

The mycological legacy of Elias Magnus Fries: corrections and additions

In attempting to outline the mycological life and legacy of Elias Magnus Fries (Petersen & Knudsen 2015¹) scattered sins of omission and of commission were committed. Some of these were brought to our attention by S.R., who has supplied needed data to set the record straight. Most grievous, correction was needed concerning the following: “For [Seth] Lundell and [John Axel] Nannfeldt, the collections for *Fungi Exsiccati Suecici* came chiefly from central Sweden, ideally from the collecting grounds of E.M. Fries. Not emphasized were Fries’s early collecting grounds in southern Sweden.”

Here must be emphasized that the simplicity and sagacity of Fries’s *Systema Mycologicum* led to acceptance of the scheme and elevated its use for more than the succeeding century. This high regard led to later “nomenclatural legislation” (insertion of Fries’s *Systema* as “starting point” for most fungal names and the subsequent changes to this nomenclatural system to the present-day), and inserted a full retroactive colon in Fries’s career and publications. Prior to 1821 (volume 1 of *Systema*), Fries had limited access to collections (adding gravitas to “v.v.” in *Systema* for taxa seen by Fries in fresh condition; “v. ic.” for taxa seen through illustration; and rarely - “v.s.” for taxa seen as dried material). All of Fries’s publications AFTER the *Systema* (apart from the *Elenchus*) are to be treated nomenclaturally as those by any other author. In reality, Fries’s name, because of the schema and elevated position of *Systema*, has evolved as especially respected and material which passed under his eyes is therefore usually treated with equal respect.

The circumstances of early Fries collections (and therefore preceding *Systema*) are complicated: in both parts of *Observationes mycologicae* (Fries 1815, 1818¹) numerous fungus names, mostly of ascomycetous microfungi, are attached to collections Fries made either specifically in Femsjö or its neighborhood, establishing toponym locations for most. When Fries was a student at Växjö in Småland, a school-mate, Johan Forsander (1795–1866), participated in field trips with Fries, and even some of Forsander’s fungus collections still exist at UPS.

Recognition of a dearth of early Fries collections influenced succeeding 20th century Swedish mycologists. In 1929, for example, Nannfeldt gathered some 960



Fig. 1. Seth Lundell drying specimens on a wood stove in Femsjö before World War II. [Photo first published in: Ryman S (1979) Insamlings- och herbarieteknik för hattsvampar (*Agaricales*) *Svensk Botanisk Tidskrift* 73: 203–209.]

specimens from the environs of Femsjö, mostly microfungi. Such specimens, both for Fries, himself, and succeeding collectors, avoided attempts to preserve specimens of fleshy fungi, a process almost insurmountable. Taxonomic representation of the Femsjö collections is skewed to microfungi and woody basidiomycetes which did not require purposeful preservation. Even a century later, Seth Lundell made numerous collecting trips to Femsjö in order to document Fries’s fungi on classic ground and in the years of 1931, 1938, 1939, 1940, 1943, 1948 and 1950 he made no less than 2952 collections in the neighborhood of Femsjö, mostly hymenomycetes, now at UPS. Parenthetically, there was no electricity in Femsjö before World War II, so Lundell had to dry his collections on a drying rack placed on a wood stove (Fig. 1). To maintain an even temperature the oven was heated by peat.

Of the Lundell Femsjö specimens, 450 made their way into *Fungi Exsiccati Suecici*

and so are widely distributed. In addition to personal collecting, Lundell established a card file with descriptions of the locations and forests of Fries’s collecting spots. The card file is now in the Museum of Evolution of Uppsala University (UPS). Lundell also gathered a record of “Femsjöbesök av botanister” (Femsjö visits by botanists). Included were Thore M. Fries (1851, 1854, lichens), M.A. Lindblad (1854, 1855, together with artist P. Åkerlund), Elias Petrus Fries (1856), O[scar] Rob. Fries (1861), and Lars Romell (1890, 1899, 1910, 1911). From the Åkerlund forays alone were produced over 500 paintings of fungi now in the Riksmuseet in Stockholm. More recently (20th century), Meinhard Moser pilgrimages to southern Sweden produced more material chronicled by Petersen & Knudsen (2015). All of this must be added to the observations from the Femsjö area by

¹For citations of Fries literature, see the bibliography in Petersen & Knudsen (2015).

Fries himself, summarized in a little-known book in 1828 (Fries 1828). Herbarium data are available from the database at the Museum of Evolution² where a blast would not include collections from nearby locations but with names differing from Femsjö).

A second questionable item in our original paper (Petersen & Knudsen 2015) centered in: “Fries, by modern standards, did not keep a large herbarium of fungi.”

To reiterate, Fries’s *Systema* (1821) was published very early in his career, but his extant herbarium, understandably, also includes specimens which came into his hands in all the years AFTER at least 1832 (volume 3 of the *Systema*). In fact, there are over 8000 mycological specimens in herb. Fries (plus several exsiccati that originally belonged to Fries), housed at the Museum of Evolution of Uppsala University, of which many represent types, some so-marked and others not. Herbarium Fries,

however, comprises not only collections made by Fries, himself, but also those which were given or sent to him. Of this category, many of the collections do not bear locations of origin, but geographically the largest contributions are 5221 from Europe, 1038 from North America, 392 from Asia, and 184 from South Africa. Equally, Fries’s correspondents submitted specimens (quantity in parentheses) which are still extant: the Norwegian botanists Sommerfelt (39) and Blytt (139), and the extra-limital mycologists Kalchbrenner (453), Curtis (387), Karsten (262), Quélet (155), Oudemans (118), and Berkeley (45 + 20 by Broome). Putative Schweinitz specimens total 218, almost surely sent by Curtis (or Berkeley), gleaned from Curtis’s “inspection” of Schweinitz’s collections at PHIL.

Taxonomically, Fries’s herbarium comprises specimens generally and understandably divided into Friesian groups (with specimen numbers in parentheses): *Sphaeria* (2112), *Agaricus* (542, with *Cortinarius* 42 and *Hygrophorus* 28), *Polyporus* (542), *Corticium* (215), *Thelephora* (215), *Hydnum* (189), *Peziza* (188), and *Clavaria* (82). Specimens

associated directly with Fries number 1308, mostly fungi

Curiously, there are numerous collections of fungi from Surinam in herb. Fries, most of them annotated “ex herb. Schweinitz.” These represent more parts of divided specimens taken by Curtis, large portions of which were sent to Berkeley. Several collections by Broome from Ceylon (now Sri Lanka), sent *via* Berkeley, are also present in herb. Fries. Altogether, Fries’s herbarium remains intact in Uppsala and available for research.

It can be hoped that if the above data are intercollated into the original paper, a more detailed and accurate picture of Fries’s mycological legacy can be summarized.

Fries EM (1828) [“1827”] *Stirpium agrii*

Femisionensis index observationibus illustrata.

Lund: Typographica Academica.

Petersen RH, Knudsen H (2015) The mycological legacy of Elias Magnus Fries. *IMA Fungus* 6: 99–114.

Ronald H. Petersen, Henning Knudsen,
and Svengunnar Ryman
(repete@utk.edu)

²The database of the Herbarium of the Museum of Evolution of Uppsala University can be accessed through: <http://130.238.83.220/botanik/home.php>.

Are old taxa without living authenticated cultures losing their status?

In the molecular era it is getting quite easy to search for sequences in GenBank. If there is no match in the database with a new isolate, then there is a temptation to conclude this must be a new species. This practice relieves mycologists from the tedious search in the literature for possibly available names for their isolate. This attitude is, however, in serious conflict with conscientious mycological taxonomy. In many cases type material exists that can be compared with recent collections, or the original description and illustration are sufficiently clear to recognize a species, which can then be epitypified with a permanently preserved culture or specimen that can be sequenced.

The situation can be illustrated by the following examples:

(1) The name *Utrechtiana cibiessia* Crous & Quaedvlieg (*Persoonia* 26: 153, 2011) was soon found to be conspecific with *Deightoniella roumegueri* (Cavara) Constant. 1983 (Seifert & Gams 2011).

(2) *Mariannaea pinicola* L.Lombard & Crous (*Studies in Mycology* 80: 213, 2015) was introduced in spite of the existence of

the earlier *Verticillium dichotomum* Ellis & Everhart 1888, the asexual morph of *Nectria mariannaeae* Samuels & Seifert 2009 (see Samuels & Seifert 1991).

(3) Wang *et al.* (2015) provided a careful overview with keys of what had been known about *Stachybotrys*, leaving as many taxa as possible with their original name, analysing the cultured ones phylogenetically, but reproducing only original illustrations. Lombard *et al.* (2016) took the alternative approach of naming as many clades as possible as new species or new genera in *Stachybotryaceae* (as “*Stachybotriaceae*”), many of which are morphologically distinct. Taxa of which no living strains and/or DNA sequences are available are not recognized, although types exist for many of them. The list of synonyms for *Stachybotrys chartarum* compiled by Jong & Davis (1976) and copied uncritically by several authors since, undoubtedly comprises names that would be suitable for presently distinguished “new species” in this genus as well as *Cymostachys* and *Sirostachys*. Where are then the highly toxigenic strains of this genus, which in my observations are morphologically slightly

different from non-toxigenic isolates of *S. chartarum*? *Stachybotrys elegans*, with all its diverse synonyms (although some are not validly published) is listed as a doubtful taxon and *Hyalobotrys* is listed as a synonym of *Stachybotrys*, although none of the species in that genus (in the strict sense of Lombard *et al.* 2016) has hyaline conidia and the genus is obviously congeneric with *Achroiostachys* L. Lombard & Crous 2016, which has to be treated as a synonym. Under *Myrothecium cinctum* several divergent elements had so far been subsumed, that could have been taken up instead of some new species in *Striaticonidium* or *Striatibotrys*. *Paramyrothecium* includes the type species of *Myrotheciella* and is thus a superfluous name and illegitimate. Some of the “excluded taxa” could perhaps have been identified with some of the “new species” and the usage fixed by epitypification rather than introducing new species names. Of the 21 new generic names introduced in the work, at least two, and of the 63 new species at least eight probably have already published names that could have been secured by epitypification.

Next month we can celebrate the centenary of C.G. Lloyd's "*Myths of mycology*", an unfriendly and remarkably critical discourse dealing with such cases that were already an issue a century ago. Lloyd castigates the unethical practice of publishing new taxa without serious efforts of critical literature investigation. Without sufficient diffusion of the literature and absence of internet databases this could happen in that time, when no peer-reviewing system was yet in function. Now the situation is generally better: self-respecting journals publish only peer-reviewed papers and conscientious authors consult the most competent colleagues anyhow before even submitting papers for publication. Nevertheless, with the proliferation of journals and e-publication, it is also possible for authors to rush into print without consulting potentially critical reviewers.

With hundreds, if not thousands, of novelties already awaiting to be named, one can sympathize with the frustration and tedium of having to study literature and specimens of up to 250 years old. However, responsible mycologists still make the time to do this, as by so doing they can have confidence that their names will be accepted and stand the test of time. It is a chastening thought that we currently already have around 400,000 species names of fungi for just 100,000 accepted species; mycologists should make every effort to avoid adding to the nomenclatural burden of our subject by introducing unnecessary names.

Jong SC, Davis EE (1976) Contribution to the knowledge of *Stachybotrys* and *Memmoniella* in culture. *Mycotaxon* 3: 409–485.

Lloyd CG (1917) *The Myths of Mycology*. Part 1. Cincinnati, OH: C.G. Lloyd.

- Lombard L, van der Merwe NA, Groenewald JZ, Crous PW (2015) Generic concepts in *Nectriaceae*. *Studies in Mycology* 80: 180–245.
- Lombard L, Houbraken J, Decock C, Samson RA, Meijer M, *et al.* (2016) Generic hyper-diversity in *Stachybotriaceae*. *Persoonia* 36: 156–246.
- Samuels GJ, Seifert KA (1991) Two new species of *Nectria* with *Stilbella* and *Mariannaea* anamorphs. *Sydowia* 43: 249–263.
- Seifert KA, Gams W (2011) *The Genera of Hyphomycetes* – 2011 update. *Persoonia* 27: 119–129.
- Wang Y, Hyde KD, McKenzie EHC, Jiang Y-L, Li D-W, Zhao D-G (2015) Overview of *Stachybotrys* (*Memmoniella*) and current species status. *Fungal Diversity* 70: 17–83.

Walter Gams
(walter.gams@online.nl)