1.5–2 times longer than broad, cell IV nearly isodiametric, convex below the insertion cell, cell V oval, usually half as long as cell IV or even longer. Insertion cell dark, strongly constricted; outer appendage up to 405 μm long, consisting of several straight branches, its basal cell isodiametric, often rounded; basal cell of inner appendage small, giving rise to two short ramified branches terminated by numerous antheridia. Stalk cell of perithecium not more than two times longer than broad; perithecium 134–141 × 60–75 μm, less than half free, ovate, slightly asymmetrical, with slightly darkened venter, subapical black spots and prominent rounded posterior lips.

On *Acupalpus* (*Stenolophus*) *teutonus* (Schrank) (*Col., Carabidae, Harpalinae*): Mikłaszewo (E of Narewka), 21.6.1995 (TM 6149); Pasieczniki Małe (SSW of Hajnówka), 10.7.1997 (TM 7450, 7451). Fig. 3: a-c.

Collected on the lower side of the host's thorax thalli are rather infrequent: 3 mature, 5 immature. They differ from *Laboulbenia acupalpi* known from Poland (M a j e w s k i 1994) by strong branching of outer and inner appendages; antheridia are very numerous, forming clusters, and basal cell of outer appendage is not elongated. Cell IV, however, is not divided and does not form a blunt outgrowth as in type of *L. anoplogenii* described by T h a x t e r (1899, 1908); consequently, these specimens are more similar to Iberian thalli (S a n t a m a r i a 1989, 1998).

In Poland, thalli that do not differ from *Laboulbenia acupalpi* were detected on other representatives of the subgenus *Stenolophus*, *Acupalpus* (*Stenolophus*) *mixtus* (Linnaeus) and *A.* (*S.*) *skrimshiranus* (Stephens).

* *Laboulbenia atlantica* Thaxter

Thallus 255–300 μm long, olive brownish. Receptacle 180–218 μm long; cells I–IV ca. 2 times longer than broad, cell V obtriangular, shorter than

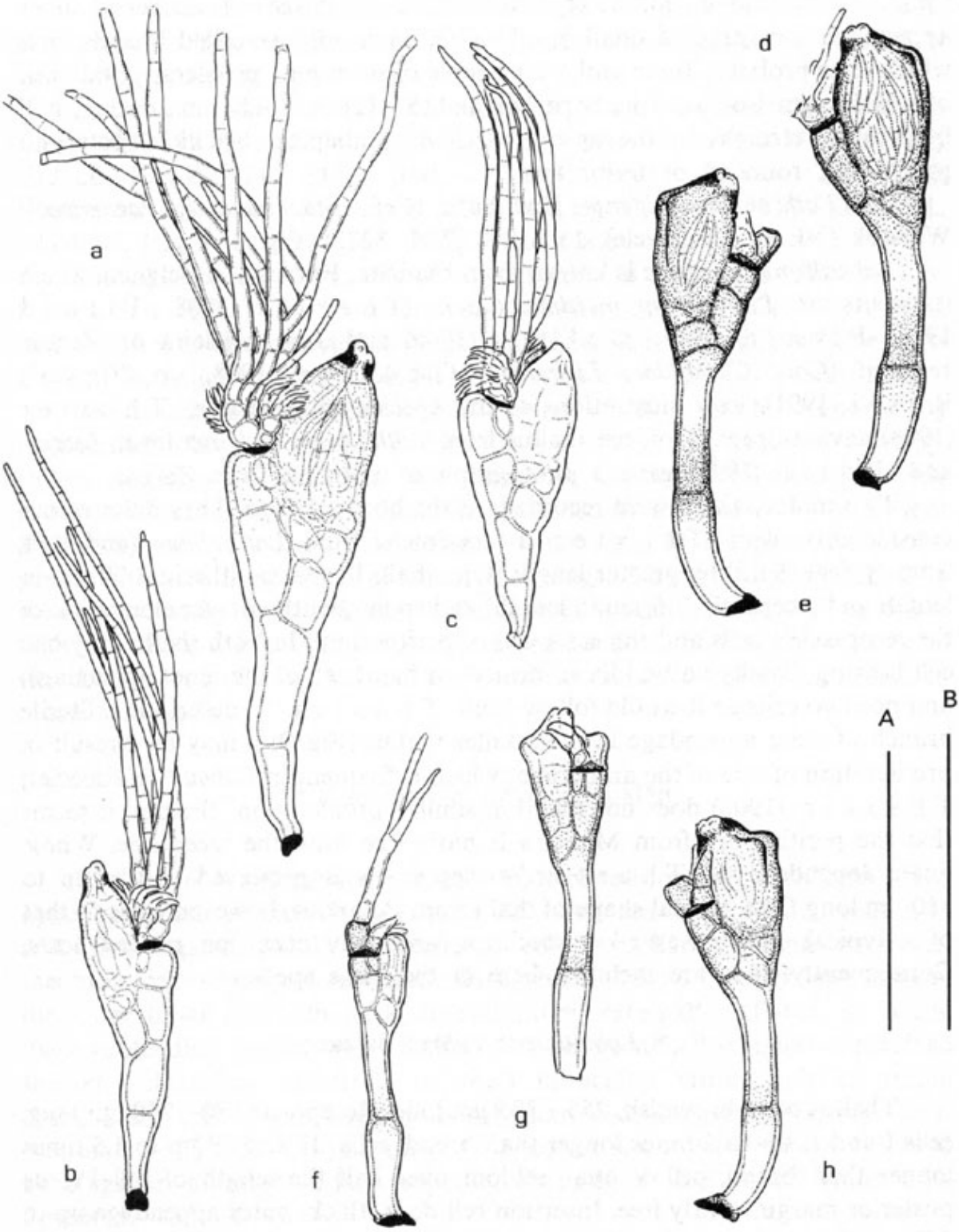

Fig. 3. *Laboulbenia anoplogenii* Thaxter. a: mature thallus, b and c: immature thalli (drawn from TM 7450, 7451 and 6149). *Laboulbenia carelica* Huldén. d, e and h: mature thalli, f and g: immature thalli (from TM 7025, 8438, 7749, 7749 and 6489). Scale bars: A – 200 μm (for a-c), B – 100 μm (for d-h).

a half of cell IV. Insertion cell dark, thick, sligthly constricted; outer appendage simple, its cells elongated, the septum between two lower cells darkened; inner appendage consisting of small basal cell bearing one one-celled branch from which arise probably three antheridia; some of them may proliferate. Stalk cell of perithecium isodiametric, perithecium 115–128 × 51–58 μm, darker, half free, ovate, straight in the apical part, with subapical blackich spots and protruding, rounded posterior lips.

On *Lathrobium volgense* Hochhuth (*Col., Staphylinidae, Paederinae*): Werstok (NE of Kleszczele), 15.5.1998 (TM. 8273). Fig. 2: i, j.

Laboulbenia atlantica is known from Madeira, France and Belgium, where it occurs on *Lathrobium multipunctatum* (Thaxter 1908, Picard 1913, Picard 1917, Collart 1945) and from Madeira on *Zargus schaumi* (*Col., Carabidae, Licininae*) (Thaxter 1908, on "*Gargus*"; Rossi 1991). Few illustrations of this species are available. Thaxter (1908) gave a drawing of one thallus from *Lathrobium* and one from *Zargus*, and Rossi (1991) gave a photograph of a thallus from *Zargus*.

Two mature thalli were recorded on the host's elytron. They differ rather considerably from Thaxter's specimens from *Lathrobium* (and thus from typical thalli) by greater length (type thalli have a perithecium 90 μm in length and receptacle 110 μm in length) and consequently greater elongation of the receptacle's cells and the stalk cell of perithecium. In both thalli, only one cell bearing distally antheridia is formed on basal cell of the inner appendage, and not two cells as it would follow from Thaxter's description. Sterile branch of inner appendage in the smaller thallus (Fig. 2: j) may be a result of proliferation of one of the antheridia, which is frequent in *Laboulbenia* species; Thaxter (1908) does not mention similar proliferation. Besides, it seems that the perithecium from Madeira is more free from the receptacle. Whole outer appendage of Thaxter's specimens is preserved and is up to 380 μm long. The general shape of thalli from Poland is, however, close to that of a typical Thaxter's specimen, and they occur on related hosts. Consequently, they are included here in the same species.

* *Laboulbenia aubryi* Balazuc

Thallus olive-brownish, 255–385 μm long. Receptacle 180–260 μm long, cells I and II up to 2 times longer than broad, cells III and IV up to 1.5 times longer than broad, cell V oval, seldom over half the length of cell IV, its posterior margin nearly free. Insertion cell dark, thick; outer appendage up to 650 μm long, always simple, composed of elongated cells; inner appendage composed of small basal cell and two ramified branches terminated in young thalli by clusters of antheridia; in older thalli some antheridia may proliferate into short branchlets exceeding the top of perithecium, seldom one or two such

branchlets may be quite long. Stalk cell of perithecium usually isodiametric, basal cells flattened, perithecium 128–180 × 45–77 μm, ovate or elongated, blackened, 3/4 free, straight or with the top directed outwards, with a slightly protruding posterior lips.

On *Amara municipalis* (Duftschmid) (*Col., Carabidae, Harpalinae*): Białowieża, 18.10.1997 (TM 8054); Kępa Kiełpińska near Warszawa, 11.3.1997, leg. Tadeusz Plewka (TM 8112): ibid., 21.3.1997, leg. T. Plewka (TM 8114); Dziekanów Leśny near Warszawa, 20.10.1997, leg. T. Plewka (TM 8122); ibid., 2.11.1997, leg. T. Plewka (TM 8123). Fig. 4: a-e.

Laboulbenia aubryi was described in Spain (B a l a z u c 1979, S a n t a m a r i a 1998) on *Cyrtonotus rotundicollis* (Schauf.) (*Col., Carabidae, Amarini*); it was also reported in Nepal and India. It is distinguished due to its free cell V, which is clearly visible in B a l a z u c ' s (1979) drawing.

Perhaps, the species is not rare in Poland, which would be supported by unpublished observations by T. P l e w k a, MSc. (Institute of Ecology, Polish Academy of Sciences), who collected it near Warszawa, but only in autumn and winter. The only thallus recorded by the author in Białowieża (Fig. 4: a), located on the trochanter of a hind leg, is untypical due to the prolifreration of the branch of inner appendage. During the preparation of the above description and figures of the species, specimens kindly given access to by T. P l e w k a were used. More precise ecological observations and site descriptions of *Amara municipalis* and its parasite will be published in a separate study.

* *Laboulbenia carelica* Huldén

Thallus 160–180 μm long, in most part olive-brownish, perithecium and upper receptacle darkened. Receptacle 120–148 μm long, slender; cells I, II and III elongated, cell IV isodiametric, cell V similar in length, narrower. Insertion cell slightly constricted, dark; basal cells of appendage brown, the outer basal cell with dark distal septum, externally inflated, in young thalli subtending fragile, once ramified branch, basal cell of inner appendage smaller, subtending antheridia or short branchlets visible only in young thalli. Stalk cell of perithecium usually flattened, situated obliquely; perithecium 50–63 × 30–33 μm, about 1/2 free, nearly obovate, with two pointed swellings on anterior surface, tapering abruptly to the broad hyaline tip. Spores 30–33 × 4 μm.

On *Bembidion doris* (Panzer) (*Col., Carabidae*): Białowieża Forest, sect. 17A/B, 20.8.1995 (TM 6489); ibid., sect. 92A, 7.8.1996 (TM. 7023, 7025); ibid., sect. 674B, 24.7.1997 (TM 7749); ibid., sect. 488C, 8.6.1998 (TM. 8438). Fig. 3: d-h.

Laboulbenia carelica was described by H u l d é n (1983) on *Bembidion doris* in Finland. Thalli that are undoubtedly identical with the species detected by H u l d é n were recorded in the Białowieża Forest on the same host. The fungus is closely related with *Laboulbenia pedicellata* Thaxter, with which it sometimes occurs on the same insect. It differs from *L. pedicellata* by its shorter perithecium with anterior swellings and shorter and thicker spores. Althout it is closely related yet deserves distinguishing. No intermediate forms between the thalli of a shorter perithecium, of the *L. carelica* type, and the thalli of an elongated perithecium, of the *L. pedicellata* type, were observed. Moreover, in *L. carelica* no receptacle variability, typical of *L. pedicellata*, in which thalli with a stout or with very slender receptacle are frequent, was noted. In Polish *L. carelica* thalli the receptacle is uniformly slender.

The cell V of *L. carelica* is similar to that in *L. pedicellata*, and thus it is connected with cell III. H u l d é n ' s (1983) drawings (Fig. 88) are not clear in this respect, while Fig. 88c suggests that cell V does not adjoin cell III. In his overaged thalli, the structure of this receptacle part, strongly darkened, may have been badly seen.

Young thalli of *L. carelica* may be indistinguishable from young thalli of the slender *L. pedicellata* form.

Laboulbenia coneglanensis Spegazzini

On *Harpalus affinis* (Schrank) (*Col., Carabidae, Harpalini*): Koszele (N of Kleszczele), 29.7.1998 (TM 8773, 8774); on *Harpalus latus* (Linnaeus): Białowieża Forest, sect. 450D, 4.8.1996 (TM 6968); on *Harpalus rufipes* (De Geer): Wiluki (NEE of Kleszczele), 6.9.1996 (TM 7257); Orla (N of Kleszczele), 19.8.1997 (TM 7936); Klejniki (SW of Narew), 19.8.1998 (TM 8839).

The type host of *Laboulbenia coneglanensis* is *Harpalus rufipes* (De Geer) (*Ophonus pubescens* O. F. Müller), later on this parasite was reported from various species of the genera *Harpalus* and *Anisodactylus*. From Poland it was reported by S i e m a s z k o (1928). The fungi of these hosts are similar to *Laboulbenia flagellata* Peyritsch (infecting mostly *Platynini* and *Pterostichini* of the *Carabidae*). Due to this they are combined by certain authors, and thus in the study of *Laboulbeniales* of Poland (M a j e w s k i 1994) *L. coneglanensis* is one of synonyms of *L. flagellata*. Recently T e r a d a (1998) analysed in detail the morphology of both these species. He concluded that *Laboulbenia coneglanensis* differs in a constant and decisive way from *L. flagellata*. The most important features that differentiate *L. coneglanensis* from *L. flagellata* are: 1° below the ostiole of perithecium there is a complete black ring area (in *L. flagellata*, the anterior black spot is not so distinct and not connected with the posterior one), 2° perithecial apex is distinctly cylindrical, 3° perithecia are often cylindrical, 4° there are solitary sessile antheridia on branches of inner

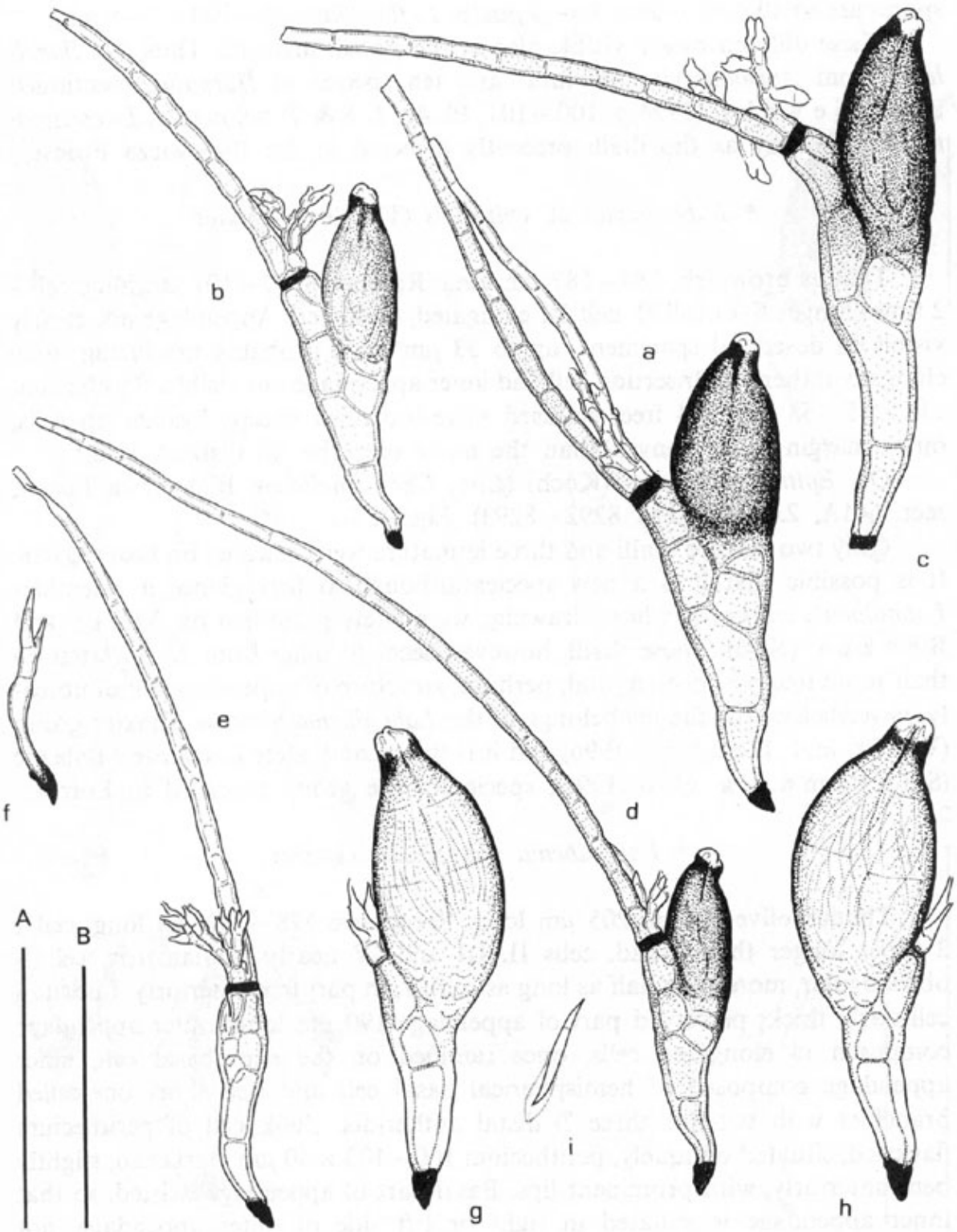

Fig. 4. *Laboulbenia aubryi* Balazuc. a-d: mature thalli, e: young thallus (drawn from TM 8054, 8112, 8122, 8123, 8114). *Laboulbenia* cf. *epithricis* (Thaxter) Thaxter. f: undeveloped thallus with antheridia only, g and h: mature thalli, i: spore (from TM 8292). Scale bars: A – 200 μm (for a-e), B – 100 μm (for f-i).

appendage of adult thalli (in *L. flagellata*, antheridia are usually paired), 5° ascospores are smaller, 47–68 × 4.5–5 μm (in *L. flagellata*, 60–100 × 5–8 μm).

These differences are visible also in the Polish material. Thus, "*L. flagellata*" from *Anisodactylus binotatus* and ten species of *Harpalus*, mentioned in Majewski (1994 p. 100–101, Pl. 49: 1, 5 & 7) belongs to *L. coneglanensis*, similarly as the thalli presently detected in the Białowieża Forest.

* *Laboulbenia* cf. *epithricis* (Thaxter) Thaxter

Thallus brownish, 184–187 μm long. Receptacle 97–101 μm long, cell I 2 times longer than cell II, cell III elongated, darkened. Appendage not clearly visible in described specimens, up to 33 μm long, probably producing three elongate antheridia. Insertion cell and inner appendage not visible. Perithecium 112 × 48–53 μm, 3/4 free, suffused olive-brownish except hyaline lip cells, outer margin more convex than the inner one; the tip distinct, blunt.

On *Epitrix pubescens* (Koch) (*Col., Chrysomelidae*): Białowieża Forest, sect. 641A, 2.6.1998 (TM 8292–8293). Fig. 4: f-i.

Only two mature thalli and three immature were detected on host's elytra. It is possible that it is a new species although at first glance it resembles *Laboulbenia epithricis*, whose drawings were lately published by Weir and Beakes (1996). These thalli, however, seem to differ from *L. epithricis* by their more free perithecium and, perhaps, structure of appendage. Undoubtedly, nevertheless, the fungus belongs to the *Laboulbenia nisotrae* Thaxter group (Weir and Beakes 1996) and it is the second, after *L. temperei* Balazuc (Santamaria et al. 1991), species of the group recorded in Europe.

* *Laboulbenia paupercula* Thaxter

Thallus olive-brown, 205 μm long. Receptacle 128–132 μm long, cell I 2 times longer than broad, cells II, III and IV nearly isodiametric, cell V obtriangular, more than half as long as cell IV, in part free anteriorly. Insertion cell dark, thick; preserved part of appendage 190 μm long; outer appendage composed of elongated cells, once ramified on the suprabasal cell, inner appendage composed of hemispherical basal cell and one short one-celled branchlet with two (or three ?) distal antheridia. Stalk cell of perithecium flattened, situated obliquely, perithecium 100–103 × 40 μm, darkened, slightly bent anteriorly, with prominent lips. Basal part of appendage twisted, so that inner appendage is situated in right or left side of outer appendage, not anteriorly, as usually in other *Laboulbenia* species. Also cell V is replaced in the same direction, being better visible on one side of the thallus.

On *Agonum viduum* (Panzer) (*Col., Carabidae, Pterostichini*): Użyki (N of Orla), 12.5.1998 (TM 8218). Fig. 5: a, b.

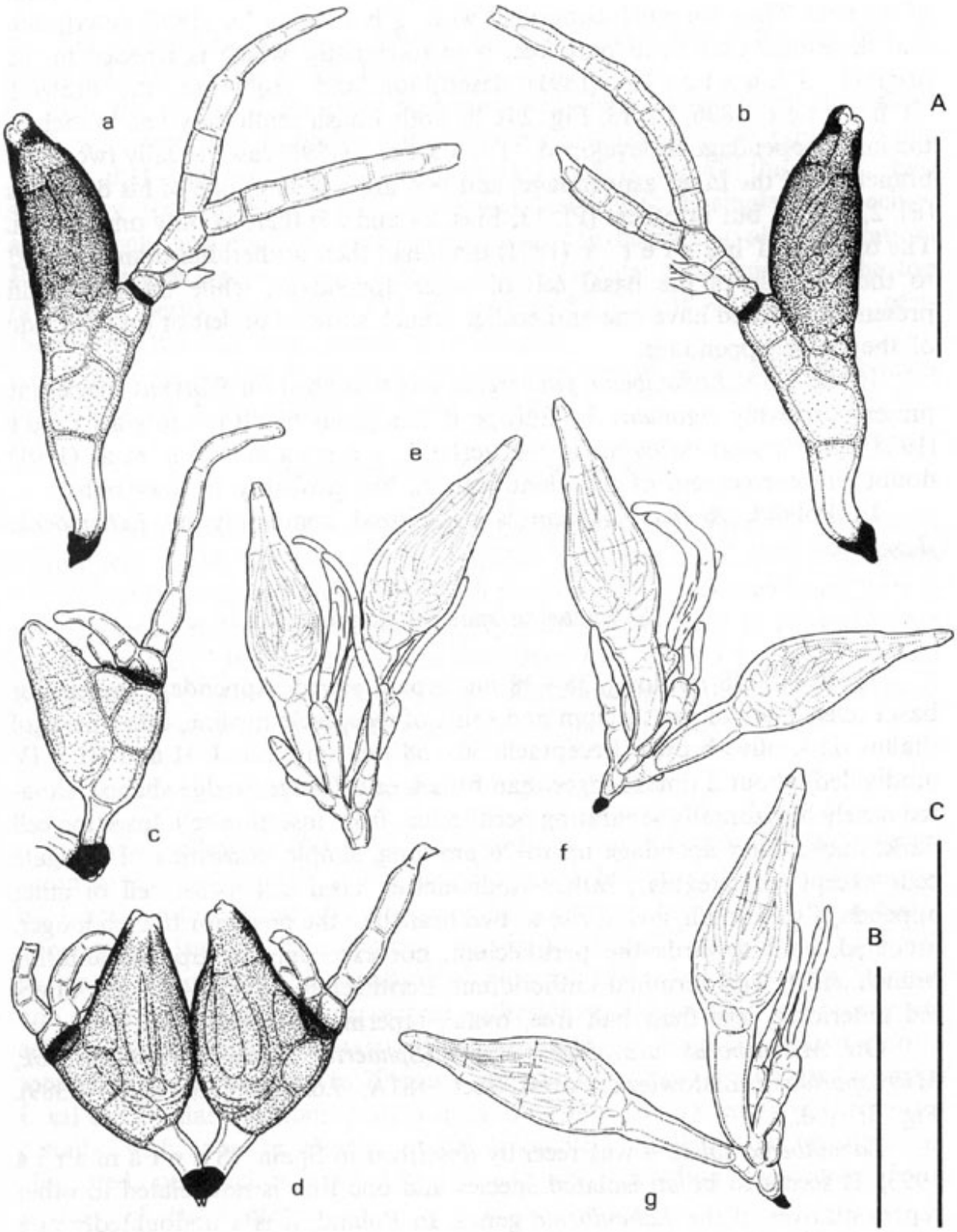

Fig. 5. *Laboulbenia paupercula* Thaxter. a, b: mature thalli (drawn from TM 8218). *Laboulbenia sphaerii* Santamaria. c: not fully mature thallus, d: mature paired thalli (from TM 8387 and 8388). *Monoicomyces balazyi* Majewski. e-g: mature thalli (from TM 8776). Scale bars: 100 μm (A for a and b, B for e-g, C for c and d).

Two thalli that were similar to each other were recorded on the pronotum of the host. They are much congruent with Thaxter's (1896) description and drawings. Cell V, in part free, is characteristic, which is stressed in the original Thaxter's (1891) description and visible on the drawing (Thaxter 1896, Pl. 13, Fig. 24). In both Polish thalli only one branch of the inner appendage is developed. Thaxter (1896) saw "usually two short branches" of the inner asppendage, and two are visible in one of his drawings (Pl. 2, Fig. 9), but in others (Pl. 13, Figs. 24 and 25) there is only one branch. The original Thaxter's (1891) thalli had their antheridial branch shifted to the left side of the basal cell of outer appendage, while the two thalli presently recorded have one antheridial branch situated on left or on right side of the outer appendage.

In the USA, *Laboulbenia paupercula* was described on *Platynus* species (at present probably *Agonum*). In Europe it was given by Baumgartner (1923) on *Platynus ruficornis* in Switzerland. Santamaria et al. (1991) doubt the correctness of his identification, but probably he was right.

In Poland, *Agonum viduum* is parasitized commonly by *Laboulbenia flagellata.*

* *Laboulbenia sphaerii* Santamaria

Thalli 68–78 μm long, 35–38 μm broad, paired. Appendage (except for basal cells), apex of perithecium and cell I of receptacle hyaline, other parts of thallus dark olive-brown. Receptacle 56–58 μm long, cels I, II and III + IV (undivided) about 2 times longer than broad, cell V large, wedge-shaped, situated nearly horizontally separating perithecium from insertion cell. Insertion cell dark, thick; outer apendage up to 76 μm long, simple, consisting of elongate cells except for irregular, rather isodiametric basal cell; basal cell of inner appendage very small, giving rise to two branches; the posterior branch longer, arcuated, bent towards the perithecium, not exceeding its tip, the anterior branch short, with terminal antheridium. Perithecium 56 × 22–25 μm, directed anteriorly, less than half free, ovate, tapering to broad apex.

On *Microsporus acaroides* (Waltl) (*Sphaerius acaroides* Waltl) (*Col., Microsporidae*): Białowieża Forest, sect. 181A, 7.6.1998 (TM 8387–8389). Fig. 5: c, d.

Laboulbenia sphaerii was recently described in Spain (Santamaria 1993). It seems to be an isolated species and one that is not related to other representatives of the *Laboulbenia* genus. In Poland, it is a undoubtedly rare species, absent in numerous controlled populations of the host, which is difficult to find due to its small body size, anyway. In one described locality two pairs of mature and maturing thalli and one very young were detected. They grew on the pronotum and elytra of the host.

Monoicomyces balazyi Majewski

On *Acrotrichis thoracica* (Waltl) (*Col., Ptiliidae*), male: Reduty (SE of Orla), 29.7.1998 (TM 8776). Fig. 5: e-g.

On the elytra of the only host specimen three mature, well developed thalli were recorded. Probably, they represent a structure more typical of this species that the holotype (Majewski 1994). In all the thalli, two secondary receptacles are well developed, each with a single perithecium and a single antheridium, and frequently at the beginning of proliferation. Primary appendage is always simple. Measurements: total length to the top of longest perithecium 162–177 μm, antheridia 35–38 × 12–15 μm, perithecia 75–100 μm long, spores 25 × 2.5 μm.

This is the second locality of this very rare species, which is so far known only from the type locality in West Poland.

Monoicomyces homalotae Thaxter

On *Atheta putrida* (Kraatz) (*Col., Staphylinidae, Aleocharinae*): Białowieża Forest, sect. 392D, 22.7.1994 (TM 5561); ibid., sect. 439C, 25.7.1994 (TM 5630).

In the Białowieża Forest, thalli with narrowed and darkened lower part of the perithecial stalks were recorded. They were not collected in Poland before (Majewski 1994), while were described by Thaxter (1908) and Santamaria (1989). The degree of darkening of these thallus parts varies, from weak to stronger, even dark amber brown.

* *Monoicomyces oxyteli* Huldén

Thallus yellowish, 190–315 μm long. Basal cell of receptacle obtriangular, suprabasal cell elongated, subtending a smaller, bell-shaped cell III separated by black septum from the once-ramified, delicate branch of the primary appendage. Usually one receptacle axis is developed; it is formed by 4–12 flattened cells oriented diagonally, the distal cell giving rise to one perithecium and one antheridium, seldom second antheridium is developed from the lower cell of the axis; each other axis cell bears bell-shaped basal cell of two filiform secondary appendages up to 200 μm long, the appendage is separated from its basal cell by dark septum. Antheridium 38–48 × 20–28 μm, stout, rounded distally, with long or shorter apical branchlets. Stalk cell of perithecium elongated, perithecium 100–130 × 26–45 μm (including basal cells), with slightly inflated venter.

On *Oxytelus fulvipes* Erichson (*Col., Staphylinidae, Oxytelinae*): Białowieża Forest, sect. 439C, 25.7.1994 (TM 5627, 5628); ibid., sect. 666A, 4.7.1997 (TM 7375); ibid., sect. 463C, 8.6.1998 (TM 8426); Kotłówka (S of Narew), 11.7.1995 (TM 6190). Fig. 6: a-e.

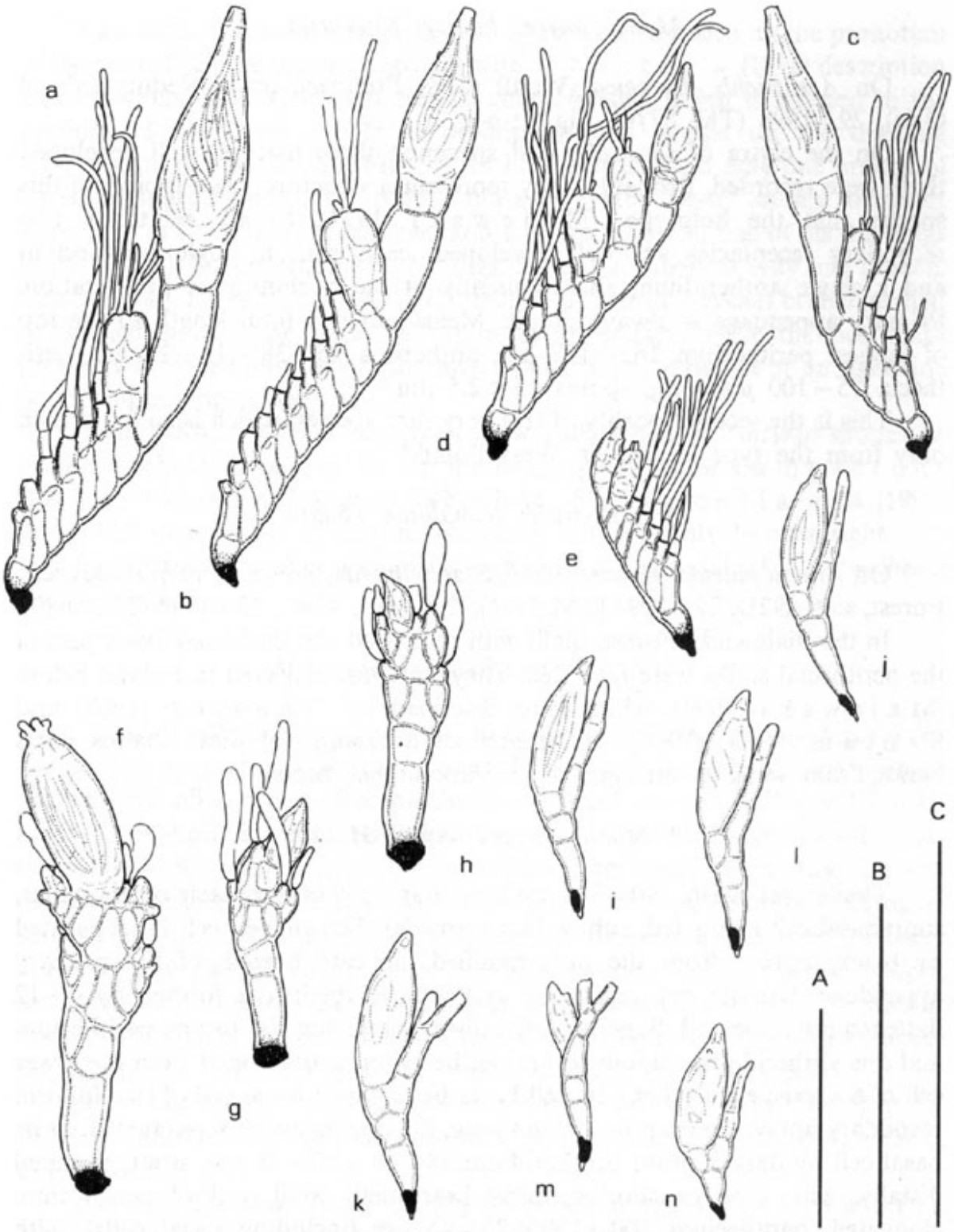

Fig. 6. *Monoicomyces oxyteli* Huldén. a-c: mature typical thalli, d: thallus with two antheridia, e: immature thallus (drawn from TM 6190, 5627, 5628, 7375 and 8426). *Peyritschiella geminata* Thaxter. f: mature thallus, g and h: immature thalli (from TM 6571, 6572 and 6573). *Phaulomyces ptilii* Majewski. i, j and l: mature thalli with simple appendage, k and m: thalli with ramified appendage, n: thallus with one-celled lower receptacle (i-m from TM 7062, holotype, n from TM 7063, isotype). Scale bars: 100 μm (A for a-e, B for f-h, C for i-n)

Monoicomyces oxyteli was described by H u l d é n (1983) and is known till now only in Finland. *Monoicomyces invisibilis* Thaxter, which is similar to it, differs by a lower number of cells of the receptacle axis (2–3, exceptionally 4), frequently encountered branched receptacle composed of two axes, and shorter secondary appendages (up to 100 μm long). Such thalli as those described by H u l d é n are found only on *Oxytelus fulvipes*; the host specialization additionally confirms these species' separatedness.

Monoicomyces oxyteli was collected in numerous localities of the Białowieża Forest. The localities given above are only those from which drawn thalli originated.

* *Peyritschiella geminata* Thaxter

Thallus hyalinus, 147 μm long. Receptacle 95 μm long, 33 μm broad; basal cell elongated, cylindrical; lower tier of cells consisting of two cells, rectangular and obtriangular ones; median tier consisting of 7 cells producing laterally two pairs of sterile appendages; upper tier consisting of 6 cells and lateral initials of next ones, giving rise to one mature perithecium, initial of a next one, and two sterile appendages up to 38 μm long; primary appendage located between the perithecia, separated by thick dark septum. Antheridia not observed. Perithecium 61 × 21 μm, slightly inflated, apex with four rounded lobes.

On *Pterostichus nigrita* (Fabricius) (*Col., Carabidae, Pterostichini*): Grudki near Białowieża, 15.7.1995 (TM 6571–6573). Fig. 6: f-h.

Only three thalli were recorded, including one mature that was described above; all were on the host's elytra, between the thalli of *Laboulbenia pseudomasei* Thaxter. This scarce material does not allow making certain identification of this unexpectedly noted species, yet it is rather closest to *Peyritschiella geminata*, which was described by T h a x t e r (1894, 1896) on *Pterostichus* spp. in the USA (at present *Americomaseus*, cf. T a v a r e s 1985). The mature thallus from Poland is, it seems, similar to the simplest T h a x t e r ' s thalli found on the smaller host.

Of 46 species of the genus *Peyritschiella* (T a v a r e s 1985) only six infects *Carabidae*; none of them was known in Europe till now.

* *Peyritschiella vulgata* (Thaxter) I. Tavares

Thallus 215–250 μm long, in greater part yellow-brownish. Receptacle 145–156 μm long (up to base of primary appendage), up to 120 μm wide; basal cell hyaline, short; lower tier of cells narrow, blackened except of upper part of middle cell, composed at first of three elongated cells, later the lateral cells subdivided; the median tier often consisting of 5 well visible elongated cells and lateral ones, which subdivide giving rise to blackish strips being

continuation of lower blackenings and laterally surrounding the upper part of receptacle, but sometimes only short slightly darkened lateral outgrowths of median tier are formed; the upper tier distally concave, consisting of 12–25 elongated cells. Antheridia brownish, up to 28 μm long; sterile appendages up to 56 μm long. Perithecia 80–100 × 21–25 μm, 2–4 in number, apex broad with two arcuated auricles up tp 5 μm long. Spores 30–33 × 2.5 μm. Seldom found thalli not darkened, without perithecial auricles and lateral outgrowths of receptacle.

On *Spatulonthus longicornis* (Stephens) (*Col., Staphylinidae, Staphylininae*): Reduty (S of Orla), 17.7.1995 (TM 6306); Policzna (E of Kleszczele), 21.7.1995 (TM 6397); Doratynka (SW of Narew), 14.7.1997 (TM 7498); ibid., 24.7.1998 (TM 8699); on *Philonthus quisquiliarius* (Gyllenhal): Zabłotczyzna (W of Narewka), 15.6.1995 (TM 5959); Tarnopol (N of Narewka), 24.8.1996 (TM 7155). Fig. 7.

Peyritschiella vulgata is a very variable species. Its typical thalli are symmetrical, but sometimes lateral black parts of the receptacle are much shorter on one side. Anyway, the degree of their development varies: from short, extending up to the middle part of the receptacle, to long strips as long as lateral lobes of upper tier of the receptacle. Thalli without blackenings and with only few subdivisions of the lower and middle tier cells of receptacle are seldom found. Some of *Peyritschiella vulgata* thalli may be confused with *P. biformis* and *P. furcifera*, already detected in Poland (M a j e w s k i 1994). *Peyritschiella vulgata* differs from *P. biformis* by its shorter and bent auricles, which are almost always present; what is more, *P. biformis* never forms lateral blackenings extending outside the middle receptacle tier. *Peyritschiella vulgata* differs from *P. furcifera* by longer auricles and more complicated upper part of the thallus: four perithecia are more frequent, and the upper tier of receptacle consists of a higher number of cells and is usually much wider than the median tier.

Peyritschiella vulgata is common in the vicinity of the Białowieża Forest, but so far little known in Poland. A complete list of localities will be given in another study (M a j e w s k i, mscr.); here only the localities of drawn specimens are given. It is known from many coutries in Europe, Africa, Asia, both Americas and Australia (S a n t a m a r i a et al. 1991). Polish specimens are congruent with T h a x t e r ' s (1908), H u l d é n ' s (1983) and S a n t a m a r i a ' s (1989) descriptions and drawings.

* ***Phaulomyces ptilii*** Majewski, sp. nova

Thallus hyalinus, 65–76 μm longus. Cellulae prima et tertia receptaculi elongatae. Appendix simplex ver ramosus, e 2 vel 3 cellulis compositus. Antheridia ignota. Cellula pedunculi perithecii elongata, perithecium elongatum, 33–43 μm.

HOLOTYPUS: Poloniae, Białowieża, sectio silvae 751B, super *Ptilii affinis* Erichson, 8.8.1996, leg. T. M a j e w s k i (KRAM, TM No 7062).

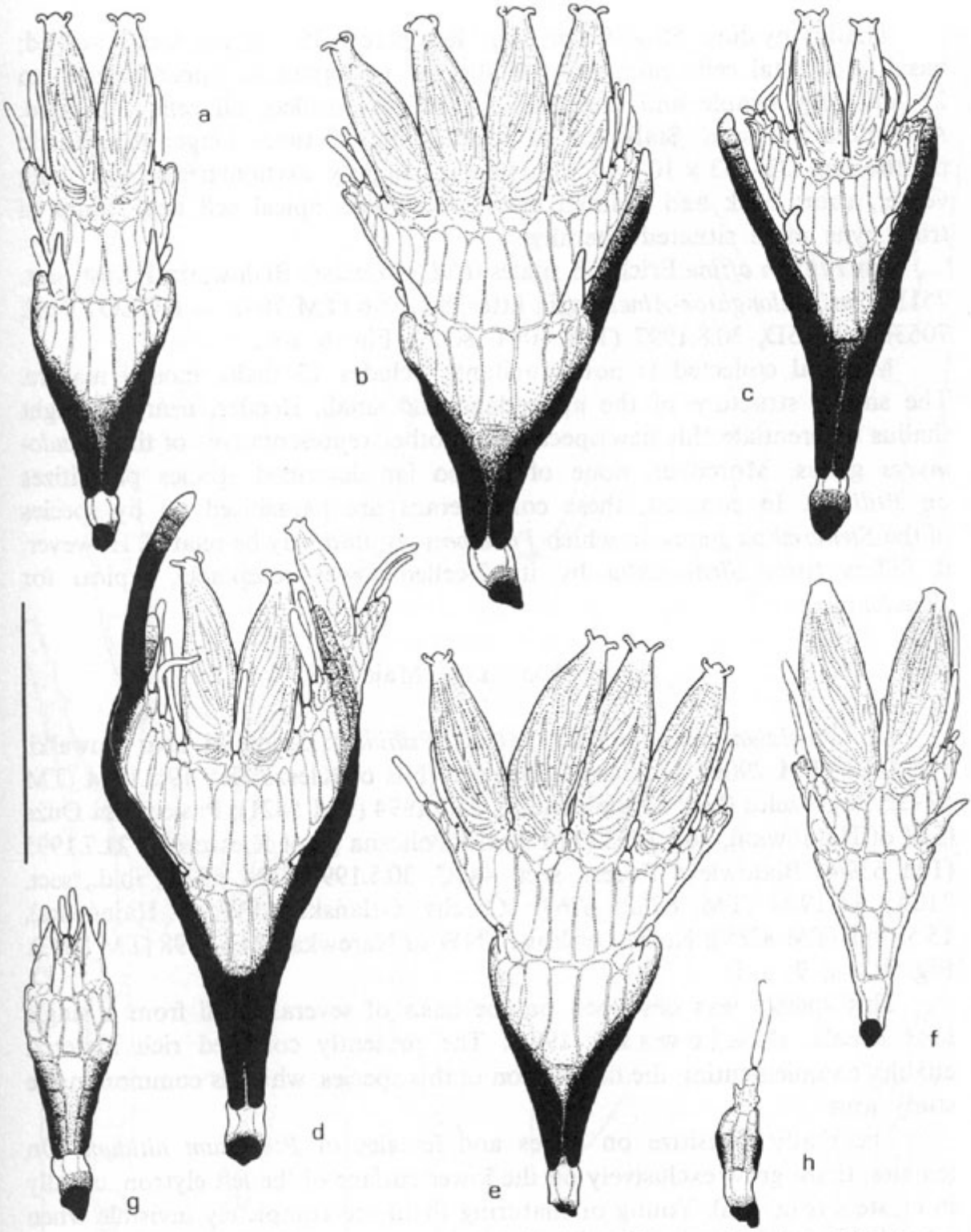

Fig. 7. *Peyritschiella vulgata* (Thaxter) Thaxter. a: thallus with two perithecia and black area developed only in lower part of receptacle, ventral view, b: thallus with four perithecia and a black strip developing only from left part of median tier, ventral view, c: thallus with well developed lateral strips, ventral view, d: thallus with long strips arising from median tier and exceptional black strip from upper tier, dorsal view, e: thallus with small black area, dorsal view, f: thallus without auricles and blackenings, ventral view, g and h: young thalli (drawn from TM 6306, 7498, 5959, 7155, 6306, 6397, 8699 and 6306). Scale bar: 100 μm

Thallus hyaline, 65–76 μm long. Receptacle 35–40 μm long, 3-celled; basal and distal cells elongated, middle cell isodiametric. Appendage up to 25 μm long, simple and 2-celled or ramified, 3-celled; all cells elongated. Antheridia not seen. Stalk cell of perithecium 1.5 times longer than thick; perithecium 33–43 × 10–15 μm, slender, slightly asymmetrical, with long venter, short neck and pointed apex; protruding apical cell and stump of trichogyne often situated laterally.

On *Ptilium affine* Erichson, males (*Col., Ptiliidae*): Białowieża Forest, sect. 751B, *Carici elongatae-Alnetum*, in litter, 8.8.1996 (TM 7062 – HOLOTYPE, 7063); sect. 5D, 30.8.1997 (TM 8044, 8046). Fig. 6: i-n.

Material collected is not abundant, includes 13 thalli, mostly mature. The simple structure of the appendage and small, slender, nearly straight thallus differentiate this new species from other representatives of the *Phaulomyces* genus. Moreover, none of the so far described species parasitizes on *Ptiliidae*. In contrast, these coleopterans are parasitised on by species of the *Siemaszkoa* genus, to which *Phaulomyces ptilii* may be related. However, it differs from *Siemaszkoa* by its 2-celled lower receptacle, typical for *Phaulomyces*.

Siemaszkoa valida Majewski

On *Ptenidium nitidum* (Heer) (*Col., Ptiliidae*): Smolniki near Suwałki, 13.6.1984 (TM 2906); Dubicze Cerkiewne (NE of Kleszczele), 19.5.1994 (TM 5392); Pogorzelce (NW of Białowieża), 21.5.1994 (TM 5421); Pasieczniki Duże (SW of Hajnówka), 26.5.1995 (TM 5921); Policzna (E of Kleszczele), 21.7.1995 (TM 6394); Białowieża Forest, sect. 442C, 30.5.1996 (TM 6621); ibid., sect. 310A, 8.6.1996 (TM 6762, 6763); Czechy Orlańskie (SW of Hajnówka), 15.5.1998 (TM 8269); Nowe Lewkowo (NW of Narewka), 24.6.1998 (TM 8533). Fig. 8: a-i, 9: a-d.

This species was described on the basis of several thalli from a single host female (Majewski 1991). The presently collected rich material enables complementing the description of this species, which is common in the study area.

The thalli parasitize on males and females of *Ptenidium nitidum*. On females, thalli grow exclusively on the lower surface of the left elytron, usually in clusters (Fig. 8: i). Young or maturing thalli are completely invisible when a beetle has its elytra closed. When thalli are mature and long, their distal parts may extend outside the edge of elytron (Fig. 8: h). However, they difficult to distinguish from the wing radii, which also frequently extend outside the elytra. In males, thalli grow most frequently solitarily on the penis, which is then always extended (Fig. 9: a). In only one case young and deformed thalli were encountered at the end of a male abdomen.

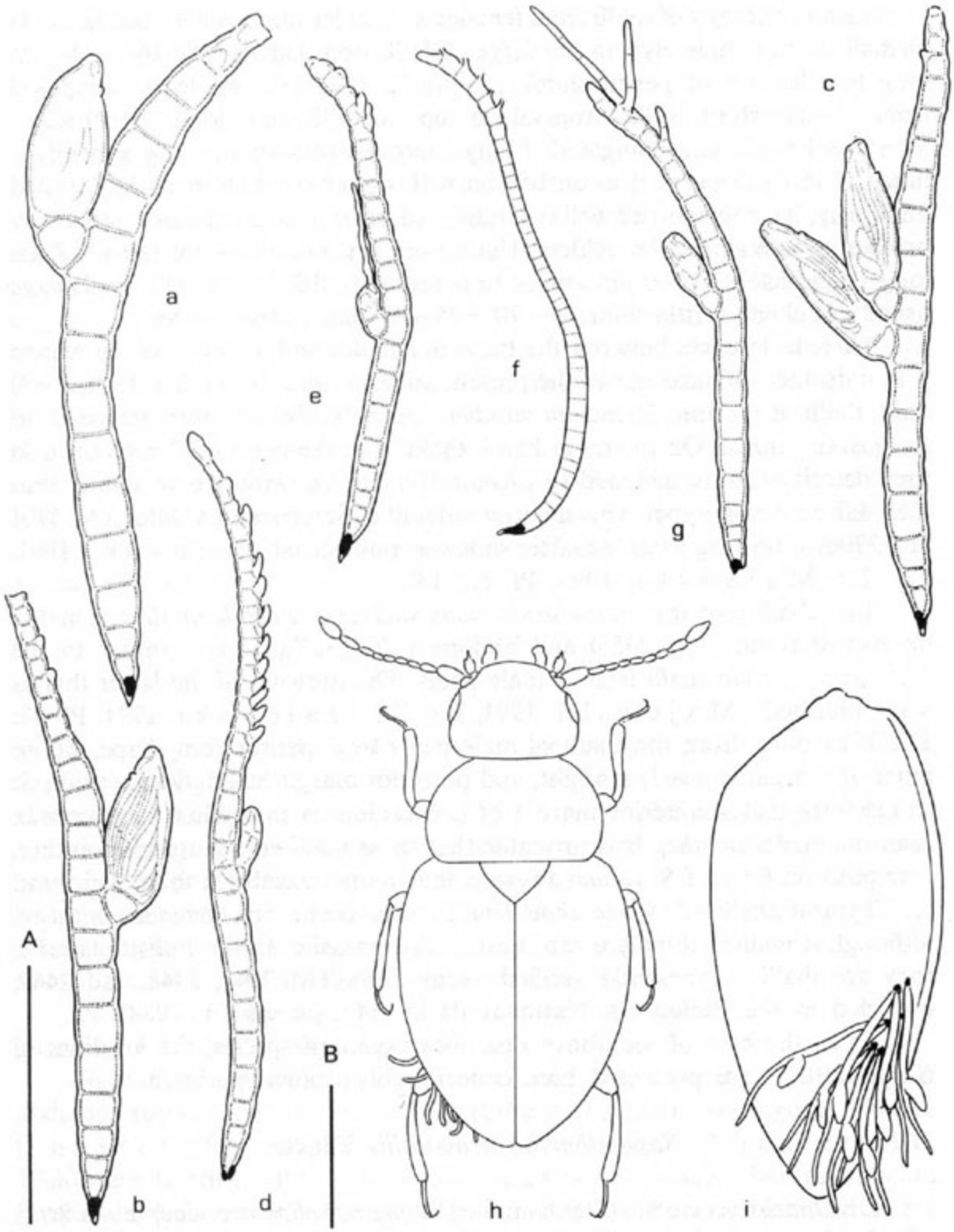

Fig. 8. *Siemaszkoa valida* Majewski from female hosts. a, b: mature normal thalli, c: thallus with two functional perithecia, d-g: young thalli, h: infected female beetle, visible distal parts of thalli protruding from under left elytron, i: lower side of left elytron of host with cluster of thalli (a-g drawn from TM 8533, 6762, 6763, 5392, 5421, 6394 and 5921; infected drawn beetles collected in Czechy Orlańskie, 15.5.1998). Scale bars: A – 100 μm for a-g, 300 μm for i; B – 300 μm, for h

The morphology of thalli from females and males much differs. All elements of thalli from female elytron are larger. Thalli from females are 160–240 μm long (to the top of perithecium), receptacle 110–180 μm long, composed from 7–11 stout cells, appendage up to 170 μm long, perithecium 55–76 × 18–30 μm, elongated. Many succesive cells of a young appendage function in its distal part as antheridia with rather stout short necks directed anteriorly, later the corner wall is established, seldom some of corner cells may proliferate into simple branchlets. Thalli from penis of males are 140–177 μm long, receptacle 82–100 μm long, composed of 8–10 slender cells, appendage usually broken, perithecium 56–70 × 25–33 μm, nearly ovate.

These differences between the thalli of females and males were the reason why in former publications of the present author (M a j e w s k i 1991, 1994) only thalli from the *Ptenidium nitidum* female's elytron were included to *Siemaszkoa valida*. On the other hand, thalli from the penis of *P. nitidum*, also then described, were included to *Siemaszkoa fennica* (with a note stating that they differ from its type). This incorrect identification concerns slides TM 2904 and 2906; a drawing from the latter slide was published (M a j e w s k i 1991, Fig. 28; M a j e w s k i 1994, Pl. 88: 13).

Two thalli growing on the lower body surface of *Ptenidium nitidum* males, on metasternum (TM 2455) and abdomen (TM 2770), were similar to the *Siemaszkoa valida* thalli from a male penis. The drawing of the latter thallus was published (M a j e w s k i 1991, Fig. 27; M a j e w s k i 1994, Pl. 88: 12). They differ from the thalli of male penis by a perithecium shape, whose anterior margin is nearly straight, and posterior margin strongly convex (in *S. valida* from males, anterior margin of perithecium is somewhat more convex than the posterior one). It is probable that these thalli constitute still another, rare position form of *S. valida*; anyway, they more resemble it than *S. fennica*.

Typical thalli of *Siemaszkoa fennica* also occur on *Ptenidium nitidum*, although it is undoubtedly a rare host of this parasite. In the Polish material, they are thalli – presently verified – in slides TM 2447, 2448, and 2449, collected in the Białowieża National Park (M a j e w s k i 1994).

As in the case of the above described common species, the localities of *S. valida* that are presented here concern only drawn specimens.

Stigmatomyces crassicollis Thaxter

On *Opacifrons coxata* (Stenhammar) (*Diptera, Sphaeroceridae*): Biała Straż (E of Kleszczele), 21.7.1995 (TM 6408, 6409); Giby near Sejny, 17.8.1978 (TM 1921). Fig. 9: e-g.

In the present author's former study (M a j e w s k i 1994, p. 159) undetermined, immature thalli parasitizing on *Opacifrons coxata*, collected at Giby, were mentioned. Similar thalli were presently recorded on the same host

close to the Białowieża Forest. Mature thalli (TM 6408, Fig. 9: e-f) are 195–202 μm long, perithecium 100–110 × 33–36 μm, appendage axis composed of 5 cells.

Till now *Stigmatomyces crassicollis* was reported on species of the *Opacifrons* genus only in Spain (Santamaria 1996, Santamaria and Rossi 1993) and Great Britain (Weir and Rossi 1995). Polish thalli from *Opacifrons coxata* have many traits of *Stigmatomyces crassicollis*, which, incidentally, is a very variable species. Their dimensions are smaller than of the specimens described by Thaxter (1917, 1931) in Jamaica and by Weir and Rossi (1995), but remain within the range given by Majewski (1994) for thalli from other hosts. The number of cells of the appendage axis is lower than in British specimens (12–13 cells), but probably does not differ from the number of cells in typical thalli (Thaxter did not more than nine or ten cells). Only brown, quite large darkening of the lower part of cell I of presently recorded thalli, raises doubts. However, it is not a constant trait; what is more, in certain *S. crassicollis* thalli from other hosts (Majewski 1994), it also occurs although to a lesser degree.

* *Stigmatomyces micrandrus* Thaxter

Thallus yellow-brownisch, 210–230 μm long, nearly straight. Lower receptacle (cells I and II) 58–73 μm long, cell II shorter than cell I, cell III elongated, cuneiform in lateral view. Appendage 63–66 μm long, straight, its axis consisting of three fertile, somewhat elongated cells. Antheridia stout. Stalk cell of perithecium flattened, shorter than cell III, cell VII triangular, lying above cell III. Perithecium 130–144 × 38–46 μm; venter slightly inflated, darker, neck as long as the venter, the pointed apex subtended by four small divergent teeth being free distal parts of lip cells.

On *Psilopa marginella* (Fallén) (*Dipt., Ephydridae*): Białowieża Forest, sect. 161A, 1.8.1997 (TM. 7897). Fig. 9: h, i.

Eight thalli of uniform shape and size were observed on the upper abdomen surface of a female host. On *Psilopa*, *Stigmatomyces rugosus* Thaxter (Thaxter 1901, 1908) and *S. micrandrus* Thaxter (Thaxter 1905, 1908) were described. Both are variable and similar to each other, and also to presently recorded thalli. According to Rossi (1988), who examined a very large number of parasites of different *Psilopa* species, both these species differ by the number of cells of the appendage. *Stigmatomyces micrandrus* has a three-celled axis of its appendasge, as the presently thalli have. This species was described in Papua-New Guinea, and recently found in Algeria and Italy (Rossi 1988, Santamaria et al. 1991).

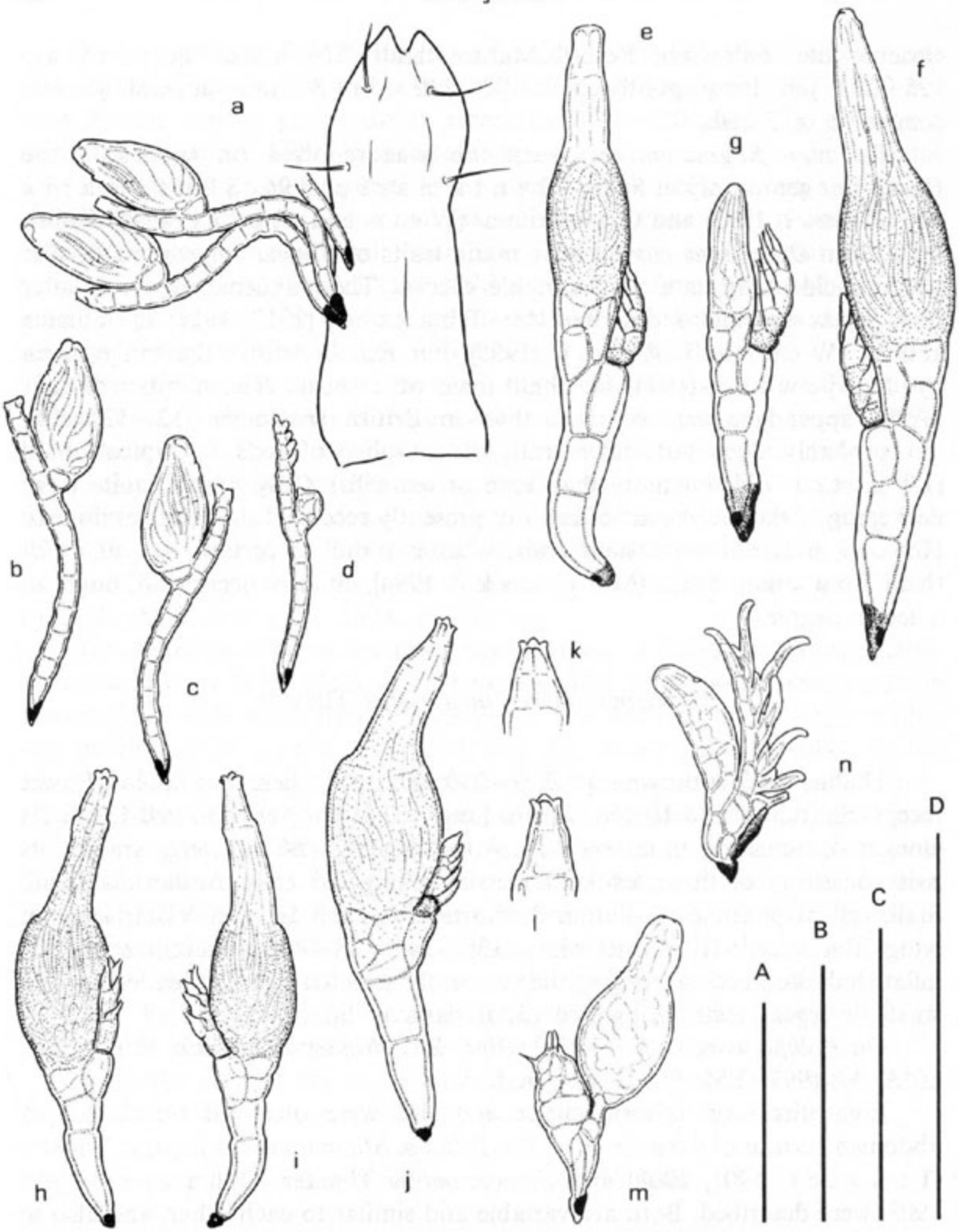

Fig. 9. *Siemaszkoa valida* Majewski from male hosts. a: mature thalli on penis, b-d: mature and immature thalli from host penis (drawn from TM 2906, 6621, 6621 and 8269). *Stigmatomyces crassicollis* Thaxter. e, f: mature thalli, g: immature thallus (from TM 6409, 6408 and 1921). *Stigmatomyces micrandrus* Thaxter. h, i: mature thalli (both from TM 8797). *Stigmatomyces* sp. from *Hydrellia albilabris*. j: mature thallus, k, l: apical part of perithecium. *Synandromyces telephani* Thaxter: m: immature thallus (from 6962). *Tavaresiella santamariae* Benjamin. n: immature thallus (from TM 6685). Scale bars: 100 μm (A for h-j, B for a-d and m, C for k and l, D for e-g and n)

* *Synandromyces telephani* Thaxter

Thallus yellowish. Receptacle 38–43 μm long, consisting of three elongated cells; the basal cell (I) centrally located, longest, surrounded anteriorly by cell II and posteriorly by cell III. Appendage 35–38 × 23–25 μm, consisting of four cells; the basal one is the broadest, other cells smaller, bearing distally single antheridia with narrow necks; the posterior antheridium with a conspicuous spine. Perithecia in examined material immature, up to 83 μm long (not including the stalk), without trichogyne but with a trace of it on posterior wall.

On *Psammoecus bipunctatus* (Fabricius) (*Col., Silvanidae*): Białowieża, 4.8.1996 (TM 6961, 6962). Fig. 9: m.

Six thalli were detected on one host specimen, on metasternum and a leg. All the thalli were at the same development stage, without a fully formed perithecium, and already without a trichogyne.

Two species of the *Synandromyces* genus were described, *S. psammoechi* Thaxter (Thaxter 1931; Majewski 1988) and *S. telephani* Thaxter (Thaxter 1912, 1931; Benjamin 1984; Santamaria 1989). The analysis of descriptions and published drawings of these two species indicate that they are similar and closely related. Yet, Thaxter (1931) and Benjamin (1984) claim that they differ sufficiently. It is not impossible that the only significant difference between them is the structure of the trichogyne (Benjamin 1984, p. 501–502). The material from Białowieża lacks this part of the thallus, hence its identification should be consider tentative. *Synandromyces telephani* is an older name; moreover, this name was used by Santamaria (1989), who probably described a species identical with the Polish thalli.

Synandromyces telephani is so far known from Argentina, USA, Guatemala, Jamaica, Trinidad and Spain.

Tavaresiella santamariae Benjamin

On *Hebrus pusillus* (Fallén) (*Heteroptera, Hebridae*): Dubicze Osoczne (W of Hajnówka), 6.6.1996 (TM 6685). Fig. 9: n.

This rare species was detected on the abdomen of a female. Of four thalli one had a complete appendage. Mature specimens are 91–93 μm long, perithecium 53–56 × 20–23 μm, appendage 58 μm long.

Tavaresiella santamariae was recorded in Poland only once, in 1976, the thalli being to various degrees incomplete, without a well preserved appendage. It is just these traits that allow best distinguishing of *T. santamariae* from a similar species, *T. hebri* Majewski (Benjamin 1993; Majewski 1994). The present detection confirms the occurrence of *T. santamariae* in Poland; it is also known from Spain, Madagascar and Indonesia.

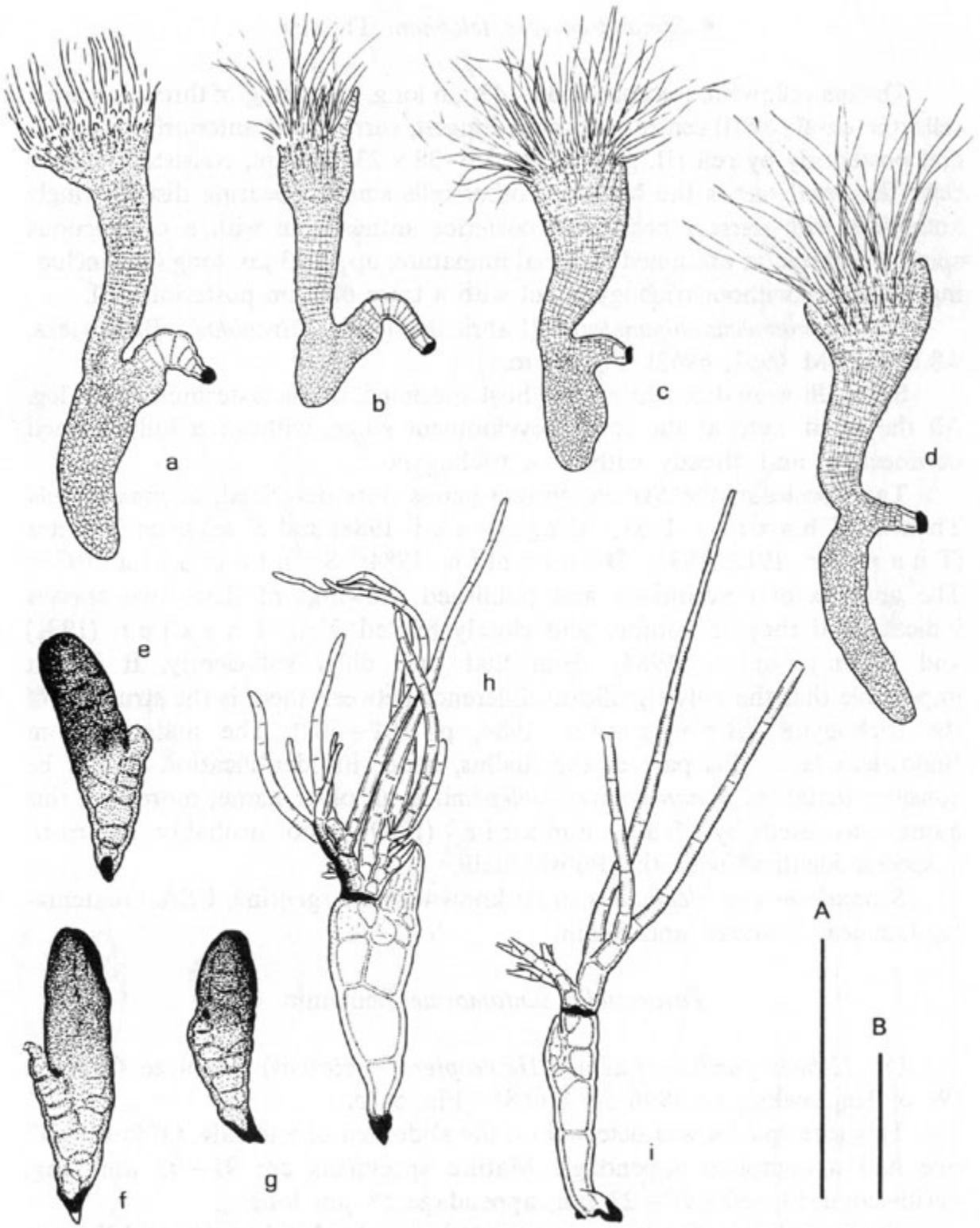

Fig. 10. *Zodiomyces suberiatus* Thaxter. a: mature thallus, b: maturing thallus (drawn from TM 7278 and 248). *Zodiomyces vorticellarius* Thaxter. c, d: thalli with one receptacular outgrowth (from TM 4966 and 4010). *Autoicomyces* (?) sp. from *Helophorus* sp., e-g: old thalli from claws (from TM 7622). *Laboulbenia* sp. I from *Epaphius rivularis*, h: immature thallus (from TM 7848). *Laboulbenia* sp. II from *Nebria brevicollis*, i: young thallus (from TM 5709). Scale bars: A – 100 μm (for a-d) and 300 μm (for e-g), B – 100 μm (for h and i)

* *Zodiomyces subseriatus* Thaxter

On *Helochares obscurus* (O.F. Müller) (*Col., Hydrophilidae*): Kolonia Kojły (NW of Hajnówka), 10.9.1996 (TM 7278); Łomianki near Warszawa, 28.4.1970 (TM 248). Fig. 10: a, b.

The *Zodiomyces* genus comprises two species, whose receptacle forms suprabasal projections: *Zodiomyces vorticellarius* Thaxter (T h a x t e r 1891, 1896), widely distributed: Europe (common in Poland), Africa, North and South America, was also reported in East Asia; and *Zodiomyces subseriatus* Thaxter (T h a x t e r 1931) collected in East Asia (recently by M a j e w s k i and S u g i y a m a 1989), and in Africa (W e i r 1993).

The most important feature distinguishing these two species is the structure of the lower part of receptacle. In *Zodiomyces subseriatus*, lower 4–9 cells of receptacle are undivided, whereas in *Z. vorticellarius* all receptacle cells, excluding the basal one, are divided into small parenchymatous cells. Two additional morphological differences are less pronounced: 1° number of receptacle projections, usually more than one in *Z. vorticellarius* [in Polish material analysed by M a j e w s k i (1994), thalli with one projection constituted 17.5% of all mature thalli, in *Z. subseriatus* thalli with one projection decisively dominate], 2° shape of paired perithecial outgrowths, differing, according to T h a x t e r (1896, 1931), between these two species. Unfortunately, T h a x t e r did not give any drawings of *Z. subseriatus*, while differences in perithecial structure that he described do not seem clear. Moreover, thalli with mature perithecia are not frequent, and attempts at preparing perithecia from thalli already closed in slides cause their partial destruction.

A solitary thallus with a receptacle typical of *Zodiomyces subseriatus* was unexpectedly recorded in the vicinity of the Białowieża Forest. After its detection the whole *Zodiomyces* collection from Poland was carefully examined, and then another such thallus, from the vicinity of Warszawa was detected. Both are of similar shape, with a single receptacular projection and strongly bent receptacle. The thallus from the Białowieża vicinity (Fig. 10: a) is more mature and its perithecia outlines are visible. The length of its receptacle (including projection) is 530 μm, width of receptacle cup 153 μm, and there are six undivided cells in the basal part of receptacle. The thallus from vicinity of Warszawa (Fig. 10: b) is younger, with a visible primary appendage, its receptacle is 320 μm long, width of receptacle cup 75 μm, and it has ten undivided cells of receptacle. In both these thalli the receptacle part located below the lateral outgrowth is much longer than the same part in typical thalli of *Z. vorticellarius* (Fig. 10: c, d).

From the point of view of receptacle structure both thalli are fully congruent with the features of *Z. subseriatus*, whose numerous specimens from

Japan are in the present author's collection, while their drawings were published (M a j e w s k i and S u g i y a m a 1989). Due to this it was assumed that *Z. subseriatus* occurs in Poland, and thus in Europe.

UNDETERMINED MATERIALS

Autoicomyces (?) sp.

Thallus smoke brown, 85–140 μm long. Lower receptacle tapering to the foot, consisting of three cells. Preserved part of appendage straight, consisting of isodiametric cells. Cells VI, VI' and VII slightly flattened, perithecium 48–88 × 25–30 μm, elongated, slightly narrowed in upper half, with broad, rounded apex.

On *Helophorus* sp. (*Col., Hydrophilidae*): Białowieża Forest, sect. 636B, 20.7.1997 (TM 7622). Fig. 10: e-g.

Only three mature and two immature thalli were detected between the claws of both middle legs of the host. All were old and dead, with an unclear structure of the perithecium, but probably wall cells are equal in heigh in all vertical rows.

The only species of the order *Laboulbeniales* parasitizing beetles of the genus *Helophorus* is recently described *Rhynchophoromyces helophori* Santamaria (S a n t a m a r i a 1999), differing in all respects from above described fungus.

Laboulbenia sp. I

On *Epaphius rivularis* (Gyllenhal) (*Col., Carabidae, Trechini*): Białowieża Forest, sect. 389D, 22.8.1996 (TM 7122); sect. 25B, 30.7.1997 (TM 7848). Fig. 10: h.

Only infrequent, young thalli without a developed perithecium were recorded. Cell V quite large, but not connected with cell III. Both appendage branches abundantly branched in the lower part, lower posterior cells of outer appendage (probably primary axis) blackened on posterior surface.

Epaphius rivularis is a rare European species of boreal-montainous distribution (P a w ł o w s k i 1975) and was not noted as a host of *Laboulbeniales.*

Laboulbenia sp. II

On *Nebria brevicollis* (Fabricius) (*Col., Carabidae*): Białowieża Forest, sect. 460D/461C, 24.8.1994 (TM 5709); ibid., sect. 395C, 22.8.1995 (TM 6447); ibid., sect. 18D/28B, 28.8.1995 (TM 6480). Fig. 10: i.

Mature thalli in bad condition, with proliferating free cell V; outer appendage branched.

* *Stigmatomyces* sp.

On *Hydrellia albilabris* (Meigen) (*Col., Ephydridae*): Białowieża Forest, sect. 92A, 7.8.1996 (TM 7035, 7036); Wygon (S of Hajnówka), 4.9.1996 (TM 7231); Zbucz (W of Hajnówka), 22.8.1997 (TM 7970). Fig. 9: j-l.

The found thalli do not show any traits of *Stigmatomyces hydrelliae* Thaxter, parasitizing often insects of the genus *Hydrellia.* Thalli are 224–236 μm long, lower receptacle 55–90 μm long, perithecium 51–58 μ long, with smooth surface and small apical teeth, appendage 32–38 μm long, its axis includes four fertile cells. The thalli are similar to the above described parasite of *Psilopa marginella*, *Stigmatomyces micrandrus* Thaxter.

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Nowe i rzadkie *Laboulbeniales* (*Ascomycetes*) z Puszczy Białowieskiej

Streszczenie

Praca zawiera opisy i rysunki interesujących gatunków grzybów z rzędu *Laboulbeniales* zebranych przez autora w Puszczy Białowieskiej i na jej przedpolu w latach 1994–1998. Wśród opisanych gatunków jest 18 nowych dla Polski (oznaczone *), cztery nowe dla nauki (*Corethromyces bialowiezensis* sp.n. na *Tachyporus solutus*, *Cryptandromyces bryaxidis* sp.n. na *Bryaxis bulbifer*, *Euphoriomyces unilateralis* sp.n. na *Agathidium atrum* i *Phaulomyces ptilii* sp.n. na *Ptilium affine*), i dwa lub trzy gatunki nowe dla Europy (*Peyritschiella geminata* Thaxter, *Zodiomyces subseriatus* Thaxter i, być może, *Laboulbenia epithricis*). Cztery dalsze gatunki (wymienione w końcowej części pracy) są prawdopodobnie także dotychczas nieznane, lecz zbyt skąpy materiał nie pozwala obecnie na ich opisanie. Dla kilku gatunków wykazanych już uprzednio z Polski podano nowe dane dotyczące ich morfologii i systematyki. Praca w istotny sposób uzupełnia opracowanie polskich *Laboulbeniales* (Majewski 1994), podnosząc liczbę znanych z Polski, oznaczonych gatunków do 198.