

Update on European species of *Xylaria*

Jacques Fournier June 2014



[Introduction](#)

[Material and Methods of evaluation of morphological characters](#)

[Index of species](#)

Dichotomous keys

Species occurring on wood, including bamboo and coniferous litter

[Key A](#)

Species occurring on woody fruits

[Key B](#)

Species occurring on herbaceous stems and debris, deciduous leaves and petioles

[Key C](#)

Species occurring on dung and manured soil

[Key D](#)

[Literature](#)

[Acknowledgements](#)

Update on European species of *Xylaria* Hill *ex* Schrank

Even though not directly interested in Xylariaceae, all field mycologists of north temperate regions recognise and name at least the two most widespread species of *Xylaria*, i. e., *X. hypoxylon* and *X. polymorpha*. Because of the distinctive shape and relatively large size of stromata of both species, the genus name *Xylaria* is one of the most popular among the few Ascomycota known by non-specialists. Paradoxically, the genus *Xylaria* is still poorly understood though it became the repository for hundreds of taxa worldwide, primarily in tropics. The confusion resulting from the accumulation of so many unrelated and/or inadequately described taxa, often represented by immature or anamorphic stromata, presumably accounts for the lack of a world monograph while most of other xylariaceous genera have been or are being monographed. In return, the lack of monographic studies in such a confused genus badly hampers the progress of taxonomy.

Modern regional surveys of *Xylaria* have been carried out by Læssøe in Europe (1987, 1992, 1993), Rogers in North America (1983, 1984, 1986), in tropical Africa by Dennis (1958, 1961, 1964), in Central and South America by Dennis (1956, 1957, 1970), Rogers and co-workers (1988, 1989, 2001), San Martin (1992), San Martin and co-workers (2001), Hladki & Romero (2010), Trierveiler-Pereira and co-workers (2009), in Indonesia by Rogers and co-workers (1987), in Papua New Guinea by Dennis (1974) and Van der Gucht (1995, 1996) and in Taiwan by Ju & Tzean (1985) and Ju & Rogers (1999). Regarding Europe, the only available comprehensive survey is that of Bertault (1984) whose main interest for French-reading mycologists is to be written in French. After revision of his several « new » species by Thomas Læssøe (pers. comm.) and revision by myself of material identified by Bertault kept in Jean Mornand's herbarium, we both agreed that his taxonomic concepts were fanciful and inadequate, that led him to the creation of new names for what are merely forms of *X. hypoxylon* and *X. longipes*, while his use of names of tropical taxa for European taxa was obviously not based on a sound knowledge of the respective tropical species. Unfortunately Bertault's work is still used by many non-specialists and the irrelevant names he created still appear too often in check-lists. I felt prompted by this disastrous situation to propose a better approach to the European species of *Xylaria* based on more relevant morphological characters and simple field observations. To give just an example of the validity of such simple field observations, any large colony of *X. hypoxylon* occurring on partly buried wood offers a wide range of forms, dimensions, and patterns of branching depending on environmental conditions during its development (see illustration in *X. hypoxylon* page). No doubt that following Bertault's concepts, at least three different of his « species » could have been recognised here !

The work proposed herein is in no way a monograph in the academic sense but a provisional compilation of my observations and notes since about fifteen years, completed by the data published by professional mycologists. I first attempted for several years to understand something of the mysterious morphological variations of *X. hypoxylon*, with frustrating results. It is only when Régis Courtecuisse has been kind enough to involve me in his fungal survey of French West Indies since 2003, that I discovered the bewildering richness and diversity of neotropical Xylariaceae and especially *Xylaria*. Then, broadening my experience of those fungi, I started to understand the importance and usefulness of less conspicuous but more informative features to sort out some often very similar collections. However I would not have been able to go further without the invaluable help I received from Marc Stadler regarding access to literature and cultures on artificial media, and continuous taxonomic support and guidance from Yu-Ming Ju, Thomas Læssøe and Jack Rogers who made all their experience available to me. I wish to gratefully acknowledge them for having shared with me their knowledge with such enthusiasm and simplicity.

What I propose in this work is primarily a dichotomous key, in fact four keys for the different ecological groupings based on substrate affiliation. For every species name appearing in the keys there is a link to a page with illustrations, description and notes, whenever I have been able to study and take photos of representative material. In case of species I did not study I copied the data available in literature, with permission of the authors. The terminology used in the keys and the descriptions is defined and illustrated in the chapter Material and Methods, as well as the ways to evaluate the morphological characters.

It is hoped that the combined use of dichotomous keys and description pages will make an efficient taxonomic tool allowing for safe identifications. As any tool, this one will need to be regularly « sharpened » by the users, meaning improvement by tracking down the errors and by bringing new data especially for poorly known species of *Xylaria*. This is why your suggestions and feedback will be welcome !

Thirty three taxa of *Xylaria* are listed in the index, many more than expected since not more than five species names usually appear in check lists. This is due to the aim to be as comprehensive as possible by including two species currently placed in *Rosellinia* that have not been formally assigned to *Xylaria* yet and two species of *Podosordaria* that have long been known as *Xylaria*, the two latter genera being indeed difficult to set apart. Three tropical taxa occasionally found in nature and one repeatedly found in glass houses are also listed in this survey, excluding tropical taxa that just occasionally occur on wood of tropical origin in indoor tropical gardens or glass houses. Three species recently described from Far East Russia are potential dwellers of further west regions of Europe and are included here, along with eleven poorly known species that need to be recollected in fresh condition to better assess their status. Along with five recently described species a further one is still in need of further investigations.

Regarding the geographical origin of the taxa dealt with in this survey, the delimitation of Europe is restricted to continental Europe, thus excluding Macaronesian islands that belong to political Europe but are known to harbour endemic and still poorly investigated species of *Xylaria*. The Caribbean islands are likewise out of the scope of this survey because of their tropical climate and totally different mycobiota.

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Material and Methods of evaluation of morphological characters

This survey is mostly based on material collected in southwestern France near the Pyrénées but would not have been possible without the contribution of many friends and colleagues, especially for species with mediterranean, continental or nordic distribution. Initials JF refer to my personal herbarium, otherwise initials of the collector and her/ his herbarium number are cited. Of special interest was the possibility to study several ancient specimens from the Kew Herbarium through a loan arranged with the kind help of Begona Aguirre Hudson (K) and Markus Scholler (KR).

Stromata

A teleomorphic stroma of *Xylaria* consists of sterile fungal tissue forming usually massive and conspicuous structures with the fertile elements (perithecia) scattered just under the surface in a single layer, opening through the stromatal surface through pores or ostioles.

Only teleomorphic stromata bearing fertile perithecia can provide enough information to make their identification possible. Too many records and collections consist only of anamorphic sterile stromata that are however given a name . Such identifications are unreliable and unfortunately lead to add more confusion to a genus which does not need it.

To make comparison with herbarium material possible, all macroscopic characters and dimensions were observed and recorded on dry material, using a stereomicroscope with 10-63x magnification, with an eyepiece fitted with a calibrated reticle.

Shape

The terms used for the description of stromata roughly follow those used by Ju & Rogers but to be as less ambiguous as possible they are explicated and illustrated in this section in the sense I used them. Terms like cylindrical, clavate, flattened, fusiform, fan-shaped, branched or forked speak for themselves but stromata are termed [terete](#) when evenly rounded in transverse section, [prostrate](#) when lying parallel to the substrate, [fasciculate](#) when several stromata arise more or less in parallel from a common base or stipe, [pulvinate](#) when they are wider than high (pillow-like), [peltate](#) when they are shield-like with a central connective, [rosellinoid](#) when they are subglobose and uniperitheciate, [wrinkled](#) when deep furrows oriented obliquely or transversally make the surface uneven and nodulose. Distinguishing a [fertile](#) stromatal apex from a [sterile](#) one implies the observation of a longitudinal section of the apex.

Texture

Most of stromata of *Xylaria* species are encased in a pseudoparenchymatous, that is cellular, black crust, but cell walls are more or less heavily melanised, which allows to distinguish between the [leathery](#) type, soft-textured, weakly melanised, usually less than 60 µm thick, and the [carbonaceous](#) type, hard textured and often over 80-100 µm thick. This character proves useful because very consistent within a species but needs to be carefully evaluated, especially for intermediate cases with carbonaceous black crust less than 60-80 µm thick. Very few European species of *Xylaria* feature a carbonaceous crust, thus the following especially concerns tropical species.

The leathery type is recognized most easily by sectioning a stroma along its longitudinal axis, with a new razor blade. The cutting is smooth, and leaves even section surfaces, without special noise and no damage to the cutting edge of the razor blade. Moreover, when rehydrated with a drop of water, the crust softens and is easily bent by pressure of a needle. In contrast, the crust of the carbonaceous type is broken with a typical crunch rather than properly cut and the cutting edge of the razor blade is damaged, in relation with crust thickness. It is more easily observed when the stroma is broken off instead of cut with a tool. In cases of thin

carbonaceous crusts that are difficult to evaluate, the absence of softening induced by addition of water is the most reliable character.

The evaluation of the crust thickness needs the use of a good powerful stereomicroscope, otherwise it can be done under a low power objective of a compound microscope with epi illumination. It is very important to measure the thickness of the black crust itself, on mature stromata, preferably between ostioles, excluding the outermost usually somewhat coloured layer which is present at least at first stages of stromatal development.

Outer layer

It consists of a tissue overlaying the black crust. This outer layer is a very informative feature, which has already been taken into account by several previous authors, but proves most informative when very thoroughly studied and evaluated. The texture of the outer layer varies from [fibrous](#) to [horny](#), it sometimes contains [black persistent granules](#), and when the stroma expands it is fragmented into [strips](#), [plaques](#), [scales](#) or is [reticulately cracked](#) or gradually worn off; it may be tightly appressed and persistent, but most often vanishes with age. Shape, colour and dimension of these fragments of outer layer are usually consistent for a given taxon and thus very informative if carefully evaluated. The depth of cracks and pattern of cracking are likewise important and reliable features. Unfortunately old weathered ascomata usually have lost this outer layer, which hampers their identification.

Ostioles

What is called ostiole in Xylariaceae is not only the pore through which ascospores are released but also the stromatal structure surrounding it. When the pore is not underlined by any structure it is termed inconspicuous ; when its is protruding above the stromatal surface it may vary from [conic-](#) to [bluntly papillate](#) or [raised-discoid](#). The diameter of the latter must be recorded.

Perithecia are always [monostichous](#) (arranged in a single layer) in Xylariaceae, more or less densely scattered just beneath the surface of the stroma. When they appear polystichous it is due to the plan of section that is too strongly oblique. Their shape and dimensions are recorded under the stereomicroscope from longitudinal or vertical sections of a stroma. The colour and texture of the internal tissue ([interior](#)) are recorded at the same time but they are usually not diagnostic in temperate species of *Xylaria*.

Stipes

Their length is usually fairly variable and rarely diagnostic except when they are [long-rooting](#), [rhizomorph-like](#) or reduced to a [narrow connective](#) in case of pulvinate stromata.

Asci and paraphyses

Asci were observed in tap water for measurements or 1% SDS (Sodium Dodecyl Sulfate) in case of old dry material. The stipes of long-stipitate asci are often difficult to make out for they remain stuck together or are easily broken. The use of [Melzer's reagent](#), [chlorazol black](#) or black Waterman ink, the two latter in combination with 1% SDS, proved useful by staining the stipes. The same methods were applied to the paraphyses.

The apical structure is of variable shape but very rarely discoid in *Xylaria*. This is why the term apical apparatus was preferred to apical ring. It varies from [tubular](#), [cuboid](#) or [wedge-shaped](#) to [urn-shaped](#) or [bipartite](#). The reaction to iodine was routinely tested by adding a drop of Melzer's reagent to the edge of the cover slip on a water mount. When the reaction is dubious the material is mounted directly in a drop of Melzer's reagent or in Lugol's solution (IKI), the latter giving more colourful reactions.

Ascospores

Ascospores were routinely observed in tap water or 1% SDS for measurements and to record their colour. As they often rapidly swell in these media it appeared important to record their dimensions first, before the swelling. To that effect at least ten photomicrographs were rapidly taken on a trinocular microscope with a x100 oil immersion objective and processed on the computer with the free software Piximetre 5.2 (ach.log.free.fr/Piximetre/). At least 30 ascospores were measured for each specimen, with [extreme values](#) appearing in brackets and 80% of the values comprised in the interval min-max, this applied to the length, the width and the quotient L/w (Q) as well as to the mean values. When a wide range of variation in ascospore dimensions was observed, often in hardly mature material featuring few-spored asci, measurement were preferably recorded on ascospores contained in mature 8-spored asci. The darkest brown ascospores are always regarded as the most mature.

Beside their colour and their dimension, the main characters to record on ascospores are the shape, the germ slit, the presence of cellular appendages or mucilaginous sheaths or caps. Ascospores may be [ellipsoid](#) or [fusiform](#), at times [navicular](#), [equilateral](#) or [inequilateral](#) when seen in lateral view. Their ends may be [narrowly](#) or [broadly](#) rounded, [pinched](#), [truncate](#) or occasionally [beaked](#). The germ slit may be [conspicuous](#) or [not](#). When it is not conspicuous it is usually more easily seen on immature ascospores or after mounting in 3% or 10% KOH. It is most often located on the less convex or flattened side of inequilateral ascospores, thus not visible on ascospores lying in lateral view. Its shape varies from [straight](#) to [sigmoid](#) or [spiralling](#), it may be [parallel](#) to the sides of the ascospore or [oblique](#). It may be [as long](#) as the spore length or nearly so, or much [shorter](#).

[Cellular appendages](#) frequently occur on lower ends of ascospores of Xylaria in early stages but are most often very small and difficult to make out, especially on mature ascospores where they collapse and vanish. They are best seen on immature ascospores, at times visible in water but more conspicuous when India ink is added to a water mount. Mature ascospores often show a slightly truncate end where the cellular appendage disappeared. The mucilaginous material present around or at ends of ascospores may be seen or at best guessed in water but is best observed when stained in [aqueous nigrosin](#) or in dilute [India ink](#).

Cultures

Cultures were obtained from perithecial contents removed with a sterile needle and inoculated on YMG (yeast malt glucose) agar plates and subcultured on OA (oat meal agar) plates, incubated at room temperature.

Anamorphic structures

Conidiogenous cells and conidia were observed in 1% SDS or 3% KOH, at times mounted in black [Pelikan ink](#) for a better contrast of details.

Photography

Photomicrographs were taken with a Nikon Coolpix 995 digital camera either directly and mounted on a stand or, for higher magnifications, through the eyepiece of a stereomicroscope, by the means of a 30 mm diameter adapter. Photomicrographs were taken with the same camera mounted on the trinocular port of the microscope. The digitalised photographs were processed with Adobe Photoshop Elements 10 and the plates assembled with the same software. To avoid unnecessary and tedious work scale bars were not inserted in the plates since stromata are displayed on millimetric paper ([one division = 1 mm](#)) and all dimensions recorded in the attached descriptions.

[Home](#)

Index of species listed by epithets

[*X. arbuscula*](#) Sacc. (JR 99, FS 11)
[*X. arbuscula* var *plenofissura*](#) Ju & Tzean (JT 85, JR 99)
[*X. bulbosa*](#) (Pers.: Fr.) Berk. & Broome (L 92)
[*Rosellinia callosa*](#) Winter (P 92)
[*X. carpophila*](#) (Pers.: Fr.) Fr. (R 79)
[*X. cinerea*](#) J. Fourn. & Stadler (FS 11)
[*X. corniformis*](#) (Fr.) Fr. (H 10)
[*X. crozonensis*](#) Leroy & Mornand (LM 04)
[*X. cubensis*](#) (Mont.) Fr. (R 84b)
[*X. delitschii*](#) Auersw. (M 13)
[*X. digitata*](#) (L.: Fr.) Grev. (L 92)
[*X. filiformis*](#) (Alb. & Schw. : Fr.) Fr. (D58, D 71, BK84)
[*X. filiformis*](#) (Alb. & Schw. : Fr.) Fr. ss Dennis (D58, D 71, BK84)
[*X. friesii*](#) Læssøe (L 92)
[*X. guepinii*](#) (Fr.) Ces. (L 92)
[*X. hippotrichoides*](#) (Sowerby) Sacc. (D 81)
[*X. hypoxylon*](#) (L.: Fr.) Grev. (P&co 09)

[*X. karsticola*](#) J. Fourn. & Stadler (FS 11)
[*X. lepidota*](#) Ju, Hsieh, Vasilyeva & Akulov (JHVA 09)
[*X. longipes*](#) Nitschke (R 83)
[*X. oxyacanthae*](#) Tul. & C. Tul. (SR 83)
[*Podosordaria pedunculata*](#) (Dicks.) Dennis (D 57, D 81, KC 74)
[*X. polymorpha*](#) (Pers.: Fr.) Grev. (R 86)
[*X. primorskensis*](#) Ju, Hsieh, Vasilyeva & Akulov (JHVA 09)
[*X. putaminum*](#) Maire & Durieu (B 84)
[*X. scruposa*](#) (Fr.) Fr. (RC 86)
[*X. sibirica*](#) Ju, Hsieh, Vasilyeva & Akulov (JHVA 09)
[*X. sicula*](#) Pass. & Beltr. (PB 82, B 84)
[*Xylaria* sp. "Gotland"](#)
[*Rosellinia tassiana*](#) Ces. & De Not. (P 92, CB 05)
[*Podosordaria tulasnei*](#) (Nitschke) Dennis (D 57, D 81, KC 74, WW 00)
[*X. vasconica*](#) J. Fourn. & Stadler (FS 11)
[*X. violaceorosea*](#) J. Fourn., A. Román, J. Balda & E. Rubio (FRBR 14)

[Home](#)

KEY A

To save space, the term spores is used herein in the sense of ascospore

1	Stromata upright, higher than wide, more or less stipitate 2
	Stromata rosellinioid, pulvinate or peltate, subglobose or wider than high, sessile or subsessile 19
2	Stromata hard-textured with a carbonaceous outer crust..... 3
	Stromata leathery..... 5
3	Stromata occurring in glass houses in botanical gardens, spores 12-15 x 5.5-6 µm with a straight germ slit 3/4 spore-length..... <i>X. arbuscula</i>
	Stromata occurring outdoors in natural conditions, spores clearly smaller or larger..... 4
4	Stromata clavate with a thick carbonaceous crust 150-170 µm thick; spores 8.5-10 x 4.5-5 µm, blackish .. brown, with germ slit hardly visible..... <i>X. cubensis</i>
	Stromata narrowly fusiform with a thin carbonaceous crust 70-80 µm thick; spores 18-20 x 6-7 µm, brown, with a conspicuous germ slit almost spore-length..... <i>X. arbuscula</i> var . <i>plenofissura</i>
5	Stromata with orange brown strongly nodulose surface, arising from a bulbous base in coniferous litter; spores light golden brown, 11,5-13 x 4,6-5,3 µm..... <i>X. bulbosa</i>
	Stromata lignicolous, with a different combination of characters 6
6	Stromatal surface cracked into small dark brown polygonal scales 7
	Stromatal surface mottled with white or striped with grey, brownish grey or purple 13
7	Spores 8-11 x 4-5 µm 8
	Spores larger..... 9
8	Spores 8-10 x 4.3-5.3 µm <i>X. corniformis</i>
	Spores 9-11 x 4-5 µm <i>X. primorskensis</i>
9	Spores with long germ slit almost spore-length 10
	Spores with short straight, oblique to sigmoid germ slit 11
10	Stromata upright, much higher than wide; spores 12-14 x 5-6 µm with a conspicuously sigmoid germ slit. <i>X. longipes</i>
	Stromata subglobose on a short stipe; spores 22.5-26.5 x 9-10.5µm with a straight germ slit almost spore-length <i>X. lepidota</i>
11	Stromata fasciculate arising from a thick common rooting base; spores 17-19.5 x 5.2-6 µm, with straight oblique germ slit <i>X. digitata</i>
	Stromata simple, not fasciculate on a common base 12
12	Spores 20-25 x 6.5-7.5 µm with a parallel or slightly oblique germ slit; temperate..... <i>X. polymorpha</i>
	Spores 16-21 x 6.5-7 µm, with oblique to sigmoid germ slit; tropical <i>X. scruposa</i>

13	Stromatal surface mottled with whitish to grey spots encrusted with minute persistent black granules, spores 13-17 x 5-6 µm with slightly diagonal to undulate germ slit less than spore-length <i>X. cinerea</i>	14
	Stromatal surface lacking black granules	14
14	Stromatal surface with purple peeling outer layer, spores 16 x 6 µm with slimy caps <i>X. violaceorosea</i>	15
	Stromatal surface with greyish outer layer, eventually black, spores averaging smaller and lacking slimy caps .	15
15	Stromata fasciculate or densely branched, arising from long to very long rooting stipes	16
	Stromata usually simple and not on rooting stipes	17
16	Stromata dichotomously branched, ostioles papillate, spores 9.2-10.6 x 3.4-4.3 µm with short germ slit . <i>X. friesii</i>	16
	Stromata fasciculate, not branched, ostioles raised-discoid, spores 11-13 x 4,7-5,5 µm with long germ slit spore-length <i>X. sp "Gotland"</i>	17
17	Stromata hypogeous occurring on buried wood in karstic soil, spores 11-13.5x 4.6-5,2 µm with acute ends	17
	..... <i>X. karsticola</i>	18
	Stromata with aerial fertile parts, spores with rounded ends.....	18
18	Stromatal surface nodulose with exposed perithecial contours, ostioles conic-papillate, spores 12-14 x 4,5-5,5 µm with germ slit almost spore-length	18
	..... <i>X. vasconica</i>	19
	Stromatal surface with inconspicuous perithecial contours, ostioles raised- discoid, spores 10–13 x 4.5–5,5 µm usually with germ slit less than spore-length	19
	..... <i>X. hypoxylon</i>	20
19	Stromata peltate to pulvinate.....	20
	Stromata rosellinioid, subglobose	21
20	Stromata carbonaceous, black, spores 13-16 x 7,5-9 µm, blackish brown, with inconspicuous straight germ slit	20
	..... <i>X. crozonensis</i>	21
	Stromata soft-textured, greyish white, spores 14.5-17 x 6.5-7 µm, olivaceous brown, with a conspicuous spiralling germ slit.....	21
	..... <i>X. sibirica</i>	21
21	Stromata sessile, spores 23-28 x 6.5-8 µm, brown, with oblique slightly sigmoid germ slit much less than spore-length.....	21
	..... "<i>Rosellinia</i> " <i>callosa</i>	21
	Stromata somewhat stalked, spores 30-36 x 13-16 µm, dark brown, with long straight germ slit.....	21
	..... "<i>Rosellinia</i> " <i>tassiana</i>	21



Xylaria vasconica

Key B

1	On <i>Fagus</i> cupules, spores 10-12.5 x 4.2-4.8 µm, golden brown <i>X. carpophila</i>
	On buried seeds of other trees, spores darker brown..... 2
2	On <i>Olea</i> stones, spores 11.5-13.5 x 5-6 µm with obtuse ends..... <i>X. putaminum</i>
	On other hosts, spores with narrowly rounded ends..... 3
3	On <i>Crataegus</i> (and <i>Carya</i>) seeds, spores 10-13 x 4.5-5.5 µm..... <i>X. oxyacanthae</i>
	On seeds of <i>Carpinus</i> , spores 10,5-12 x 4,5-5,5 µm..... <i>X. delitschii</i>



X. oxyacanthae (Photo Peter Rönsch)

[Home](#)

KEY C

1	On <i>Olea</i> leaves, spores 9.5-11.5 x 4.7-6.7 μm <i>X. sicula</i>
	Not on <i>Olea</i> leaves, spores larger.....2
2	On dead leaves and herbaceous stems, spores 14-18 x 4,5-8 μm}.....3
	On rotting vegetable material, preferably indoors, spores 14-20 x 7-10 μm <i>X. hippotrichoides</i>
3	Spores 14-18 x 4,5-5,5 μm with inconspicuous germ slit <i>X. filiformis</i>
	Spores broader 14-16 x 6,5-8 μm with conspicuous germ slit <i>X. filiformis ss Dennis</i>

[HOME](#)

KEY D

1	Stromata yellowish brown to reddish brown, spores light golden brown, 6.5-8 x 3.5-4 μm , on manured soil	<i>X. guepinii</i>
	Stromata black, spores darker and much larger	2
2	On rabbit droppings, spores 22-25.5 x 12-14.5 μm	<i>P. tulasnei</i>
	Associated with dung of large herbivorous, spores 40-60 x 20-30 μm	<i>P. pedunculata</i>



Podosordaria tulasnei

[Home](#)

Podosordaria pedunculata (Dicks.) Dennis

France: Ariège, Les Cabannes, Plateau de Beille, 1800 m, on cow dung collected on 24 Oct. 2005, incubated in moist chamber until 28 Jun. 2006, **JF 06136.**

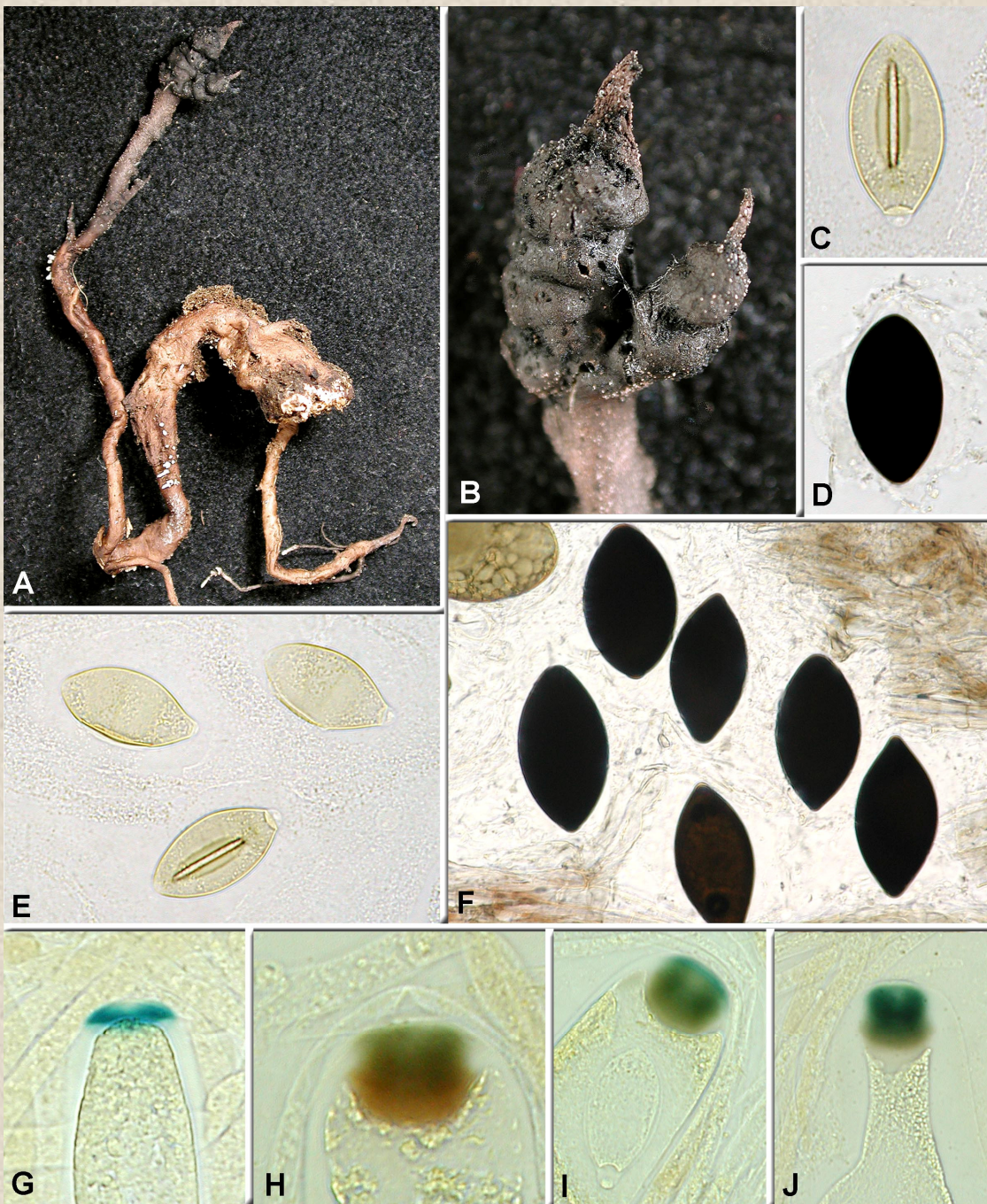
Stroma (A) upright, originating from long rooting stipes and stout pale reddish brown rhizomorphs, the fertile parts roughly ellipsoid to fusiform with a sterile reddish brown mucronate apex (B), 0.7-1.2 cm high x 3-5 mm diam; surface dull black, roughened and nodulose with conspicuous perithecial contours, soft-textured, with a leathery crust ca. 30 μ m thick, lacking a peeling outer layer; interior white to greyish, loosely fibrous. The stipes brown to black, finely puckerred, glabrous, originating from contorted, flattened rhizomorphs up to 8 mm wide (A). **Perithecia** ovoid to subglobose, 0.7-0.9 mm high x 0.6 mm diam. **Ostioles** umbilicate, surrounded by a low raised-discoid annulus ca. 170 μ m diam.

Asci cylindrical to narrowly fusiform, deliquescing at maturity, not measured, short-stipitate, with eight obliquely uniseriate ascospores, with a discoid (G) to massive cuboid apical apparatus with or without a lateral rim, bipartite, upper part bluing or turning dull green in Melzer's reagent, lower part darker green or reddish brown (G-J). Paraphyses copious, tapering above asci.

Ascospores (F) 38-50 x 17-24 μ m, ellipsoid-equilateral with upper end narrowly rounded to acute and lower end slightly truncate with a fugacious hyaline cellular appendage (C, E), blackish brown, smooth, with a straight germ slit about 2/3 spore length, best seen before full maturity (C, E), surrounded by a thick gelatinous sheath visible in water (D).

Notes: This rarely recorded fungus was obtained after a long incubation of cow dung collected in autumn. Rhizomorphs developed in winter beneath the dung, giving rise to two fertile stromata after eight months of incubation at room temperature. Similar rhizomorphs occurred on sheep dung incubated under the same conditions but remained sterile. In natural conditions, the rhizomorphs most likely develop in the ground under old dung and fertile heads arise among the grass in spring, which makes them very easily overlooked.

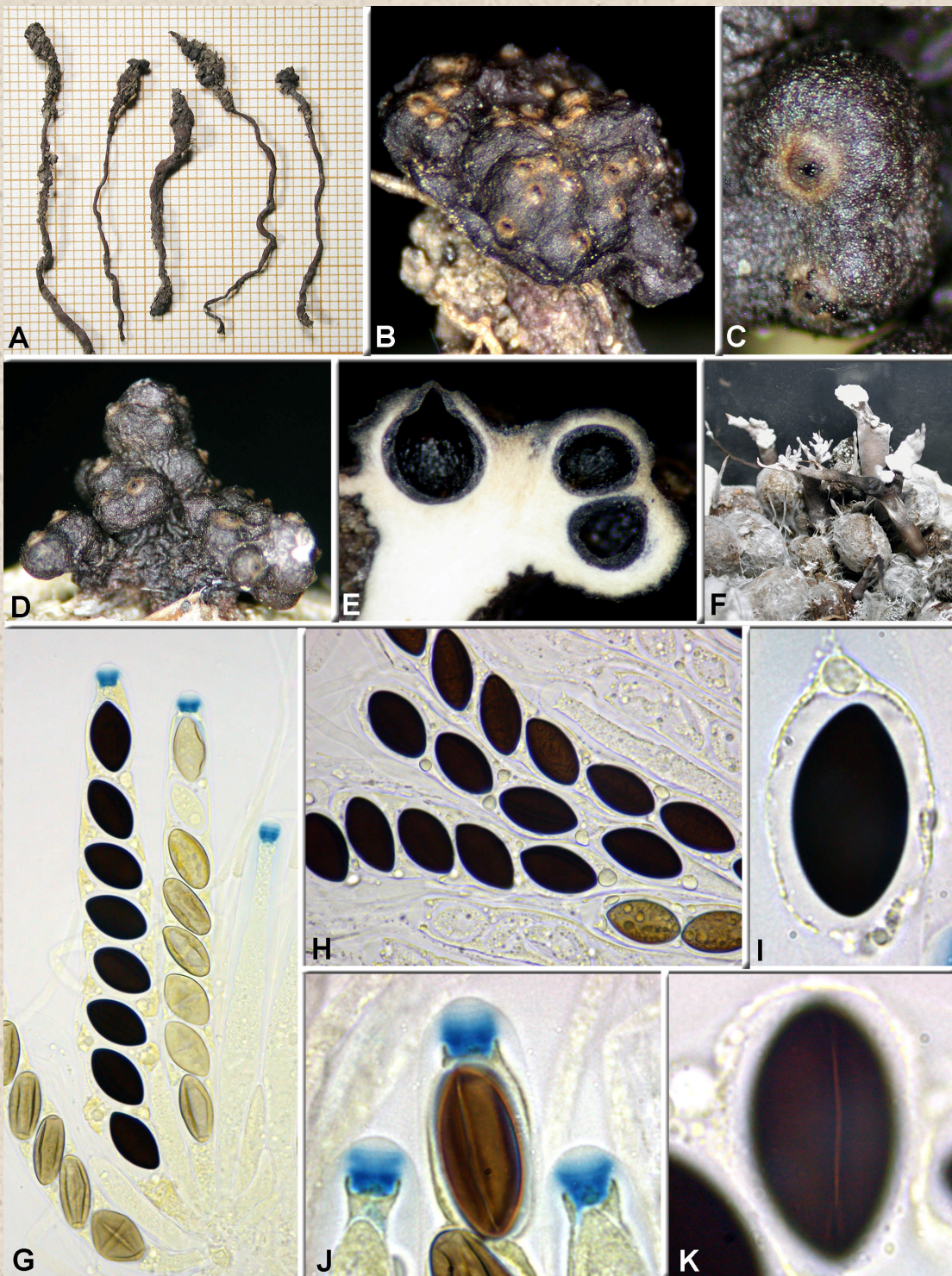
It is well characterized by its apiculate and nodulose fertile heads, and huge blackish ascospores with a short germ slit and a thick gelatinous sheath. The reaction of ascal apical apparatus to iodine varies from greenish blue to reddish brown, recalling what is observed in some *Hypocypria* species.



Podosordaria pedunculata was formerly assigned to *Xylaria* and was combined in *Podosordaria* by Dennis (D57). This combination was accepted by Krug & Cain (KC 74) and by Rogers, Ju & San Martin (RJSM 98) though the morphological differences with *Xylaria* remain unclear. It is remarkable that like in *P. tulasnei* the stromata of *P. pedunculata* arise from long and stout contorted pale reddish brown rhizomorphs, which might be a distinctive character of the genus

[BACK TO KEY](#)

[Close](#)



Podosordaria tulasnei (Nitschke) Dennis

France: Vendée, La Mothe Achard, Ricordeau, on rabbit droppings, 12 Oct. 1999, leg J. Gaborit, det P. Leroy, **JF 03057** (C, D); Haute Garonne, Muret, tollbar on A 64 motorway, on rabbit droppings incubated in moist chamber from 08 May 2010 until 23 May 2010, **JF 10060** (F, rhizomorphs), then incubated in soil until 09 Feb. 2011, **JF 11005** (A, E, G-K, teleomorphs).

Stromata superficial on rabbit droppings (D) or superficial on soil but originating from long rooting stipes (A), few-peritheciate, fertile head subglobose, irregularly conical or discoid, 1-3 mm diam composed of irregularly clustered rosellinioid or coalescent ascomata; surface brownish black, slightly roughened, soft-textured, with a leathery crust 20-25 µm thick, lacking a peeling outer layer (C); interior white, solid, spongy (E). The stipes immersed in the substrate, dark reddish brown, glabrous or tomentose in places, contorted, rhizomorph-like, up to 1,5-2 mm thick (A), up to 3,2 mm high in JF 11005 but reduced in JF 03057, often encrusted with soil particles. **Perithecia** subglobose, 0,4-0,45 mm diam (E). **Ostioles** conic- papillate, surrounded by a conspicuous orange brown discoid area (B-D).

Rhizomorphs (F) emerging within two weeks from a felty white mycelium extensively covering the droppings incubated in moist chamber, prostrate to upright, stout, brown with white sterile fan-shaped tips, remaining sterile even after prolonged incubation, eventually withering.

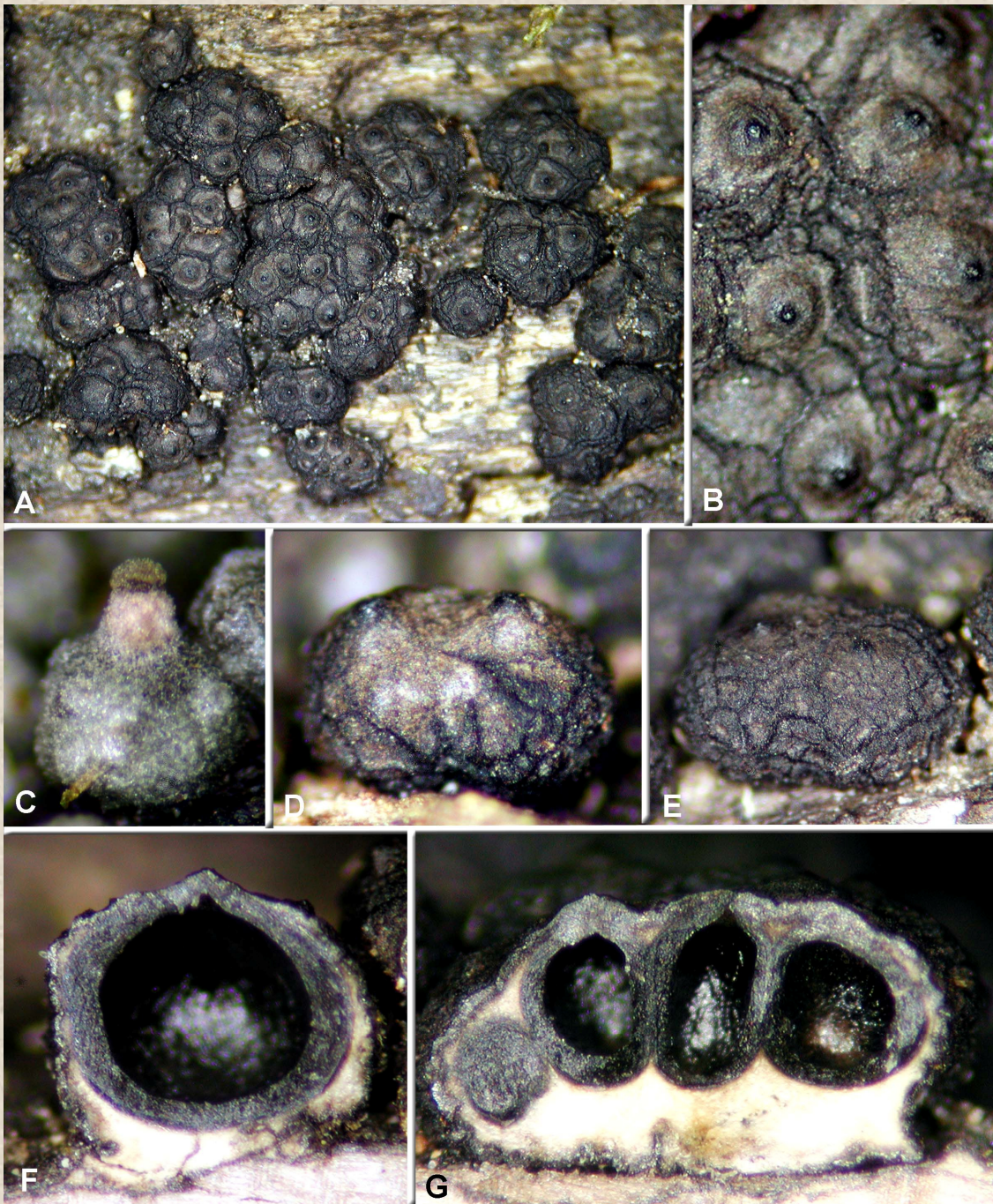
Asci (G) cylindrical, 180-200 µm total length, the spore-bearing parts 160-180 µm long x 18-20 µm broad, the stipes 20-25 µm long, with eight obliquely uniseriate ascospores, with a massive bipartite obconical to rhomboid apical apparatus 6-7,5 µm total height, the basal part 3,5-5 x 6,5-8 µm bluing more strongly in Melzer's reagent (G, J). Paraphyses tapering above asci, deliquescent, slightly embedded in mucilage.

Ascospores (H) (21,8) 22,8 - 25,6 (26,4) x (11,5) 12,2 - 14,1 (14,5) µm ; Q = (1,6) 1,7 - 2,0 (2,3) ; N = 40 ; Me = 24,3 x 13,2 µm ; Qe = 1,9, ellipsoid-equilateral with narrowly rounded to acute ends, blackish brown, smooth, with a straight germ slit spore-length (K), inconspicuous, best seen before full maturity; a thin gelatinous sheath 1-5 µm thick is visible in water, Melzer's reagent (I) and India ink.

Notes: Incubation of rabbit droppings in a moist chamber sometimes leads to the development of an extensive white mycelium from which emerge stout rhizomorphs, that remain sterile even after a prolonged incubation. Webster & Weber (WW00) showed that they may become fertile when buried in sandy soil and give rise to telomorphic stromata of *P. tulasnei*. This fungus is very inconspicuous in the field but probably not uncommon on this peculiar substrate. Obtaining it *in vitro* appears to be more effective than searching for it in nature. It is easily recognized based on its very small stromata with very prominent perithecial contours and large blackish brown equilateral ascospores with narrowly rounded to acute ends and long germ slit. It was also known as *Xylaria tulasnei* Nitschke, before Dennis (D 57) transferred it to *Podosordaria* but the boundaries between both genera remain ill-defined as long as molecular data are lacking for most members of *Podosordaria*. Interestingly the two species of *Podosordaria* that have been sequenced, *P. mexicana* and *P. muli*, were shown to be distantly related to *Xylaria* (H 10).

[BACK TO KEY](#)

[Close](#)



"Rosellinia" callosa Winter

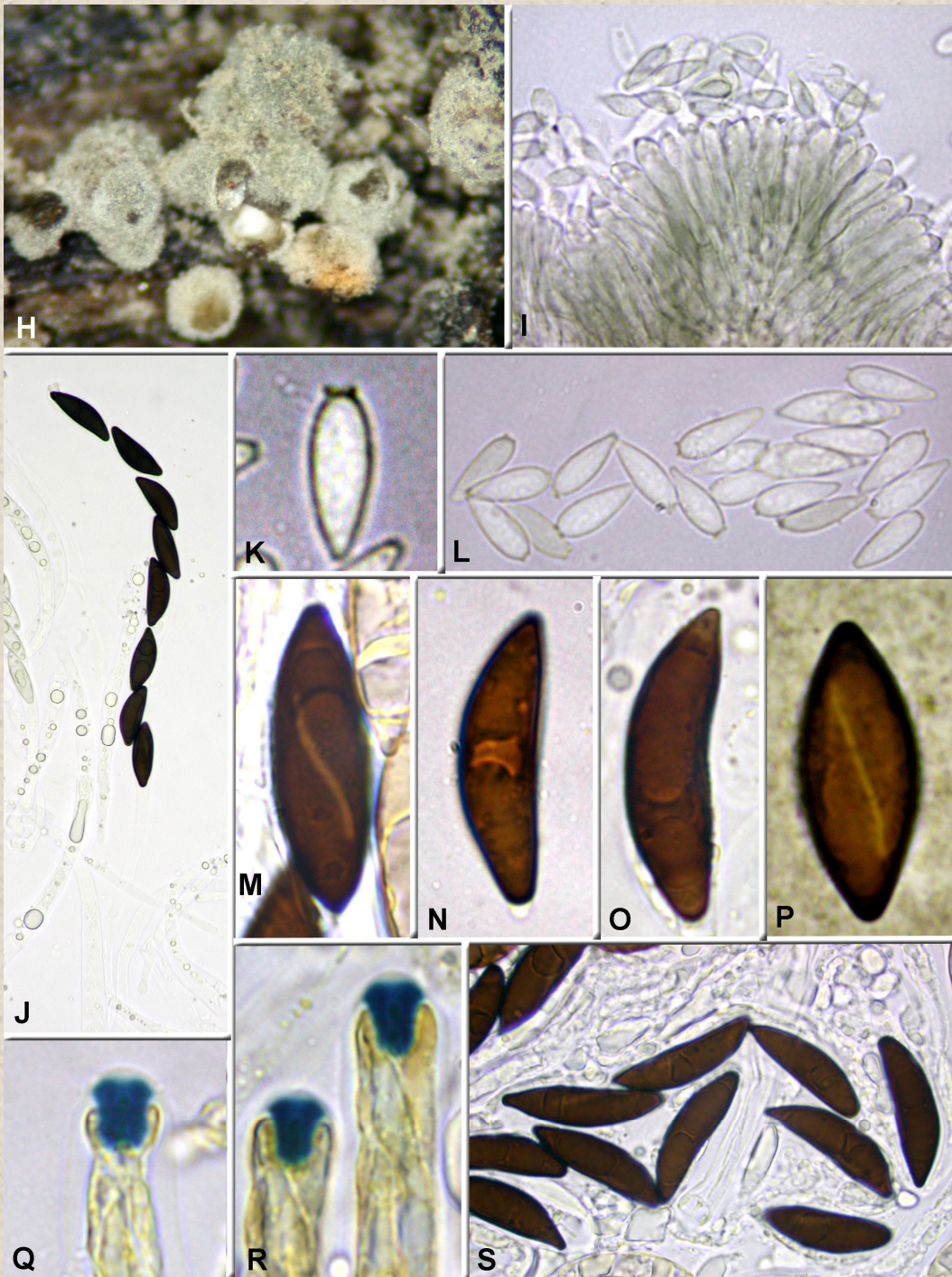
France: Ariège, Rimont, Peyrau, ca. 410 m, at the collar of a small dead trunk of *Acer campestre*, 23 Aug. 1997, **JF 97127** (A, B, D-G, J, M-S); **Spain,** Asturias, Pola de Somiedo, Coto de la Buenamadre, banks of rio Orio, on dead roots of *Alnus glutinosa*, 02 Jun. 2013, **JF 13144** (C, H, I, K, L) (immature).

Stromata (A, B, D, E) superficial, rosellinioid, subglobose 0.8-1 mm diam, gregarious and often in contact to coalescent, then pulvinate containing up to 12 perithecia, 1.5-2.5 mm diam x 0.6-0.9 mm thick, with inconspicuous perithecial contours, broadly attached to the substrate; surface brownish black, with a brown to dark brown outer layer (B, D) deeply cracked into thick polygonal plaques, usually even or less cracked around the ostiole, with an underlying leathery crust ca. 40 µm thick; white to cream-coloured tissue beneath the perithecia, solid, spongy (F, G). **Perithecia** subglobose, 0.6-0.7 mm diam, laterally flattened in multiperitheciate stromata. **Ostioles** black, conic- papillate (B, D, E).

Asci (J) cylindrical, 230-245 µm total length, the spore-bearing parts 145-160 µm long x 12-13 µm broad, the stipes 80-90 µm long, with eight obliquely uniseriate ascospores, with a broadly cylindrical to obconical apical apparatus with a sharp lateral rim, 5-6 µm high x 4-4.5 µm broad, bluing in Melzer's reagent (Q, R). Paraphyses 6-8.5 µm broad, filled with large oily guttules, embedded in mucilage

Ascospores (M-P, S) (21,6) 23,2 - 28,4 (31,2) x (6,4) 6,5 - 7,9 (9,4) µm ; Q = (2,7) 3,0 - 4,1 (4,5) ; N = 40 ; Me = 25,5 x 7,2 µm ; Qe = 3,6, fusiform-inequilateral to navicular, with narrowly rounded and slightly pinched ends, upper end acute to apiculate, lower end somewhat truncate, rarely with a visible minute cellular appendage (N), dark to blackish brown, smooth, with a conspicuous oblique, straight to slightly sigmoid germ slit ca. 2/3 spore-length (M-P); no sheath observed in India ink (P).

Anamorph on natural substrate (H) forming a greyish green woolly coating on immature stromata, at times evolving as a coremium apical structure on top of maturing stromata (C). Conidiophores cylindrical, palisadic, greyish green, 18-27 µm high (I, 3% KOH), of the geniculosporium-like type commonly encountered in *Xylaria*. Conidia 7-9 x 3-3,4 µm, clavate to pip-shaped (L), hyaline, smooth, with a crown-like collarete on distal end (K).



Notes: This fungus, which obviously has more affinities with penzigoid members of the genus *Xylaria* has been excluded from *Rosellinia* by Petrini (P 92) but not formally transferred to *Xylaria*. It is characterized by small rosellinioid stromata often fused into larger pulvinate stromata, with thin leathery crust and surface deeply cracked except around the papillate ostiole, and microscopically by large navicular ascospores with a short oblique, slightly sigmoid germ slit. It is so far known from temperate Europe and has been recorded on *Alnus* and *Populus* by Petrini (P 92). In our experience it can also occur on other hosts like *Fraxinus*, *Evonymus*, *Acer*, *Lonicera* roots, but always on partly buried parts of stumps or roots, which most likely accounts for its apparently rare records.

« *Rosellinia* » *tassiana* Ces. & De Not.

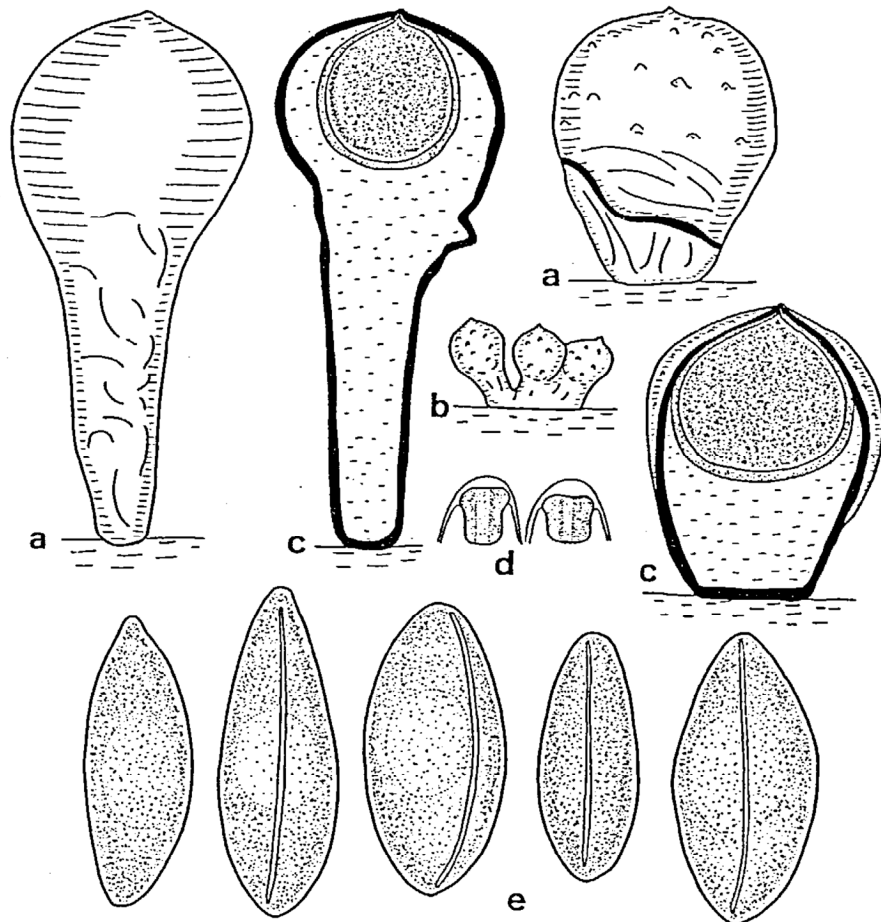
33. *tassiana*, *Rosellinia* Ces. & De Not., Sfer. It. Cent. 1: 19, tab. 16. 1863.— Figs. 17a–c. E

Syn.: *Hypoxylon tassianum* (Ces. & De Not.) Martin, J. S. Afr. Bot. 42: 74. 1976.

Anamorph.— Not seen.

Stromata 1.1–2 mm diam., (1.5) 2.3±0.8 (4.8) mm high, sometimes almost globose, sessile, usually arising in groups of two or three

Fig. 17.— *R. tassiana*; *R. valdiviensis*.— *R. tassiana*: a. Stromata.— b. Group of stromata.— c. Vertical section of stromata.— d. Ascus plugs.— e. Ascospores.— *R. valdiviensis*: f. Stromata.— g. Vertical section of stromata.— h. Ascus plugs.— i. Ascospores.— Bar: stromatal and macroscopic characters, 0.5 mm; microscopic characters, 10 µm; group of stromata (b), 2 mm.



From L. E. Petrini 1992, with her kind permission

from a common base of stromatic material, or occurring singly, with a stalk up to 2.5 mm long, ending in a nearly globose head, always containing one perithecium, with distinctive, finely papillate to pointed ostioles, black, surface of the part containing the perithecium warty, lower part or stalk wrinkled; ectostroma 50–75 µm thick, black; entostroma white to cream-coloured, soft, spongy, tightly attached to the ectostroma.— Perithecia approx. 900 µm diam., 825 µm high (1 measurement).— Asci not seen.— Ascus plugs up to 6.5 µm high, upper width 6.5–7.5 µm, lower width 4.5 µm.— Ascospores (27) 33±3 (41.5) × (11) 14.5±1.5 (17) µm, almost ellipsoidal to ovoid, with one end more broadly rounded than the other, dark brown; germ slit nearly spore length, straight; appendages or slimy caps not seen.

Habitat.— Various hardwood, e.g., *Morus*, *Quercus*, *Quercus ilex*.

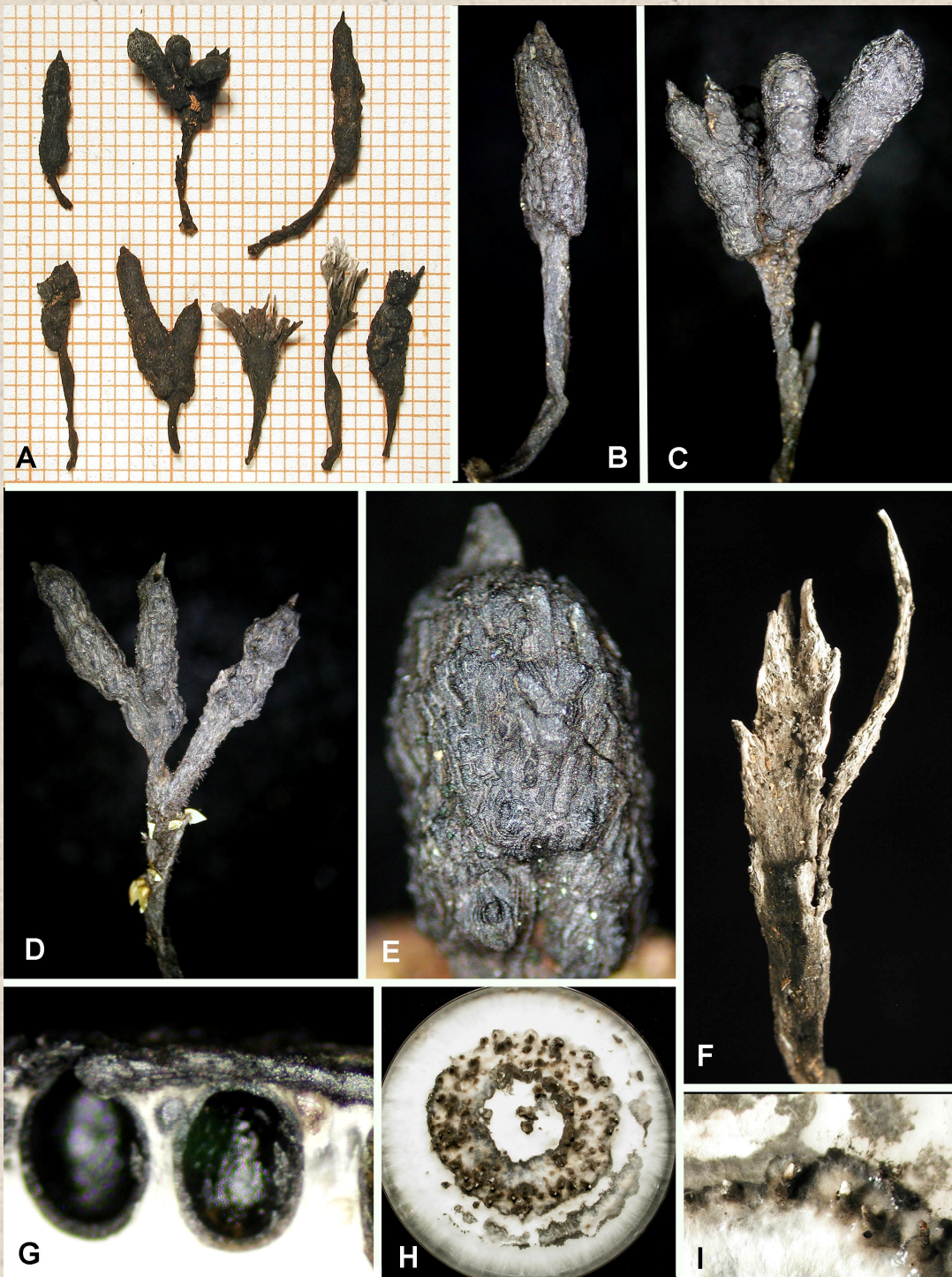
Distribution.— EUROPE: Italy.

Specimens examined.— ITALY: Toscana, Chianti, Rodda, on *Quercus*, VI.1862, O. Beccari (RO, ERB. CRITT. IT NO 990).— Toscana, near Florence; IV.1865, De Notaris (RO).— Toscana, Florence; V.1865, L. Calderi (RO).— Toscana, Pisa, on *Quercus ilex*; 1862, O. Beccari (RO, ZT, RABH. FUNGI EUROPAEI 655).— Toscana, Siena, Forest of Monaca, on *Quercus*, A. Tassi (RO).— Toscana, Siena, on *Morus*; 1862, A. Tassi (RO).

R. tassiana is distinguished by its usually stalked stromata or by stromata arising from a common stromatic base containing only one perithecium in the globose heads. The entostroma is soft, tightly attached to the comparatively thin ectostroma and not reduced in mature material. These stromatal characters suggest some affinities with uniperitheciate *Xylaria* or *Kretzschmaria*, rather than with *Rosellinia*. No subiculum has been observed.

Only a few specimens collected during the last century are known from Italy. Recent collections, and any from other areas, are lacking.

This rarely recorded species was recently reported from Spain by Checa & Blanco (2005) on *Quercus ilex* bark. Morphological characters point towards stronger affinities with *Xylaria* than with *Rosellinia*.

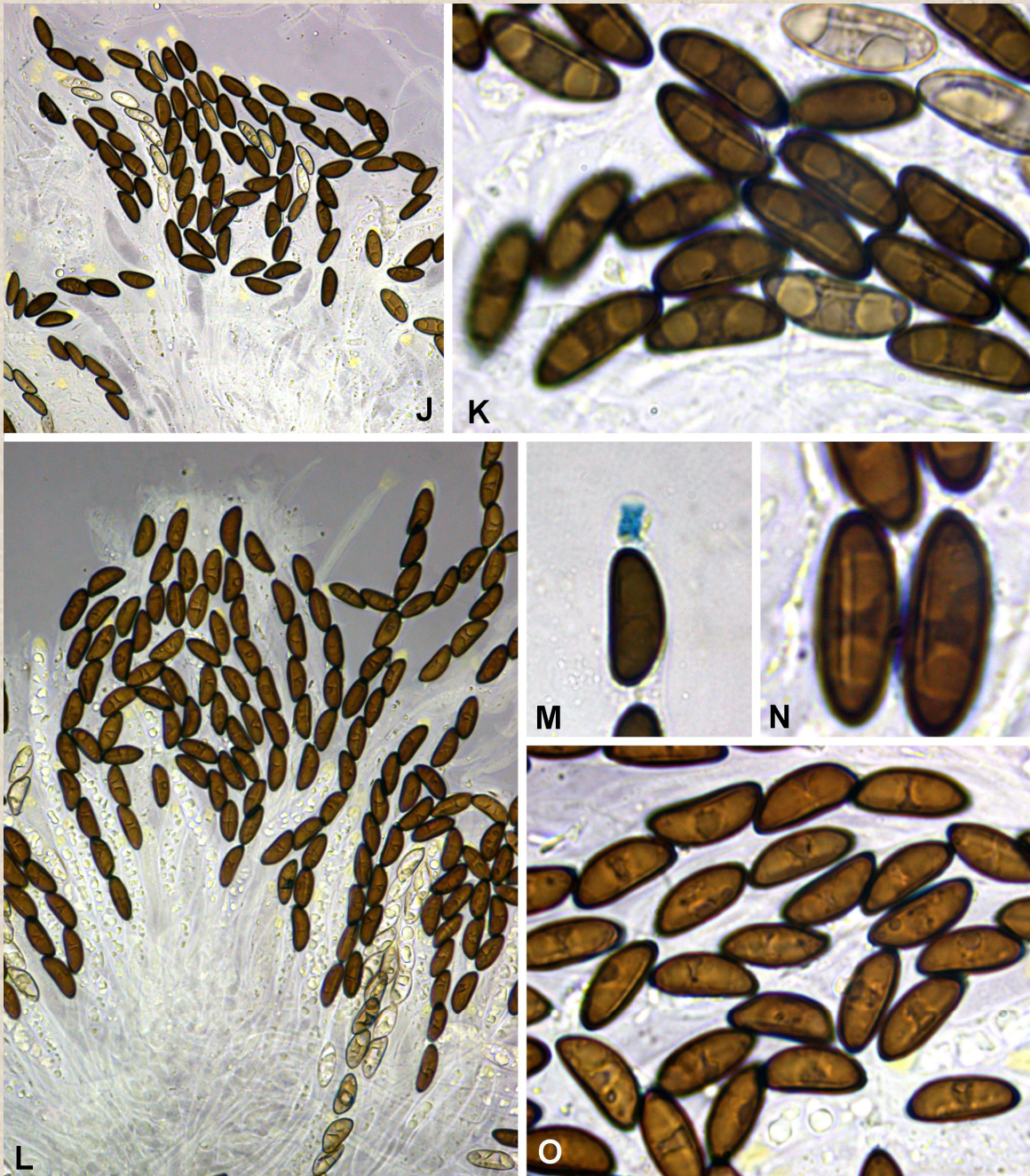


Xylaria arbuscula Sacc.

Germany: Brandenburg, Postdam, Botanical garden, ferns greenhouse, 29 Oct. 2009, on a branch of *Quercus* on the ground, leg. det. V. Kummer BRD 3544/33 (A-K, M, N); same location, on bamboo, 31 Jan. 2000, V. Kummer VK 2000 (L, O).

Stromata erect, scattered to gregarious, simple to ramified, 5-24 mm total height, the fertile head 3-11 mm high x 1.5-2.5 mm diam, cylindrical to slightly fusiform or flattened (A-D), hard-textured, with a pointed sterile apex, long-stipitate to nearly sessile, the stipes well-defined, 1-15 mm high black, glabrous to hairy. Stromatal surface silvery grey to blackish, without visible perithecial contours, roughened by persistent grey to dull black carbonaceous elongated plaques (E) and undulating lines furrowing the surface of the underlying stromatal crust; crust carbonaceous, 80-120 μ m thick, interior white, spongy, solid (G). **Perithecia** fully immersed, subglobose to obovoid, 0.4-0.5 mm diam (G). **Ostioles** hemispherical to discoid, inconspicuous, ca. 80 μ m diam.

Anamorphic stromata flattened, ramified at apex, yellowish grey (F). Cultures on YMG yielding zonate colonies with white felty mycelium overlain with brownish annular zone bearing anamorphic stromata (H, I)



Asci cylindrical (J, L), 8-spored, 150-180 μm total length, the spore-bearing parts 82-110 μm long x 7-8 μm broad, the stipes 64-72 μm long, with apical apparatus tubular with flared apex, 3-3.5 μm high x 2,3-2.5 μm broad, bluing in Melzer's reagent. Paraphyses filiform, copious.

Ascospores (12,0) 12,9 - 14,1 (14,9) x (4,9) 5,2 - 5,7 (5,9) μm ; Q = (2,1) 2,4 - 2,67 (2,7) ; N = 36 ; Me = 13,4 x 5,4 μm ; Qe = 2,5, ellipsoid-inequilateral with broadly to narrowly rounded ends, overlapping uniseriate in the ascus, medium to dark brown (olive brown when fresh), smooth, biguttulate, with a conspicuous straight germ slit 3/4 spore-length on the ventral side (K, N). Ascospores of the specimen on bamboo deviate in being smaller (10,0) 10,2 - 11,3 (11,7) x (4,0) 4,2 - 4,7 (4,8) μm ; Q = (2,1) 2,3 - 2,6 (2,7) ; N = 30 ; Me = 10,7 x 4,4 μm ; Qe = 2,4, with often more acute ends and paler brown wall (L, O).

Notes: Several collections from Postdam botanical garden greenhouses were examined. All appeared highly similar in macro and micro morphology, except a deviating specimen on bamboo. It is assumed that they possibly represent *Xylaria arbuscula* Sacc., the type of which was collected in such greenhouses in Italy. The stromata vary from typically branched to simple but all feature a similar carbonaceous crust with dull black plaques and furrowed surface, and very similar asci and ascospores. When compared with tropical collections from French West Indies, Taiwan and Thailand referred to *X. arbuscula* based on stromatal habit, ascospore dimensions and germ slit morphology, the material from Postdam appears slightly different in having a slightly thinner carbonaceous crust (80-120 vs 120-170 μm thick), slightly different external appearance of stromatal surface and germ slits of ascospores averaging slightly longer. *Xylaria arbuscula* as currently accepted appears as an unresolved complex of closely related taxa, mostly tropical, featuring variations in stromatal surface and ascospore morphology (JR 99). Among other putative synonyms, *X. mellisii* (Berk.) Cooke from St. Helena island might be an earlier synonym of *X. arbuscula*.

[BACK TO KEY](#)

[Close](#)

Xylaria arbuscula var. *plenofissura* Y. M. Ju & S.-S. Tzean

France, Manche : Héauville, ruisseau des Sablons, 19 Nov. 2005, on partly buried corticated branch of *Prunus spinosa*, CLF 05170, leg. C. Lécuru, det JF, conf. Y-M Ju

Stromata upright, simple, 7-16 mm total height, the fertile head 4-12 mm high x 1-2 mm diam, irregularly fusiform, with a mucronate sterile apex (A-C), the stipes well-defined, black, hairy, swollen at base. Stromatal surface black, nodulose with exposed perithecial contours, carbonaceous, with a persistent dull grey outer layer splitting into broad, elongated strips; carbonaceous crust 50-80 µm thick, interior whitish to tan, with a darker core (D). **Perithecia** immersed, subglobose, 0.5 mm diam. **Ostioles** rounded papillate ca. 80 µm diam.

Asci cylindrical, 4-8-spored, 200-220 µm total length, the spore-bearing parts 120-140 µm long x 8-8.5 µm broad, the stipes 70-90 µm long, with apical apparatus tubular to slightly urn-shaped, 4-4.2 µm high x 3-3.5 µm broad, bluing in Melzer's reagent (E). Paraphyses, copious, filiform.

Ascospores (17,8) 18,2 - 19,9 (21,0) x (6,1) 6,2 - 7,3 (7,8) µm ; Q = (2,5) 2,6 - 3,1 (3,5) ; N = 36 ; Me = 19,0 x 6,8 µm ; Qe = 2,8, ellipsoid slightly inequilateral with narrowly rounded ends (F), uniseriate in the ascus, medium brown, smooth, with a conspicuous straight to sometimes slightly sinuous and/or oblique germ slit almost spore-length (G), usually on the flattened side, infrequently on the convex side.

Notes: This unexpected find deviates from typical material from Taiwan (JT 85) in having stunted stromata and many 4-spored asci probably accounting for ascospores averaging a bit larger, but the identification was confirmed by Yu-Ming Ju based on overall morphology and characters of cultures. It is noteworthy that the typically long and slightly oblique to sinuous germ slit occurs fairly frequently on the most convex side of ascospores in all observed collections, regardless of their geographical origin. *Xylaria arbuscula* var. *plenofissura*, initially described from Taiwan, has been collected in Martinique, Canary Islands and northwestern France. Collections under *X. juniperus* Starb. var. *asperula* Starb. from South America and Mexico represent the same taxon. It belongs to the *X. arbuscula* Sacc. complex because of its small narrowly fusiform apiculate stromata with a carbonaceous crust and large grey to tan plaques or strips on surface and filiform often hairy stipes. The species belonging to this complex are tentatively distinguished based on ascospore size and morphology of the germ slit, along with characters of cultures.



A



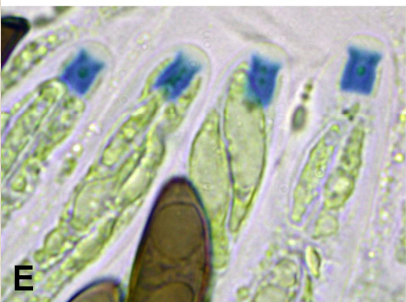
B



C



D



E



F



G

[BACK TO KEY](#)

[Close](#)

Xylaria bulbosa (Pers.: Fr.) Berk. & Broome

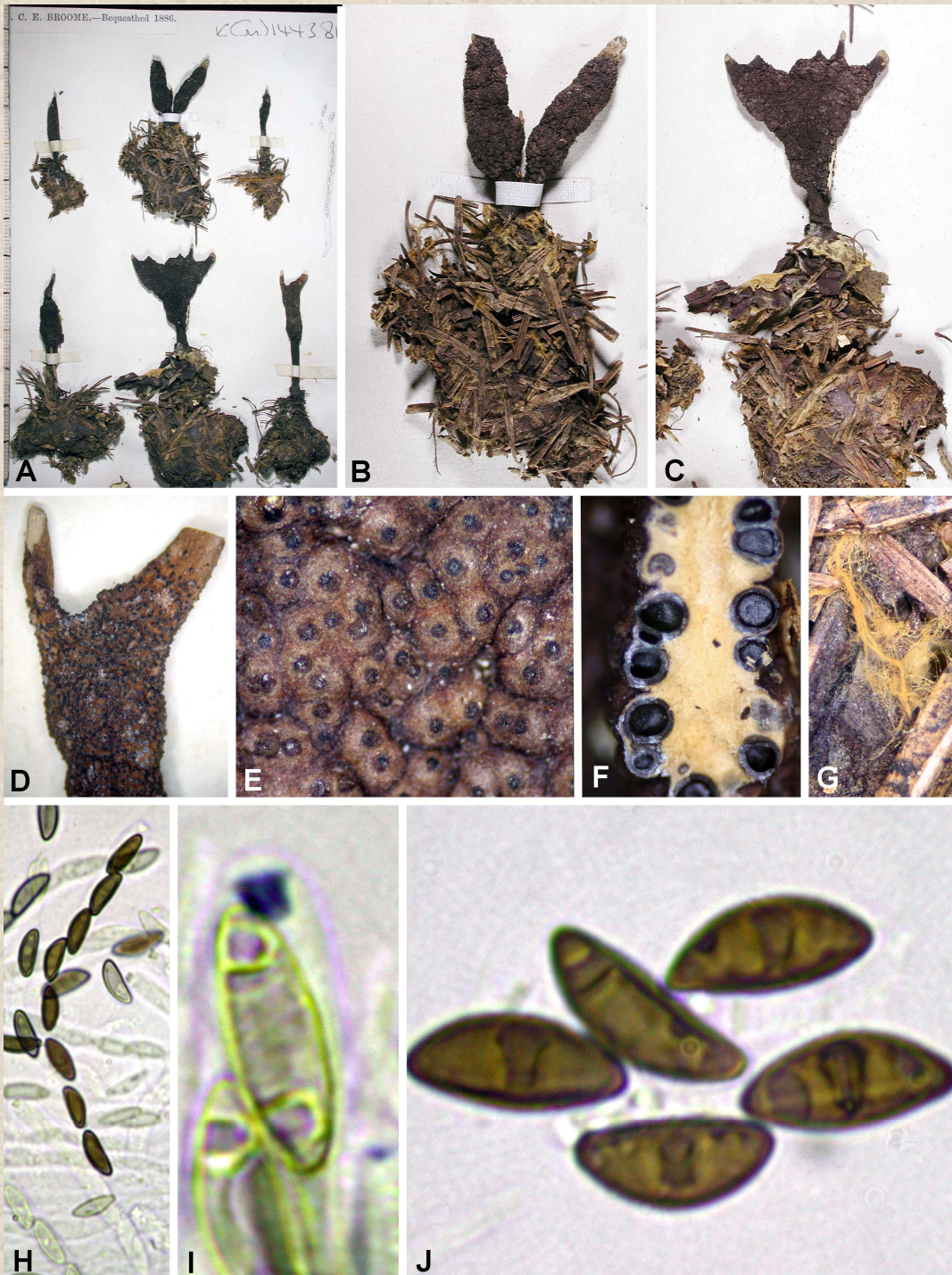
England, North Wiltshire, Lucknam, on wood?, 10 Oct. 1859, C. E. Broome, K(M) 144381

Stromata upright, 23-36 mm total height, short-stipitate, arising singly or fasciculate from a bulbous base (A-C) composed of debris of coniferous litter aggregated by curry-yellow mycelium (G); fertile parts narrowly fusiform to spatulate-ramified, 11-22 mm high x 3-20 mm broad, with yellowish mucronate sterile apices; the stipes well-defined, 6-16 mm high, dark reddish brown, puckered, downy, slightly swollen and felty at base. Stromatal surface orange brown to brown, strongly nodulose, with wrinkles isolating small groups of perithecia, slightly downy, lacking a peeling outer layer, with a very thin outer crust (E); interior fairly dense yellow, solid, cheesy (F). **Perithecia** immersed to half-exposed, subglobose 0.4-0.5 mm diam (F). **Ostioles** papillate, black (E).

Asci cylindrical (H), rarely intact, short-stipitate, with eight uniseriate ascospores, with apical apparatus cuboid with flared apex, 1.7-2 μ m high x 1.7-2 μ m broad, bluing in Melzer's reagent (I).

Ascospores (10,8) 11,4 - 13,1 (13,3) x (4,3) 4,6 - 5,37 (5,4) μ m ; Q = 2,2 - 2,9 (3,0) ; N = 23; Me = 12,1 x 5,0 μ m ; Qe = 2,5, ellipsoid-inequilateral with narrowly rounded ends, golden brown to medium brown, smooth, with a conspicuous straight germ slit almost spore-length (J); cellular appendages not seen.

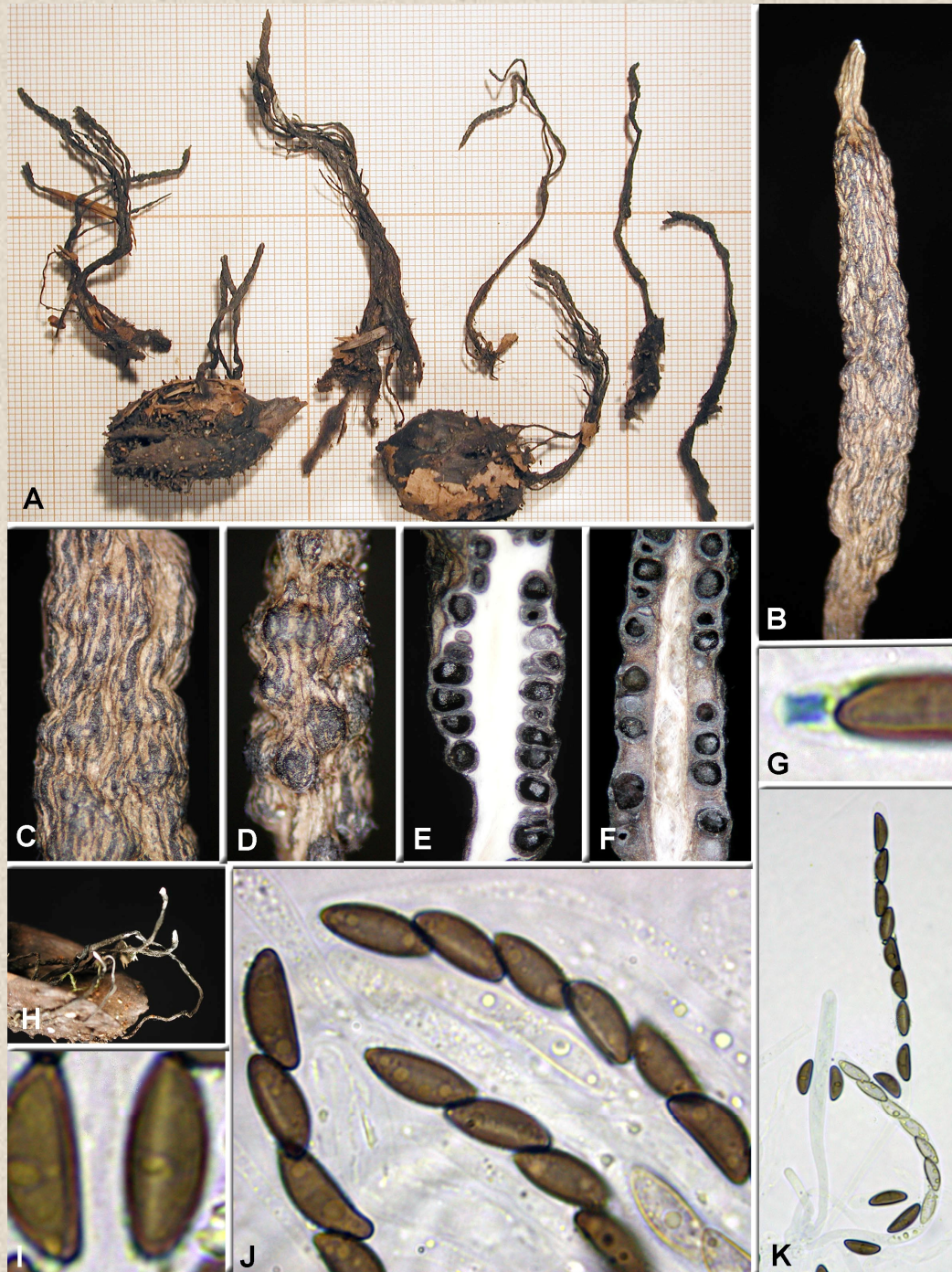
Notes: *Xylaria bulbosa* is very distinctive by its orange brown stromata that arise from from a bulbous sclerotial base composed of debris of coniferous litter aggregated with yellow mycelium. Its stromata are likewise remarkable in having a very thin outer crust, a strongly nodulose surface that lacks a peeling outer layer and possess a yellow interior. Microscopically the golden brown ascospores with a fairly long germ slit are less diagnostic. According to Læssøe (1992) this species is only known from Germany, England, Denmark and France and has not been recorded since the 19th century. Furthermore, Læssøe (1993) stated that *X. bulbosa* sensu Rogers (1983, R 83) was different from his concept based on European collections and would rather belong to the *X. polymorpha* group.



[BACK TO KEY](#)

[Close](#)

Xylaria carpophila (Pers.: Fr.) Fr.



France, Ariège: Caussou, Caussou brook, 740 m, on dead cupules of *Fagus sylvatica*, 14 May 2004, **JF 04099** (H, immature). Prat-Communal, Loumet, 980m, riparian forest, on dead cupules of *Fagus sylvatica*, 22 Aug. 2002, **JF 02145** (A-G, I-K).

Stromata (A, B) narrowly fusiform, upright, simple to rarely furcate on top, 15-70 mm total height, the fertile heads 3-18 mm high x 0.8-2 mm diam, straight to contorted, with mucronate fertile apices; the stipes well-defined, 8-55 mm high, sinuous, dark brown to black, puckered, glabrous to densely tomentose, swollen at base, often many stipes fused into a common tomentose stalk (A). Stromatal surface nodulose with perithecia partly immersed to strongly exposed (C, D); outer crust black, leathery, ca 20 μm thick, externally roughened by minute black granules, coated by a brownish grey outer layer splitting into elongated strips, long persistent (C, D); interior white, solid, spongy (E), becoming brown around the perithecia with a loosely fibrous core white in age (F). **Perithecia** subglobose to laterally flattened when crowded, 0.35-0.45 mm diam.

Ostioles conic-papillate, black, inconspicuous.

Anamorphic stromata (H) filiform, contorted, black with white apices, conidia white in mass.

Asci (K) cylindrical with eight slightly overlapping uniseriate ascospores, 130-145 μm total length, the spore-bearing parts 80-90 μm long x 6-7 μm broad, the stipes 55-60 μm long, with apical apparatus tubular, 2-2.5 μm high x 1.7-2 μm broad, bluing in Melzer's reagent (G). Paraphyses copious, embedded in mucilage.

Ascospores (I, J) (10,2) 10,5 - 12,2 (12,8) x (3,8) 4,2 - 4,8 (5,1) μm ; Q = (2,2) 2,3 - 2,7 (3,0); N = 41; Me = 11,3 x 4,5 μm ; Qe = 2,5, fusiform-inequilateral with narrowly rounded ends, yellowish brown, smooth, with a conspicuous straight germ slit 4/5 to spore-length on the flattened side, without sheath or appendages visible in India ink.

Notes: *Xylaria carpophila* is characterized by small filiform stromata with acute sterile apices and nodulose black surface with a contrasting brownish grey fibrous outer layer split into elongated microscopically, it is distinctive in having pale brown ascospores with narrowly rounded ends devoid of mucilaginous appendages.

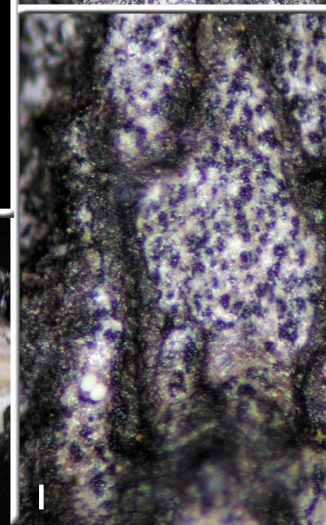
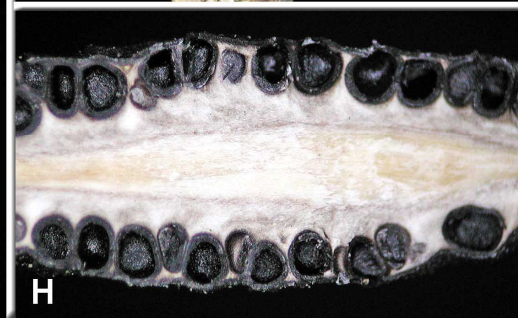
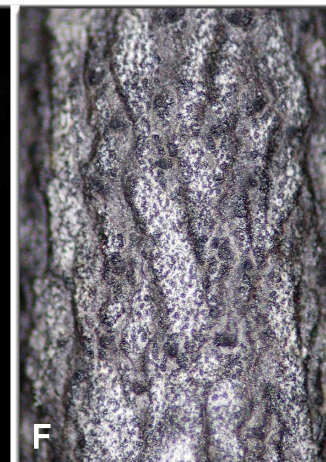
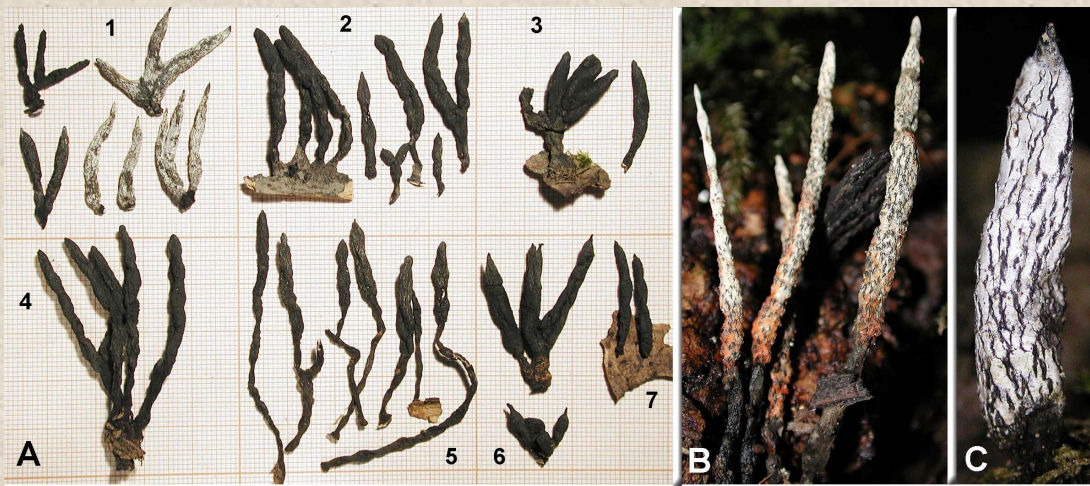
It is likewise very distinctive in occurring exclusively on the woody cupules of *Fagus* sp. buried in the litter. The conidial state occurs in spring, while ascigerous stromata ripen at the end of summer and in autumn, usually originating from cupules deeply buried in the leaf litter.

Distribution: Europe, North America (R 79), Japan (YS 72).

[BACK TO KEY](#)

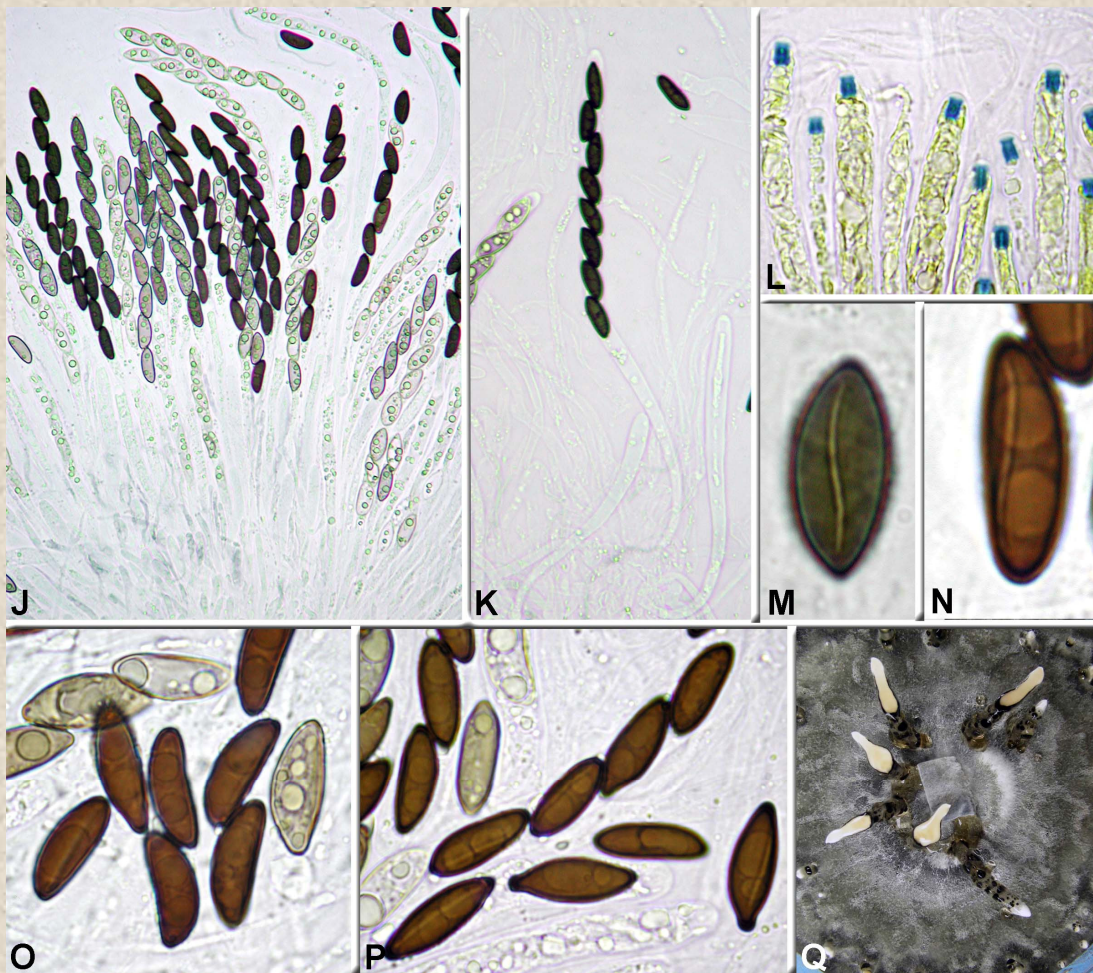
[Close](#)

Xylaria cinerea J. Fourn. & M. Stadler



Spain: Tenerife Province, Isla de La Palma, , Los Tiles near Casa Demetrio Restaurant, on fence post (cf. *Laurus*), 21 Dec. 2004, **STMA 05036** (A1, C) ; **France**, Pyrénées Atlantiques: Auterive, Island of Gave d'Oloron, on blackened dead wood of *Fraxinus excelsior*, 30 May 2004, **JF 04105** (A2, F, H, I-P) (holotype) ; Saint Pée sur Nivelle, Zirikolatz, 60m, on dead trunk of *Quercus* across a brook, 19 Mar. 2008, **JF 08041** (A3, D, G) ; Manche, Vauville, Vallée du Petit Doué, moor, on dead branch of *Ulex*, 7 May 2007, leg. M. Basley Gallis, **JF 07046** (A4, E) ; Charente Maritime, Ile de Ré, Saint Martin en Ré, Les Salières, 10m, coastal forest, on a branch of *Q. ilex* buried in the leaf litter, 28 Apr. 2004, leg M. Fournier, **JF 04050** (A5) ; Côtes du Nord (Brittany), Ploumilliau, Kertanguy, dead trunk across a brook, 13 Feb. 2007, leg M. Fournier, **JF 07021** (A6) ; Ariège, Rimont, Las Muros, 470 m, on a corticated log of *Fraxinus excelsior*, 16 Dec. 2004, **JF 04259** (A7) ; same location, 16 Jun. 2009, **JF 09149** (B) ; same location, on a corticated branch of *Quercus ilex* collected in Finistère by J. Mornand, incubated outdoors, 25 Aug. 2008, **JF 08173** (Q).

Stromata (A-E, G) upright, solitary to cespitose, at times occurring in bunches on short to long stipes, simple to branched, 8-95 mm total height, nearly sessile to long-stipitate; fertile parts 5-30 mm high x 2-5 mm broad, narrowly fusiform to cylindrical with narrowly rounded to mucronate sterile apices, often somewhat flattened, at times nodulose with circular or longitudinal wrinkles, more rarely furcate; stipes 2-70 mm high x 1.5-3 mm broad, simple to branched, often ill-defined, black, smooth, with a swollen finely tomentose base. Surface first smooth in young stromata, consisting of a white to cream-coloured, fibrous outer layer, at times with orange marks (B), splitting longitudinally into broad strips (B, C), progressively worn off; mature stromata black with a cinereous tinge due to persistent whitish areas covered in minute shiny black granulations (F, I). Outer stromatal crust 40-50 μm thick, leathery, interior solid, spongy, white to cream-coloured with a slightly darker core at maturity (H). **Perithecia** immersed to faintly exposed, subglobose 500-600 μm diam to laterally flattened 600-700 μm high x 400-450 μm diam. **Ostioles** faintly to coarsely papillate, bluntly conical, black, 120-170 μm diam, opening between the white plaques. **Asci** (J, K) cylindrical, 8-spored, 160-185 μm total length, the spore-bearing parts 95-115 μm long x 8.5-9.5 μm broad, the stipes 60-75 μm long, with apical apparatus bluing in Melzer's reagent (L), rectangular to urn-shaped, 3.5-4 μm high x 2.5-3 μm broad. **Ascospores** (M-P) (13,6) 13,9 - 16,9 (17,8) x (5,6) 5,9 - 7,0 (7,2) μm ; Q = (2,0) 2,1 - 2,6 (3,0) ; N = 40 ; Me = 15,4 x 6,4 μm ; Qe = 2,4, uniseriate but overlapping in the ascus, ellipsoid-inequilateral with narrowly to broadly rounded ends, one end slightly pinched, the opposite more rounded, with a



persistent but inconspicuous hyaline cellular appendage visible at one or both ends, brown, smooth, biguttulate, with a parallel to long axis to slightly diagonal, straight to slightly sinuous germ slit 2/3-4/5 spore-length on the less convex side. Aberrant ascospores with beaked ends, citriform or pyriform frequently occur, that were not taken into account for measurements.

Colonies on OA (Q) covering a 9 cm plate in 7-12 days, at first white, velvety, zonate, soon becoming grey and finally darkening to blackish brown, but regularly developing a secondary, aerial mycelium, which collapses when becoming melanised, resulting in the surface being covered with white patches. Stromata arising after one week of incubation, cylindrical, unbranched, up to 3 cm high x 2 mm diam, bearing the anamorph.

Notes: Based on a number of collections from various localities (A), this fungus illustrates well how much the stromatal macromorphology of *Xylaria* spp. is often misleading. The current species may produce stunted cespitose to long-stipitate candle-shaped stromata, but some key features make it readily distinguishable from similar taxa. *Xylaria cinerea* is readily set apart from other European species based on the combination of the presence of minute black granules on white background on the stromatal surface and fairly large ascospores with an often oblique to sinuous long germ slit.

Distribution : France, Spain, UK.

Additional information available in FS 11

[BACK TO KEY](#)

[Close](#)

Xylaria corniformis (Fr.) Fr.

France, Côte d'Or, St Léger-Tricy, local forest, corticated branch of *Carpinus betulus*, 01 Oct. 2011, Alain Gardiennet, AG 11170 ((A-K).

Czech Republic, on *Fagus sylvatica*, 17 Aug. 1994, Miroslav Beran, communicated by A. Gardiennet, JF 11006 (L-R).

Stromata (A-C) clavate, broadly fusiform or irregularly spatulate, simple, 28-56 mm total height, the fertile heads 21-42 mm high x 10-33 mm broad, with broadly rounded fertile apices; the stipes ill-defined, 7-20 mm high, dark brown, puckered, bulbous and tomentose at base. Stromatal surface wrinkled, dark brown, with a reddish brown outer layer cracked into small persistent scales (E); black crust leathery, 20-30 μm thick; interior white, solid, spongy, greyish brown between perithecia (D).

Perithecia immersed, subglobose to obovoid, 0.4-0.5 mm diam (D).

Ostioles papillate, raised-discoid, black, 100-120 μm diam (E).

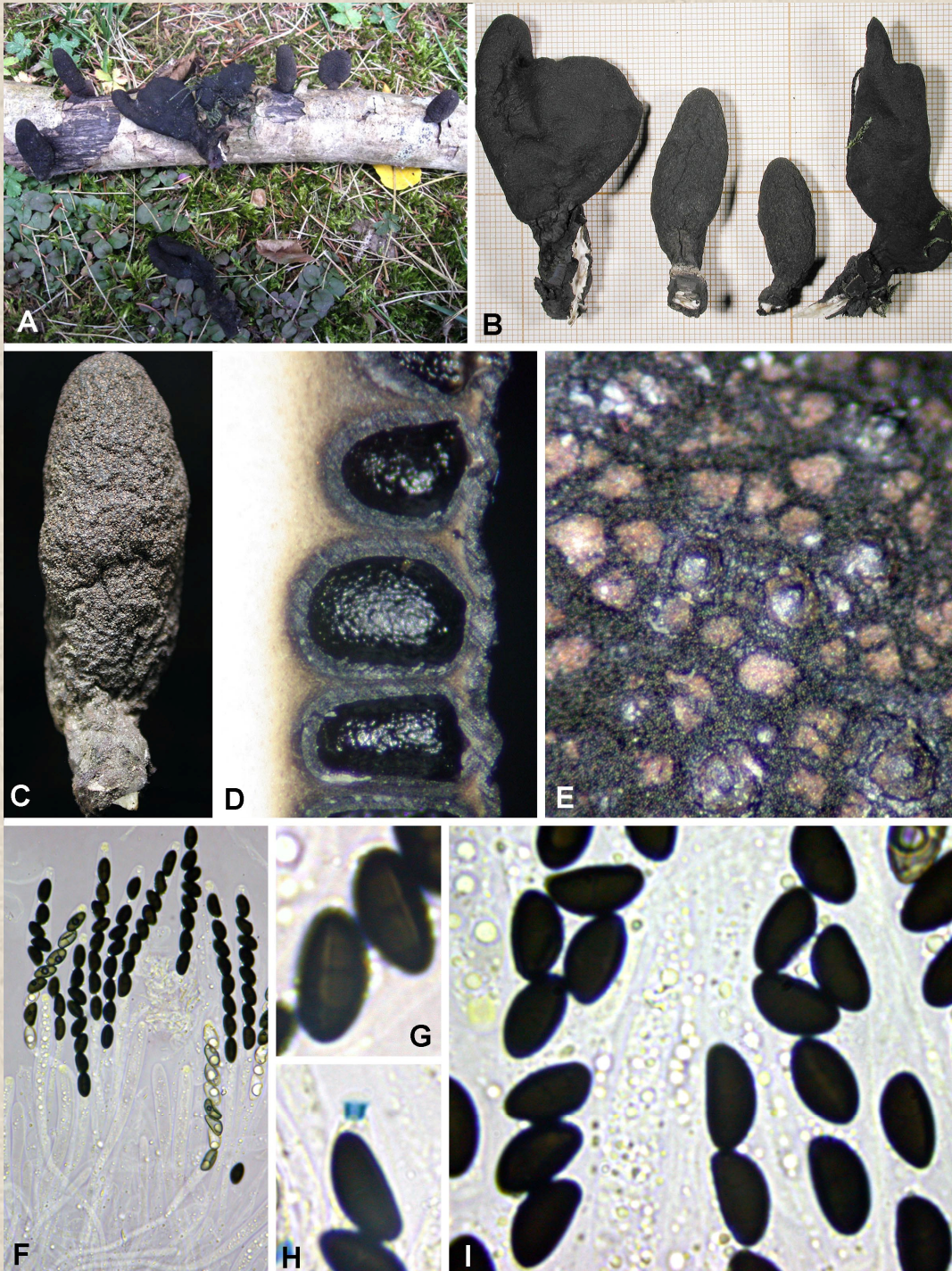
Asci cylindrical (F), 8-spored, 140-160 μm total length, the spore-bearing parts 63-70 μm long x 6-7 μm broad, the stipes 80-100 μm long, with apical apparatus cuboid to wedge-shaped, 1,8 μm high x 1,8-2 μm broad, bluing in Melzer's reagent (H), at times very faintly. Paraphyses up to 8.5 μm broad at base, tapering above.

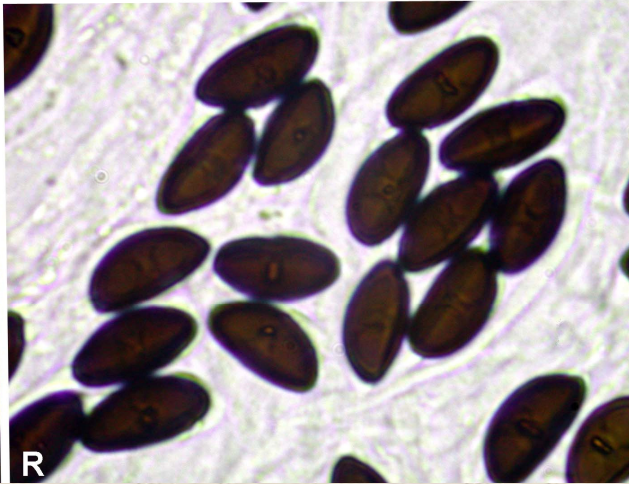
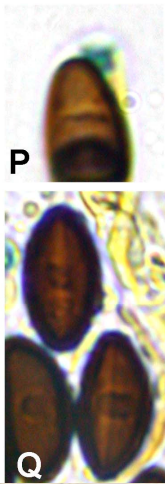
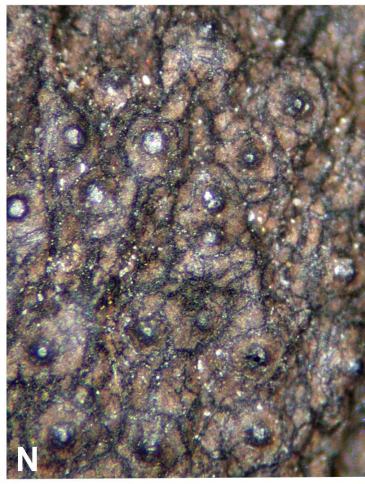
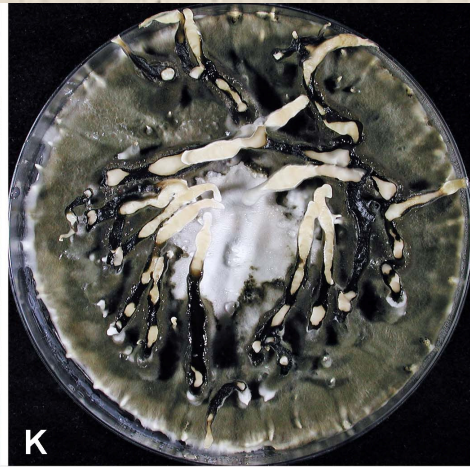
Ascospores (7,2) 8,0 - 8,6 (9,7) x (3,7) 4,4 - 5,2 (5,4) μm ; Q = (1,6) 1,64 - 1,9 (2,4); N = 30; Me = 8,4 x 4,7 μm ; Qe = 1,8, ellipsoid-inequilateral with broadly rounded ends, blackish brown (I), with a very inconspicuous germ slit on the flattened side (G), spore-length to shorter, best seen on immature ascospores or after mounting in PVA.

Colonies on OA forming a white felty mycelium overlain with a blackish green annular zone bearing anamorphic stromata (J, 25 days, K, 55 days).

Notes: This collection appears to be the typical *X. corniformis* ss Læssøe (L87). The external appearance makes it very difficult to distinguish in the field from other members of the *X. polymorpha* group, from which it is however easily separated based on ascospore morphology.

When describing *X. primorskensis* from China and Russia, Ju et al. (JHVA 09) proposed a concept of *X. corniformis* slightly different from that of Læssøe in regarding the collections with stromata with broadly rounded apices and blackish brown ascospores as *X. corniformis* var. *obovata* Cooke & Ellis, while the true *X. corniformis* has less robust stromata with pointed





apices and paler brown ascospores. However they refrained to take a formal decision until more material is available.

According to this concept, the collection from Czech Republic illustrated below (L-R) might represent the true *X. corniformis* because of its differently shaped stromata and slightly paler ascospores (R)(8,1) 8,8 - 9,8 (10,0) x (4,4) 4,5 - 5,0 (5,4) μm ; Q = (1,7) 1,8 - 2,1 (2,2) ; N = 36 ; Me = 9,2 x 4,8 μm ; Qe = 1,9, with more conspicuous germ slits (Q).

The type species of *X. corniformis* is from Sweden and a similar collection from Poland was reported by Læssøe (L 87). The type of *X. corniformis* var. *obovata* is from USA and the material reported from Poland by Læssøe as *X. corniformis* (L 87) might fit the variety *obovata*. We have examined similar material from Sweden and from France (Meurthe et Moselle and Pyrénées Atlantiques).

[BACK TO KEY](#)

[Close](#)

Xylaria crozonensis Leroy & Mornand

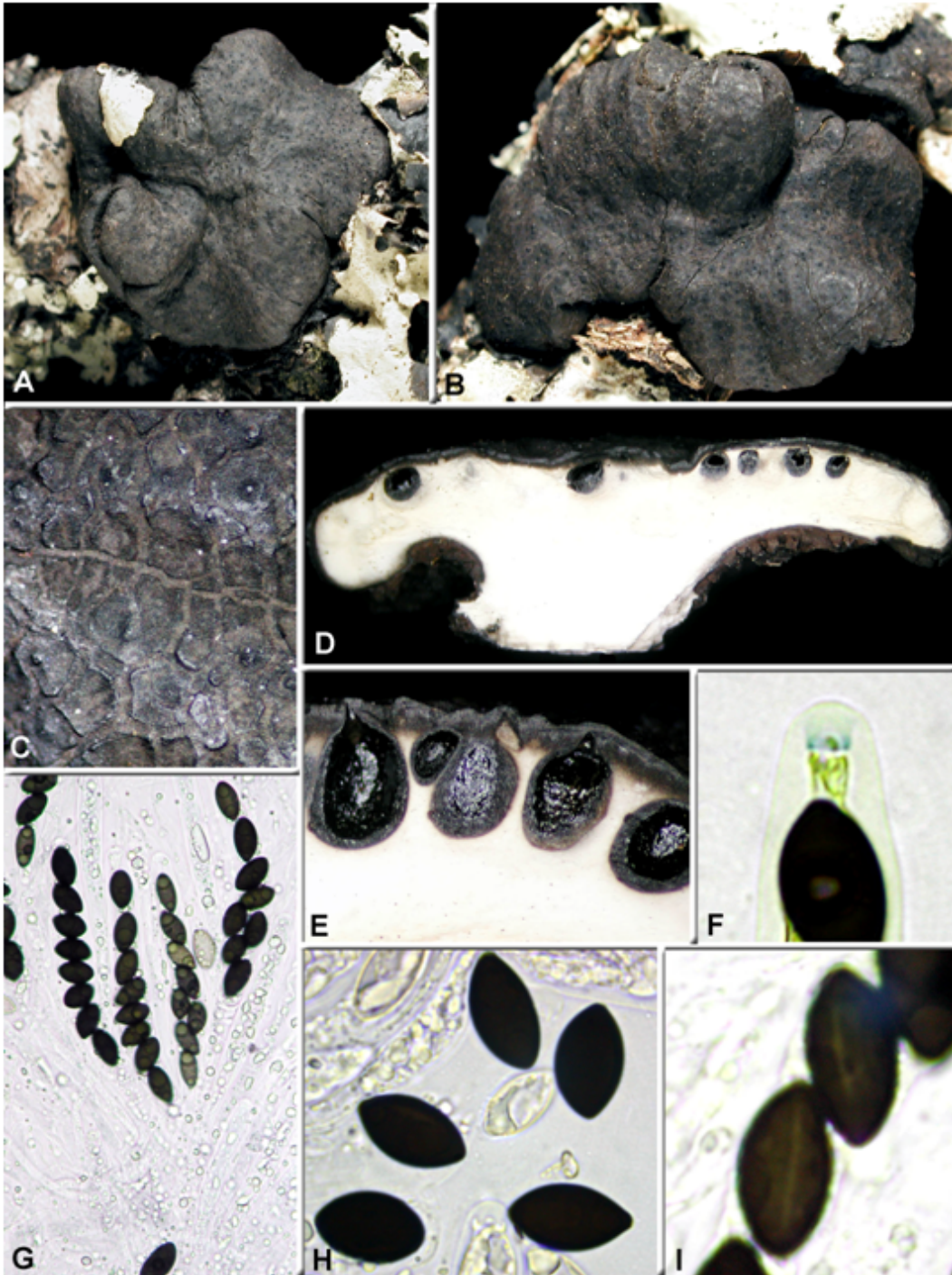
France : Finistère, Lanvéoc, Kerguéron, on a small fallen corticated branch of *Quercus petraea*, Aug. 2000, J. Mornand, **PL 01033A**.

Stromata (A, B) erumpent through the bark singly or in groups of 2-3, peltate, fertile part flattened to undulate, often shrivelled, 6-20 mm diam x 1.5-2 mm thick, on a stout to narrow central to eccentric stipe (D); surface dull black, reticulately cracked (C), without visible perithecial contours, hard-textured, with a carbonaceous crust 80-100 μm thick (E); underside brownish black, deeply cracked into small warts; interior white, brownish grey just beneath the crust, spongy, solid (D, E). **Perithecia** obovoid to subglobose, 0.5-0.8 mm diam (E). **Ostioles** faintly papillate, conic, black (C). **Asci** (G) cylindrical, 230-260 μm total length, the spore-bearing parts 90-110 μm long x 10-13 μm broad, the stipes 120-160 μm long, with eight uniseriate slightly overlapping ascospores, with subapical apparatus (F) crown-like, bipartite, with only the base 0.8 μm high x 2.5-3 μm broad faintly bluing in Melzer's reagent. Paraphyses filiform, copious, with oily guttules.

Ascospores (H) (12,9) 13,3 - 15,6 (16,4) x (7,5) 7,6 - 8,8 (9,2) μm ; Q = (1,5) 1,6 - 2,0 (2,2) ; N = 32 ; Me = 14,6 x 8,2 μm ; Qe = 1,8, broadly ellipsoid with narrowly rounded to acute or slightly apiculate ends, often citriform, blackish brown, with straight inconspicuous germ slit 2/3 to 3/4 spore-length (I), without sheath or appendages visible in India ink.

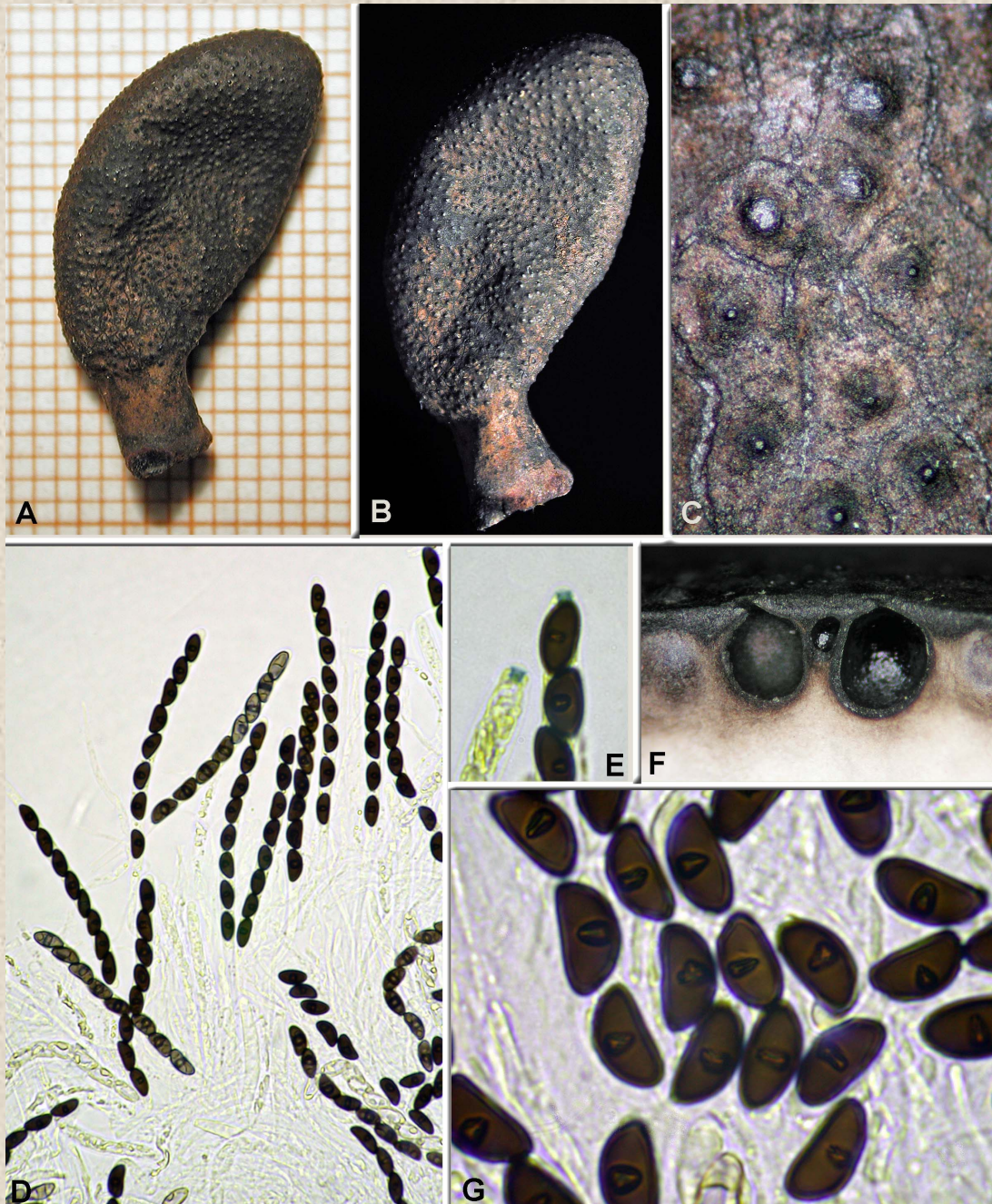
Notes : *Xylaria crozonensis* resembles the pantropical *X. enteroleuca* (Speg.) P. Martin (= *X. berteri* (Mont.)Cooke?) in stromatal habit and anatomy and blackish brown equilateral ascospores with a faint germ slit less than spore length; moreover, the two taxa feature very similar ascal apical apparatus the base of which only stains in iodine. This new taxon was erected based on occurrence in temperate location and larger ascospores. In addition, a thorough comparison with specimens of *X. enteroleuca* shows that the carbonaceous crust of *X. crozonensis* is slightly thinner and that its ascospores have more acute ends.

Xylaria crozonensis was so far only known from one station in a woodland close to the seaside at the westernmost end of Brittany, an area known to have very mild winters and humid climatic conditions, in which tropical or subtropical taxa have already been recorded (LM 04). Interestingly a recent collection of typical material from Cornwall made by Pauline Penna on *Quercus* and possibly on *Betula pubescens* in a similar environment was recently forwarded by Peter Thomson (UK).



[BACK TO KEY](#)

[Close](#)



***Xylaria cubensis* (Mont.) Fr.**

Germany : Rheinland-Pfalz, Trippstadt, Karlstal, May 2004, on *Fagus sylvatica*, STMA04W33, leg M. Stadler, det JF.

Stroma ellipsoid flattened with broadly rounded fertile apex, simple (A, B), 20 mm total height x 9 mm broad, the stipe well-defined, 4 mm high, smooth, glabrous, carbonaceous, brown, enlarged at base. Stromatal surface brownish black (C), finely reticulate to smooth, hard-textured; stromatal crust black, carbonaceous, 120-170 μm thick (F); interior spongy, grey brown beneath surface, whitish below, solid. **Perithecia** immersed, subglobose, 0.6-0.75 mm diam. **Ostioles** dome-shaped with a central papilla, black, 170-200 μm diam.

Asci cylindrical (D), 8-spored, long-stipitate, the spore-bearing parts 75-80 μm long x 6 μm broad, the stipes 80-110 μm long, with apical apparatus inverted hat-shaped, 1.7-2 μm high x 1.7 μm broad, bluing in Melzer's reagent (E).

Ascospores (8,5) 8,6 - 10,2 (10,7) x (4,3) 4,4 - 4,9 (5,1) μm ; Q = (1,7) 1,8 - 2,2 (2,3) ; N = 32 ; Me = 9,3 x 4,7 μm ; Qe = 2,0, uniseriate in the ascus, ellipsoid-inequilateral with narrowly to broadly rounded ends, blackish brown, smooth, with a very inconspicuous, blurred straight germ slit less than spore-length.

Notes: *Xylaria cubensis* is a pantropical taxon, well characterized by its clavate stromata varying from copper brown to blackish, hard-textured, with a faint reticulate pattern of cracking on surface and rounded papillate ostioles; microscopically, its small blackish brown ascospores without or hardly visible germ slit are diagnostic. Besides its occurrence in tropical regions, *X. cubensis* is likewise known from temperate North America (R 84b)) and from Russian Far East (H10), but this record from Germany is likely to be the first for Western Europe.

Xylaria cubensis might be confused in the field with species related to *X. polymorpha* like *X. corniformis*. It clearly differs from members of this group by its thick carbonaceous crust and by the absence of corky scales on surface.

Xylaria delitschii Auersw.

Germany: southern Saxony-Anhalt, Müchelholz, east of Albersroda, 190 m above sea level, on dead seeds of *Carpinus betulus* buried in sandy soil, 08.Nov.2009, **JF 09345**, leg det Peter Rönsch.; same location, Sept. 2004, **JF 04253**. Photos B, C: P. Rönsch.

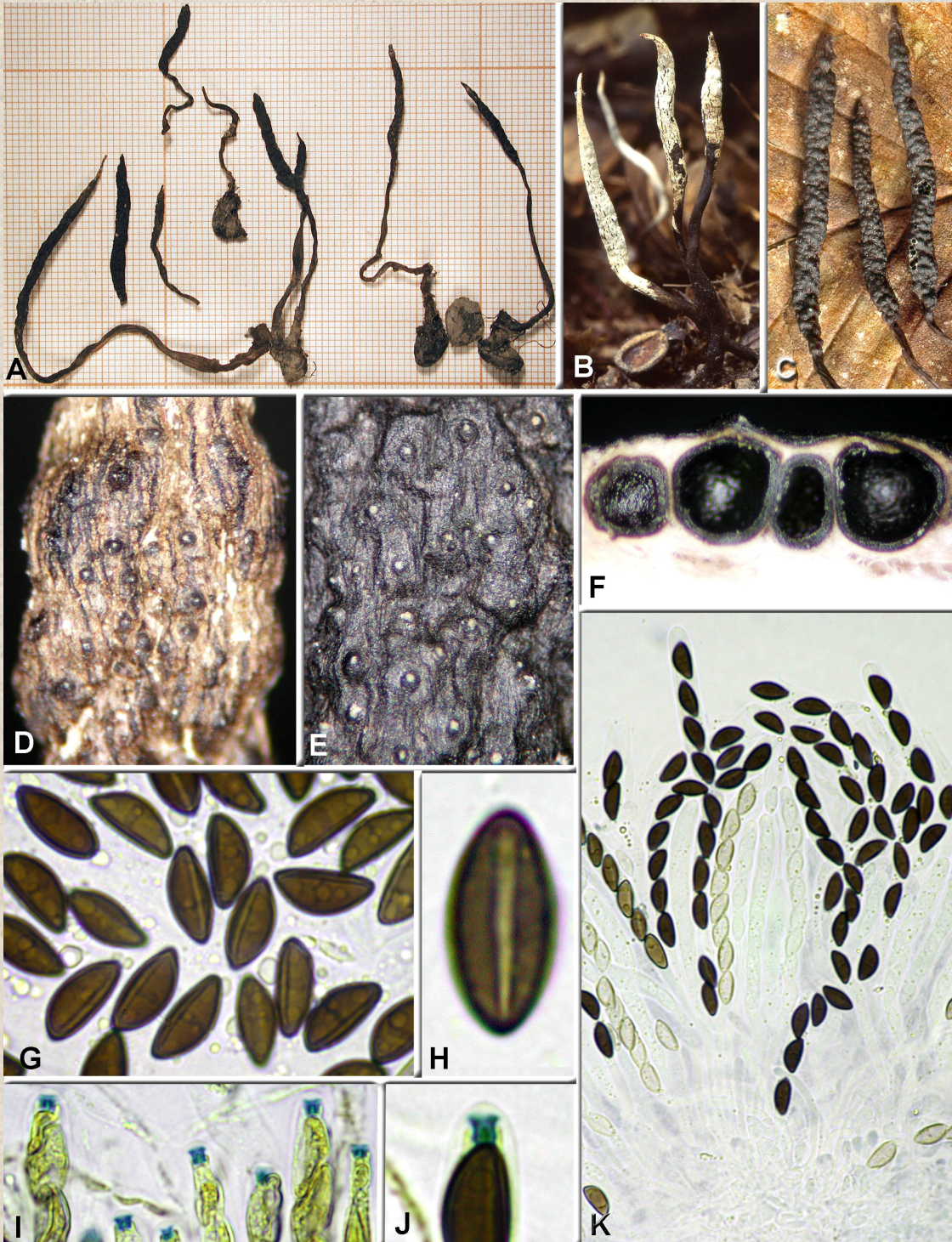
Stromata (A, C) upright, arising from buried seeds of *Carpinus*, simple, 37-75 mm total height, the fertile heads 11-30 mm high x 0.8-3 mm diam, narrowly fusiform, straight to contorted, terete to flattened, with mucronate to filiform sterile apices; the stipes well-defined, 22-40 mm high, filiform to strap-like, often broken, sinuous, black, puckered, glabrous, finely downy with golden brown hairs towards the slightly swollen base. Stromatal surface strongly nodulose with perithecia partly immersed to strongly exposed; outer crust black, leathery, ca 20 µm thick, coated by a pale greyish brown fibrous outer layer (D) splitting into elongated narrow strips, disappearing at full maturity (E); interior white, solid, spongy (F). **Perithecia** subglobose 0.45-0.6 mm diam, at times laterally flattened by mutual pressure (F). **Ostioles** rounded-papillate, black, 80-100 µm diam (E).

Anamorphic stromata (B) occurring mostly in June and July, narrowly fusiform, white with somewhat orange tips, white anamorphic layer peeling off gradually, revealing the underlying greyish brown layer.

Asci (K) cylindrical with eight slightly overlapping uniseriate ascospores, 140-170 µm total length, the spore-bearing parts 80-95 µm long x 7.5-8.5 µm broad, the stipes 55-80 µm long, with apical apparatus cuboid, 2-2.5 µm high x 2 µm broad, bluing in Melzer's reagent (I, J). Paraphyses copious, embedded in mucilage.

Ascospores (G) (9,5) 10,4 - 11,9 (12,8) x (4,3) 4,6 - 5,2 (5,3) µm ; Q = (1,9) 2,0 - 2,4 (2,7) ; N = 45 ; Me = 11,0 x 4,9 µm ; Qe = 2,2, ellipsoid-inequilateral with both ends narrowly rounded to acute, dark brown, smooth, with a conspicuous straight germ slit spore-length on the flattened side (H), without sheath or appendages visible in India ink. (10,3) 10,4 - 11,9 (12,5) x (4,3) 4,6 - 5,4 (5,5) µm ; Q = (1,9) 2,1 - 2,4 (2,8) ; N = 40 ; Me = 11,2 x 5,0 µm ; Qe = 2,2 (**JF 04253**)

Notes: until its recent rediscovery by Peter Rönsch in northern Germany (RRRO 10), *Xylaria delitschii* was only known from Auerswald's

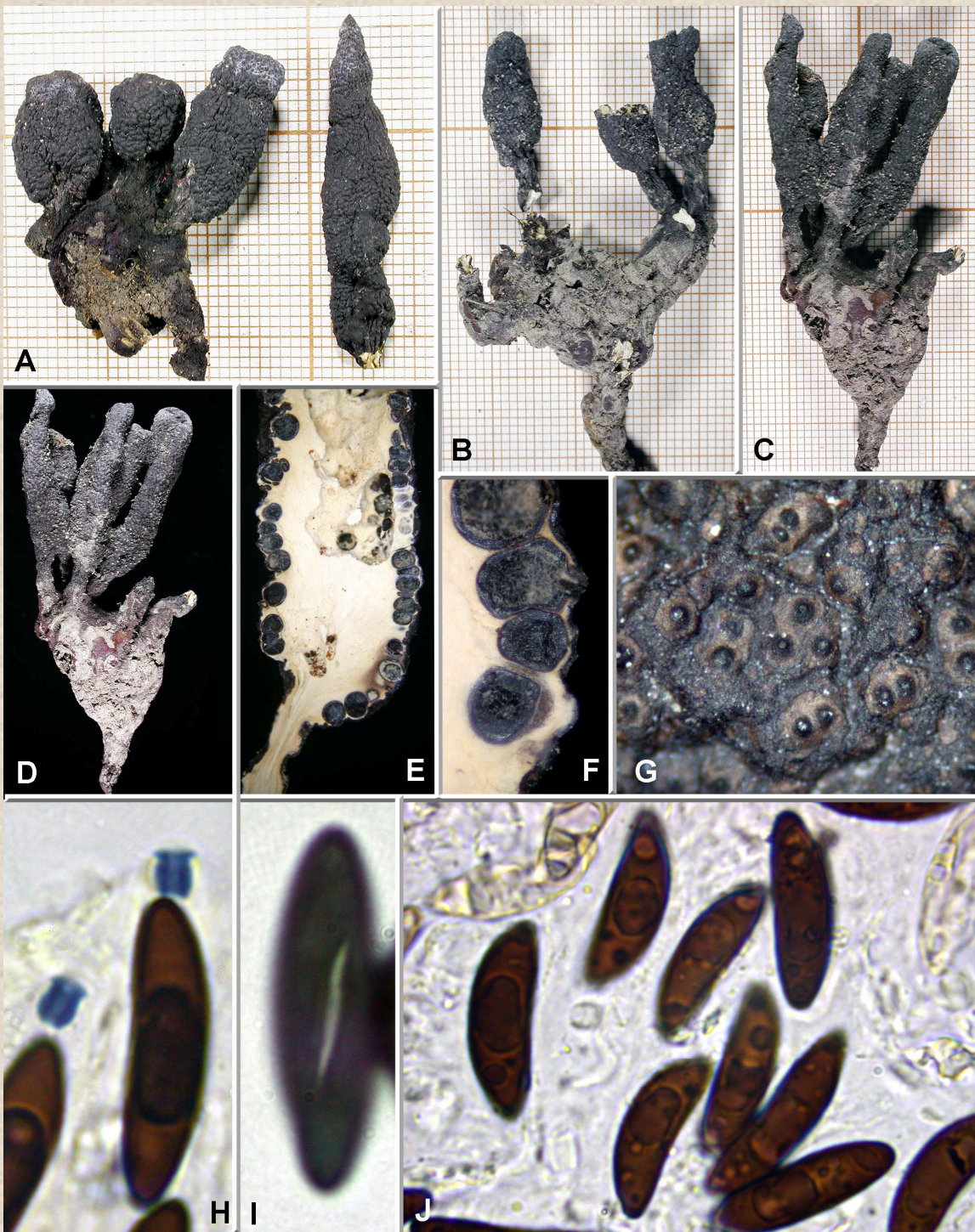


collection of immature stromata at conidial state, shortly described by Migula (1913). Aside from its occurrence on *Carpinus* seeds instead of *Crataegus* seeds it cannot be clearly distinguished from *X. oxyacanthae* based on morphological traits. However, Rönsch and co-workers, comparing the growth of both species on sterilized seeds of *Carpinus* observed a better growth of *X. delitschii*. As a comparison of ITS DNA sequences of both species showed significant divergences, they concluded that *X. delitschii* deserves a separate status. See discussion in *X. oxyacanthae* for other finds on buried seeds of deciduous trees.

Distribution: Northern Germany.

[BACK TO KEY](#)

[Close](#)



***Xylaria digitata* (L. : Fr.) Grev.**

England, Shropshire, Shrewsbury, on wood, 1846, W. A. Leighton, det R. W. G. Dennis, **K(M) 144396**.

Stromata upright, short-stipitate, arising usually fasciculate from a common base covered by purplish tomentum, attenuated downwards into a rooting extension (A-D); fertile parts varying from cylindro-clavate to fusiform, terete to flattened, simple to branching from above the stipe, 12-26 mm high x 5-10 mm broad, with broadly rounded or acute fertile apices; the stipes usually well-defined, 4-10 mm high, blackish, glabrous and puckered, swollen and tomentose at base. Stromatal surface black, nodulose to cerebriform, with wrinkles delimitating small groups of perithecia, roughened by ostioles and a persistent brown outer layer cracking into large polygonal scales surrounding one or several ostioles (G); crust black, leathery, ca 40 μm thick (F); interior yellowish white, solid to lacunose, spongy (E). **Perithecia** immersed to slightly exposed, subglobose 0.7-0.8 mm diam (F), laterally compressed in places. **Ostioles** papillate, conical to rounded, 80-120 μm diam, black (G).

Asci fragmentary, not measured, with apical apparatus urn-shaped 3 - 3,3 μm high x 2,3 - 2,5 μm broad, bluing in Melzer's reagent (H).

Ascospores (16,3) 16,7 - 19,9 (20,4) x (4,7) 4,9 - 5,7 (6,3) μm ; Q = (2,7) 3,0 - 3,9 (4,1); N = 45; Me = 18,1 x 5,3 μm ; Qe = 3,4, ellipsoid-inequilateral to banana-shaped with narrowly rounded ends, slightly curved in side view, dark brown, smooth, with an oblique straight germ slit ca. 1/3 spore-length, best seen in 3% KOH (I); cellular appendages not seen.

Notes: *Xylaria digitata* is well-characterized by fasciculate stromata arising from a thick common base, originating from buried wood. It can be confused with *X. polymorpha*, from which it differs by ascospores averaging smaller and stromata with a thinner brown outer layer that does not crack into small scales but instead leaves large scales surrounding often several ostioles. In a recent phylogenetic study (H 10), a specimen of *X. digitata* from Ukraine sets apart from the aggregate of species related to *X. polymorpha*. This species was not uncommon in 18th and 19th century but recent records are very scarce.

Distribution: Europe

Xylaria filiformis (Alb. & Schw. : Fr.) Fr.

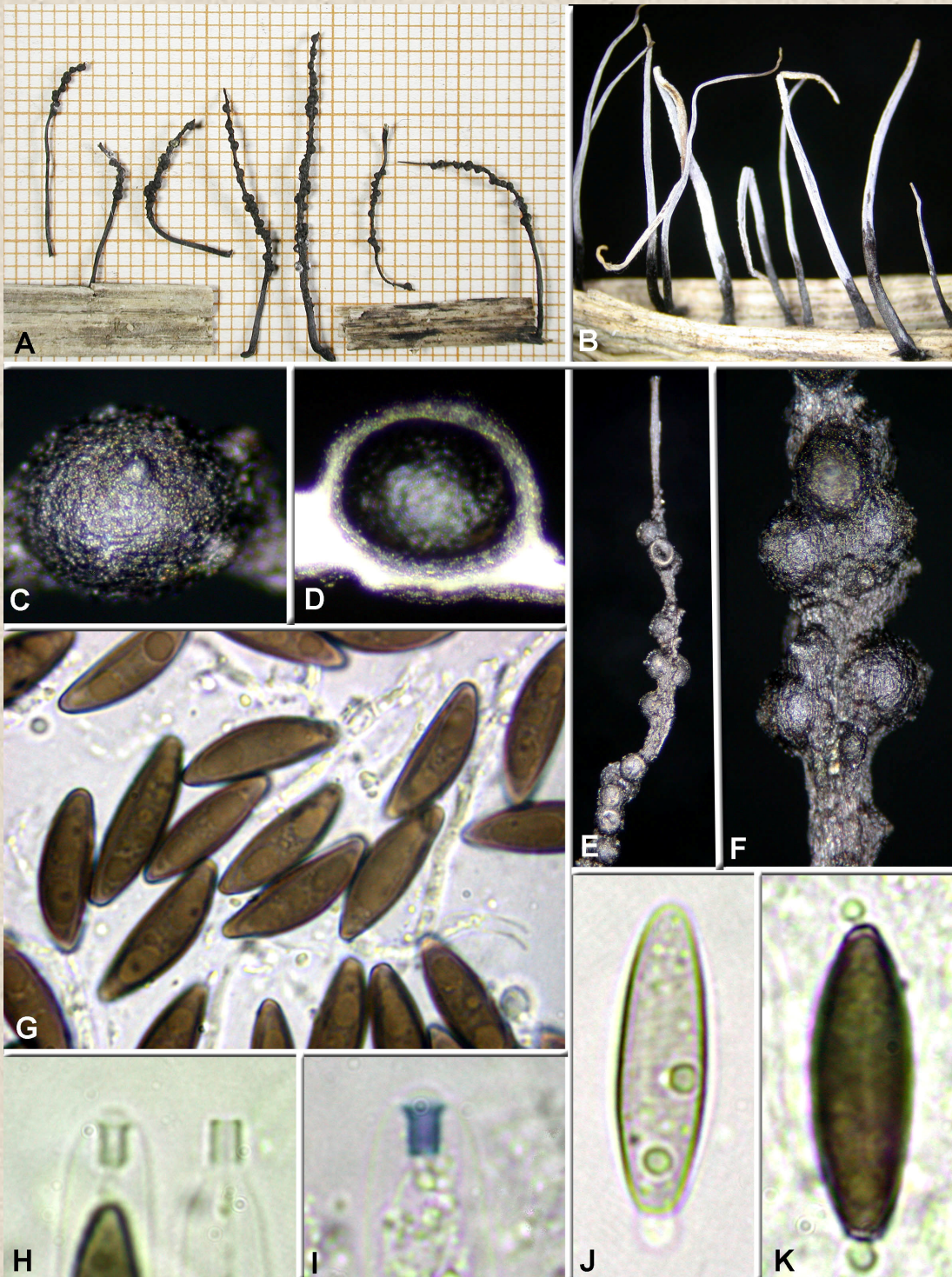
Finland: North Carelian, Outokumpu, Rikkaranta, Eskola, on dead herbs, Oct. 2011, Marja Pennanen, **MP 111004** (A, C-K); **Sweden:** Västerbotten: Vännäs par., mire in the slope at the rapids Fällforsen in Ume River, on *Carex* sp., a grass, *Equisetum fluviatile* and leaves of *Betula pubescens*, 02 Oct. 1972, Ove Eriksson, **UME 26414** (L-R); same location, date and collector, on *Levisticum officinale* (immature) **UME 26413** (B).

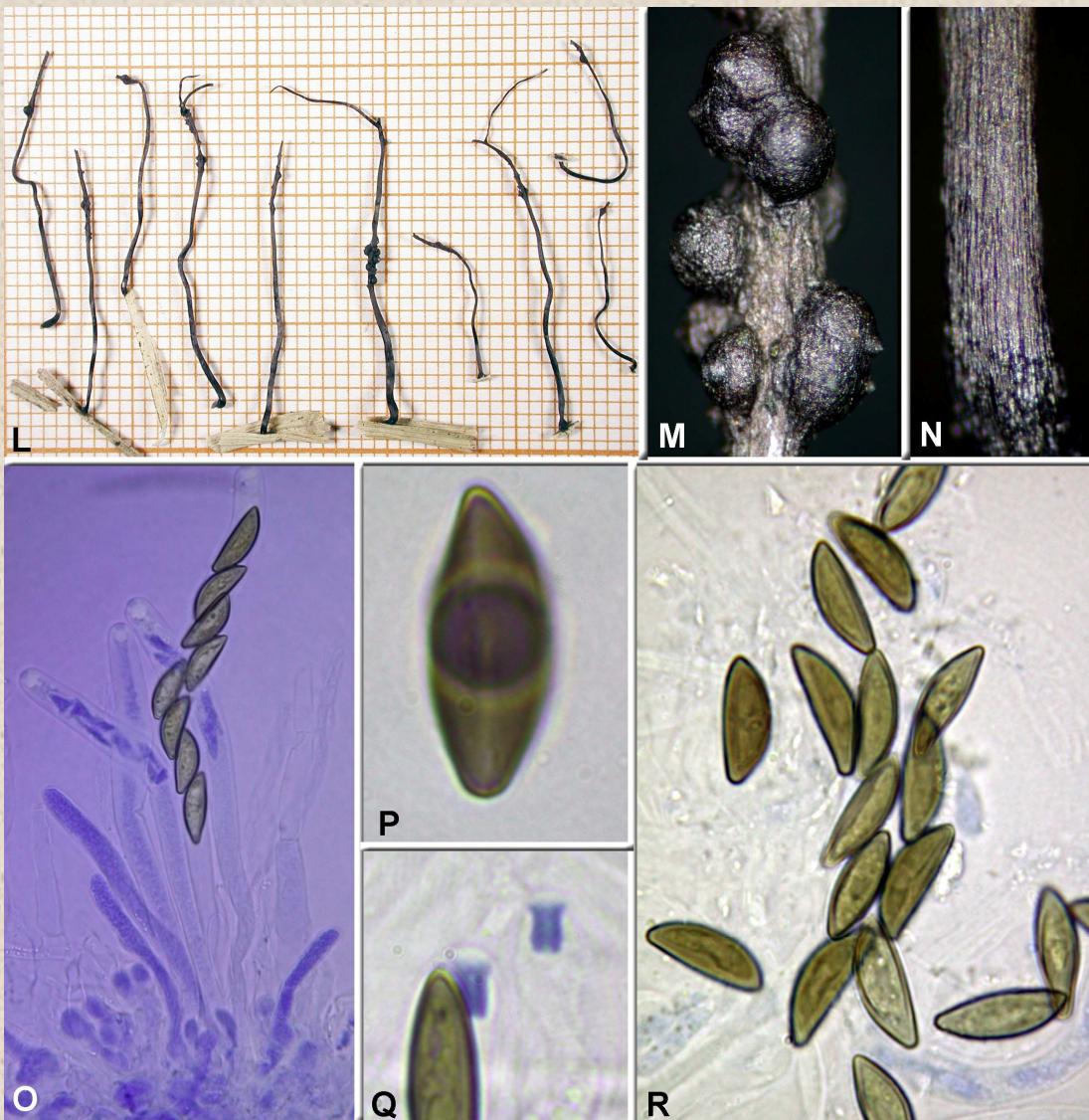
Stromata (A, L) 12-32 mm high x 0.3-1 mm diam, upright, thread-like, straight to contorted, simple to once branched, black; fertile part consisting of few scattered perithecia beneath a long sterile filiform apex (E, F, M); stipe shiny black, glabrous, finely longitudinally striate (N), the base slightly swollen and sometimes weakly tomentose. Outer crust very thin, leathery, black, roughened (C), interior solid, white, soft-textured (D). **Perithecia** superficial, subglobose with a flattened base, ca. 0.5 mm diam. **Ostioles** conic-papillate, conspicuous (C).

Anamorphic stromata (B) upright, thread-like, up to 60 mm high x 0,5 mm diam, black and finely striate at base, white and powdery above with pale orange tips. Conidiogenesis and conidia not observed.

Asci cylindrical (O), 130-145 μm total length, the spore-bearing parts 80-90 x 8-9.5 μm , the stipes 48-60 μm long, with eight obliquely uniseriate overlapping ascospores, with a tubular apical apparatus slightly flared at apex, 3.4-4 μm high x 1.7-2 μm broad, bluing in Melzer's reagent (Q) or not bluing (H) but bluing in Lugol's solution (I) Paraphyses sparse, septate, hyaline, thin-walled, 7-10 (-13) μm broad at base, tapering above asci (O), fragile.

Ascospores (G, R) (14,2) 15,5 - 17,5 (18,7) x (4,6) 4,8 - 5,4 (5,5) μm ; Q = (2,9) 3,0 - 3,4 (3,6) ; N = 45 ; Me = 16,4 x 5,1 μm ; Qe = 3,2 (MP 111004), fusoid-inequilateral with upper end narrowly rounded to acute, lower end often truncate, pale to medium brown, smooth, with a very inconspicuous straight to slightly oblique germ slit extending over the whole spore length (K, P). No mucilaginous sheath nor appendages observed, though the truncate ends are usually associated with cellular appendages on immature ascospores (J), that usually disappear at maturity. Ascospores of UME 26414 were recorded as 13.5-16.2 x 5-6 μm , thus slightly smaller than in MP 111004 but the material was not as mature.





Notes: The above description is based on two collections, one from Finland (MP 111004) and one from Sweden (UME 26414), both with asci and ascospores. They are assumed to be conspecific in all respects except slight divergences in ascospores dimensions and reaction of apical apparatus with iodine.

I examined 17 collections from UME herbarium kindly sent over by Prof. O. Eriksson, most were at conidial state or immature, including a collection from Norway and one from Canary Islands that was deviating in having perithecia clustered in a subglobose fertile head and most likely represents another taxon.

A confused nomenclatural and taxonomic situation about the name *X. filiformis* is commented upon by Dennis (D 58 and D 71), involving at least two different taxa occurring on herbaceous stems and leaves, maybe more. Although it remains a dubious name I suggest to regard the taxon illustrated above as *X. filiformis* in the sense of Fries, based on its frequent occurrence in Scandinavia. It could be defined by its thread-like stromata with scattered superficial perithecia and narrowly fusoid ascospores with indistinct germ slit, occurring mostly on dead herbaceous substrates.

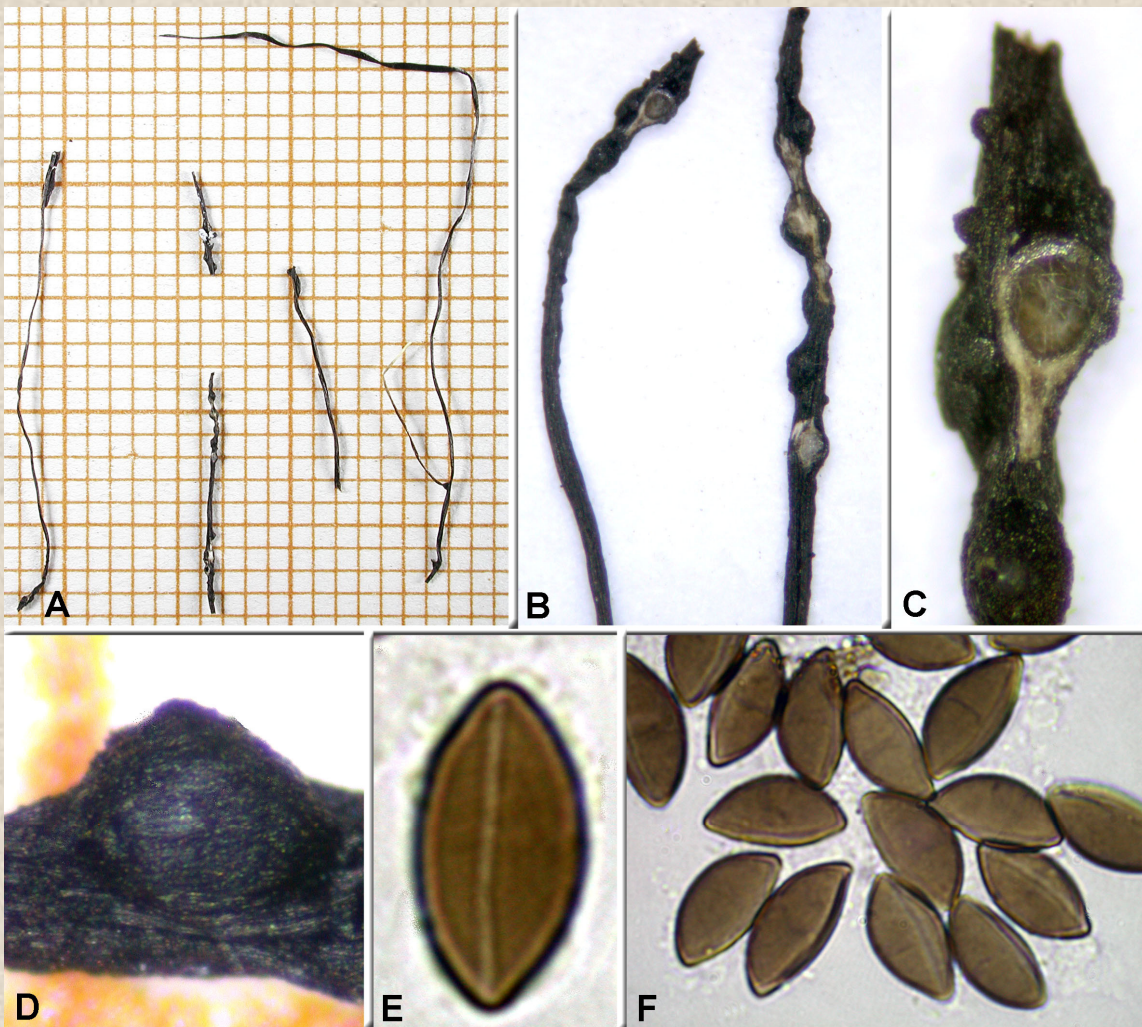
The collection of *X. filiformis* on *Betula* leaves illustrated by Dennis (D 71) is regarded here as different, as *X. filiformis* ss Dennis, with differently shaped ascospores with a conspicuous germ slit.

Another taxon referred to *X. filiformis* occurring on herbaceous stems and ferns was reported from Swiss Alps by Breitenbach & Kränzlin (BK 84). It differs from the above collection by having perithecia more crowded in more robust stromata and ascospores 12,5-17 x 5-6,5 µm with more broadly rounded ends. All my efforts to find something referable to *X. filiformis* on the French side of Pyrénées were so far unsuccessful.

The situation is even more complicated due to many irrelevant records of *X. filiformis* on woody substrates that are merely small forms of *X. hypoxylon* at conidial or even teleomorphic state. Moreover, the use of this name for tropical *Xylaria* spp. that feature thread-like stromata and occur on dead leaves, most often at conidial state, should be avoided too.

[BACK TO KEY](#)

[Close](#)



Xylaria filiformis (Alb. & Schw. : Fr.) Fr. ss Dennis

England: Westmorland, Meathrop Wood, on decaying leaves of *Betula* sp., 28 Jan. 1970, P. J. Howard, comm. J. Frankland, det R. W. G. Dennis, **K (M) 163347**.

Stromata (A) fragmentary, upright, thread-like, ca. 0.2 mm broad, flattened, straight to slightly contorted, simple to branched, black; fertile part consisting of few scattered perithecia beneath a long sterile filiform apex; stipe black, glabrous, finely longitudinally striate, the base slightly swollen and sometimes weakly tomentose. Outer crust very thin, leathery, black, roughened, interior dull white, soft-textured (B, C). **Perithecia** superficial (D), subglobose with a flattened base to conical, ca. 0.3-0.35 mm diam (B, C). **Ostioles** bluntly papillate (D).

Asci not seen. **Ascospores** (E, F) (14,1) 14,5 - 16,0 (16,8) x (6,3) 6,6 - 7,9 (8,2) μm ; Q = (1,9) 2,0 - 2,3 (2,4) ; N = 40 ; Me = 15,2 x 7,2 μm ; Qe = 2,1, ellipsoid-inequilateral with narrowly rounded to acute ends, both sides convex, medium brown, smooth, with a conspicuous straight germ slit extending over the whole spore length (E). No mucilaginous sheath nor appendages observed.

Notes: This material is very scanty and the provisional data recorded here should be confirmed by examination of more stromata at ascigerous state. For instance Dennis (D71) recorded ascospores dimensions from the same sample as 11-14,5 x 5-6 x 4,5 μm . However, though the dimensions of ascospores overlap with those of collections on *Carex* leaves and herbaceous stems considered here as typical *X. filiformis*, ascospores from this taxon on *Betula* leaves appear broader, with more acute ends and a more conspicuous germ slit, as illustrated by Dennis (D71). In a letter to Dennis enclosed in the packet, the collector indicates that the stromata were obtained from dead leaves of *Betula* incubated in somewhat artificial conditions, a method that should be followed again to obtain fresh material of this very rarely encountered species.

[BACK TO KEY](#)

[Close](#)

Xylaria friesii Læssøe, *spec. nov.*—Figs.7–9, 15

A *X. bulbosa* stipite ad basin non bulboso, fissuris germinationis brevirostris, apparatus apicali asci maiore differt. Stromata ex substrato subterraneo orientia, usque 47.5 cm longa; partes fertiles 10–25 × 2.5–4(–7) mm, brunneae, laeves sed circum perithecia protuberantes; entostroma album, solidum. Apparatus apicalis asci in mixtura Melzeri caerulescens, (2–)2.3–2.6 × 2.3–2.6 μm; ascospores pallide olivaceo-brunneae, inaequilaterales, (8.6–)9.2–10.6(–11.2) × 3.4–4.3(–4.6) μm, fissura germinationis plerumque ventralis, per $\frac{1}{3}$ – $\frac{1}{2}$ longitudinem sporae extensa. — Typus: Sweden, Västergötland, Backa Parish, 22.IX.1945, *F. Karlvall*, in Fungi. exs. Suecici 1458 (*X. digitata*) (holotype S, isotypes C & K).

Stromata dichotomously branched in several orders, rooting, only very short stipe part and fertile parts above soil level, total length up to 47.5 cm (according to notes on fresh material), subterranean and sterile parts smooth, brown to purplish brown from appressed felt, in immature condition with orange brown apices, fertile parts brown, smooth, more or less furrowed, apices sterile or substerile, flattened, with prominent, mammiform perithecial outlines, some-

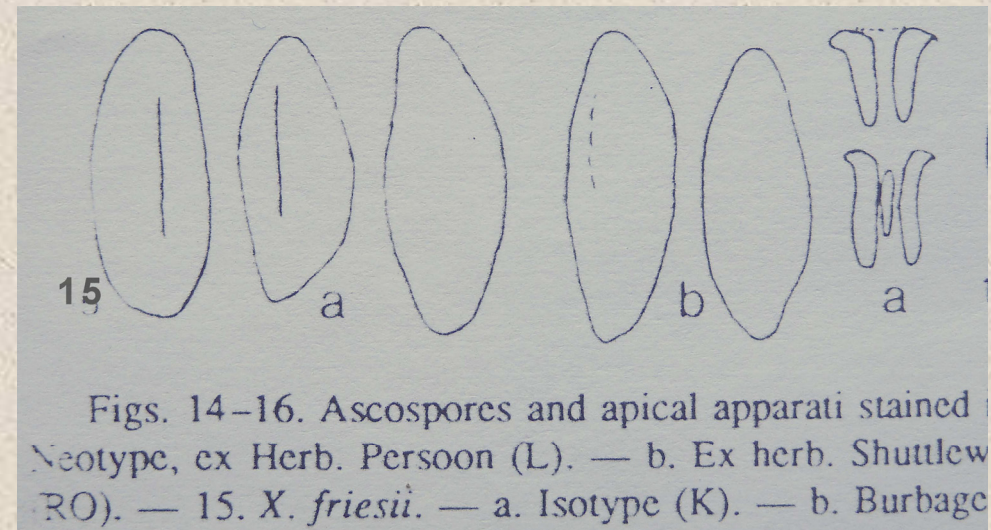


times restricted to a very small area of the upper parts, 10–25 × 2.5–4(–7) mm; entostroma massive, white or pale wood brown in old stromata; ostioles papillate, perithecia sphaerical, 0.4–0.7 mm diam.

Asci mostly 8-spored, fertile part cylindrical, with obliquely uniseriate spores, 60–75 μm, stipe 35–45 μm; apical apparatus (2–)2.3–2.6 × 2.3–2.6 μm, stained clear azure to medium blue in Melzer's reagent, barrel shaped, with prominent flaring apical rim; spores light to subopaque olive brown, inequilaterally ellipsoid-fusiform, often pinched at one end, rarely with a remnant of primary appendage, (8.6–)9.2–10.6(–11.2) × 3.4–4.3(–4.6) μm (average range 9.4–10.1 × 4–4.3), germ slit variously positioned, although mostly ventral, $\frac{1}{3}$ – $\frac{1}{2}$ of total spore length.

Additional specimens examined.—SWEDEN: Västergötland, Göteborg, Hisingen, Backaplan, bland träbitar och sågspån. Längsta kontrollerade ex. var över 47.5 cm, 9.X.1945, *F. Karlvall* 2387 (S). — GERMANY: Schleswig-Holstein, Heide, rooting in sandy soil under *Picea* (and *Betula*?), 14.VII.1966, *G. Struckhoff s.n.* (C). — ENGLAND: Wiltshire, Burbage, 25.IX.1970, *H. Mary Morgan* (K).

It is impossible from the few available collections to form any definite conclusions about the ecological niche of this species. The available material is rather uniform and all stromata show a strongly rooting basal part. Apart from the rooting base *X. friesii* differs from *X. bulbosa* in shorter germ slit and larger perithecia. See also discussion of deviating specimen under *X. guepini*.



Figs. 14–16. Ascospores and apical apparatus stained Neotype, ex Herb. Persoon (L). — b. Ex herb. Shuttleworth (RO). — 15. *X. friesii*. — a. Isotype (K). — b. Burbage

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[BACK TO KEY](#)

[Close](#)

Xylaria guepinii (Fr. : Fr.) Fr.

Scotland : Mid Perthshire, Meikloeur (nr Perth), on the ground, 1875, M. Matheson (ex herb. M. C. Cooke), K (M) 144407, holotype of *X. scotica* Cooke.

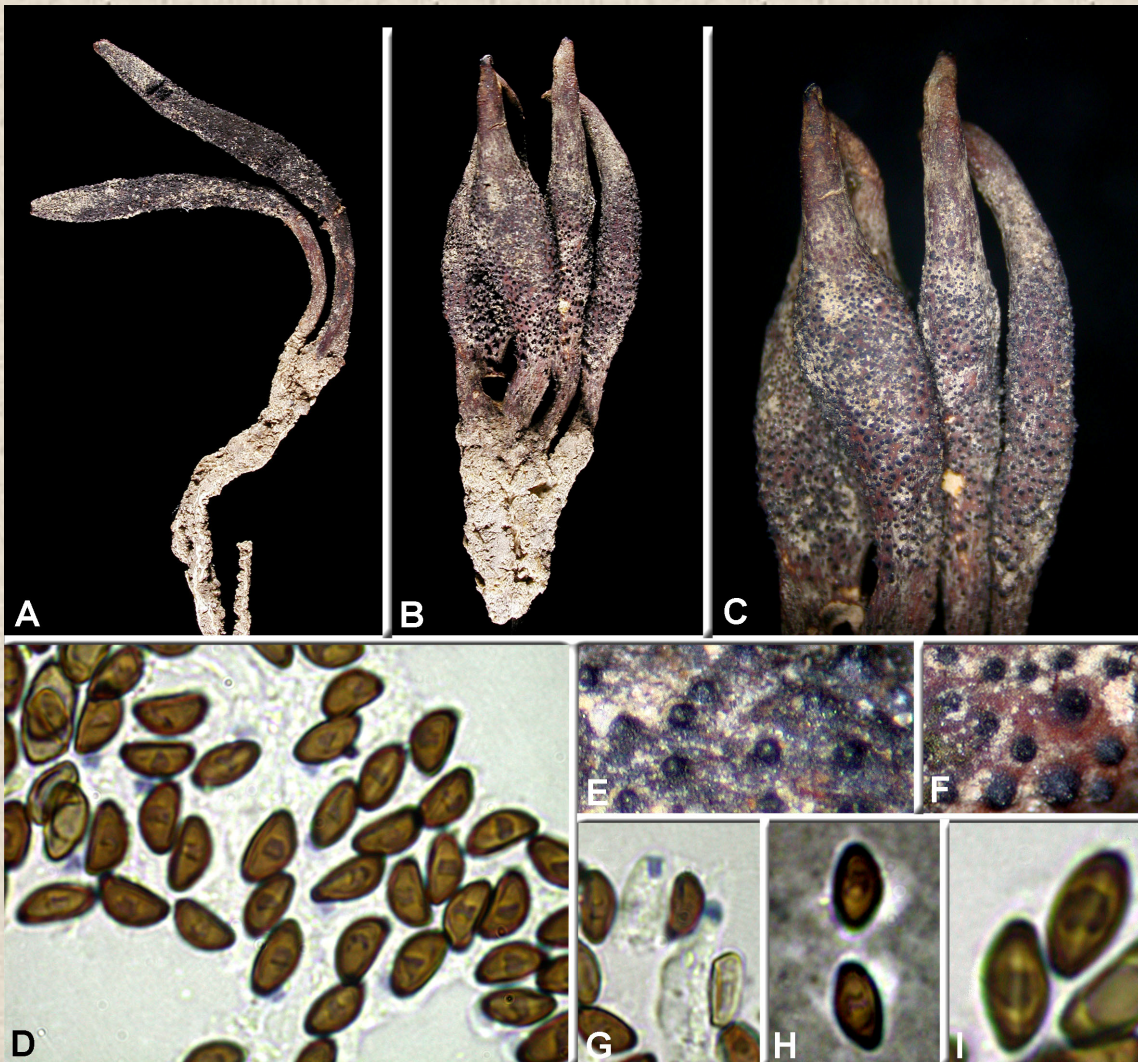
Stromata (A, C) upright, arising from long rooting stipes in manured soil, fertile heads branched 2-4 times from the top of the common stipe, oblong-cylindrical to fusiform-flattened with rounded to long mucronate sterile apices (C), 12-16 mm high x 2-5 mm broad, the stipes broken; surface reddish brown (B, C, F) turning blackish (A, E), with perithecial contours not exposed, soft-textured, with a very thin leathery outer crust; interior not investigated. **Perithecia** not investigated. **Ostioles** black, coarsely conic-papillate (E, F).

Asci fragmentary, not measured, with a tubular apical apparatus with flared apex, 1,2-2 μm high x 1-1,3 μm broad, bluing in Melzer's reagent (G). Paraphyses not observed.

Ascospores (D) (6,5) 6,8 - 8,1 (8,3) x (3,4) 3,5 - 4,0 (4,2) μm ; Q = (1,7) 1,8 - 2,2 (2,3) ; N = 42 ; Me = 7,6 x 3,8 μm ; Qe = 2,0 , ellipsoid-inequilateral with narrowly rounded ends, often somewhat twisted, unicellular, golden brown to brown, wall smooth, with an inconspicuous straight germ slit 2/3-4/5 spore-length on the flattened side (J) and irregular mucilaginous coating visible in India ink (H).

Notes: *Xylaria guepinii* is a rarely recorded and poorly understood taxon, even its fimicolous ecology is unsettled (L 93). Yu-Ming Ju annotated the type of *X. scotica* illustrated here as a synonym of *X. guepinii* and suggested possible affinities with the subgenus *Pseudoxylaria* but T. Læssøe is more doubtful about the synonymy (L 93). The branched stromata on long rooting stipes and the small golden brown ascospores of *X. guepinii* also make it difficult to distinguish unambiguously from *X. friesii*. Fresh material is needed to evaluate its true ecology and its diagnostic morphological characters.

Distribution: Italy, France, The Netherlands, Scotland (L 93).



[BACK TO KEY](#)

[Close](#)

Description and illustration from Dennis 1981

***Xylaria hippotrichoides* (Sow. : Fr.) Sacc.**

Xylaria hippotrichoides is a remarkable but poorly documented taxon, apparently very rarely recorded. A more recent illustration based on material collected by Andrew Miller in the USA, showing ascospores with mucilaginous pads at both ends and on ventral side is available at:

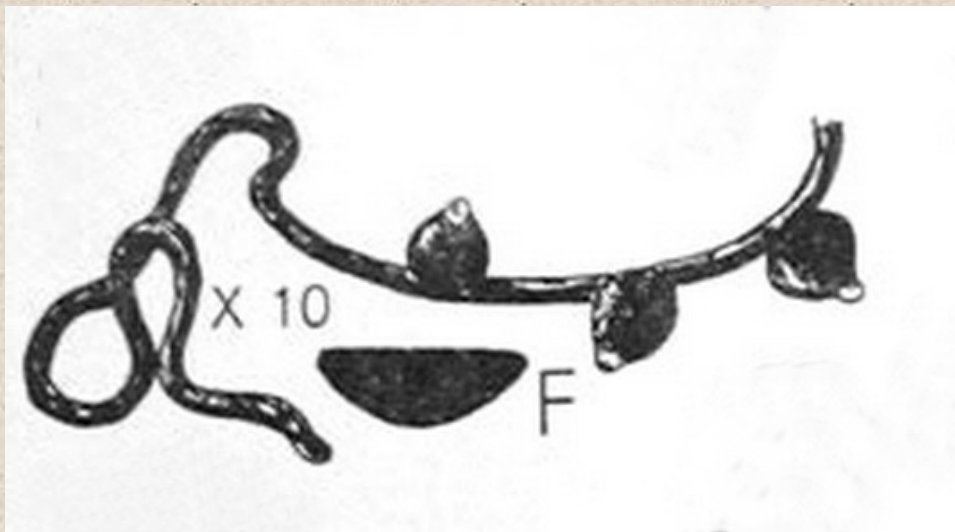
<http://www.discoverlife.org/mp/20p?&res=md&see=I ANM89;&start=/mp/20q%3Fsearch%3DXylaria%2Bhippotrichoides&xml=Checklist United Kingdom;Xylariaceae;&guide=Xylariaceae>

Xylaria hippotrichoides (Sowerby ex Fries) Saccardo, *Sylloge Fungorum* 1: 344 (1882). (Fig. 11 F.)

This is another species with very long, black, hair-like stromata along which black flask-shaped superficial perithecia are sparsely scattered. Asci cylindrical, 8-spored; ascospores fusiform with one side flattened, $14-20 \times 7-10 \mu$, black.

On decaying sawdust, rush matting and other debris, especially in cellars and damp churches. Rare or perhaps not native. This species is sometimes called *Thamatomyces hippotrichoides* (Sowerby) Ehrenberg but the genus *Thamatomyces* Ehrenberg ex Fries in *Linnaea* 5: 534 (1830), was based on a tropical American fungus of very different

320



[BACK TO KEY](#)

[Close](#)

Xylaria hypoxylon (L.: Fr.) Grev.

France, Ariège, Rimont, Las Muros, 460 m, *Fraxinus excelsior*, 16 Dec. 2004, JF 04258 (A-C, H-P); Vendée, Vouvant, moss-covered dead wood, 28 Apr. 2005, leg A. Gminder, JF 05066 (D, F).

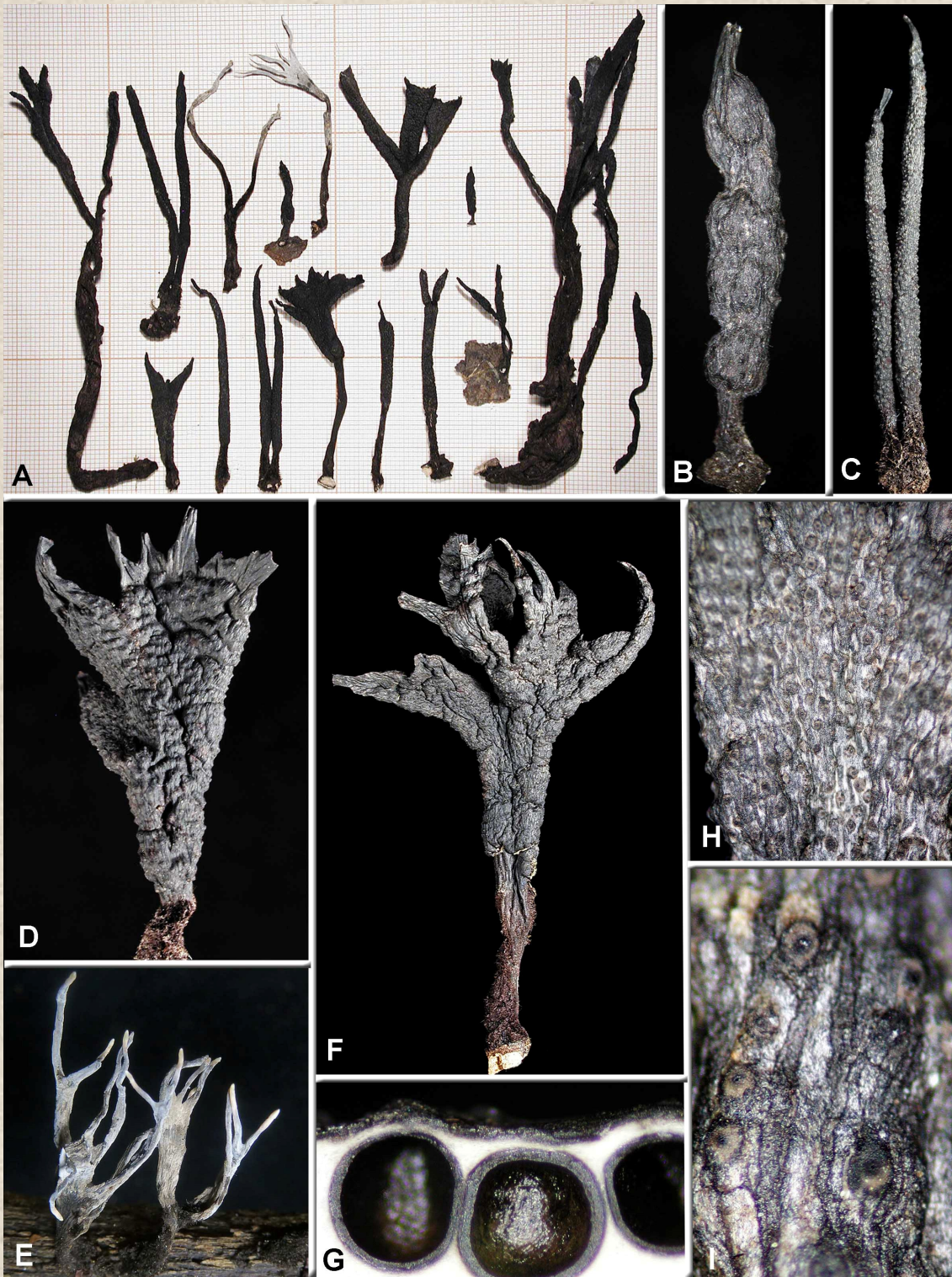
Stromata extremely variable in size and shape (A-D, F), 12- 85 (-115) mm total height, with fertile parts 10-45 mm high x 2-5 (-15) mm diam, ranging from cylindrical to narrowly fusiform or fan-shaped, terete to flattened, simple to branched from the base, from the middle or at top, nearly sessile or arising from long rooting stipes, always with flattened to mucronate sterile apices; surface with a long persistent white peeling outer layer, whitish at immature state, turning gradually silvery grey (H) to dull black at maturity, finely longitudinally furrowed delimiting narrow strips (I), roughened with prominent ostiolar papillae, at times with circumferential wrinkles isolating groups of perithecia, especially on small fusiform stromata, but perithecial contours most often inconspicuous; outer crust 35-50 μ m thick, leathery (G). Interior solid, homogeneous to slightly fibrous, cheesy, white to cream-coloured, with a slightly darker core in aged specimens. The stipes 2-40 (-65) mm high x 1-3 mm broad, often ill-defined, cylindrical to strap-like, longitudinally folded, black, with a hairy-tomentose broadened base, smooth to downy to hairy-tomentose above; tomentum black to dark purplish brown, composed of dark brown, thick-walled, remotely septate hyphae 3.5-4 μ m broad.

Perithecia subglobose (G), 0.4-0.7 mm diam, immersed to slightly exposed.

Ostioles raised-discoid, 160-280 μ m diam, grey brown to black, with a low conical papilla at the center (I).

Anamorphic stromata (E) 10-55 mm high x 1-2 mm broad, cylindrical, the apex either tapered or flattened and branched, white, powdery with conidia, the base broadened and tomentose, black, furrowed. Conidiogenous cells palisadic, conidia fusiform-clavate, 8.5-12 x 3.4-3.8 μ m, hyaline, smooth.

Asci unitunicate (J), (6-)8-spored, cylindrical, long-stipitate, 140-220 μ m total length, the spore-bearing parts 70-90 x 6-8 μ m, the stipes 70-140 μ m long, with apical apparatus tubular with slightly flared apex, 2.5-3.4 μ m high x 2 μ m broad, bluing in Melzer's reagent. Paraphyses sparse, hypha-like, hyaline, septate, 1.5-2 μ m broad





Ascospores (M) (9,9) 10,1 - 11,4 (12,2) x (4,2) 4,6 - 5,2 (5,4) μm ; Q = (1,9) 2,0 - 2,4 (2,9) ; N = 40 ; Me = 10,8 x 4,9 μm ; Qe = 2,2, uniseriate overlapping in the ascus, ellipsoid-inequilateral with narrowly to broadly rounded ends, medium brown, smooth, devoid of cellular appendage at maturity, containing two large guttules, with a very conspicuous straight, rarely slightly sinuous germ slit 1/2-4/5 spore-length on the flattened side (L-P). Atypical ascospores with acute ends, slightly oblique or sinuous germ slits located next to one end or on the convex side can be encountered in some collections. Further ascospores measurements are given below.

Notes: Because of a complex nomenclatural history since it was given the name *Clavaria hypoxylon* by Linnaeus in 1753, *X. hypoxylon* was only recently lectotypified and epitypified (SHF 14). Despite this highly variable macro-and microscopic morphology, *X. hypoxylon* features a combination of characters which allows to distinguish it from other wood-inhabiting members of the genus *Xylaria* known from Europe. The always sterile, pointed to flattened stromatal apices, the silvery grey peeling outer layer, the longitudinally furrowed surface with usually immersed perithecia and raised discoid ostioles, the hairy tomentose stipe combined with the small ascospores with a conspicuous germ slit shorter than spore length are the reliable distinctive characters of this species. Moreover, unlike all other *Xylaria* species occurring in Europe which start at conidial state in spring and develop teleomorphic stromata from early summer to late autumn, *X. hypoxylon* develops its conidial state in late autumn to early winter and, because of its slow growth, can be found at teleomorphic state nearly all over the year. This field observation is usually sufficient to highly suspect the occurrence of *X. hypoxylon*. The collection JF 04258 was selected to illustrate the morphological variations of *X. hypoxylon* encountered in nature because it encompassed most of the morphological types known for this species. Stromata were growing on a big blackened log of *Fraxinus* half-buried in the soil in a shadowy coomb. Those occurring on upper parts were mostly small to stunted, simple, nearly sessile, while those originating from the buried part were often ramified and originating from very long stipes, with all intermediate forms occurring in between. It was remarkable that flattened and cylindrical stromata were randomly distributed and mixed, and that conidial stromata were typically already present among fully mature stromata in early winter.

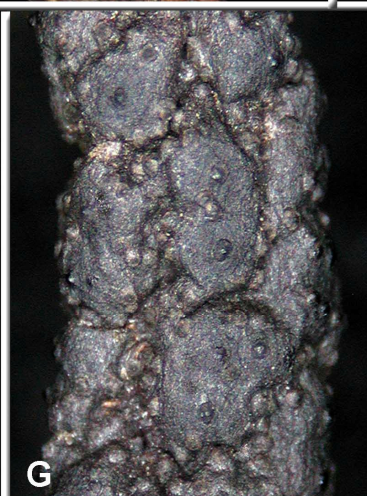
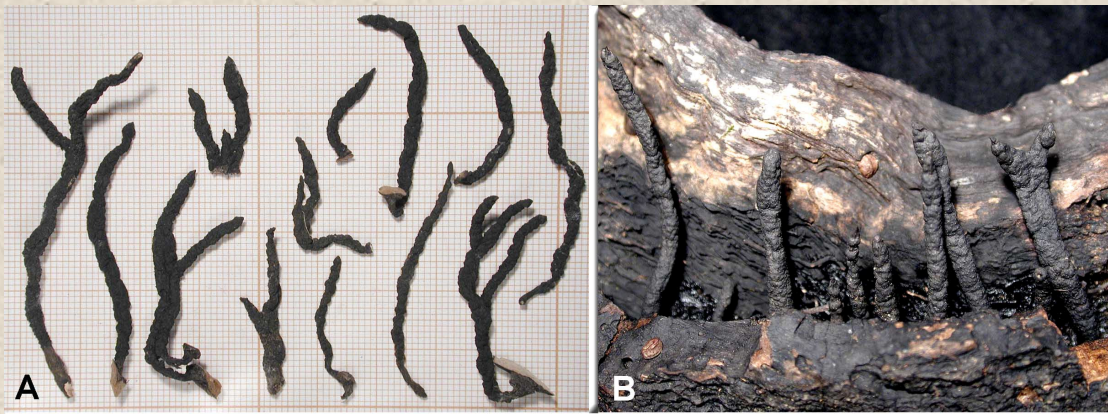
- JF04053** (9,2) 9,7 - 11,1 (11,4) x (4,1) 4,3 - 4,9 (5,0) μm Q = (2,0) 2,04 - 2,5 (2,7) ; N = 36
Me = 10,4 x 4,6 μm ; Qe = 2,3
- JF 05060** (9,7) 10,1 - 12,1 (12,8) x (4,3) 4,7 - 5,4 (5,5) μm Q = (1,9) 2,0 - 2,5 (2,9) ; N = 40
Me = 11,1 x 5,0 μm ; Qe = 2,2
- JF 06022** (9,7) 10,2 - 11,4 (12,1) x (4,3) 4,6 - 5,1 (5,3) μm Q = (2,0) 2,1 - 2,5 (2,7) ; N = 40
Me = 10,9 x 4,8 μm ; Qe = 2,3
- JF 12102** (9,9) 10,5 - 12,4 (13,5) x (4,4) 4,8 - 5,5 (5,8) μm Q = (1,9) 2,1 - 2,5 (2,6) ; N = 40
Me = 11,7 x 5,1 μm ; Qe = 2,3

[BACK TO KEY](#)

[Close](#)

Xylaria karsticola J. Fourn. & M. Stadler

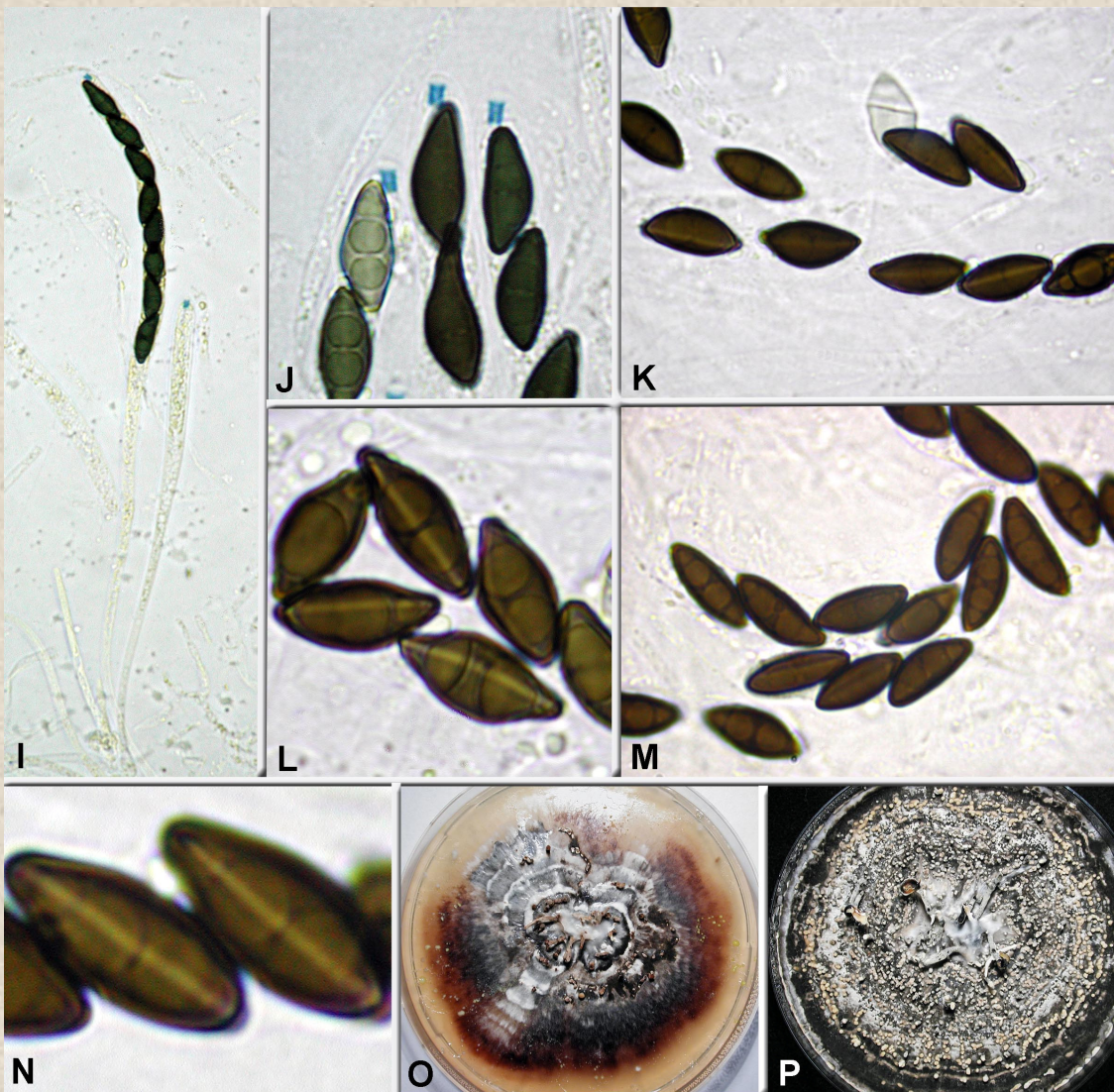
France, Ariège, Rimont, Las Muros, on *Quercus* wood buried in karstic soil, 24 Aug. 2008, **JF 08171** (holotype) (A, F-L, O, P) ; same location, on the buried part of a stump of *Crataegus*, 26 Jun. 2004, **JF 04137**, immature (C); same location and host, 16 Dec. 2004, **JF 04260** (D) ; same location, 10 Aug. 2004, on a buried stump of *Quercus* on karstic soil, **JF 04169** (B, M, N) ; Montseron, Roquebrune, 450m, on buried stump of *Quercus* on karstic soil, 11 Oct. 2004, **JF 04239** (E);



Stromata (A-E)) upright to prostrate, solitary to often clustered in small groups with the bases in contact, simple to branched or forked, 10-65 mm total height, short-stipitate; fertile parts 8-50 mm high x 1.5-3.5(-5) mm broad, terete to rarely flattened, straight to most often sinuous to contorted, with short, pointed sterile apices, strongly nodulose with deep wrinkles isolating small to very small groups of perithecia (G); stipes 2-20 mm high x 1.5-2 mm broad, often ill-defined, black, puckered, downy to tomentose, arising from a pannose base; surface with a thin greyish to pale brown peeling outer layer at immature state (C), turning dull black, often incrustated with dirt particles; outer stromatal crust 25-35 μ m thick, leathery, finely longitudinally furrowed delimiting narrow dark grey strips (H); interior solid, spongy, white to cream-coloured (F). **Perithecia** (F) immersed to slightly prominent, spherical to depressed spherical, 0.5-0.8 mm diam. **Ostioles** black, hemispherical to conical on a slightly raised discoid base 160-220 μ m diam (H).

Asci (I) cylindrical, (4-)8-spored, long stipitate, 160-180 μ m total length, the spore-bearing parts 70-85 μ m long x 6.5-8 μ m broad, the stipes 90-115 μ m long, with apical apparatus (J) bluing in Melzer's reagent, tubular with a slightly flared apex, 2-2.5 (-3) μ m high x 1.5-2 μ m broad.

Ascospores (J-N) (10,8) 11,1 - 12,7 (13,3) x (4,4) 4,6 - 5,2 (5,4) μ m ; Q = (2,2) 2,22 - 2,6 (3,0) ; N = 36 ; Me = 11,9 x 4,9 μ m ; Qe = 2,4, obliquely uniseriate in the ascus, ellipsoid-inequilateral with narrowly rounded to acute, often slightly pinched ends and a very inconspicuous hyaline cellular appendage at one end that disappears at maturity, dark olive brown to dark brown, smooth, biguttulate, with a conspicuous straight germ slit spore-length on the flattened side (L, N). Aberrant ascospores up to 14.5 x 6 μ m, at times gibbous or subcitriform, with strongly pinched or beaked ends can be often encountered (J, L), most likely originating from few-spored asci.



Colonies on YMG (O) and OA (P) covering a 9 cm plate in 3-5 weeks, at first white, velvety, zonate, with finely lobed margins, soon becoming yellowish. Reverse turning reddish brown, due to release of a pigment which is extremely abundant on YMG agar. OA cultures later becoming blackish. Stromata with yellowish to cream surface, up to 15 mm high x 2-3 mm wide, developing on both media, largely restricted to the centre of colonies. No conidiogenesis was noted in the vegetative mycelium and on stromatal primordia on old agar plates.

Distribution : So far known only from France (Ariège)

Notes: *Xylaria karsticola* is first distinctive by its consistent occurrence under the soil level, on remnants of very old stumps, in woodlands in karstic areas where the soil is stony. Most of lignicolous *Xylaria* species favour old stumps or partly buried wood, but always develop fertile parts above the soil level, at times on long rooting stipes. Unlike them, the stromata of *X. karsticola* remain hypogeous, short-stipitate, developing in narrow spaces between wood remnants, stones and soil.

Xylaria karsticola roughly resembles *X. hypoxylon* in its stromatal habit with pointed apices, surface cracking into longitudinal strips, raised discoid ostioles, stipes tomentose at base and ascospores with a similar size range. *Xylaria karsticola* primarily differs by having a strongly nodulose, deeply wrinkled stromatal surface, and by having ascospores with almost acute, often slightly pinched ends and longer germ slits. The cultures obtained were also morphologically and physiologically different from those of *X. vasconica* and *X. hypoxylon*. However, for the field mycologist, the most striking differences with *X. hypoxylon* evidently regard their different ecology (see above) and phenology. For instance, the conidial state of *X. karsticola* occurs during late spring to early summer, rather than in late autumn and winter.

Additional information available in FS 11

[BACK TO KEY](#)

[Close](#)

Xylaria lepidota Y.-M. Ju, H.-M. Hsieh, Lar. N.

Vassiljeva & Akulov, sp. nov. FIGS. 1–5

MycoBank MB513099

Etymology. For the fine scales covering the stromatal surface.

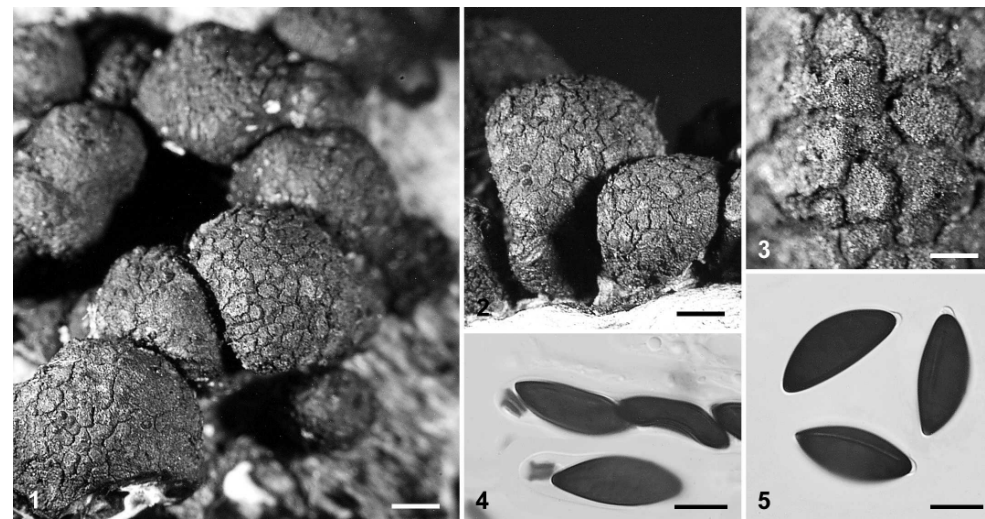
A *Xylaria globosa* et speciebus arte affinibus *Xylariae globosae* differt in ascosporis rima germinativa recta longa praeditis et in distributione hemisphaerae borealis regione temperata.

Stromata aggregated, turbinate, convex on top, attached to substrate with a narrow central connective, 2–4 mm diam, 2–4 mm high; surface lacking perithecial mounds, blackish with a brown tinge due to the presence of a finely reticulately cracked, dark brown outer layer, underlain with a black layer of ca. 0.1 mm thick; interior white, coriaceous. Perithecia spherical, 0.8–1 mm diam. Ostioles papillate, 0.15 mm broad at base. Asci with eight ascospores arranged in uniseriate manner, cylindrical, 340–370 µm total length by 9–10 µm broad, the spore-bearing parts 165–190 µm long, stipes 170–190 µm long, with an apical ring staining blue in Melzer's iodine reagent, inverted hat-shaped to urn-shaped, 6–6.5 µm high by 4.5–5 µm broad. Ascospores dark brown, unicellular, ellipsoid-inequilateral, with narrowly rounded ends, usually bearing a tiny cellular appendage on one end, smooth, 22.5–26.5 (–28) × (8–)9–10.5 µm, with a straight germ slit nearly spore length on the ventral side; epispore smooth.

Cultures not obtained.

Specimen examined. RUSSIA. Primorsky Territory, District Schkotovo, Anisimovka Village, on log, 14 Sep 1990, Vasilyeva, L. N. (VLA HOLOTYPE, HAST ISOTYPE).

Additional specimens examined. PUERTO RICO. *sine loco et datum*, on wood (UPS HOLOTYPE of *Sphaeria globosa* Spreng. ex Fr.: Fr. [= *Xylaria globosa*]). FRENCH GUIANA.



FIGS. 1–5. *Xylaria lepidota* (from holotype). 1, 2. Stromata. 3. Stromatal surface with ostioles and fine scales. 4. Ascus apical rings and ascospores. 5. Ascospores. 4, 5 by DIC. Bars: 1, 2 = 1 mm; 3 = 0.25 mm; 4, 5 = 10 µm.

Cayenne, on wood, May 1838, *Leprieur, F. M. R. 438* (K[M] 107216 ISOSYNTYPE of *Hypoxylon anisopleuron* Mont. [= *Xylaria anisopleura*]). SRI LANKA. Central and southern parts, on wood, *Thwaites, G.H.K. 31* (K[M] 144077 HOLOTYPE of *Xylaria haemorrhoidalis*).

Commentary. Stromata of *X. lepidota* look like those of *X. globosa* (Spreng. ex Fr.: Fr.) Mont. and its allies, such as *X. anisopleura* (Mont.) Fr. and *X. haemorrhoidalis* Berk. & Broome, in having a stromatal surface cracked into fine scales and ascospores 20–30 µm long. The long, straight ascospore germ slit readily sets *X. lepidota* apart from *X. globosa* and its allies, which are characterized by a much less than spore length germ slit that is oblique to sigmoid. *Xylaria tuberiformis* Berk. (Rogers and Samuels 1986), which is mainly known from New Zealand, is also similar to *X. lepidota* in gross morphology but its ascospores are narvicular, bearing a less than spore length germ slit.

Description and illustrations from Ju et al. 2009, with authors' permission

[BACK TO KEY](#)

[Close](#)



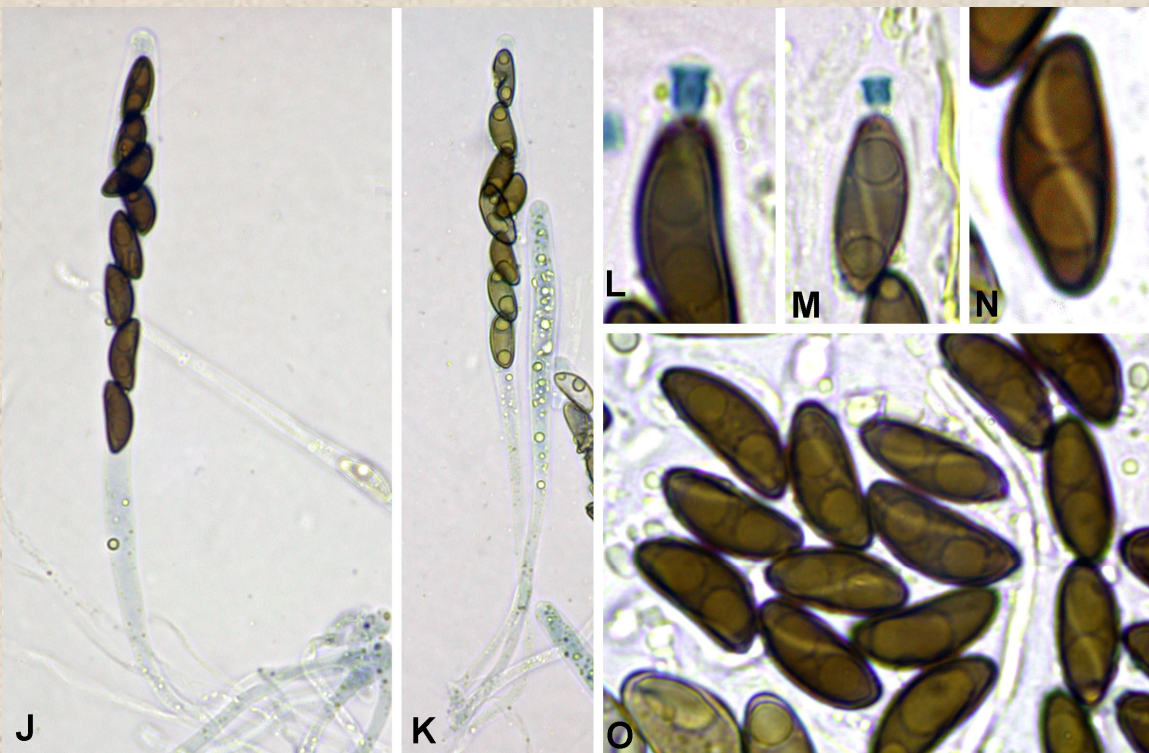
Xylaria longipes Nitschke

Belgium: Wellin, Halma, Ry des Glands, on a dead trunk of *Acer pseudoplatanus* lying on the bank of a small brook, 26 Sept. 2006, **JF 06230**

Stromata (A, C, D, G) upright, long-stipitate to nearly sessile, variously shaped from clavate to fusiform, terete to flattened, straight to curved, usually simple, at times furcate at apex, 22-50 mm total height, the fertile head 15-38 mm high x 3-11mm broad, typically with broadly rounded fertile apices (C) but also with pointed sterile apices (D, G); the stipes usually well-defined, 5-20 mm high, reddish brown to dark brown, glabrous and puckered, swollen and downy at base. Stromatal surface brown to brownish black in age, even to slightly nodulose, wrinkled in places, roughened by ostioles and a persistent outer layer cracking into small brown to blackish polygonal scales (H); crust black, leathery, 30- 40 μm thick (F); interior white to cream-coloured, solid, spongy (I).

Perithecia (F) immersed to slightly exposed, subglobose 0.5-0.7 mm diam. **Ostioles** (H) raised-discoid to hemispherical, 120-170 μm diam, black.

Anamorphic stromata on natural substrate (B, E) at first white, gradually covered by the anamorph forming a greenish grey powdery layer (France: Loire, St Georges en Couzan, Pont de Diable, 570m, 05 May 2010, on buried wood of *Acer pseudoplatanus*, **JF 10045**).



Asci cylindrical (J, K), (3-) 8-spored, the spore-bearing parts 80-90 μm long x 8-8.5 μm broad, the stipes 70-90 μm long, with apical apparatus cuboid to tubular with upper rim, 2-2.5 μm high x 1.8-2 μm broad, bluing in Melzer's reagent (L, M). Paraphyses filiform, copious.

Ascospores (11,4) 11,8 - 13,4 (13,9) x (5,2) 5,5 - 6,1 (6,5) μm ; Q = (2,0) 2,02 - 2,4 (2,5) ; N = 36 ; Me = 12,7 x 5,9 μm ; Qe = 2,2, overlapping uniseriate in the ascus, at times somewhat biseriata in mid part, ellipsoid-inequilateral with narrowly rounded ends, brown, smooth, with a conspicuous sigmoid germ slit almost spore-length on the flattened side (N, O); cellular appendages not seen.

Notes: *Xylaria longipes* is closely related to *X. polymorpha*, from which it is hardly distinguishable in the field, both species exhibiting similar highly variable stromatal shape and corky-cracked surface. They are mainly separated based on different ascospore size range and the conspicuously sigmoid germ slit of *X. longipes*. Unlike what it is suggested by its name, the stromata of *X. longipes* are often short-stipitate to almost sessile. It seems restricted to *Acer pseudoplatanus*, but *X. polymorpha* also occurs on this substrate, which makes microscopic examination of ascospores the only way to identify them safely.

Distribution: Europe and Northeastern USA (R 83).

[BACK TO KEY](#)

[Close](#)



Xylaria oxyacanthae Tul. & C. Tul.

France, Ariège: Montseron, Roquebrune, 480 m, on dead fruits of *Crataegus sp.* buried in the ground, 14 Aug. 2000, JF 00157 (A, C-G, I-M). Rimont, Las Muros, 420 m, on dead fruits of *Crataegus sp.* buried in the ground, 12 Jul. 2000, JF 00118. Germany, Saxony-Anhalt: P. Rönsch (B, H) photos P. Rönsch

Stromata (A, B, E, F) upright, arising from buried fruits of *Crataegus sp.*, simple to 2-4-furcate, 34-61 mm total height, the fertile heads 11-28 mm high x 0.8-2.5 mm diam, filiform to narrowly fusiform, straight to contorted, with mucronate to filiform sterile apices (E, F); the stipes well-defined, 15-40 mm high, filiform to strap-like, sinuous, black, puckered, finely downy with golden brown hairs, swollen at base. Stromatal surface strongly nodulose with perithecia partly immersed to strongly exposed (D); outer crust black, leathery, ca 20 µm thick, coated by a pale golden brown fibrous outer layer (C) splitting into elongated narrow strips, long persistent (D); interior white, solid, spongy (G). **Perithecia** subglobose 0.4-0.5 mm diam (G). **Ostioles** conic-papillate, black (D).

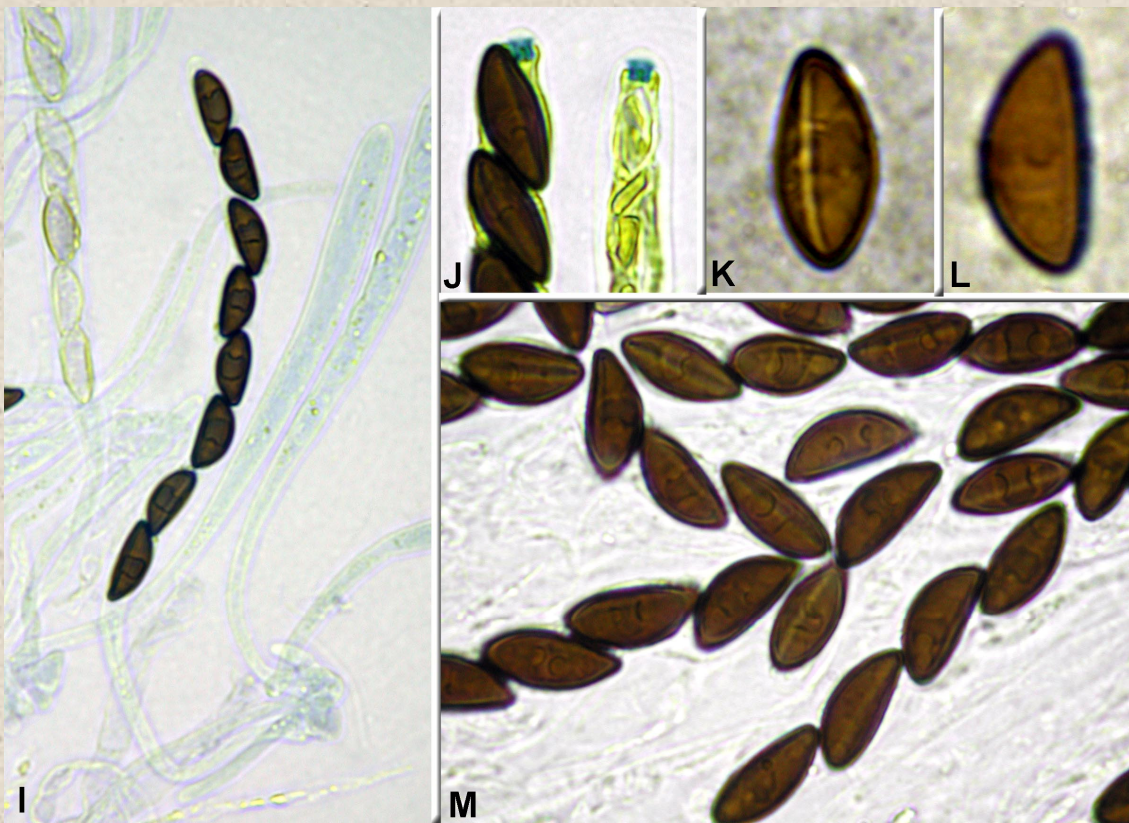
Anamorphic stromata (H) filiform, with a white anamorphic layer peeling off gradually, revealing the underlying golden brown layer.

Asci (I) cylindrical with eight slightly overlapping uniseriate ascospores, 130-140 µm total length, the spore-bearing parts 80-90 µm long x 8-8.5 µm broad, the stipes 55-85 µm long, with apical apparatus cuboid, 1.7-2 µm high x 1.7-2 µm broad, bluing in Melzer's reagent (J). Paraphyses copious, embedded in mucilage.

Ascospores (K-M) (9,0) 10,1 - 11,4 (12,0) x (4,3) 4,7 - 5,2 (5,4) µm ; Q = (1,8) 2,0 - 2,4 (2,6) ; N = 40 ; Me = 10,7 x 4,9 µm ; Qe = 2,2, ellipsoid-inequilateral with both ends narrowly rounded to acute or one end acute and the other broadly rounded, dark brown, smooth, with a conspicuous straight germ slit spore-length or nearly so on the flattened side, without sheath or appendages visible in India ink (K, L).

(11,1) 11,4 - 12,9 (13,2) x (4,6) 4,9 - 5,6 (5,9) µm ; Q = (2,1) 2,11 - 2,5 (2,6) ; N = 40 ; Me = 12,1 x 5,3 µm ; Qe = 2,3 (JF 00118)

NOTES



Notes: the minute stromata of *X. oxyacanthae* are easily overlooked because they arise from buried seeds of *Crataegus* and just the fertile heads and the upper part of the stipe are usually protruding above the soil level. For this reason they are best seen at conidial state when the white filiform stromata contrast against the bare ground. It is apparently present only under old to very old *Crataegus* trees. This species is morphologically very similar to *X. carpophila*, from which it differs in having cuboid apical apparatus and darker ascospores, in anamorphic characteristics and host specificity.

Its presumable occurrence on *Carya* (Juglandaceae) woody fruits in USA is discussed by Stowell & Rogers (SR 83). Based on morphological and cultural data they concluded that the species growing on *Carya* was not different from typical *X. oxyacanthae*.

Anamorphic stromata of *Xylaria* were sporadically encountered on various buried stones of *Prunus persicaria*, *P. domestica*, nuts of *Juglans regia*, unfortunately none of them attained the teleomorphic state and could not be identified to species.

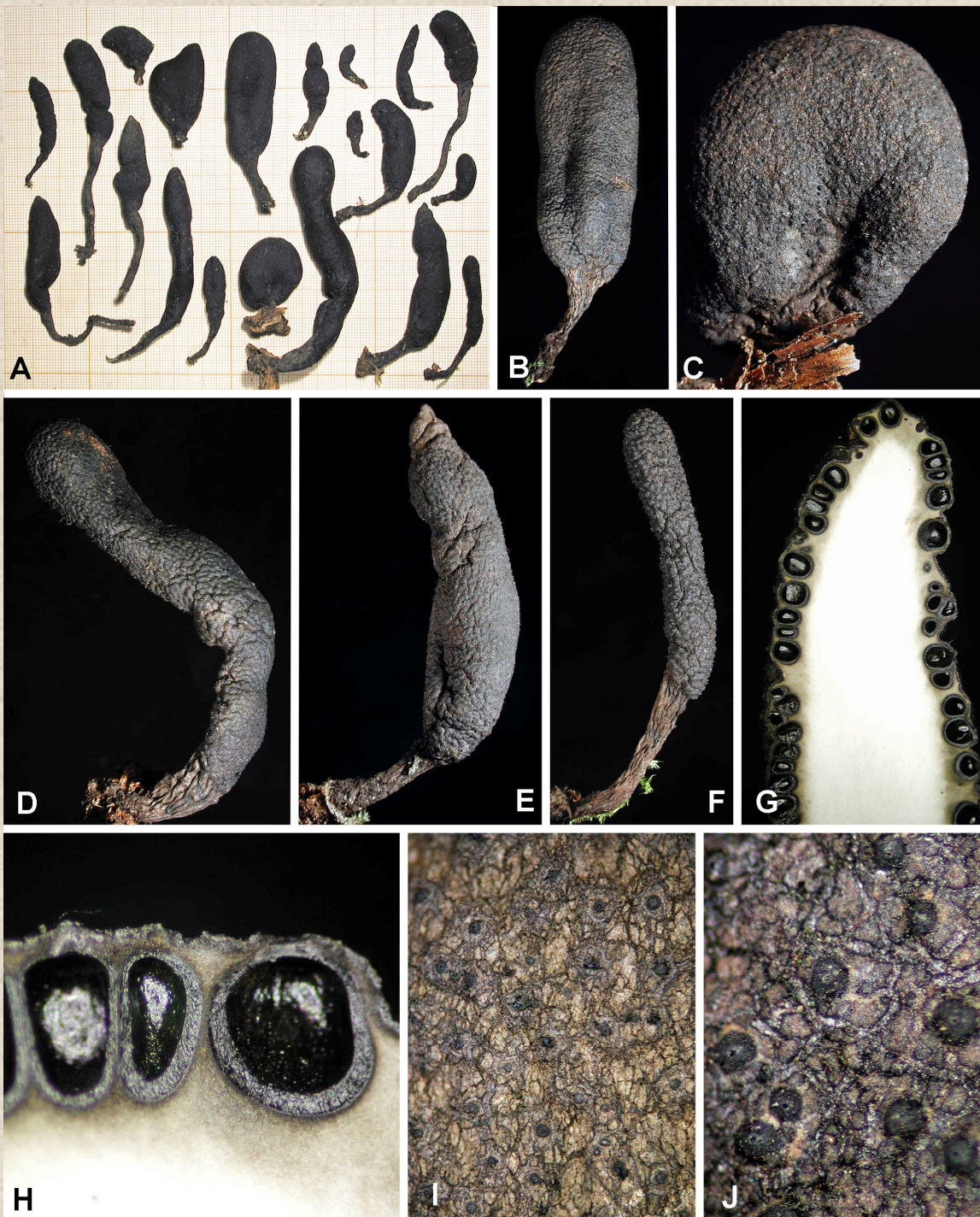
A collection of a mature stroma of *Xylaria* on *Cornus sanguinea* seed was sent by Peter Welt. It was morphologically much alike *X. oxyacanthae*, but was deviating in having significantly larger ascospores averaging $13,0 \times 5,7 \mu\text{m}$; $Q_e = 2,3$. It was communicated to Prof. Rogers and Dr. Yu-Ming Ju who provisionally concluded that those species assignable to *X. oxyacanthae* occurring on other hosts than *Crataegus* fruits cannot be separated based on morphology nor ITS sequences but remain suspected of host-specificity until more extensive sampling allows to sort them out.

Also see comments on *X. delitschii*.

Distribution: Europe and North America.

[BACK TO KEY](#)

[Close](#)

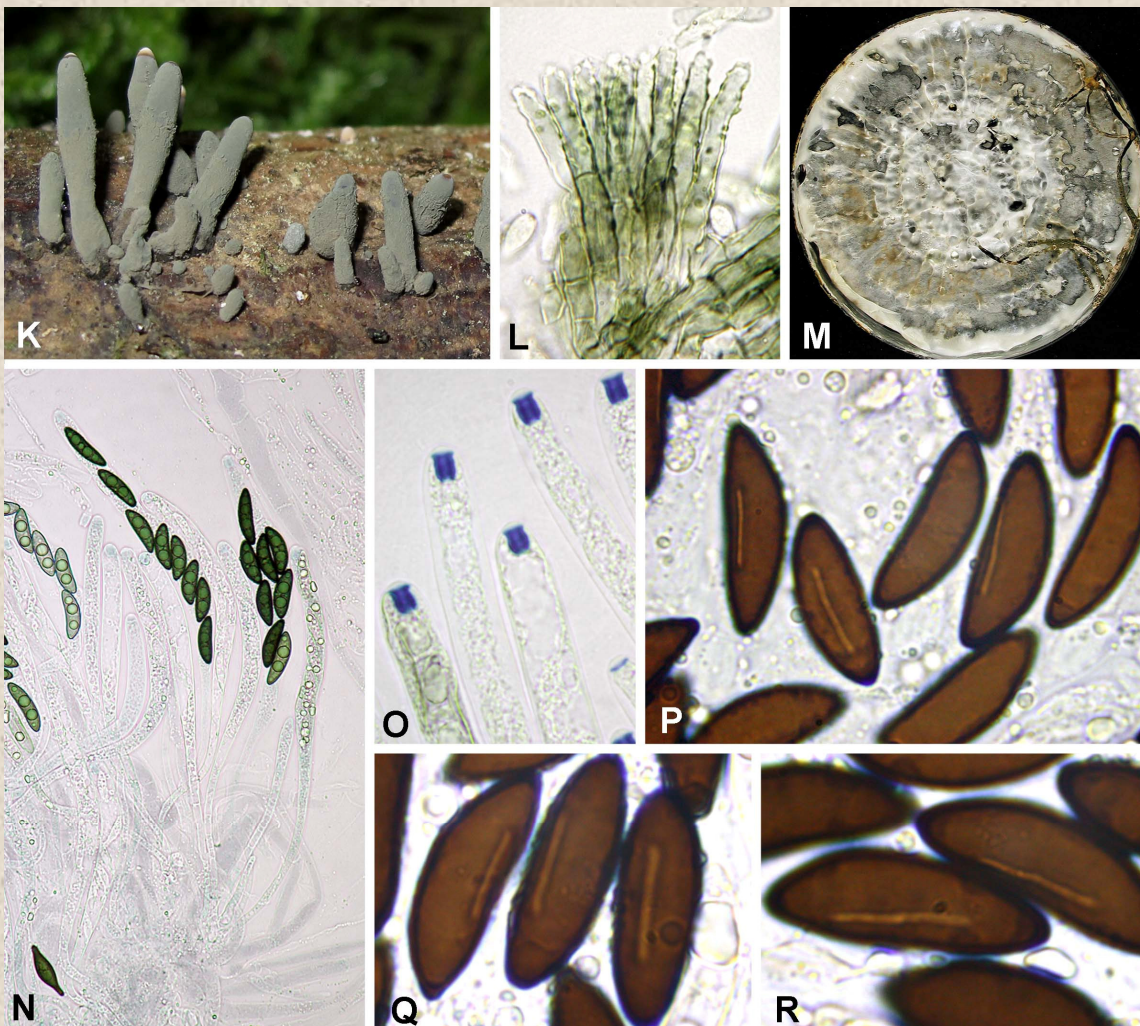


Xylaria polymorpha (Pers.: Fr.) Grev.

France, Ariège : Rimont, Peyrau, Paletès, 400m, on a dead moss-covered trunk of *Alnus glutinosa* lying on the ground, 20 Nov. 2009, **JF 09311**

Stromata upright, long-stipitate to nearly sessile, variously shaped (A-F) ranging from clavate to fusiform or discoid, at times truffle-like, terete to flattened, straight, contorted or curved, simple, 15-80 mm total height, the fertile head 10-68 mm high x 5-24 mm broad, typically with broadly rounded fertile apices (G) but sometimes with pointed sterile apices; the stipes usually well-defined, 5-45 mm high, dark brown, glabrous and puckered, swollen and downy at base. Stromatal surface brown (I) to brownish black (J) in age, even to slightly nodulose, wrinkled in places, roughened by ostioles and a persistent outer layer cracking into small polygonal scales varying from brown to black depending on the state of maturity (J); crust black, leathery, ca 40 µm thick; interior white to cream-coloured, pale olivaceous brown between the perithecia (G, H), solid, spongy, with a faint brown to blackish core at maturity. **Perithecia** immersed to slightly exposed, subglobose 0.7-1mm diam. **Ostioles** discoid to hemispherical, 170-250 µm diam, black (J).

Anamorphic stromata on natural substrate (K) covered by the geniculosporium-like palisadic anamorph (L) forming a greenish grey powdery layer (France, Ariège, Rimont, trail from Las Muros to Saurine, dead stump, 12 Jun. 2011, **JF 11063**). Colonies on OA (M) at first white and velvety, turning zonate, overlain by olivaceous and dark grey mycelium, yielding sterile conidiomata at the periphery.



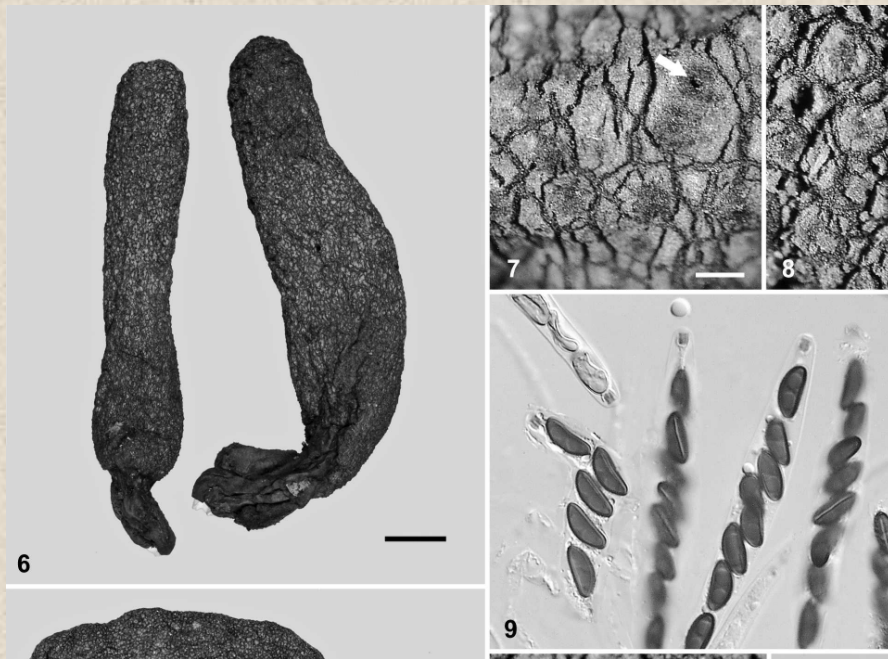
Asci cylindrical (N), (3-)8-spored, the spore-bearing parts (80-)140-160 μm long x 8.5-11 μm broad, the stipes 120-140 μm long, with apical apparatus rectangular to slightly urn-shaped, 3.5-4.2 μm high x 3-3.5 μm broad, bluing in Melzer's reagent (O). Paraphyses filiform, copious.

Ascospores (19,8) 20,4 - 23,7 (25,6) x (6,1) 6,3 - 7,3 (7,4) μm ; Q = (2,7) 2,9 - 3,6 (4,0); N = 50; Me = 22,0 x 6,8 μm ; Qe = 3,3, overlapping uniseriate in the ascus, at times multiseriate, ellipsoid-inequilateral to navicular with narrowly rounded to slightly pinched ends (P-R), slightly curved and somewhat banana-shaped, dark olive brown when fresh to dark brown, smooth, with a conspicuous parallel to oblique straight germ slit 1/2 to 2/3 spore-length on the ventral side (P-R), more rarely on the dorsal side (P, second spore from the left); cellular appendages not seen.

Notes: *Xylaria polymorpha* is a well-known and often recorded ascomycete due to its frequent occurrence on various woody substrates, including bamboo, and its often large-sized and conspicuous stromata. As suggested by its name, its habit is highly variable, even within a same collection as illustrated above. It is first easily distinguished from most of European species more or less closely related to *X. hypoxylon* in lacking the striped greyish outer layer encountered in this group and in having instead a corky-cracked surface in shades of brown. Two other species encountered in the same geographical area that feature a similar stromatal surface, i. e., *X. corniformis* and *X. longipes*, can be easily distinguished from *X. polymorpha* by their much smaller ascospores and their germ slit morphology, respectively straight and sigmoid.

Distribution: Europe and North America (RC 86).

Rogers and Callan (RC 86) reported *X. polymorpha* as a common species in North America, especially in eastern and midwestern parts, with a possible cryptic species with a more southern distribution that features more brown-coloured stromata and has ascospore that hardly germinate in culture and yield much larger conidial stromata. All European collections that have been cultured proved to germinate readily, but this does not warrant the absence of cryptic species in the *X. polymorpha* complex in Europe too.



Xylaria primorskensis Ju, Hsieh, Vasiljeva & Akulov

Description and illustrations from Ju et al. 2009, with authors' permission

Xylaria primorskensis Y.-M. Ju, H.-M. Hsieh, Lar. N.

Vassiljeva & Akulov, sp. nov. FIGS. 6–9

MycoBank MB513100

Etymology. After Primorsky Territory, where this fungus was first collected.

A *Xylaria corniformis* var. *obovata* differt in ascosporis utrinque convexis et colore dilutiore.

Stromata cylindrical or clavate to occasionally grotesque, unbranched, rounded and fertile at apex, on a stout stipe, 2–11 cm long by 0.5–1.4 cm broad, 1–8 cm long at fertile parts, 0.5–3.5 cm long at stipes; surface

lacking perithecial mounds, wrinkled, with minute pits in places, blackish with a brown tinge on the fertile part due to the presence of a finely reticulately cracked, dark brown outer layer, black on the stipe overlain with a dark vinaceous brown tomentum, underlain with a black layer of ca. 0.03 mm thick; interior white, coriaceous. Perithecia spherical, 0.4–0.6 mm diam. Ostioles papillate, 0.1–0.15 mm broad at base. Asci with eight ascospores arranged in uniseriate manner, cylindrical, 130–180 μm total length by 7.5–8.5 μm broad, the spore-bearing parts 60–70 μm long, stipes 70–115 μm long, with an apical ring staining blue in Melzer's iodine reagent, inverted hat-shaped, 2–2.5 μm high by 2 μm broad. Ascospores brown to dark brown, unicellular, narvicular to ellipsoid-inequilateral, with narrowly rounded ends, smooth, 9–11 \times 4–5 μm , with a straight germ slit spore length on the ventral side; episporium smooth.

Cultures and anamorph. Colonies on OMA covering 9 cm Petri dish in 3–4 wk, white, velvety, appressed, azonate or faintly zonate, with lobed margins. Reverse uncolored. Anamorph not produced.

Specimens examined. CHINA. Heilongjiang Province, Shengli State Farm, on wood, 6 Aug 2004, *Vasilyeva, L.N.* (cultured) (VLA, HAST), in two packets. RUSSIA. Primorsky Territory, reserve Lazovsky, on log, 19 Aug 2005, *Vasilyeva, L.N.* (cultured, GenBank accession number FJ707473) (VLA HOLOTYPE, HAST ISOTYPE); Primorsky Territory, district Ussurisky, Gornotaeyzhnoye, on log, 17 Sep 2001, *Vasilyeva, L.N.* (VLA, HAST); no detailed locality,

on wood, 2000, *Tcherepanov, P.* (CWU (Myc) AS 2209, HAST).

Additional specimens examined. ARGENTINA. Misiones, on wood, 1886, *Holmberg, C. L.* (LPS 3310 HOLOTYPE of *X. holmbergii*). SWEDEN. Småland, logs of *Fagus* (E 00218736, K[M] 144056 ex herb. Cooke SYNTYPES of *X. corniformis*). USA. New York, Potsdam, on wood, 6 Dec 1892, *Ellis, J.B.* 2796 (NY ISOTYPE of *X. corniformis* var. *obovata*).

Commentary. *Xylaria primorskensis* is a member of the complicated *X. corniformis* complex. Species assigned to this species complex are characterized by stromata overlain with a thin outer layer, which is gradually cracked into fine scales while maturing. The fine scales usually remain adhered to the stromatal surface but may fall off when over-mature. There is little doubt that *X. primorskensis* was reported by Dennis (1971) from Russian Far East as *Xylosphaera feejeensis* subsp. *faveolis* (C.G. Lloyd) Dennis [\equiv *Xylaria faveolis* C.G. Lloyd], which is a synonym of *X. curta* Fr., a species characterized by whitish fine scales and mainly distributed in the tropics and subtropics. *Xylaria corniformis* var. *obovata* Cooke & Ellis (FIGS. 10–13), an equivalent of *X. corniformis sensu* Læssøe (1987), resembles *X. primorskensis* in having robust stromata and is

probably the most frequently encountered member of the *X. corniformis* complex in northern temperate regions (Rogers 1983 [as *X. curta*], Læssøe 1987, Callan and Rogers 1990 [as temperate collection of *X. curta*]). Although *X. corniformis* var. *obovata* has a similar ascospore size as *X. primorskensis*, its ascospores differ in being blackish brown and convex on both sides. Typical *X. corniformis* (FIGS. 14–17) appears to be a rare fungus, known only from Sweden and perhaps Poland thus far (Læssøe 1987 [as possible abnormal collections of *X. corniformis*]). Unlike var. *obovata* and *X. primorskensis*, it has delicate, horn-like stromata that are attenuated or even sterile at the apex. Ascospores of *X. corniformis* resemble those of var. *obovata* in shape but differ primarily in having a lighter color. We are inclined to consider *X. corniformis* and var. *obovata* as distinct species but are refrained from making a formal taxonomic decision until further evidence is available. South American *X. holmbergii* Speg. is highly similar to *X. primorskensis* from which it differs mainly in having an ascospore germ slit much less than spore length.

[BACK TO KEY](#)

[Close](#)

Xylaria putaminum Maire et Dur.

CHAMPIGNON
N° 11.162
DE TANGER

N° 6105

sur vieilles olives

Cherf el Akab

28.01.61

MPU-BERT-08-060-03

Clavules fusiformes, atteignant 20 mm de haut, à somme atténué et stérile formant un apicule blanchâtre étroitement conique de 2 mm de haut.

Partie fertile large de 1-1,5 mm, fortement bosselée-rugueuse par la saillie des périthèces, d'abord gris ocré et fibrilleuse, puis noirâtre.

Stipe atteignant la moitié de la hauteur totale, soit 10 mm, filiforme (0,5 mm diam. environ), à surface irrégulièrement striée, noirâtre, la base poilue-tomentueuse et pourpre foncé, un peu dilatée au contact du support.

Substance blanchâtre, blanc rosé, formée d'hyphes hyalines larges de 2,5 μ en moyenne, densément entremêlées et d'aspect cérébriforme.

Périthèces subglobuleux, de 300-450 μ diam., à parois peu colorées, groupés en périphérie du stroma.

Thèques cylindriques, à sommet pourvu d'un appareil apical amyloïde en bleu, 8-spores, 100-110 x 6-7 μ .

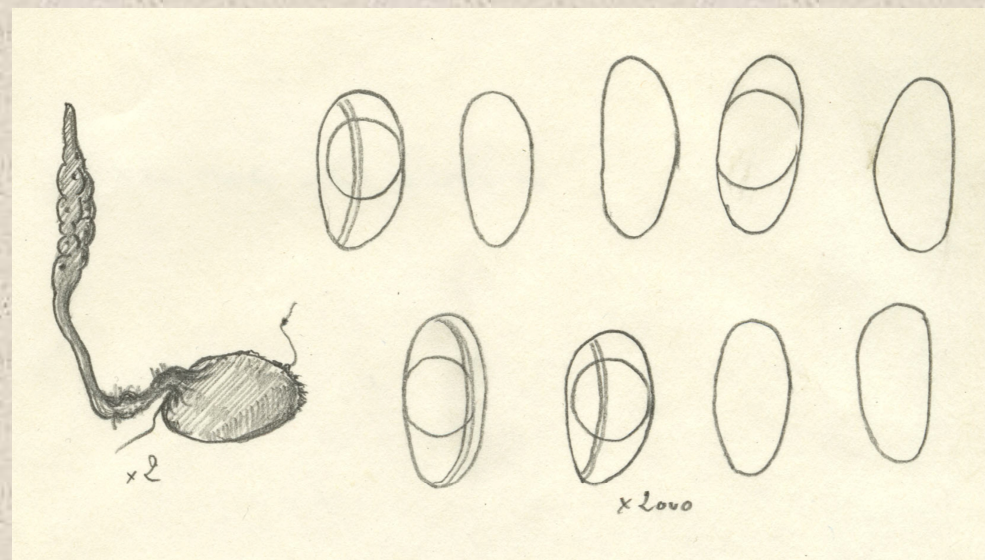
Spores elliptiques, obtuses, inéquilatérales, brun foncé, lisses, renfermant une grosse gouttelette centrale et pourvues d'un sillon germinatif: 11,5-13,5 x 5-6-(6,5) μ .

Obs.- Correspond parfaitement à la description de Maire (N° 6768 AFN, Algér, 1.01.20) sous réserve de la présence de nombreuses spores mûres chez nos échantillons (les exemplaires de R. Maire sont immatures, comme l'a noté l'auteur).

Il ne saurait s'agir du X. carpophila tel que l'a suggéré DENNIS (in litt.), ce dernier ayant des conidies brun rosâtre en masse, alors que celles de X. putaminum sont un peu grisâtres.

A noter que les vieux fruits d'Olea récoltés par nous sont pratiquement réduits au noyau, mais c'est bien le péricarpe desséché qui semble servir de support au champignon et non le noyau.

Xylaria putaminum Maire & Durieu



Descriptions and illustrations by Bertault, kindly communicated as electronic files by Marie Joséphe Mauruc are available at MPU, Montpellier, France, where the material is housed.

Xylaria putaminum as described by Bertault from material collected in Morocco is distinctive in growing on *Olea* stones. The type material from Algeria is said to be immature. The ascospore morphology, especially the broadly rounded ends (if we rely on Bertault's observations and drawings), suggests a possible difference with *X. oxyacanthae*. *Xylaria putaminum* can be expected to be present in Mediterranean regions of Europe like Italy and Spain.

A specimen collected on the same date in the same location is illustrated below by Bertault. It deviates in having smaller ascospores.

Observations reported by Graniti (G 59) point toward a possible conspecificity with *X. sicula* that is known from *Olea* leaves. Aside from the substrate, the main difference appears to be the stromatal shape, fusiform in *X. putaminum* vs. subglobose in *X. sicula*. See observations on the latter's page.

[BACK TO KEY](#)

[Close](#)

Xylaria sp.
=====

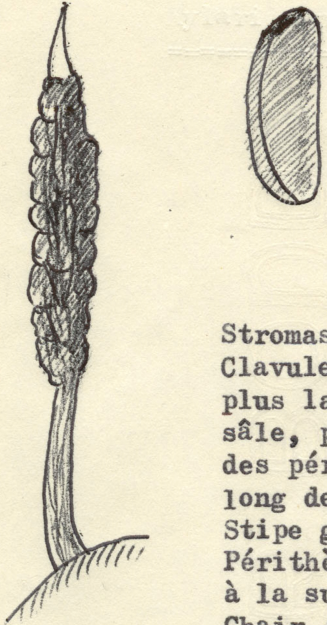


sur vieux fruits
d'Olea europaea

Cherf el Akab

28 / I / 61

A étudier



Stromas droits, stipités, atteignant 25 mm de haut.
Clavule fusiforme, épaisse de 2 mm dans sa partie la plus large, à surface d'abord fibreuse et gris ocracé sâle, puis bosselée difforme et noirâtre par la saillie des périthèces, terminée au sommet par un apicule pointu long de 1 à 2 mm., stérile, blanchâtre.

Stipe gris brun, glâbre, irrégulièrement sillonné.
Périthèces subglobuleux, proéminents, densément groupés à la superficie du stroma, de 300 à 450 μ de diamètre.
Chair du stroma blanc rosé.

Thèques cylindriques, avec un appareil apical bien visible se colorant en bleu par l'iode, $100 \times 6 - 7 \mu$, 8-spores.
Spores elliptiques, inéquilatérales, à sillon germinatif évident, atténuées mais obtuses aux extrémités, d'abord hyalines puis gris fuligineux, enfin noirâtres, $10 - 11 \times 5 \mu$.

N.B. Saccardo ne signale aucun Xylaria sur ce support.
Seul, Oudemans cite un X. oleagina Thüm. qui semble s'apparenter plutôt au Thamnomycetes siculus.
Cf Dossier N° 6106 sur cette dernière espèce.

BACK TO KEY

Close

Xylaria scruposa (Fr.) Fr.

Xylaria scruposa is a widespread pantropical species we did not so far encounter in Europe but as it has been reported from France, Germany and Switzerland by Rogers (RC 86) it is included in this survey. The following description is based on material collected in the Caribbean.

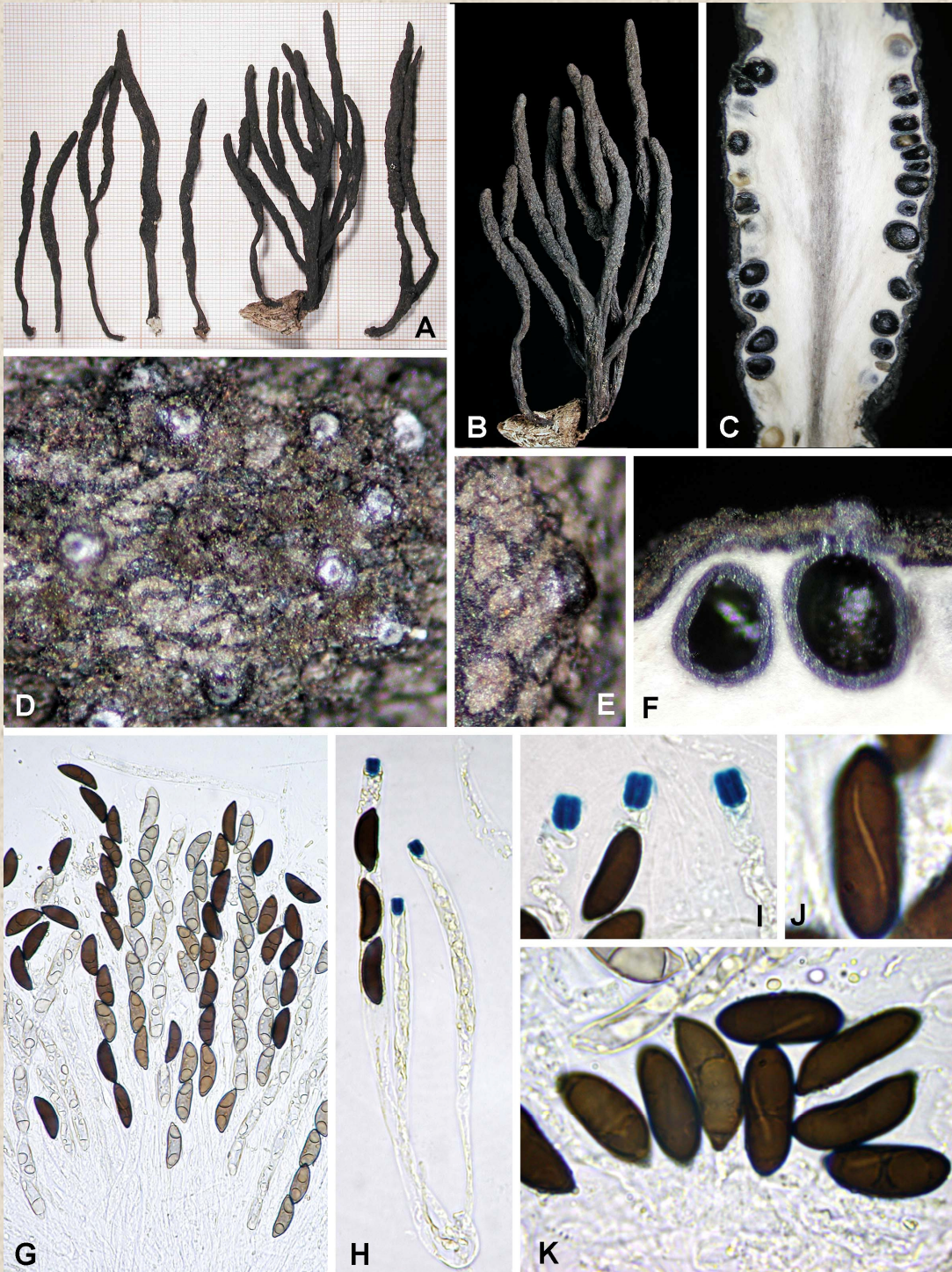
FWI, Martinique : Trinité, Pointe Rouge, on dead wood, 27 Aug. 2005, Christian Lechat, **CLL 5217**

Stromata (A, B) upright, cylindrical, simple to branched from the base or above, usually densely clustered to fasciculate, 50-80 mm total height, the fertile head 35-55 mm high x 3-5 mm diam, contorted to curved, flattened to wrinkled in places, with narrowly rounded fertile apices; the stipes ill-defined, 20-30 mm high, dark brown, finely tomentose, puckered, swollen and tomentose at base. Stromatal surface dark brown, strongly roughened by wrinkles and thick outer layer cracking into small polygonal to elongated scales (E), overlaid by tufts of brown tomentum (D); crust black, leathery, ca 40 µm thick (F); interior white to cream-coloured, solid, spongy, with a brown core (C). **Perithecia** immersed to slightly exposed, subglobose 0.5-0.6 mm diam (F). **Ostioles** discoid to hemispherical, 170-200 µm diam, black, often overlaid by white substance (D, E).

Asci cylindrical, 3-8-spored (G, H), the spore-bearing parts (80-)120-135 µm long x 9-10 µm broad, the stipes 50-80 µm long, with apical apparatus rectangular somewhat rounded-attenuated at base, 5.5-7 µm high x 4-4.5 µm broad, bluing in Melzer's reagent (H, I).

Ascospores (14,6) 15,2 - 17,3 (19,7) x (5,8) 5,9 - 6,7 (6,9) µm ; Q = (2,2) 2,3 - 2,8 (3,2) ; N = 36 ; Me = 16,2 x 6,3 µm ; Qe = 2,6, obliquely uniseriate in the ascus, ellipsoid-inequilateral to navicular with narrowly rounded to pinched ends, dark brown, smooth, with a conspicuous oblique to sigmoid germ slit 1/2 to 2/3 spore-length (J, K).

Notes: *Xylaria scruposa* is at the same time very common in tropics and highly variable in stromatal morphology. The collection illustrated here is quite typical, but stromata can be much smaller and more robust, with broadly rounded apices, nearly sessile to long stipitate, variously branched. This taxon is chiefly identified based on ascospore morphology and characters of stromatal surface, but in different collections, even from the same region, the ascospores may vary in dimensions, shape and germ slit morphology ranging from short oblique to longer and sigmoid. The wider ascospore size range given in the key is a consequence of these variations. At the present time it is interpreted as a widespread taxon with variable morphology, but it may turn out one day to be a complex of closely related species.

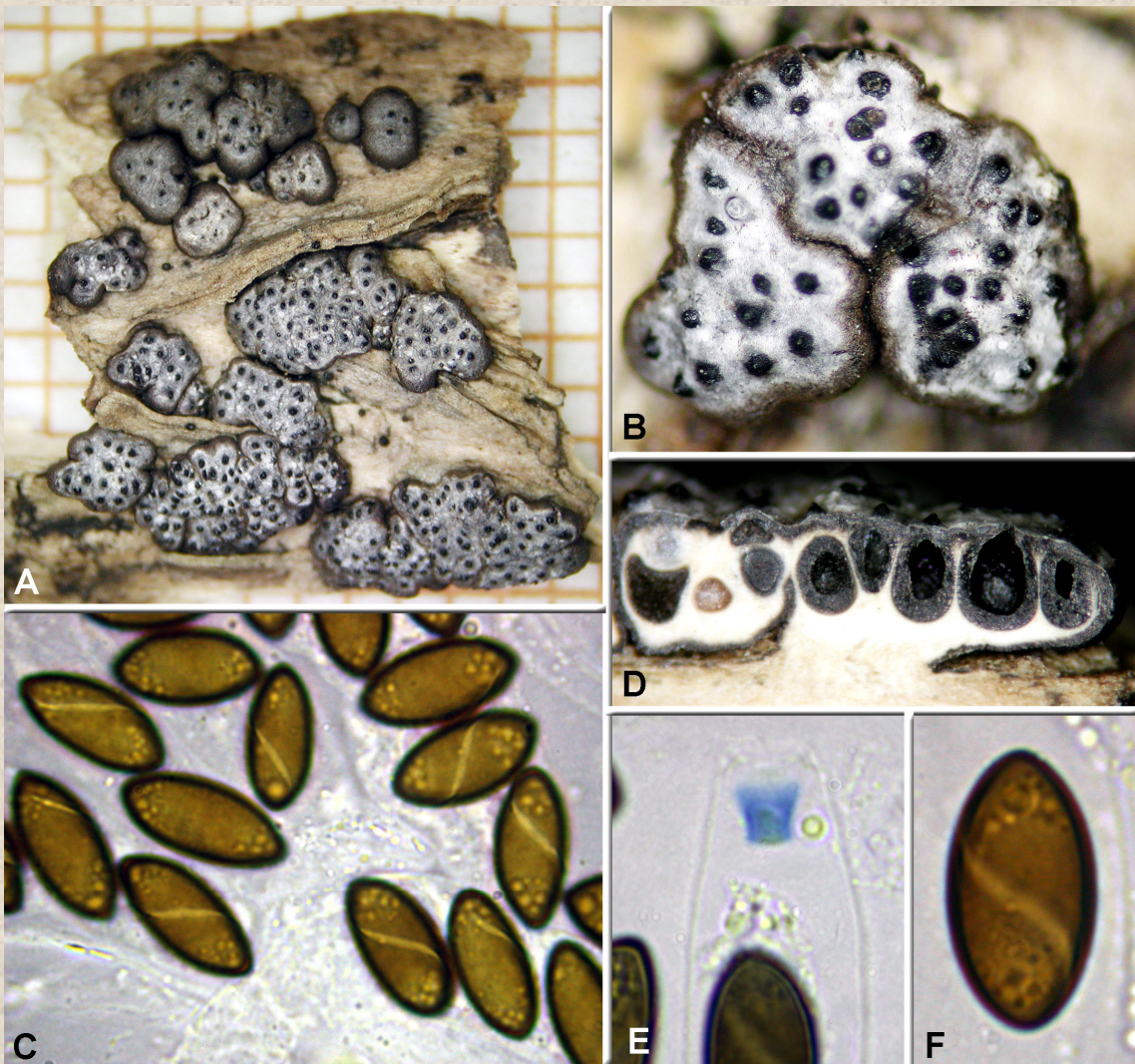


[BACK TO KEY](#)

[Close](#)

Xylaria sibirica Y.-M. Ju, H.-M. Hsieh, Lar. N. Vasiljeva & Akulov

Russia: Primorsky Territory, vic. Valdivostok, Natural Reserve "Cedrovaya Pad" 19 Aug. 2005, on roots of unidentified deciduous tree, leg E. Popov, comm. A. Akulov, **CWU (Myc) AS 2065** (Isotype).



Stromata (A, B) pulvinate, flat-topped, with lobate margins, 1-3 mm diam, 0.9-1 mm thick, superficial, gregarious and often coalescent, attached to the substrate by a narrow central connective (D); surface pale brown to dark grey, with a long persistent white powdery layer on top (B), with inconspicuous perithecial contours except at sides, soft-textured, with a black leathery crust 50-80 μm thick; interior white, solid, spongy, extending downwards into the connective (D). **Perithecia** ovoid, 0.5-0.6 mm high, 0.4-0.5 mm diam. **Ostioles** black, coarsely conic-papillate (B).

Asci cylindrical to slightly clavate, readily deliquescent, the spore-bearing parts 120-145 μm long x (10-)12-14 μm broad, the stipes 75-100 μm long, with eight obliquely uniseriate ascospores at times irregularly biseriate in upper part, with a cuboid with flared apex subapical apparatus 4-5 μm high x 4-4.5 μm broad, bluing to weakly bluing in Melzer's reagent (E). Paraphyses copious, 6-8 μm broad at base, tapering above asci.

Ascospores (C, F) (12,2) 13,3 - 15,7 (16,0) x (6,3) 6,5 - 7,5 (7,8) μm ; Q = (1,7) 1,8 - 2,2 (2,3); N = 40; Me = 14,5 x 7,1 μm ; Qe = 2,1, ellipsoid equilateral with narrowly rounded ends, unicellular, olivaceous brown to brown, with small guttules clustered at both ends, wall smooth, with a conspicuous spiralling germ slit less than spore-length; no sheath or appendages visible in India ink.

Notes: *Xylaria sibirica* is characterised by small soft-textured pulvinate stromata with a long persistent white powdery coating and equilateral ascospores with a conspicuous spiralling germ slit. It is assigned to *Xylaria* instead of *Nemania* based on the restricted stromata and the synnematous *Xylocoremium*-like anamorph obtained in culture (JHVA 09). It is externally much like *X. lechatii* Ju, Hsieh, Rogers & J. Fourn. collected in French West Indies, from which it mainly differs by the distribution and ascospore germ slit morphology (JHR12).

Its occurrence in Far East Russia from which it is so far only known is likewise remarkable.

[BACK TO KEY](#)

[Close](#)

Xylaria sicula Pass. & Beltrani

Spain, Andalusia, Cordoba Prov., Hornachuelos, Los Cerrillares, dead *Olea* leaves, 07 Dec. 2008, M. A. Ribes MAR-071208-36 (immature)



Photo M. A. Ribes

Notes: A *Xylaria* growing on dead *Olea* leaves was first described from Sicily in 1878 by Passerini & Beltrani (PB78), as *X. sicula*. It was characterised by stromata 1-3 cm high with subglobose and mucronate fertile heads on long filiform stipes, and ascospores $6 \times 4 \mu\text{m}$. Further reports of a *Xylaria* on *Olea* leaves were published by Maire (M 15, M 27) and Killian (K 29) from Algeria, Ciccarone (C47) from Kenya, Graniti (G 59) from Sardinia, Sicily and South Italy, Bertault (B 84) from Morocco and Moreno *et al.* (MPG 08) from South Spain. The material collected and studied by these authors was in agreement with the original description as to the gross morphology of stromata but clearly deviated, when mature, by larger ascospores $9-13 (15) \times (3-)4,5-6(-7) \mu\text{m}$. This discrepancy led Ciccarone (C47) to create *X. sicula f. major* based on a collection from Kenya featuring such larger ascospores. Graniti (G59) assessed that the type collection of *X. sicula* was apparently lost and revived *X. sicula*, emended with ascospores $9-15 \times 3-7 \mu\text{m}$ after reexamination of Ciccarone's original slide.

Furthermore, Graniti (G59) successfully inoculated leaves and fruits of *Olea* with a culture of *X. sicula* and obtained similar sterile stromata on both substrates. He also reported and illustrated in the same study the ascigerous state of *X. sicula* on both natural substrates, which would imply that *X. putaminum* Maire & Dur. known from *Olea* stones might be a synonym.

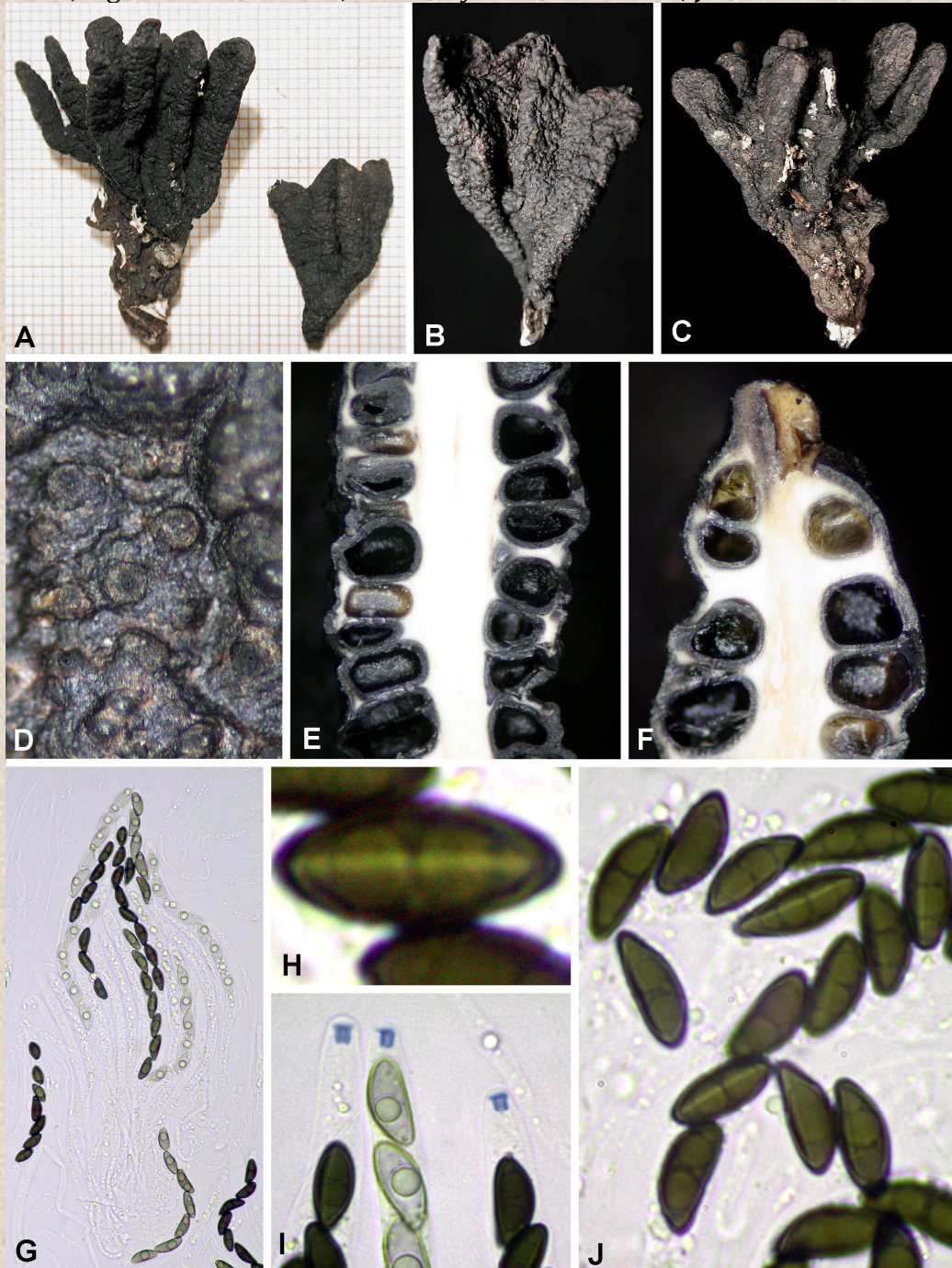
I gratefully acknowledge Milena Tanaskovic, Alessio Pierrotti and Guy Garcia for their invaluable help to gather the hard to find literature cited in this attempt to summarize the nomenclatural history of *X. sicula*. No doubt further work is needed to sort out the *Xylaria* species affiliated to *Olea* in southern Europe and North Africa.

[BACK TO KEY](#)

[Close](#)

Xylaria sp. "Gotland"

Sweden, Gotland, Skansudd, N: 57.2884 E: 18 1050, buried wood, 24 Sept. 2010, leg. Irene Andersson, comm. by Thomas Læssøe, **JF 11004**



Stromata (A-C) fasciculate to palmate, 19-33 mm total height, with fertile parts 14-20 mm high x 4-7 mm broad x 2-3 mm thick, branching 2-3-times, flattened, with bluntly rounded to minutely mucronate sterile apices (F); surface dull black with a greyish peeling outer layer present in places at stromatal apices, cracked into longitudinal furrows, nodulose to cerebriform with shallow wrinkles isolating small groups of perithecia, with perithecial contours most often hardly exposed (D); outer crust 40-50 μm thick, leathery. Interior solid, homogeneous, cheesy, white (E, F). The stipes ca 15 mm high, tightly fused into a common, irregular, apparently rooting broken stipe, dark brown to blackish, covered by a golden brown to black tomentum. **Perithecia** subglobose, 0.5 mm diam to laterally compressed when crowded (E). **Ostioles** bluntly papillate to most often raised-discoïd, 200-250 μm diam (D).

Asci (G) unitunicate, with eight obliquely uniseriate ascospores, cylindrical, long-stipitate, 135-150 μm total length, the spore-bearing parts 68-76 x 7.5-8.5 μm , the stipes very fragile at maturity, 65-80 μm long, with apical apparatus tubular with flared apex, 2-2.5 μm high x 1.7 μm broad, bluing in Melzer's reagent (I). Paraphyses sparse, hypha-like, hyaline, septate.

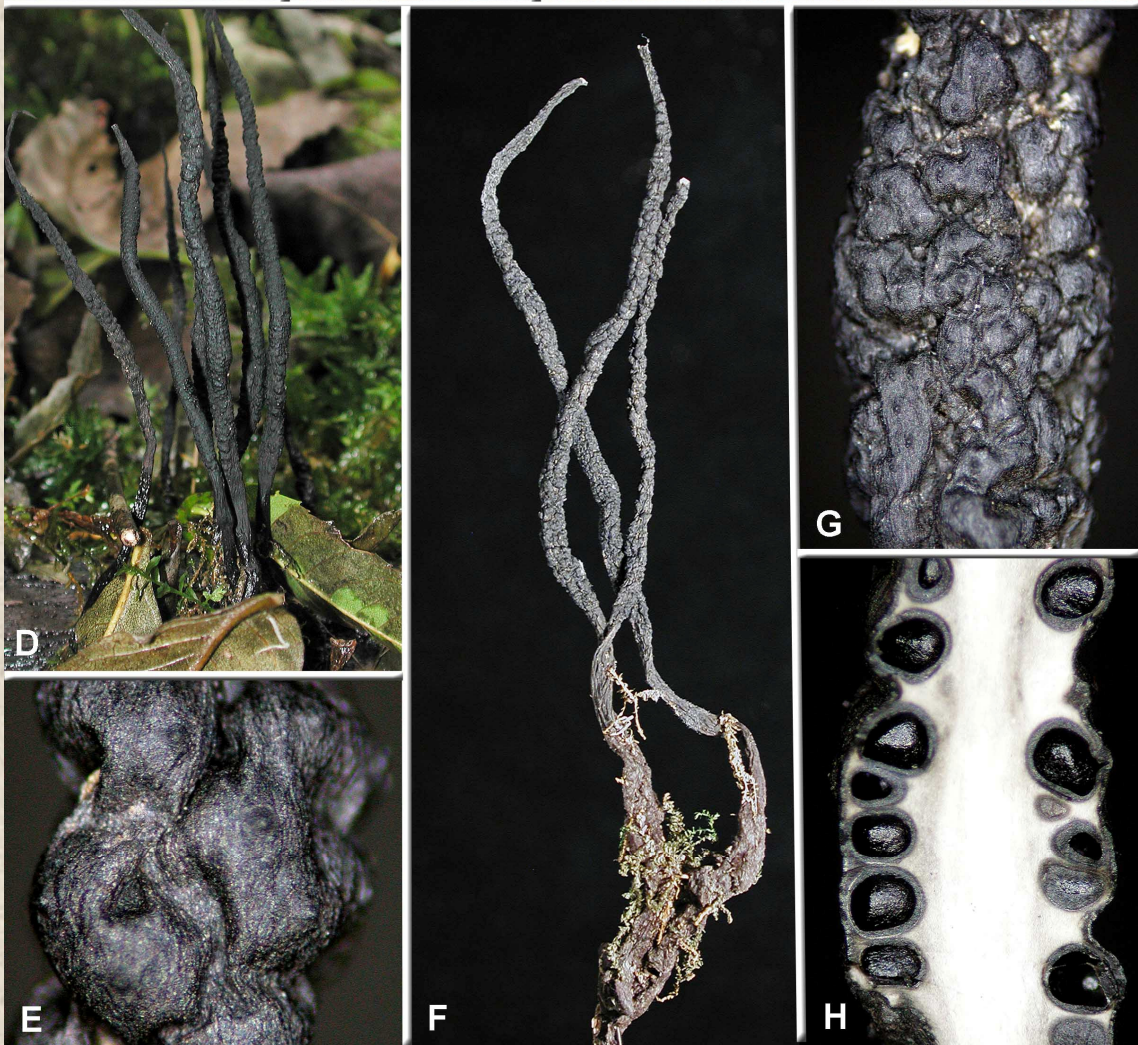
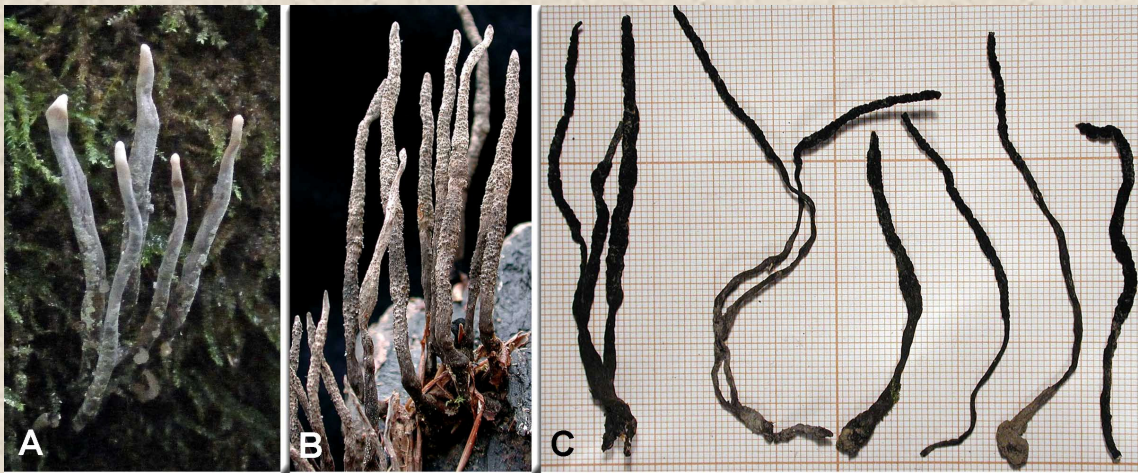
Ascospores (10,1) 11,1 - 13,1 (14,6) x (4,6) 4,7 - 5,5 (5,9) μm ; Q = (1,9) 2,1 - 2,6 (2,8); N = 45; Me = 12,1 x 5,2 μm ; Qe = 2,3, ellipsoid-inequilateral with narrowly rounded ends to pip-shaped, one end often attenuated to slightly pinched, dark olive brown, smooth, devoid of visible cellular appendage at maturity, with two large guttules, with a conspicuous straight germ slit spore-length or nearly so the flattened side (H, J).

Notes: This *Xylaria* has several traits in common with *X. hypoxylon*, such as flattened fertile parts with grey peeling outer layer, raised-discoïd ostioles, tomentose stipes and ascospores 10-13 μm long. It is however different in having a nodulose stromatal surface and most often broadly rounded apices, while ascospores deviate in averaging narrower and in having a spore-length germ slit. Judging from only those two stromata, it cannot be ruled out we are dealing with an aberrant form of *X. hypoxylon* growing on buried wood, with deviating ascospore morphology as it can be observed in this highly variable taxon.

Thomas suggested possible affinities with *X. karsticola* because of possible similar ecology linked to calcareous soil, the buried lower part of the stroma and the similar slightly piriform ascospores. In my experience, *X. karsticola* never reaches the soil surface and therefore never has such long rooting stipes; moreover its ascospores are significantly larger. Cultural and DNA sequence data would be helpful to sort this out when further collections become available.

[BACK TO KEY](#)

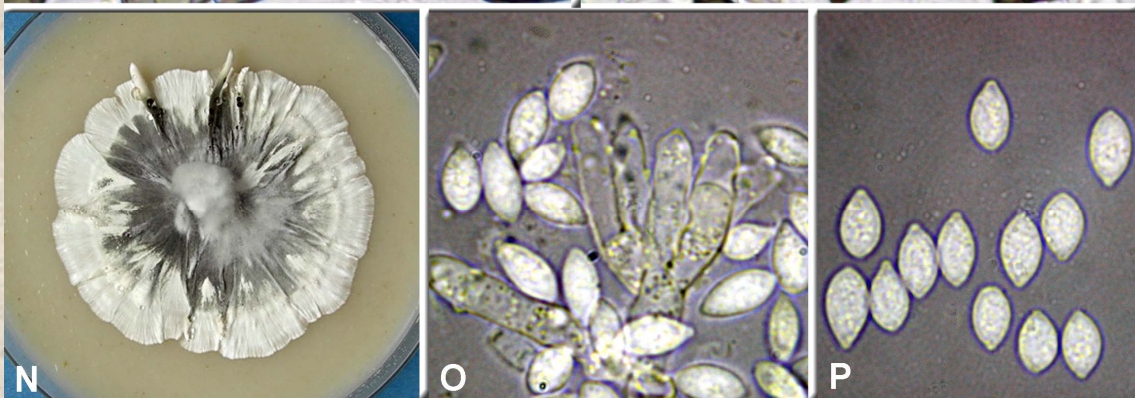
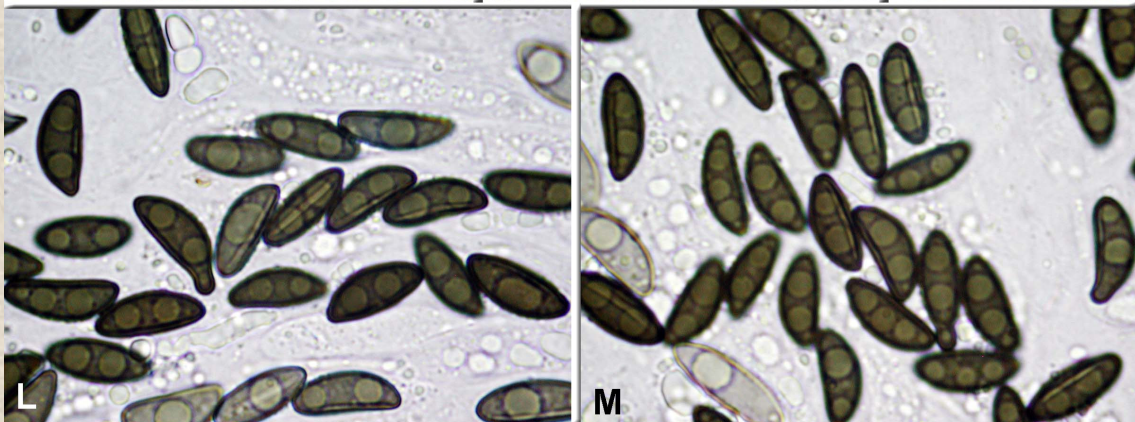
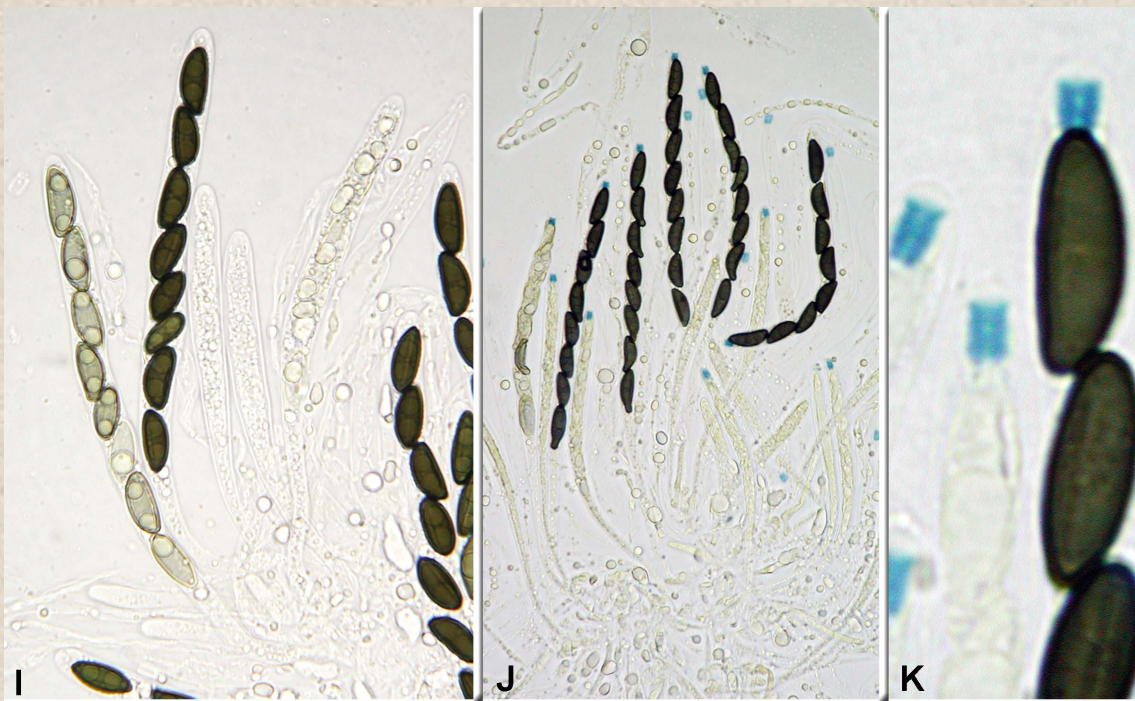
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Xylaria vasconica J. Fourn. & M. Stadler

France, Ariège: Rimont, Las Muros, 460m, on buried wood, 02 Oct. 2009, **JF 09263** (I-M, N) (holotype) ; Rimont, La Maille, 550m, on blackened wood in a streambed, immature, 8 July 2006, incubated outdoors until 30 Aug. 2006, **JF 06150** (B) ; Rimont, Las Muros, 460m, on buried wood (derived from JF 99198), 2 Oct. 2005, **JF 05116** (D, E, G, H); Rimont, Peyrau, 400m, on a dead trunk of *Fraxinus excelsior* across a brook, 09 Sept. 2012, **JF 12084** (F) ; same location and host, 23 Jun. 2013, anamorphic state, **JF 13098** (A, O, P). Pyrénées Atlantiques, Arudy, Bois du Bager, L'Ourtau, on unidentified buried log, 4 Sep. 1999, leg. J.F., J.-F. Magni & F. Candoussau, **JF 99198** (C)

Stromata (C-F) upright, solitary to most often densely clustered, simple to branching from the base by coalescence of the stipes, rarely branching above the stipe, (20-)50-110(-140) mm total height, long-stipitate; fertile parts terete, sometimes flattened, 30-70 mm high x 1.3-3(-4.5) mm broad, straight to contorted with narrowly rounded or mucronate sterile apices, at times longitudinally furrowed, strongly nodulose with deep wrinkles delimiting small groups of perithecia giving a cerebriform appearance (G); stipes 25-65(-90) mm high x 1-2 mm broad, often ill-defined, terete to strap-like, black, puckered, smooth to downy, arising from a pannose, distinctly enlarged base. Surface with a thin, vanishing pale brown peeling outer layer (B), dull black at maturity; outer crust 30-40 μ m thick, leathery, finely longitudinally furrowed to nearly smooth (E); interior solid, spongy, white to cream-coloured, at times dark grey between the perithecia (H). Anamorphic stromata (A, B) brownish grey, with white, powdery apices bearing the anamorph. **Perithecia** (H) immersed to nearly superficial, spherical to depressed spherical, 0.4-0.6 mm diam. **Ostioles** black, conical-papillate (E), 60-80 μ m diam, often inconspicuous. **Asci** (I, J) cylindrical, 8-spored, long stipitate, 120-170 μ m total length, the spore-bearing parts 85-95 μ m long x 5.5-7 μ m broad, the stipes 40-85 μ m long, with apical apparatus bluing in Melzer's reagent, tubular with a slightly flared apex, 2.5-3 μ m high x 1.7-2 μ m diam (K). Paraphyses copious, filiform, filled with large oily guttules best seen on fresh material. **Ascospores** (L, M) (11,2) 11,8 - 13,7 (14,9) x (4,5) 4,6 - 5,6 (6,3) μ m ; Q = (1,9) 2,3 - 2,8 (3,0) ; N = 32 ; Me = 12,8 x 5,1 μ m ; Qe = 2,5, uniseriate overlapping in the ascus, ellipsoid-inequilateral with narrowly rounded at times beaked ends and an inconspicuous hyaline cellular appendage visible on fresh material, disappearing at maturity, dark olive brown to dark brown, smooth, biguttulate, with a conspicuous straight germ slit 3/4 to nearly spore-length on the flattened side.



Colonies on OA (N) usually covering a 9 cm plate after 4-5 weeks, sometimes never reaching the edge of the colony even at prolonged incubation times. Mycelia on OA at first white, velvety, zonate, with finely lobed margins, sparsely developing brown patches. Aerial mycelium later attaining a cream to pinkish colour, surface becoming lanose at this stage of development. Reverse largely remaining uncoloured for up to four weeks, finally turning greyish brown. Anamorph on natural substrate (O) geniculosporium-like, palisadic, yielding broadly fusiform conidia 7-8 x 4-4,5 µm (P).

Notes: *Xylaria vasconica* is undoubtedly closely related to *X. hypoxylon*, through its slender stromata with acute sterile apices, on ill-defined stipes with enlarged pannose bases, and similar asci and ascospores. It deviates from this taxon in having always long cylindrical stromata that arise in dense clusters (never being flattened with forked or ramified, "antler-like" apices), a pale brown exterior layer at immature state, and a strongly nodulose surface featuring prominent groups of perithecia and small conical-papillate ostioles. Moreover, its conidial state occurs from spring to early summer, while *X. hypoxylon* rarely forms conidiogenous stromata before late autumn. The deeply wrinkled stromatal surface of *X. vasconica* resembles that of *X. karsticola*, but they differ in ostiolar morphology, ascospore shape - and ecology. Its habit with high, densely clustered filiform stromata is first distinctive in the field. A closer examination of its surface, showing the deep wrinkles, the cerebriform pattern and the prominent perithecial contours, along with a finely furrowed to nearly smooth outer crust and small conical ostioles, allow for its reliable identification.

Distribution : Southwestern France, Eastern USA, possibly Japan.

Additional information available in FS 11

[BACK TO KEY](#)

[Close](#)

Xylaria violaceorosea J. Fourn., A. Román, J. Balda & E. Rubio

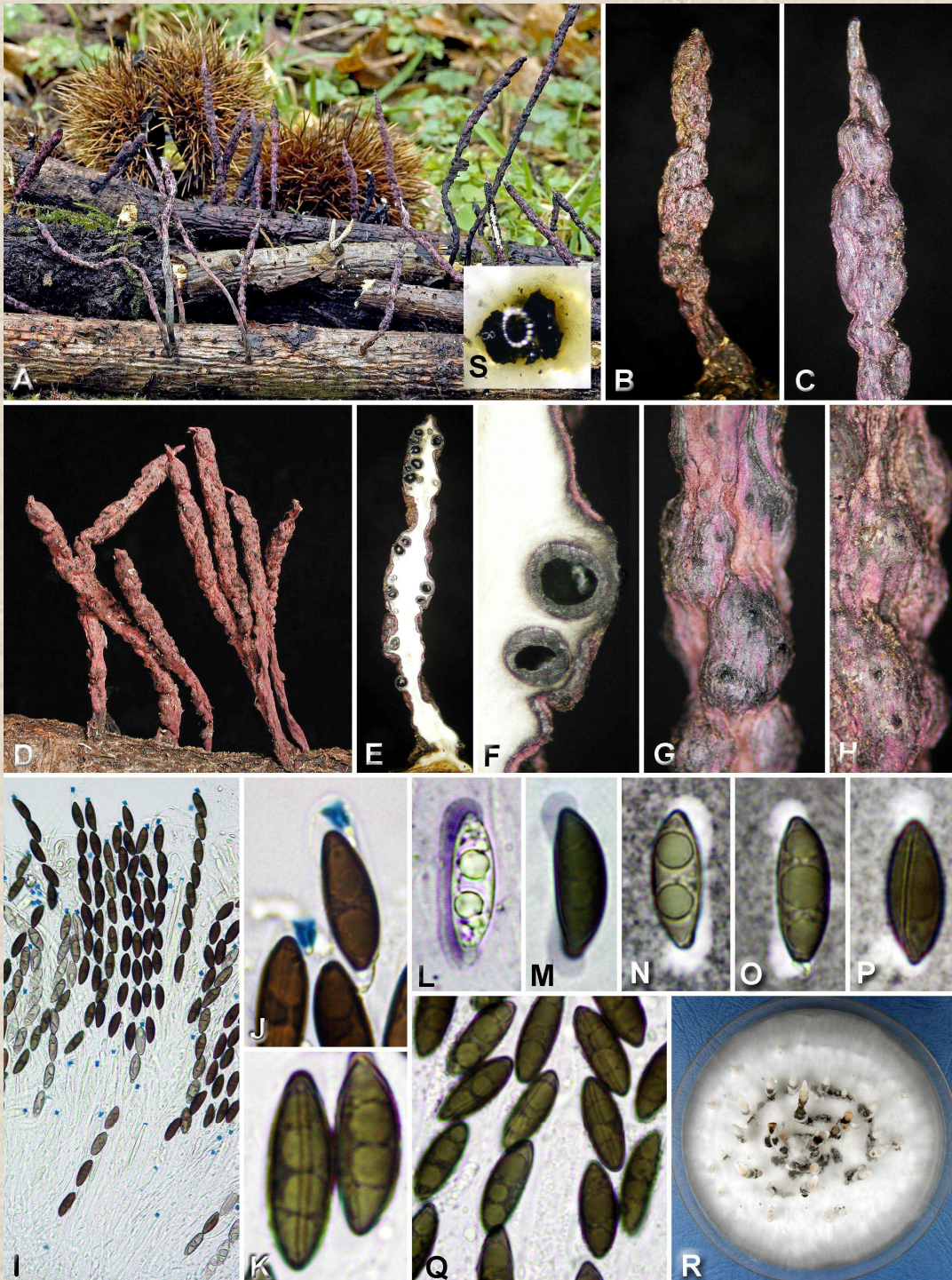
(FRBR 14)

Spain: Asturias, La Andina, cuevas de Andina (El Franco), 43° 29.580 N 006° 49.826 W, 29T PJ 7540 1785 (UTM coordinates), 100 m, on dead corticated twigs and branchlets of *Castanea sativa*, 22 Jan. 2010, leg. A. Román, communicated by Enrique Rubio, ERD-5046. Navarra, Olagüe, UTM 30 T XN 14 56, 550m, in a *Quercus* wood lining a small brook, on unidentified branches in a pile, 17 Jan. 2010, leg Javier Balda, JF 10004 (immature).

Stromata first white when immature (A, centre); mature stromata (A-D) upright, simple, scattered to clustered in small groups, 7-52 mm total height, the fertile head 6-40 mm high x 2-3 mm diam, cylindrical, terete to slightly flattened in places, typically with a mucronate sterile apex, sometimes with a rounded apex especially on small stunted sessile stromata; stromatal surface nodulose with deep wrinkles and perithecial contours slightly to conspicuously exposed, with a purple to vinaceous purple peeling outer layer somewhat powdery and fragile, splitting into elongated strips (G, H), vanishing with time; aged specimens dark grey to blackish with a faint purplish tone in places; the coloured granules present in the peeling outer layer are vinaceous in water and turn violet blue when 10% KOH is added to the slide; when added to a drop of 10% KOH, a fragment of the peeling outer layer yields olivaceous yellow pigments (S, inserted in A); crust leathery ca. 40 µm thick, interior fibrous to cheesy, solid, white with a yellowish core; the stipes ill-defined, irregularly cylindrical to strap-like, at times much reduced, concolorous turning blackish, puckered, glabrous, hardly swollen at base. **Perithecia** immersed to exposed, subglobose, 0.6-0.7 mm diam (F). **Ostioles** conic-papillate, black, ca. 80 µm diam (G, H).

Asci cylindrical, 200-230 µm total length, the spore-bearing parts 115-130 µm long x 8-9 µm broad, the stipes 80-110 µm long, with eight uniseriate ascospores (I), with apical apparatus tubular with a rim at upper end, 2.5-4 µm high x 2.2-2.5 µm broad, bluing in Melzer's reagent (J). Paraphyses filiform, copious, embedded in mucilage.

Ascospores (14,1-)15,8-16,3 (-17,9) x (5-) 5,9-6,1 (-7) µm; Q = (2,1-) 2,6-2,8 (-3,3); N = 60; Me = 16 x 6 µm; Qe = 2,7, fusiform slightly inequilateral with narrowly rounded ends (Q), the lower end with a hyaline cellular appendage visible on hyaline immature ascospores (L), often mucronate when pigmented, dark olive brown when fresh, turning dark brown, smooth, with a mucilaginous sheath stained in aqueous nigrosin (L, M) and visible in India ink (N-P), forming two persistent pads at both ends and a thin layer on the less convex side that gradually disappears with maturation, with a conspicuous straight germ slit spore-length on the less convex side, often slightly oblique and/or undulate (K).



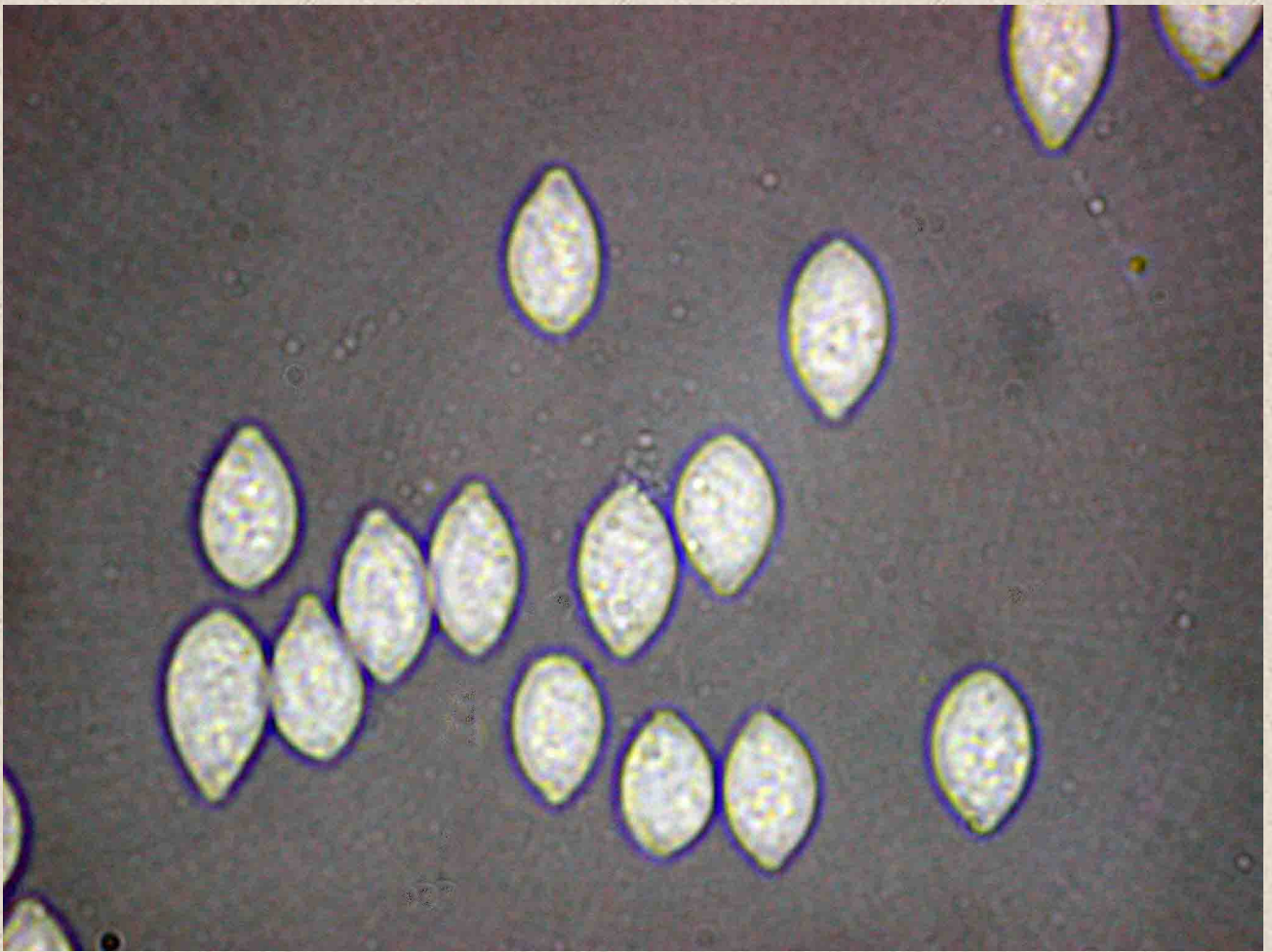
Colonies on YMG (R) forming a white felty mycelium with faint radiating strands, with black anamorphic stromata developing at the centre and concentrically arranged, remaining sterile.

Notes: This *Xylaria* is very distinctive in the vinaceous purple colour of the peeling outer layer and the secondary appendages of ascospores. Such appendages recall those of species of *Rosellinia* like *R. britannica* and *R. necatrix* but are much unusual (if not unknown) in lignicolous species of *Xylaria*.

Xylaria inathino-velutina is known to have purplish stromata, but this is due to a dense purplish brown tomentum; moreover it is a tropical taxon occurring on woody pods and its ascospore morphology is much different. *Xylaria moliwensis* Læssøe is a terrestrial taxon known from Cameroon, with a pinkish squamulose coating on stromata, but the fertile heads are clavate nodulose and its ascospores are larger (av. 36.2 x 8.8 µm) and lack mucilaginous appendages. An unnamed *Xylaria* known from French Guiana, Panama and West Indies also features purplish stromata, but their shape varies from clavate with fertile apices to cylindrical with faintly mucronate apices, they are hard-textured with a thick carbonaceous crust and unexposed perithecial contours, and ascospores average 10x 4µm, without appendages.

[BACK TO KEY](#)

[Close](#)



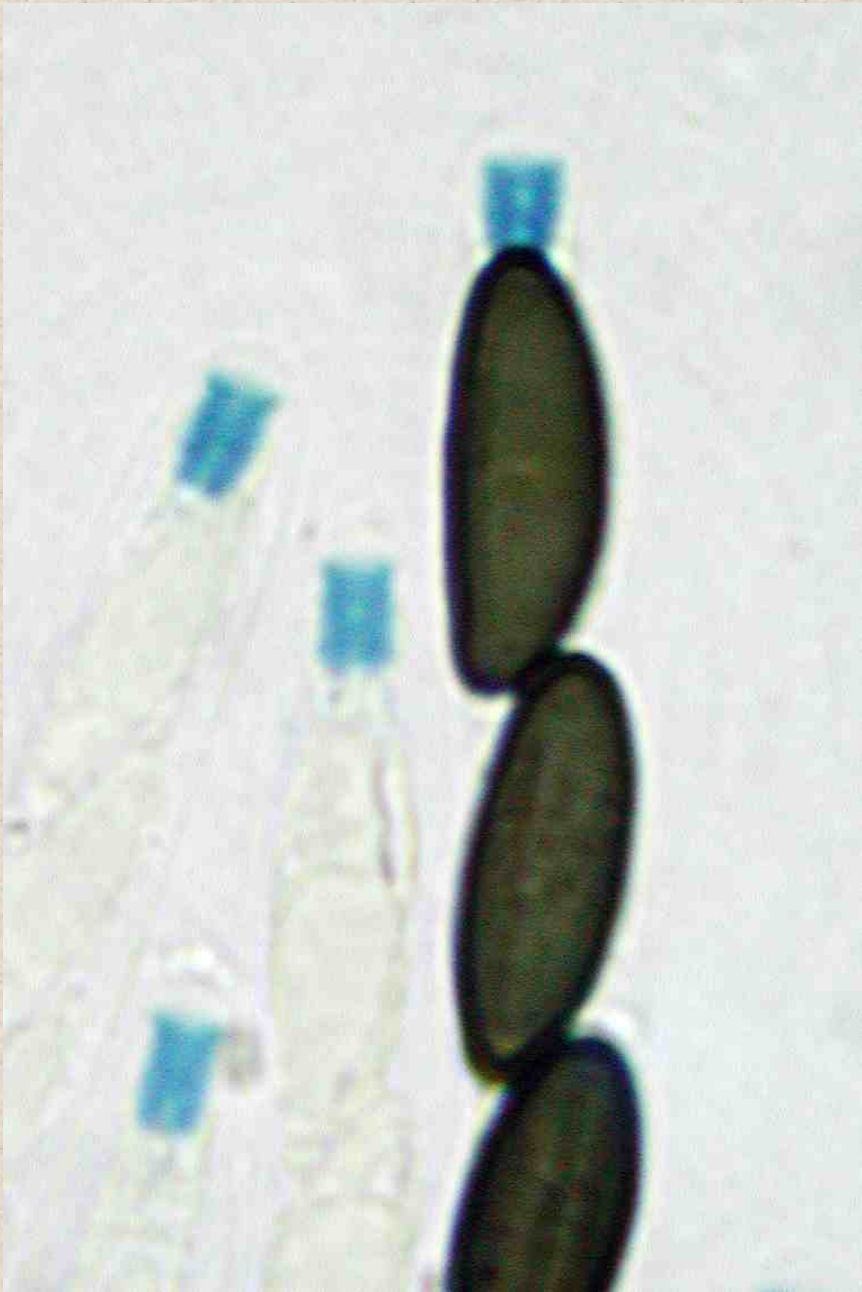
Pelikan

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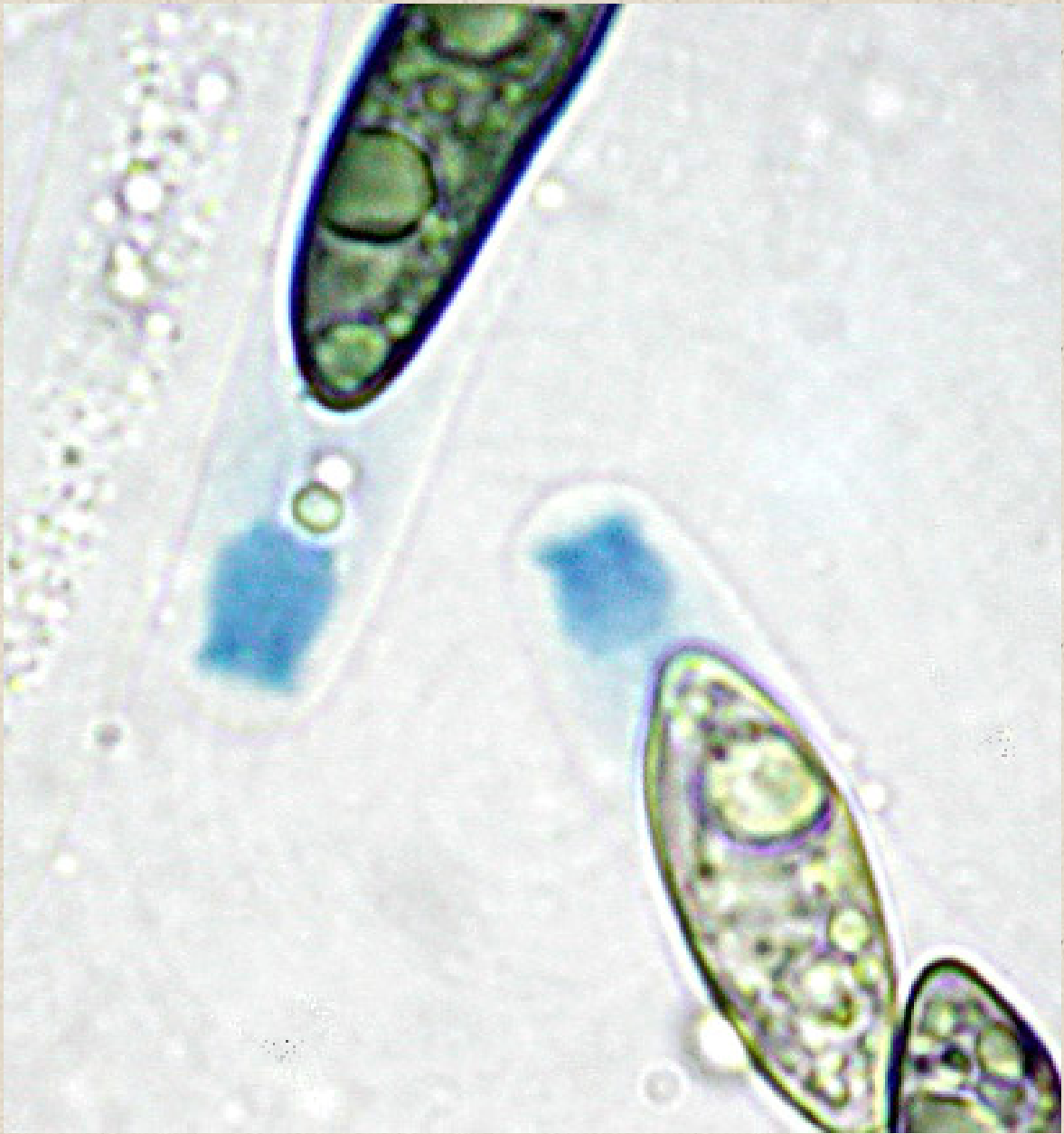
Melzer

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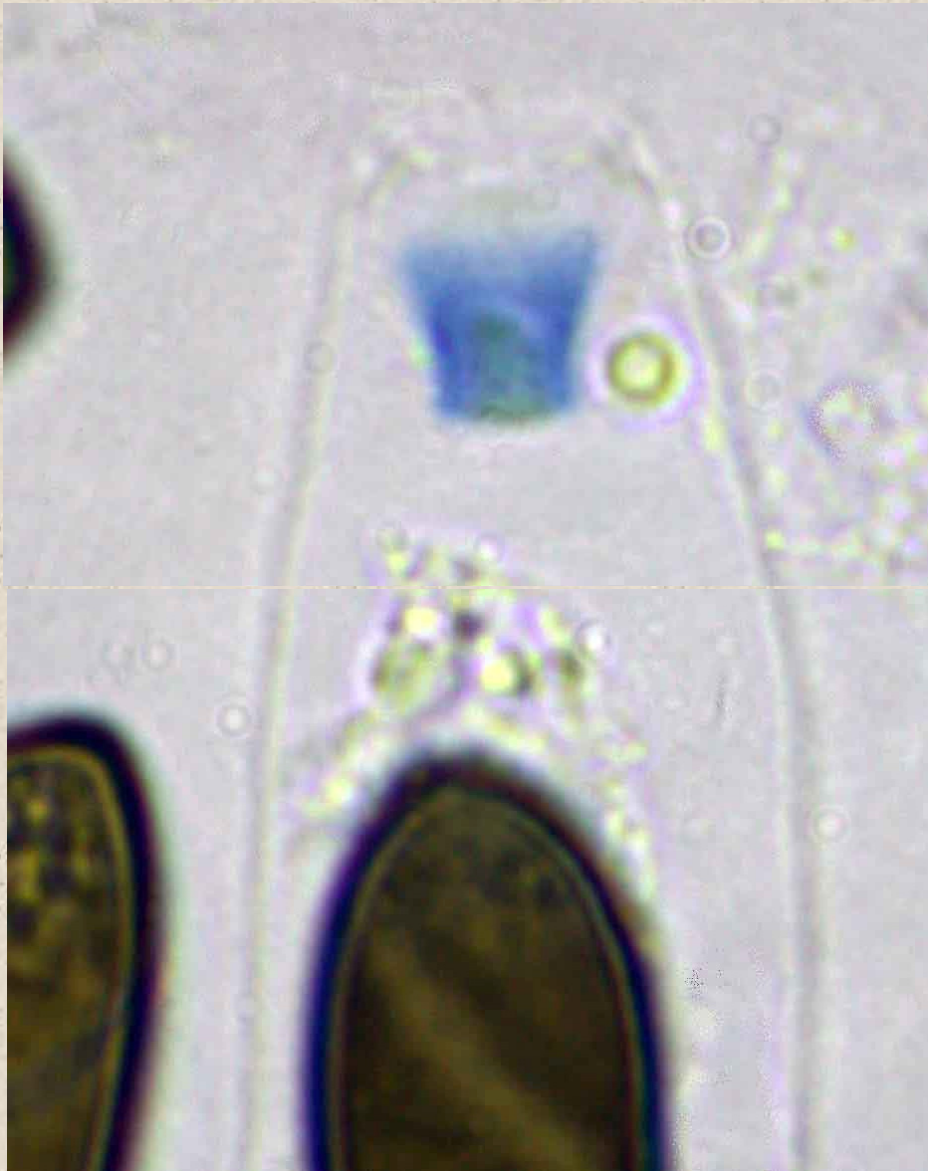
Tubular

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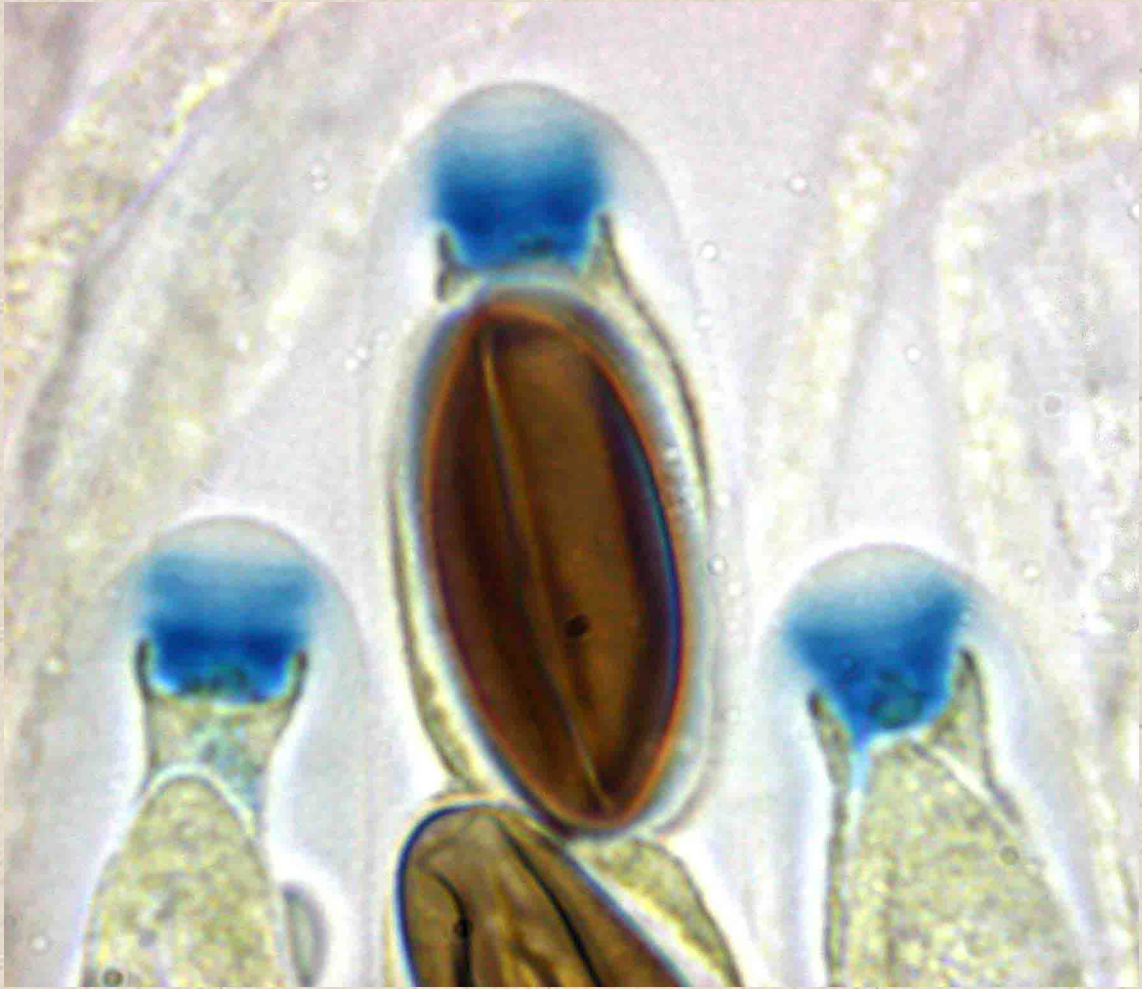
Urn shaped

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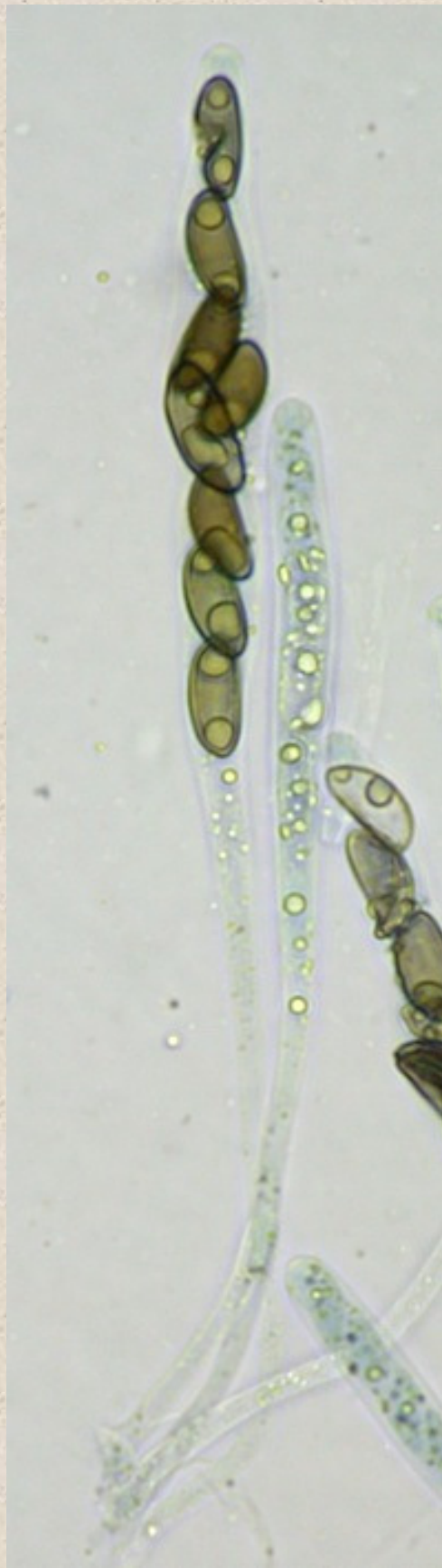
Wedge shaped

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Bipartite

Close



Chlorazol black [Close](#)



Cuboid

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Oblique

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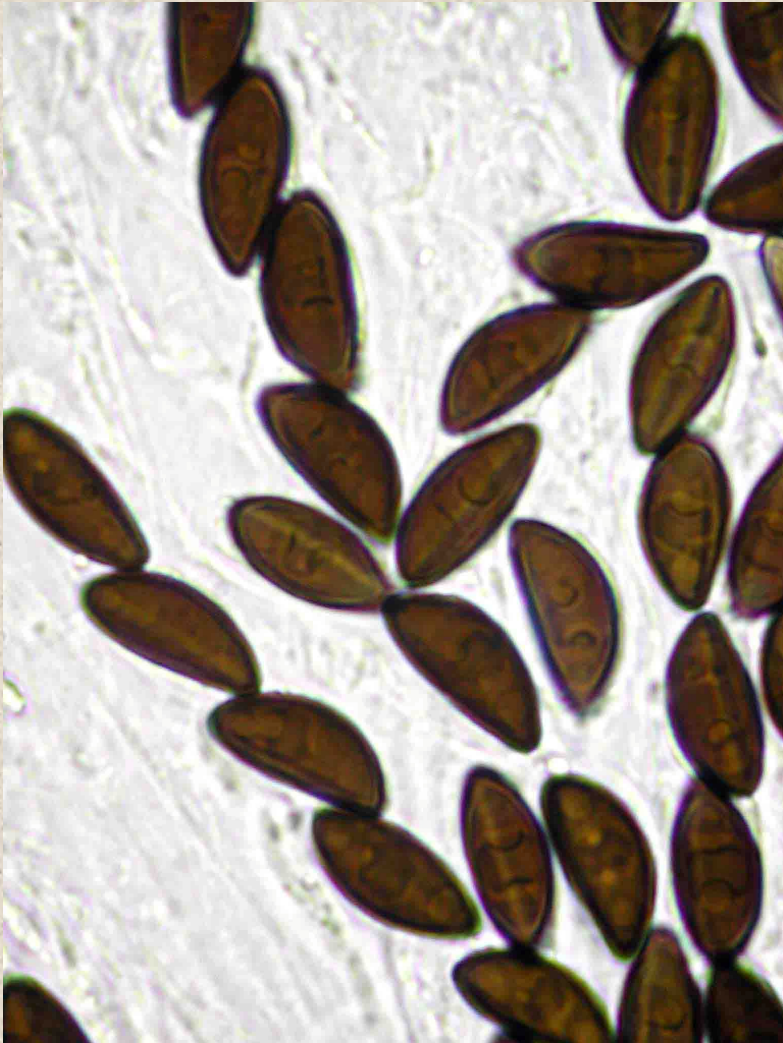
Aqueous nigrosin

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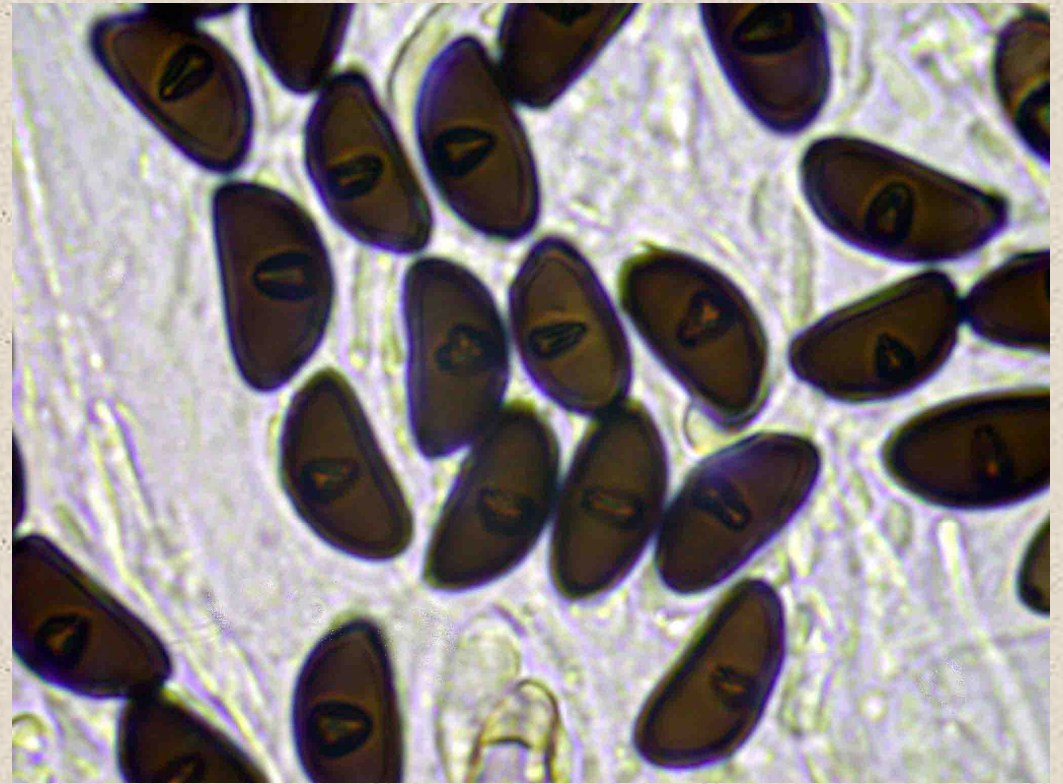


as long

Close



narrowly_rounded



Close

broadly rounded



Parallel

Close



Pinched



Truncate



Beaked

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Truncate

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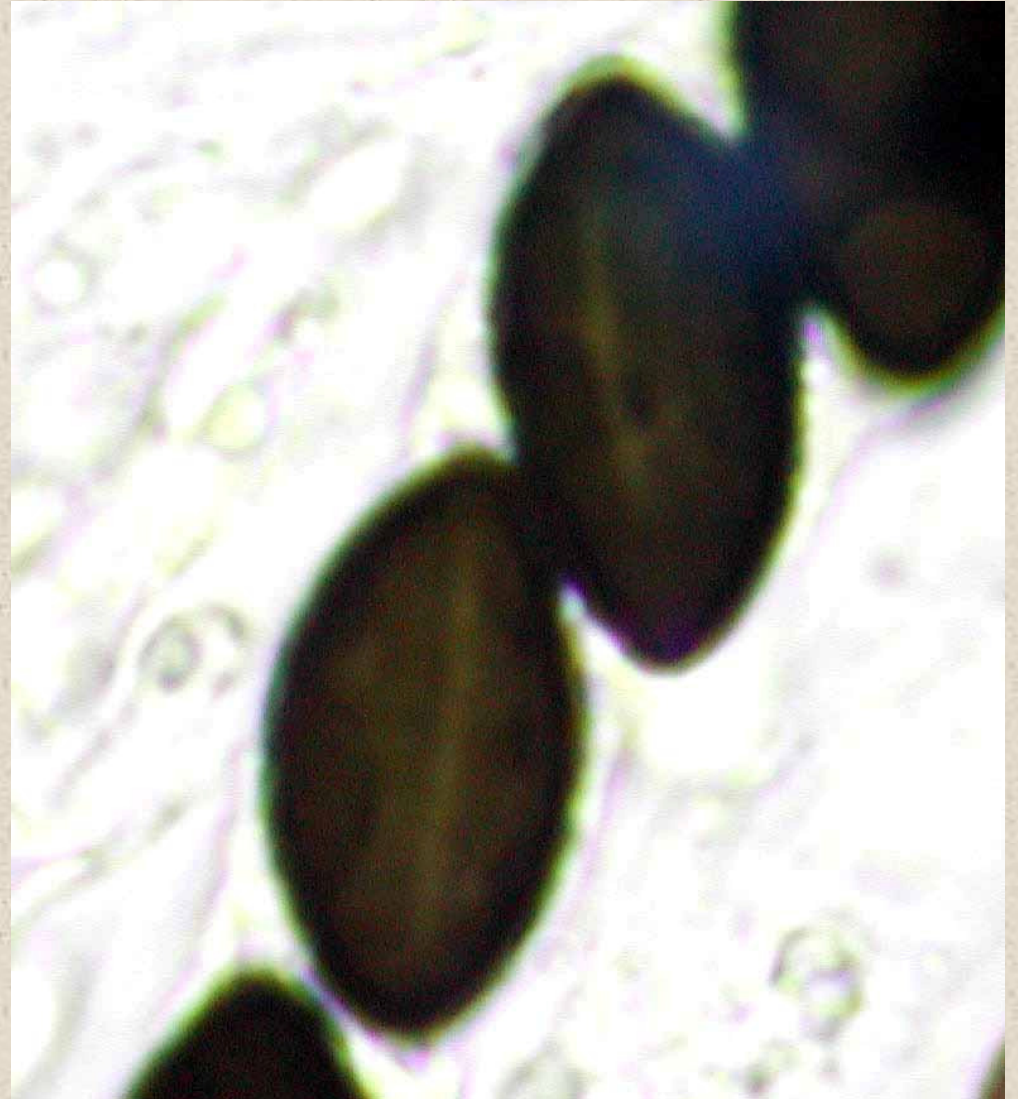


cellular

[Close](#)



Conspicuous



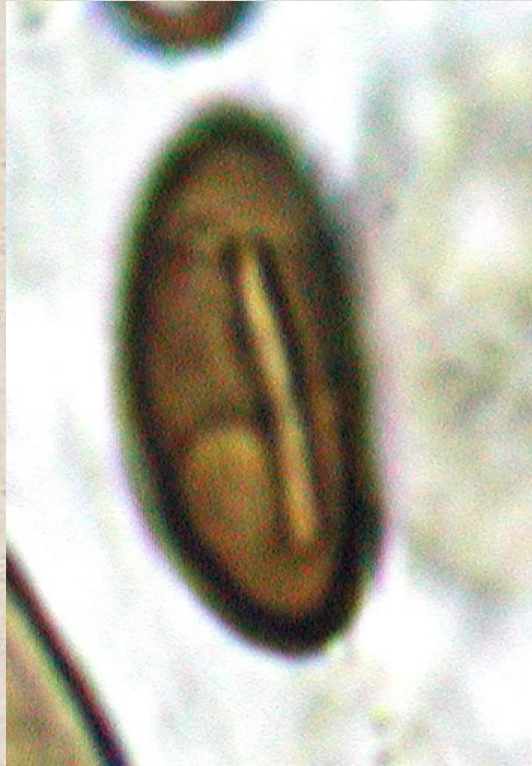
Not conspicuous

Close



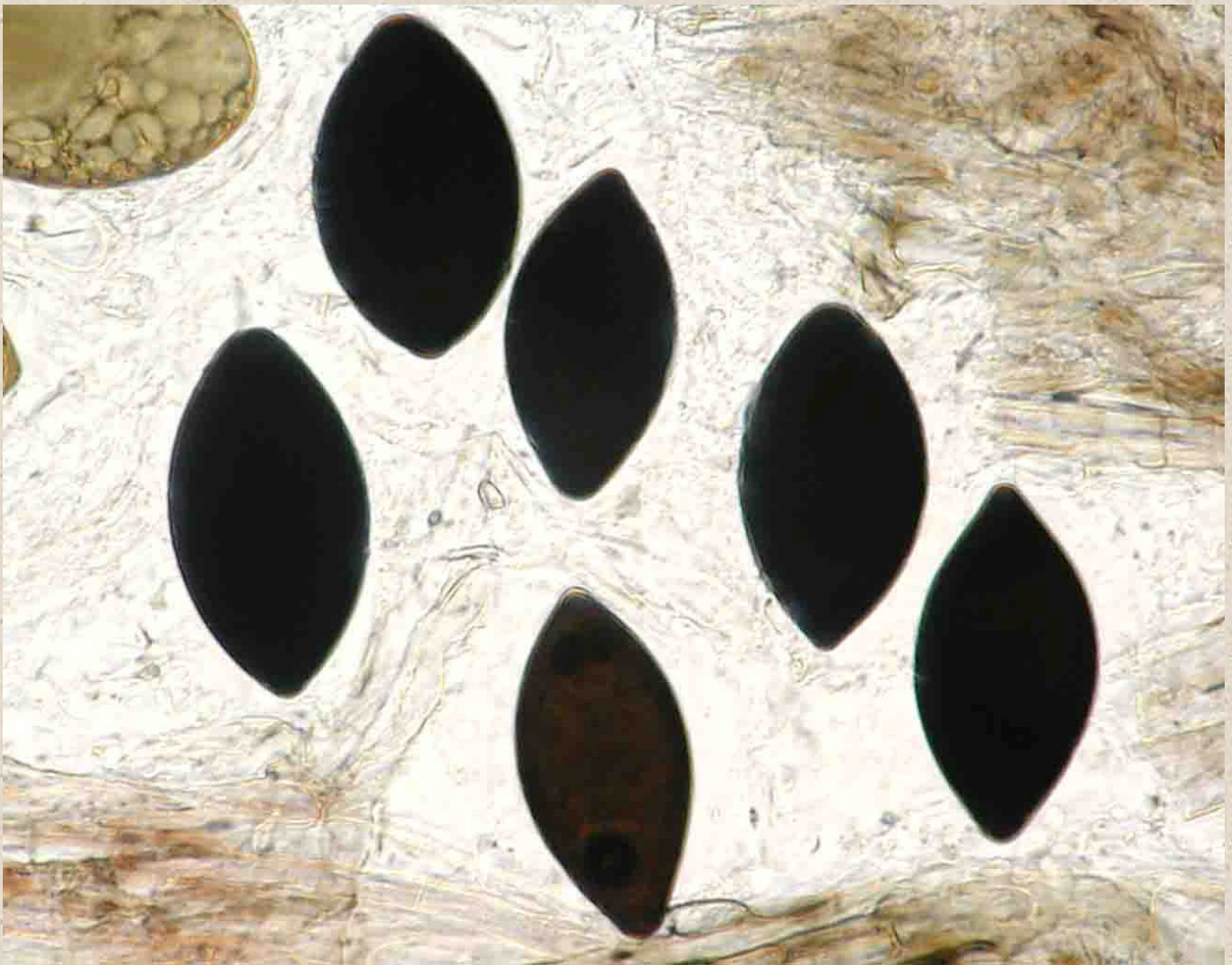
Ellipsoid

Close



Shorter

[Close](#)



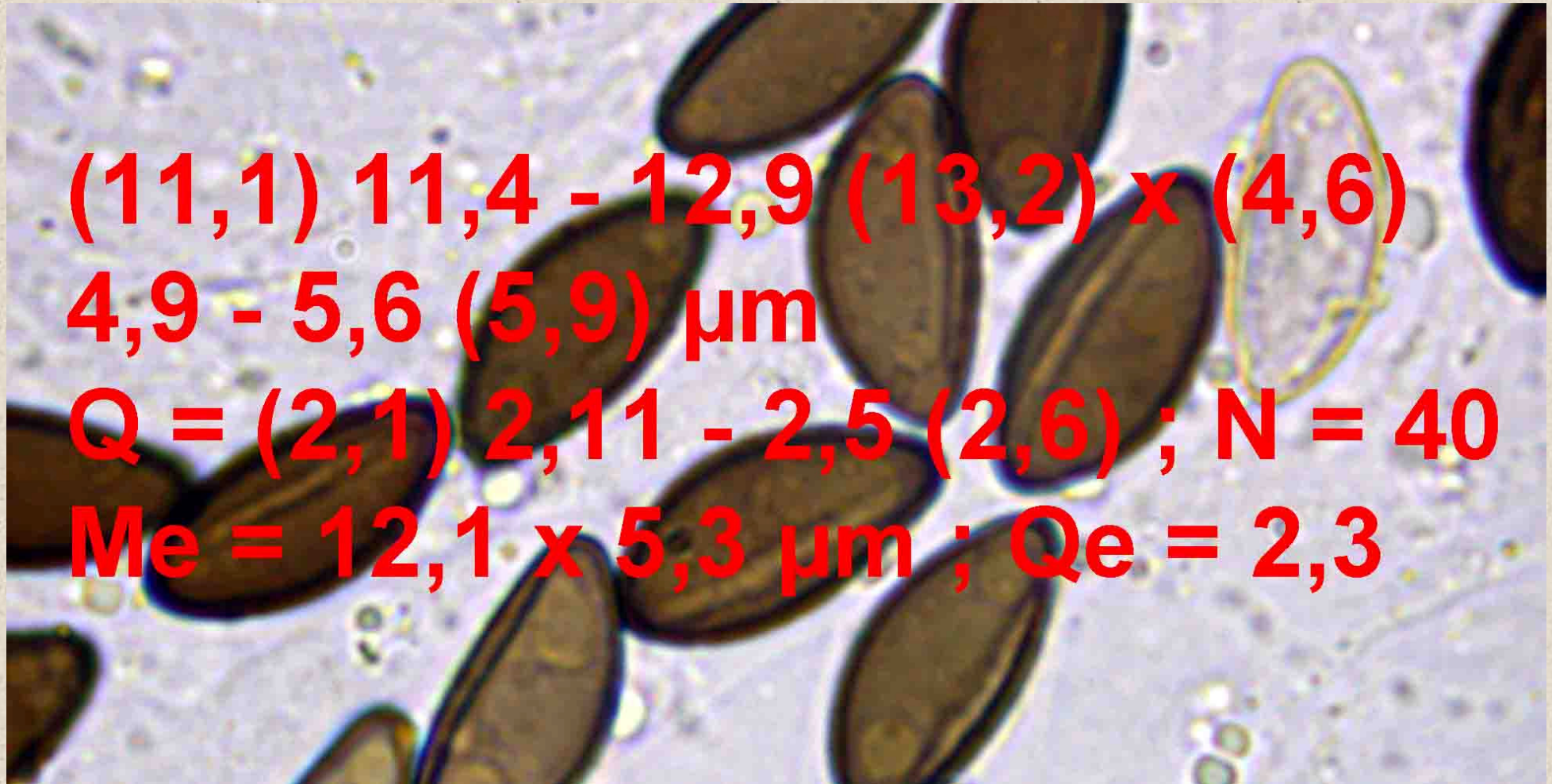
Equilateral

Close



Sigmoid

[Close](#)



$(11,1) 11,4 - 12,9 (13,2) \times (4,6)$

$4,9 - 5,6 (5,9) \mu\text{m}$

$Q = (2,1) 2,11 - 2,5 (2,6) ; N = 40$

$Me = 12,1 \times 5,3 \mu\text{m} ; Qe = 2,3$

extreme values

Close



inequilateral

Close



Spiralling

Close



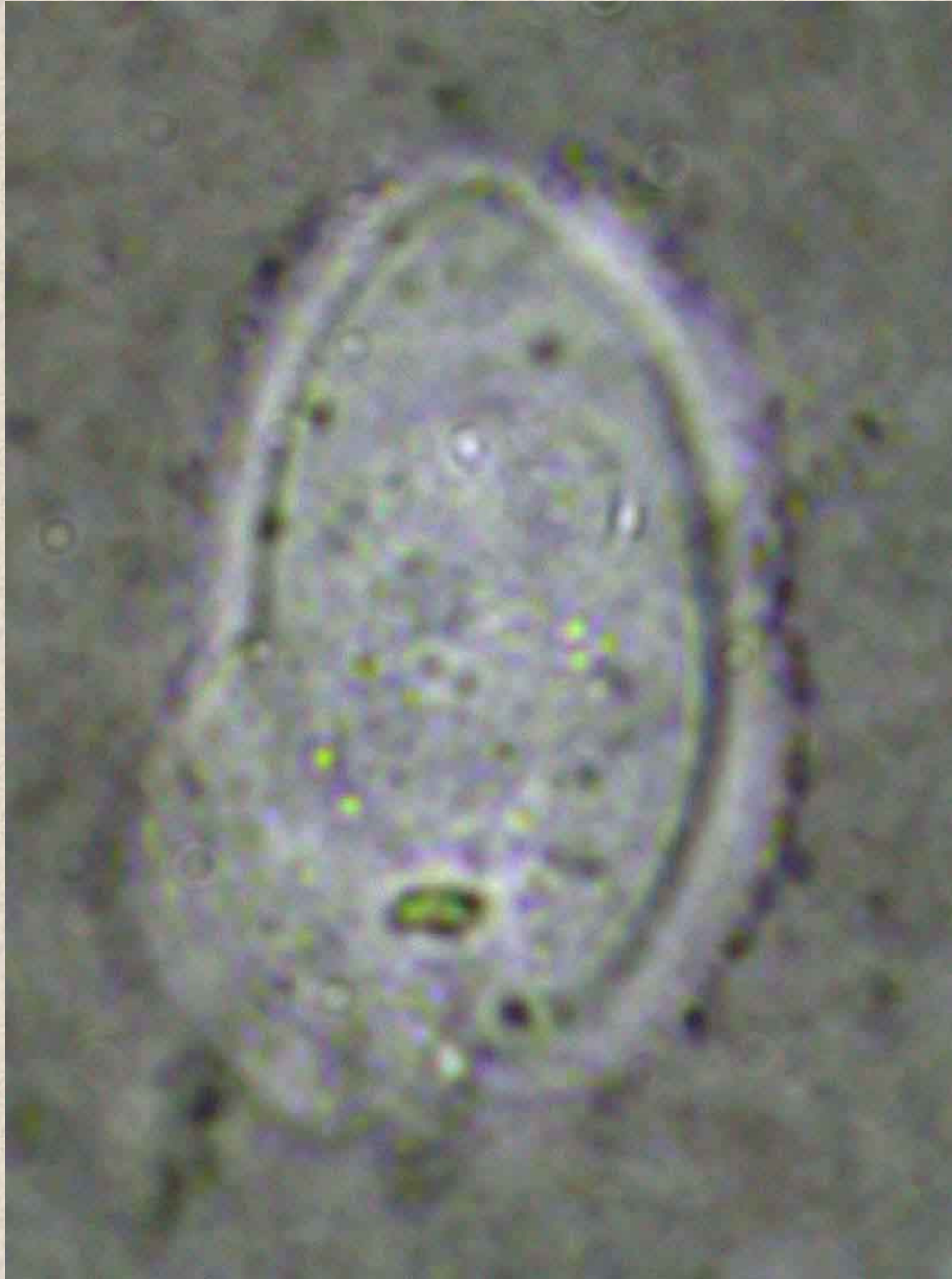
fusiform

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Navicular

[Close](#)



India_ink

[Close](#)



Straight

Close



Blunt papilla

[Close](#)



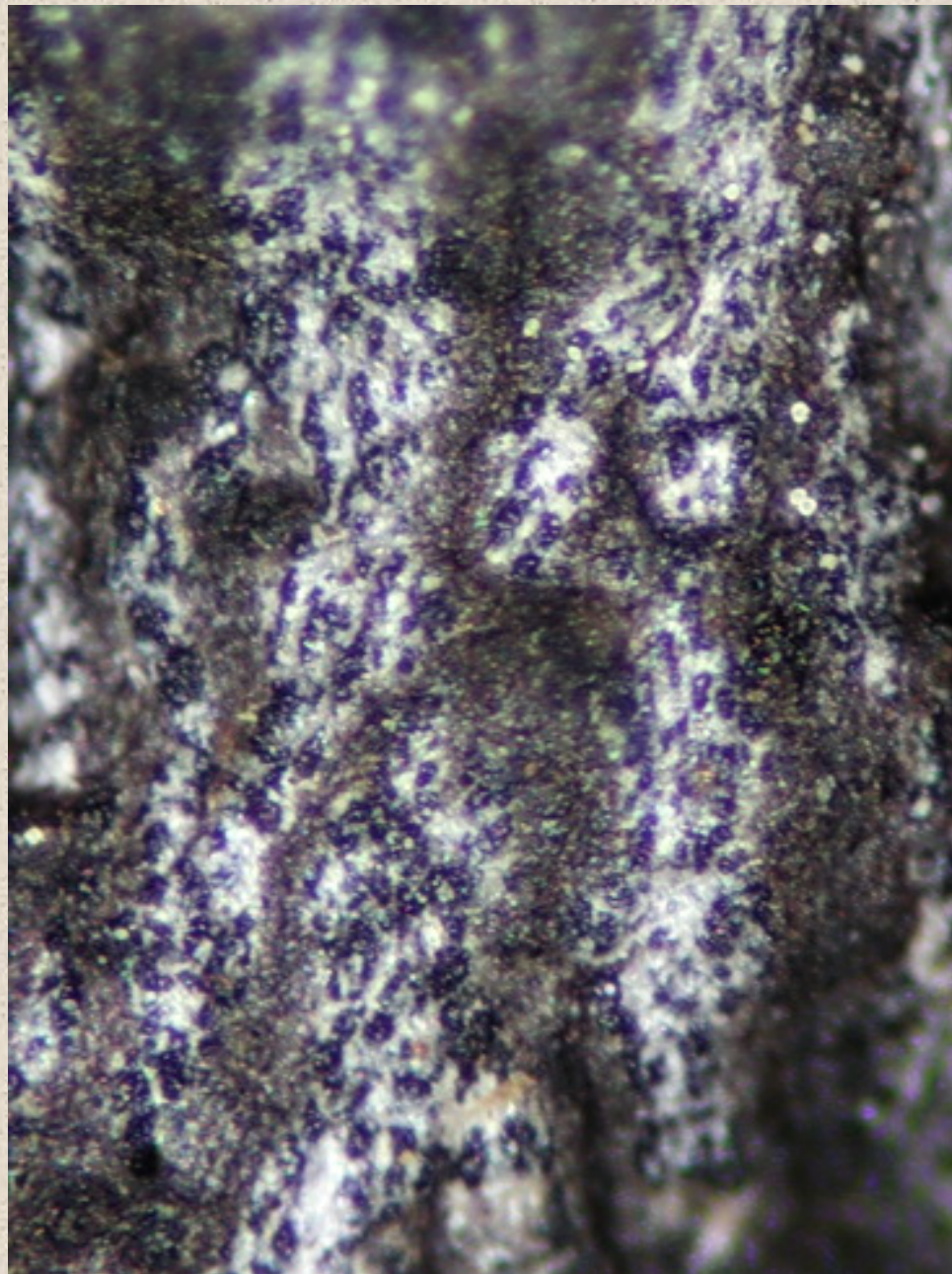
Conic

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Raised discoid

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Black persistent granules

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Fibrous

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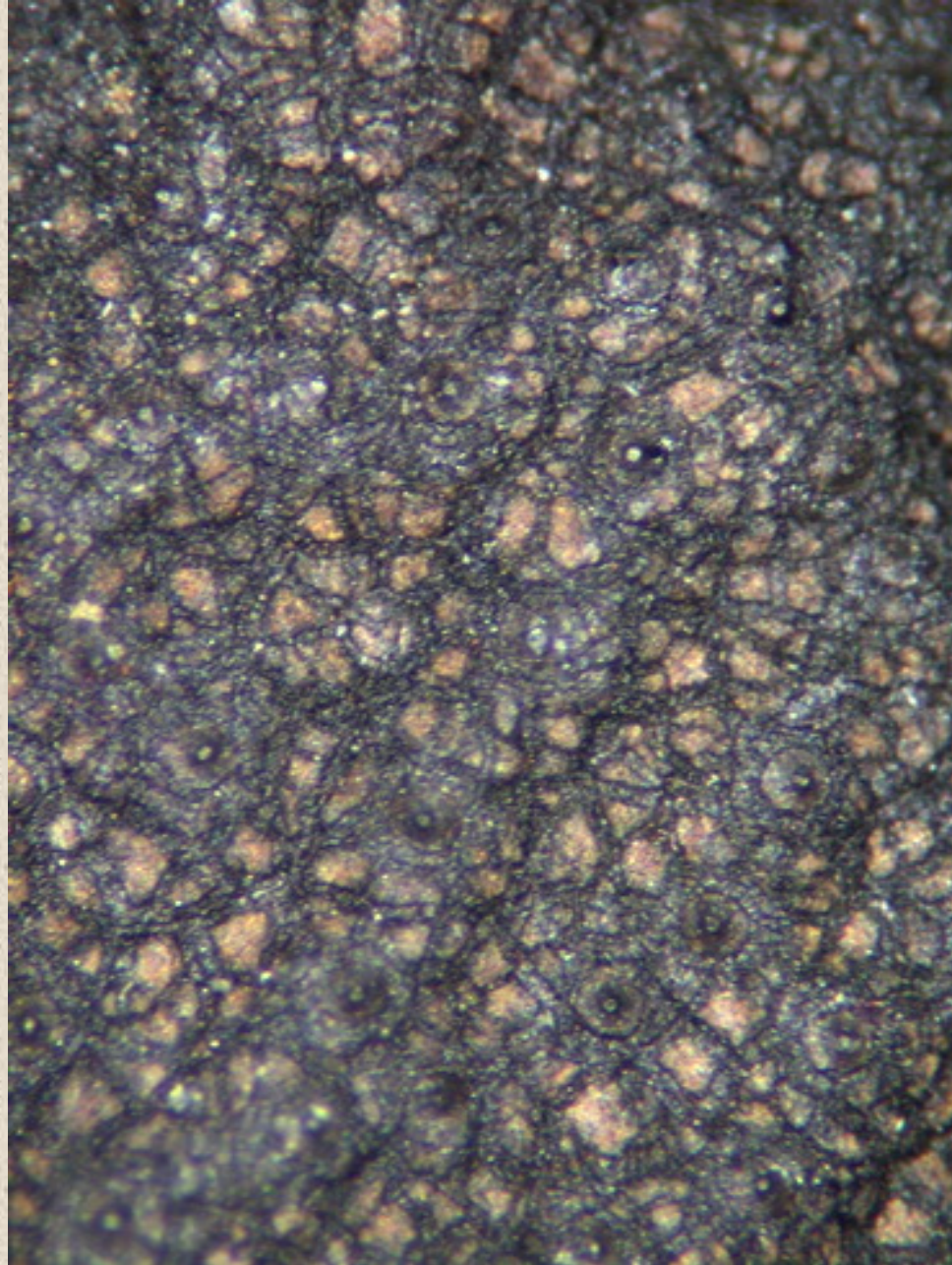
Horny

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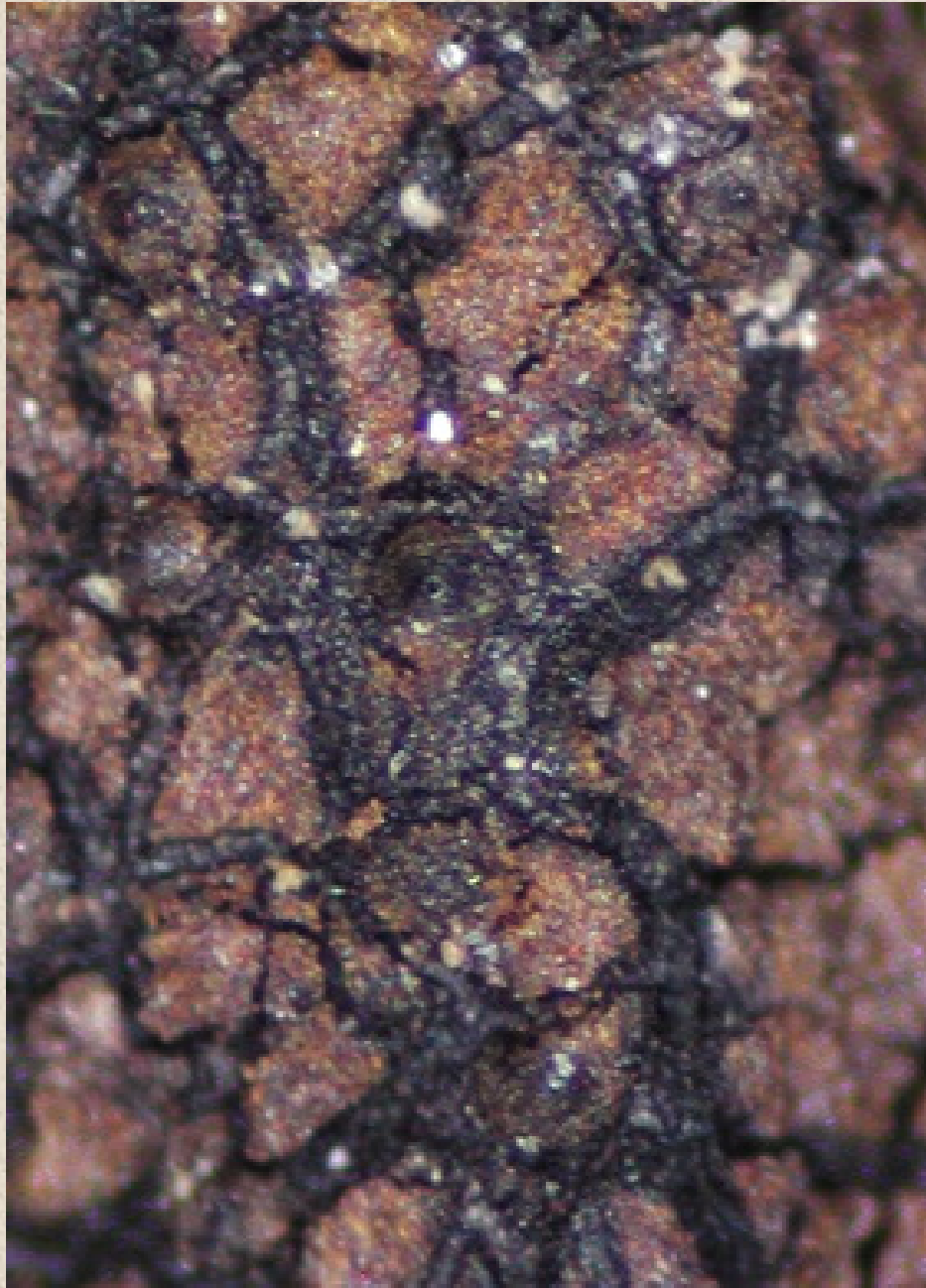
Plaques

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Reticulately cracked

[Close](#)



Scales

[Close](#)



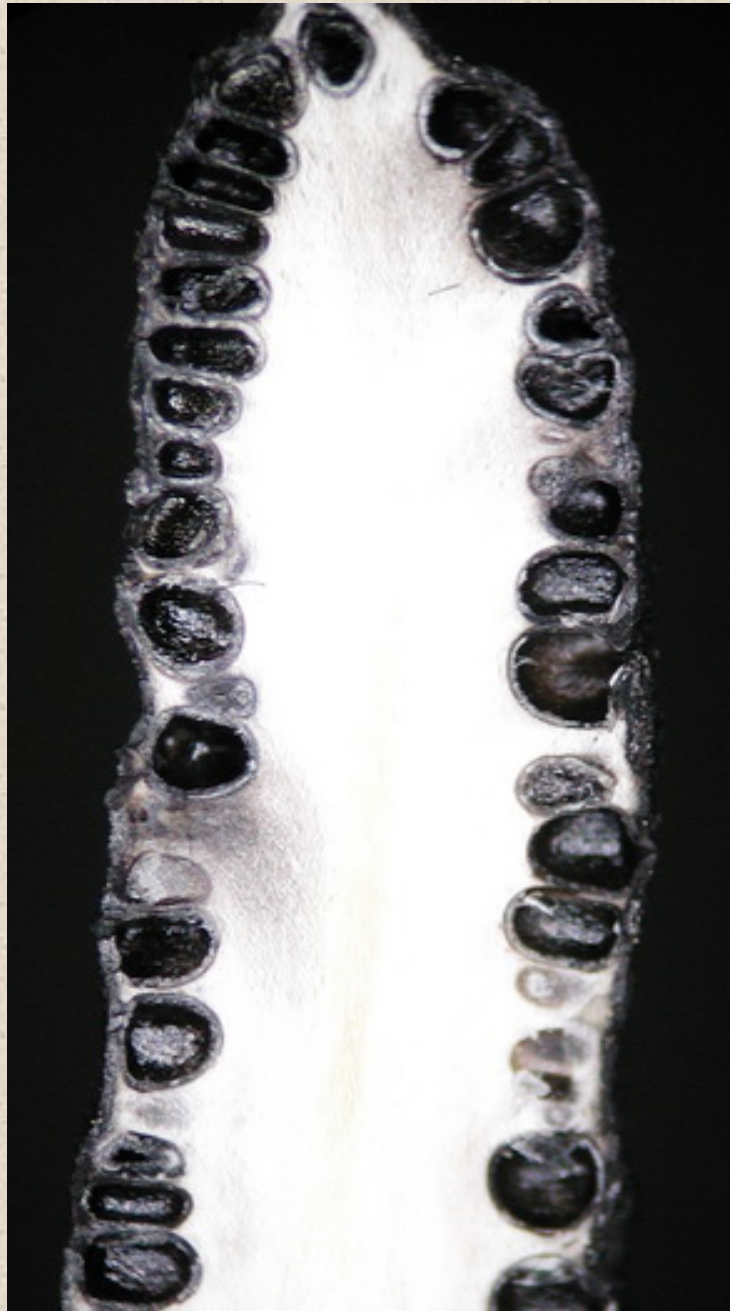
Strips

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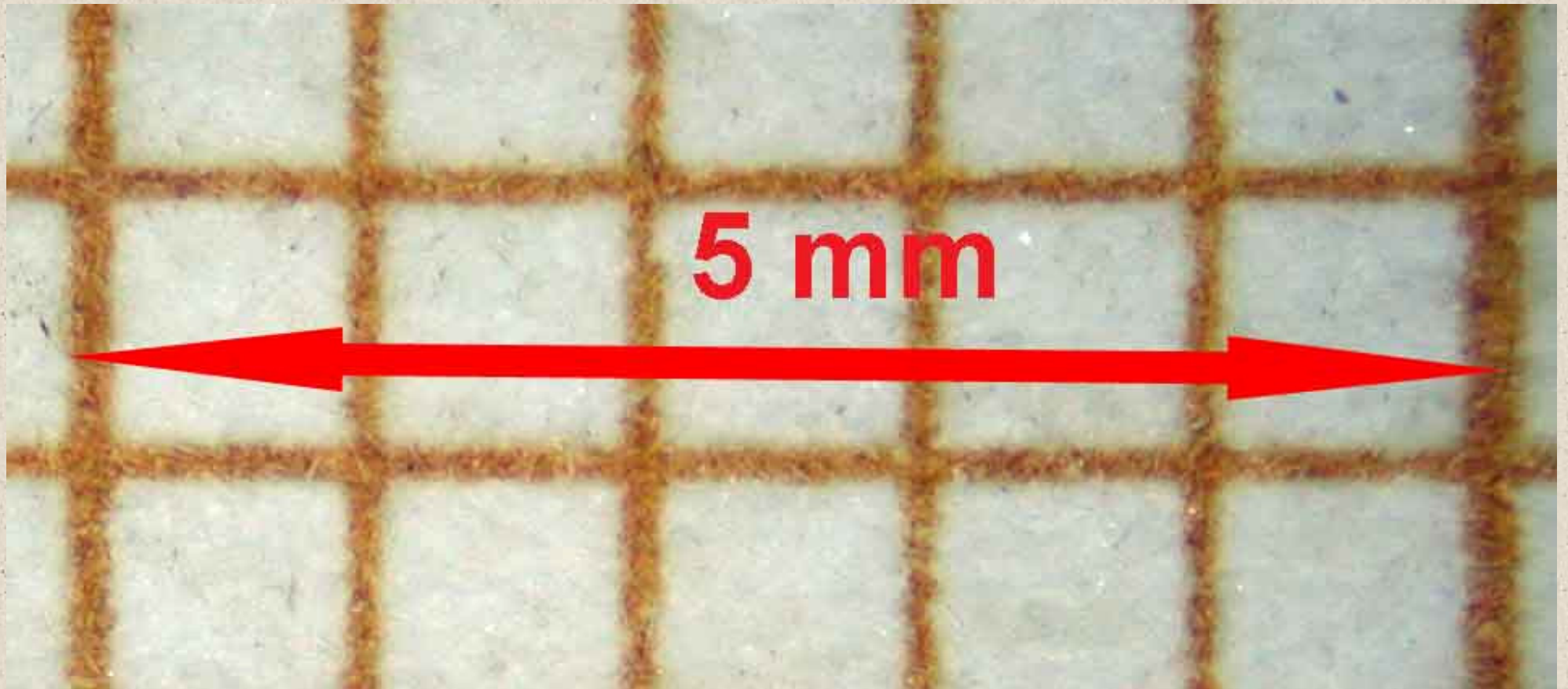
Interior

[Close](#)



Monostichous

[Close](#)



five divisions

[Close](#)



Long rooting

[Close](#)



Narrow connective

[Close](#)



Rhizomorph-like

[Close](#)



Fasciculate

[Close](#)



Fertile

[Close](#)



Peltate

[Close](#)



Prostrate

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Pulvinate

[Close](#)



Rosellinoid

[Close](#)



Sterile [Close](#)



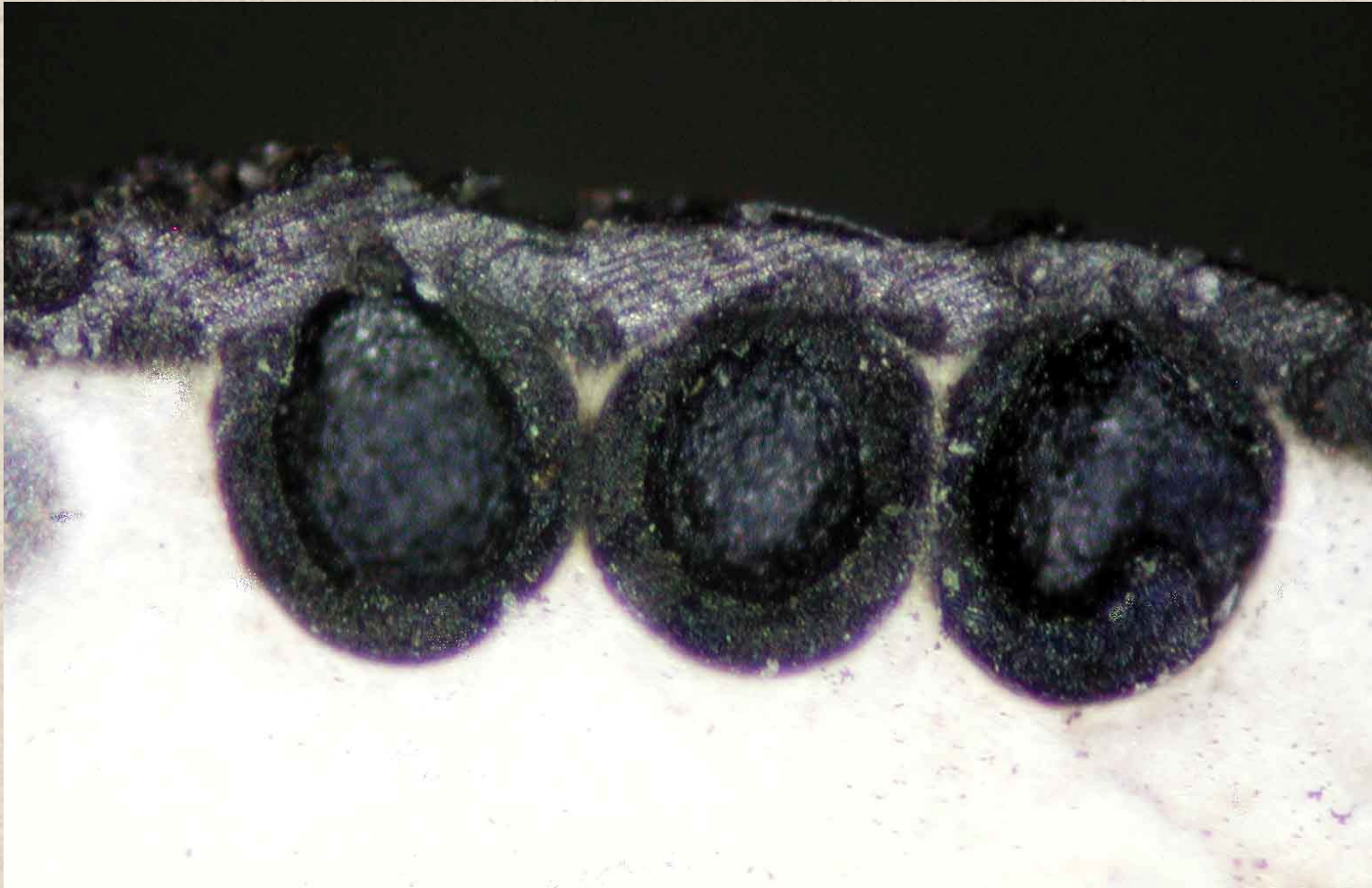
Terete

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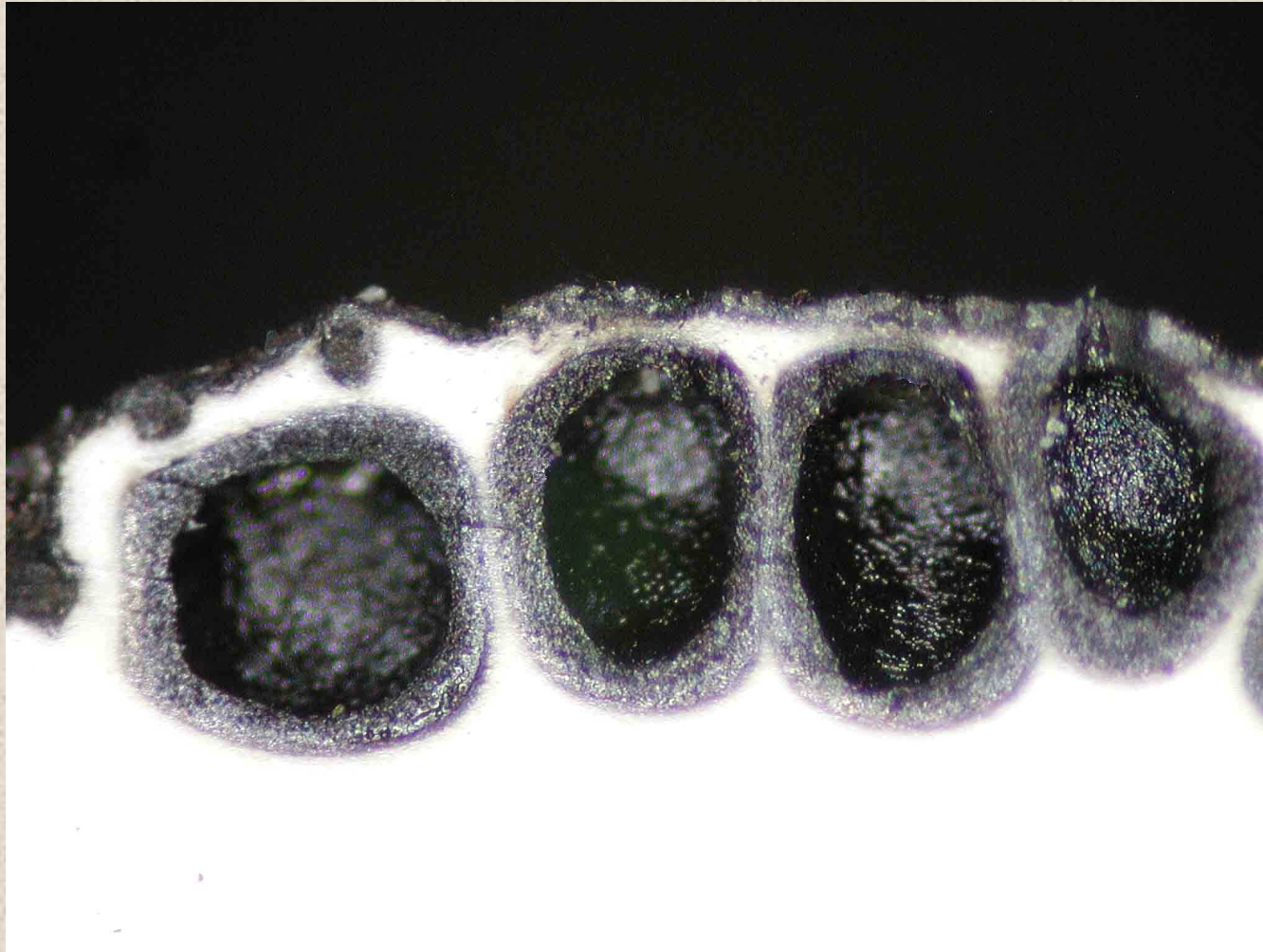
Wrinkled

Close



Carbonaceous

[Close](#)



Leathery

Close

The present survey could not have been carried out without the precious help of the friends listed below. I wish to gratefully acknowledge them for their various contributions.

Alex Akulov
Begona Aguirre Hudson
Monique Basley Gallis
Esperanza Beltrán
Françoise Candoussau
Adrian Carter
Marie Casters-Fournier
Gilles Corriol
Régis Courtecuisse
Ove Eriksson
J. Gaborit
Guy Garcia
Alain Gardiennet
Andreas Gminder
Yu-Ming Ju
Volker Kummer
Thomas Læssøe
Christian Lechat
Christophe Lécuru
Paul Leroy
Marie-Josèphe Mauruc
Jean Mornand
Marja Pennanen
Alessio Pierotti
Jean Paul Priou
Miguel Angel Ribes
Jack Rogers
Alberto Róman
Peter Ronsch
Enrique Rubio Dominguez
Markus Scholler
Marc Stadler
Milena Tanaskovic
Peter Thomson
Peter Welt

[HOME](#)

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