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# Some New Myxomycete Records for the Neotropics and Some Taxonomic Problems in the Myxomycetes

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New myxomycete records for the neotropics and certain taxonomic problems are discussed. Attention is focused on the genus *Diachea* and particularly *D. bulbillosa, Badhamia obovata, Didymium leoninum,* and *D. floccosum.*

INDEX DESCRIPTORS: Neotropical Mxyomycetes, Myxomycetes, Myxomycetes Taxonomy, Diachea.

In this paper I wish to report several species of myxomycetes discovered in the Neotropical latitudes for the first time, and critically reexamine the taxonomic position of certain taxa.[2]

## MYXOMYCETES FROM AMERICAN TROPICAL LATITUDES

In this section I will comment upon several species of myxomycetes found in the Neotropics for the first time.

1. *Hemitrichia leiotricha* (A. Lister) G. Lister (Figure 1). Reported from the widely scattered localities Europe, Ceylon, and Kansas, this species is apparently predominantly (if not exclusively) a Temperate-Zone species. It was collected in the Venezuelan Andes (obviously a montane, non-tropical habitat). *H. leiotricha* shows some resemblance to *H. clavata* (Pers.) Rost. and *H. stipitata* (Mass.) Macbr., but differs from both in its robust, subglobose, shining olivaceous or brownish yellow sporangia borne on very short stipes, its thinner capillitial threads, and its larger spores. From *H. intorta* (A. Lister) A. Lister it differs in stipe structure and lack of spines on the capillitium.

2. *Physarum alpinum* (A. and G. Lister) G. Lister (Figure 2). This is a montane species, which likewise was found in the Venezuelan Andes. It is characterized by clustered, robust, yellow, subglobose sporangia with double peridia, and strong calcareous capillitium.

3. *Physarum mutabile* (Rost.) G. Lister (Figure 3). There are now several specimens in the National Fungus Collections (BPI) from Argentina and Venezuela, indicating that this species is probably not as rare as it is generally supposed to be. It is listed in Martin and Alexopoulos (1969) from widely separated localities in western Europe, Africa, Ceylon, and North America. *P. mutabile* is usually easily recognized by its elongated, white sporangia borne on yellow, limy stalks, and the cylindric pseudocolumellae.

4. *Physarum fulgens* Pat. (Figure 4). Most workers probably are not familiar with this species, since it is generally listed as a synonym of *P. lateritium* (Berk. and Rav.) Morgan. An examination of the type from Ecuador and several other gatherings from Brazil, Panama, and the West Indies indicates, however, that it appears to be a distinct species characterized by laterally compressed, generally yellow or orange fruiting bodies and capillitium with abundant, orange (sometimes fading to white), mostly rounded or lenticular lime knots of uniform size and distribution.

5. *Erionema aureum* Penzig (Figure 5). The specimen pictured is tentatively identified as *Erionema aureum,* a species previously known only from the Far East. It is typical in all respects except that the plasmodiocarps are reticulate or convoluted, rather than pendent.

6. *Didymium leoninum* Schrad. and *D. floccosum* Martin, Thind, and Rehill. These two species also represent new records for the Western Hemisphere. Typically the stipes of *D. leoninum* are short, thick, rugose, and limeless or only frosted with lime; the columellae are big and prominent and more or less clavate; the large lime crystals on the peridium occur in scale-like aggregations, which may be sparse or sufficiently abundant to form a continuous layer (Figure 6). Because of its tough peridium, *D. leoninum* is at present segregated in a separate subgenus. The peridium, which under the compound microscope actually appears to consist of a colorless membrane fused with a bright reddish-brown, thickened (cartilaginous) layer, breaks up into irregularly shaped plates on dehiscence (Figure 7). The Jamaican collection pictured fits the species well, except for some minor color differences and slightly less of the reddish brown thickening material in the peridium (Figure 8). The Venezuelan collection of *D. floccosum* (Figure 9) compares well with the description and type specimen from India. The salient characteristics of *D. floccosum* are relatively long, smooth, calcareous stipes; small, globose to clavate columellae; and a peridium resembling that of *D. leoninum* in containing brown thickening material, in bearing aggregations of large lime crystals, and in dehiscing in the form of scales or platelets (Figure 10). In *D. floccosum,* however, the peridium is thinner (i. e., not of cartilaginous consistency), smoky or greyish brown instead of bright reddish, and the platelets are smaller and more rounded than those of *D. leoninum.* Similar brown thickening and areolate dehiscence have been found in *D. nigripes* (Lk.) Fr., and probably occur in other species as well. These observations raise doubts as to the

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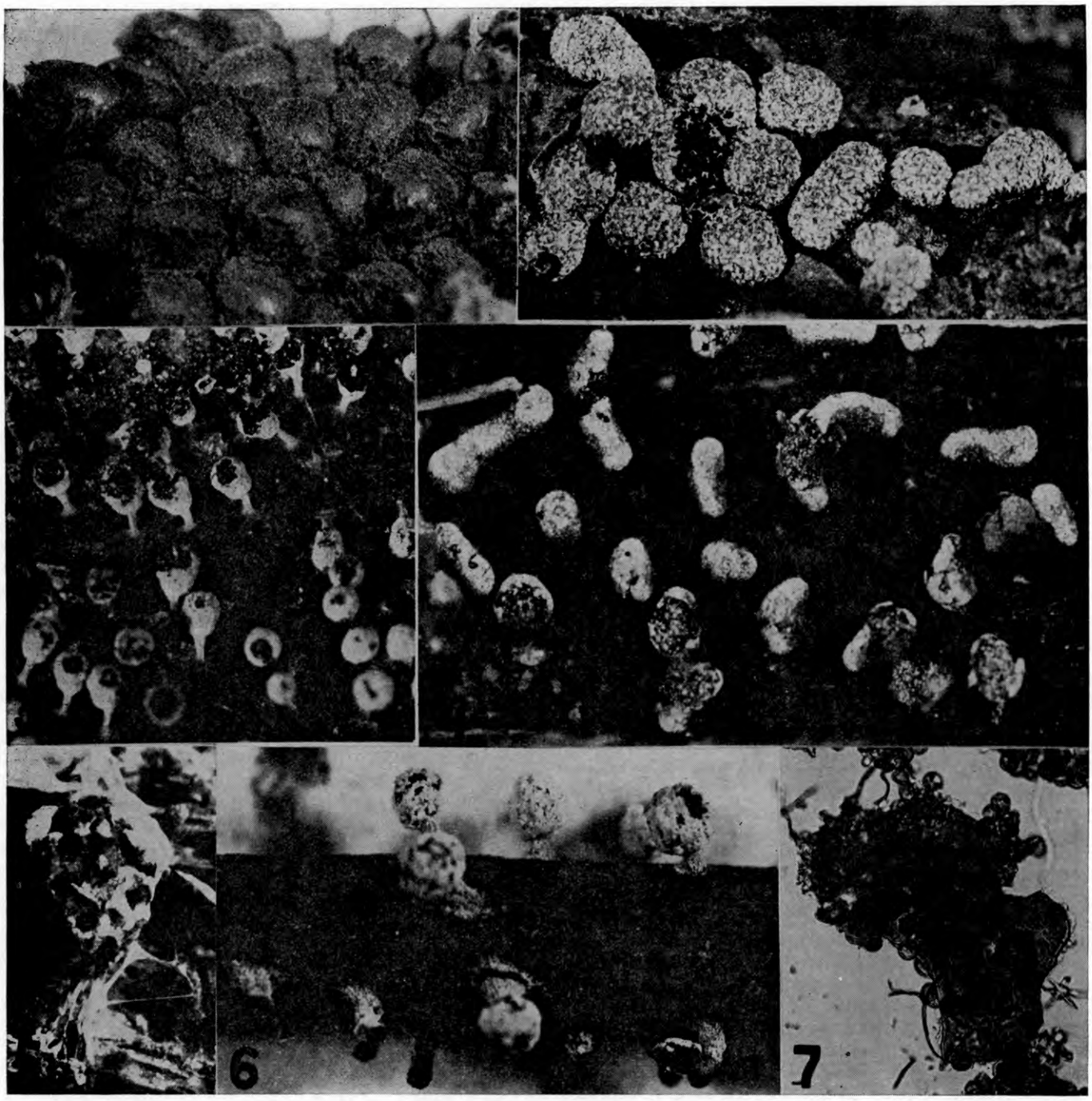
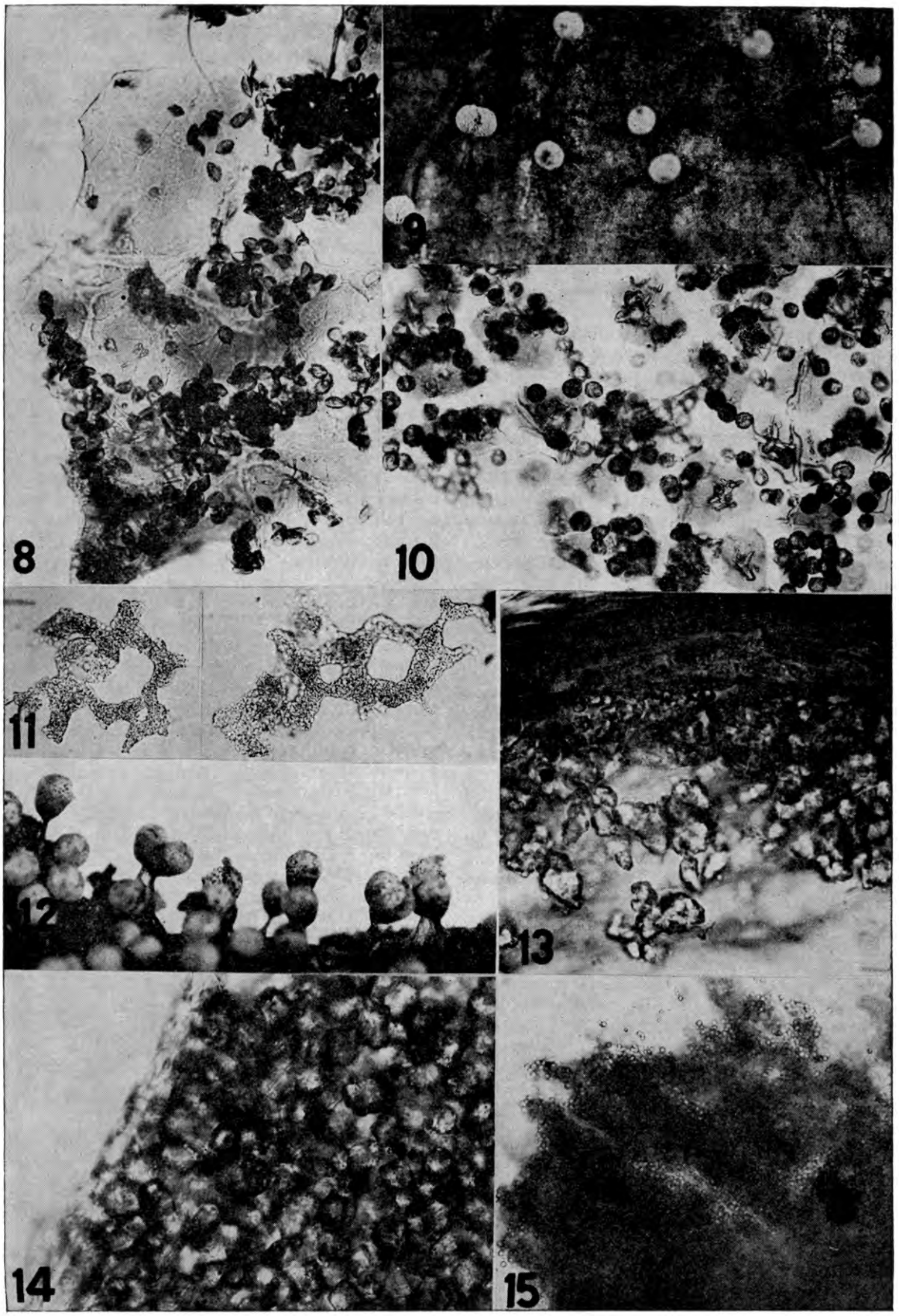
[2] The following reworks are a result of a critical review of myxomycetes from the Neotropics in preparation of the monograph, "Flora Neotropica Myxomycetes."




Figures 1-7. Figure 1. *Hemitrichia leiotricha,* habit *(Oberwinkler 13686).* X 16. Figure 2. *Physarum alpinum,* habit *(Oberwinkler 13688).* X 16. Figure 3. *P. mutabile,* habit *(Oberwinkler 15913).* X 16. Figure 4. *P. fulgens,* habit *(Mariz 5).* X 16. Figure 5. *Erionema ?aureum,* habit *(Oberwinkler 15030a).* X 16. Figure 6. *Didymium leoninum,* habit (CUP-*MJ 716*). X 16. Figure 7. *D. leoninum,* peridial fragments from a typical Far East collection *(NY 11339).* Figure 8. *Didymium leoninum,* peridial fragment from CUP-*MJ 716,* showing varying amounts of reddish brown thickening material. X 180. Figure 9. *D. floccosum (Dumont VE-3215),* habit. X 16. Figure 10. *D. floccosum,* peridial fragments. X 180. Figure 11. *Craterium obovatum,* portion of capillitium *(Stevenson, sp. n.).* X 180. Figure 12. *C. obovatum,* habit *(Morgan sp. n.).* X 16. Figure 13. *C. obovatum,* portion of crushed stipe *(Stevenson sp. n.).* X 675. Figure 14. *Diachea bulbillosa,* portion of crushed stipe from a tropical specimen *(Farr 2432).* X 180. Figure 15. *D. bulbillosa,* portion of crushed stipe from a temperate specimen *(R. K. Benjamin sp. n.).* X 180.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necessity of maintaining a distinct subgenus for *Didymium leoninum* solely on the basis of peridial structure.

## THE TAXONOMIC POSITION OF CERTAIN MYXOMYCETE TAXA

In this section I wish to review the taxonomic placement of certain Myxomycetes.

1. *Badhamia obovata* (Peck) S. J. Smith or *Craterium obovatum* Peck? This rather common myxomycete usually forms abundant colonies and, despite the variability in spore size and stipe length, it is easily recognized and stable in its distinctive marks. Thus its classification becomes a matter of interpreting and weighing the relative diagnostic importance of these well-known characteristics. The species has only its badhamioid capillitium (Figure 11) in common with the other members of *Badhamia* Berk. This is a consistent and striking character. In all other respects, however, the species stands alone in *Badhamia*. The shape of the sporangium, the structure of the peridium, which is thicker below and often clearly delimited as a basal cup, and the presence of a columella or a pseudocolumella all bespeak *Craterium* Trent. (Figure 12). The craterioid traits are not only more numerous, but taxonomically more weighty, at least in our present classification of the Physarales. The genus *Craterium,* after all, was founded upon the sporangial shape and peridial characters, and it is these characters that separate *Craterium* and *Physarum* Pers., not the capillitial structure. Hence the species known as *obovatum* appears more naturally placed in *Craterium* and should be returned to that genus.

2. *Diachea* in the Physarales? The final subject of discussion is the genus *Diachea* Fr. This genus manifests some physaraceous and some stemonitaceous characters, and thus it has been classified in both the *Stemonitales* and the *Physarales.* Unfortunately it has as yet not been completely studied in the laboratory. Indira (1965) reported laboratory culture of *Diachea splendens* Racib., but she did not observe sporangial development, which, by modern standards, is of fundamental importance in establishing taxonomic relationships in the Myxomycetes. The plasmodium is described by Indira as intermediate between the phaneroplasmodium and aphanoplasmodium types, a fact which is of no help at present in deciding where to place the genus. Any classification of *Diachea* remains necessarily tentative and must be derived from the interpretation of the limited knowledge at hand. Although the type of development is not yet known, the structure of the stipe, which consists of a membranous sheath stuffed with lime (Figures 14, 15), would indicate a subhypothallic mode of development, as in the Physarales. A similar stipe structure was casually observed in *Craterium obovatum* (Figure 13). The very presence of lime as a structural component is, of course, a further trait distinctive of that order. The only known stemonitaceous features of *Diachea* are similarities in capillitium and peridium structure with those in *Lamproderma* Rost. These similarities, however, should be ranked subordinate in significance to the physaraceous features just pointed out, because they are not entirely confined to the Stemonitales. A wholly or partly limeless, membranous, iridescent peridium, for example, occurs in *Physarum flavicomum* Berk., *P. nudum* Macbr., *P. dictyospermum* A. and G. Lister, and occasionally in other species. The capillitium of *Diachea,* although generally more similar to that of *Lamproderma,* does not appear to differ fundamentally from that of many Didymiaceae. Thus, on the basis of our present knowledge and available evidence, *Diachea* seems to me more naturally and compatibly placed in the Physarales, family Didymiaceae, rather than in the Stemonitaceae.

3. Lime structure in *Diachea bulbillosa* (Berk. and Br.) A. Lister. So much for *Diachea* in general. Within this rather small genus, next to the ubiquitous and common *D. leucopodia* (Bull.) Rost., the second-most-common and widely distributed species is *D. bulbillosa,* characterized by globose sporangia, rather long, white or whitish stripes, and verrucose spores. The intriguing aspect of this species is that, in tropical and subtropical collections, the lime is invariably crystalline (Figure 14), whereas in temperate-zone specimens it is granular (Figure 15). In about 50 collections examined, this has proven to be a competely dependable characteristic, but it is also the only one consistently distinguishing temperate-zone from tropical or subtropical material. In tropical collections, the spores are sometimes slightly larger, but spore size and markings were found to be variable and not correlated with structure of the lime. This obviously poses two questions: (1) Is the structure of the lime climatically controlled? (2) If not, is this character alone sufficiently important to warrant splitting *D. bulbillosa* into two species? Intensive collecting in borderline climatic areas and laboratory culture testing of the factors governing lime structure in this taxon are needed to provide a conclusive answer to the first question. It is noteworthy that in *D. leucopodia* the lime appears to be invariably granular, regardless of geographic origin. If the structure of the lime in *D. bulbillosa,* likewise, should be proven to be *inherent* rather than environmentally determined, then the second question would, in my opinion, have to be answered in the affirmative. In the classification of the family Didymiaceae, the structure of the lime is the sole character separating the two principal genera, *Didymium* and *Diderma* Pers. It would be inconsistent with this concept to ignore this character on the species level within *Diachea* by retaining both granular-limed and crystalline-limed fruitings within *D. bulbillosa.*

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