

## Anthostomella and related Xylariaceous fungi on hard wood from Europe and North America

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Summary. – Material of species classified in *Anthostomella*, *Anthostoma* and *Leptomassaria*, collected on hard wood from Europe and North America, have been studied. Anamorphic data have also been taken into account. The species have been grouped by average linkage clustering. They are keyed out and classified in five xylariaceous genera: *Anthostomella*, *Leptomassaria*, *Helicogermis*, *Lopadostoma* subgenus *Anthostomopsis* (subgenus nov.) and *Barrmaelia* (gen. nov).

One new species is proposed: *Barrmaelia rhamnocola*. Five species are transferred to *Anthostomella*: *Sphaeria anserina* Pers., *Anthostoma foveolare* Sacc. & Berl., *Sphaeria diderma* Schw., *A. ambiguum* Fabre, *A. urophorum* Sacc. & Speng. *Sphaeria unedonis* De Not. is transferred to *Leptomassaria*. *Sphaeria polynesia* Berk. & Curtis, *Anthostoma saprophilum* Ellis & Everh. and *A. flavoviride* Ellis & Holway are transferred to *Lopadostoma* sub. gen. *Anthostomopsis*. Six species are transferred to *Barrmaelia*: *Eutypa moravica* Petr., *Valsa macrospora* Nitschke, *Sphaeria oxyacanthae* Mont., *Sphaeria sustenta* Plowr., *Rosellinia pseudobombarda* Sacc., *Sphaeria picacea* Cooke & Ellis. *Sphaeria altipeta* Peck is transferred to *Apiorhynchostoma*; *Rosellinia catacrypta* Rehm to *Phaeosporis*, *Anthostoma feruginea* Nitschke to *Pseudovalsaria*, *Amphisphaeria hederiae* Fuckel to *Lepteutypa*, *Sphaeria phyllireae* Mont. to *Biscogniauxia*, *Leptomassaria americana* Petr. to *Rosellinia*.

Résumé. – Une classification des espèces lignicoles européennes et nord-américaines attribuées jusqu'ici aux genres *Anthostomella*, *Anthostoma* et *Leptomassaria* est proposée. Cette classification, testée par regroupement obtenu par «average linkage», se base principalement sur l'étude des téléomorphes, mais les caractères culturels ont également été pris en compte lorsqu'ils étaient disponibles. Une clé de détermination permet de reconnaître les espèces qui sont attribuées à cinq genres des Xylariacées: *Anthostomella*, *Helicogermis*, *Leptomassaria*, *Lopadostoma* subgenus *Anthostomopsis* (subgenus nov.) et *Barrmaelia* (gen. nov). *Barrmaelia rhamnocola* est décrite comme nouvelle espèce. La liste des espèces transférées est donnée dans le résumé anglais.

## Introduction

*Anthostomella* is poorly known. Since the work of Francis (1975) on species on stems and leaves of herbaceous plants and gymnosperms, no general study has been made. One of the main pool of lignicolous species, the genus *Anthostoma*, is now reduced to a monotypic taxon in the Diatrypaceae (Rappaz, 1992). With increasing anamorph connection proved, a better understanding of unitunicate pyrenomycetes systematics has been achieved. New characters are used to obtain more natural taxa. For example, germ slit position, ascus ring morphology, stromatal pigmentation and anamorphs have resulted in the transfer of species from *Hypoxylon* to *Biscogniauxia* (Pouzar, 1979), *Camillea* (Lassøe & al., 1989) and *Creosphaeria* (Ju & al., 1993).

Application of these new schemes of classification to the species currently classified in *Anthostomella*, *Anthostoma*, *Leptomassaria* was necessary and the present work has been undertaken. Considering the number of species in *Anthostomella*, the material collected only on hard wood from Europe and North America was studied. Specimens collected on palms and bamboo (*sensu lato*) have also been studied in part, and results from these have been used only for synonymy.

## Material and methods

*Microscopy.* – Observations, drawings and measurements have been made with water as mounting media. Amyloidity was tested with Melzer's reagent, and when unobserved, with a 5% KOH pretreatment.

*Statistics.* – 24 measurements have been made for each collection studied. Figures are given with extreme values in brackets and mean  $\pm$  standard deviation. Otherwise, extreme values only are given. Peridial thickness is taken on the melanised part of the perithecial wall without the inner hyaline part. The thickness of this part varies with age and with desiccation, being wider in young or in fresh material.

*Cultures.* – Ascospore isolates have been prepared after dissecting a perithecium, or as far as possible, by gluing a humidified piece of substrate with perithecia on the inner side of a Petri dish cover. Ascospores were projected on agar. Nature of inoculum and germination could be controlled during process. Cultures have been started with few-spored inoculum, but one-spored isolation was difficult to ascertain. Media used are described in Rappaz (1992).

*Nomenclature.* – The listing made by Rodrigues (1989) of species names, nomenclatural synonyms and types of J.B. Ellis has been used extensively in the present work.

*Numerical analysis.* – Using the descriptions of species and the characters coding shown in Table 1, a matrix describing 29 taxa with 23 characters has

Table 1. - Coding of characters. Abbreviation are (a) p.v.: polar view; - (b) l.v.: lateral view.

	Score: 1	2	3	4	5	6	7
<b>Stromata</b>							
PG: Perithecial grouping	Perithecium isolate	in groups of 2-4	more than 4				
EE: External part of entostroma	unmelanized	mel. near ostiole	clypeus		disc or carbonaceous crust		
ES: Stroma in substrate	immersed	± erumpent					
IE: Internal part of entostroma	loose prosenchyma	developped, hyalin	developped, melanized				
<b>Perithecia</b>							
OE: Ostioles emergence	scattered	scattered-clustered	always clustered				
OD: Ostioles diam. (µm)	< 80	[80-120]	[120-200]	≥ 200			
PN: Perithecial neck	short	cylindrical < Perith. diam.	cylindrical > Perith. diam.				
PH: Perithecial height (mm)	< 0.4	[0.4-0.6]	[0.6-1]	≥ 1			
PW: Perithecial width (mm)	< 0.4	[0.4-0.6]	[0.6-1]	≥ 1			
PT: Peridium thickness (µm)	<20	[20-40]	≥40				
<b>Asci</b>							
AI: Apical ring in iodine	1+, urn shaped	1+, triangular	1+, rhomboidal	1+, cylindrical	1-		
AH: Apical ring height (µm)	< 2	[2-4]	[4-6]	> 6			
AW: Apical ring width (µm)	< 2	[2-4]	[4-6]	[6-8]	> 8		
AS: Asci: stipe length	< 1.4 p.sp	1.4 p.sp-1.2 p.sp	1.2-1 p.sp	> 1 p.sp			
<b>Ascospores</b>							
SL: Spore lenght (µm)	< 10	[10-12]	[12-14]	[14-18]	[18-22]	[22-28]	≥ 28
SW: Spore width (µm)	< 4	[4-6]	[6-8]	[8-11]	[11-14]	≥ 14	
SS: Spore shape	allantoid to as. ellips.	asym. ellipsoid	ovoid, round in p.v. (a)	ovoid, in l.v. (b) + p.v.	ovoid to sphaerical		
SP: Spore polar shape	tapered	tapered or rounded	rounded or truncate	rounded			
SE: Sporal epispore	none	thin, not mucous	mucous at one pole	mucous all around	thick, not mucous		
SC: Spore, second cell	none	only when immature	a dwarf cell	base narrow persistent	base broad, persistent		
SG: Spore, germ slit	none	straight, < length	straight, = length	sinuous	spiral	circular	
SM: Spore melanization	wall yellow	yellow to brown	brown to dark brown				
SB: Spore, blots on the wall	none	on young spore	on mature spores				

Table 2. - Matrix of characters coded for the species. Code of characters see Table 1.

Label	Epithet	PG	EE	ES	IE	OE	OD	PN	PH	PW	PT	AI	AH	AW	AS	SL	SW	SS	SP	SE	SC	SG	SM	SB
ADU	adusta A.	2	4	2	1	3	2	2	2	2	2	2	4	3	1	6	5	2	4	2	1	4	3	1
AMB	ambigua A.	1	2	2	1	1	3	1	3	3	1	1	4	4	1	7	5	2	2	3	3	4	3	1
ANS	anserina A.	1	3	2	1	1	3	1	2	3	2	1	2	2	2	3	3	2	3	3	3	3	3	1
BAR	Barr specimens	3	4	2	2	1	3	1	3	2	2	3	2	3	4	4	2	2	3	2	1	3	3	2
COR	cornicola A.	1	3	2	2	1	2	1	3	3	1	2	3	4	1	6	4	3	4	5	4	1	3	1
DEL	delitescens S.	1	2	1	2	1	2	1	1	2	1	2	1	1	1	5	4	3	2	2	1	1	3	1
DID	diderma A.	1	3	2	1	1	2	1	2	3	2	1	2	3	1	4	4	2	4	2	3	3	2	1
FLE	fleischhackii A.	1	1	2	1	1	3	2	3	2	2	2	2	2	1	4	5	3	1	5	3	5	3	1
FLV	flavoviride Lop.	3	4	1	1	1	3	2	2	2	2	4	1	2	2	3	3	3	4	1	1	3	3	1
FOV	foveolaris A.	1	3	2	1	1	2	1	2	3	2	1	2	2	1	3	2	2	4	2	3	3	2	1
GAS	gastrinum Lop.	3	4	2	2	2	2	3	3	2	2	4	1	2	3	2	2	3	4	1	1	6	3	1
HEL	helichrysi A.	1	3	2	3	1	4	1	2	3	1	2	2	3	1	5	4	3	4	2	3	1	2	2
INF	infernalis A.	3	4	2	1	1	3	1	2	2	2	2	2	2	2	3	2	2	3	2	3	2	3	1
MAC	macrospora B.	3	3	1	1	1	3	1	2	3	1	5	1	2	1	6	3	2	4	2	1	1	2	1
MAL	mamillana Clyn.	1	3	2	1	1	3	1	2	2	1	1	3	2	1	5	3	2	4	2	1	1	3	1
MOR	moravica B.	3	3	2	1	1	2	1	2	3	1	5	1	2	2	4	1	1	4	1	1	1	1	1
OST	ostiolata A.	1	3	2	1	1	2	1	1	1	1	1	1	2	1	2	2	2	4	2	3	2	3	1
OXY	oxycanthac B.	3	3	2	1	1	3	1	2	3	1	5	2	3	1	3	2	3	2	1	3	3	1	1
PIC	picacea B.	3	3	1	1	1	2	1	1	1	1	5	1	2	1	2	1	1	2	2	1	3	2	1
POL	polynesium Lop.	3	4	1	2	1	3	1	1	1	1	4	1	2	2	1	2	3	2	1	1	6	3	1
PSE	pseudobombarda B.	3	3	2	1	1	3	1	2	2	1	5	1	2	1	3	2	2	2	1	3	3	1	1
QUE	americana R.	1	4	2	3	1	2	1	3	3	1	1	4	4	2	5	3	2	3	2	2	4	3	1
RHA	rhamnocola B.	3	3	1	1	1	3	1	2	3	1	5	1	2	1	4	2	1	4	1	1	1	2	1
SAP	saprophyllum Lop.	3	4	1	1	1	2	1	1	1	1	4	1	2	2	1	1	3	2	1	1	2	3	1
SIM	simplex Lept.	1	1	1	2	1	4	1	4	4	2	2	3	4	1	6	6	3	4	5	1	5	3	2
SUS	sustenta B.	3	3	1	1	1	3	1	2	3	1	5	3	3	1	6	4	2	4	2	1	3	3	1
TUR	turgidum Lop.	2	4	2	2	3	2	2	2	3	1	4	1	2	3	2	2	3	4	1	1	3	3	1
UNE	unedonis Lept.	1	3	2	2	1	4	1	3	3	2	1	3	3	1	6	5	3	4	2	1	5	3	1
URO	urophora A.	1	2	1	1	1	2	1	2	2	1	1	2	2	1	5	3	2	3	2	5	1	3	1

been built (Table 2). Cultural data have not been taken into account because of too many missing values.

Some species which are not described in details here have been included in the numerical analysis for comparison. In these cases personal and published observations have been used. These species are *Lopadostoma gastrinum* (Fr.) Trav. (abbreviation: GAS), *L. turgidum* (Pers.) Trav. (TUR) (see Arx & Müller, 1954), *Clypeosphaeria mamillana* (Fr.) Lambotte (MAL) (see Barr, 1989).

BAR is the taxon collected in Canada by M.E. Barr. It is described at the end of this work but is not named formely for the moment.

Cluster analysis using the normalised percent disagreement as distance has been carried out using the data. The correlation matrix has also been analysed by a principal component analysis.

### Results of numerical analyses

The clusters obtained by average linkage is shown in Pl. 1. The vertical scale is the percent of dissimilarity by which grouping occurred.

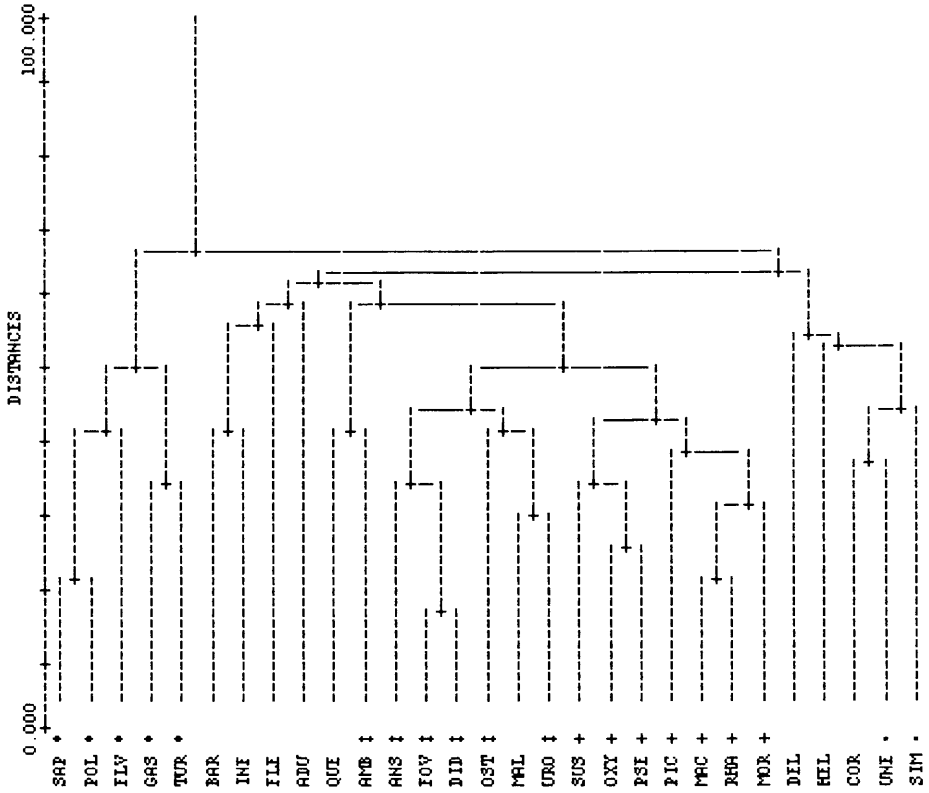
Three clusters split below the 50 % of dissimilarity and correspond to the genera *Lopadostoma*, *Anthostomella* and *Barrmaelia*.

The principal components 1 to 3 explain only 55 % of the total variance. This suggests that this method is not fully adequate to describe the data and has thus been omitted. The reason for this is heterogeneous data, due to an incomplete description of the taxa or due to taxa truly remotely related. To answer this would need more observations on anamorph data, and possibly more species from a wider geographic range.

### Key to families and to non-Xylariaceous genera encountered in the present work

Only the amerspored members of the *Amphisphaeriaceae* are keyed out. The description of the two members of *Leptomassaria* should suffice to determine them and therefore they are not keyed out here. The taxa of doubtful position have their genus name in quotation marks and are described at the end of this work.

1. Ascospores with an apical pore; asci with a small I- apical ring . . . . . 2
1. Ascospores without apical pore, equatorial pores or germ slits may be present; apical ring I+ or I- . . . . . 4
2. Ascospores 2 septate, with a basal cell lighter in color than the 2 other cells which are brown; porate pole covered by a hyaline cap . . *Apiorhynchostoma*
2. Ascospores mostly non septate, rarely 1 or 2 septate; without hyaline cap covering the pore . . . . . Boliniaceae 3



Pl. 1. – Results of average linkage clustering with normalized percent disagreement as distance. Vertical scall: percent of dissimilarity between clusters. The genera which are recognized are marked. From left to right: Lopadostoma (small cross). – Anthostomella (double cross). – Barrmaelia (cross). – Leptomassaria (point).

3. Ascomata in valsoid configuration, at times with long necks; outer stromatal layer developed as a black or brown-red crust; ascospores septate in the middle ..... *Pseudovalsaria*
3. Ascomata isolate to gregarious; outer stromatal layer usually reduced to a blackening of the substrat; ascospores septate or 1 celled, at times with a small and lighter end cell ..... *Endoxyla*
4. Ascospores usually asymmetric; 1 celled or unequally 2 celled, at times smaller cell disappearing at maturity; usually with a germ slit . Xylariaceae

4. Ascospores symmetric; 1 celled or septate; without germ slit, equatorial pores sometimes present ..... Amphisphaeriaceae 5  
5. Ascospores with equatorial germ pores ..... *Amphisphaerella*  
5. Ascospores without pores ..... "*Sphaeria*" *delitescens*

### Key to treated Xylariaceous genera

Xylariaceous species of doubtful position are also included.

1. Entostroma melanized circling and adjacent to the wall of 1 or 2 perithecia, immersed or ± erumpent from the substrate, apical ring amyloid 8–9 µm high, ascospores 15–20 × 6–8 µm ..... *Rosellinia americana*  
1. Stroma pustulate and then apical ring smaller, or stroma effused or reduced to a clypeus ..... 2  
2. Stroma pustulate discoid, basal part also carbonized and capsuling one or a few perithecia but with outer carbonaceous part not adjacent to the peridium, ascospores 13–16 × 11–13 µm ..... "*Rosellinia*" *salicium*  
2. Stroma effused or pustulate and then without melanized basal part ..... 3  
3. Pseudostroma present, forming a prosenchymatous tissue, at least around the peridium; stroma effused or pustulate; usually strongly melanized in surface ..... 4  
3. Inner part of entostroma reduced to a loose tissue not forming a pseudostroma, melanized part of entostroma effused or reduced to a clypeus or hardly developed ..... 9  
4. ascospores ± symmetric, 1 celled, smaller than 12 µm; germ slit straight or circular, at times missing; asci with an apical ring I+, 1–1.5 µm high ..... *Lopadostoma*  
4. ascospores and apical ring larger ..... 5  
5. Ascospores with a germ slit, 1 celled from the beginning ..... 6  
5. Ascospores without germ slit, 2 celled when young, with or without a cellular appendage when mature ..... 8  
6. Germ slit spiral ..... *Leptomassaria*  
6. Germ slit sigmoid or straight ..... 7  
7. Ascospores 23–29 × 12–14 µm ..... "*Anthostomella*" *adusta*  
7. Ascospores smaller than 20 µm ..... BAR: material on *Acer* from Canada  
8. Ascospores 17–25 × 9–12 µm, punctate when young, with a cellular appendage which tends to disappear ..... *Anthostomella helichrysi* 6  
8. Ascospores 20–30 × 8–12 µm, cellular appendage persistent ..... *Anthostomella cornicola* 7  
9. Ascospores with or without germ slit, 1 celled from the beginning; apical ring I– ..... *Barrmaelia*

http://doc.rero.ch

9. Ascospores with a germ slit, 2 celled when young, with a cellular appendage when mature; apical ring I+ ..... 10
10. Melanized part of the stroma very reduced, germ slit spiral  
..... *Helicogermis* *fleischhackii*
10. Melanized part forming a clypeus or effused and confluent, germ slit straight, sinuous or missing ..... *Anthostomella*

### Key to species of *Barrmaelia*

1. Ascospores with a germ slit ..... 2
1. Germ slit missing, or very tenuous ..... 6
2. Ascospores  $9\text{--}12 \times 4\text{--}5 \mu\text{m}$  ..... *Barrmaelia* *picacea* 7
2. Ascospores larger ..... 3
3. Ascospores  $11\text{--}15 \times 3\text{--}5 \mu\text{m}$  ..... *Barrmaelia* *pseudobombarda* 6
3. Ascospores larger or at least broader ..... 4
4. Ascospores  $11\text{--}16 \times 5\text{--}7 \mu\text{m}$  ..... *Barrmaelia* *oxyacanthae* 4
4. Ascospores larger ..... 5
5. Ascospores  $19\text{--}25 \times 9\text{--}10 \mu\text{m}$  ..... *Barrmaelia* *sustenta* 5
5. Ascospores  $24\text{--}34 \times 13\text{--}17$  ..... "*Anthostoma*" *gallicum*
6. Ascospores  $12\text{--}17 \times 2\text{--}3 \mu\text{m}$  ..... *Barrmaelia* *moravica* 2
6. Ascospores larger ..... 7
7. Ascospores yellow to dilute brown  $14\text{--}22 \times 4\text{--}5 \mu\text{m}$  .. *Barrmaelia* *rhamnicola* 1
7. Ascospores brown  $17\text{--}27 \times 4\text{--}7 \mu\text{m}$  ..... *Barrmaelia* *macrospora* 3

### Key to species of *Anthostomella* treated

1. Ascospores remaining hyaline in the asci, becoming brown after projection, smaller cell rostrate, up to  $5 \mu\text{m}$  long ..... *Anthostomella* *nitidula* 9
1. Ascospores already brown in the asci ..... 2
2. Ascospores without germ slit ..... 3
2. Ascospores with a germ slit ..... 5
3. Ascospores  $15\text{--}22 \times 6\text{--}7 \mu\text{m}$ , asymmetric ..... *Anthostomella* *urophora* 8
3. Ascospores  $8\text{--}12 \mu\text{m}$  wide,  $\pm$  symmetric ..... 4
4. Ascospores  $17\text{--}25 \times 9\text{--}12 \mu\text{m}$ , with a cellular appendage which tends to disappear, punctate when young ..... *Anthostomella* *helichrysi* 6
4. Ascospores  $20\text{--}30 \times 8\text{--}12 \mu\text{m}$ , cellular appendage persistent  
..... *Anthostomella* *cornicola* 7
5. Germ slit straight ..... 6
5. Germ slit sinuous ..... 10
6. Ascospores  $15\text{--}20 \times 9\text{--}11 \mu\text{m}$  ..... *Anthostomella* *diderma* 3
6. Ascospores  $10\text{--}15 \mu\text{m}$  long ..... 7



7. Ascospores 6–8  $\mu\text{m}$  broad ..... *Anthostomella anserina* 1  
7. Ascospores 4–6  $\mu\text{m}$  broad ..... 8  
8. Germ slit as long as the ascospores, perithecia 0.5–1 mm in diam.  
..... *Anthostomella foveolaris* 2  
8. Germ slit shorter than ascospores length ..... 9  
9. Superficial blackened part of stroma effused, perithecia 0.5–0.8 mm  
in diam. .... "Anthostoma" *infernale*  
9. Blackened part reduced to a clypeus, perithecia 0.2–0.4 mm in diam  
..... *Anthostomella ostiolata* 4  
10. Ascospores 22–35  $\times$  10–15  $\mu\text{m}$  with a cellular appendage and  
a mucilaginous cap when mature ..... *Anthostomella ambigua* 5  
10. Ascospores 15–20  $\times$  6–8  $\mu\text{m}$ , cellular appendage disappearing at  
maturity, without mucilaginous cap ..... *Rosellinia americana*

### Key to species of *Lopadostoma* treated

1. Stroma pustulate, enclosing perithecia in valsoid or diatrypoid  
configuration ..... *Lopadostoma* sub gen. *Lopadostoma*  
1. Stroma effused, enclosing a few to many perithecia in eutypoid  
configuration ..... *Lopadostoma* sub gen. *Anthostomopsis* 2  
2. Ascospores 4–6  $\mu\text{m}$  wide, with germ slit well formed, on the less convex  
side ..... *Lopadostoma flavoviride* 3  
2. Ascospores 3–4.5  $\mu\text{m}$  wide, germ slit otherwise ..... 3  
3. Ascospores 8–11  $\times$  3–4.5  $\mu\text{m}$ , germ slit circular, at times ill distinct  
..... *Lopadostoma polynesium* 1  
3. Ascospores 7–10  $\times$  3–4  $\mu\text{m}$  long, germ slit missing or shorter than spore  
length ..... *Lopadostoma saprophilum* 2

### *Anthostomella*

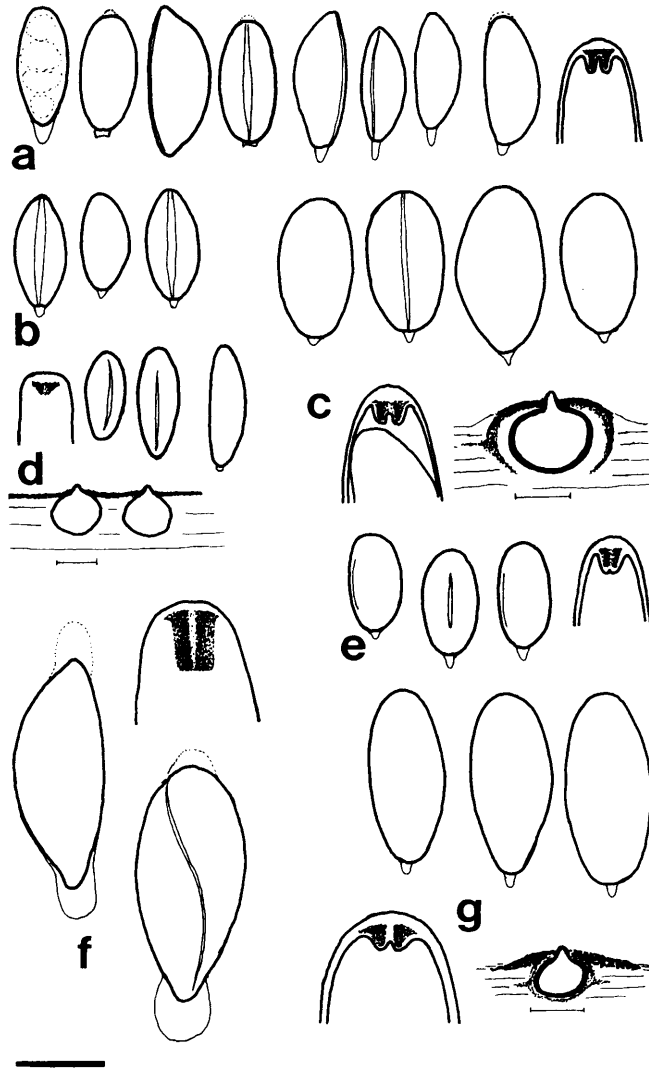
Sacc., *Atti Soc. Venteto-Trent. Sc. Nat.* 4: 84, 1875.

Syn.: see Francis (1975), Læssøe and Spooner (1994).

Type species: *A. tomicoides* Sacc. (Francis, 1975; Læssøe, 1994).

*Anamorph.* – Possibly *Nodulisporium* (see below).

*Clypeus* black, delimited, pierced with the ostiole, gregarious or ill delimited and confluent when the perithecia are close, rarely missing; usually slightly raised; entostroma prosenchymatous weakly developed, mixed with substrate cells, at times delimited by a black border line. – *Perithecia* globose, peridium melanized, prosenchymatous, paraphyses numerous. – *Asci* unitunicate, cylindrical, usually with uniseriate ascospores, apical ring I+, rarely I-, usually higher than 2  $\mu\text{m}$ . – *Ascospores* brown to dark brown, wall smooth, asymmetri-



Pl. 2. – *Anthostomella anserina*, *A. foveolaris*, *A. diderma*, *Anthostoma infernale*, *A. ostiolata*, *A. ambigua*, *A. helichrysi*. – *A. anserina*: a. Ascospores and ascus ring in iodine; ascospore 1 is immature (ascospores 1–4 from B: sub *A. carbonescens*, 5–7 from FH: sub *S. anserina*, 8 from L'Harmas: sub *A. corni*). – *A. foveolaris*: b. Ascospores. – *A. diderma*: c. Ascospores, ascus ring in iodine and perithecia. – *A. infernale*: d. Ascospores, ascus ring in iodine and stroma. – *A. ostiolata*: e. Ascospores and ascus ring in iodine. – *A. ambigua*: f. Ascospores and ascus ring in iodine. – *A. helichrysi*: g. Ascospores, ascus ring in iodine and perithecia. – Bars near stromata and perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.

cal at times symmetrical, ellipsoid, ends rounded, tapered or truncate, germ slit on the less convex side of asymmetrical ascospores, usually spore length, straight or sinuous, at times germ slit lacking; epispore thin; with a cellular appendage at one end disappearing on old material, at times with a slimy cap on the opposite end.

*Habitat.* – Twigs, wood, petioles and leaves of Spermatophytes.

*Distribution.* – Cosmopolitan.

*Notes.* – This concept of *Anthostomella* enclose only species which are unequally two celled at the beginning of their formation and is more restricted than what Francis (1975) had adopted in her treatment of European species.

Ascospores and ascus ring morphology is similar in *Anthostomella* and in *Nemania* Gray. In *Anthostomella* however, the “stroma” is uniperitheciate and is represented by the clypeus and a weakly developed entostroma. In *Nemania*, the stroma is developed, covering a few or many perithecia. In mature ascospores of *Nemania serpens* (Pers.: Fr.) Gray the cellular appendage has disappeared, contrarily to the species classified here in *Anthostomella*, where it is still visible.

It is probable that cultural studies will help in delimiting a natural genus. Martin (1969) described a *Nodulisporium* anamorph for a fungus (wrongly determined as *A. melanotes*) which seems to fit the present concept of *Anthostomella*. Francis & al. (1980) described two species with their anamorph: *A. baileyi* with a *Virgariella* anamorph and *A. trachycarpi* with a *Nodulisporium* sp. However, both species seem to have unicellular ascospores from the beginning.

### 1. *Anthostomella anserina*

(Pers. : Fr.) F. Rappaz, comb. nov. – Pl. 2a.

Bas.: *Sphaeria anserina* Pers., Icones et descriptiones fungorum minus cognitorum: 5, tab. 1 fig. 8–10, 1797. Fr., Syst. Mycol. 2: 480, 1823.

Syn.: *Phaeosperma anserina* (Pers.: Fr.) Trav., Flora Ital. Crypt. 2: 293, 1905 non Fuckel 1869.

*Valsaria anserina* (Pers.: Fr.) Sacc., Atti Soc. Veneto-Trent. Sc. Nat. 4: 120, 1875.

*Anthostoma anserina* (Pers.: Fr.) Petrak & Sydow, Ann. Mycol. 27: 114, 1929.

*Anthostomella carbonescens* Nitschke, Pyrenom. germ. 1: 114, 1867.

*Anthostomella tersa* Sacc. in Mouton, Bull. Soc. Roy. Bot. Belg. 4: 73, 1889.

*Entosordaria tersa* (Sacc.) Höhnelt, Sitzungber. Kaiserl. Akad. Wiss. Math.-Naturwiss. Cl. Abt. 1, 129: 166, 1920.

*Anthostomella corni* Fabre, Ann. Sci. Nat. Bot. sér. 6, 15: 39, 1883.

*Anthostoma corni* (Fabre) Cooke, Grevillea 17: 90, 1889.

*Paranthostomella corni* (Fabre) Petrak, Ann. Mycol. 19: 48, 1921.

*Anthostomella rusci* Fabre, Ann. Sci. Nat. Bot. sér. 6, 15: 40, 1883.

*Neotype.* – NO ANNOTATIONS (FH-herb. Theissen ex herb. Pers. : sub *Sphaeria anserina* Pers.)

*Anamorph.* – not seen.

*Clypeus* black, delimited, 0.5–1/0.5 mm, with a 120–150 µm diam., conical ostiole; gregarious or ill delimited and confluent when the perithecia are close; rarely missing; usually only slightly raised, up to semiglobose on decayed wood, made of melanized hyphae, forming a *textura intricata*, fused with the ostiolar wall; entostroma prosenchymatous, mixed with substrate cells, rarely delimited by a thin black border line. – *Perithecia* 0.5–1 mm wide, 0.4–0.6 mm high, peridium melanized, prosenchymatous, 25–30 µm thick; paraphyses numerous, dissolving at maturity. – *Asci* cylindrical, with obliquely uniseriate ascospores, 110–180 × 8–10 µm; spore-bearing part 80–120 µm; stipe 30–80 µm; apical ring I+, 3–4 µm high, 4 µm thick. – *Ascospores* (11) 14.1 ± 1.3 (18.5) × 6–8 µm, asymmetrical, ellipsoid with rounded or sometimes truncate ends, brown to dark brown, germ slit spore length on the less convex side, straight; epispore thin; a cellular appendage at one end disappearing on old material, a slimy cap on the opposite end sometimes seen.

*Habitat.* – Corticated and decorticated twigs and branches of various hardwoods, lignose twigs of Monocotyledons.

*Known hosts.* – *Ruscus aculeatus*, *Salix* sp., *Carpinus betulus*, *Cornus sanguinea*, *Fraxinus excelsior*.

*Distribution.* – EUROPE: Belgium, Czechoslovakia, France, Germany.

*Additional collections examined.* – BELGIUM: on *Salix*, Mouton n. 3 (PAD sub *Al. tersa*, holotype). – CZECHOSLOVAKIA: Moravia: Weisskirchen, Welka, August 1925, F. Petrak (LAU, W(1970)25453-herb. Petrak 4194: Fl. Boh. & Mor. exs.: 2148 sub *A. melanotes*).

– FRANCE: Sérignan (Vaucluse), on *Cornus sanguinea*, J.H. Fabre (L'Harmas: sub *Al. corni*, holotype). – FRANCE: Sérignan (Vaucluse), on *Ruscus aculeatus*, September 1880, J.H. Fabre (L'Harmas: sub *Al. rusci*, holotype). – GERMANY: Ostricher Wald, on *Carpinus*, Fuckel (G: Nassau's Flora, Fungi Rhenani 2060 ? syntype; B: herb. Nits., annotated «misit Fuckel 24/10.66», sub *A. carbonescens*, holotype).

*Misidentifications.* – Herb. Persoon. – Mougeot (L-Pers. 910270–496 sub *S. anserina* var., is a bitunicate). – (L-Pers. 910270-335 sub *S. anserina*, is *Eutypa lata* (Pers.) Tul.). – (L-Pers. 910270–487 sub *S. anserina* var. is *Diaporthe cf hederiae* Wehm.). Herb. Fries. – on *Suaeda media*, Forsell (UPS-herb. Fries sub *S. anserina* is *Cryptovalsa suaedicola* Spooner). Herb. Saccardo. – on *Frangula* (PAD-Sacc. sub *Valsaria anserina* is *Didymosphaeria fulilis* (Berk. & Br.) Rehm).

*Notes.* – The original description of *S. anserina* shows a drawing of brown and unicellular ascospores. The authentic specimen from FH fits well and is a suitable neotype. It is unfortunately very small, consisting of one perithecium only. This specimen could be what Petrak & Sydow (1929) have described when they classified this species in *Anthostoma*.

The use of the name for a species with two celled spores goes back to Berkley & Broome (1859: 19).

*A. anserina* is similar to *A. tomicoides* Sacc. as described by Francis (1975) but has bigger perithecia and a germ slit as long as the spore length. The specimens of *A. tomicoides* I have seen (see under *Sphaeria mortuosa* in excluded species) had a germ slit shorter than the ascospore.

*A. fuegiana* Speg., *A. minor* Ellis & Everh., *A. phaeosticta* (Berk.) Sacc., are also similar to *A. anserina* in having ascospores with a cellular appendage. Ascospores from a fresh collection of *A. fuegiana* failed to germinate on agar media whereas those *A. minor* led to perithecia on sterilized pine needles (Francis & al., 1980). On MAA, the ascospores of *A. phaeosticta* germinate but growth stops after a few days (pers. obs.).

*Specimen cultured.* – Ireland: Kerry Co.: Rossbehy Creek, on *Ammophila arenaria*, July 1992, F. Rappaz no 920726–2 (LAU: sub *A. phaeosticta*).

## 2. *Anthostomella foveolaris*

(Sacc. & Berl.) F. Rappaz, comb. nov. – Pl. 2b.

Bas.: *Anthostoma foveolare* Sacc. & Berl. in Sacc., Bull. Soc. Bot. Belgique 28: 86, 1889.

*Holotype.* – RUSSIAN FED.: Siberia, in sylvis pr. mont Kortus, N. 1676 (PAD sub *A. foveolare*).

*Anamorph.* – not seen.

*Clypeus* black, 0.5 × 1 mm, raising the surface of the wood in a pustulate manner, gregarious or confluent, with a conical ostiole ca. 100 µm diam. – *Perithecia* globose, ca 0.5 mm high, up to 1 mm wide. – *Asci* cylindrical, with uniseriate ascospores; spore-bearing part 70–80 × 8–10 µm; stipe not seen, short according to the original description; apical ring I+, ca 2 µm high, 2.5–3 µm thick. – *Ascospores* (11) 12.2 ± 0.7 (13) × 5–6.5 µm, asymmetrical, ellipsoid with rounded ends, brown, germ slit spore length on the less convex side, straight; episore thin; a cellular appendage at one end.

*Habitat.* – Decorticated wood.

*Known host.* – Angiosperm. Saccardo gives *Salix*, but the microstructure of the wood does not fit.

*Distribution.* – Siberia. Known only from the type collection.

*Notes.* – Possibly only a small-spored variety of *A. anserina*.

## 3. *Anthostomella diderma*

(Schwein.) F. Rappaz, comb. nov. – Pl. 2c.

Bas.: *Sphaeria diderma* Schwein., Trans. Amer. Phil. Soc Philadelphia 4: 215, 1834.

Syn.: *Amphisphaerella diderma* (Schwein.) Cooke, Grevillea 16: 91, 1888

*Rosellinia diderma* (Schwein.) Sacc., Syll. Fung. 9: 500, 1891.

*Lectotype* (Petrini, 1993). – USA: Pennsylvania: Bethlehem, Schweinitz (PH sub *S. diderma*).

*Anamorph.* – not seen.

*Clypeus* black, 1–1.5 mm diam., ca 120 µm thick, raising the surface of the wood in a pustule 0.2–0.6 mm high, gregarious, rarely two confluent, with a conical ostiole ca. 100 µm diam. – *Perithecia* globose, 0.5–0.8(1) wide, 0.4–0.6 mm high,

peridial wall prosenchymatous. – *Asci* cylindrical, with uniseriate ascospores 130–150 µm long; spore-bearing part (two measures) 110–120 × 8–10 µm; stipe 20–30 µm; apical ring I+, 2.5–3 µm high, 4.5–5 µm thick. – *Ascospores* (17) 17.3 ± 1.3 (19) × 9–11 µm, weakly asymmetrical, ellipsoid with rounded ends, brown, germ slit spore length on the less convex side, straight or sometimes slightly sinuous; epispore thin; a cellular appendage at one end sometimes seen.

*Habitat.* – Decorticated wood, apparently quite rotten.

*Known host.* – Angiosperm; possibly *Quercus* from wood anatomy.

*Distribution.* – USA: Pennsylvania. Known only from the type collection.

*Notes.* – Læssøe and Spooner (1994) have described and illustrated isotypic material of this fungus without mention of the cellular appendage on the ascospores. They listed this taxon as a possible candidate for inclusion in *Astrocystis*, a genus they restricted however for fungi on monocots. They also asked if it could be classified near *Nemania confluens* (Tode : Fr.) Læssøe & Spooner. Differences between *Nemania* and *Anthostomella* have been outlined previously, and in my opinion *S. diderma* is better classified in *Anthostomella*.

#### 4. *Anthostomella ostiolata*

Ell. & Everh., Bull. Torrey Bot. Club 11(4): 42, 1884. – Pl. 2e.

Syn.: *Anthostoma ostiolata* (Ell. & Everh.) Cooke, Grevillea 17: 90, 1889.

*Holotype.* – USA: New-Jersey, Newfield, on *Laurus benzoin*; Ellis (NY-herb. Ellis).

*Anamorph.* – not seen.

*Clypeus* limited as a blackened area 0.5 mm in diam. of the substratum around the ostiole, gregarious or in row, with 1 or sometime 2 or 3 perithecia; raising the epidermis; made of melanized hyphae fused with the ostiolar wall; ostiole 80–100 µm diam., conical; entostroma prosenchymatous, mixed with substrate cells, not delimited by a border line. – *Perithecia* 0.2–0.3 mm diam., peridium melanized, prosenchymatous, about 15 µm thick; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, 90–100 × 8 µm; spore-bearing part 75–90 µm; stipe 5–10 µm, apical ring I+, 1.5–2 µm high, 2 µm thick. – *Ascospores* (10) 11.8 ± 0.9 (13) × 5–6 µm, slightly asymmetrical, ellipsoid with rounded ends, brown, germ slit shorter than spore length, on the less convex side, straight or slightly oblique; epispore thin; a cellular appendage at one end disappearing in old material.

*Habitat.* – Small corticated twigs.

*Known host.* – *Laurus benzoin*.

*Distribution.* – USA: New-Jersey. Known only from the type collection.

*Notes.* – The original description does not cite any collection, but give comments that are identical with the notes accompanying the material described

above. The measurements of the ascospores are also identical. This material is treated therefore as original.

### 5. *Anthostomella ambigua*

(H. Fabre) F. Rappaz, comb. nov. – Pl. 2f.

Bas.: *Anthostoma ambiguum* H. Fabre., Ann. Sci. Nat. Bot. sér. 6, 15: 40, 1883.

*Holotype*. – FRANCE: Vaucluse, Sérignan-du-Comtat, on *Pistacia terebinthus*, January 1881, H. Fabre (L'Harmas de Fabre: Sphaeriaceés du Vaucluse, sub *Anthostoma ambiguum*).

*Anamorph*. – not seen.

*Clypeus* ill defined, isolated and reduced to a black spot around the 120–150 µm diam. conical ostiole, or at times effused, confluent; surface raised by the perithecia; entostroma prosenchymatous, mixed with substrate. – *Perithecia* 0.5–1 mm wide, 0.5–0.8 mm high, peridium melanized, prosenchymatous, about 15 µm thick; paraphyses not seen. – *Asci* not seen, according to the protologue they are cylindrical, short stipitate, with uniseriate ascospores, 180–200 µm long; apical ring I+, 6–8 µm high, 6–7 µm thick. – *Ascospores* (22)  $28.2 \pm 3.3$  (35) × 10–15 µm, asymmetrical, ellipsoid with rounded or slightly pinched ends, brown, germ slit sigmoid, spore length on the less convex side; epispore thin; with a cellular appendage at one end and a slimy cap on the opposite end.

*Habitat*. – Decorticated branches.

*Known host*. – *Pistacia lentiscus*.

*Distribution*. – EUROPE: Southern France. Known only from the type collection.

*Notes*. – The type material consists of 6 fragments glued on a sheet. Two of them, on the upper left and right corners show *A. anserina*. This species has smaller ascospores and there is no doubt that Fabre had the above fungus in mind when he described his species. *A. ambigua* is similar to *A. chionostoma* (Mont.) Sacc. which has smaller ascospores 18–25 × 7–11 µm (Francis, 1975).

### 6. *Anthostomella helichrysi*

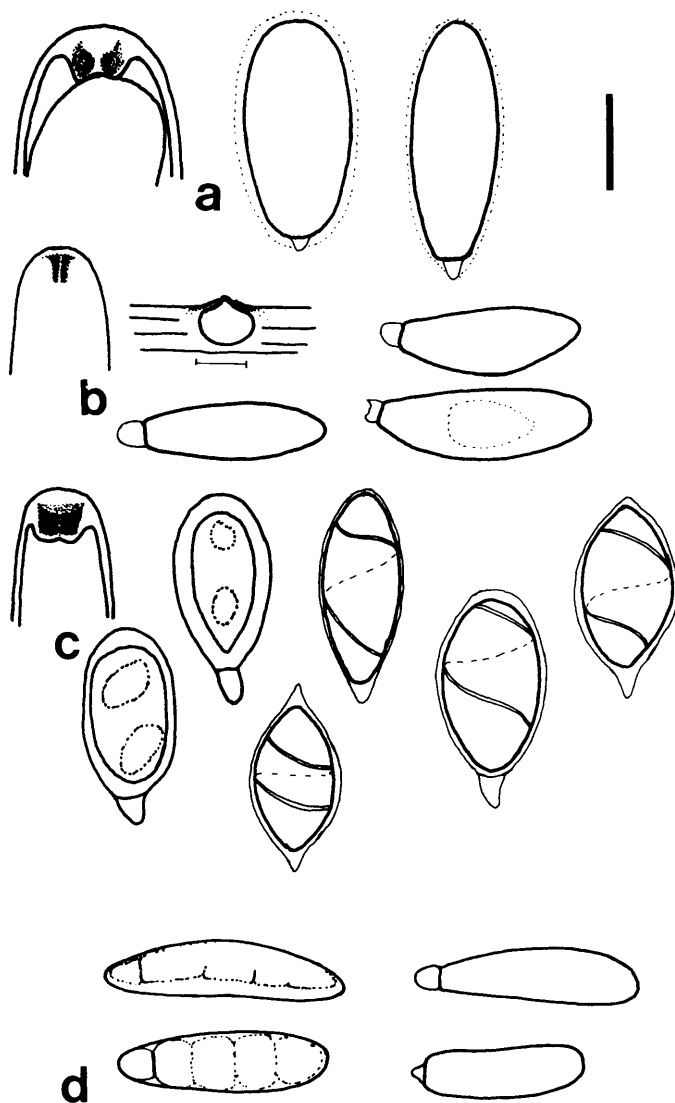
Fabre, Ann. Sci. Nat. Bot. sér. 6, 15: 40, 1883. – Pl. 2g.

Syn.: *Anthostoma helichrysi* (Fabre) Cooke, Grevillea 17: 90, 1889.

*Holotype*. – FRANCE: Vaucluse, Sérignan-du-Comtat, on *Helichrysum stoechas*, 1880, H. Fabre (L'Harmas de Fabre: Sphaeriaceés du Vaucluse). – *Isotype*. – (PAD-herb. Sacc.).

*Anamorph*. – not seen.

*Clypeus* black, 0.8–1.2 mm diam., 0.5 mm high, gregarious and raising up the surface of the bark or effused and ill delimited, made of melanized



Pl. 3. – *Anthostomella cornicola*, *A. urophora*, *Helicogermisita fleischhackii*, *Clypeosphaeria mamillana*. – *A. cornicola*: a. Ascospores and ascal ring in iodine. – *A. urophora*: b. Ascal ring in iodine, ascospores and perithecia. – *H. fleischhackii*: c. Ascal ring in iodine, ascospores, the two on the left are immature. – *C. mamillana*: d. Septate ascospores near one pole, on the left as seen in water, on the right in Hoyer media after coloration in Melzer reagent and a 5% KOH pretreatment (from G: *Fungi Rhenani* 1823). – Bars near stromata and perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.



hyphae, forming a *textura intricata*, fused with the ostiolar wall; ostiole 200 µm diam., conical or cylindrical up to 0.3 mm high; entostroma prosenchymatous, mixed with substrate cells, sometimes forming a melanized capsule enclosing a perithecium. – *Perithecia* 0.5–0.8 mm wide, up to 0.6 mm high, peridium melanized, prosenchymatous, 10–15 µm thick; paraphyses 4–5 µm wide, numerous, dissolving at maturity. – *Asci* cylindrical, with obliquely uniseriate ascospores, 110–150 × 13–17 µm; spore-bearing part not distinct from stipe, apical ring I+, 3–4 µm high, 5–6 µm wide. – *Ascospores* (17) 20.8 ± 2.0 (25) × 9–12 µm, symmetrical or slightly asymmetrical, ellipsoid with rounded ends, light brown, no germ slit; epispore thin; a cellular appendage at one end disappearing at maturity, young ascospores with a punctate wall.

*Habitat.* – Small lignose and corticated twigs.

*Known host.* – *Helichrysum stoechas*.

*Distribution.* – EUROPE: Southern France. Known only from the type collection.

*Notes.* – This taxon could be placed in *Clypeosphaeria* sensu Barr (1989) on account of its ascospores ±symmetrical, devoid of germ slit. The ascospores are also quite similar to what can be seen in *Anthostomella* sensu stricto, the missing germ slit apart, and no formal proposal is made until more is known. The punctate ascospore wall is striking and has been observed also by Fabre in the protologue. The taxonomic significance of this character is unknown. I have not observed punctate ascospores in *Anthostomella* (sensu stricto). Contrarily to what is seen in *A. cornicola* or in *A. urophora*, the hyaline cell in the present species disappears and can only be seen when the perithecia are not over-mature.

## 7. *Anthostomella cornicola*

Ellis & Everh., *Erythea* 1: 198, 1893. – Pl. 3a.

*Holotype.* – USA: Washington, Seattle, on *Cornus* sp., August 1892, A.M. Parker no 115 (NY-herb. Ellis).

*Anamorph.* – not seen.

*Stroma* in bark, seen as a clypeus 0.8–1 mm in diam., 25–50 µm thick, pierced by a 80–100 µm diam. slightly projecting ostioles; entostroma prosenchymatous, mixed with substrate cells, poorly developed except around the perithecial wall; no black zone seen. – *Perithecia* globose, weakly raising the substrate, gregarious, 0.5–0.8 mm in diam., peridium melanized, prosenchymatous, ca 15 µm thick; paraphyses numerous, about 5 µm wide. – *Asci* cylindrical, with obliquely uniseriate ascospores, 120–190 × 15–20 µm; short stipitate, apical ring I+, 6–7 µm thick, 4–5 µm high. – *Ascospores* total length: (22) 24.4 ± 2.1 (30) × 8–12 µm, symmetrical, ellipsoid with rounded ends, bigger cell brown (16)

22.3 ± 2.9 (27), without germ slit; with a cellular appendage 1–2 µm long which does not disappear in old ascospores; a pore ca 0.3 µm in diam. in septum; episore ca 1 µm thick.

*Habitat.* – Corticated twigs.

*Known host.* – *Cornus* sp.

*Distribution.* – USA: Washington.

*Notes.* – Barr (pers. com.) observed different ascospores in this material. These spores were similar to those of *A. ambigua*. The developed entostroma near the peridium is not typical of *Anthostomella*

## 8. *Anthostomella urophora*

(Sacc. & Speg.) F. Rappaz, comb. nov. – Pl. 3b.

Bas.: *Anthostoma urophorum* Sacc. & Speg. apud Sacc., Fungi Italici: t. 166, 1878.

Syn.: *Entosordaria urophorum* (Sacc. & Speg.) Höhnel, Sitzungber. Kaiserl. Akad. Wiss. Math.-Naturwiss. Cl. Abt. 1, 129: 166, 1920.

*Holotype.* – NO ANNOTATIONS (PAD-Sacc., sub *Anthostoma urophorum*; with notes and drawing as illustrated in Saccardo (1878a).

*Anamorph.* – not seen.

*Clypeus* ill defined, just a blackening of the wood around the conical ostiole. – *Perithecia* 0.5–0.6 mm wide, 0.4–0.6 mm high, gregarious or sometimes in contact; peridium melanized, prosenchymatous, ca 15 µm thick; paraphyses not seen – *Asci* not seen; 100–110 × 8 µm and short stipitate according to Saccardo (1878a); apical ring I+, 3–3.5 µm high, 2–2.5 µm thick. – *Ascospores* (15) 18.2 ± 2.0 (22) × 6–7 µm, dark brown, asymmetrical, narrowly ellipsoid, one end rounded or slightly acute, the other end truncate, with a persistent cellular appendage which remains hyaline, germ slit not seen; episore thin.

*Habitat.* – Decorticated wood.

*Known host.* – *Ulmus* sp..

*Distribution.* – EUROPE: Italy. Known only from the type collection.

*Notes.* – The material determined by Petrak as *A. urophorum* is *Stereosphaeria perfidiosa*. (De Not.) Erriksson.

CZECHOSLOVAKIA: Moravia: Weisskirchen, Podhorn on *Fagus* or *Quercus*, April 1913, F. Petrak (B, LAU, W(1970)13255: Fl. Boh. & Mor. exs.: 14: 674, sub *A. urophora*).

*A. cornicola* and *A. urophorum* could be classified in *Clypeosphaeria* sensu Barr (1989) because of the ascospores with their hyaline but persistent cellular appendage and the absence of a germ slit. Barr (1989) widened the concept of *Clypeosphaeria* Fückel to include *C. americana* Barr & Samuels, a species similar to *A. urophora*, and to include also *Stereosphaeria* Kirschst. (= *Entosordaria* Höhnel non Speg.) because she found apiosporous ascospores in a collection of *C. mamillana*, the type of *Clypeosphaeria*. Observation of a duplicate of this

collection (Pl. 3d) [GERMANY: Ostricher Wald, on *Rubus*, Fuckel (G-Herb. Barbey-Boissier, Fungi Rhen. 1823 sub *Clypeosphaeria notarissii* and *Sordaria clypeata*)] shows also that a few ascospores were septate near an extremity, the wall of the smaller cell being sometimes unmodified, sometimes much lighter and thinner than the wall of the rest of the ascospore and then quiet similar to those of *A. urophora*.

The fact that only a small number of the young ascospores are septate could mean that septation occurs late during sporogenesis in this collection of *C. mamillana*, in contrast to what is observed in *Anthostomella*, where all the young ascospores are septate. This could suggest that these two modes of development are different, and that the similarity between *C. mamillana* and the present species is superficial.

### 9. *Anthostomella nitidula*

Sacc., Atti Soc. tenet.-trent. Sc. Nat. 4: 102, 1875. Ill.: Fungi. ital.: tab. 131, 1877.  
– Illustration and description, see Francis (1975: 38, as *A. rubicola*).

Syn.: *Anthostoma nitidula* (Sacc.) Cooke, Grevillea 17: 90. 1889.

*Entosordaria rubicola* Speg., Fungi Chilenses: 40. 1910.

*Anthostomella rubicola* (Speg.) Sacc. & Trotter, Syll. fung. 22: 100. 1913.

The protologue of *A. nitidula* mentioned a clypeate *Anthostomella* found on small twigs of *Carpinus betulus*, having short stipitate asci  $110\text{--}120 \times 10 \mu\text{m}$  and hyaline, asymmetrical, fusoid, guttulate ascospores measuring  $25 \times 6 \mu\text{m}$ . These ascospores become brown and  $20 \times 5 \mu\text{m}$ . The illustration showed hyaline ascospores with  $\pm$ pointed ends and four or more lipid droplets.

I think the differences in ascospore size occurred because they are two celled, the smaller cell (ca  $5 \mu\text{m}$  long) remaining unmelanised and therefore unnoticed by Saccardo. The fungus described as *A. rubicola* (Speg.) Sacc. & Trotter by Francis (1975) matches this description. It is not restricted to *Rubus*. I have found it on small twigs of *Cornus sanguinea*. The typification of *A. nitidula* is delayed until a suitable material on *Carpinus* is found.

On MAA, *A. nitidula* forms perithecial primordia in two months. No anamorph was seen.

Collections examined. – SWITZERLAND: Roche (VD), on *Rubus* sp., December 1993, F. Rappaz no 931212–2 (LAU: sub *A. nitidula*, cultured). – Same data, on *Cornus sanguinea*, 931212–1.(LAU: sub *A. nitidula*).

## Helicogermisita

Lodha and Hawksworth, Trans. Brit. mycol Soc. 81: 91, 1983.

Type species: *H. celastri* (Kale & Kale) Lodha & Hawksworth

*Stroma* black, delimited, pierced with the ostiole, gregarious, carbonized and enclosing one or a few perithecia or at times reduced; entostroma prosenchymatous, mixed with substrate cells; ectostroma white, abundant at the beginning of the development. – *Perithecia* globose, peridium melanized, prosenchymatous, paraphyses numerous. – *Asci* unitunicate, cylindrical, usually with uniseriate ascospores, apical ring I+ or I–, discoid. – *Ascospores* brown, wall smooth, asymmetrical or symmetrical, ellipsoid, ends rounded or tapered, germ slit spiral; epispore thin or thick; with a cellular appendage at one end disappearing on old material, at times with a slimy cap on the opposite end.

*Habitat.* – Twigs and wood of Spermatophytes.

*Distribution.* – Cosmopolitan.

*Notes.* – The taxonomy of *Helicogermisita* Hawksworth & Lodha has been much debated. Dargan, Singh & Rogers (1984) have shown that the ascospores of the type species *H. celastri*, had a dwarf cell and an apical ring which was sometimes amyloid. They suggested a possible relationship with *Rosellinia*. In her treatment of species from temperate zone, Petrini (1993) did not consider *Helicogermisita* a synonym of *Rosellinia*. According to Hawksworth & Lodha (1983), the stroma of *H. celastri* is two layered: a carbonized outer crust, including substrate cells, and a medullary prosenchymatous layer which is composed only of fungal tissue. One or a few perithecia are enclosed. In *Anthostomella* the medullary layer is a mixture of fungal hyphae and host cells. This character could permit a generic distinction but one may wonder if this difference is not a matter of lytic activity of the hyphae, or if it is really a structural difference.

Læssøe and Spooner (1994) have recently used *Helicogermisita* for four species including *H. fleischhackii*, which I had first thought to include in *Anthostomella*. Rather than introducing a new name, I accept their taxonomy, pending further studies. Contrary to the type species of *Helicogermisita*, the entostroma of *H. fleischhackii* is reduced and hardly melanized, as rightly mentioned by Læssøe and Spooner (1994). However, they keyed out *Helicogermisita* under the heading “stroma strongly carbonized, in part not confined to the epidermis”.

### 1. *Helicogermisita fleischhackii*

(Auersw.) Læssøe & Spooner, Kew Bull. 49: 48, 1994. – Pl. 3c.

Bas.: *Sordaria fleischhackii* Auersw. in Rabenh. Fungi Europaei: 1133, 1867.

Syn.: *Anthostoma cubiculare* Nitschke, Pyrenom. germ. 1: 119, 1867 (illeg.) as *A. cubiculare* (Fr.) Nitschke non *Sphaeria cubicularis* Fr.:Fr., Syst. Mycol. 2: 477, 1823 (= *Robergea cubicularis* (Fr.) Rehm).

*Lopadostoma cubiculare* (Fr.) Martin, J. South Afr. Bot. 42: 75, 1976 (illeg.).

*Lectotype* (proposed here).– GERMANY: Arnstadt, Thuringen, on *Pinus*, Fleischhack (BRSL: Herb Menschelianum sub *Sphaeria fleischhackii* Awd. n. sp).  
– *Isotype*. – (G-herb. Barbey-Boissier, BRSL, K: Rabenh., Fungi europaei 1133 sub *Sordaria fleischhackii*).

*Anamorph*. – not seen.

*Clypeus* not formed, melanized part of entostroma reduced to a thin zone around the ostioles; ostioles 150–220 µm diam., slightly depressed, not prominent but clearly visible since they are surrounded by an area of decolored wood mixed with white material (crystals), area circular and 0.5 mm diam. when the perithecia are immersed or extending up to 1–2 mm in small pustules when the substrate is raised; entostroma prosenchymatous of hyaline hyphae (1–2 µm diam.), mixed with substrate cells. – *Perithecia* 0.4–0.5 mm wide, 0.5–0.8 mm. high, isolated or gregarious, raising more or less the surface of the substrate, sometimes immersed only by the base, the upper part powdery with white material, peridium melanized, prosenchymatous, 25–35 µm thick surrounded externally by numerous white crystals; paraphyses numerous, dissolving at maturity. – *Asci* cylindrical, with obliquely uniseriate ascospores, short stipitate, 110–140 × 14–18 µm; apical ring I+, 2 µm high, 3 µm thick. – *Ascospores* (15) 17.3 ± 1.8 (21) × (9)10–13 (15) µm, symmetrical, ellipsoid with slightly pointed ends or one end acute the other one rounded, sometimes spherical, brown, germ slit spiral with two coils, or Y shaped in spherical ascospores; epispore thick and easily removed in young ascospores becoming thinner and forming a pointed cap at one end; a cellular appendage 2–3 µm in length at the opposite end, disappearing in old material.

*Habitat*. – Decorticated wood of gymnosperms.

*Known hosts*. – *Pinus* sp.

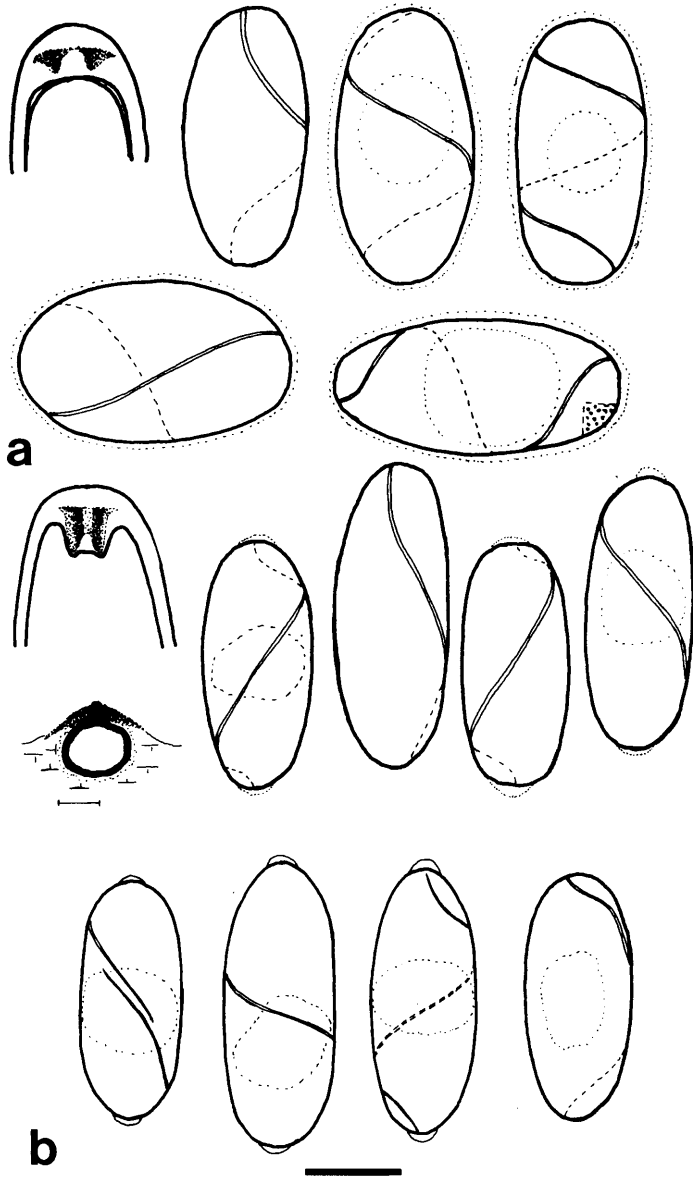
*Distribution*. – EUROPE: France, Germany.

*Additional collection examined*. – FRANCE: Barrière de Grenelles au champ de Mars, Paris, [from xylotomy on Gymnospermous wood], Rev. Daenen, (PC-Herb. Mont. no 381, 388 sub *Sphaeria cubicularis* Fr.).

*Missidentification*: Rehm Ascom. 290 (G-Herb. Barbey-Boissier sub *Anthostoma cubiculare*, is *Winterella* cf *corylina*).

*Notes*. – Læssøe and Spooner (1994) have a description which matches the present one except for the white material around the ostiole they described as an ectostroma, and the cellular appendages which they do not mention. This character however could offer a clear delimitation with *Leptomassaria*, whose species show also a spiral germ slit.

Contrary to them, I consider that the protologue of *S. fleischhackii* is not Auerswald's first discussion of this taxon (Auerswald, 1868a) but the illustration and measurement given with the dried material distributed by Rabenhorst.



Pl. 4. – *Leptomassaria simplex*, *L. unedonis*. – *L. simplex*: a. Ascus ring in iodine and ascospores. – *L. unedonis*: b. Ascus ring in iodine, perithecia and ascospores (upper row from RO: sub *S. unedonis*, lower row from PC: sub *S. umbrinella*). – Bar near perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.

Auerswald (1868a) demonstrated that Nitschke's interpretation of *Sphaeria cubicularis* is inadequate: the protologue could not be applied to the present species but to *Ostropa cubicularis* (Fr.) Awd. (= *Robergea cubicularis* (Fr.) Rehm). Nitschke (1868) claimed that this description was vague, that Auerswald's interpretation of it was inaccurate, and that it is his own delimitation, based on Montagne's material and on an illustration of Currey (1859), which was correct. Auerswald (1868b) maintained his position and taxonomy! Latter students of ascomycetes have confirmed Auerswald's view: Sherwood (1977) based *Robergea cubicularis* (Fr.) Rehm on *S. cubicularis* for an Ostropalean fungus.

"*Anthostoma*" *leucostomum* Berlese, "*Amphisphaeria*" *canicollis* Karsten on branches of *Populus tremula* (Hawksworth and Lodha, 1983), "*Anthostoma*" *chionostoma* Sp. from Paraguay, which has asymmetrical ascospores, are not treated by Læssøe and Spooner (1994) they could belong here.

### Leptomassaria

Petrak, Ann. Mycol. 12: 474, 1914.

Type species: *L. simplex* (Nitschke ex Otth) Petrak.

*Stroma* externally not visible or reduced to a clypeus; entostroma prosenchymatous, white and well developed near the peridium, mixed with substrate cells further, without melanized zone line. – *Perithecia* globose, 0.5–1.5 mm diam., peridium prosenchymatous, up to 30 µm thick; paraphyses numerous. – *Asci* cylindrical, stipitate, apical ring I+, discoid to cylindrical, well developed. – *Ascospores* always unicellular, symmetrical, ellipsoid with rounded ends, brown, germ slit spiral; epispore thin, not dissolving in KOH.

*Habitat*. – Corticated branches.

*Distribution*. – EUROPE.

*Notes*. – *Leptomassaria* is kept distinct from *Anthostomella* for species having big ascospores with a spiral germ slit. Ascospores of species in *Helicogermis* differ in having a cellular appendage.

#### 1. *Leptomassaria simplex*

(Nitschke ex Otth) Petrak, Ann. Mycol. 12: 474, 1914. – Pl. 4a.

Bas.: *Quaternaria simplex* Nitschke ex Otth, Mitth. Naturf. Ges. Bern: 95, 1870.

Syn.: *Anthostoma simplex* (Nitschke ex Otth) Sacc., Syll. Fung. 11: app. 25, 1895.

*Neotype* (proposed here). – CZECHOSLOVAKIA: Moravia: Weisskirchen, Park der k.k. Mil.-Oberrealschule, on *Tilia platyphylla*, November 1912, F. Petrak (W14826 -herb. Petrak 3716: Fl. Boh. & Mor. exs.: 1677).

*Anamorph*. – not seen.

*Stroma* in bark, completely hidden under the periderm except for black disc, 0.3–0.5 mm diam. which is pierced by a 250–300 µm diam. not projecting ostiole; entostroma prosenchymatous, mixed with substrate cells but well developed, mostly composed of fungal element near the perithecia, appearing as a white layer 0.2–0.3 µm thick, no black zone seen. – *Perithecia* globose, gregarious, 0.5–1.5(2) mm in diam. peridium prosenchymatous, 20–30 µm thick, sometimes melanized only at the base; paraphyses numerous, about 2–3 µm wide. – *Asci* cylindrical, with obliquely uniseriate ascospores, 220–280 × 15–22 µm; spore-bearing part 200–250 µm; stipe 20–50 µm, apical ring I+, 3–5 µm high, 7–8 µm thick. – *Ascospores* (23)  $27.2 \pm 2.0$  (31) × 13–19 µm, symmetrical, ellipsoid with rounded ends, dark brown, wall weakly punctuate, germ slit spiral; epispore developed up to 1 µm thick; young ascospores unicellular.

*Habitat.* – Corticated branches.

*Known host.* – *Tilia*.

*Distribution.* – EUROPE: Czechoslovakia, Switzerland.

*Notes.* – The material of Petrak matches the description of Otth. However, none of these authors nor Arx & Müller (1954) have reported the spiral germ slit, which is nevertheless quite visible. The ascospores described by Arx & Müller match better those of *Eutypella dissepta* (Fr.) Rappaz.

## 2. *Leptomassaria unedonis*

(De Not.) F. Rappaz, comb. nov. – Pl. 4b.

Bas.: *Sphaeria unedonis* De Not., Mem. R. Acad. Sc. Torino ser. 2, 16: 465, 1857.

Syn.: *Anthostomella unedonis* (De Not.) Sacc., Atti Soc. vent.-trent. Sc. Nat. 4: 102, 1875.

*Anthostoma unedonis* (De Not.) Cooke, Grevillea 17: 90, 1889.

*Sphaeria umbrinella* De Not., Mem. Reale Accad. Sci. Torino ser. 2 16: 464, 1857.

*Amphisphaeria umbrinella* (De Not.) Ces. & De Not., Schem. Sfer. 9, 1863.

*Anthostomella umbrinella* (De Not.) Sacc., Syll. Fung. 1: 287, 1882.

*Anthostoma umbrinella* (De Not.) Cooke, Grevillea 17: 90, 1889.

*Entosordaria umbrinella* (De Not.) Höhnelt, Sitzungber. Kaiserl. Akad. Wiss.

Math.-Naturwiss. Cl. Abt. 1, 129: 166, 1920.

*Lectotype.* – ITALY: Genua, allo Scoglietto, on *Arbutus unedo*, December 1843 (RO-herb., De Not., Micromyc. ital. dec. 9: 6, sub *Sphaeria unedonis*, Isotype proposed here as lectotype). – *Isotype.* – Same data (PAD-herb. Sacc., PC-herb. Durieu).

*Anamorph.* – not seen.

*Stroma* in bark forming pulvinate swelling 1.5–3 mm in diam., 0.5 mm high, clypeus black well developed under the periderm, pierced by an ostiole 200–250 µm in diam. when projecting, sometimes ill distinct and appearing smaller, entostroma prosenchymatous, mixed with substrate but well developed under the clypeus near the perithecial neck and around the peridium, no



black zone seen. – *Perithecia* globose, gregarious, 0.8–1 mm in diam. peridium prosenchymatous, 30–45  $\mu\text{m}$  thick, melanized; paraphyses numerous, 2–5  $\mu\text{m}$  wide. – *Asci* cylindrical, with obliquely uniseriate ascospores, 180–250  $\times$  15–20  $\mu\text{m}$ ; spore-bearing part 150–200  $\mu\text{m}$ ; stipe 20–50  $\mu\text{m}$ , apical ring I+, 4–5  $\mu\text{m}$  high, 4  $\mu\text{m}$  thick. – *Ascospores* (22.5) 26.9  $\pm$  2.0 (32.5)  $\times$  11–13 (15)  $\mu\text{m}$ , symmetrical or weakly asymmetrical, ellipsoid with rounded ends, brown, germ slit spiral; epispore thin, a mucuous cap at each pole sometimes seen; young ascospores unicellular.

*Habitat.* – Corticated branches.

*Known hosts.* – *Arbutus unedo*, *Castanea sativa* (as *C. dealbata*).

*Distribution.* – EUROPE: Italy.

*Additional collection examined.* – ITALY: near Genova, on *Castanea* (RO: Micromyc. Ital. Dec. 9: 5, sub *S. umbrinella*, with notes, holotype; PC-herb. Roussel: isotype).

*Notes.* – Schrantz (1960) has illustrated both collections of *S. unedonis* and *S. umbrinella* but he did not treat them as conspecific. Both names have been published together. The type material of *S. unedonis* being more abundant, I unite both species under this name.

### Lopadostoma

(Nitschke) Traverso, *Flora Ital. Crypt.* 2: 169, 1906.

Bas. *Anthostoma* Nitschke sub gen. *Lopadostoma* Nitschke, *Pyrenom.* germ.: 121, 1867.

Type species: *Lopadostoma turgidum* (Pers.: Fr.) Trav. (Shear, 1938).

*Anamorph.* – *Libertella*, when known.

*Stroma* in bark and pustulate: conical, pulvinate, or discoid (subgenus *Lopadostoma*), or in wood, effused and surface blackened only in small spots around ostioles or blackened in wide area, at times  $\pm$  raised by the perithecia (subgenus *Anthostomopsis*), ostioles fused with stromatic outer crust, at times  $\pm$  indistinct or conical and slightly projecting; entostroma prosenchymatous, in subgenus *Lopadostoma* well developed, at times composed mostly of fungal tissue, in subgenus *Anthostomopsis* developed at least around the peridia, mixed with substrate cells, zone line present and well marked in pustulate stromata, less evident in effused form. – *Perithecia* at times in two rows in pustulate stromata, or in one row and  $\pm$  gregarious or in contact within each other, neck short or long depending on stromatal configuration, peridium melanized, prosenchymatous; paraphyses numerous, ca 4  $\mu\text{m}$  wide near the base, ca 2  $\mu\text{m}$  wide higher. – *Asci* cylindrical, with uniseriate rarely biseriate ascospores, stipe well marked about as long as half the spore-bearing part, apical ring I+, cylindrical, up to 1–1.5  $\mu\text{m}$  high. – *Ascospores* symmetrical, elongate ellipsoid, at times asymmetrical and curved, with rounded or sometimes weakly pointed ends, at times slightly compressed laterally, dark brown to olive brown, germ slit cir-

cular or straight and spore length or shorter on two sides, sometimes difficult to see and possibly truly absent; young ascospores one celled with a thin episore.

*Habitat.* – Bark and wood of various hardwoods, lignose part of monocots.

*Distribution.* – EUROPE, USA.

*Notes.* – Until now *Lopadostoma* comprised species with pustulate or conical stromata, mainly *L. turgidum* and *L. gastrinum*. (Fr.) Trav. The first is very frequent in newly fallen branches of *Fagus sylvatica*, from both Europe and North America (Barr, pers. com.). Its stromatal shape is constant, the ostioles being collectively erumpent through a small disc piercing the periderm.

*L. gastrinum* is not restricted to a peculiar substrate. Its stromatal shape is also different, usually conical with a flat disc (see Arx & Müller, 1954; for an illustration of both type of stromata).

Stromata in *L. gastrinum* are however much more polymorphous: in shape, from truly conical to pustulate or rarely effuse through pustules confluence in thick bark; polymorphous in entostromatal proliferation: with an entostroma weakly developed, appearing lighter in color than the surrounding bark, or strongly developed and mostly formed of fungal tissue. A wider host spectra could explain this variability. Perithecial configuration and length of perithecial neck is likewise variable.

These two species have the same ascus ring morphology, similar ascospores, and in culture both *L. turgidum* (pers. obs.) and *L. gastrinum* (pers. obs.; Ju & al., 1993 as *L. turgidum*) produced holoblastic scoleococonidia which are extruded in colored droplets from conidiomata identical to what is found in Diatrypaceae.

Therefore, the morphological features of the stromata do not unite these taxa. Moreover, *L. polynesium* a species with an effused stroma, but with asci and ascospores identical to those of *L. gastrinum* produced the same anamorph. It becomes evident that the concept of *Lopadostoma* should be broadened to include effused forms similar to *L. polynesium*, rather than to create a new genus. I propose a distinction at subgeneric level only.

Currently, the number of species in *Lopadostoma* is a matter of speculation. Many names have been proposed for pustulate taxa, but many will proved to be synonymous.

### Lopadostoma subgenus Lopadostoma

Type species: *Lopadostoma turgidum* (Pers.: Fr.) Trav.

*Stroma* in bark or seated on wood, pustulate and conical, pulvinate, or discoid, ostioles fused with stromatic outer crust, ± indistinct; entostroma proenychmatous, well developed, composed mostly of fungal tissue near surface,

relatively soft; zone line present. – *Perithecia* in one row or at times in two rows, in contact within each others or ± compressed, neck short or long. – *Asci* and *ascospores* as in generic description.

*Habitat.* – Bark or wood of various hardwoods.

*Notes.* – This subgenus encompass *L. turgidum*, and *L. gastrinum*. Besides the stromatal shape and host spectra, these two taxa differ also by their germ slits as Petrini & al. (1987: 389) have outlined: on one side of the ascospore in the first species, circular in *L. gastrinum*.

### Lopadostoma subgenus Anthostomopsis

F. Rappaz, subgenus nov.

Type species: *Lopadostoma polynesium* (Berk. & Curtis) Rappaz.

Stromate effuso eutypeo, ligno immerso, ejusque superficiem nigrificante ac maculas formante vel omnino nigrificante. Entostromata a textura intricata formata. Perithecia monosticha in ligno immersa, globosa, nunc laxe sparsa nunc conferta. Asci et ascosporae ut in *Lopadostoma* subgenus *Lopadostoma*.

*Stroma* in wood, effuse, surface blackened only in small spots around ostioles or blackened in wide area, at times ± raised by the perithecia; entostroma prosenchymatous, poorly developed except around the peridium, mixed with substrate cells. – *Perithecia* in one row and ± gregarious or in contact within each other. – *Asci* and *ascospores* as in subgenus *Lopadostoma*.

#### 1. *Lopadostoma polynesium*

(Berk. & Curtis) F. Rappaz, comb. nov. – Pl. 5a–b, e; 6f–h.

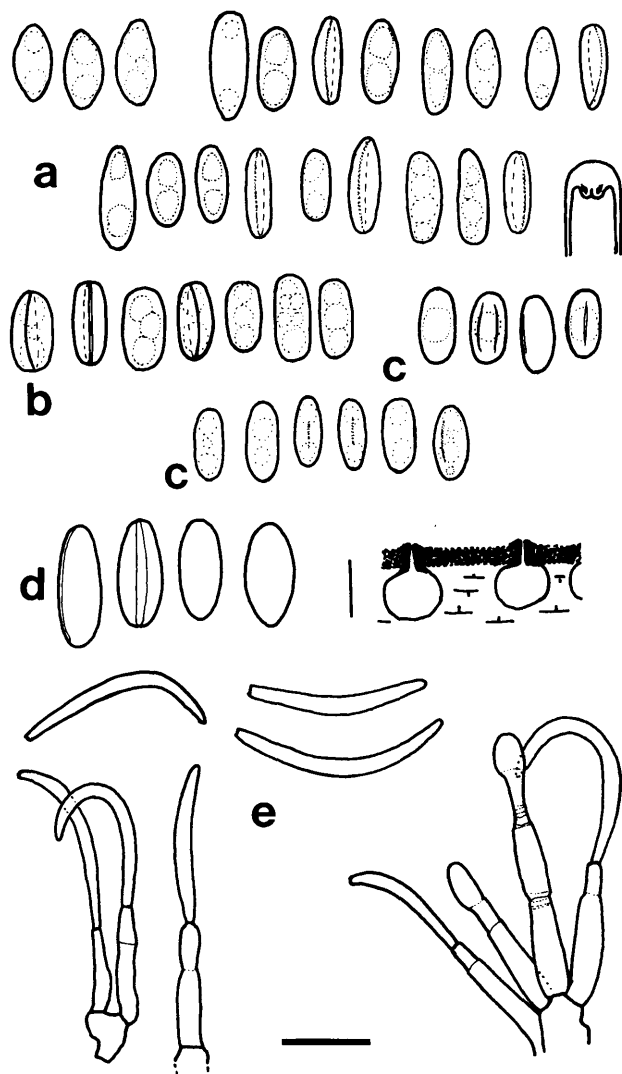
Bas.: *Sphaeria polynesia* Berk. & Curtis, Grevillea 4: 146, 1876.

Syn.: *Anthostoma polynesium* (Berk. & Curtis) Sacc., Syll. Fung. 1: 298, 1882 as “polynesia”).

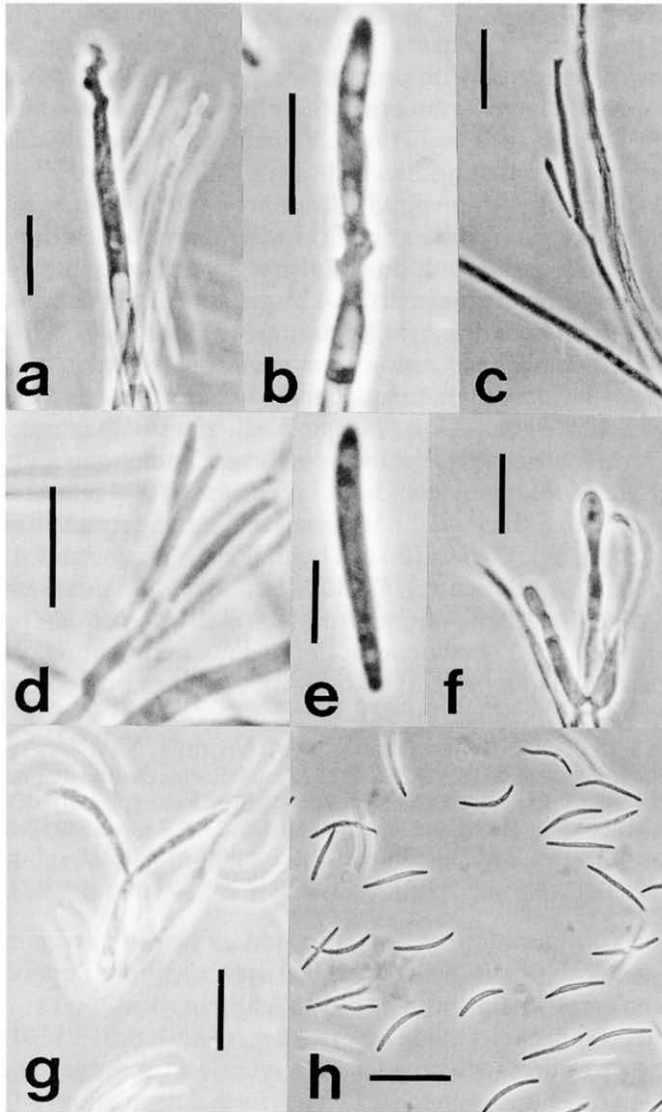
*Holotype.* – USA: Virginia mountains, Curtis no 3347 (K-herb. Berk., sub *Sphaeria polynesia*).

*Anamorph.* – *Libertella*.

*Stroma* in wood, surface blackened in wide area and slightly tomentose, sometimes glossy, flat or raised by the perithecia, sometimes surface blackened only in small spots a few mm in area, around the 120–180 µm diam. ostioles which can be ± indistinct or conical and slightly projecting; entostroma prosenchymatous, mixed with substrate cells, poorly developed except around the peridium, sometimes delimited in the border of the perithecial area by a diffuse zone line. – *Perithecia* globose, sometimes raising the substrate, gregarious or in contact within each others, 0.2–0.4 mm wide, 0.2–0.3 mm high, peridium melanized, prosenchymatous, 10–20 µm thick; paraphyses numerous, about 1.5–2 µm wide. – *Asci* cylindrical, with uniseriate ascospores, 80–130 × 5–6 µm;



Pl. 5. – *Lopadostoma polynesium*, *L. saprophilum*, *L. flavoviride*. – *L. polynesium*: a. Ascospores and ascus ring in iodine (first row 1–3 from K: sub *S. polynesia*, 4–7 from LAU: 298, 8–11 from LAU: 830305, lower row 1–3 from LAU: 880415, 4–6 from LAU: 920609–4, 7–9 from LAU: 931212–3). – *L. polynesium*: b. Ascospores (1, 4–7 from LAU931212–4, 2–3 from LAU: 920609–5). – *L. saprophilum*: c. Ascospores (upper row from NY: sub *A. saprophilum*, lower row 1–6 from LAU: 920628). – *L. flavoviride*: d. Ascospores and perithecia. – *L. polynesium*: e. Conidia and conidiogenous cells in culture. – Bar near perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.



Pl. 6. – BAR: taxon on *Acer* from Canada, *Lopadostoma polynesium*. Anamorph in culture. – BAR a–e. a. Conidiogenous cell with secession scars. – b. Young conidia and scars. – c. Conidia and conidiogenous cell showing apical growth. – d. Cluster of conidia. – e. Conidia. – L. *polynesium*: f–h. f. Clavate cells suggesting a percurrent proliferation of the conidiogenous cell without conidia being formed. – g. Sympodial proliferation. – h. Conidia. – Bars a–d, 10  $\mu$ m; e, 5  $\mu$ m; f–h, 25  $\mu$ m.

spore-bearing part 75–100(120)  $\mu\text{m}$ ; stipe up to 50  $\mu\text{m}$ , apical ring 1+, 2  $\mu\text{m}$  wide, ca 0.8  $\mu\text{m}$  high. – *Ascospores* (7.2)  $9.4 \pm 1.0$  (13)  $\times$  3–4.5  $\mu\text{m}$ , symmetrical or asymmetrical, ellipsoid with rounded or sometimes weakly pointed ends, slightly compressed laterally, brown to olive brown, germ slit circular difficult to see, on the narrow sides, sometimes ill distinct. – *Anamorph in culture*. – On MAA, ascospores germinating after ca 18 days. Colony reaching 6 mm in diam. after 5 weeks, aerial mycelium pinkish, forming a swelling 3 mm high, bristled with fasciculate hyphae, white at margin which never reach the edge of the plate, taking a yellow tint with time. Reverse coloration dilute yellow. After some month, conidiomata formed, 0.5–1 mm diam., plurilocular, with a pseudoparenchymatous, melanized wall, exuding conidia in yellow droplets. *Conidiophores* branched, hyaline, arising from pseudoparenchyma. *Conidiogenous* cells hyaline, cylindrical, sometimes slightly swollen, arranged in dense palisade (8)  $14.1 \pm 3.2$  (20)  $\times$  2–3  $\mu\text{m}$ , the apex sometimes with faint annellations. *Conidiogenesis* holoblastic, proliferation percurrent, sometimes seeming to proliferate without forming any conidia, a succession of 2–3 cells ending with a rounded apex with a thick wall can be seen (Pl. 6f). Sympodial proliferation also observed (Pl. 6g). *Conidia* (Pl. 6h) hyaline, falcate, one end truncate, the other rounded or slightly acute, (18)  $23.1 \pm 2.9$  (29)  $\times$  2  $\mu\text{m}$  (first sample, n=16); (26)  $30.9 \pm 3.5$  (36)  $\times$  2  $\mu\text{m}$  (second sample, n = 25), sometimes branched, or nodulose and devoided of cytoplasm. Conidia not germinating.

*Habitat*. – Decorticated twigs and branches of various hardwoods.

*Known hosts*. – *Tilia*, *Fraxinus*, *Pyrus*.

*Distribution*. – EUROPE: Switzerland. – USA: Virginia, New-Jersey.

*Additional collections examined*. – SWITZERLAND: Vaud: Roche, chemin du pont d'Egraz, on *Tilia*, December 1982, F. Rappaz 298 (LAU). – Same locality, same substrate 880415–1 (LAU). – 931212–3 (LAU). – Vaud: Roche, On *Fraxinus* March 1983, F. Rappaz 830305 (LAU). – June 1992, F. Rappaz 920609–4 (LAU). – 920609–5 (LAU, cultured). – 9131212–4 (LAU). – USA: New-York, Alcove, on *Pyrus malus*, may 1893, Shear (NY-herb. Ellis, New York Fungi no 34, sub *Anthostoma saprophilum*).

*Notes*. – The configuration of the germ slit is best seen when the ascospores are gently rolling in water at a 1000 magnification. Depending on the collection, the germ slit itself can be only slightly marked.

Of the Swiss collections made on *Fraxinus*, two (920609–5, 9131212–4) had symmetrical ascospores with broader ends, were less compressed laterally and had a germ slit much easier to see (Pl. 5b). A formal distinction of these collections is delayed.

*Sphaeria nitidissima* Mont. on *Arundo* from Algeria is similar to the present species. The type material (PC) differs in having smaller asci (p sp. 50–70  $\mu\text{m}$ ) with an apical ring staining blue in iodine only after a KOH pretreatment.

## 2. *Lopadostoma saprophilum*

(Ellis & Everh.) F. Rappaz, comb. nov. – Pl. 5c.

Bas.: *Anthostoma saprophilum* Ellis & Everh., J. Mycol. 3: 43, 1887.

*Holotype*. – USA: New-Jersey: Newfield, on *Acer* sp., May 1878 (NY-herb. Ellis sub *A. saprophilum*).

*Anamorph*. – not seen.

*Stroma* in wood, surface black and shining, on a wide area or in spots a few mm, swelled by the perithecia, ostioles distinct, slightly projecting, 80–100 µm diam.; entostroma poorly developed. – *Perithecia* globose, gregarious or rarely in contact, 0.3–0.4 mm wide, 0.2–0.3 mm high, peridium melanized, prosenchymatous. – *Asci* cylindrical, with uniseriate ascospores, 80–100 × 5 µm; spore-bearing part 50–70 µm; stipe 15–30 µm, apical ring I+, 2 µm wide, ca 0.8 µm high. – *Ascospores* (6) 8.5±0.8 (10.2) × 3.2–4 µm, symmetrical, ellipsoid with rounded or slightly pointed ends, brown to dark brown, two germs slits on opposite sides, difficult to see about  $\frac{2}{3}$  of the spore length.

*Habitat*. – Decorticated twigs and branches.

*Known hosts*. – *Acer* sp., *Quercus* sp.

*Distribution*. – USA: New-Jersey. – EUROPE: Ireland.

*Additional collection examined*. – IRLAND: Kerry Co., Gap of Dunloe, on a stake of *Quercus* wood, June 1992, F. Rappaz 920628 (LAU)

*Notes*. – The authentic material on *Pyrus* attributed by Ellis to *L. saprophilum* has ascospores with a clearly circular germ slit. For that reason, it is best classified in *L. polynesium*.

## 3. *Lopadostoma flavoviride*

(Ellis & Holway) F. Rappaz, comb. nov. – Pl. 5d.

Bas.: *Anthostoma flavoviride* Ellis & Holway in Arthur & al., Bull. geol. Nat. Hist. Surv. 3: 32, 1887.

Syn.: *Anthostomella flavoviridis* (Ellis & Holway) Martin, J. South Afr. Bot. 42: 71, 1976.

*Holotype*. – USA: Minnesota, Vermilion lake, on *Populus tremuloides*, July 1886, Holway no 263 (NY-herb. Ellis, sub *Anthostoma flavo-viride*).

*Anamorph*. – possibly *Libertella* sp. (see below).

*Stroma* in wood on an area 1–2 cm wide, much more in length, not elevated from the substrate, surface green-black and somewhat powdery, or brown and smooth, punctuated by the 180–200 µm diam., slightly projecting ostioles; entostroma prosenchymatous, poorly developed in the wood, over the perithecia becoming dense and melanized in a 200 µm thick layer, and on the surface forming a 20 µm thick weakly melanized yellowish layer, appearing as a *textura globosa* in transversal section mixed with sclerenchyma cells; border of the fruiting area delimited by a black zone 1–2 mm thick. – *Perithecia* globose,

evenly spaced, 0.4–0.5 mm in diam., perithecial neck well marked, peridium melanized by spots, prosenchymatous, 15–20  $\mu\text{m}$  thick; paraphyses numerous, about 2–4  $\mu\text{m}$  wide. – *Asci* cylindrical, with obliquely uniseriate ascospores, 140–170  $\times$  10  $\mu\text{m}$ ; spore-bearing part 100–110  $\mu\text{m}$ ; stipe 40–70  $\mu\text{m}$ , apical ring I+, 2  $\mu\text{m}$  wide, ca 0.8  $\mu\text{m}$  high. – *Ascospores* (11)  $12.3 \pm 0.9$  (13.5)  $\times$  4–6  $\mu\text{m}$ ,  $\pm$  symmetrical, ellipsoid with rounded ends, laterally slightly compressed, brown, germ slit appearing as punctuated straight band 1–1.5  $\mu\text{m}$  wide, of spore length on the less convex side of asymmetrical ascospores.

*Habitat.* – Decorticated branches.

*Known host.* – *Populus tremuloides*.

*Distribution.* – USA: Minnesota. Known only from the type collection.

*Notes.* – The original description mentioned globose conidia 1–1.5  $\mu\text{m}$  which I have not seen. Ju & al. (1993) have reported a *Libertella* anamorph for a “*Nummularia*” like fungus which seems to be quite similar to the present one, except for smaller ascospores (8–10.5  $\times$  3.5–4.5  $\mu\text{m}$ ).

### Barrmaelia

F. Rappaz, gen. nov.

*Stroma* eutypeo, effuso ligno vel cortice immerso, ejusque superficiem nigrificante ac maculas formante, plerumque elongatas, saepe confluentes. Entostroma a textura intricata formata. Ostiola papillata. Perithecia sparsa, globosa. Paraphysis filiformes. *Asci* 8-spori, cylindrici, breve stipitati. *Asci* annulus apicalis iodo non coerulescens. *Ascosporae* uni vel biseriatae, unicellularibus, inaequilater anguste ellipsoidea, apicem rotundatae vel truncatae, luteae vel brunnea. *Epispora* tenua, hyalina.

*Type species* – *Barrmaelia rhamnica*.

*Anamorph.* – *Libertella*, when known.

*Stroma* mostly in wood and blackening the surface in wide area or in elongate bands, sometimes darker around the ostioles; entostroma prosenchymatous, poorly developed, mixed with substrate cells, sometimes delimited in the border of the perithecial area by a black or brown zone. – *Perithecia* globose, sometimes raising the substrate, gregarious or rarely  $\pm$  compressed by each other, peridium melanized, prosenchymatous; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, short stipitate, apical ring I-. – *Ascospores* asymmetrical narrowly ellipsoid or allantoid with rounded or sometimes truncate ends, yellow to brown, germ slit missing or when present spore length on the less convex side, straight; epispora thin; young ascospores unicellular.

*Habitat.* – Twigs and branches of various hardwoods.



*Ethymology.* – *Barrmaelia* is an anagram with some of the letters of Margaret Elisabeth Barr, an homage towards her immense contribution to taxonomy of pyrenomycetous fungi.

*Notes.* – Species in *Barrmaelia* differ from *Lopadostoma* in having usually larger and more asymmetric ascospores. In fact ascospore shape in *B. rhamnocola*, *B. moravica*, *B. picacea* is similar to allantoid ascospores of the Diatrypaceae. The anamorph is also identical. The asci of these species, shortly pedicellate with a refractive pulvillus when seen in phase contrast, with a thin wall around the subapical chamber are different from the long pedicellate asci of the Diatrypaceae, which is morphologically constant in the whole family.

Germ slit is quiet variable: missing constantly in *B. rhamnocola*, present in some collections of *B. macrospora* and not in others, always present in *B. oxyacanthae* or *B. sustenta*.

When non reacting in iodine, the apical ring in Xylariaceous or in Diatrypaceous taxa is not used alone for distinguishing genera. In *Barrmaelia* however, this is constant in all species and also for those taxa where many collections are known. Mathiassen (1989, as *A. melanotes*) examined some 40 collections of *B. oxyacanthae* which were all similar in this aspect.

### 1. *Barrmaelia rhamnocola*

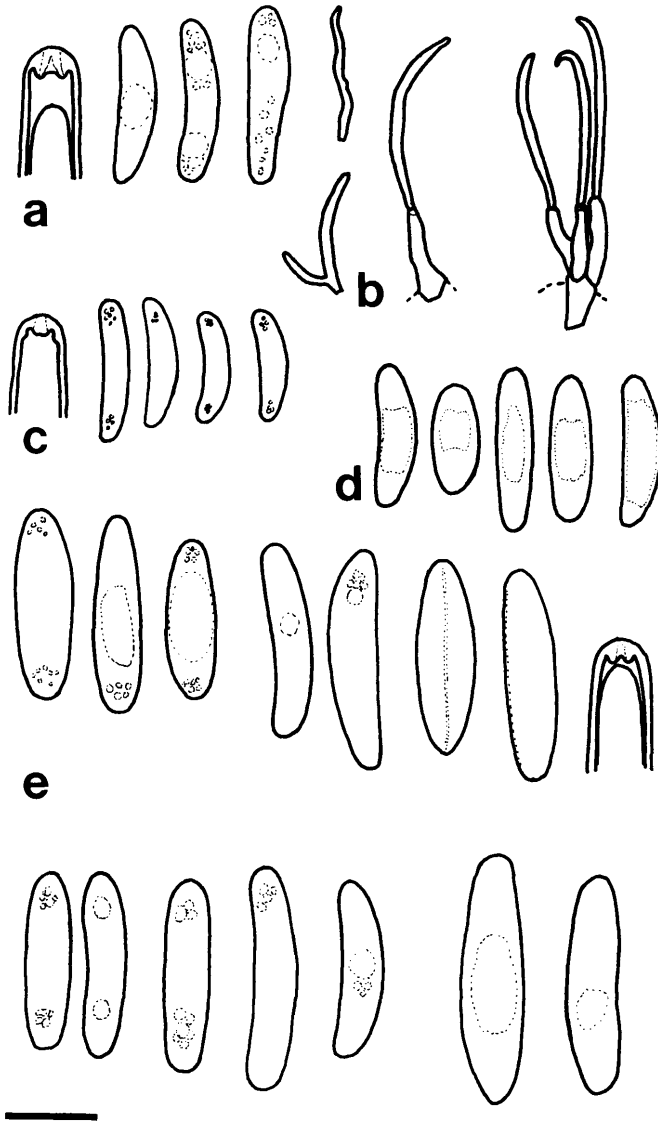
F. Rappaz, spec. nov. – Pl. 7a–b, 9a–c.

Stromate effuso ligno immerso, ejusque superficiem nigrificante. Entostroma a textura intricata formata. Ostiola papillata 100–150  $\mu\text{m}$  diam. Perithecia sparsa, globosa, 0.4–0.8 mm lata, 0.3–0.5 mm alta. Paraphysis filiformes. Asci 8–spori, cylindrici, incluso 110–150  $\mu\text{m}$  longi  $\times$  7–8  $\mu\text{m}$  crassi, partibus sporiferi 100–130  $\mu\text{m}$ , stipite maxime 30  $\mu\text{m}$  longi. Asci annulus apicalis iodo non coerulescens. Ascosporae (14)  $17.8 \pm 2.2$  (23)  $\times$  4–5  $\mu\text{m}$ , uni vel biseriatae, unicellularibus, inaequilater anguste ellipsoidea, apicem rotundatae, luteae vel viride-brunnea. Epispora tenua hyalina. Status anamorphosis *Libertella* simile.

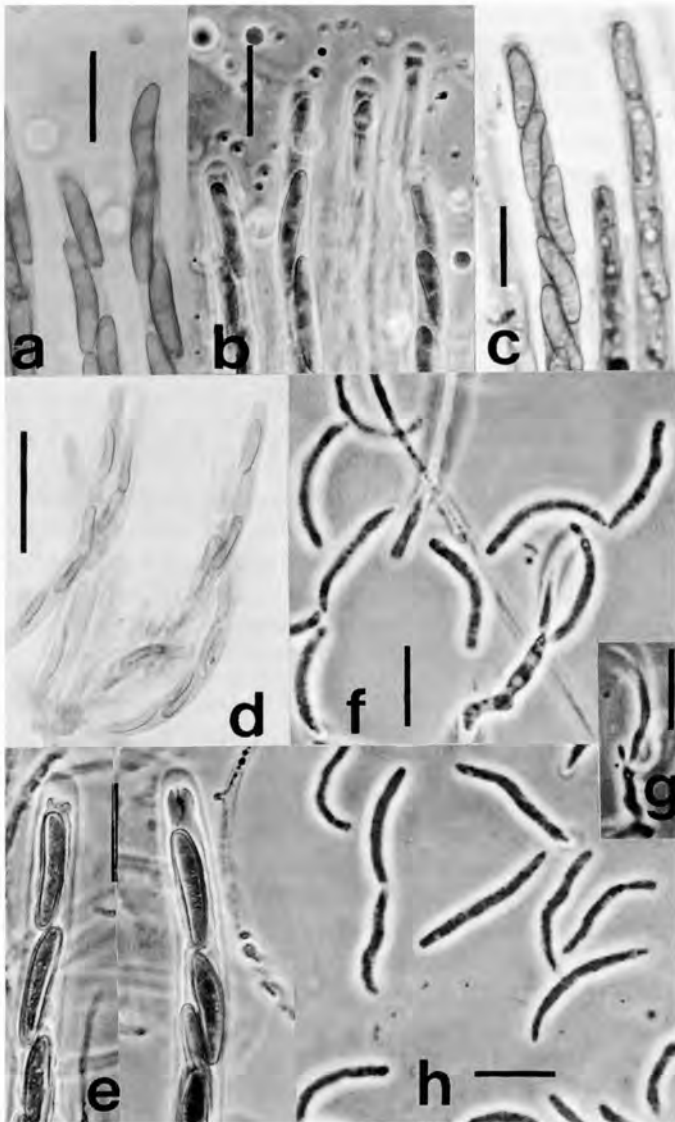
*Holotypus.* – SWITZERLAND: Vaud, les Rochers-de-Naye, Sautaudon, on *Rhamnus alpinus*, June 1989, Rappaz no 890611–2 (LAU, cultured).

*Anamorph.* – *Libertella*.

*Stroma* in wood and blackening the surface in wide area or only grey with darker spot around the 100–150  $\mu\text{m}$  diam. projecting but not prominent conical ostioles; entostroma prosenchymatous, poorly developed, delimited in the border of the perithecial area by a black zone which penetrates the wood. – *Perithecia* globose, not raising the substrate, gregarious or sometimes two in contact, rarely  $\pm$  compressed by each other, 0.4–0.8 mm wide, 0.3–0.5 mm high, peridium melanized, pale brown, prosenchymatous, 15–25  $\mu\text{m}$  thick; para-



Pl. 7. – *Barrmaelia rhamnocola*, *B. moravica*, *B. macrospora*. – *B. rhamnocola*: a. Ascospores and ascus apex. – b. Distorted conidia and normal conidia with conidiogenous cells in culture. – *B. moravica*: c. Ascus apex and ascospores. – *Barrmaelia* sp.: d. Ascospores (from W(1978)18347). – *B. macrospora*: e. Ascospores and ascus apex (upper row: 1–3 from B: sub V. *macrospora*, 4–7 from W(1970)25449, lower row: 1–5 from W11838, 6–7 from FH: sub A. *thyridioides*). – Bar, 10  $\mu$ m.



Pl. 9. – *Barrmaelia rhamnocola*, *B. moravica*, *Barrmaelia* sp., *B. oxyacanthae*. – *B. rhamnocola*: a–b. Asci in Melzer reagent with direct light (a) or phase contrast (b) microscopy. – c. Asci in Janus green. – *B. moravica*: d. Asci in Congo red. – *Barrmaelia* sp.: e. Asci in Melzer reagent. (from LAU: R.186). – *B. oxyacanthae*: f–h. Anamorph in culture. – f. Conidia and a conidiogenous cell with two attached conidia. – g. Young conidia seen at the apex of a conidiogenous cell. – h. Conidia. – Bar a–c, 15  $\mu$ m; d, 25  $\mu$ m; e 16  $\mu$ m; f–h, 10  $\mu$ m.

physes numerous, about 3  $\mu\text{m}$  wide near base, 1.5  $\mu\text{m}$  wide in the upper part. – *Asci* cylindrical, with uni- or biseriata ascospores, 110–150  $\times$  7–8  $\mu\text{m}$ ; spore-bearing part 100–130  $\mu\text{m}$ ; stipe up to 30  $\mu\text{m}$ , apical ring I–. – *Ascospores* (14) 17.8  $\pm$  2.2 (23)  $\times$  4–5  $\mu\text{m}$ , weakly allantoid or asymmetrical narrowly ellipsoid with rounded ends, yellow to olive brown, epispore thin, without germ slit or appendage. – *Anamorph in culture*. – On MAA, ascospores germinating within 48 h. Colony reaching 4–5 cm in diam. after 5 weeks, never reaching the edge of the plate, with a regular margin, aerial mycelium dense and cottony on a central area of 3 cm in diam., white, sometimes with yellow-brown spots near the center. Reverse coloration dilute brown. After 4–6 weeks, small spherical conidiomata (resembling perithecial primordia) formed, 0.2–0.4 mm diam., plurilocular, with a pseudoparenchymatous and slightly melanized wall, exuding the conidia in white droplets in well sporulating isolates, more often the conidia seen only on squash. *Conidiophores* branched, hyaline, arising from pseudoparenchyma. *Conidiogenous* cells hyaline, conical or cylindrical, arranged in dense palisades (6)8–17(20)  $\times$  1.5–2  $\mu\text{m}$  the apex sometimes with faint annulations. *Conidiogenesis* holoblastic, proliferation percurrent or sympodial. *Conidia* hyaline, falcate, one end truncate, the other rounded or slightly acute, (14) 22.0  $\pm$  3.2 (27)  $\times$  1–1.2  $\mu\text{m}$ , sometimes in old colonies, branched, nodulose or zig-zag shaped (Pl. 7b), or devoid of cytoplasm.

*Habitat*. – Decorticated branches, often still attached to the tree.

*Known host*. – *Rhamnus alpinus*.

*Distribution*. – EUROPE: Switzerland.

*Additional collections examined*. – SWITZERLAND: Vaud, Leysin, on *R. alpinus*, May 1981, Rappaz (LAU, cultured). – Same data, June 1985 (LAU). – Vaud, Roche, on *R. alpinus*, June 1992, Rappaz 920609–7 (LAU, cultured).

*Notes*. – In transversal section mounted in cotton blue, young conidiomata show deep staining coiled hyphae reminding one of an ascogonial coil. In fact, it is tempting to interpret these structures as perithecial primordia that have shifted toward conidiomata.

## 2. *Barrmaelia moravica*

(Petr.) F. Rappaz, comb. nov. – Pl. 7c, 9d.

Bas.: *Eutypa moravica* Petr., Ann. Mycol. 25: 224, 1927.

*Holotype*. – Czechoslovakia: Moravia: Weisskirchen, Usti, on *Salix caprea*, October 1925, Petrak (W(1970)24077, herb. Petr. 4285, sub *Eutypa moravica*). –

*Isotype*. – Same data (LAU, W(1978)10895-Fl. Boh. & Mor. exs. 2257).

*Anamorph*. – not seen.

*Stroma* in bark and blackening the parenchyma just beneath the periderm in a spot around the ca 100  $\mu\text{m}$  diam. conical ostioles; more rarely stroma in

wood, blackening the surface; entostroma prosenchymatous, poorly developed. – *Perithecia* globose, raising the periderm, gregarious, 0.5–0.8 mm wide, 0.5–0.6 mm high, peridium melanized, prosenchymatous, 15–20 µm thick; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, 90–120 × 5–8 µm; spore-bearing part 70–90 µm; stipe 10–40 µm, apical ring I-. – *Ascospores* (12) 14.3 ± 1.2 (16) × 2.5–3 µm, allantoid or asymmetrical, ellipsoid with rounded ends, yellow to olive brown, without germ slit or appendage.

*Habitat.* – Corticated and decorticated twigs.

*Known host.* – *Salix caprea*.

*Distribution.* – EUROPE: Czechoslovakia, Known only from the type collection.

*Notes.* – A collection from USA on *Populus* is similar to *B. moravica* except for slightly darker and larger ascospores (12) 15.2±1.5 (17) × 4–5 µm (Pl. 7d).

*Collection examined.* – USA: N. Dakota: Nylands Grove, on *Populus deltoides*, March 1914, Brenckle (W(1978)18347, sub *A. flavoviride*).

### 3. *Barmaelia macrospora*

(Nitschke) F. Rappaz, comb. nov. – Pl. 7e.

Bas.: *Valsa macrospora* Nitschke, Pyrenom. germ. 1: 145, 1867.

Syn.: *Eutypa macrospora* (Nitschke) Sacc., Syll. Fung. 1: 173, 1882.

*Anthostomella thyridioides* Ellis & Everh., J. Mycol. 9: 167, 1903.

*Anthostoma bavaricum* Petr., Krypt. Forsch. Bayer. Bot. Ges. Erforsch. heim. Flora 2: 156, 1931.

*Anthostomella bavarica* (Petr.) Martin, J. South Afr. Bot. 42: 81, 1976 as “*cavarica*”.

*Lectotype.* – GERMANY: Nienberge, on *Quercus* (from xylotomy: *Populus*), December 1865, Nitschke (B-herb. Nits.: sub *Valsa macrospora*).

*Anamorph.* – not seen.

*Stroma* in wood and blackening the surface in wide area or in elongate bands, sometimes darker around the 100–180 µm diam. conical ostioles; entostroma prosenchymatous, poorly developed, mixed with substrate cells, delimited on the border of the perithecial area by a diffuse brown zone. – *Perithecia* globose, just beneath the surface and sometimes raising the substrate, gregarious or rarely 2 or 3 ± compressed by each other, 0.4–0.8(1) mm wide, 0.5–0.6 mm high, peridium melanized, pale brown, prosenchymatous, 15–20 µm thick; paraphyses numerous, about 3 µm wide. – *Asci* cylindrical, with biseriate or obliquely uniseriate ascospores, 120–200 × 6–12 µm; spore-bearing part 100–170 µm; stipe up to 30 µm, apical ring I-. – *Ascospores* (15) 22.2 ± 2.5 (30) × 4–7 µm, asymmetrical, narrowly ellipsoid with rounded or sometimes pointed ends, dilute brown to olive brown, the convex side sometimes slightly darker than the opposite, germ slit missing or hardly seen (at 1000× magnif.) as a light band running the spore length on the less convex side, straight; epispore thin. *Culture:* Aerial mycelium on MAA white with light

brown tint near the center of the colony, bearing small spherical unmelanized structures (0.5–0.8 mm diam.). No anamorph observed.

*Habitat.* – Decorticated twigs and branches of various hardwoods.

*Known hosts.* – *Salix* sp., *Populus* sp., *Ligustrum* sp.

*Distribution.* – EUROPE: Czechoslovakia, France, Germany, Switzerland. – USA: Kansas.

*Additional collections examined.* – CZECHOSLOVAKIA: Mähr.-Weissk. Swrcow, on *Ligustrum vulgare*, 8–1925, F. Petrak (LAU, W(1970)25449–herb. Petrak 4195: Fl. Boh. & Mor. exs.: 2147 sub *A. inquinans*). – GERMANY: Reichenhall, Messnerholz, on *Ligustrum vulgare*, July 1910, Ade (W11838–herb. Petr.: sub *A. bavarium*, holotype). – SWITZERLAND: Vaud: Villeneuve, les Grangettes, on *Populus nigra*, February 1988, Rappaz (LAU). – Same locality, on *Salix* sp., September 1984, Rappaz 466 (LAU, cultured). – USA: Kansas, Rooks Co., on *Populus deltoides*, July 1902, Bartholomew (FH–herb. Ellis, sub *A. thyridioides*, isotype). – NO ANNOTATIONS: on *Ligustrum vulgare*, June 1924, Petrak (W(1978)18993–herb. sub *A. bavarium*).

*Notes.* – Rappaz (1983) had shortly described the material of *Valsa macrospora*, stating it was possibly not original. From two envelopes, both labelled “*Valsa macrospora* N”, one contains a note with spores drawing and figures “21/5”, and a fungus on poplar wood. The other envelope is with a note: spores drawing and “7–10/2”, and a fragment of wood, possibly from a leguminous host, with a *Didymosphaeria* and a pycnidial fungus with hyaline, unicellular, conidia 8–11 × 2–2.5 µm. The protologue is clearly a mixture of both elements, which proves that this material is in fact original. Asci and ascospores are undoubtedly those of the fungus in the first envelope, which is therefore proposed now as a lectotype.

Like in *Clypeosphaeria mamillana* (Fr.) Lambotte, some collections of the present species have ascospores with a wall which is less melanized and lighter in color on the flat side than on the convex side. In *C. mamillana* the ascus ring is amyloid and inverted hat shaped, the ascospores are pseudoseptate through oil droplet in their cytoplasm (Barr, 1989).

Three collections made on *Salix* and *Fraxinus* differ from the above description in having smaller ascospores (Pl. 9e) (15)  $18.1 \pm 2.1$  (23) × 4–5 µm with a germ slit easier to see (with 1000 magnification however). Measurements from this material were not included in the statistics given above. Cultures from these strains were similar to *B. macrospora*. I refrain from making formal differences for the moment.

*Collections examined.* – FRANCE: Vaucluse: Gordes, Gorges de la Véronde, on *Salix* sp., March 1985, Rappaz 503 (LAU). – SWITZERLAND: Vaud: Roche, Chemin du pont d'Egraz, on *Fraxinus* sp., August 1981, Rappaz 186 (LAU, cultured). – Same locality and substrate, March 1983, Rappaz 386 (LAU, cultured).

#### 4. *Barrmaelia oxyacanthae*

(Mont.) F. Rappaz, comb. nov. – Pl. 8a, 9f–h, 10.

Bas.: *Sphaeria oxyacanthae* Mont. in L. Castagne, Supplément au catalogue des plantes qui croissent naturellement aux environs de Marseille: 48, 1851.

Syn.: *Anthostoma oxyacanthae* (Mont.) Sacc., Syll. Fung. 1: 300, 1882.

*Sphaeria melanotes* Berk. & Broome, Ann. & Mag. Nat. Hist. ser. 2. 9: 321, 1852.

*Anthostoma melanotes* (Berk. & Broome) Sacc., Syll. Fung. 1: 294, 1882.

*Anthostomella melanotes* (Berk. & Broome) Martin, J. South Afr. Bot. 42: 71, 1976.

*Anthostoma schmidtii* Auerswald ex Nitschke, Pyrenom. germ.: 116, 1867.

*Anthostoma melanotes* var. *schmidtii* (Nitschke) Sacc., Syll. Fung. 1: 294, 1882.

*Anthostoma intermedium* Nitschke, Pyrenom. germ.: 117, 1867. non Cooke 1889.

*Anthostomella paliuri* Fabre, Ann. Sci. Nat. Bot. sér. 6, 9: 81, 1878.

*Anthostoma paliuri* (Fabre) Cooke, Grevillea 17 90, 1889.

*Anthostomella nobilis* Sacc. & Speg., Fungi ital. tab. 173, 1878. (Illeg.).

*Anthostoma nobilis* (Sacc. & Speg.) Cooke, Grev. 17: 90, 1889.

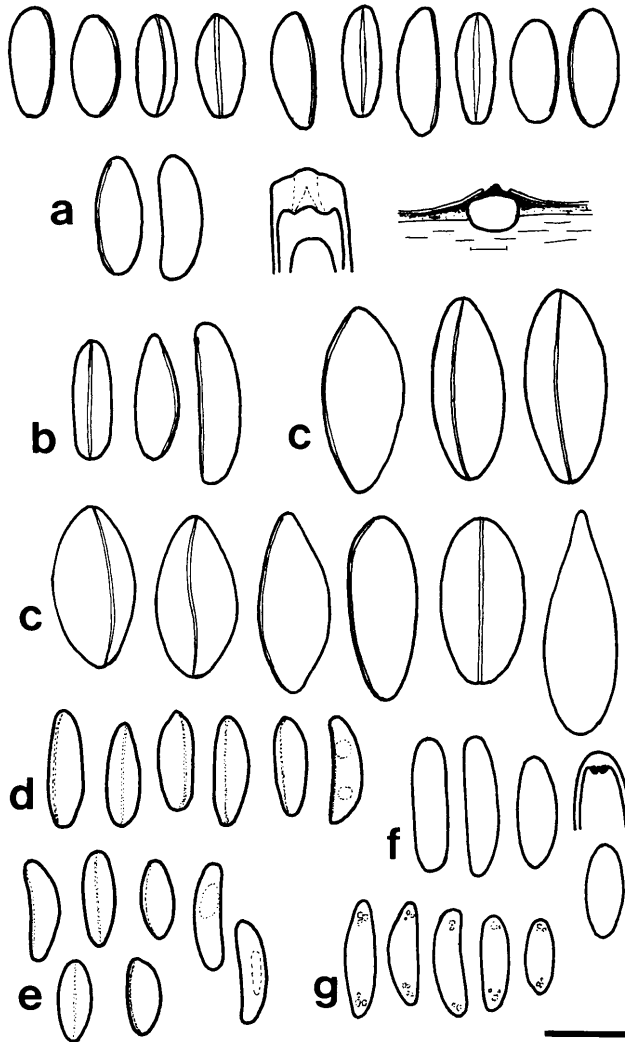
*Coniothyrium innatum* Karst., Medd. Soc. Fauna & Flora fennica 13: 162, 1886. (Petrak & Sydow, 1924a).

*Anthostomella eructans* Ell. & Everh. in Fairman, Proc. Rochester Acad. Sci. 1890.

*Holotype*. – NO ANNOTATIONS (PC-herb. Mont. sub *Sphaeria oxyacanthae*).

*Anamorph*. – *Libertella*.

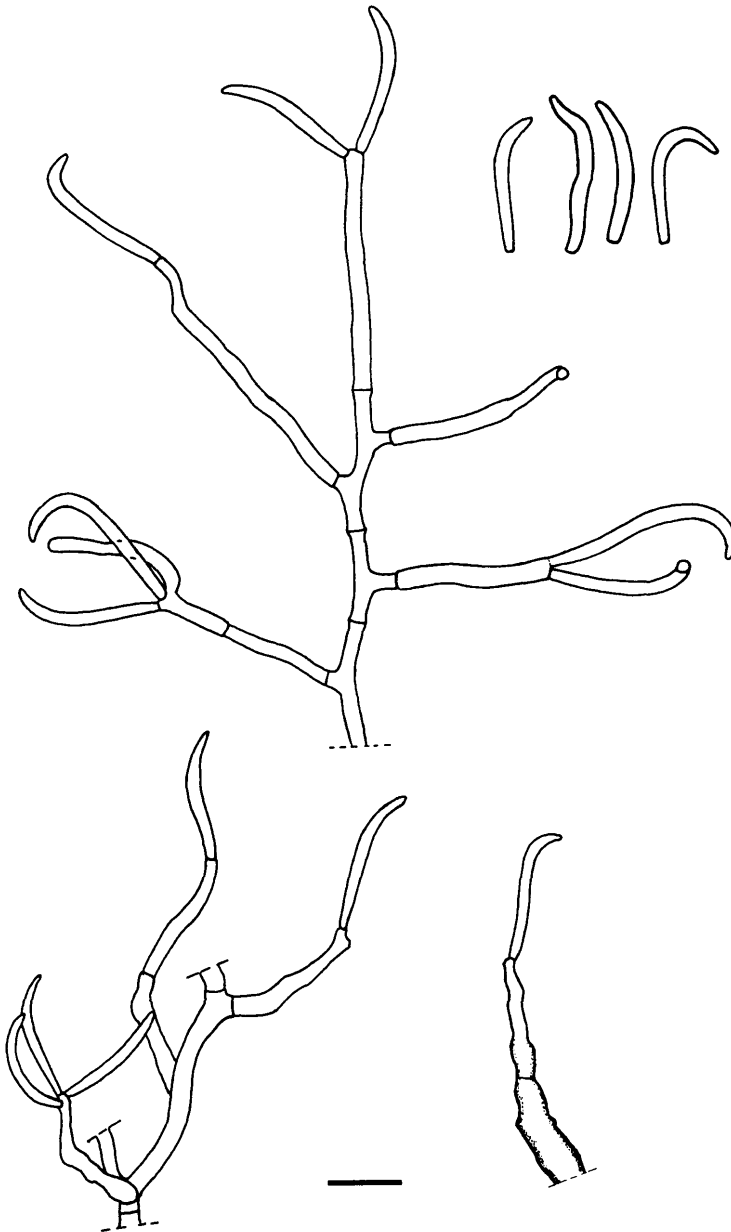
*Stroma* in wood and blackening the surface in wide area or in elongate bands, or in a ring around the twig, sometimes darker around the 120–150 µm diam. conical ostioles; more rarely on thin twigs, stroma in bark and then more limited in area, raising and tearing the periderm, the perithecia still half sunken in the wood, entostroma prosenchymatous, poorly developed, mixed with substrate cells, sometimes delimited in the border of the perithecial area by a black or brown zone. – *Perithecia* globose, sometimes raising the substrate, gregarious or rarely ± compressed by each other, 0.5–0.8(1) mm wide, 0.5–0.6 mm high, peridium melanized, prosenchymatous, 10–15 µm thick; paraphyses numerous, about 3 µm wide. – *Asci* cylindrical, with obliquely uniseriate ascospores, 90–140 × 5–8 µm; spore-bearing part 70–110 µm; stipe 10–40 µm, apical ring I–. – *Ascospores* (11) 13.7 ± 2.1 (17) × 5–7 µm, asymmetrical, ellipsoid with rounded or sometimes truncate ends, brown to dark brown, germ slit spore length on the less convex side, straight; epispore thin; young ascospores unicellular. *Anamorph in culture*. – On MAA, ascospores germinating in 24 h., giving rise to a colony reaching 4 cm in diam. after 3 weeks, aerial mycelium felty, white. No reverse coloration. No melanization. After two month mycelium dense and cottony on a central area of 3–4 cm in diam., more felty near the margin, white, bearing a few melanized structures 0.5–1 mm in diam., ± immersed in aerial mycelium, exuding the conidia in pinkish droplets in well sporulating isolate, more often the conidia are seen only on squash. *Conidiphores* melanized, dichotomously branched, up to 5 µm in diam., densely



Pl. 8. – *Barrmaelia oxyacanthae*, *B. sustenta*, *B. pseudobombarda*, *B. picacea*, *Lopadostoma* sp. – *B. oxyacanthae*: a. Ascospores, ascus apex and perithecium (ascospores upper row: 1–5 from PC; sub *S. oxyacanthae*, 6–10 from B; sub *A. carbonescens*, lower row from K; sub *S. melanotes*). – *Barrmaelia* sp.: b. Ascospores (from W23144). – *B. sustenta*: c. Ascospores (upper row from W(1975)1220, lower row 1–3, 6 from Barr 8615, 4–5 from Barr 7389). – *B. pseudobombarda*: d. Ascospores. – *Barrmaelia picacea*: e. Ascospores (from K; sub *S. picacea*). – *Lopadostoma* sp.: f. Ascospores and ascus ring in iodine (from NY ex Herb. Harper sub *S. picacea*). – *Barrmaelia* sp.: g. Ascospores (from W(1978)15827). – Bars near stromata and perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.

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Pl. 10. – *Barrmaelia oxyacanthae*: Conidia, conidiogenous cells and conidiophores in culture. – Bar, 10  $\mu$ m.

interwoven within the melanized prosenchymatous wall. *Conidiogenous* cells hyaline, conical or  $\pm$ distorted, arranged in palisades (8)  $16.7 \pm 6.3$  (35)  $\times$  1.5–2  $\mu\text{m}$ . *Conidiogenesis* holoblastic, conidiogenous cell proliferation sympodial, no annellations formed by percurrent proliferation were seen, possibly through inadequate optical equipment. *Conidia* hyaline, falcate, one end truncate, the other rounded or slightly acute, (16)  $23.5 \pm 3.5$  (30)  $\times$  1.5–2  $\mu\text{m}$ , sometimes branched, nodulose or zig-zag shaped, or devoid of cytoplasm. Conidia not germinating in water within 48 h.

*Habitat.* – Twigs and branches of various hardwoods, usually decorticated.

*Known hosts.* – *Salix*, *Alnus*, *Carpinus*, *Castanea*, *Quercus*, *Ulmus*, *Laurus*, *Crataegus*, *Prunus*, *Cytisus*, *Cornus*, *Acer*, *Paliurus*, *Fraxinus*, *Lonicera*.

*Distribution.* – EUROPE: Czechoslovakia, England, France, Germany, Italy, Russia, Switzerland. – USA: New-York State.

*Additional collections examined.* – BELGIUM: on *Salix*, Mouton n. 3 (PAD sub *A. tersa*, holotype). – CZECHOSLOVAKIA: Moravia: Weisskirchen, Welka, 8–1925, F. Petrak (LAU, W(1970)25453-herb. Petrak 4194: Fl. Boh. & Mor. exs. 2148 sub *A. melanotes*). – Weisskirchen, Hrabuvka, on *Cytisus scoparius*, March 1923, Petrak (LAU, W(1970)23184: herb. Petrak 3594: Fl. Boh. & Mor. exs. 1553, sub *A. melanotes*). – Weisskirchen: Lhotka, on *Ulmus* sp., October 1914 (W(1974)13124, sub *A. melanotes*). – Weisskirchen: Svrocov, on *Ligustrum vulgare*, October 1914, Petrak (W(1978)17155-sub *A. moravicum*). – West-Beskinden: Berg Cab, Wsetin, on *Carpinus betulus*, September 1923, Petrak (W(1971) 18212: herb. Petrak 20739 sub *A. melanotes*). – FRANCE: Orange, on *Paliura spina-christi* (as *P. aculeatus*) February 1878, Fabre (L'Harmas, sub *A. paliuri*, holotype). – GERMANY: Erdmannshof, April 1866, Nitschke (B: herb. Nits., sub sub *A. schmidtii*, syntype). – Erdmannshof, May 1865, Nitschke (B: herb. Nits., sub *A. intermedium*, holotype). – Erdmannshof, on *Quercus*, August 1865, Nitschke (B: herb. Nits., sub *A. schmidtii*, syntype). – Hasellacke, Grossbehnitz, on *Prunus spinosa*, November 1934, Kirschstein (B, sub *A. intermedium*). – Königstein, on *Salix purpurea*, October 1880 & April 1881, Krieger (G, Rabenh.-Wint., Fungi europaei 2670, G: herb. Barbey-Boissier, W(1978)18315: herb. Petrak, Krieger, Fungi Saxonici 85, sub *A. schmidtii*). – Nienberge, on *Fagus* [from xylotomy: *Pyrus*], April 1865, Nitschke (B: herb. Nits., sub *A. schmidtii*, syntype proposed as lectotype). – Ostricher Wald, on *Carpinus*, Fuckel (B: herb. Nits., Fuckel, Fungi Rhenani 2060, sub *A. carbonescens*, syntype). – Schkenditz, on *Fraxinus excelsior*, 1874, Winter (W(1975)12122, De Thümen, Mycoth. universalis 172b, sub *A. schmidtii*). – Wiesenfeld bei Gemünden am Main, on *Cornus sanguinea*, September 1931 (W(1973)17153: herb. Petrak 41688 sub *A. melanotes*). – GREAT BRITAIN: Batheaston, C.E.B (K, sub *S. melanotes*, holotype). – Elton sta., on *Quercus* sp (K, sub *S. melanotes*). – ITALY: Bissa Valobobbia, on *Lonicera xylosteum*, May 1898, Saccardo 1751 (PAD, herb. Sacc., sub *A. nobilis* f. *loniceracae*). – Conegliano, on *Laurus nobilis*, Spegazzini (PAD: herb. Sacc. sub *A. nobilis*). – Selva, on *Castanea vesca*, Aut. 1873, Saccardo (G, W(1975)12014: herb. Petrak, De Thümen, Mycoth. universalis 172, sub *A. schmidtii*). – Same data, March 1875 (G, Rabenh., Fungi europaei 1926, sub *A. schmidtii*). – USA: Lyndonville, N.Y., May 1889, Fairman no 42 (NY: herb. Ellis, sub *A. ercutans*, holotype). – RUSSIAN FED.: Kola, on *Salix*, July 1861, Karsten no 3245 (H: herb. Karst., sub *C. innatum*, holotype). – Stryj, Galizien, on *Salix fragilis*, November 1916, Petrak (W(1973) 23439: herb. Petrak 35339 sub *A. melanotes*). – SWITZERLAND: Berner Oberland, Gsteig, on *Salix* sp., September 1981, Rappaz (LAU). – Valais, vallée du trient, on *Alnus viridis*, May 1981, Monod & Rappaz (LAU, cultured). – Vaud, les Pléiades, Tenasses, on *Salix* sp., August 1993, Rappaz

(LAU, cultured). – NO ANNOTATIONS: (G, herb. Barbey-Boissier, Rehm, Ascomyten 222, sub *A. melanotes*).

*Missidentifications.* – (LAU, W(1970)25453-herb. Petrak 4194: Fl. Boh. & Mor. exs.: 2148, sub *A. melanotes* is *A. anserina*).

*Notes.* – When published originally, *A. nobilis* was treated as synonym of *A. delitescens*. The name is invalid therefore.

*Sphaeria melanotes* is placed in *Anthostoma* by Saccardo on two occasions (Saccardo, 1878a, 1878b) but at that time, he seemed to accept it only as a variety of *A. schmidtii*. It is only in the reference given above that the name is clearly accepted at species rank.

*A. schmidtii* is based on four syntypes, three of them being deposited in Berlin (B), all representing the same fungus. Among the three, the one which is better developed (Nienberge 4/65) is proposed here as lectotype.

This species has always been treated as a synonym of *A. melanotes*, except by Martin (1969). However, his concept of *A. melanotes* is inadequate, as Mathiassen (1989: 23) has outlined. Martin used that name for a collection having ascospores with prominent gelatinous epispore, asci having amyloid apical ring, and *Nodulisporium* conidia in culture.

In the collections attributed to *B. oxyacanthae* sensu lato, mean length of the ascospores range from 12.5 µm to 15.5 µm. Three groups could be made: the first which include the type of *S. oxyacanthae* with mean length (in µm) between 12.5 and 13, the second around *A. melanotes* with mean length between 13.5–14 and between 14.5–15 for the last group, which consist mostly of collections made on *Salix*. (see Mathiassen, 1989, 1993; for a description of material on *Salix* and for a discussion on the ecology). There is no correlation in partition of groups 1 and 2 with the substrate of the collections. No formal dispositions are made for the moment.

One American collection (USA: Dakota, Northville, on *Symphoricarpos occidentalis*, March 1927, Brenckle (W23144 herb. Petr. no 40080: sub *Anthostoma melanotes* var. *symphoricarpi*. nom herb.) has still larger ascospores (Pl. 8b): (13)  $15.8 \pm 1.6$  (18)  $\times$  5–6 µm and has been excluded from *B. oxyacanthae* for that reason.

## 5. *Barrmaelia sustenta*

(Plowright) Rappaz, comb. nov. – Pl. 8c.

*Sphaeria sustenta* Plowright, Grevillea 7: 73, 1878.

Syn.: *Anthostoma sustentum* (Plowright) Sacc., Syll. Fung. 1: 300, 1882.

*Anthostomella sustenta* (Plowright) Martin, J. South Afr. Bot. 42: 71, 1976.

*Anthostomella lavandulae* Lucas & Da Camara, Agron. lusit. 16: 82, 1954. (ex descript., type lost fide Francis, 1975).

*Type.* – No type proposed for the present.

*Anamorph.* – not seen.

*Stroma* in wood, reduced to a swelled clypeus up to 1 mm in diam., ostioles conical up to 200  $\mu\text{m}$  high, 150–200  $\mu\text{m}$  diam.; entostroma poorly developed, prosenchymatous, mixed with substrate cells. – *Perithecia* globose, 0.5–0.8(1) mm wide, 0.5–0.6 mm high, peridium slightly melanized, prosenchymatous, 10–20  $\mu\text{m}$  thick; paraphyses numerous, 3–4  $\mu\text{m}$  in diam. – *Asci* cylindrical, with obliquely uniseriate ascospores, 160–240  $\times$  10–15  $\mu\text{m}$ ; spore-bearing part 120–170  $\mu\text{m}$ ; stipe (10)30–70  $\mu\text{m}$ , apical ring I-. – *Ascospores* (17) 21.6  $\pm$  2 (27)  $\times$  (8)9–10  $\mu\text{m}$ , asymmetrical, at times almost symmetrical, ellipsoid with rounded or pointed ends, brown, germ slit spore length on the less convex side, straight; epispore thin; unicellular when young. – *Culture* on MAA. Colony slow growing reaching 25 mm in diam. after 3 weeks, never reaching the edge of the plate. Aerial mycelium white, felty, thicker on an area ca 8 mm in diam. in the center, stained with dilute brown spots after two month. Reverse coloration orange-brown. No anamorph seen.

*Habitat*. – Decorticated twigs.

*Known hosts*. – *Arbutus menziesii*, *Arctostaphylos glaucus*, *Lavandula angustifolia*.

*Distribution*. – CANADA: British Columbia, FRANCE: Isère. – USA: California.

*Collection examined*: CANADA: British Columbia, Sidney, on *Arbutus menziesii*, M.E. Barr (DAOM: Barr 7389 cultured, 7552, 7751, 8167, 8615 cultured; LAU). –FRANCE. Isère: Vif, *Lavandula angustifolia* (as *L. spica*), July 1881, Terry (W(1975) 1220, W(1978)18215-herb. Petrak: De Thümen Mycoth. universalis 2264, sub *A. italicum*).

*Notes*. – The protologue of *S. sustentata* describes a fungus with immersed perithecia, cylindrical asci 150  $\mu\text{m}$  long, dark brown ascospores 20–25  $\times$  10–11  $\mu\text{m}$ . Nothing corresponding to that description has been found in the material received from Kew.

*Collection examined*. – USA: California, on *Arctostaphylos glaucus*, Harkness no 381 (K, Fungi California).

Duplicates have been requested in NY without success. Martin (1969) keyed out *A. sustentata* with small black shiny clypeus (as stromata)  $\pm$ symmetrical ascospores, 19–22.5  $\times$  7.5–10.5  $\mu\text{m}$ , without cellular appendage, with rounded ends and a straight germ slit. He did not mention any collection unfortunately, and typification is delayed until a suitable duplicate of the Harkness collection is found.

## 6. *Barrmaelia pseudobombarda*

(Sacc.) F. Rappaz, comb. nov. – Pl. 8d.

Bas.: *Rosellinia pseudobombarda* Sacc., Atti Soc. Veneto-Trentina Sc. nat. 2: 157, t.10 fig. 45–47, 1873.

Syn.: *Anthostomella intermedia* Sacc., Fungi Italici: t. 172, 1878.

*Anthostoma intermedium* (Sacc.) Cooke, Grevillea 17: 90. 1889 non Nitschke 1867.

*Holotype*. – ITALY: Selva, on *Quercus*, (PAD-herb. Sacc.: sub *Rosellinia pseudobombarda*).

*Anamorph.* – not seen.

*Stroma* in wood and blackening the surface, pierced by ca 150 µm diam. conical ostioles; or stroma in bark raising and tearing the periderm, blackening the underlying parenchyma; entostroma prosenchymatous, mixed with substrate cells, no black zone seen. – *Perithecia* globose, raising the substrate, in contact or ± compressed by each other, 0.3–0.5 mm wide, 0.3–0.4 mm high, peridium melanized, prosenchymatous, 15–25 µm thick; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, 70–100 × 6–8 µm; spore-bearing part 60–80 µm; stipe up to 25 µm, apical ring I–. – *Ascospores* (11) 12.6 ± 0.9 (15) × 3–5 µm, asymmetrical narrowly ellipsoid with rounded or sometimes truncate ends, brown, germ slit spore length on the less convex side, straight; epispore thin; young ascospores unicellular.

*Habitat.* – Corticated and decorticated twigs and branches.

*Known hosts.* – *Rosa* sp., *Quercus* sp.

*Distribution.* – EUROPE: Italy.

*Additional collection examined.* – ITALY: on *Rosa*, Spegazzini (PAD-herb. Sacc sub *Anthostomella intermedia*, authentic proposed as a neotype).

*Notes.* – Saccardo (1878a) gave a collection on *Salix vitelliana* with the description of *A. intermedia*. This material was not received from Padova. The collection cited above, which corresponds to the protologue, is proposed as a neotype. The perithecia and ostioles in this material are smaller than the few examples in the material of *R. pseudobombarda* –see also Petrini (1993: 270) for a description. However, microscopical features in both fungi are identical.

## 7. *Barrmaelia picacea*

(Cooke & Ellis) F. Rappaz, comb. nov. – Pl. 8e.

Bas.: *Sphaeria picacea* Cooke & Ellis, Grevillea 7: 9, 1878.

Syn.: *Anthostomella picacea* (Cooke & Ellis) Sacc., Syll. Fung. 1: 293, 1882.

*Anthostoma picaceum* (Cooke & Ellis) Cooke, Grevillea 17: 90, 1889.

*Anthostomella inconspicua* Martin, J. South Afr. Bot. 42: 82, 1976. (superfluous).

*Lectotype* – USA: New-Jersey: Newfield, on *Vaccinium corymbosum*, no 2846 (K-herb. Cooke. : sub *Sphaeria picacea* ). – *Isotype*. – Same data (NY; NY-herb. Ellis; NY-ex Barnard Coll.: North Amer. fungi 183, sub *S. picacea*).

*Anamorph.* – not seen.

*Stroma* in wood, surface flat, red-brown or black, not glossy, a few mm to 1–2 cm in area, ostioles ±distinct but rarely projecting, slightly depressed, ca 100 µm diam.; entostroma prosenchymatous, poorly developed, delimited in the border of the perithecial area by a diffuse brown zone. – *Perithecia* globose, rarely raising the substrate, gregarious, 0.2–0.4 mm wide, 0.2–0.3 mm high, peridium melanized, prosenchymatous, ca 10 µm thick; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, 70–100 × 5–7 µm;

spore-bearing part 60–90  $\mu\text{m}$ ; stipe 10–40  $\mu\text{m}$ , apical ring I-. – *Ascospores* (9)  $10.5 \pm 0.9$  (13)  $\times$  3–4  $\mu\text{m}$ , asymmetrical narrowly ellipsoid or allantoid with rounded ends, dilute brown to olive brown, germ slit spore length on the less convex side, straight; epispore thin; no appendage.

*Habitat.* – Decorticated twigs.

*Known host.* – *Vaccinium corymbosum*.

*Distribution.* – USA: New-Jersey. Known only from the type collection.

*Notes.* – The original description of *S. picacea* mentioned a fungus on *Vaccinium*, with immersed perithecia beneath a black zone with cylindrical asci, uniseriate, brown,  $16 \times 4 \mu\text{m}$  ascospores. Latter descriptions (Saccardo, 1882; Ellis & Everhardt, 1892) give ascospores  $8\text{--}10 \times 3\text{--}4 \mu\text{m}$ . The fungus in the original material from Kew, 5 fragments of *Vaccinium* wood, has ascospores  $10\text{--}12 \times 3\text{--}4 \mu\text{m}$ . This fungus is present in the Ellis herbarium in NY together with another species which has  $13\text{--}18 \times 4\text{--}5 \mu\text{m}$  big ascospores. This second species has been found in only one (ex Herb. R.A. Harper) of the four collections from NY, and although the size of the spores fit the description, I prefer to treat the  $16 \times 4 \mu\text{m}$  indication as a mistake, considering that the species Cooke and Ellis had in mind was the small-spored one. The type material in the Cooke herbarium (K) which is proposed here as a lectotype, contains only the small spored taxa and is described above. The second species is described below. It does not fit in *Barrmaelia* but would be better placed in *Lopadostoma*.

*Stroma* in wood, 2–10  $\times$  1–3 mm, blackening the surface which is a little glossy, swelled by perithecia, limited in the wood by a diffuse zone line; ostioles rounded. – *Perithecia* globose, 0.4–0.5 mm in diam., in contact with each other or  $\pm$  compressed; peridium prosenchymatous. – *Asci* (Pl. 8f) cylindrical, with obliquely uniseriate ascospores, 90–130  $\times$  8–9  $\mu\text{m}$ ; spore-bearing part 80–100  $\mu\text{m}$ ; stipe up to 40  $\mu\text{m}$ , apical ring I+, 0.8  $\mu\text{m}$  high, 2  $\mu\text{m}$  wide. – *Ascospores* (Pl. 8f.) (13)  $14.9 \pm 1.6$  (18)  $\times$  4–5  $\mu\text{m}$ ,  $\pm$ symmetrical, ellipsoid with rounded ends, dilute brown, without germ slit or appendage; epispore thin.

*Collection examined.* – USA: New-Jersey: Newfield, on *Vaccinium corymbosum*, no 2846 (NY-ex herb. Harper: sub *Sphaeria picacea* mixed with *B. picacea*).

A fungus found on *Fraxinus* from North Dakota differs from *B. picacea* in having olive-brown ascospores (10)  $11.7 \pm 1.6$  (15)  $\times$  2.5–4  $\mu\text{m}$ , without germ slit (Pl 8g). It is a species of *Barrmaelia*, which will be described when more material is at hand.

*Collection examined.* – USA: North-Dakota: Winck lake, on *Fraxinus lanceolatus*, May 1914, Brenckle (W(1978)15827-herb. Petr 705, sub *A. picaceum* var. *fraxini* (nom. herb.).

### Species of doubtful taxonomic position

The species described here are included in the key. They could be incorporated in *Anthostomella* in an artificial sense: they have one celled brown ascospores and are devoid of an obvious stroma.

#### *Sphaeria delitescens*

De Not., Mem. Reale Accad. Sci. Torino ser. 2, 13: 125, 1853. – Pl. 11a.

Syn.: *Anthostomella delitescens* (De Not.) Sacc., Atti Soc. vent.-trent. Sc. Nat. 4: 102, 1875.

*Anthostoma delitescens* (De Not.) Cooke, Grevillea 17: 90, 1889.

*Anthostomella scopariae* Fabre, Ann. Sci. Nat. Bot. sér. 6, : 38, 1883.

*Anthostoma scopariae* (Fabre) Cooke, Grevillea 17: 90, 1889.

*Anthostomella ilicis* Fabre, Ann. Sci. Nat. Bot. sér. 6, : 39, 1883.

*Anthostoma ilicis* (Fabre) Cooke, Grevillea 17: 90, 1889.

*Holotype*. – ITALY: Genova, on *Erica arborea*, march 1842, De Notaris (RO, Micro-myc. Ital. Dec. 8: 9, sub *Sphaeria delitescens*). – *Isotype*. – (RO-herb. Cesati, sub *Sphaeria delitescens*).

*Anamorph*. – not seen.

*Stroma* in bark, surface not raised, not blackened or in places darker around the ill distinct and not projecting ostioles, ca 100 µm diam.; in wood surface blackened and weakly raised; entostroma prosenchymatous, poorly developed except near the peridium and near the surface when blackened, mixed with substrate cells, no black zone seen. – *Perithecia* flattened, gregarious or in contact by 2–3, 0.4–0.5 mm wide, 0.1–0.2 mm high, peridium weakly melanized, dilute brown, prosenchymatous, 10–20 µm thick; paraphyses numerous, incrustated with yellow material, hymenium peripheral, filling the perithecial cavity. – *Asci* cylindrical, with uniseriate ascospores, 110–170(200) × 10–15 µm; stipe up to 20 µm, apical ring I+, 1.5–2 µm high and 4–5 µm thick. – *Ascospores* (16) 19.9 ± 2.2 (25) × 9–12(14) µm, mostly symmetrical, ellipsoid with rounded or acute ends, brown; wall slightly larger near the equator; epispore thin, not dissolving in KOH.

*Habitat*. – Corticated and decorticated twigs.

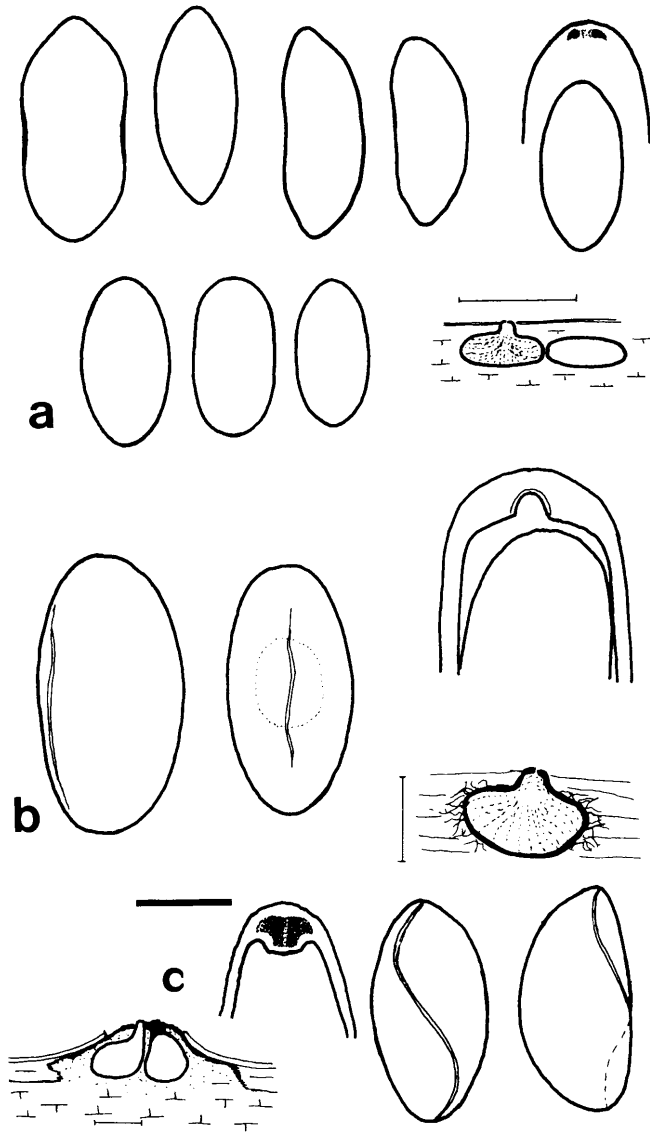
*Known hosts*. – *Erica arborea*, *Erica scoparia*, *Quercus ilex*.

*Distribution*. – EUROPE: Italy, Southern France.

*Additional collections examined*. – FRANCE: Sérignan (Vaucluse), on *Erica scoparia*, September 1880, J.H. Fabre (L'Harmas: Sphaeriacees de Vaucluse, sub *A. scopariae*, holotype). – Same locality, on *Quercus ilex*, June 1881, J.H. Fabre (L'Harmas: sub *A. ilicis*, holotype).

*Notes*. – Although Saccardo (1878a) based his concept of *S. delitescens* on original material judging from his illustration, his delimitation was inadequate since it included material (as *A. nobilis*) which is here classified in *B. oxyacanthae*.

Francis (1975) found *A. delitescens* similar to an *Anthostomella* on *Lavandula* which fits my concept of *B. sustenta*.



Pl. 11. – *Species of doubtful position: Sphaeria delitescens, Anthostoma gallicum.* – *Anthostomella adusta* collection sub *A. mammooides* – *S. delitescens*: a. Ascospores, ascus ring in iodine and perithecia (ascospores: upper row 1–3 from RO: sub *S. delitescens*, 4–5 from L'Harmas: sub *A. ilicis*, lower row from L'Harmas: sub *A. scopariae*). – *A. gallicum*: b. Ascospores, ascus apex and perithecium. – *A. adusta*: c. Ascus ring in iodine, ascospores and stroma. – Bars near perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.



*S. delitescens* has symmetrical ascospores without germ slit and asci with a small apical ring. I would describe it as an *Amphisphaerella* with ascospores devoid of germ pores, and would classify it therefore in the Amphisphaeriaceae. It remains to decide whether it represents a new genus or if it could be accommodated in *Amphisphaerella*. Although *Amphisphaerella* members seem deprived of anamorph, their appearance in culture is quite typical: colonies of *Amphisphaerella xylostei* have been described by Shoemaker & al. (1966) as exceedingly slow growing, without conidial state. A colony isolated from an *Amphisphaerella* on *Salix* found in the Tien Shan mountains in central Asia was similar: reaching 2–3 mm in diam. and 1 mm high after 6 weeks, pinkish in color, without conidia. Martin (1969) reported conflicting results, describing blastoconidia for material attributed to *A. xylostei* and to *A. alpigena* (as *Anthostomella*). Judging from his descriptions of the ascospores, he had not seen the equatorial pores, and it is probable that he used species which were not members of *Amphisphaerella*.

### **Anthostoma gallicum**

Sacc. & Flageolet, Atti Congr. bot. Palermo: 50, 1902. – Pl. 11b.

*Holotype*. – FRANCE: Saône et Loire: Rigny sur Arroux, on *Quercus* sp., Flageolet no 24 (PAD-herb. Sacc.).

*Anamorph*. – not seen.

*Stroma* limited to a blackening of the wood around the ill distinct 200–250 µm in diam. ostiole, and to melanized hyphae 3–4 µm in diam. around the perithecia. – *Perithecia* immersed in the wood, spherical, gregarious, 0.5–0.8 mm in diam., slightly raising the wood; peridium melanized, pseudoparenchymatous, forming a *textura angularis* inside, a *textura globosa* outside, 12–25 µm thick, paraphyses numerous, anastomosing, 1–2 µm wide. – *Asci* cylindrical seemingly unitunicate but without apical ring, with uniseriate ascospores, 200–250 × 15–20 µm; spore-bearing part 180–210 µm; stipe 10–40 µm. – *Ascospores* (21)  $28.8 \pm 2.6$  (34) × 13–17 µm, symmetrical, ellipsoid with rounded ends, weakly compressed laterally, brown, without appendage, germ slit about  $\frac{2}{3}$  of the spore, straight or irregular and like a rip but present on all the ascospores, episore thin.

*Habitat*. – Rotten wood.

*Known host*. – *Quercus* sp.

*Distribution*. – EUROPE: France. Known only from the type collection.

*Notes*. – The symmetrical and laterally compressed ascospores, the pseudoparenchymatous peridia and the weakly developed apical apparatus of the asci are not those of a xylariaceous fungus, but of a member of the Sordariales, classified near or in *Coniochaeta*.

**Anthostoma infernale**

Fabre, Ann. Sci. Nat. Bot. sér. 6, 15:41, 1883. – Pl. 2d.

*Holotype*. – FRANCE: Vaucluse, Sérignan-du-Comtat, on *Olea europaea*, H. Fabre (L'Harmas de Fabre: Sphaeriaceés du Vaucluse, sub *Anthostoma infernale*). – *Isotype*. – PAD-herb. Sacc. legit Berlese.

*Anamorph*. – not seen.

*Stroma* effused, surface blackened in a wide area at times slightly raised around the ostiole, about 150  $\mu\text{m}$  diam., conical; stromatic crust ca 50  $\mu\text{m}$  wide; entostroma prosenchymatous, mixed with substrate. – *Perithecia* spherical 0.5–0.8 mm diam., gregarious, evenly spaced, peridium melanized, prosenchymatous, 30–50  $\mu\text{m}$  thick. – *Asci* not seen, from the protologue: 120–150  $\mu\text{m}$  long, spore-bearing part 80  $\times$  6  $\mu\text{m}$ , apical ring I+, 2  $\mu\text{m}$  high, 3–4  $\mu\text{m}$  wide. – *Ascospores* (9) 12.7  $\pm$  1.5 (15)  $\times$  4.5–6  $\mu\text{m}$ , asymmetrical, ellipsoid with rounded or sometimes truncate ends, brown, sometimes darker at the ends, germ slit shorter than spore length on the less convex side, straight; epispore thin; a cellular appendage at one end visible when the spores are agglutinated.

*Habitat*. – Corticated stump.

*Known host*. – *Olea europea*.

*Distribution*. – EUROPE: Southern France. Known only from type collection.

*Notes*. – The stromatic layer which is effused and strongly carbonised externally suggests that this taxon belongs to *Lopadostoma* sub genus *Anthostomopsis*. But the present observation of cellular appendage in agglutinated ascospores does not confirmed this classification. Fresh material should clear up the matter. Moreover, I did not observed these appendages on an otherwise similar collection on *Quercus* from Virginia-USA (Dasal Creek, Giles Co., Va, October 1925, C.L. Shear (W(1971) 14278-Herb. Petrak-10158).

**Anthostomella adusta**

(Cooke & Peck) Barr in Barr, Rogerson & Haines, Bull. New York State Mus. Sci. Serv. 459: 6, 1986. – Pl. 11c.

Bas.: *Diatrype adusta* Cooke & Peck in Peck, Ann. Rep. New York State Mus. 29: 58, 1878.

Syn.: *Anthostomella mammoïdes* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 1893: 139.

*Holotype*. – not seen (See Barr & al., 1986; for a description).

*Anamorph*. – not seen.

*Stroma* reduced to a clypeus under the raised periderm when the perithecia are single, or stroma conical, gregarious, raising the periderm in pustules 1–1.2 mm in diam., with a black disc, 0.2–0.5 mm in diam., pierced by up to 5 clustered ostioles; ostioles ill defined or conical, about 100  $\mu\text{m}$  diam.; entostroma white, circumscribed by a black border line, prosenchymatous, mixed

with substrate cells. – *Perithecia* globose, 0.4–0.8 mm diam., peridium melanized, prosenchymatous, 20 µm thick; paraphyses numerous, 2–3 µm thick. – *Asci* cylindrical, with obliquely uniseriate ascospores, 160–200 × 20–25 µm; spore-bearing part 130–180 µm; stipe 10–35 µm, apical ring I+, 7–8 µm high, 4–6 µm thick. – *Ascospores* (22) 25.6±1.5 (28) × 12–14 µm, asymmetrical, ellipsoid with rounded ends, brown, germ slit spore length on the less convex side, S shaped; episporium thin; unicellular when young and therefore without cellular appendage.

*Habitat.* – Corticated twigs.

*Known host.* – *Ostrya virginica*.

*Distribution.* – CANADA: Ontario. – EUROPE: Switzerland (Læssøe & Spooner, 1994). – USA: New York State (Barr & al., 1986).

*Specimen examined.* – CANADA: London, Ontario, on *Ostrya*, Dearness no 1801 (NY-herb. Ellis, sub *A. mammoides* holotype).

*Notes.* – The description above is based solely on the material of *A. mammoides* which matches the observations (Barr & al., 1986; Læssøe & Spooner, 1994) made from the type of *Diatrype adusta*. The two species are treated therefore as synonymous.

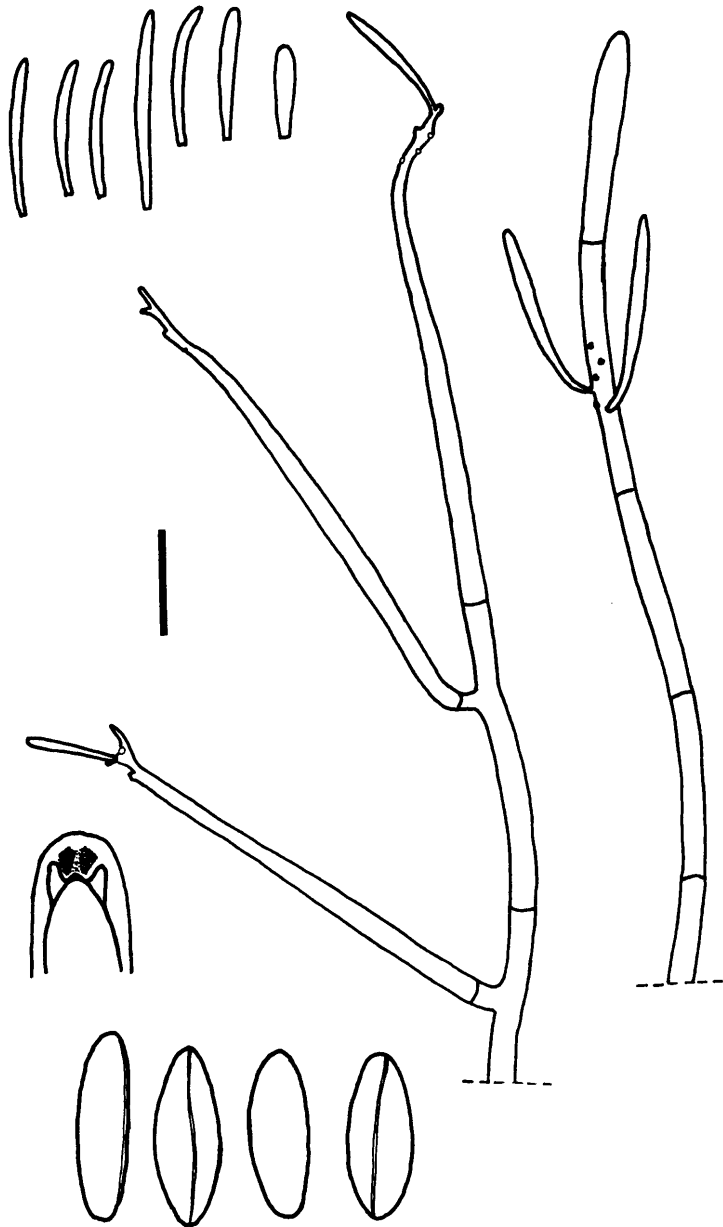
The clustered perithecia and the ascospores which are unicelled from the beginning keep from classifying this fungus in *Anthostomella* as delimited here. As Læssøe & Spooner (1994) have outlined, it could belong to a new genus.

*BAR:* Barr specimen on *Acer*. – Pl. 6a–e, 12.

*Anamorph.* – *Geniculosporium*.

*Stroma* effused, blackening the wood surface and within 0.4 mm deep ostioles ill distinct; entostroma prosenchymatous, strongly developed and filling entirely the wood cells. – *Perithecia* raising the surface of the wood, globose to ovoid-elongate through mutual pressure, 0.5–0.8 mm wide, 0.5–1 mm high, peridium melanized, prosenchymatous, 20–25 µm thick; paraphyses numerous, 3–5 µm wide. – *Asci* cylindrical, long stipitate, with obliquely uniseriate ascospores, 200–260 × 6–8 µm; spore-bearing part 100–130 µm; stipe 80–130 µm, apical ring I+, 2.5 µm high, 4 µm wide. – *Ascospores* (13.5) 15.8±1.6 (20) × 5–6 µm, asymmetrical, ellipsoid with rounded or sometimes truncate ends, brown, germ slit spore length on the less convex side, straight or sometimes weakly sinuous; episporium thin; young ascospores unicellular, when yellow, the wall appears finely striate longitudinally. – *Anamorph in culture.* – On MAA, colony reaching 7 cm in diam. after 3 weeks, growing in sector which give a stellate aspect, aerial mycelium felty, at first white, then with yellow spots becoming dilute brown or green. Reverse coloration yellow-brown. Conidia formed after one month, hyphomycetous and discrete, located in the area of thicker mycelium where sectors overlap. *Conidiophores* 2–4 µm in diam., vari-

<http://doc.rero.ch>



Pl. 12. – Species of doubtful position: BAR: taxon on Acer from Canada Ascus ring in iodine and ascospores, conidia and conidiophores in culture (from Barr 7306). – Bar: 10  $\mu$ m.

able in length, dichotomously branched, hyaline, with a refractive and finely punctate wall, thus appearing distinct from the vegetative hyphae (1–2 µm in diam.). *Conidiogenous* cells (13)20–30(40) × 2–3 µm, hyaline or dilute brown, terminal and then cylindrical with a pointed end becoming zig-zag distorted by conidiogenesis (Pl. 6a), or integrated and cylindrical with conidia hanged in a lateral cluster (Pl. 6d). *Conidiogenesis* holoblastic, proliferation sympodial. *Conidia* (Pl. 6e) (8) 15.3 ± 4.4 (28) × 1.5–2 µm, hyaline, cylindrical or falcate, one end truncate, the other rounded or slightly acute.

*Habitat.* – Decorticated branches.

*Known host.* – *Acer* sp.

*Distribution.* – CANADA: Vancouver Island. Known only from two small collections, not sufficient to be used as type material.

*Collections examined.* – CANADA: Halkink, Sidney, Vancouver Island, BC., on *Acer macrophyllum*, 19–9–1990, M.E. Barr (DAOM, LAU: Barr 7306). – Same data, 1–12–1993, M.E. Barr (DAOM, LAU: Barr 8604).

*Notes.* – The present fungus is possibly related to “*Anthostomella*” *adusta* by its ascospores with a germ slit at time weakly sinuous, by the rhomboidal apical ring, and by the developed entostroma.

Its anamorph is similar to the *Virgariella* state of *A. baileyi* Francis (Francis & al., 1980). It differs through hyaline and thinner conidiogenous cells, and smaller denticles. It does not match neither with *Virgariella* as described by Petrini & Petrini (1985). They segregate *Virgariella* from *Geniculosporium* through the disposition of the conidiogenous loci: crowded to densely aggregated on short nodules for the first genus and loci separated, forming a rachis for the second, which fits better to the present fungus.

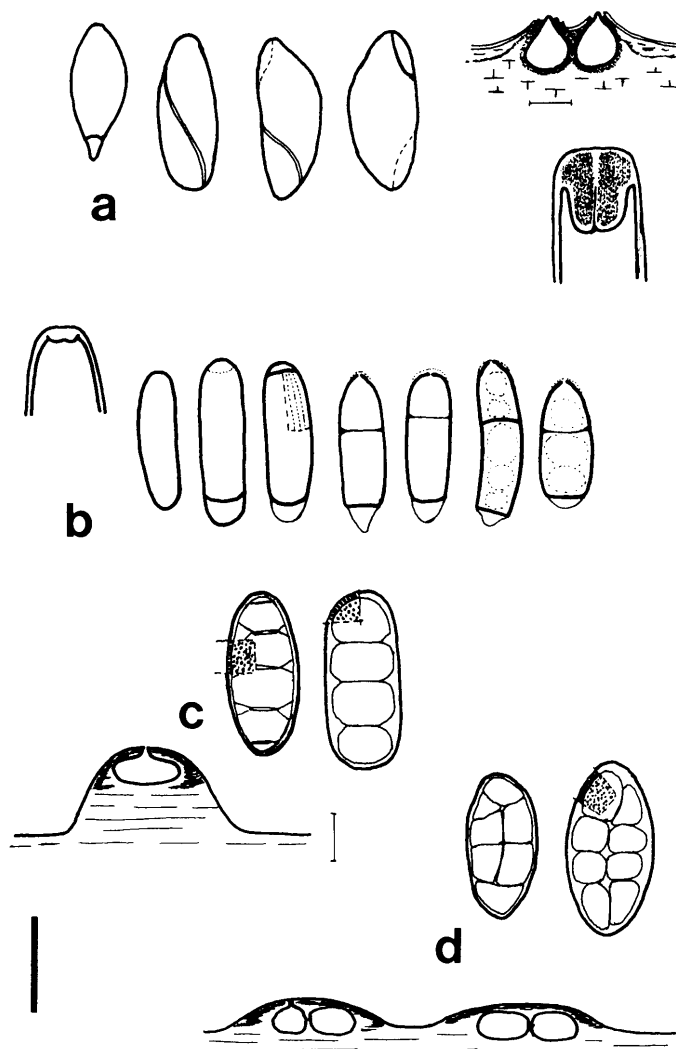
The elongate conidia are reminiscent of *Libertella*, used for anamorphs of the Diatrypaceae, of *Lopadostoma*, of *Barrmaelia* and of some other taxa in the Xylariaceae. But here the conidia are not produced in droplets and the conidiogenous cells are never aggregated in conidiomata or on melanised structure. Moreover, here the conidiogenous scars are much more spaced along the apical part of the conidiogenous cell than in any of the *Libertella* and *Libertella*-like anamorphs. Therefore, *Geniculosporium* seems to be the more appropriate genus.

### Excluded species

The species are listed by alphabetical order of the epithet. Only the amero-spored or apiospored species are keyed out.

*Anthostoma acerinum* Ellis & Fairman, Proc. Rochester Acad. Sci. 4: 189. 1905.  
*Collection examined.* – USA: New-York State: Lyndonville, on *Acer* (from *xylotomy: Fagus*), April 1904, Fairman (FH isotype).

This is *Lopadostoma turgidum* (Pers. : Fr.) Trav.



Pl. 13. – Excluded species: *Rosellinia americana*, *Apiorhynchostoma altipetum*, *Dyrithium lividum* collection sub *Sphaeria defossa*. – *R. americana*: a. Ascospores the first one immature, stroma and ascus ring in iodine (ascospores 1,2,4 from W11871, 3 from W05906). – *A. altipetum*: b. Ascus apex and Ascospores. Three ascospores on the left at different stages of formation. The surface of the third ascospore was striate in Hoyer media when seen with phase contrast. – *D. lividum*: c. Symmetrical and longitudinally septate ascospores (on the left seen in water, on the right in Hoyer medium) and perithecium. d. Asymmetric dictyospores (Left in water, right in Hoyer) and perithecia from where they were observed. – Bars near perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.

### ***Apiorhynchostoma altipetum***

(Peck) F. Rappaz, comb. nov.. – Pl. 13b.

Bas.: *Sphaeria altipeta* Peck, Bot. Gaz. (Crawfordsville) 5: 34, 1880.

Syn.: *Rhynchostoma altipetum* (Peck) Sacc., Syll. Fung. 1: 731.

*Entosordaria altipeta* (Peck) Höhnelt, Sitzungber. Kaiserl. Akad. Wiss. Math.-Naturwiss. Cl. Abt. 1, 129: 183, 1920.

*Holotype*. – USA: New Hampshire: Mt. Washington, Pringle no 328bis (NYS-herb. Peck sub *Sphaeria altipeta*).

*Anamorph*. – not seen.

*Stroma* reduced to hyaline or dilute yellow hyphae around the perithecia and not developed in itself. – *Perithecia* globose, completely immersed in the rotten wood, not raising the surface, gregarious or 3–5 in contact, 0.5–0.7 mm in diam., ostiolar neck well developed, ostiole conical or truncate, 150–200 µm in diam., projecting up to 0.3 mm, peridium melanized, pseudoparenchymatous, 30–50 µm thick; paraphyses numerous. – *Asci* cylindrical, with obliquely uniseriate ascospores, spore-bearing part ca 120 µm; probably long stipitate, no apical ring seen. – *Ascospores* (10.5)  $16.2 \pm 1.7$  (18)  $\times$  4–6 µm, at the beginning of the formation cylindrical and unicellular with rounded ends, becoming uniseptate near one end, the opposite end also cut with another septum which is located just under the original wall, this second septum becomes thick and pierced by a pore, the remnant external wall forming a hyaline cap. The central cell is at last cut by a third septum, about two third from the small cell. This small cell is hyaline  $1\text{--}2.5 \times 3\text{--}5$  µm, the rest of the ascospore being brown and (9)  $13.6 \pm 1.6$  (16)  $\times$  4–6 µm. Some ascospores have no dwarf hyaline cells and are completely brown.

*Habitat*. – Rotten wood.

*Known host*. – No substrate is given in the original description. From the wood anatomy, the substrate is gymnospermous.

*Distribution*. – USA: New Hampshire. Known only from the type collection.

*Notes*. – This taxon belongs to *Apiorhynchostoma*, and differs from the type species, *A. curreyi* (Rabenh.) Müller through smaller ascospores. The collection of *A. curreyi* examined during this study had ascospores: 22–29  $\times$  8–12 µm. Petrak (1923, as *A. apiculata* Curr. non Wallroth) gaved 18–27  $\times$  5.5–9 µm and Ellis & Ellis (1985) 22–28  $\times$  6–8 µm.

Collection of *A. curreyi* examined. – AUSTRIA: Hütteldorf – Wien, on *Abies*; September 18??, Niessl (W(1979) 01229 sub *Anthostoma trabeum*).

The ascospores in *A. altipeta* differ from those of *Endoxyla munkii* Untereiner (Untereiner, 1993) through the hyaline cap covering the porate pole and the septum, which is not located in the middle of the colored cell. Barr (1989) classified *Apiorhynchostoma* in the Clypeosphaeriaceae. On one hand, it is true that the similarity between *A. curreyi* (Rabenh.) Müller and *Stereosphaeria per-*

*fidiosa* (De Not.) Eriksson (= *Entosordaria perfidiosa* (De Not.) Höhnelt) is striking. On the other hand, the ascospores of the present species and those which are found in the Boliniaceae as delimited by Barr (1990, 1993), for example in *Apiocamarops* Samuels & Rogers (a bigger brown and porate cell with a hyaline dwarf cell) or in *Pseudovalsaria* Spooner (a brown and porate cell which is septate near the middle) is also evident.

### Rosellinia americana

(Petr.) F. Rappaz, comb. nov. – Pl. 13a.

Bas.: *Leptomassaria americana* Petr., Sydowia 7: 121, 1953.

Syn.: *Leptomassaria quercina* Petr., Sydowia 6: 354, 1952.

*Anthostoma quercina* (Petr.) Arx & Müller, Beitr. Kryptogamenfl. Schweiz 11: 320, 1954.

*Holotype*. – USA: Maryland, Beltsville, on *Quercus* sp.; July 1950, F. Petrak (W(11871)-herb. Petr.(10544): sub *Leptomassaria quercina*). *Isotype*. – W(12142).

*Anamorph*. – not seen.

*Stroma* black, 0.8–1.5 × 0.8–1 mm diam., 0.8 mm high, buried in the bark, with a 200–500 µm diam. disc rupturing the periderm pierced in the center by a 100 µm diam. conical or ill defined ostiole; gregarious or sometimes 2 or 3 fused in row; entostroma of melanised hyphae, prosenchymatous, mixed with substrate cells, completely bordering the perithecial wall, 50–250 µm thick. – *Perithecia* 0.5–1 mm wide, 0.5–0.8 mm high, peridium melanized, prosenchymatous, about 10 µm thick, darker in color than the entostroma; paraphyses numerous, dissolving at maturity. – *Asci* cylindrical, with obliquely uniseriate ascospores, 150–200 × 10 µm; spore-bearing part 100–150 µm; stipe 40–60 µm, apical ring I+, inverted hat shaped, 8–9 µm high, about 6 µm thick, the wall of immature asci shows a circular zone, located below the ring which is also weakly amyloid. – *Ascospores* (16) 18.4 ± 1.8 (25) × 6–8 µm, asymmetrical, ellipsoid with rounded or sometimes truncate ends, dark brown, germ slit S shaped, spore length on the less convex side; epispore thin; bicellular during formation, the smaller cell disappearing in mature ascospores.

*Habitat*. – Corticated twigs of various hardwoods.

*Known hosts*. – *Quercus* sp., *Sassafras officinale*.

*Distribution*. – USA: Maryland.

*Additional collection examined*. – USA: Maryland, Beltsville, on *Sassafras officinale*; June 1950, F. Petrak (W(05906, 12142)-Herb. Petr. (10543) sub *L. americana* holotype).

*Notes*. – In *Rosellinia*, *R. quercina* Hartig (1880) exists already and is treated as a synonym of *R. desmazierii* (Berk. & Br.) Sacc. by Petrini (1993). The next epithet in priority has to be used to classified the present species in *Rosellinia*.

Compared with the type of *L. quercina*, the collection of *L. americana* has a thinner entrostoma and more conical ostioles, which does not warrant any distinction.



*Rosellinia evansii* Læssøe & Sponer differs only from the description above through stromata which are less immersed in the substrate, the periderm being ruptured in a stellate manner (Læssøe & Sponer, 1994). The text of the protologue of *R. evansii* described a spiral germ slit as in *Helicogermis*lita, but the illustration (fig 6 [sic, ie 8] A–C) show ascospores which are identical with those described for *R. americana*. Both names could well be synonymous.

*R. americana* does not belong in *Leptomassaria* as delimited here. As pointed out by Læssøe & Spooner (1994) for *R. evansii*, the asymmetric ascospores which are two celled when young and the ascus ring are similar to what is seen in *Rosellinia* or in *Xylaria*.

*Anthostoma anceps* Sacc. & Roumeguère, Revue mycol. 3: 41, 1881 non Berlese & F. Sacc.

Collection examined. – ITALY: Riva Valiobbia, on *Prunus spinosa* (from xylotomy: on a gymnospermous substrate), September 1897, Carestia (PAD, authentic).

This material is near *Stereosphaeria perfidiosa* (De Not.) Eriksson.

*Anthostoma areolatum* Nitschke, Pyrenom. germ. 1: 115, 1867.

Collection examined. – GERMANY: Nienberge, Nitschke (B-herb. Nits., original material).

The substrate of this collection is *Rosaceous*, possibly *Crataegus*, not *Fagus* as mentioned in the protologue. There is a note on a fragment of paper describing ascospores as ovoid and 10–12 / 6–7  $\mu\text{m}$ , as is given in the protologue. No fungus corresponding to such a description has been found, but *Eutypa lata* (Pers.) Tul. and *Diaporthe eres* Nits.

*Sphaeria avocetta* Cooke & Ellis, Grevillea 8: 15, 1879.

Syn.: *Ceratostoma avocetta* (Cooke & Ellis) Sacc., Syll. Fung. 1: 216, 1882.

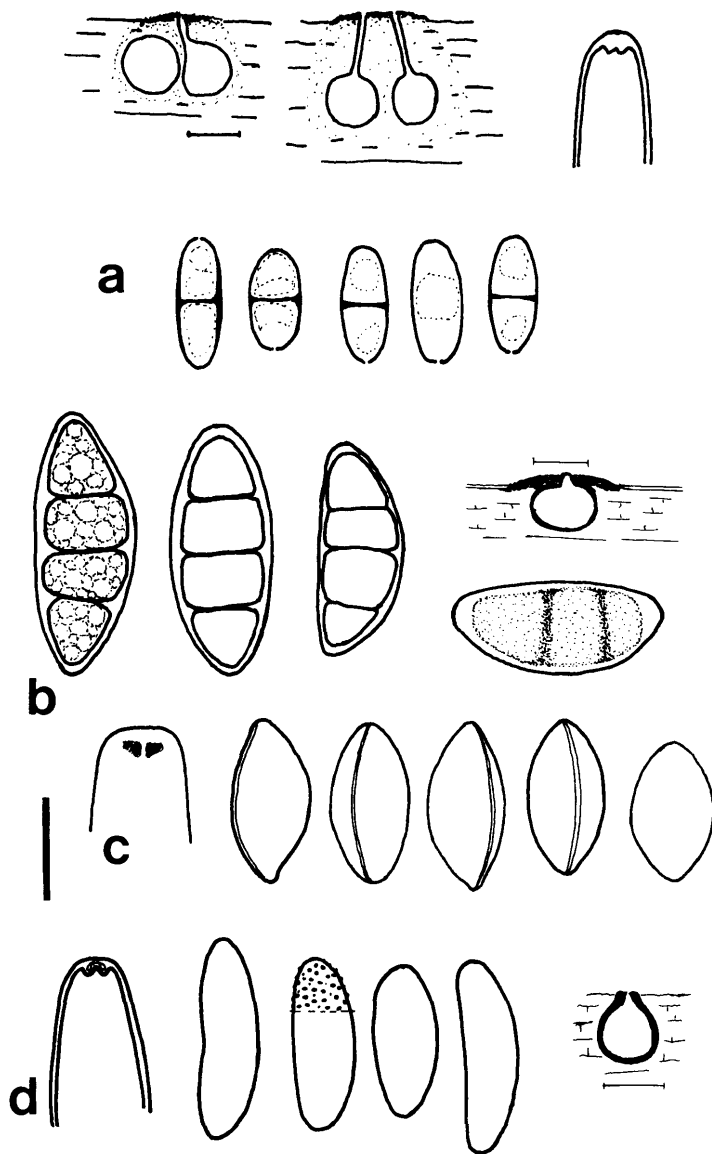
*Anthostoma avocetta* (Cooke & Ellis) Arx & Müller, Beitr. Kryptogamenfl. Schweiz 11: 317, 1954.

*Endoxyla avocetta* (Cooke & Ellis) Romero & Samuels, Sydowia 43: 231, 1991.

Collections examined. – USA: New Jersey, Newfield, on rotten wood, Ellis no 2860 (K-herb. Cooke, sub *S. avocetta*, holotype). – Same locality, on rotten wood of *Nyssa*, November 1881 (K-herb. Cooke).

This taxon has been described by Romero & Samuels (1991) from fresh material found on *Eucalyptus viminalis*. From their observations, the ascospores have a basal pore. Some of the ascospores I have observed in the two collections above seemed to have a pore at each extremity. Untereiner (1993) did not accept this species in her treatment of *Endoxyla*.

*Anthostomella brachystoma* Ellis & Everh., Bull. Washburn Coll. Lab. Nat. Hist. 1: 5, 1884.



Pl. 14. – Excluded species: *Pseudovalsaria ferruginea*, *Lepteutypa hederæ*, *Biscogniauxia phyllireae*, *Phaeosporis catacrypta*. – *P. ferruginea*: a. Stromata, ascus apex and ascospores. – *L. hederæ*: b. Ascospores and stromata. – *B. phyllireae*: c. Ascospores and ascus ring in iodine. – *P. catacrypta*: d. Ascus apex, ascospores and perithecium. – Bars near perithecia, 0.5 mm; bar for microscopic characters, 10  $\mu$ m.

Syn.: *Xylosphaeria brachystoma* (Ellis & Everh.) Cooke, Grevillea 17: 86, 1889.

Collection examined. – USA: Washington St.: Mt Paddo, Adams, on *Tsuga pattoniana*  
(= *T. mertensiana* fide Francis, 1975), Suksdorf (FH, sub *A. brachystoma*).

This taxon is *Apiorhynchostoma tumulatum* (Cke) Sivanesan. Sivanesan (1975) illustrates the type material of *S. tumulata* found on *Pinus contorta* in Sierra Nevada.

### **Phaeosporis catacrypta**

(Rehm) F. Rappaz, comb. nov. – Pl. 14d.

Bas.: *Rosellinia catacrypta* Rehm, Ann. Mycol. 5: 537, 1907.

Original material. – GERMANY: Mittelfranken, Sugenheim, June 1866 (S-herb. Rehm). – Same data, September 1866 (S-herb. Rehm).

Anamorph. – not seen.

*Stroma* not seen. – *Perithecia* immersed in bark, spherical, becoming erumpent, gregarious or aggregated, 0.15–0.25 mm in diam., without ostiolar papilla, just a flat disc ca 50 µm in diam. pierced by the ostiolar aperture; peridium melanized, pseudoparenchymatous (*textura globosa-epidermoidea*), 10–15 µm thick; hymenium basal. – *Asci* cylindrical, with uniseriate or biseriate ascospores, 100–170 × 10–13 µm; short stipitate (up to 30 µm), apical ring I–, weakly refractive. – *Ascospores* (16) 18.4 ± 1.6 (23) × (5) 6–8 µm, asymmetrical, ellipsoid with rounded ends or allantoid, wall verrucose, yellow to dilute brown, without germ slit nor appendage; epispore thin.

*Habitat*. – Bark of trunk.

*Known hosts*. – *Malus sylvestris* (as *Pyrus malus*), *Prunus cerasus* (as *Pyrus cerasus*) according to the protologue.

*Distribution*. – EUROPE: Germany. Known only from the type collection.

*Notes*. – Petrini (1993) has described this fungus suggesting it should be accommodated in *Anthostomella*. The absence of stroma, the inamyloid but refractive ring, the pseudoparenchymatous peridia dispose it in the Sordariales. Barr (pers. comm.) suggests to classify it in *Areolospora*, a taxonomic synonym of *Phaeosporis* Clem. (Hawksworth in Eriksson and Hawksworth, 1987). A comparison with the description of *Phaeosporis melasperma* (Nyl.) Clem. (Hawksworth, 1980; as *Areolospora bosensis* (Das) Hawksw.), shows that both species are congeneric. *P. melasperma* has been isolated from soil and leaf-spots of *Buddleia*. (Hawksworth, 1980). It differs from *P. catacrypta* through smaller ascospores.

*Sphaeria defossa* Mont. in Durieu, Expl. Sci. Alg. 1: 513, 1849 – Pl. 13c, d.

Syn.: *Anthostoma defossum* Sacc., Syll. Fung. 1: 299, 1882.

Collection examined. – ALGERIA: on *Atropa frutescens*. (PC-herb. Mont., sub *Sphaeria defossa* Dr. & M., holotype).

*Stroma* in wood, forming a clypeus 1–1.5 × 0.5–1 mm, becoming raised up to 1 mm above surface as fibers weather away, 100–150 µm thick, pierced by 80–100 µm diam. nonprojecting ostioles; entostroma poorly developed without black zone. – *Perithecia* globose, raising the substrate, gregarious, isolated or 2–3 under the same clypeus, 0.5–1 mm wide, 0.5 mm high, when isolated, smaller when grouped and 0.2–0.4 mm in diam., peridium melanized, prosenchymatous, 15–25 µm thick; paraphyses numerous, surrounding gel blueing in Melzer's reagent. – *Asci* cylindrical, with obliquely uniseriate ascospores, 65–80 × 13–15 µm; short stipitate, apical ring I–, but refractive. – *Ascospores* (15)  $19.4 \pm 2.0$  (25) × 8–10 µm, symmetrical, ellipsoid with rounded ends, or asymmetrical with ends tapered, distoseptate transversely 3 times in symmetrical ascospores, up to 4 times and with longitudinal septa in asymmetrical ascospores, wall brown with distinct punctuations which seem to cross the wall in optical section.

*Notes.* – *Sphaeria defossa* is a synonym of *Dyrithium lividum* (Fr.) Barr, the blueing of the hymenium in iodine being the only element which is not mentioned by Barr (1994) in her study of this species. In the protologue of *S. defossa*, Montagne attributed to *Sphaeria livida* Fr. those of the stromata containing perithecia with dictyosporous ascospores. Upon examination, in my first sampling from a strongly prominent stroma, ascospores were only transversally 3 septate. A second sampling from a much less prominent stroma led to ascospores which were in majority transversally and longitudinally septate, even when still in the asci. Some were only 3 septate however showing that all stromata were conspecific.

*Anthostomella destruens* Shear., Bull. Torrey Bot. Club. 34: 313, 1907.

Syn.: *Melanospora destruens* (Shear) Doidge, J. Agric. Res. 34: 1023, 1927.

*Sordaria destruens* (Shear) Hawker, Trans. Br. Mycol. Soc. 34: 174, 1951.

*Collections examined.* – USA: New-Jersey, culture 450 isolated from diseased Cranberry, November 1905 (BPI-581243, slide 1491, holotype). – Also from culture 450 (BPI 581241, 581248, 581247, 581237). – From 729 stock culture, Sawyer 1922 (BPI-581239, 581240, 581242).

This is a species of *Sordaria*, which has been studied intensively by Hawker (1951). It is near *S. uvicola* Viala & Marsais according to Lundqvist (1972).

*Antosthoma endoxyloides* Mouton, Bull. soc. bot. Belgique: 146, 1886.

*Specimen examined.* – Belgique: Beaufays, sur un vieux pieu [*Quercus* from xylotomy], automne (BR-herb. Mouton, holotype).

This taxon is *Endoxyla macrostoma* Fuckel (see Untereiner, 1993; for a description). The ascospores are similar to those of the tropical *Apiocamarops alba* (Samuels & Rogers, 1987) apart from their symmetry. The reduced apical apparatus is similar to what is found in boliniaceous species.

### ***Pseudovalsaria ferruginea***

(Nitschke) F. Rappaz, comb. nov. – Pl. 14a.

Bas.: *Anthostoma ferrugineum* Nitschke, Pyrenom. germ. 1: 118, 1867.

Syn: *Camarops ferruginea* (Nitschke) Shear, Mycologia 30: 508, 1938.

*Holotype*. – GERMANY: Nienberge, on *Salix* (from xylotomy on *Carpinus*), April 1865, Nitschke (B-herb. Nitschke sub *Anthostoma ferrugineum*).

*Anamorph*. – not seen.

*Stroma* completely immersed in the wood, not raising the surface, well developed as a prosenchymatous grey-brown tissue around the perithecial necks and venters, 1–1.5 mm wide, 2–2.5 mm long, 1–1.5 mm high, sometimes confluent in row; surface brown-red becoming black, through a pseudoparenchymatous fungal layer forming a palisade (*textura globosa*) in which the ostioles are immersed without being distinct; wood reddish near the stromata; entostroma prosenchymatous, well developed, without melanized border line. – *Perithecia* globose, completely immersed and up to 10 in the same stroma with their necks ± collectively emergent, sometimes single, the stromatic layer at the surface reduced to a disc 0.3 mm in diam. around the ostiole; 0.5–0.8 mm in diam., ostiolar neck shorter than the venter or well developed up to 0.8 mm long, 250 µm in diam., peridium melanized, pseudoparenchymatous, 50–80 µm thick; paraphyses numerous. – *Asci* 90–120 µm long, cylindrical, with uniseriate ascospores, spore-bearing part 65–90 × 6–8 µm; stipe 20–45 µm long, apical ring I–. – *Ascospores* 10–14 × 4–6 µm, cylindrical symmetrical with rounded ends, brown, unicellular or uniseptate in the middle, one end pierced by a pore, epispore thin.

*Habitat*. – Rotten wood.

*Known hosts*. – *Hamamelis virginiana*, *Carpinus betulus*.

*Distribution*. – USA: New-York state, GERMANY.

*Additional collection examined*. – GERMANY: Rheinland, forest near Oestricher: Aepfelbach, on *Carpinus betulus*, Fuckel (B-herb. Nits., G-herb. Barbey-Boissier, W(1977)18214-Herb. Petrak, sub *A. ferrugineum*). – USA: Sarkvill Valley, N.Y., on *Hamamelis virginiana*, June 1914, Shear (W(1977)18769: Herb. Petrak 1022, sub *A. ferrugineum*).

*Notes*. – This species can be classified in *Pseudovalsaria* on account of its septate, cylindrical and uniporate ascospores. Untereiner (1993) shares this opinion without making any formal transfer. The ascospores in *P. foedans* (Karsten) Spooner, and in *P. allantospora* (Ellis & Everh.) Barr are often curved, which is not the case here. Shear (1938) attributed the present species to *Camarops* without comment. Nannfeldt (1972) rejected Shear's conclusion, stating that *A. ferrugineum* was related to *Endoxyla operculata*, a species he excluded from the *Boliniaceae*. Although Barr (1994) placed again these taxa in the *Clypeosphaeriaceae*, they have asci and ascospores typical of the *Boliniaceae* however, and are to be classified there in my opinion. Barr (1993) stressed the dif-

ference between ascospore morphology in *Camarops*: ovoid, unicellular, and flattened laterally, and in *Pseudovalsaria*: cylindrical-allantoid, not compressed laterally and mostly septate.

*Anthostoma formosum* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia: 344, 1894.

Syn.: *Lopadostoma formosum* (Ellis & Everh.) Martin, J. South Afr. Bot. 42: 75, 1976.

Collection examined. – USA: Kansas: Rockport, on *Celtis occidentalis*, June 1894, Bartholomew no 1492 (NY-herb. Ellis, holotype).

This is *Lopadostoma gastrinum* (Fr.) Trav.

### **Lepteutypa hederæ**

(Fuckel) F. Rappaz, comb. nov. – Pl. 14b.

Bas.: *Amphisphaeria hederæ* Fuckel., Jahrb. Nassauischen Vereins. Naturk 25–26: 304, 1871.

Syn.: *Anthostoma hederæ* (Fuckel) Sacc., Syll. Fung. 1: 301, 1882.

*Holotype*. – SWITZERLAND: Neuchâtel: on *Hedera helix* (from xyotomy: on *Viburnum* sp.) (G-herb. Barbey-Boissier, sub *Amphisphaeria hederæ*).

*Anamorph*. – not seen.

*Stroma* in bark, forming black discs 1–1.2 mm in diam. ca 100 µm thick, slightly raised and not covered by the periderm, pierced by a 80–100 µm diam. non-projecting ostiole; entostroma poorly developed without black zone. – *Perithecia* globose, isolated, rarely 2 under in the same stroma, 0.4–0.8 mm wide, 0.5 mm high, peridium melanized, prosenchymatous, 25–30 µm thick; paraphyses numerous. – *Asci* 130–190 × 15 µm, cylindrical, with uniseriate or biseriate ascospores, short stipitate, apical ring I-. – *Ascospores* (19) 25.4 ± 2.8 (30) × 8–11 µm, symmetrical or not, ellipsoid with tapered ends, round in polar view, transversal septa 3 rarely 1 or 2, possibly distoseptate, wall brown, inner wall punctate, punctuations denser around the septa, cytoplasm seen with numerous droplets when young.

*Habitat*. – Corticated twigs.

*Known host*. – *Viburnum* sp.

*Distribution*. – Switzerland: Neuchâtel. Known only from the type collection.

*Anthostomella lambottiana* Fautr., Rev. mycol. 1895: 168, 1895.

According to Francis (1975: 86) this is a *Coniochaeta* sp.

*Rosellinia gomzeensis* Mouton, Bull. Soc. Roy. Bot. Belg. 36: 12, 1897.

Collection examined. – BELGIEN: Gomzé near Liège, on rotten wood of *Pinus* sp. (BR-herb. Mouton, holotype).

Petrini (1993) described this material and classified it in *Amphisphaerella*. I have seen two species upon examination: a *Coniochaeta* sp. and *Endoxyla operculata*. The description of the ascospores in the protologue applied to this second species. *R. gomzeensis* is therefore a synonym of *E. operculata*.

*Sphaeria hiascens* Fr.: Fr., System. mycol. 2: 477, 1823.

Syn.: *Anthostoma hiascens* (Fr.: Fr.) Nitschke, Pyrenom. germ. 1: 113, 1867.

Collections examined. – SWEDEN: Småland, Femsjö, (from xylotomy: on *Fagus sylvatica*), E. Fries (UPS-herb. Fr., sub *S. hiascens*, proposed as a neotype). GERMANY: Landeck an Schlesien, on *Fagus sylvatica*, Auerswald no 101 (B-herb. Nits., sub *A. hiascens*).

The two collections are *Eutypa spinosa* (Pers.) Tul. The material from B has been described by Nitschke (1867) as *A. hiascens*. I have not seen what he had in mind when he mentioned ascospores  $23\text{--}36 \times 8 \mu\text{m}$ .

*Anthostomella hypsophila* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 1894: 338, 1894.

Collection examined. – USA: Colorado: Cameron Pass, on stem of *Lonicera involucrata*, July 1884, Baker 243 (NY-herb. Ellis, holotype).

The fungus is *Amphisphaerella xylostei* (Pers. : Fr.) Munk.

*Anthostoma inquinans* Nitschke, Pyrenom. germ. 1: 114, 1867.

Collection examined. – GERMANY: Westfalen, Ziergarten zu Cappenberg, annotated "Loniz" and from xylotomy on *Lonicera*, August 1866, Nitschke (B-herb. Nits., with notes as in the protologue, holotype).

This is *Amphisphaerella xylostei*. Also present is *Leptosphaeria lonicerae* (Karst.) Holm. The protologue gives the substrate as *Acer*, which has been misleading for subsequent authors.

*Anthostoma microecium* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 1894: 344, 1894.

Syn.: *Lopadostoma microecium* (Ellis & Everh.) Martin, J. South Afr. Bot. 42: 75, 1976.

Collections examined. – USA: Virginia: Fayette Co., on *Asimina trilobata*, February 1894, Nuttall 1377 (W(1978)18286-herb. Petr. 1025, FH-herb. Ellis, isotype). – Same data, the mention of substrate excepted: *Acer dasycarpum*, from xylotomy and aspect, identical with the material of W and FH (NY-herb. Ellis, with notes as in the protologue, holotype).

This is *Coniochaeta cf ligniaria* (Grev.) Cooke.

*Anthostoma moravicum* Petrak, Ann. Mycol. 21: 252, 1923.

Collections examined. – CZECHOSLOVAKIA: Moravia, Parschowitzov Revier, on *Quercus*, July 1922, Petrak (W-herb. Petr., holotype). – On *Corylus*, May 1924, Petrak (W(1978)16148).

These collections are *Coniochaeta cf ligniaria* (Grev.) Cooke. A third collection in Petrak herbarium in W under *A. moravicum* is *Barrmaelia oxyacanthae*.

*Sphaeria mortuosa* Ellis, Bull. Torrey Bot. Club 1, 9: 73, 1882.

Syn.: *Anthostoma mortuosum* (Ellis) Sacc., Syll. Fung. 9: 519, 1891.

*Xylosphaeria mortuosa* (Ellis) Cooke, Grevillea 17: 86, 1889.

Collection examined. – USA: New-Jersey: Newfield, on *Eupatorium purpureum*, (W(1977)18792-herb. Petr. 1030, North Amer. Fungi 897, sub *A. mortuosum*, isolectotype: Francis, 1975).

Francis synonymised this taxon with *Anthostomella tomicoides* Sacc. The material on *Eupatorium* from Petrak's herbarium is of this species. The isosyntype on *Andropogon* is different from *Anthostomella chionostoma* (Mont.) Sacc. that Francis had seen from Kew. The material on *Andropogon* is here quite similar to the lectotype, but has a germ slit which runs the whole spore length.

*Anthostomella olearum* Sacc. & Speg., Fungi ital.: tab. 176, 1878.

Syn.: *Anthostoma olearum* (Sacc. & Speg.) Cooke, Grevillea 17: 90, 1889.

Collection examined. – ITALY: Conegliano, on *Olea europea*, December 1876, Spegazzini (PAD-herb. Sacc., holotype).

The specimen belongs to *Amphisphaerella* with ascospores 13–18 × 7–8 µm.

*Anthostoma pamphilianum* Sacc. & Cuboni, Ann. Ist. Bot. Roma 4: 20, 1891.

Collection examined. – ITALY: Roma: Villa Pamphilia, on *Ulmus* sp., March 1889, Cuboni & Celotti (PAD-herb. Sacc., holotype).

This is *Eutypella dissepta* (Fr.) Rappaz.

*Sphaeria pholidigena* Ellis, Bull. Torrey Bot. Club 1, 10: 54, 1883.

Syn.: *Anthostomella pholidigena* (Ellis) Berl. & Vogl., Syll. Fung. Addit. 1–4: 44, 1886. *Anthostoma pholidigena* (Ellis) Cooke, Grevillea 17: 90, 1889.

Collection examined. – USA: Utah, Pleasant Valley, on cones of Red Pine, winter 1882, Harkness no 90 (NY-herb. Ellis. sub *Sphaeria pholidigena*, holotype).

This is *Coniochaeta* sp. Barr (1993) classified it in *C. pulveracea* (Ehrenb.) Munk.

### Biscogniauxia phyllireae

(Mont.) F. Rappaz, comb. nov. – Pl. 14c.

Bas.: *Sphaeria phyllireae* Mont. in Durieux, Expl. Sc. Alg.: 458, 1849.

Syn.: *Diatrype phyllireae* (Mont.) Mont., Syll. gen. sp. crypt.: 217, 1856.

*Anthostoma phyllireae* (Mont.) Sacc., Syll. Fung. 1: 299, 1882.

Holotype. – ALGERIA: Sétif (Phillipeville), on *Phyllirea media*, (PC-herb. Mont. sub *Sphaeria phyllireae*, original material).

Anamorph. – not seen.

*Stroma* in bark or on wood surface, applanate, 1 mm thick, surface circular 3–4 mm in diam. or elongate up to many cm long, smooth sometimes convoluted, or cracked, at first vinose brown becoming black, ostiole appearing as light spots in a small depression, rarely as a weakly projecting papilla; ectostroma vinose-brown, entostroma black. – *Perithecia* ovoid 0.5–0.6 mm



high, 0.2–0.3 mm wide – *Asci* cylindrical, with uniseriate ascospores, spore-bearing part ca 120–130  $\mu\text{m}$ ; apical ring I+, 4.5  $\mu\text{m}$  wide, 2  $\mu\text{m}$  high. – *Ascospores* 14–17  $\times$  7–9  $\mu\text{m}$ , brown, weakly asymmetrical, ellipsoid, ends tapered or rounded, germ slit straight on the less convex side, full spore length, epispore thin, young ascospores unicellular.

*Habitat.* – Bark and wood.

*Known host.* – *Phyllirea media*.

*Distribution.* – ALGERIA. Known only from the type collection.

*Notes.* – This species is near *Hypoxylon albostictum* (Ellis & Morgan) Miller.

*Anthostomella picconiana* De Not. ex Sacc., Syll. Fung. 9: 506, 1891.

Syn.: *Anthostoma picconiana* De Not. ex Cooke, Grevillea 17: 90. 1889 as *A. picconiana* (De Not.) Cooke (nom. nud.).

*Collection examined.* – ITALY: Capo di Napoli, Agust 1864, *A. Piccone* (RO-herb. De Notaris, sub *Amphisphaeria picconiana*, proposed as neotype).

In the original description of *A. picconiana* Saccardo gave "*Cryptosordaria picconiana* De Not." as unpublished name. Despite the discrepancy with this and the name on the herbarium sheet, the material from RO fits well with the description and in collecting data. It is therefore a suitable neotype. The fungus is an *Amphisphaerella* with ascospores 16.5–22  $\times$  10–13  $\mu\text{m}$ .

*Anthostomella quercus* Passerini, Fung. nov. ser. 5 no 2 (SF 11: 281).

*Collection examined.* – ITALY: on *Quercus*, Passerini (PAD-herb. Sacc.ex herb. Passerini, isotype).

This is a *Coniochaeta* sp.

*Rosellinia salicum* Fabre, Ann. Sci. Nat. Bot. sér. 6, 15: 37, 1883.

Syn.: *Byssosphaeria salicum* (Fabre) Cooke, Grevillea 15: 122, 1887.

*Collection examined.* – FRANCE: Vaucluse: Sérignan, Aleyon, on *Salix* sp., April 1880, Fabre (L'Harmas de Fabre: Holotype).

Petrini (1993) has described and classified this material in *Anthostomella* or in *Hypoxylon* sect. *Primo-cinerea*. The stromata are erumpent from the wood surface, pulvinate to discoid, 1–2  $\times$  1–1.5 mm in diam., 1–1.5 mm high, hard and carbonaceous, including 1 or a few perithecia, the disintegrating entostroma leaving a cavity around the perithecia. Apical ring I+, 1.5–2  $\mu\text{m}$  high, 4–5  $\mu\text{m}$  wide; ascospores ovoid, symmetric, almost globose, brown, 13–16  $\times$  11–13(14)  $\mu\text{m}$ , germ slit straight, full spore length.

This taxon is similar to *Nemania confluens* (Tode: Fr.) Læssøe & Spooner but I have not seen cellular appendage on the ascospores. They resemble those of *Biscogniauxia marginata* (Fr.) Pouzar.

*Sphaeria sicyosperma* Mont. in Durieu, Expl. Sci. Alg. 1: 519, 1849.

Syn.: *Anthostoma sicyospermum* (Mont.) Sacc., Syll. Fung. 1: 300, 1882.

*Collection examined.* – ALGERIA: near Alger, on *Quercus coccifera*, Durieu (PC-herb. Mont., (part of ?) holotype).

The protologue described a species similar to *S. diderma* Schw. (= *Anthostomella diderma*) with brown ascospores shaped like melon seeds,  $25 \times 15 \mu\text{m}$ . The only fungus I have seen on the “type” material (a fragment of wood 15 mm long) was a *Diatrype* or a *Diatrypella* with ascospores ca  $2\text{--}3 \times 1 \mu\text{m}$ .

*Botryosphaeria stromatica* Cooke, Grevillea 13: 102, 1884.

Syn.: *Anthostoma stromaticum* (Cooke) Berl. & Voglino in Sacc. Syll. Fung. Addit.: 47, 1886.

*Sphaeria stromatica* Schw. in herb. Berk. fide Cooke.

*Collection examined.* – NO ANNOTATION (K-herb. Berk. sub *Melogramella stromatica* S. with notes as in the protologue, ? holotype).

The material shows conical, erumpent, uniperitheciate, carbonaceous stromata with stout ostiole up to 0.8 mm long. Asci and ascospores not seen. No material under *S. stromatica* in Schweinitz herbarium in PH.

*Anthostomella suberumpens* Ellis & Everh., Proc. Acad. Nat. Sci. Philadelphia 1894: 338, 1894.

*Collection examined.* – USA: Kansas: Rooks Co., Rockport, on inner side of weathered elm (*Ulmus* sp.) bark, November 1893, E. Batholomew (NY-herb. Ell., with notes as in the protologue, holotype). – Same data (NY-herb. Ell., isotype).

The fungus is a *Coniochaeta*, near *C. pulveracea* (Ehrh.: Fr.) Munk.

*Anthostoma venetum* Sacc., Fungi ital.: tab. 128, 1878.

*Collection examined.* – SWEDEN: ?Visley, Gotland, on wood of *Malus* sp., July 1887, Romell (PAD-herb. Sacc., authentique).

The material received is an *Amphisphaerella* with ascospores  $23\text{--}28 \times 12\text{--}13 \mu\text{m}$ . It fits well with the protologue.

*Anthostomella zonospora* Mouton, Bull. Soc. Roy. Bot. Belg. 28: 73, 1889.

*Collection examined.* – FRONTIER AUSTRO-GERMAN: Allgäuer Alpen, in einem Tobel der Hochgrad. Alpen, on *Fagus sylvatica* (from xyotomy on *Salix* or *Populus*), July 1881, Britzelmayr (BR-herb. Mouron, Rehm, Ascom. 624 (*Hysterographium vulvatum*), sub *Anthostomella zonospora*).

The species is *Amphisphaerella dispersella* (Nyl.) Eriksson. Interestingly, the protologue characterized the ascospores as having “plusieurs alvéoles disposées en cercle dans l'épaisseur de l'épispore (meaning the wall)”. This is the key-character of *Amphisphaerella*, which will be described some sixty years latter.

Species whose type has not been found

*aucubae*, *Anthostomella* Santos & Camara, Agron. lusit. 17: 139, 1955. No type found by Francis (1975) in LISFA.

*berberidis*, *Anthostomella* Richon, Bull. Soc. Mycol. France 4: 53, 1888. Possibly a synonym of *A. anserina*.

*discincola*, *Sphaeria* Schwein.: Fr., Syn. fung. Car.: 34, 1822. System. Mycol. 2: 368, 1823.

Syn.: *Anthostoma discincolum* (Schw.: Fr.) Sacc., Syll. Fung. 1: 296, 1882.  
No material in PH.

*distachyae*, *Anthostomella* Maublanc, Bull. Soc. Mycol. France 20: 87, 1905.  
No material in PC.

*genistae*, *Sphaeria* Crouan, Flore du finistère: 27, 1867.  
Syn.: *Anthostoma genistae* (Crouan) Cooke, Grevillea 17: 90, 1889.  
*Anthostomella genistae* (Crouan) Sacc., Syll. Fung. 1: 290, 1882.

Type probably in Concarneau (Laboratoire de biologie marine), but blocked there for judicial reason.

*leucostomum*, *Anthostoma* Berlese, Atti Soc. Veneto.-Trent. Sc. Nat. 9 (2): 238, 1886.

No type in PAD. Possibly near *Helicogermis* *fleischhackii*.

*longiascum*, *Anthostoma* Berlese, Malpighia 1: Tab. 13, fig. 1-7, 1887.

Syn.: *Anthostoma melanotes* (Berk. & Br.) Sacc. var. *longiascum* (Berlese) Sacc., Syll. Fung. 9: 517, 1891.

No type in PAD.

*osyridis*, *Anthostomella* Bubák, Bull. herb. Boissier, sér. 2, 6: 402, 1906.

No type in B, BKL, PR.

*platyspora*, *Leptomassaria* Munk, Dansk. bot. Ark. 17: 146, 1957.

No type in CO. Judging from the protologue this name could be a synonym of *Eutypella dissepta* (Fr.) Rappaz.

*protuberans*, *Anthostomella* P. Martin, J. South Afr. Bot. 35: 408, 1969.

No type in NY.

*tripunctata*, *Anthostoma* Bonorden ex Sacc. Syll. Fung. : 75, 1891.

Syn.: *Ascospora tripunctata* Bonorden, Handbuch der Allgemeinen Mykologie: taf. 3, fig. 71, 1851. (nom. nud.).

*vincensii*, *Anthostoma* Arnaud, Ann. Sci. Nat. Bot. sér. Bot. & Zool. 7: 717, 1925.  
See Læssøe & Sponer (1994: 50).

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