

Redefining *Ellisembia* sensu stricto and its systematic implications

Gregorio Delgado^a

Laboratory of Mycology, Eurofins Built Environment Central, Pasadena, TX 77503, United States

*The phylogenetic placement and taxonomic affinities of the fungus *Ellisembia coronata*, the type species of the genus, were resolved after its recollection on the original host and type locality in Germany. Implications for the systematics of *Ellisembia*, *Sporidesmium* and related genera are summarized.*

Ellisembia is a large and polyphyletic genus belonging to the fungal class Sordariomycetes. Its members are sporidesmium-like in morphology and often found as saprobes colonizing dead plant debris. They are characterized by the presence of distoseptate conidia or asexual propagules that emerge from specialized, modified hyphae named conidiophores lacking or rarely forming percurrent extensions. *Ellisembia*, along with several other similar genera, was segregated from the highly heterogeneous *Sporidesmium*. However, the systematics of this generic complex was based on morphological or developmental characters with limited diagnostic value resulting in artificial taxa that do not reflect natural phylogenetic affinities. With the advent of the genomic era and the increasing use of molecular data in fungal systematics, many of these genera have been gradually reevaluated and incorporated into a more natural classification of the kingdom Fungi. Nowadays, *Ellisembia* is known to be polyphyletic and *ellisembia*-like species with available DNA sequence data are currently placed in different sordariomycetous families such as Chaetosphaeriaceae, Distoseptisporaceae, Sporidesmiaceae, and the order Xylariales.

In order to resolve the polyphyletic status of *Ellisembia*, a key step was to recollect and sequence *E. coronata*. This is the type species of the genus or the one upon which the generic concept was initially established. The fungus was originally described over 150 years ago by the German mycologist K.W.G.L. Fuckel as *Sporidesmium coronatum* on dried twigs of the plant *Philadelphus coronarius* (Hydrangeaceae) near the small town of Niederwalluf in the State of Hessen, Germany. However, living cultures were not available in international strain repositories and although multiple duplicates of the type specimen were deposited in European and North American herbaria, destructive sampling for DNA extraction was not possible. Consequently, the recollection of a fresh specimen at the type locality, ideally on the same host and substrate, emerged as a viable solution. This approach is not always feasible due to habitat loss and land-use changes that may have occurred over time, in this case over the past century and a half.

During a short-term visit to Germany, field work was carried out in collaboration with German and Czech mycologists with the primary objective of sampling

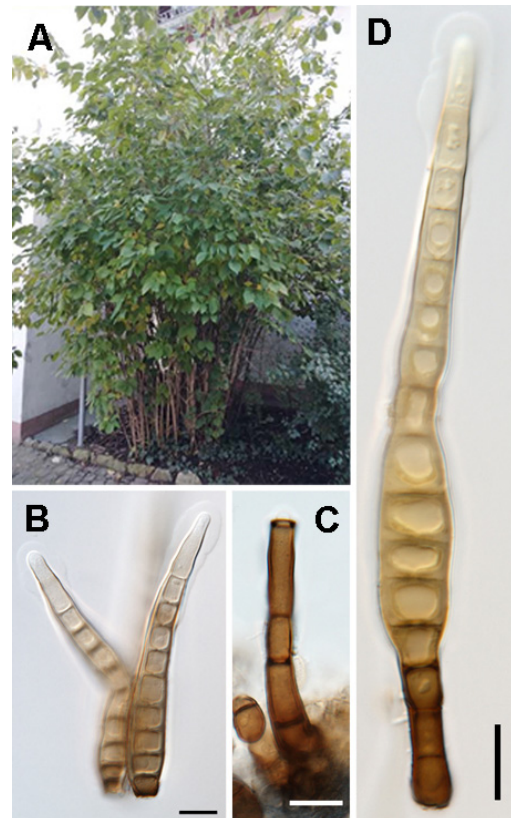


Figure 1: A. *Philadelphus coronarius*, host plant at the type locality in Niederwalluf, Germany. *Ellisembia coronata*. PRC 9257 B. Conidia of fresh specimen. C. Conidiophore. D. Conidiophore with attached conidium. Scale bars B, C, D = 10 μ m Source [1]

E. coronata at its type locality [1]. The fungus was not only successfully recollecting but also found on its original host and subsequently isolated on culture media. The identity of the fresh specimen was confirmed by comparison with duplicate specimens loaned from herbaria G and IMI, and an amended description of the fungus was provided. Genomic DNA was extracted from fresh cultures, and several molecular markers were amplified and sequenced. They included the complete internal transcribed spacer region and partial large subunit of the nuclear ribosomal DNA together with fragments of the translation elongation factor 1 α and the RNA polymerase II second largest subunit. Phylogenetic analyses of concatenated DNA sequence data revealed the placement of the fungus and suggested that *E. coronata* belongs to the family Sporidesmi-

aceae where it groups with other morphologically similar ellisembia-like taxa in a distinct monophyletic lineage distant from *Sporidesmium*. To ensure public accessibility and long-term preservation, a voucher specimen and living strain are deposited in herbarium PRC and culture collection CCF, respectively, whereas all sequence data are available in GenBank.

The successful recollection and sequencing of *E. coronata* had several taxonomic, phylogenetic and nomenclatural implications. The fungus was integrated into the modern molecular-based phylogenetic classification of Fungi for the first time. The polyphyletic status of the genus was also partially resolved, and its taxonomic circumscription was updated. *Ellisembia* in a stricter sense is now restricted to those members of this newly established lineage in Sporidesmiaceae having distoseptate conidia and none or a few percurrent conidiophore extensions. Consequently, four new combinations in *Ellisembia* were proposed for these fungi assigned in the past to genera such as *Sporidesmium* or *Imimyces*. Some authors previously treated the genus as a synonym of *Sporidesmium*. However, *Ellisembia* is now recognized as morphologically and phylogenetically distinct and therefore this synonymy is no longer tenable. Additionally, the taxonomy of a group of ellisembia-like fungi that forms a monophyletic clade in Chaetosphaeriaceae distant from the *Ellisembia* sensu stricto lineage was revised. The genus *Lomaantha* was expanded to include this group of species, and six new combinations were proposed to accommodate them.

of the name *Sp. coronatum* maintained at G was selected as lectotype, whereas the fresh specimen collected at the type locality, previously cited as an epitype, was proposed as a reference material with reference DNA sequences for phylogenetic and taxonomic purposes [2].

Notes

a. Email: Gregorio.Delgado@et.eurofinsus.com

References

- [1] Delgado, G., Koukol, O., Maciá-Vicente, J.G., Colbert W. and Piepenbring M. Redefining *Ellisembia* sensu stricto with a reassessment of related taxa in Sordariomycetes. *Mycological Progress* 23 (2024) 32
- [2] Delgado, G., Koukol, O. and Braun, U. Typification of *Sporidesmium coronatum* revisited. *Schlechtendalia* 41 (2024) 83–84

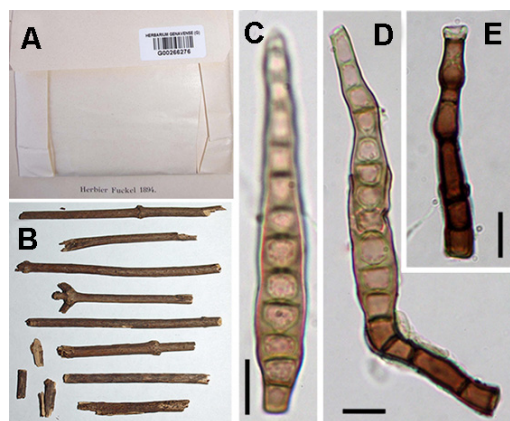


Figure 2: *Ellisembia coronata*. G00266276. A. Packet containing specimen. B. Herbarium material. C. Conidium. D. Conidiophore with attached conidium. E. Conidiophore with percurrent extensions. Scale bar = 10 μm . Source [1]

Finally, to preserve nomenclatural stability and fix the application of the name *Sp. coronatum*, basionym of *E. coronata*, the original illustration was designated as holotype and the fresh sequenced material was selected as epitype. These typifications, however, were later corrected in accordance with the current International Code of Nomenclature for algae, fungi, and plants. The examined duplicate specimen (or syntype)