Pseudotrichia ambigua (*Pleosporales*): A new species from New Zealand

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Abstract: A new species of *Pseudotrichia* is described, based on material collected on wood of *Nothofagus* sp. Aspects of its relationship with other species are discussed.
Keywords: Ascomycota, wood decaying fungi, bitunicate ascomycetes, *Melanommataceae*.

Introduction

Thirteen species of *Pseudotrichia* Kirschst. are presently recorded in the Index Fungorum database. These represent a diverse variety of substrate, habitat and morphology. Both saprophytic and parasitic species are included and those sequenced have been placed in several different families. The species described here is no different and, in time, may find itself among species of *Xenolophium* Syd., *Byssosphaeria* Cooke or others which share some of the same or similar morphologies. In the meantime, more collecting, descriptive work and sequencing is needed before a monographic treatment is warranted.

Materials and methods

Morphological material was examined in water, Shear's mounting fluid (SMF), Melzer's reagent and lacto-fuchsin. Observations were made using brightfield and phase microscopy. Semi-permanent slides in SMF together with dried herbarium material have been deposited in the New Zealand Fungarium (PDD).

Taxonomy

Pseudotrichia ambigua A. Bell & D.P. Mahoney, *sp. nov.* — Mycobank MB 838124, Figs. 1–3.

Holotype: New Zealand. Grace's Stream Track, Remutaka Forest Park near Wellington, S 41°20'39.973", E 174°55'56.891", alt. 100 m, on hard decorticated wood of *Nothofagus* sp., 20/5/2020, *leg*. A. Bell, pers. coll. #AEB 1336 (PDD 117244).

Etymology: From *ambigua*, referring to the ambiguous nature of the pseudothecium ostiole being circular or longitudinal.

Characteristics of the fresh material. — Pseudothecia crowded, heavily melanised, semi-immersed in hard decorticated wood, approx. 650–850 µm in length (overhead view). **Ascomata** glabrous, irregular or laterally compressed, generally aligned with the grain of the wood. At maturity with circular or slot-like ostioles (Figs. 1A; 2A–E). No cellular structure was visible in the heavily melanised pseudothecial walls. **Pseudothecia** very fertile, contents colourless except for the brown ascospores, asci embedded in highly branched and trabeculate pseudoparaphyses (Figs. 1C; 3B). **Asci** eight-spored, without bluing in Melzer's, bitunicate, cylindroclavate, short-stalked and difficult to disengage from basal tissue, approx. 230 µm long, 25 µm wide (Figs. 1B and D; 3A–E). Mature **ascospores** irregularly biseriate, initially two-celled, biconic to slightly asymmetrical, median septum indented, upper cell noticeably widest close to septum. There was no evidence of any mucilaginous sheath surrounding the ascospores. Ascospores initially hyaline becoming brown at maturity with faintly verruculose ornamention and occasionally one additional median septum in upper and lower cells, 53–60 × 10–13 µm (n=38) (Figs. 1D and E; 3C–I).

Discussion

Our new species has a morphological mix of features shared by other *Pseudotrichia* species but can be distinguished by its larger light brown, faintly verruculose, 2–4 celled ascospores. It is further characterised by its lack of any ascoma tomentum, its laterally compressed only partially emergent ascomata with mostly circular but sometimes slot-like ostioles that lack bright pigments, its numerous trabeculate pseudoparaphyses and its short-stalked asci.

The history of the ascomycete genus *Pseudotrichia* was discussed by Barr (1984). She described the genus as possessing heavily carbonised pseudothecia, the lower portions of which are usually covered by an external tomentum of branched, thick-walled, variously pigmented hyphae. Apices of the pseudothecia were generally compressed or even irregular to tri-radiate and ostioles slit-like or circular. She gave descriptions of three species accompanied by illustrations. Subsequently, a number of authors have assigned additional species to the genus including Rossman (1987), who transferred the previously described species *Nectria viburnicola* P. Crouan & H. Crouan to *Pseudotrichia*. She described the ascocarps as having scarlet papillae and ascospores 58–90 × 11–15 µm and being 7-septate. However, a reddish pigmentation of the ostiolar region is generally characteristic of the genus *Byssosphaeria*. Huhndorf (1994) described a new species, *P. guatopoensis*, from Venezuela and included a key to all known species (4, not including *P. viburnicola*). Molecular phylogenetic work by Mugambi & Huhndorf (2009) demonstrated that two isolates of *Pseudotrichia mutabilis* belong to the family *Melanommataceae*, also designated as such earlier by Barr (1984), but two samples of *P. guatopoensis* described by Huhndorf (1994) were assigned to the family *Platystomaceae*.

For the most comprehensive historical account of *Pseudotrichia*, the reader is directed to the extensive treatment by Thambugala *et al.* (2014) in which they list additional species to those mentioned above in addition to giving a full description of *P. stromatophila* — the type species — as it was originally envisaged by Kirschstein using material collected in Czechoslovakia. Due to morphological and sequenced variations among species now assigned to the genus and confusion as to their ascribed family, they conclude that an extensive taxonomic revision of the genus is required.

In Liu *et al.* (2015), the authors collaborated in an effort to clarify the taxonomic and phylogenetic relationships among a number of bitunicate ascomycetes (and others), comprising 67 genera of ascomycetes. In it are included two new species of *Pseudotrichia*, both

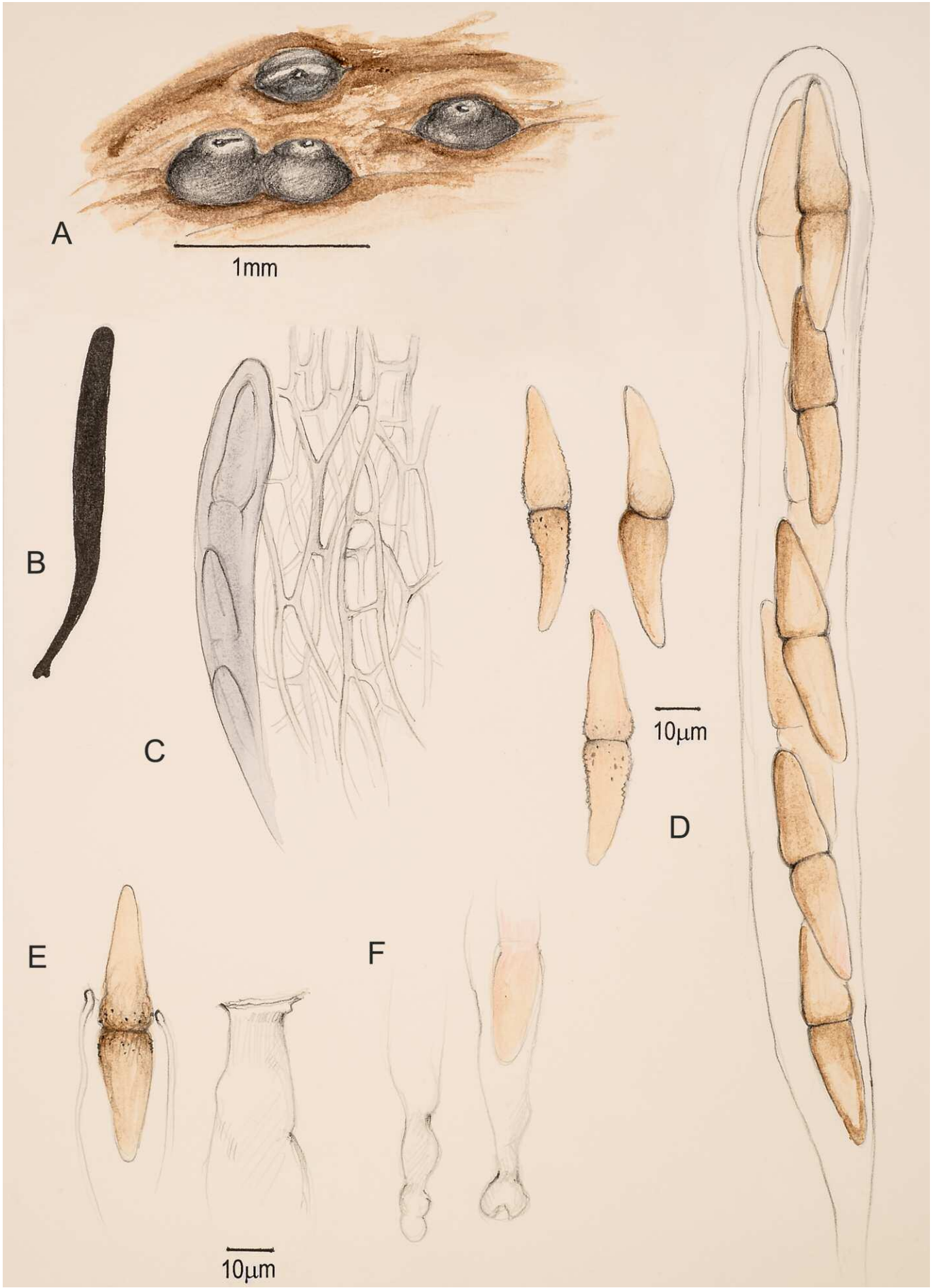

Fig. 1 – *Pseudotrichia ambigua*. A. Pseudothecia *in situ* on substrate. B. Silhouette of mature ascus. C. Portion of ascus surrounded by pseudoparaphyses. D. Mature ascospores within ascus and 3 free showing verruculose ornamentation. E. Ascospore emerging from ascus tip. F. Detail of ascus bases. Drawing: A. Bell

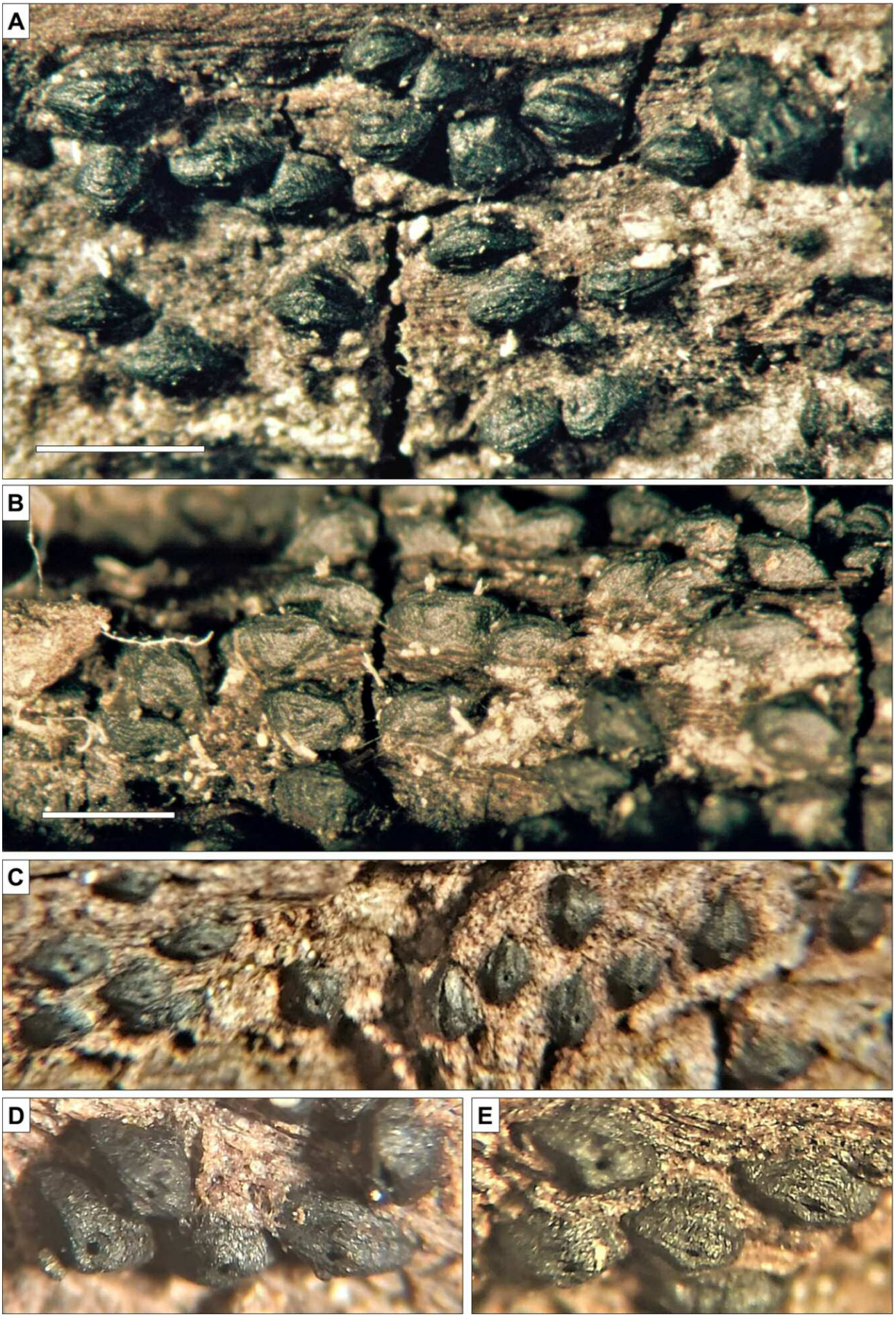

Fig. 2 – *Pseudotrichia ambigua*. Ascomata *in situ* on dead wood. A–B. Overhead and side views, respectively, of partially emergent ascomata. Zeiss dissecting microscope with camera. C–E. Ascomata *in situ* viewed with a smartphone camera through the Zeiss dissecting microscope eyepiece port. Scale bars: A = 1000 µm; B = 800 µm.

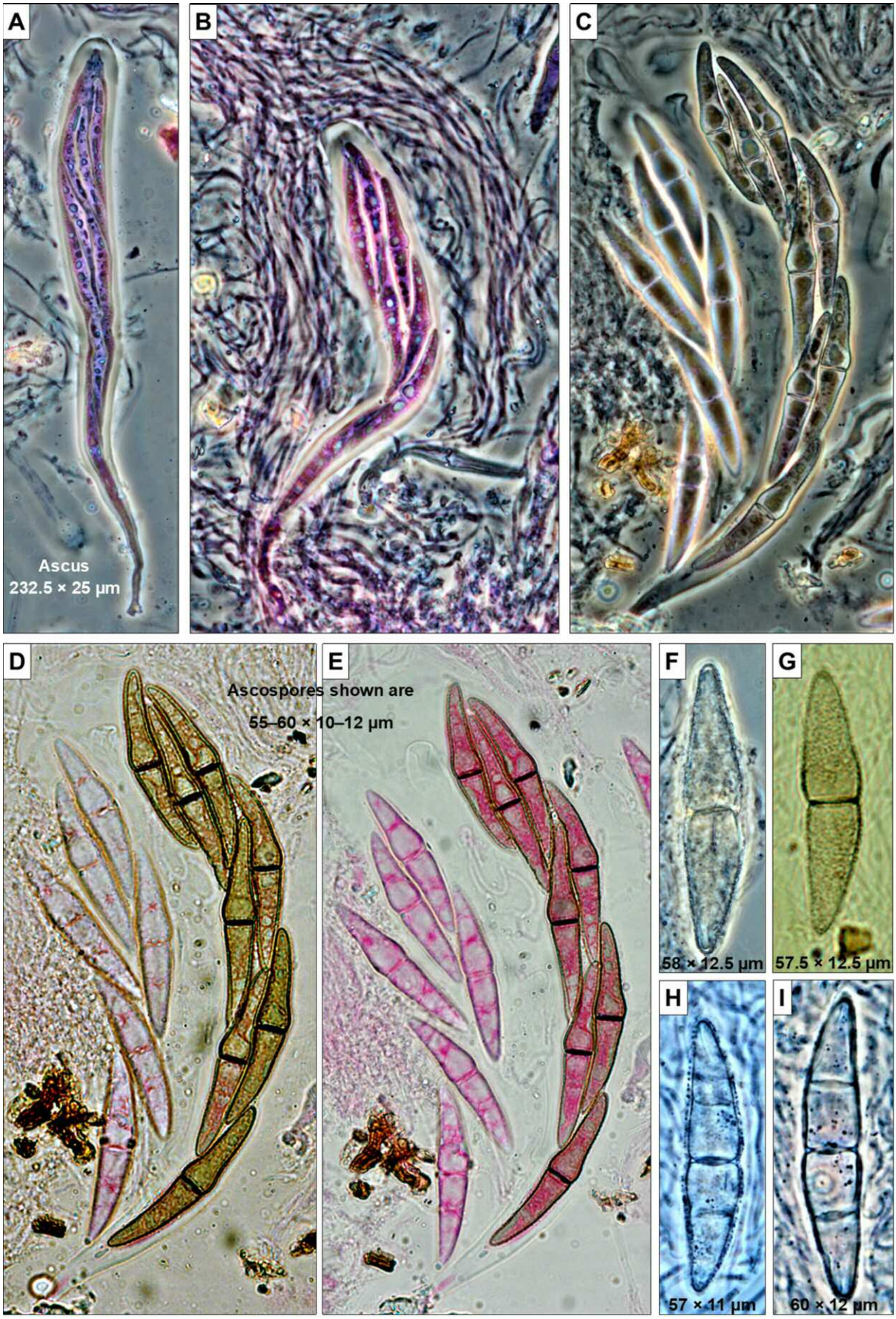

Fig. 3 – *Pseudotrichia ambigua*. Asci, pseudoparaphyses and ascospores. A–B. Young asci. B. With numerous pseudoparaphyses surrounding the ascus. C–E. Same field of view. 'C' highlights the ascus and ascospores while 'D' and 'E' feature natural and stained colours. 'D' was photographed first and 'E' 24-hrs. later. The original ascospore colour occurs in 'D' before the fuchsin stain penetrates them in 'E'. The fuchsin stain fails to penetrate more mature free-floating ascospores shown in F, H and I. Most mature, or nearly mature, ascospores are faintly verruculose, often more likely to have more than 1 septum and less likely to show an obvious bulge above the median septum. All photos are from lacto-fuchsin slide mounts, except G in Melzer's reagent.

from Thailand (= *P. rubriostiolata* Phook. & K.D. Hyde and *P. thailandica* Phook. & K.D. Hyde). These two new species are described as having unambiguously circular ostioles containing reddish pigment — a feature morphologically similar to the traditional characterisation of the genus *Byssosphaeria*. However, since their sequencing data places them closer to *Pseudotrichia guatopoensis*, the authors place them in the genus *Pseudotrichia*. Later that same year though, some of the same authors re-evaluated that decision and erected the new genus *Thysanolaenae* Q. Tian & K.D. Hyde (Tian *et al.*, 2015) to accommodate them as *T. rubriostiolata* (Phookamsak & K.D. Hyde) Q. Tian, & K.D. Hyde and *T. thailandica* (Phookamsak & K.D. Hyde) Q. Tian, & K.D. Hyde.

Several other genera have been considered close to *Pseudotrichia*, for example *Xenolophium* (Huhndorf, 1993). We endorse this view and described two new species of *Xenolophium* from New Zealand (Bell & Mahoney, 2008). There we explained the difficulty in assigning one of them to either *Pseudotrichia* or *Xenolophium* because several of its features crossed the generic boundaries as they were defined. In the end, we compromised by describing the new species as *Xenolophium pseudotrichioides* A. Bell & Mahoney, thus hedging our bets. Based upon morphological evidence, it is clear that *Xenolophium*, *Pseudotrichia*, and *Byssosphaeria* are closely related. More field work needs to be undertaken to find other species before any monographic work can be undertaken and more accurate keys constructed. We continue to maintain that classical keys are necessary in order to identify specimens collected, regardless of whether they express real genetic closeness or not, because the name of an organism is a key to its literature. Eventually, sequencing data may provide accurate data concerning true genetic relationships, but currently, when so few of the estimated fungal diversity are actually known, genetic analysis of what is presently stored in herbaria will not provide the panacea that is routinely promised. Moreover, erecting an avalanche of morphologically identical entities does nothing to enable field collections to be traced back to their literature.

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