

## MYXOMYCETES OF TAIWAN VII: THREE NEW RECORDS OF *PHYSARUM*

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**Abstract:** Fruiting bodies of three physaraceous Myxomycetes were found among others abundantly growing on a pile of decaying fallen leaves in spring and summer, 1993 at a corner of NTU campus. They all are plasmodiocarpous in form, have distinctly separated double peridium, smooth outer surface of outer peridium, and dense capillitium consisting of large rounded lime nodes and short hyaline threads. Yet they can be separated from each other by the colour of outer peridium and spore markings. *Physarum aeneum* R.E. Fries and *P. bogoriense* Racib. are similar in spores but easily recognized by the colour of outer peridium. *Physarum aeneum* has beige to bronze outer peridium, while *P. bogoriense* is paler, brownish grey. *P. echinosporum* A. Lister is distinct by the white, eggshell-like outer peridium and the longly echinulate spores. In this paper, the plasmodium of *P. echinosporum*, white in color, is reported for the first time. All of the above three species of plasmodiocarpous *Physarum* are new to Taiwan. Specimens collected are deposited in the Mycology Herbarium of the Botany Department, NTU, Taipei, Taiwan, R.O. C.

Keywords: Myxomycetes, *Physarum*, Taiwan

### INTRODUCTION

In a survey of campus for the Myxomycetes flora, a pile of decaying leaves on the ground at one corner of the National Taiwan University was found excellent for the Myxomycetes biota. That site was therefore visited periodically for collecting Myxomycetes. Among the specimens collected, three members of the Physaraceae were obtained for the first time in Taiwan (Nakazawa, 1929; Liu, 1980-1983, 1989, 1990; Chiang and Liu, 1991). For species identification and distribution recorded, several related references (Raciborski, 1898; Lister, 1899; Martin and Alexopoulous, 1969; Farr, 1976; Thind, 1977) are followed. All specimens are deposited in the Mycology Herbarium, the Department of Botany, National Taiwan University, Taipei, Taiwan, R. O. C.

### SPECIES DESCRIPTION

*Physarum aeneum* R.E. Fries, Ark. Bot. 1: 62. 1903.

Fructification plasmodiocarpous, up to 6.48 mm in length, 0.23 - 0.36 mm in width, long and curved, often accompanied by short segment of fruitings, laterally depressed when dry; beige to grayish straw or bronze colored, glossy.

Peridium double, the outer layer thick, opaque, brittle, smooth and glossy on the outer surface, dehiscence along the length of the fruiting body and folding back revealing the grayish white, evenly frosted, limy under surface; inner layer membranous, transparent, iridescent, wrinkled at maturity when dry, distinctly separated from the outer layer.

Capillitium a dense network of short hyaline threads with many broad, more or less angular, pale (dark brown by

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transmitted light) lime nodes.

Spores brown in mass, 7.5 - 8  $\mu\text{m}$  in diameter, light brownish by transmitted light, globose to subglobose or ovoid, nearly smooth under high dry lense, minutely warted under SEM.

**Habitat:** On decaying fallen leaves of angiosperms.

**Specimen Examined:** Taipei City, National Taiwan Univ.: CHLB 1112, March 24, 1993.

**Distribution Recorded:** Antigua, Bolivia, Brazil, Dominica, Hawaii, India, Japan, Taiwan, U.S.A., U.S. Virgin Isls., West Indies.

The brownish plasmodiocarpous fruitings with smooth and shining outer peridium, and the large lime nodes make this species easy to recognize. The spore markings are never clustered in our collections.

***Physarum bogoriense*** Racib., Hedwigia 37: 52.18F. 1898.

Fructification plasmodiocarpous, 0.31 - 0.42 mm in width, up to 2.35 mm in length, long and flexuose or branched, or fragmented into short forms or in subglobose, ovoid, sessile sporangia; grayish brown-yellow with dehiscent white line separating peridium into several angular lobes.

Peridium double, the outer layer pale grayish brown-yellow, opaque, appearing smooth under light microscope, roughened by SEM, bearing abundant white line granules on the under surface, breaking up into angular lobes above at dehiscence, inner layer distinctly separated from the outer peridium, membranous, iridescent.

Capillitium abundant, consisting of many large, rounded, white lime nodes and hyaline threads.

Spores dark brown in mass, violet brown by transmitted light, minutely warted, 7.5 - 8  $\mu\text{m}$  in diameter.

**Habitat:** On decaying fallen leaves of angiosperms.

**Specimen Examined:** Taipei City, National Taiwan Univ.: CHLB 1117, March 5, 1993; CHC390(224) November 6, 1993.

**Distribution Recorded:** Australia, Asia (mainland China, Taiwan), Central America, Czechoslovakia, Portugal, Rumania, South Africa, South America, U.S.A.

The dehiscence pattern by breaking the outer peridium into angular lobes makes this species distinct in the field. Otherwise it is similar to *P. aeneum* in spore and the plasmodiocarp fruitings. Yet it is recognizable by the paler, not glossy peridium and the dehiscent white lines that separate the peridium into angular lobes.

As Gray & Alexopoulos (1968) indicated, this species was collected chiefly from the tropical area.

***Physarum echinosporum*** A. Lister, Journal of Botany (London) 37: 147. 1899.

Fructifications plasmodiocarpous, scattered, usually curved and strongly compressed laterally, up to 4.2 mm long, 0.2 - 0.29 mm wide, occasionally forming short or sporangiate forms.

Peridium double, dehiscing along a preformed fissure on the upper ridge, the outer layer smooth, eggshell-like, composed of compacted lime granules; the inner layer membranous, iridescent, distinctly separated from the outer-peridium.

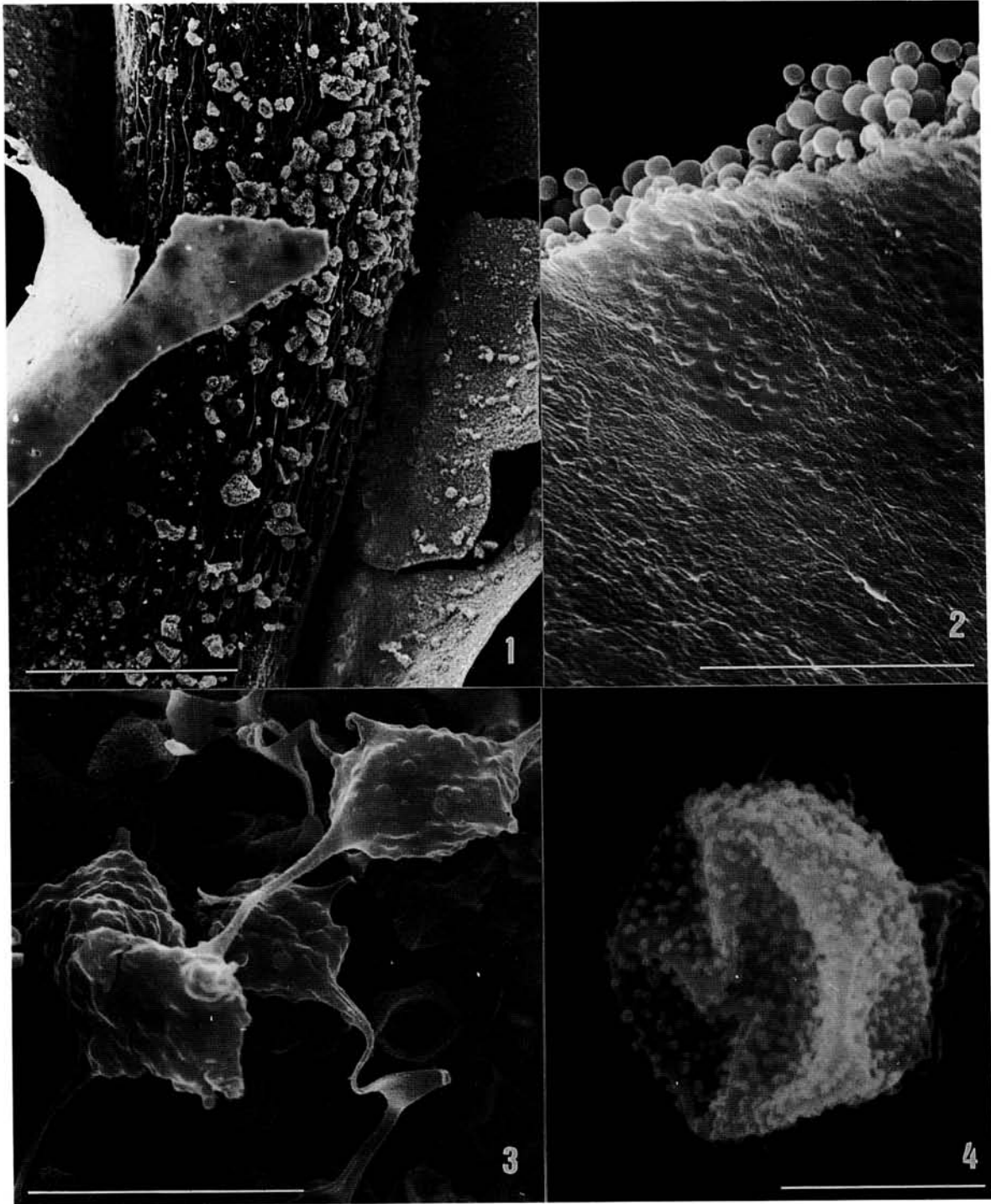
Capillitium dense, threads hyaline, short; the lime nodes white, large, angular to rounded.

Spores purplish black in mass, violet brown by transmitted light, marked with long spines, 10 - 12  $\mu\text{m}$  in diameter (spines included).

Plasmodium white.

**Habitat:** On decaying fallen leaves of angiosperms.

**Specimen Examined:** Taipei City, National Taiwan Univ.: CHC375(208), Aug. 23, 1993; CHC371(204), Aug. 18, 1993.



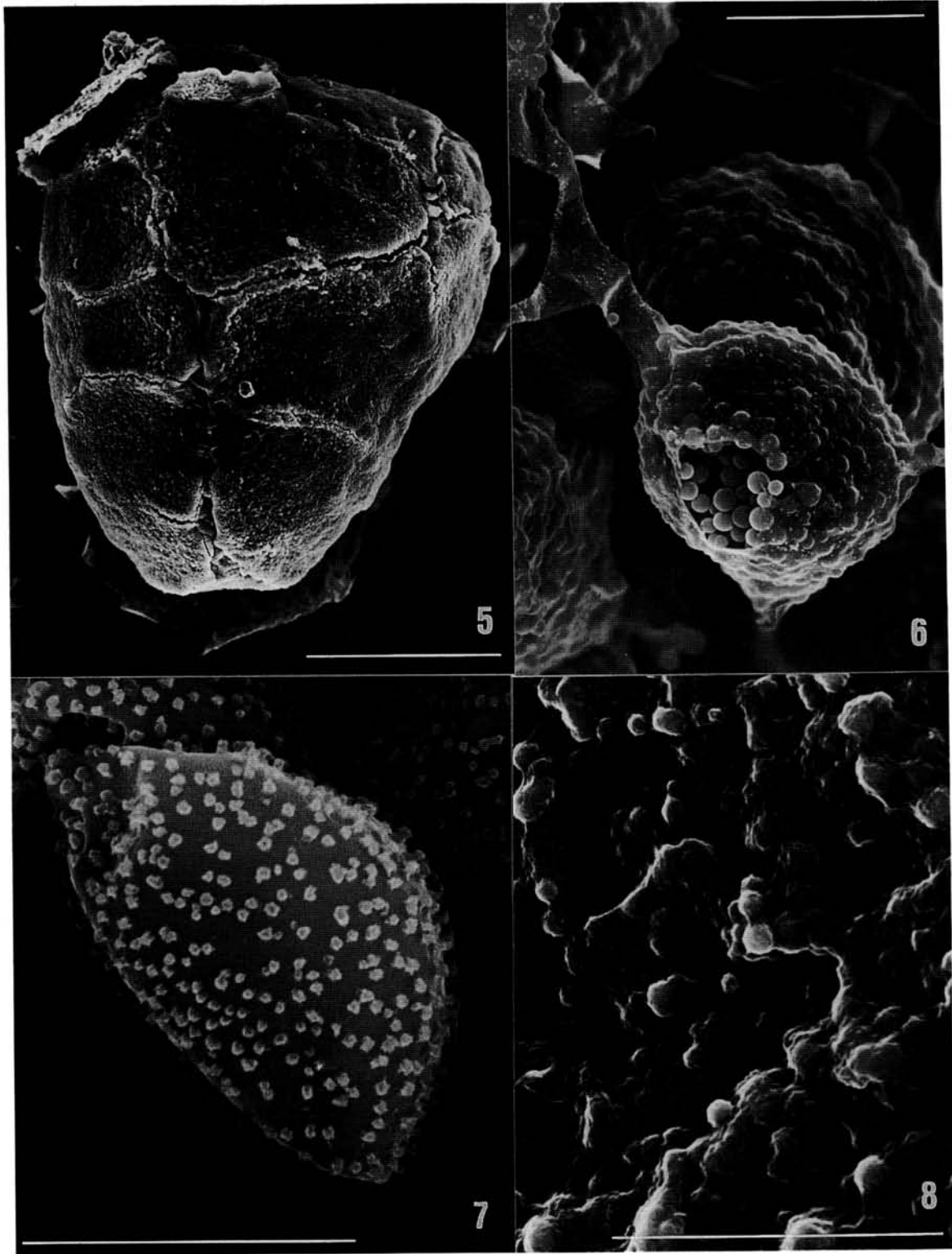
1~4. *Physarum aeneum* R. E. Fries

1. Part of plasmodiocarp with outer peridium broken; bar = 200  $\mu\text{m}$ .

2. Outer surface of outer peridium, exposing the lime granules of the under surface on the upper side; bar = 10  $\mu\text{m}$ .

3. Capillitium; bar = 20  $\mu\text{m}$ .

4. Spore; bar = 3  $\mu\text{m}$ .



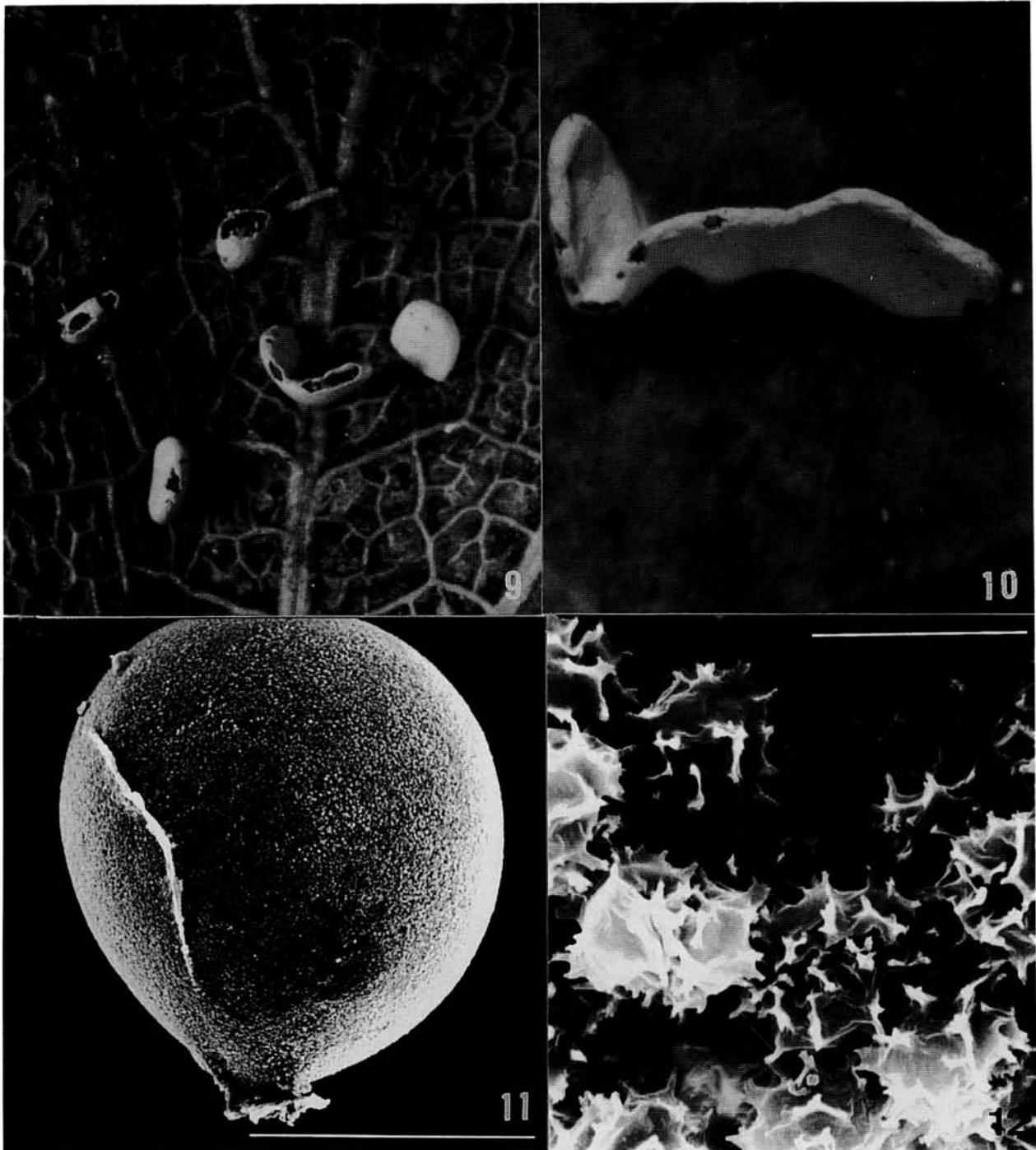
5~8. *Physarum bogoriense* Racib.

5. Sporangium; bar = 200  $\mu\text{m}$ .

6. Capillitium; bar = 10  $\mu\text{m}$ .

7. Spore, collapsed; bar = 5  $\mu\text{m}$ .

8. Outer surface of outer peridium; bar=10  $\mu\text{m}$ .

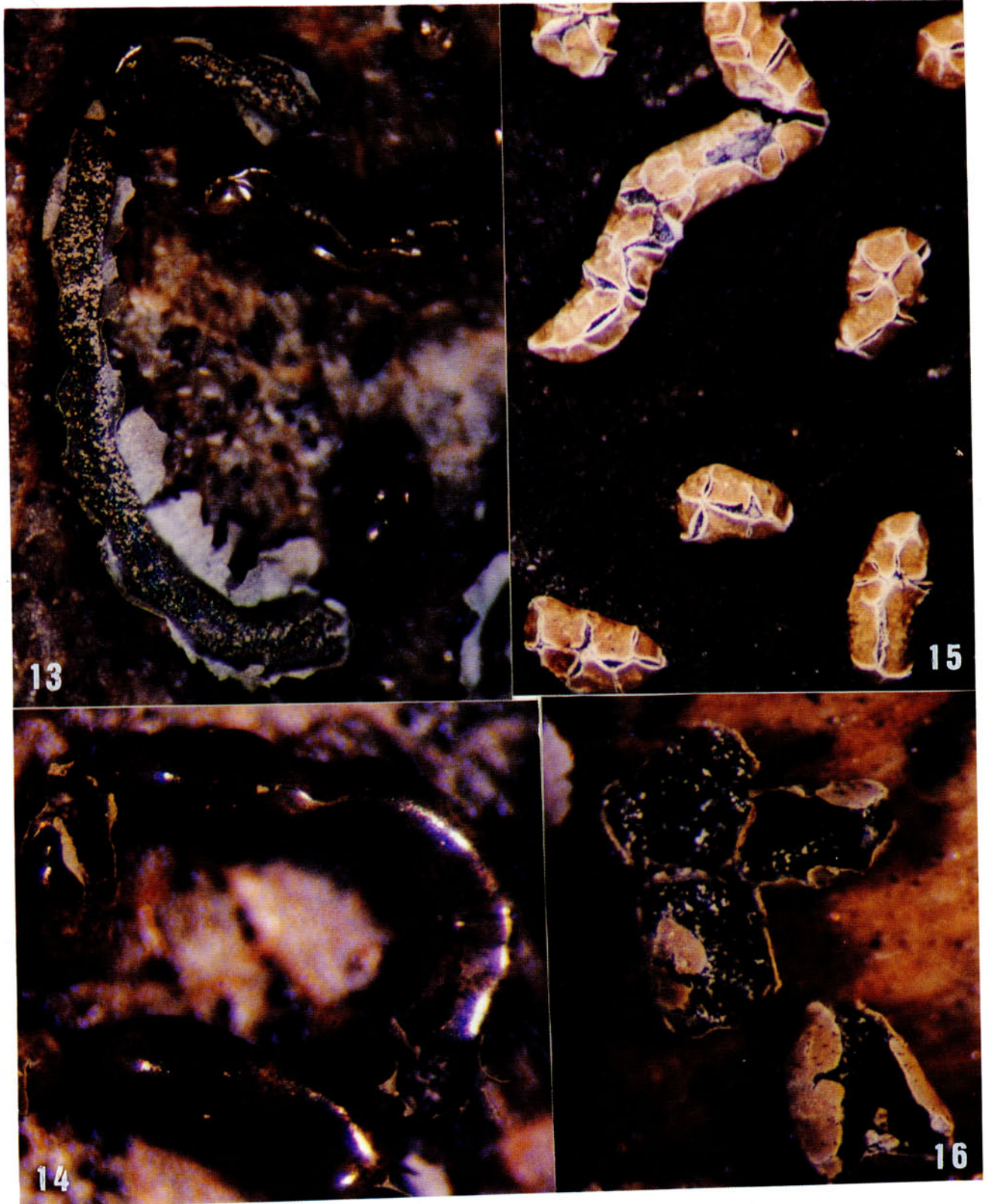


9~12. *Physarum echinosporum* A. Lister

9~10. Plasmodiocarps; 9. X20; 10. X32.

11. Sporangium; bar = 200  $\mu$ m.

12. Spores, collapsed; bar = 10  $\mu$ m.



13~14. Plasmodiocarps of *Physarum aeneum* R.E. Fries

13. X24; 14. X37.5

15~16. Plasmodiocarps of *Physarum bogoriense* Racib.

15. X24; 16. X37.5

**Distribution Recorded:** Antiqua, Brazil, Dominica, India, Indonesia, Jamaica, Kenya, Panama, Philippines, Taiwan, Uruguay, West Indies.

This species is easy to recognize by the eggshell-like, white outer peridium and the long-spined spores which is large (10 - 12  $\mu\text{m}$ ) and dark colored. As reported (Thind, 1977) it is widely distributed in India, and are recorded mostly from the tropical. According to the records, our specimens represent the northernmost collection of the world.

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## 臺灣黏菌(7)：三種*Physarum*之新紀錄種

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### 摘 要

民國82年春夏時節，在台大校園之一角的枯葉堆裡，分別發現三種絨泡黏菌屬 (*Physarum*)，數量頗多。這三種黏菌都具有原質果型的子實體，明顯分離的兩層周皮，表面平滑之外周皮，以及由大而圓胖的石灰結和短而透明的絲線所形成之細毛體。然而由子實體外表的顏色以及孢子表面特徵，仍可將其區分。*Physarum aeneum* R. E. Fries 和 *P. bogoriense* Racib. 的孢子特性相似，但由外周皮之色澤可辨認出來。*P. aeneum* 之外周皮是灰褐至古銅色，而 *P. bogoriense* 之外周皮顏色較淡，呈褐灰色。*P. echinosporum* A. Lister 非常特出，具有白色，如蛋殼的外周皮，其孢子表面之刺狀突起很長，而原生質體之顏色首次發現是白色的。

以上三種原質果型的絨泡菌屬黏菌皆為臺灣新記錄種。所採收之標本都放置於臺大植物系菌類標本室。

關鍵詞：黏菌，絨泡菌，臺灣