

Mycological Investigations — VI

By

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In a previous report (Johnson, 1970), I emphasized what appears to be a significant aspect of the Icelandic aquatic mycoflora, namely, the abundance of forms or variants that are useful in studying the ranges of species variation. The bulk of the work during 1969 and 1970 on the aquatic fungi of Iceland involved many of these variants in attempts to discover limits to species diversity in particular groups of aquatic fungi. In the report to follow, certain of these studies are summarized.

Representatives of eight genera of the Saprolegniaceae are now known to occur in Iceland (Howard *et al.*, 1970). Four species of *Aphanomyces* have been identified, but these probably do not represent the total number of taxa in the genus in Iceland. Currently, I am intensifying the field work in attempts to study this genus further. Snakeskin, roach wings, and boiled cellophane have been the baits of choice in collecting species of *Aphanomyces* from water and soil samples. *Pythiopsis cymosa* is common on fish in the hatcheries near Reykjavík, but the usual habitat for the fungus is soil and water.

A number of taxonomic changes in the Saprolegniaceae have been made as a result of the study of specimens from Iceland. Chief among the changes has been the recognition of *Saprolegnia torulosa* as the valid name embracing such long-standing species as *S. monilifera*, *Isoachlya monilifera*, and *Isoachlya torulosa*.

Eight species of *Olpidium* (Chytridiales) and seven species of *Phlyctochytrium* (Chytridiales) have been found in Iceland (Johnson, 1969a, b). Variants or forms of several species have been described, and distributional records extended.

For example, *Phlyctochytrium indicum* Karling has been collected on Heimaey; its only other record is the original collection from New Zealand. Also found on Heimaey is Sparrow's *Olpidium rhizophlyctidis*, a parasite of a fungus in the genus *Rhizophyidium*. The other known sites for this species are the Marshall Islands and Cuba.

During 1969 and 1970, I gave particular attention to a study of three species of Chytridiales with gibbose sporangia. The morphological variation in generous collections of *Chytridium schenkii* led me to conclude that Scherffel's *C. gibbosum* is a synonymous species.

Within the biflagellate aquatic fungi, I have found substantial material of species of *Olpidiopsis* and *Pythium*. Members of *Olpidiopsis* are parasitic on other fungi and in algae. While I have been unable to culture these fungi (and thus study their morphology extensively), there is substantiating evidence for taxonomic changes to be made. One species (evidently new to science) of *Olpidiopsis* occurs in *Chara*(?) in Iceland.

Much of the mycological effort in 1969 and 1970 went into characterization and taxonomy of isolates of *Pythium* from Iceland's soils and waters (and from filamentous green algae). Members of this genus are free-living in soil and water, or are parasitic on other plants. These fungi are very common in Iceland, but many of the specimens collected did not reproduce sexually even in pure culture. In my study of the isolates at hand, I have attempted to characterize species in such a way as to indicate something about their ranges of variation.

These species of *Pythium* have been discovered in Iceland: *P. debaryanum*, *P. dissotocum*, *P. echinulatum*, *P. gracile*, *P. inflatum*, *P. mamillatum*, *P. middletonii*, *P. monospermum*, *P. pulchrum*, *P. rostratum*, *P. tenue*, *P. torulosum*, *P. ultimum*, *P. undulatum* and *P. vexans*. The Iceland specimens, *in toto*, would be important in any future monograph of the genus since they generally seem to be highly variable, and in a genus as complex as *Pythium*, it is essential to know as much of morphological variability as is possible if meaningful taxonomic judgments are to be made.

In the genus *Pythium*, as in other genera of aquatic fungi studied in Iceland, there are substantial new records of occurrence. *Pythium dissotocum*, for example, inhabits roots of vascular plants, but in Iceland it occurs in soil. Before its discovery in the Laugarvatn area, *P. inflatum* was known only from North Carolina. Other species — such as *P. debaryanum* and *P. ultimum* — are very widely distributed, being found both in Europe and in North America, and it is not surprising to recover them also in Iceland.

There are numerous species complexes yet to be studied. Outstanding among these is the galaxy of forms revolving about the species of *Chytridium* and *Rhizophyidium* with globose sporangia. These fungi are very common in Iceland in the soils below tufts of grasses and *Rhacomitrium*. In addition to projected studies on these aquatic fungi, there is a need for an intensive investigation of aquatic species developing on submerged twigs and rosaceous fruits. This portion of the aquatic mycoflora of Iceland has been touched upon in only the most superficial of ways. I have collected some species of the filamentous, biflagellate groups on submerged apples and birch twigs, but these have generally been members of *Pythium* and of the Saprolegniaceae. It is surprising that members of *Blastocladia*, *Rhipidium*, *Sapromyces*, and *Monoblepharis* have not occurred on twigs or fruits submerged in various streams in southwestern Iceland.

A very substantial contribution to our knowledge of the mycoflora of Iceland has been made by E. V. Laube, Jr., Duke University (doctoral dissertation) on the mucoraceous fungi and coprophilus Ascomycetes. Fifty-two species of mucoraceous fungi, representing eleven genera in seven families have been isolated from soils and dung from Iceland. As has been the case with the aquatic fungi, there is an abundance of variants and forms of mucors among the specimens isolated. Accordingly, certain taxonomic changes have been made in several genera, based on the results of comparative morphological studies: *Mortierella*, *Rhizopus*, *Spinalia*, and *Mucor*. New taxa are described in the genera *Absidia*, *Mortierella*, *Zygorhynchus*, *Spinalia*, and *Thamnidium*.

Laube (dissertation, 1971) also reports forty-seven species of ascomycetes from soil and dung. These species (some of which are as yet not named or positively identified) represent twenty-two genera.

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