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The First Record of *Osteomorpha fragilis* in Russia

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Abstract—Data on the hyphomycete *Osteomorpha fragilis* hitherto unrecorded in Russia are reported.

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The evidence for anamorphs of higher fungi is related mainly to the conidial stage of ascomycetes. Data on basidiomycetous anamorphs are much scarcer by far. Some information may be derived from works on aphyllophoroid and agaricoid fungi (in the old sense of the boundaries between these two groups), but there are hardly any special reports on basidiomycetous anamorphs other than the chapter "Mitospores in Basidiomycetes" [1] in the book *The Whole Fungus* [2]. A number of anamorphs of many basidiomycete genera are mentioned there; however, their morphology, substrate, and occurrence are not described. A publication on the evolution of asexual reproduction in higher basidiomycetes is known [3]. Five hundred and eighty species of higher basidiomycetes with known asexual sporulation (anamorphs according to the present-day terminology) are mentioned in this review. The author assessed the advanced state or primitiveness of the morphological and ontogenetic characteristics of the conidial stages and considered the problems pertinent to the original groups of basidiomycetes, the ancestral structures for a basidium and the identified groups of anamorphs, as well as the divergence of the modern basidial fungi. The book has made a certain contribution to the development of research into the evolution of higher basidiomycetes and their anamorphs, but, naturally, it is hardly helpful for revealing the composition of these hyphomycetes in the world and specific regions thereof, including Russia.

This short publication is devoted to the hyphomycete *Osteomorpha fragilis* G. Arnaud ex Watling et W.B. Kendr., which is interesting due to its unusual arthroconidia.

The species *O. fragilis* is conventionally regarded as an anamorph of the corticioid fungus *Trechispora farinacea* (Pers.: Fr.) Liberta. Liberta [4] noted the absence of direct evidence of a genetic link between *O. fragilis* and *T. farinacea*. It is also not clear whether *O. fragilis* is a parasymbiont or, possibly, a weak parasite sporulating on a basidiomycete. At the same time, comparison of the fungal hyphae revealed them only at the basidiome sites with the typical hymenium elements, including the basidia, and the hyphae found among the arthroconidia revealed that they were similar in size. According to Liberta, this fact supports the conclusion that they belong to the same fungal species. Such a conclusion is also confirmed by the observation of the hyphae from which *O. fragilis* conidiophores branch off. Despite the doubts he expressed, Liberta [4] considered *O. fragilis* to be an anamorph of *T. farinacea*.

It should be noted that the issue of the taxonomic position of basidiomycetes remains controversial. For example, there exists the opinion [5, 6] that, apart from *T. farinacea*, there exists an independent species, *T. stevensonii* (Berk. et Broome) K.H. Larss., with which the *O. fragilis* stage is associated. Since the taxonomic position goes beyond the scope of this article, we consider *T. farinacea* in the broad sense of Liberta's interpretation [4].

According to the description of *O. fragilis* quoted in the article upon validation of this taxon [7], the arthroconidia Lmeasure 2–3.5 (–5) × 1.5–2.5 μm; according to Liberta's description, 4–8 × 2.5–4.5 μm; and, according to the data of other authors, about 5 × 2.5 μm. It can be seen that these figures, despite the difference between them, are likely to reflect the variability in the size of athroconidia of this hyphomycete. Considering all the data available, we identified with certainty the sample found on a stump of *Duschekia fruticosa* from the Komarov Botanical Institute, Russian Academy of Sciences, as *O. fragilis*. Below, the description of this sample is given.

O. fragilis G. Arnaud ex Watling et W.B. Kendr. *Naturalist*, *London* **104** (no. 948): 1 (1979). – *O. fragilis* G. Arnaud, *Bull. Trimest. Soc. Mycl. Fr.* **68**: 192 (1952), nom. illeg.

The colonies are compact, snow-white, well noticeable, consisting of unique pointlike sods up to 400 μm in diameter each, and dispersed on the substrate surface. The conidiophores, if any, are reduced to short projections 5–10 μm long and 2–3 μm wide;

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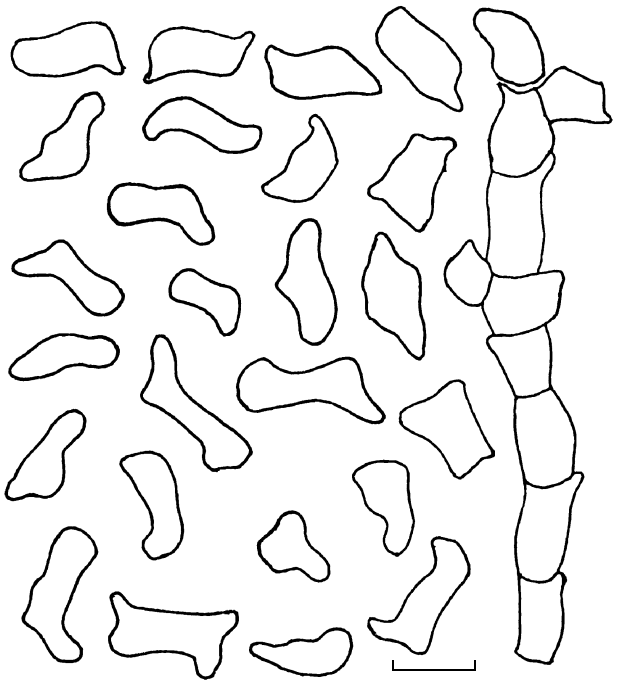

Osteomorpha fragilis: separate conidia (a) and a chain of young conidia (b). Scale bar: 5 μm.

sometimes, they are longer and recall vegetative hyphae. The arthroconidia are colorless, snow-white in a mass, originating by fragmentation of the fertile hyphae with clamp connections into separate segments; the fertile hyphae develop from the vegetative hyphae. The conidial shape is highly variable, more often oblong, with truncate ends. One or both ends of the conidia have a small cone-shaped projection, which may be regarded as a trace of fragmentation of the fertile hyphae with clamp connections. The conidia measure 4–6 × 2–3 (–3.5) μm in size (see figure).

The specimen studied: Russia, St. Petersburg, the park of the Komarov Botanical Institute, Russian Academy of Sciences, on the bark of a *Duschekia fruticosa* stump, October 29, 2009, collected by V.A. Melnik (LE 261804).

Importantly, thorough examination of the *O. fragilis*-containing bark pieces constituting this specimen did not reveal the presence of any basidiomycete. Evidently, this fungus is able to exist independently of the teleomorph. This phenomenon is common among ascomycetous anamorphs, with the conidial stage of a pathogen existing on a damaged plant and its teleomorph being absent. The number of cases in which the fungus occurs simultaneously on the same substrate both in the perfect and anamorphic stage are comparatively few. Powdery mildews are an exception, commonly occurring simultaneously as a teleomorph and an anamorph. Moreover, attempts to obtain the *T. farinacea* culture from the basidiospores and tissues of this fungus have been unsuccessful [7]. The same result was noted when an attempt was made to obtain culture of *O. fragilis* from the arthroconidia and hyphae of this fungus. At the same time, the fertile hyphae with clamp connections observed in our sample give evidence of this hyphomycete being linked to a basidiomycete.

There are several dozen of *T. farinacea* specimens in the Mycological Herbarium (LE) of the Komarov Botanical Institute, Russian Academy of Sciences (BIN RAS). It is quite possible that some specimens may contain, in addition to this basidiomycete, *O. fragilis*. As evidenced by I.V. Zmitrovich (BIN RAS) he found the fungus *O. fragilis* while analyzing a collection of basidiomycetes from Leningrad oblast. Analysis of the material kept in the BIN herbarium is likely to extend the data on the occurrence of this easily identifiable (primarily due to the unconventional shape of its arthroconidia) hyphomycete in the mycobiota of Russia. Thus far, this published evidence has been the first documented record of the discovery of *O. fragilis* in Russia.

Moreover, documented evidence exists of *O. fragilis* on the wood of oak branches in Lithuania [6].

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