

## First records of myxomycetes from Lubang Island, Occidental Mindoro, Philippines

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The first records of myxomycetes are reported from Lubang Island, Occidental Mindoro, Philippines. Specimens collected in the field and/or from moist chamber cultures prepared with samples of ground leaf litter and twigs yielded a total of 45 taxa, six of which are new to the Philippines. These are *Arcyria globosa*, *Collaria rubens*, *Comatricha robusta*, *Craterium atrolucens*, *Lamproderma cacographicum*, and *Perichaena microspora*. Thirty years after Reynolds (1981) had published a checklist of the myxomycetes of the Philippines, the total number of species now known from the country has been increased from 107 to 128, including the present six new additions.

Keywords: species listing, islands, myxomycetes, surveys.

Relatively little is known about the status of myxomycete biodiversity in the tropics, and this is particularly true for Southeast Asia. The earliest published report of myxomycete diversity in the region is a species list for Myanmar and Thailand (Reynolds & Alexopolous 1971). More recent publications for Asia have included lists of species collected in Taiwan and China (Liu & Chen 1998, Ukkola *et al.* 2001). In the Philippines, an annotated checklist of 107 species, based on both published and unpublished records, was reported by Reynolds (1981). The latter was the most extensive checklist of Philippine myxomycetes available at that time. Most of these myxomycetes, including those presently deposited in the mycological herbarium of the Museum of Natural History at the University of the Philippines in Los Baños, Laguna, were obtained from several localities in the country. These were (1) Luzon: Batanes, Ilocos, Mt. Province, Benguet, Bataan, Laguna, Quezon, Camarines Sur, Sorsogon, Albay, and Palawan; (2) Visayas: Iloilo, Antique, Leyte, Negros and Cebu; and (3) Mindanao: Agusan, Cotabato, Surigao del Sur, Davao, Zamboanga and Sulu (dela Cruz *et al.* 2009). Recently, 15 new records were reported for the Philippines (Corpuz *et al.* 2009; Moreno *et al.* 2009; Daga-

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mac *et al.* 2010, 2011). However, the reported number of species is still considered small for a tropical region of the world, which suggests that there are likely to be many more myxomycetes yet to be found in the remaining unexplored parts of the country.

As of 2010, there were 122 records of myxomycetes for the Philippines. However, this comprises only about 12 % of the total number of species known worldwide, which clearly points to the need for more investigation. The study reported herein provides a checklist of myxomycetes recorded from Lubang Island, including reports of six new records for the Philippines.

### Materials and methods

#### Study site

The Lubang group of islands, located at 13°47'0"N, 120°12'0"E and with a total land area of 6,918.78 hectares (Fig. 1), is composed of four islands adjacent to but physically isolated from the island of Mindoro. The topography of the latter is generally characterized as rugged terrain, with narrow strips of coastal lowlands, successive mountain ranges, valleys, and elongated plateaus, with rolling lands along the coastal region. Two distinct forest types, the first consisting of forests from the coastal areas and the second of forests from mountainous areas, served as the study areas for collecting both samples of substrates and field specimens. In each instance, substrates and field specimens were collected from ten sites along the periphery of Lubang Island and ten sites on two different slopes of Mt. Gonting, which is located near the center of the island (Fig. 1).

#### Collecting localities

Localities were randomly selected from the forested areas along the periphery of the main island of Lubang, which comprises two municipalities (Lubang and Looc), as represented below by *CF* (site number). In a similar fashion, forest sites were randomly selected from two accessible trails leading to the summit area of Mount Gonting (477 meter above sea level, m a.s.l.), the highest point on the island, as represented by *MF* (site number). The location and elevation of each collecting sites were noted using a portable GPS unit (Garmin, USA). The specific collecting localities are enumerated and described below.

#### Forest sites in the coastal area:

- Site 1: *CF1*. Agkawayan. 13°45'46.7"N, 120°15'18.3"E, 27 m a.s.l.
- Site 2: *CF2*. Bungahan. 13°46'15.1"N, 120°15'21.8"E, 9 m a.s.l.
- Site 3: *CF3*. Balikias (1). 13°47'23.2"N, 120°13'15.7"E, 26 m a.s.l.
- Site 4: *CF4*. Balikias (2). 13°48'51.0"N, 120°13'47.6"E, 22 m a.s.l.
- Site 5: *CF5*. Vigo. 13°49'15.6"N, 120°09'54.8"E, 10 m a.s.l.
- Site 6: *CF6*. Binacas. 13°46'19.9"N, 120°07'22.9"E, 11 m a.s.l.
- Site 7: *CF7*. Hulagaan (1). 13°45'32.6"N, 120°09'13.5"E, 0 m a.s.l.
- Site 8: *CF8*. Hulagaan (2). 13°45'32.6"N, 120°09'13.5"E, 0 m a.s.l.

Site 9: *CF9*. Pangpang. 13°47'32.4" N, 120°00'00.0" E, 40 m a.s.l.

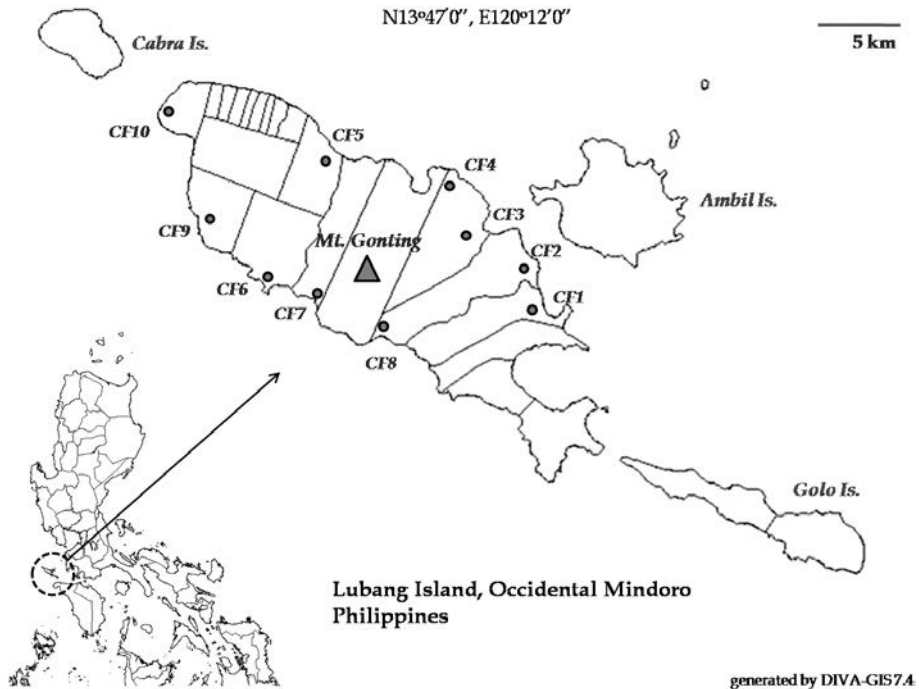
Site 10: *CF10*. Kusang loob. 13°54'10.1" N, 120°04'43.0" E, 0 m a.s.l.

Forest sites in Mount Gonting:

Site 1: *MF1*. Trail A(1). 13°47'26.1" N, 120°09'01.8" E, 433 m a.s.l.

Site 2: *MF2*. Trail A(2). 13°47'25.2" N, 120°09'04.4" E, 407 m a.s.l.

Site 3: *MF3*. Trail A(3). GPS coordinates: not determined (n.d.)



**Fig. 1.** Collecting sites on Lubang Island, Occidental Mindoro. Ten sites (dots) in coastal areas and ten sites (triangle) on Mt. Gonting. Map source: DIVA-GIS 7.4.

Site 4: *MF4*. Trail A(4). GPS coordinates: n.d.

Site 5: *MF5*. Trail A(5). 13°47'23.3" N, 120°09'03.0" E, 420 m a.s.l.

Site 6: *MF6*. Trail B(1). 13°47'11.9" N, 120°09'03.7" E, elevation: n.d.

Site 7: *MF7*. Trail B(2). 13°47'03.0" N, 120°09'04.6" E, 477 m a.s.l.

Site 8: *MF8*. Trail B(3). GPS coordinates: n.d.

Site 9: *MF9*. Trail B(4). GPS coordinates: n.d.

Site 10: *MF10*. Trail B(5). 13°47'37.9" N, 120°09'01.6" E, 445 m a.s.l.

#### Field collections of myxomycetes

Specimens of myxomycetes were collected directly in the field from the forest sites in May 2009. Fruiting bodies observed on substrates were collected, placed in compartmentalized plastic collection boxes and brought to

the laboratory. Following collection, these specimens were slowly air-dried and then placed in separate, labeled herbarium boxes for permanent storage.

#### Random sampling of substrates and preparation of moist chamber cultures

Ten (10) samples each of dead twigs (TW) and ground leaf litter (GL) were collected from each of the ten collecting sites in the forests of coastal areas and from each of the ten collecting sites on Mt. Gonting. These samples were then used to prepare moist chamber cultures, following the protocol described by Stephenson & Stempen (1994). Moist chambers (MC) were checked regularly for the presence of myxomycete plasmodia and/or fruiting bodies, either of which was noted as a positive culture. Following incubation, individually-gathered myxomycetes with their respective substrates were separately placed in labeled herbarium boxes.

#### Characterization and identification of collected myxomycetes

Features of fruiting bodies and spores were characterized and described following the protocol of Keller & Braun (1999). Morphometric data obtained from particular specimens were compared with comparable data in identification keys or published literature (e.g., Stephenson & Stempen 1994), and web-based electronic databases, e.g. Eumycetozoa Project (<http://slimemold.uark.edu>) and Nomenyx (<http://nomen.eumycetozoa.com>). Nomenclature used for the identified myxomycetes follows that given on the latter web site. The abbreviation 'cf.' in the name of a taxon indicates that the specimen representing the source of the record could not be identified with certainty. All specimens listed herein are deposited in the myxomycete herbarium of the Fungal Biodiversity and Systematics Group of the Research Cluster for the Natural and Applied Sciences at the University of Santo Tomas in Manila, Philippines.

## Results

A total of 718 specimens, including 35 from field-collected specimens and 683 obtained from moist chamber cultures, representing 45 taxa in 13 genera are listed below. All 45 species developed in moist chamber cultures prepared from GL and TW, including the 13 species from eight genera also collected in the field. The present study lists the first records of myxomycetes from Lubang Island, Occidental Mindoro, including the six new taxa in the Philippines. In the list that follows, the myxomycetes we recorded are arranged alphabetically by genus and then species.

### Annotated species list

*Arcyria afroalpina* Rammeloo

MC (11 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF8), Mt. Gonting (MF1, MF6, MF7, MF8, MF9).

- Arcyria cinerea* (Bull.) Pers.  
MC (261 collections); substrates: GL, TW. 2009.  
Sites: coastal forest (all 10 sites), Mt. Gonting (all 10 sites).
- Arcyria denudata* Fr.  
FS (2 collections), MC (12 collections); substrate: TW. 2009.  
Sites: coastal forest (CF2, CF4, CF5, CF6), Mt. Gonting (MF5).
- Arcyria globosa* Schwein.  
FS (3 collections), MC (8 collections); substrates: GL, TW. 2009.  
Site: Mt. Gonting (MF2, MF9). New record for the Philippines.
- Arcyria pomiformis* (Leers) Rostaf.  
MC (3 collections); substrates: GL, TW. 2009.  
Sites: coastal forest (CF4, CF5).
- Collaria arcyrionema* (Rostaf.) Nann.-Bremek. ex Lado  
MC (7 collections); substrates: GL, TW. 2009.  
Sites: coastal forest (CF8), Mt. Gonting (MF2, MF4, MF10).
- Collaria rubens* (Lister) Nann.-Bremek.  
MC (3 collections); substrate: GL. 2009.  
Sites: coastal forest (CF3), Mt. Gonting (MF1, MF10).
- Comatricha nigra* (Pers. ex J. F. Gmel.) J. Schröt.  
FS (2 collections), MC (5 collections); substrates: GL, TW. 2009.  
Sites: coastal forest (CF3, CF8), Mt. Gonting (MF3, MF9).
- Comatricha robusta* (T. N. Lakh et K. G. Mukerji) Nann.-Bremek. et Y. Yamam  
MC (1 collection); substrate: TW. 2010.  
Site: coastal forest (CF6). New record for the Philippines.
- Comatricha subcaespitosa* (Peck) Nann.-Bremek.  
MC (8 collections); substrates: GL, TW. 2009.  
Sites: coastal forest (CF1, CF5, CF9), Mt. Gonting (MF5).
- Craterium atrolucens* Flatau  
MC (2 collections); substrate: GL. 2010. New record for the Philippines.  
Site: Mt. Gonting (MF9).
- Craterium concinnum* Rex.  
MC (10 collections); substrate: GL. 2009.  
Sites: coastal forest (CF7), Mt. Gonting (MF1, MF2, MF6, MF9).
- Craterium* sp.  
MC (2 collections); substrate: GL. 2009.  
Site: Mt. Gonting (MF4).
- Cribraria microcarpa* (Schrad.) Pers.  
MC (10 collections); substrate: TW. 2009.  
Sites: Mt. Gonting (MF2, MF4, MF5, MF9).
- Cribraria* sp.  
MC (1 collection); substrate: GL. 2010.  
Site: Mt. Gonting (MF1).
- Diachea leucopodia* (Bull.) Rostaf.  
FS (6 collections), MC (22 collections); substrate: GL. 2009.  
Sites: coastal forest (CF3, CF6, CF7, CF8), Mt. Gonting (MF2, MF3, MF4, MF6, MF8, MF9).

*Diachea radiata* G. Lister et Petch

FS (2 collections), MC (3 collections); substrate: GL. 2009.

Site: coastal forest (CF2).

*Diderma effusum* Morgan

FS (4 collections), MC (85 collections); substrates: GL, TW. 2009.

Sites: coastal forest (*all 10 sites*), Mt. Gonting (MF1, MF2, MF3, MF4, MF5, MF9, MF10).

*Diderma hemisphaericum* (Bull.) Hornem.

FS (2 collections), MC (7 collections); substrate: GL. 2009.

Sites: coastal forest (CF2, CF7, CF9), Mt. Gonting (MF1, MF3).

*Didymium iridis* (Ditmar) Fr.

MC (4 collections); substrate: GL. 2009.

Sites: coastal forest (CF2, CF3), Mt. Gonting (MF9).

*Didymium melanospermum* (Pers.) T. Macbr.

MC (8 collections); substrate: GL. 2009.

Sites: coastal forest (CF5, CF8), Mt. Gonting (MF10).

*Didymium nigripes* (Link) Fr.

FS (1 collection), MC (3 collections); substrate: GL. 2009.

Sites: coastal forest (CF6, CF9), Mt. Gonting (MF1).

*Didymium ochroideum* G. Lister

MC (12 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF2, CF3, CF4, CF7, CF8), Mt. Gonting (MF1).

*Didymium squamulosum* (Alb. et Schwein.) Fr.

FS (2 collections), MC (11 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF3, CF4, CF6, CF8, CF10), Mt. Gonting (MF6, MF7).

*Lamproderma cacographicum* Bozonnet, Mar. Mey. et Poulain

MC (1 collection); substrate: GL. 2010. New record for the Philippines.

Site: coastal forest (CF10).

*Lampoderma scintillans* (Berk. et Broome) Morgan

FS (2 collections), MC (21 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF7, CF9), Mt. Gonting (MF2, MF3, MF4, MF6, MF7, MF8, MF9).

*Oligonema schweinitzii* (Berk.) G. W. Martin

MC (6 collections); substrate: GL. 2010. New record for the Philippines.

Sites: coastal forest (CF3), Mt. Gonting (MF2, MF5).

*Perichaena corticalis* (Batsch) Rostaf.

MC (6 collections); substrate: TW. 2009.

Sites: coastal forest (CF5), Mt. Gonting (MF1, MF7, MF8).

*Perichaena depressa* Lib.

MC (3 collections); substrate: TW. 2009.

Sites: coastal forest (CF5, CF9).

*Perichaena microspora* Penz. et Lister

MC (8 collections); substrates: GL, TW. 2009. New record for the Philippines.

Sites: coastal forest (CF9), Mt. Gonting (MF1, MF5, MF8).

*Physarum bivalve* Pers.

MC (4 collections); substrate: GL. 2009.

Sites: coastal forest (CF9, CF10).

*Physarum cinereum* (Batsch) Pers.

MC (40 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF4, CF5, CF6, CF8, CF9, CF10), Mt. Gonting (MF1, MF2, MF5, MF7, MF9, MF10).

*Physarum compressum* Alb. et Schwein.

MC (22 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF3, CF6, CF8, CF9), Mt. Gonting (MF6, MF7, MF8, MF9, MF10).

*Physarum echinosporum* Lister

FS (3 collections), MC (5 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF2, CF8, CF9), Mt. Gonting (MF6).

*Physarum melleum* (Berk. et Broome) Masee

MC (5 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF1, CF5, CF8).

*Physarum oblatum* T. Macbr.

FS (3 collections), MC (6 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF1, CF2, CF5), Mt. Gonting (MF1, MF8).

*Physarum viride* (Bull.) Pers.

MC (3 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF5), Mt. Gonting (MF3).

*Stemonitis axifera* (Bull.) T. Macbr.

MC (9 collections); substrates: GL, TW. 2009.

Sites: Mt. Gonting (MF6, MF7, MF8, MF9).

*Stemonitis fusca* Roth

MC (19 collections); substrates: GL, TW. 2009.

Sites: coastal forest (CF3, CF4, CF6, CF7, CF9), Mt. Gonting (MF2, MF3, MF7, MF8, MF10).

*Stemonitis* cf. *herbatica* Peck

MC (1 collection); substrate: TW. 2010.

Site: coastal forest (CF9).

*Stemonitis nigrescens* Rex

MC (1 collection); substrate: TW. 2009.

Site: coastal forest (CF7).

*Stemonitis pallida* Wingate

MC (14 collections); substrate: TW. 2009.

Sites: coastal forest (CF4, CF8, CF9, CF10), Mt. Gonting (MF2, MF10).

*Stemonitis smithii* T. Macbr.

MC (8 collections); substrate: TW. 2010.

Sites: coastal forest (CF7), Mt. Gonting (MF3, MF4, MF5, MF9).

*Stemonitis splendens* Rostaf.

FS (3 collections), MC (1 collection); substrate: TW. 2009.

Site: Mt. Gonting (MF9).

Myxomycete gen. sp. LI09-01

MC (1 collection); substrate: TW. 2009.

Site: coastal forest (CF4). Characterized as a myxomycete but impossible to identify even to genus.

## Discussion

### Number of taxa

This study reports the first myxomycetes recorded from Lubang Island in the Philippines, including six taxa new to the country. The 45 species listed herein belong to 13 genera of myxomycetes and were identified from field-collected specimens (FS) and specimens obtained from moist chamber cultures (MC) prepared with two distinct substrates – ground leaf litter (GL) and dead twigs (TW). Also included is one unidentified specimen that was recorded from a moist chamber culture.

### Field collections

A total of 13 species belonging to eight genera of myxomycetes were collected and identified from specimens that developed in the field under natural conditions along the two mountain trails on Mt. Gonting, the highest point on Lubang Island (Fig. 1). These species can be grouped into three taxonomic orders – *Physarales* (eight species), *Stemonitales* (three species) and *Trichiales* (two species). The order *Physarales* had two species each belonging to the genera *Diachea*, *Diderma*, *Didymium* and *Physarum*. The *Stemonitales* had one species each from *Comatruchia*, *Lamproderma* and *Stemonitis*, whereas the *Trichiales* was represented by two species of *Arcyria*. Most of these species had been recorded previously from the Philippines. For example, in a 13-year study of Philippine myxomycetes, Dogma (1975) reported *Comatruchia nigra*. Apart from its presence in the two different regions of Luzon and Mindanao, *Arcyria denudata* and the two species of *Diderma* and *Didymium* recorded in the present study were also found in La Mesa Eco-park in Quezon City, a protected leisure forest park (Macabago *et al.* 2010). This was not unexpected, since some species such as *A. cinerea* and *D. effusum* are thought to be cosmopolitan in distribution (Farr 1976). One species, *Stemonitis splendens*, has been recorded on numerous occasions in collections from Basco, Batanes in the northern Philippines down to Tawi-Tawi in the southern portion of the country (Reynolds 1981). However, *Arcyria globosa*, recorded as field and moist chamber collection in this study, is a new record of this species in the Philippines.

### Moist chamber culture collections

All of the species recorded as field collections also appeared in the moist chamber cultures (MC). Since the number of field collections was less than 1/3 of the total recorded in moist chamber cultures, it appears that the use of the latter method is a more effective way of reflecting the species composi-



tion of the assemblage of myxomycetes present in a particular area. In a study by Stephenson *et al.* (2000) on the distribution and ecology of myxomycetes in high-latitude regions of the Northern Hemisphere, they found that although only 55 % of the moist chamber cultures were positive for myxomycetes, these produced a greater number of specimens (1043) than the number (933) of field collections. The limitations imposed on the use of field collections alone to assess diversity may also be related to the fact that such collections are usually limited by the “visibility” of those species that are usually microscopic, and thus easily overlooked as field collections. Presumably, moist chamber cultures also mimic the ideal environmental conditions required for the spore germination and growth of myxomycetes.

In the present study, six species of myxomycetes were new records for the Philippines. These were *Arcyria globosa*, *Comatricha robusta*, *Craterium atrolucens*, *Lamproderma cacographicum*, *Oligonema schweinitzii* and *Perichaena microspora*. All of these six species appeared in moist chamber cultures, with *A. globosa* also being recorded as a field collection. These species have been reported mostly from temperate regions and less frequently from a few tropical regions. *Craterium atrolucens*, a very rare myxomycete, has been collected only once in northern Thailand (Stephenson, pers. comm. 3 Sep 2010). To the best of our knowledge, three of the species—*L. cacographicum*, *O. schweinitzii* and *P. microspora*—have not been reported previously from Asia and thus are first known records in Asia. Recently, 15 species were listed as new records for the Philippines (Corpuz *et al.* 2009; Moreno *et al.* 2009; Dagamac *et al.* 2010, 2011). Together with the new records reported in this study, this increases the number of species of Philippine myxomycetes from the previously annotated list of 107 (Reynolds 1981) to a new total of 128 species.

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### References

- Corpuz, L. H. M., Javier, A. O. M., Kuhn, R. V., Parra, C. M., Rodillas, C. P., dela Cruz, T. E. E. (2009) Diversity and occurrence of plasmodial myxomycetes in selected highlands and islands of Luzon, Philippines. *UST College of Science Book of Abstracts* **39** (1): 17.

- Dagamac N. H. A., dela Cruz T. E. E., Pangilinan M. V. B., Stephenson S. L. (2011) List of species collected and interactive database of myxomycetes (plasmodial slime molds) for Mt. Arayat National Park, Pampanga, Philippines. *Mycosphere* **2** (4): 449–455.
- Dagamac N. H. A., Leontyev D., dela Cruz T. E. E. (2010) Corticolous myxomycetes associated with *Samaneasaman* collected from different sites in Luzon Island, Philippines. *Philippine Biota* **43**: 2–15.
- Dela Cruz T. E. E., Kuhn R. V., Javier A. O. M., Parra C. M., Quimio T. H. (2009) Status of the Myxomycete Collection at the UPLB-Museum of Natural History (UPLB-MNH) Mycological Herbarium. *Philippine Journal of Systematic Biology* **3**: 97–111.
- Dogma I. J. (1975) Of Philippine mycology and lower fungi. *Philippine Journal of Biology* **4**: 69–105.
- Farr M. L. (1976) Myxomycetes. *Flora Neotropica Monograph* **16**.
- Keller H. W., Braun K. L. (1999) Myxomycetes of Ohio: their systematics, biology, and use in teaching. *Ohio Biological Survey New Series* **13/2**.
- Liu C. H., Chen Y. F. (1998) Myxomycetes of Taiwan XI: two new species of *Physarum*. *Taiwania* **43**: 185–192.
- Macabago, S. A. B., Dagamac N. H. A., Dela Cruz, T. E. E. (2010) Diversity and distribution of plasmodial myxomycetes (slime molds) from La Mesa Ecopark, Quezon City, Philippines. *Biotropia* **17** (2): 51–61.
- Moreno, G., Mitchell, D. W., Stephenson, S. L., dela Cruz, T. E. (2009). A new species of *Craterium* (Myxomycetes) with reticulate spores. *Bolletín Sociedad Micología Madrid* **33**: 175–180.
- Reynolds D. R. (1981) Southeast Asian myxomycetes II. Philippines. *Philippine Journal of Biology* **10** (2, 3): 127–150.
- Reynolds D. R., Alexopoulos C. J. (1971) Southeast Asian myxomycetes: Thailand and Burma. *Pacific Science* **25**: 33–38.
- Stephenson S. L., Novozhilov Y. K., Schnittler M. (2000) Distribution and ecology of myxomycetes in high-latitude regions of the Northern Hemisphere. *Journal of Biogeography* **27**: 741–754.
- Stephenson S. L., Stempen H. (1994) *Myxomycetes. A handbook of slime molds*. Timber Press, USA.
- Ukkola T., Härkönen M., Zeng Z. (2001) Myxomycetes of Hunan Province, China I. *Annales Botanici Fennici* **38**: 305–328.

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