

## Notes on Japanese Myxomycetes (IV)\*

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**Abstract** Five new species, six new varieties and two new forms of Japanese myxomycetes are described. They are as follows; *Arcyria cinerea* f. *rubella*, *Dianema harveyi* var. *verruculatum*, *Dianema mongolicum* var. *macrosporum*, *Fuligo candida* f. *persicina*, *Lamproderma cribrarioides* var. *meyerianum*, *Licea capitatoides* var. *fujiokana*, *L. parvicapitata*, *L. takahashii*, *Physarum bogoriense* var. *matsumotoi*, *P. cinereum* var. *magninodosum*, *P. myricanum*, *P. subnutans* and *P. vermiforme*.

**Key words:** Japan, myxomycetes, taxonomy

In the course of my studies on Japanese myxomycetes, I recognized thirteen taxa as new to science. Their descriptions and information are provided in this paper. All the specimens examined are preserved in the herbarium of the National Science Museum, Tokyo (TNS). Descriptive terminology partly follows Doerfelt & Marx (1990), and color is after Kornerup & Wanscher (1978). Several specimens cited in this paper were gained by the moist chamber culture, which is indicated by “in culture” in the following list.

1. ***Arcyria cinerea*** (Bull.) Pers. f. ***rubella*** Y. Yamamoto, f. nov. (Fig. 1)

A typo sporocarpio roseo vel rubello differt.

Fructifications sporocarpous. Sporocarps scattered to nearly solitary, stipitate, up to 1.2 mm tall. Capitula ellipsoid, oblong or rarely globose, red to pink, fading to ochraceous, up to 0.3 mm wide when unexpanded, 0.4 mm wide when expanded. Peridium early evanescent, remaining a shallow calyculus at the bottom of capitulum. Calyculus deep red to ochraceous, plicate, with broken net of papillae on the inner surface. Columella none. Capillitium of a compact net, not so elastic, firmly attached to the calyculus. Capillitium threads pale to nearly colorless by transmitted light, with spines, cogs or semi-annulate markings, 2–3  $\mu\text{m}$  in diam. without markings. Stalk (funiculus) slender, with spore-like cysts, translucent, longitudinally striate, red to pale ochraceous, up to thrice the height of capitulum. Hypothallus discoid, membranous, translucent. Spores globose, red to ochraceous in mass, nearly colorless by transmitted light, with a few scattered indistinct wartlets, (7.5–) 8.3–11.1  $\mu\text{m}$  (mean = 9.6, sd = 0.72, n = 20) in diam. Plasmodium not observed.

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\*Notes on Japanese Myxomycetes (III), in *Bull. Natn. Sci. Mus., Tokyo, Ser. B*, 25: 65–78, 1999.

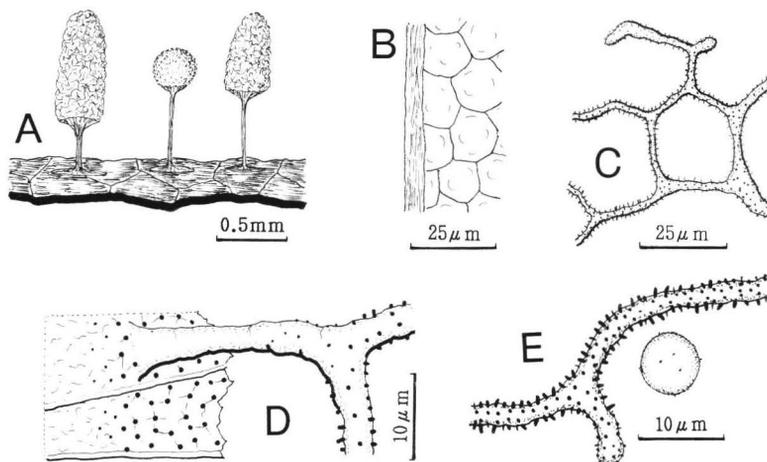


Fig. 1. *Arcyria cinerea* f. *rubella* (YY-7501). A: Three stipitate sporocarps. B: Cysts in a stalk. C: Capillitium. D: Peridium and basal part of capillitium. E: Capillitium and a spore.

Specimen examined: YY-7501 (Tokushima Pref., Kito-mura, Oriudani, on dead leaves of *Quercus glauca*, 7 IX 1988, Y. Yamamoto. HOLOTYPE).

This forma is similar to *Arcyria insignis* Kalchbr. & Cooke var. *dispersa* Hagelst. in shape and color of fructifications, but it is different from the latter variety in markings of capillitium threads and larger spores.

Etymology: Latin *rubellus* (from the color of capitulum).

2. ***Dianema harveyi* var. *verruculatum*** Y. Yamamoto, var. nov. (Fig. 2)

A typo peridio verruculoso et capillitio scabrato differt.

Fructifications sporocarpous. Sporocarps very scattered to solitary, sessile, globose to subglobose, golden, pale orange or pale yellow, glistening, 0.06–0.14 mm in diam. Hypothallus indistinct. Peridium of one layer, smooth to somewhat plicate, pale yellow to nearly transparent, without granular matter, palely verruculose on the inner surface. Dehiscence irregular from above. Capillitium of solid threads, slender, scanty, sometimes lacking, pale yellow to almost transparent, verruculose and/or spinulose especially on one side, 1–1.5  $\mu\text{m}$  in diam. Spores golden, pale orange or pale yellow in mass, pale yellowish to nearly transparent by transmitted light, verruculose, 9.1–10.7 (mean=10.1, sd=0.56, n=20)  $\mu\text{m}$  in diam. when globose, ca. 8.6  $\times$  12.0  $\mu\text{m}$  when ellipsoid. Plasmodium not observed.

Specimen examined: 99TK-1 (Tokyo Pref., Chiyoda-ku, in the premises of Imperial Palace, on bark of unidentified dead tree, 23 V 1999, Y. Yamamoto, in culture. HOLOTYPE).

This variety is different from the type variety in markings of peridium and capillitium. It is somewhat similar to *Calomyxa metallica* (Berk.) Nieuwl. in the

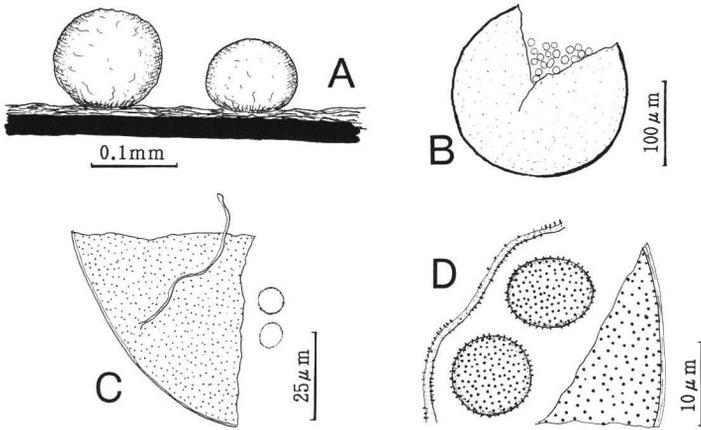


Fig. 2. *Dianema harveyi* var. *verruculatum* (99TK-1). A: Two sessile sporocarps. B: A ruptured sporocarp. C & D: Peridium, capillitium and two spores.

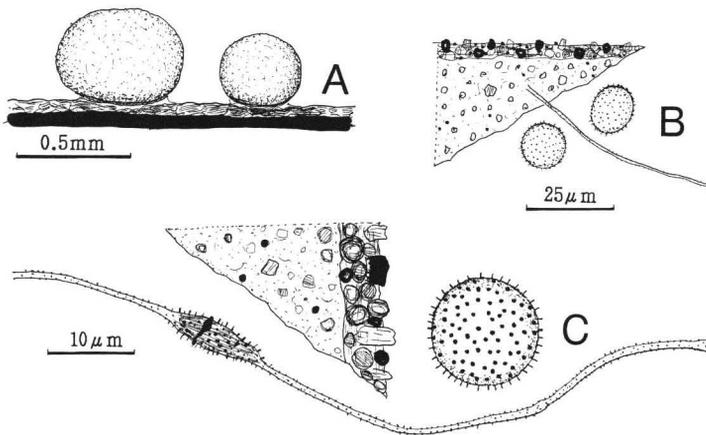


Fig. 3. *Dianema mongolicum* var. *macrosporum* (99TK-32). A: Two sessile sporocarps. B: Peridium, capillitium and two spores. C: Peridium, capillitium with a thickening, and a spore.

appearance of fructifications. But *C. metallica* has smooth peridium, more tangled capillitium, and spinulose spores.

Etymology: Latin *verruculatus* (from the verruculose peridium).

3. ***Dianema mongolicum*** Novoz. var. ***macrosporum*** Y. Yamamoto, var. nov.

(Fig. 3)

A typo sporis majoribus, 12.8–15.6  $\mu\text{m}$  differt.

Fructifications sporocarpous. Sporocarps very scattered, sessile, globose, depressed-globose or somewhat elongated with constricted base, 0.25–0.6 mm in diam.,

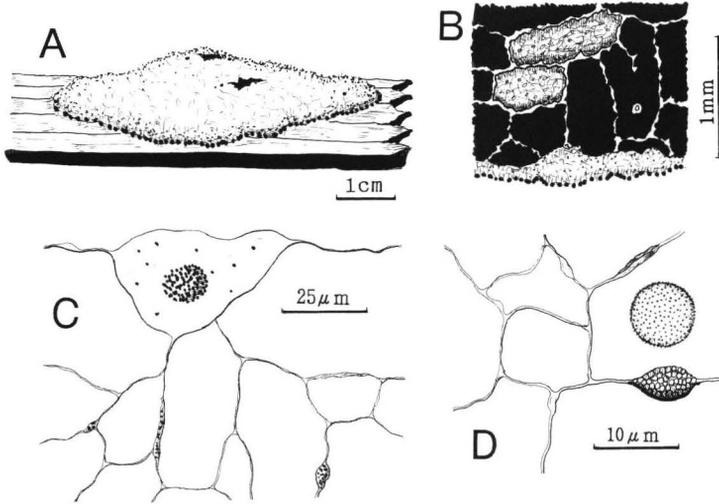


Fig. 4. *Fuligo candida* f. *persicina* (YY-15386). A: Aethalium. B: Pseudocapillitium in the section of an aethalium. C: Capillitium. D: Capillitium with a lime node, and a spore.

up to 0.4 mm tall, olivaceous-brown, slightly iridescent. Hypothallus membranous, pale olivaceous, slightly iridescent. Peridium membranous, nearly transparent, pale yellow by transmitted light, covered by refuse matter. Capillitium of solid threads, scanty, slender, pale yellow to nearly colorless, usually  $1\text{--}2\ \mu\text{m}$  in diam., with spinules and/or wartlets throughout, sometimes with darker, fusiform and nodulose thickenings. Spores globose to ellipsoid, olivaceous-brown in mass, pale olivaceous-yellow by transmitted light, spinulose,  $12.8\text{--}15.6\ \mu\text{m}$  (mean =  $14.3$ ,  $\text{sd} = 0.65$ ,  $n = 20$ ) in diam. including spinules when globose, ca.  $14 \times 16$  ( $\text{--}17$ )  $\mu\text{m}$  including spinules when ellipsoid. Spinules up to  $1\ \mu\text{m}$  high. Plasmodium not observed.

Specimens examined: 99TK-32 (Tokyo Pref., Chiyoda-ku, in the premises of Imperial Palace, on bark of living *Acer buergerianum*, 3 VI 1999, Y. Yamamoto, in culture. HOLOTYPE); YY-18009 (Okayama Pref., Niimi-shi, Niimi, Niimi High School premises, on bark of living *Juniperus chinensis*, 12 VI 1999, K. Fujioka, in culture).

This variety has larger spores than those of the type variety ( $11\text{--}13\ \mu\text{m}$  in diam.).

Etymology: Greek *makros* + *spora* (from the large spores).

4. ***Fuligo candida* Pers. f. *persicina* Y. Yamamoto, f. nov.** (Fig. 4)

A typo aethalio roseo vel persicino differt.

Fructifications aethaliod. Aethalia gregarious to solitary, sessile, pulvinate,  $1\text{--}20\ \text{cm}$  in larger dimension,  $0.5\text{--}2\ \text{cm}$  thick. Cortex well-developed, fragile, rosy, peach-colored, pale red or pastel red. Hypothallus calcareous or membranous, pastel

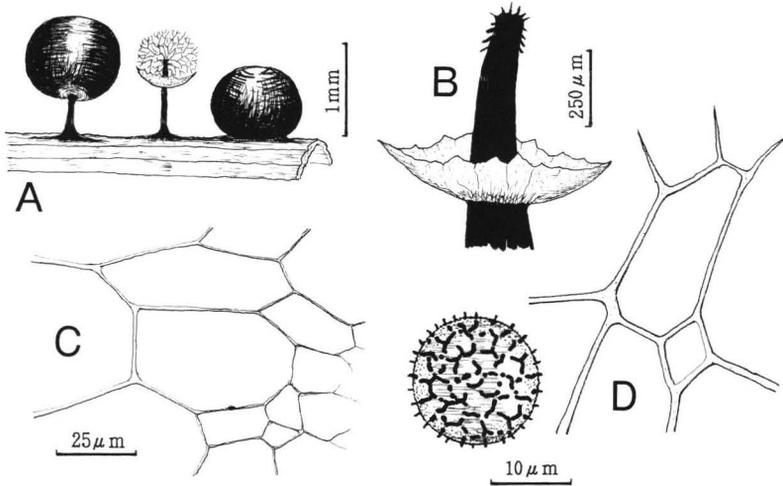


Fig. 5. *Lamproderma cribrarioides* var. *meyerianum* (YY-16592). A: Three sporocarps. B: Columella and collar. C: Capillitium. D: Capillitium and a spore.

red to rosy. Peridium almost hyaline, with rosy or white lime. Pseudocapillitium calcareous, rosy to white. Capillitium consisting of hyaline connecting threads and small lime nodes. Lime nodes scanty, rosy to white, fusiform or rounded. Spores nearly globose, dark brown in mass, brownish-gray by transmitted light, verruculose, with clusters of darker and larger wartlets,  $6.7\text{--}7.7\ \mu\text{m}$  (mean = 7.3, sd = 0.27, n = 20) in diam. Plasmodium not observed.

Specimen examined: YY-15384 (Kochi Pref., Motoyama-cho, Akaare-toge, on bark of dead tree, 10 VIII 1995, Y. Yamamoto. HOLOTYPE).

This forma is similar to *Fuligo septica* var. *rosea* Nann.-Bremek. in color of fructifications, but it can be recognized to be *F. candida* by having well-developed cortex.

Etymology: Latin *persicinus* (from the color of aethalium).

5. *Lamproderma cribrarioides* (Fr.) R. E. Fr. var. ***meyerianum*** Y. Yamamoto, var. nov. (Fig. 5)

A typo sporis incomplete reticulatis et capillitio fere hyalino differt.

Fructifications sporocarpous. Sporocarps gregarious, stipitate to almost sessile, erect, up to 2.3 mm tall. Capitula globose to subglobose, up to 1.7 mm in diam., metallic with bluish to silvery tint. Stalk cylindrical, somewhat tapering upwards, furrowed, nearly black, up to  $3/5$  the total height. Hypothallus membranous, brownish, discoid or common to the colony. Peridium persistent, membranous, nearly transparent by transmitted light. Columella being a continuation of the stalk, nearly black, reaching up to  $1/2$  or a little more of the height of capitulum. Capillitium arising

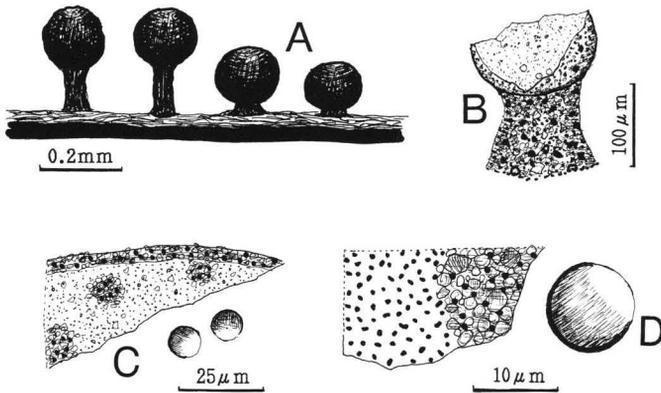


Fig. 6. *Licea capitatoides* var. *fujiokana* (99TK-29). A: Four stipitate sporocarps. B: Dehiscent sporocarp. C: Peridium and two spores. D: Peridium and a spore.

mainly near the tip of columella, almost hyaline, branched and anastomosed to form a complicated net, with many pointed free ends at the periphery. Spores dark brown in mass, brownish-gray by transmitted light, irregularly and incompletely reticulate, somewhat paler on one side, 15.8–18.7  $\mu\text{m}$  (mean=16.8, sd=0.74, n=20) in diam. Plasmodium not observed.

Specimens examined: YY-13962 (Yamagata Pref., Nishikawa-machi, Shizu, on plant litter near melting snow, 20 V 1994, M. Hario); YY-14236 (Gifu Pref., Asahimura, Kurumi Campsite, on plant litter near melting snow, ca. 1840 m alt., 4 V 1994, K. Takahashi); YY-15859 (Iwate Pref., Takizawa-mura, Yanagisawa, on plant litter near melting snow, ca. 600 m alt, 21 IV 1995, M. Tamayama); YY-16592 (Fukushima Pref., Kitashiobara-mura, Dekodaira, on herbal litter near melting snow, 14 IV 1997, M. Hario. HOLOTYPE).

This variety differs from the type variety in having almost hyaline capillitium and incompletely reticulate spores.

Etymology: in honor of French myxomycetologist, Mme. Marianne Meyer.

6. ***Licea capitatoides*** Nann.-Bremek. & Y. Yamam. var. ***fujiokana*** Y. Yamamoto, var. nov. (Fig. 6)

A typo sporis atrioribus et majoribus, 9.7–11.4  $\mu\text{m}$  differt.

Fructifications sporocarpous. Sporocarps scattered, stipitate, rarely sessile, erect, 0.1–0.3 mm tall. Capitula globose, subglobose or somewhat ovoid, 0.05–0.1 mm in diam., grayish-brown, reddish-brown to dark brown, sometimes glossy, somewhat thickened at the base, usually almost smooth, sometimes wrinkled but without platelets. Stalk cylindrical, somewhat tapering upwards, nearly black, longitudinally striate, up to 1/3 the height of sporocarp, including refuse matter. Peridium double. The outer layer gelatinous, with refuse matter, sometimes lacking. The inner layer

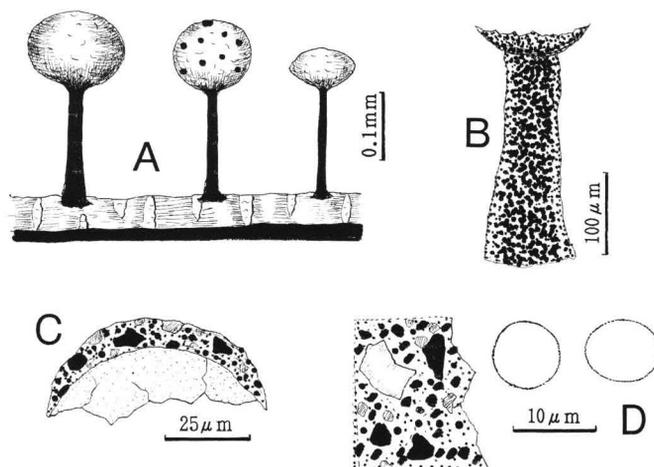


Fig. 7. *Licea parvicapitata* (MT-2503). A: Three stipitate sporocarps. B: Stalk. C: Peridium. D: Peridium and two spores.

membranous to subcartilaginous, yellowish-gray and translucent by transmitted light, with small wartlets and sometimes with small spore-like bodies inside. Spore-like bodies of the same color as spores, nearly globose, up to 2–4.5  $\mu\text{m}$  in diam. Dehiscence irregular from above, usually leaving deep or shallow calyculus. Hypothallus indistinct or only an expansion of the stalk-base, dark, discoid. Spores almost globose, dark brown or olivaceous-brown in mass, brownish-gray by transmitted light, smooth, sometimes encircled by indistinct gelatinous layer, 9.7–11.4  $\mu\text{m}$  (mean = 10.8, sd = 0.50, n = 20) in diam. Spore wall thickened on one side, paler and thinner on the other. Plasmodium not observed.

Specimens examined: 99TK-14 & 17 (Tokyo Pref., Chiyoda-ku, in the premises of Imperial Palace, on bark of living *Acer buergerianum*, 24 V 1999, Y. Yamamoto, in culture); 99TK-26 & 29 (Tokyo Pref., Chiyoda-ku, in the premises of Imperial Palace, on bark of living *Acer buergerianum*, 3 VI 1999, Y. Yamamoto, in culture. HOLOTYPE: 99TK-29. ISOTYPE: 99TK-26).

This variety differs from the type variety in having darker and larger spores.

Etymology: Japanese excellent collector of myxomycetes, Miss Kayoko Fujioka.

7. ***Licea parvicapitata*** Y. Yamamoto, sp. nov. (Fig. 7)

Sporocarpia dispersa, stipitata, erecta, usque ad 0.7 mm alta. Capitula globosa vel subglobosa, usque ad 0.2 mm diam., luteoalba vel luteocinerea vel atrobrunnea, interdum nitida vel punctata, saepe cum crassa basi. Stipes atrobrunneus, cylindricus, sulcatus, usque ad 3/4 sporocarpium, materiam granulosam includens. Peridium duplex. Endoperidium membranaceum, fere hyalinum, rugulosum, intus verruculatum. Exoperidium gelatinosum, cum materia granulosa. Dehiscencia irregularis superne.

Hypothallus plerumque indistinctus. Sporae globosae, luteoalbae luce reflexa, fere incoloratae luce transmissa, fere leves, 7.3–7.9  $\mu\text{m}$  diam. Plasmodium ignotum.

Haec species plus minusve affinis *Liceae capitatoidei*, sed colore sporarum differt.

Fructifications sporocarpous. Sporocarps scattered, stipitate, erect, 0.2–0.7 mm tall. Capitula globose or subglobose, up to 0.2 mm in diam., yellowish-white, yellowish-gray to dark brown, sometimes glossy or mottled with brownish spots, often thickened at the base. Stalk cylindrical, dark brown, sometimes paler upwards, slightly tapering upwards, furrowed, 1/2–3/4 the height of sporocarp, including refuse matter. Peridium membranous, nearly transparent, rugulose, verruculose on the inner surface, covered by a gelatinous layer with refuse matter. Dehiscence irregular from above, usually leaving shallow calyculus. Hypothallus indistinct or only an expansion of the stalk base. Spores yellowish-white in mass, almost colorless by transmitted light, nearly smooth, 7.3–7.9  $\mu\text{m}$  (mean=7.7, sd=0.20, n=20) in diam. Spore wall sometimes with slightly thickened part, usually thinner on one side. Plasmodium not observed.

Specimens examined: MT-2503 (Ibaraki Pref., Kashima-shi, Kyuchu, Kashima-jingu, on bark of living *Euscaphis japonica*, 8 V 1981, M. Tanaya, in culture); MT-2515 (Ibaraki Pref., Kashima-shi, Kyuchu, Kashima-jingu, on bark of living *Abies firma*, 22 V 1981, M. Tanaya, in culture); MT-2516 (Ibaraki Pref., Kashima-shi, Kyuchu, Kashima-jingu, on bark of living *Euscaphis japonica*, 22 V 1981, M. Tanaya, in culture); MT-2527 (Ibaraki Pref., Kashima-shi, Kyuchu, Kashima-jingu, on bark of living *Stachyurus praeocox*, 2 VI 1981, M. Tanaya, in culture); MT-2566 (Ibaraki Pref., Kamisu-machi, Oaza-shitte, Aza-yanagibori, bark of living *Podocarpus nagi*, 21 IX 1981, M. Tanaya, in culture); MT-2614 (Ibaraki Pref., Kashima-shi, Kyuchu, Kashima-jingu, on bark of living *Callicarpa japonica*, 15 IV 1982, M. Tanaya, in culture); MT-2664 (Chiba Pref., Sawara-shi, Sawara-ho, Atago-jinja, on bark of living *Quercus acuta*, 18 V 1982, M. Tanaya, in culture. HOLOTYPE); 99TK-2 (Tokyo Pref., Chiyoda-ku, in the premises of Imperial Palace, on bark of unidentified tree, 23 V 1999, Y. Yamamoto, in culture).

This species has the smallest spore among the stalked species of *Licea* except for *L. capitatoidei* Nann.-Bremek. & Y. Yamam., which differs from the present new species in having smaller sporocarps, dark brown capitula, and spores of brownish-gray color by transmitted light.

Etymology: *Latin parvus* + *capitatus* (from the figure of sporocarp).

8. ***Licea takahashii*** Y. Yamamoto, sp. nov. (Fig. 8)

Sporocarpia gregaria, stipitata, erecta, usque ad 1.2 mm alta. Capitula obovoidea vel pyriformia, usque ad 0.5 mm diam., plerumque brunnea. Stipes rubrobrunneus vel atrobunneus, cylindricus, sulcatus, usque ad 2/3 sporocarpium, materiam granulosaam includens. Hypothallus membranaceus, argenteus. Peridium membranaceum, dilute

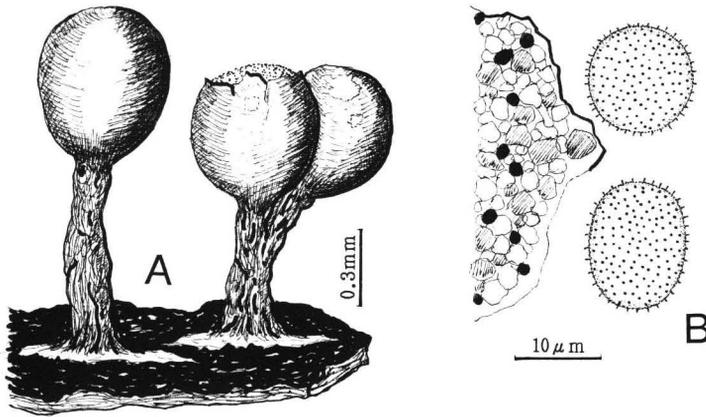


Fig. 8. *Licea takahashii* (YY-14468). A: Three stipitate sporocarps. B: Peridium and two spores.

luteolum, cum materia granulosa. Dehiscencia irregularis superne. Sporae luteae luce reflexa, dilute luteae luce transmissa, 11.7–13.6  $\mu\text{m}$  diam., ubi globosae. Plasmodium ignotum.

Propinqua *Liceae capitatae* vel *Liceae floriformi* var. *aureosporae*, sed sporis spinulosis distat.

Fructifications sporocarpous. Sporocarps gregarious, sometimes digitate, stipitate, nearly erect, up to 1.2 mm tall. Capitula obovoid to pyriform, brown, rarely mottled with yellow, darker at the base, up to 0.5 mm in diam. Stalk thick, furrowed, reddish-brown to dark brown, cylindrical, usually tapering, rarely expanding upwards, up to 2/3 the height of sporocarp, opaque, including granular matter. Hypothallus membranous, silvery, shining, discoid or common to the cluster of sporocarps, sometimes indistinct. Peridium membranous, pale yellow and almost transparent by transmitted light, with granular matter. Dehiscence irregular from above. Columella none. Capillitium none. Spores yellow in mass, pale yellow by transmitted light, evenly spinulose, 11.7–13.6  $\mu\text{m}$  (mean=12.5, sd=0.46, n=20) in diam. when globose, up to 13.6 $\times$ 16.9  $\mu\text{m}$  when ellipsoid. Spore wall somewhat thinner on one side. Plasmodium not observed.

Specimen examined: YY-14468 (Gifu Pref., Osaka-machi, Nigorigo-onsen, ca. 1950 m alt., on dead wood, 8 X 1994, K. Takahashi. HOLOTYPE).

This species apparently resembles a species of *Trichia* or *Hemitrichia* in size and color of fructifications, but it obviously lacks capillitium. The present new species is somewhat similar to *L. capitata* Ing & McHugh and *L. floriformis* Lakh. & Chopra var. *aureospora* Willemse & Nann.-Bremek. in having stalked sporocarps, but it is quite different from these taxa in having much larger sporocarps and spinulose spores.

Etymology: Japanese myxomycetologist, Mr. Kazunari Takahashi.

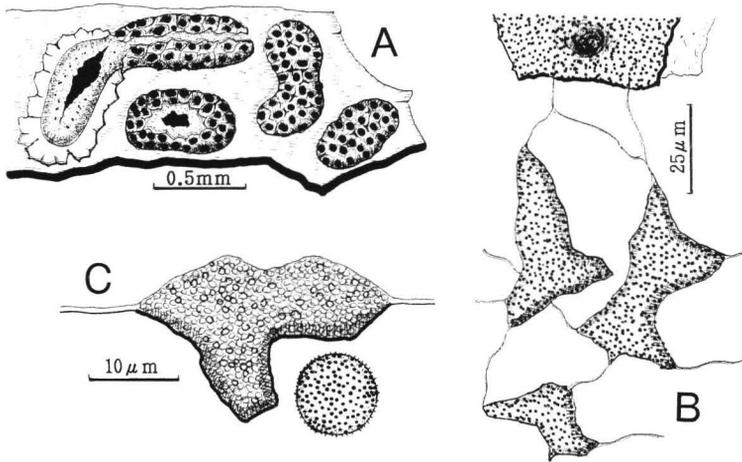


Fig. 9. *Physarum bogoriense* var. *matsumotoi* (YY-14888). A: Four sessile fructifications. B: Peridium and capillitium with three lime nodes. C: Lime node and a spore.

9. *Physarum bogoriense* Racib. var. *matsumotoi* Y. Yamamoto, var. nov. (Fig. 9)

A typo fructificationibus corticolae et sporis majoribus differt.

Fructifications plasmodiocarpous to sporocarpous, usually scattered, rarely gregarious in small groups, terete to subglobose, flexuose, rarely netted, somewhat depressed above and laterally, up to 0.4 mm tall, 0.5 mm wide, 2.6 mm long. Peridium double, or appearing triple. The outer wall thick, brittle, calcareous, pale brown with reddish-brown blotches, dehiscing by angular flakes. The inner layer membranous, gray to whitish, almost hyaline by transmitted light, dehiscing irregularly from above. Capillitium of hyaline to pale yellowish threads with usually angular white lime nodes. Lime nodes sometimes aggregate in the center of fructification as a pseudo-columella. Hypothallus indistinct. Spores globose, dark brown in mass, brownish-gray by transmitted light, verruculose, 9.3–10.3  $\mu\text{m}$  (mean=9.8, sd=0.31, n=20) in diam. Plasmodium unknown.

Specimens examined: YY-1091 (Kochi Pref., Motoyama-cho, Motoyama, Reihoku High School premises, on bark of living *Juniperus chinensis*, 20 VIII 1981, Y. Yamamoto); YY-11564 & 13057 (Hiroshima Pref., Hiroshima-shi, Heiwa-kinen-koen, on bark of living *Cinnamomum camphora*, 13 VII 1991, J. Matsumoto. HOLOTYPE: YY-13057. ISOTYPE: YY-11564); YY-13241 (Hokkaido, Ebetsu-shi, Nopporo-shinrin-koen, bark of living *Ulmus davidiana* var. *japonica*, VII 1992, M. Yokoyama, in culture); YY-14886 & 14888 (Kochi Pref., Kochi-shi, Kami-machi, bark of living tree, 10 VII 1995, Y. Yamamoto).

This variety is distinguished from the type variety by having corticolous habitat, larger spores, more laterally compressed fructifications, and darker blotches.

This myxomycete has been reported by Nannenga-Bremekamp & Yamamoto

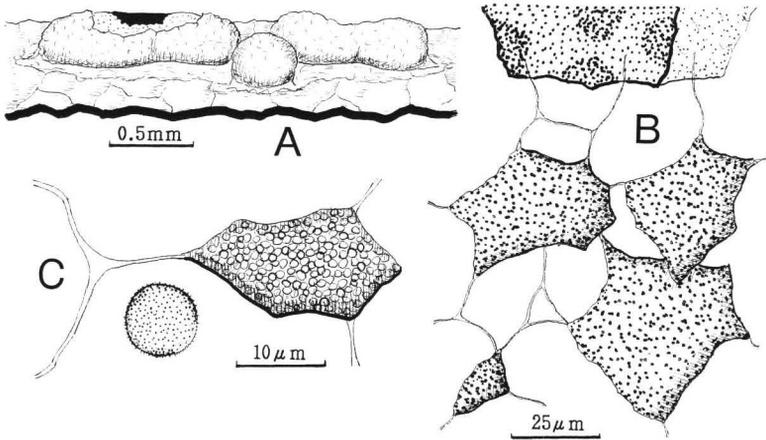


Fig. 10. *Physarum cinereum* var. *magninodosum* (YY-15932). A: Three sessile fructifications. B: Peridium and capillitium with four lime nodes. C: Lime node and a spore.

(1983) as *Physarum superbum* Hagelst., but it is clearly different from the latter species in well-developed fructifications.

Etymology: Japanese myxomycetologist, Dr. Jun Matsumoto.

10. ***Physarum cinereum*** (Batsch) Pers. var. ***magninodosum*** Y. Yamamoto, var. nov. (Fig. 10)

A typo nodis calcareis majoribus, sporis obscurioribus et pariete sporae partim graciliore differt.

Fructifications sporocarpous to plasmodiocarpous, sessile, subglobose with constricted base, rarely pulvinate, often elongate, sometimes reticulate, white, brown when lime is lacking, 0.3–0.4 mm wide, 2 mm or more long. Peridium membranous, almost transparent, covered by thick, squamulose, white lime, sometimes appearing double. Dehiscence irregular from above. Hypothallus usually distinct, white, membranous, sometimes venulose, calcareous. Capillitium abundant, netted. Lime nodes white, large, usually 50–80  $\mu\text{m}$  diam. though mixed with smaller ones, angular, calcareous, rarely massed in the center as a pseudocolumella. Connecting threads short, hyaline. Spores dark brown in mass, brownish-gray by transmitted light, globose or somewhat ellipsoid, verruculose, with some clusters of darker wartlets, 8.3–9.4  $\mu\text{m}$  (mean=8.8, sd=0.26, n=20) in diam. Spore wall thinner on one side. Plasmodium not observed.

Specimens examined: YY-3451 & 3452 (Kochi Pref., Gohoku-mura, Edagawa, Kuzu, on fallen leaves, 20 VIII 1985, Y. Yamamoto. HOLOTYPE: YY-3451. ISO-TYPE: YY-3452); YY-4315 (Kochi Pref., Monobe-mura, Kuwanokawa, on fallen leaves, 23 VII 1986, Y. Yamamoto); YY-5671 (Kochi Pref., Gohoku-mura, Kakiyabu, on fallen leaves, 1 VIII 1987, Y. Yamamoto); YY-6015, 6018, 6019 & 6020 (Kochi

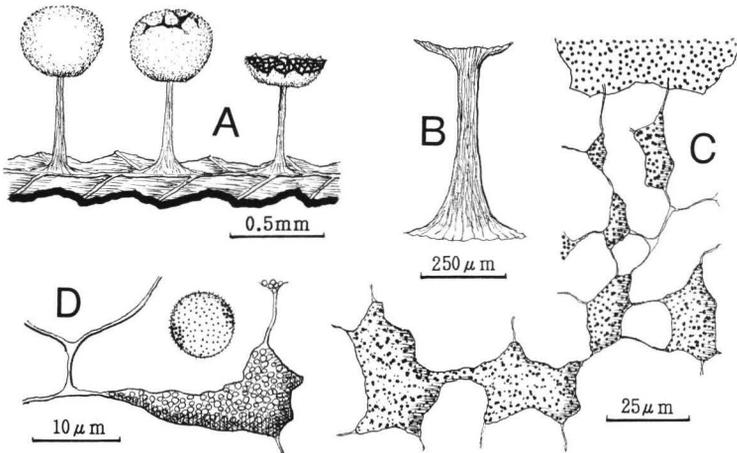


Fig. 11. *Physarum myricanum* (YY-15898). A: Three stipitate sporocarps. B: Stalk observed by transmitted light. C: Peridium and capillitium with several lime nodes. D: Lime node and a spore.

Pref., Gohoku-mura, Edagawa, on fallen leaves, 28 VIII 1987, Y. Yamamoto); YY-9456 & 9458 (Kochi Pref., Kagami-mura, Sadanaga, on fallen leaves, 6 VII 1990, Y. Yamamoto); YY-9825, 9826 & 9925 (Kochi Pref., Gohoku-mura, Edagawa, on fallen leaves, 1–3 VIII 1990, Y. Yamamoto); YY-15932 (Kochi Pref., Kahoku-cho, Birafu, on fallen leaves, 13 VII 1996, Y. Yamamoto).

This variety differs from the type variety in having pure white fructifications, larger lime nodes, more distinct white hypothallus, darker spores, and thinner spore wall on one side. It resembles *Physarum vernum* in the appearance of fructifications and in having large white nodes, but *P. vernum* is nivicolous and forms wider plasmodiocarps. The present new variety is common on fallen leaves of evergreen broad-leaved trees (*Quercus glauca*, *Cinnamomum camphora*, *Persea thunbergii* etc.).

This myxomycete has been previously introduced by Nannenga-Bremekamp & Yamamoto (1987) as "*Physarum cf. cinereum*".

Etymology: Latin *magnus* + *nodosus* (from the large lime node).

11. ***Physarum myricanum*** Y. Yamamoto, sp. nov. (Fig. 11)

Sporocarpia gregaria, stipitata, erecta, usque ad 0.9 mm alta. Capitula plerumque globosa vel subglobosa, usque ad 0.5 mm diam., alba vel griseoalba. Stipes rubrobrunneus, cylindricus, sulcatus, usque ad 2/3 sporocarpium, sine materia granulosa. Hypothallus membranaceus, discoideus, rufobrunneus. Peridium membranaceum, fere incoloratum, cum albis granulis calcareis. Dehiscencia irregularis superne. Capillitium abundans, reticulatum. Nodi calcarei parvi, albi, angulares, connexi ab filis brevibus hyalinis. Sporae globosae, verruculosae cum atris densis verruculis, atrobrunneae luce reflexa, brunneocinereae luce transmissa, 7.2–8.1 μm

diam. Plasmodium ignotum.

Affine *Physaro pusillo*, sed colore capituli et sporis parvioribus differt.

Fructifications sporocarpous. Sporocarps gregarious, stipitate, erect, up to 0.9 mm tall. Capitula globose to subglobose, with somewhat narrow base, white to ashy-white, usually thicker and flat or somewhat umbilicate at the base, rarely pyriform and umbilicate above, up to 0.5 mm in diam. Stalk cylindrical, reddish-brown, somewhat tapering upwards, furrowed, usually without granular matter, 1/2–2/3 the height of sporocarp. Hypothallus membranous, discoid, reddish-brown. Peridium membranous, thin, nearly transparent, covered with white lime granules, sometimes with clusters of lime. Dehiscence irregular from above, leaving a shallow calyculus at the base of capitulum. Columella and pseudocolumella none. Capillitium abundant, netted. Lime nodes usually small, white, angular, rarely rounded, sometimes branched, connected by short hyaline threads. Spores dark brown in mass, brownish-gray by transmitted light, densely verruculose, with some groups of darker wartlets, 7.2–8.1  $\mu\text{m}$  (mean=7.7, sd=0.21, n=20) in diam. Plasmodium not observed.

Specimens examined: YY-4247 & 4251 (Kochi Pref., Tano-cho, Okaji, on fallen leaves of *Myrica rubra* etc., 14 VII 1986, Y. Yamamoto); YY-15898 & 15906 (Kochi Pref., Kochi-shi, Ohtsu, Seki, on fallen leaves under *Myrica rubra*, 6 VII 1996, Y. Yamamoto. HOLOTYPE: YY-15898. ISOTYPE: YY-15906).

This species is very similar to *Physarum pusillum* (Berk. & Curtis) G. Lister in the appearance of fructifications, though *P. pusillum* has usually larger capitula with orange base, rougher peridium and larger spores.

A form with umbilicate and pyriform capitula of this new species has been considered by Nannenga-Bremekamp & Yamamoto (1987) to be allied to two taxa, *P. javanicum* and *P. pezizoideum* var. *microsporum*.

Etymology: Latin *Myrica* (from the habitat of this taxon).

12. ***Physarum subnutans*** Y. Yamamoto, sp. nov. (Fig. 12)

Sporocarpia gregaria, stipitata, plerumque declinata, usque ad 1.5 mm alta. Capitula hemisphaeroidea vel depresso-globosa, alba vel cinereoalba, usque ad 0.6 mm diam. et 0.4 mm crassa, basi leviter umbilicata et fuscata. Stipes crassus, albus, calcareus, sulcatus, sursum angustatus, plerumque usque ad 2/3 sporocarpii, interius materiam granulosaam includens. Hypothallus membranaceus, brunneolus. Peridium membranaceum, fere incoloratum, cum albis granulis calcareis. Dehiscencia petaloidea. Capillitium radiatum e basi capituli, dichotome ramificans, interdum anastomosans. Nodi calcarei parvi, albi, fusiformes vel bacilliformes. Sporae globosae, verruculosae cum atris densis verruculis, atrobrunneae luce reflexa, brunneo-cinereae luce transmissa, 9.2–10.9  $\mu\text{m}$  diam. Plasmodium ignotum.

Aliquantum affine *Physaro nutanti*, sed stipite calcareo differt. Simile *Physaro globulifero* et *P. stellato*, sed capillitio radiato et nodis calcareis fusiformibus distat. Parum affine *P. tenerum*, sed nodis calcareis albis differt.

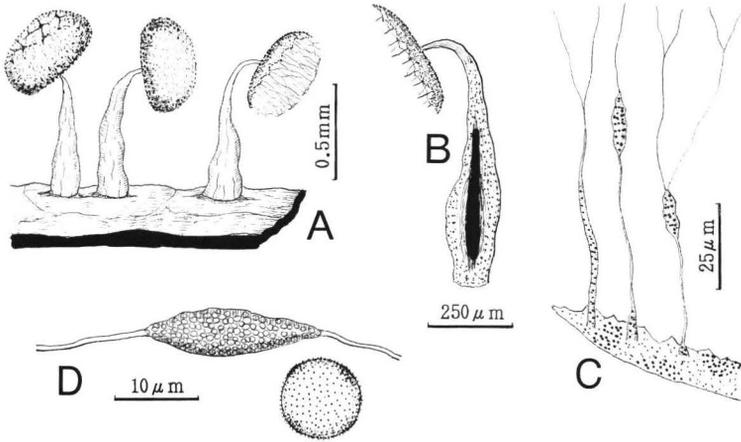


Fig. 12. *Physarum subnutans* (YY-4279). A: Three stipitate sporocarps. B: Stalk observed by transmitted light. C: Peridium and capillitium. D: Lime node and a spore.

Fructifications sporocarpous. Sporocarps gregarious, stipitate, usually nodding, up to 1.5 mm tall. Capitula hemispheroid to depressed-globose, white to grayish-white, up to 0.6 mm in diam., 0.4 mm thick, flat or slightly umbilicate and darker at the base. Stalk thick, white, calcareous throughout, furrowed, tapering upwards, 1/2–2/3 (–3/4) the height of the sporocarp, including dark granular matter. Hypothallus membranous, brownish, frequently indistinct. Peridium membranous, almost colorless and transparent, covered with thick, white lime granules. Dehiscence by a petaloid fashion. Columella none. Capillitium radially arising from the bottom of capitulum, like pillars, white, colorless by transmitted light, divided dichotomously, sometimes anastomosed, reaching the upper peridium. Lime nodes small, white, calcareous, fusiform to rod-like. Spores dark brown in mass, brownish-gray by transmitted light, verruculose, with some clusters of darker wartlets, 9.2–10.9  $\mu\text{m}$  (mean = 9.8,  $\text{sd} = 0.41$ ,  $n = 20$ ) in diam. Plasmodium not observed.

Specimens examined: YY-4279 & 4280 (Kochi Pref., Monobe-mura, Mt. Miune, on bark of a dead tree, 21 VII 1986, Y. Yamamoto. HOLOTYPE: YY-4279. ISOTYPE: YY-4280); YY-16938 (Hiroshima Pref., Hiroshima-shi, Higashi-ku, Fukuda, on bark of living *Pinus* sp., 1 VIII 1997, Y. Harakon).

This species has intermediate characters between *Physarum globuliferum* (Bull.) Pers. and *P. nutans* Pers., i.e., the white limy stalk is found in *P. globuliferum* and the radial capillitium with fusiform lime nodes in *P. nutans*. The present new species is somewhat similar to *P. stellatum* (Masse) Martin and *P. tenerum* Rex in the appearance of fructifications. But it differs from *P. stellatum* in having neither pseudo-columella nor netted capillitium, and from *P. tenerum* in shape and color of lime nodes.

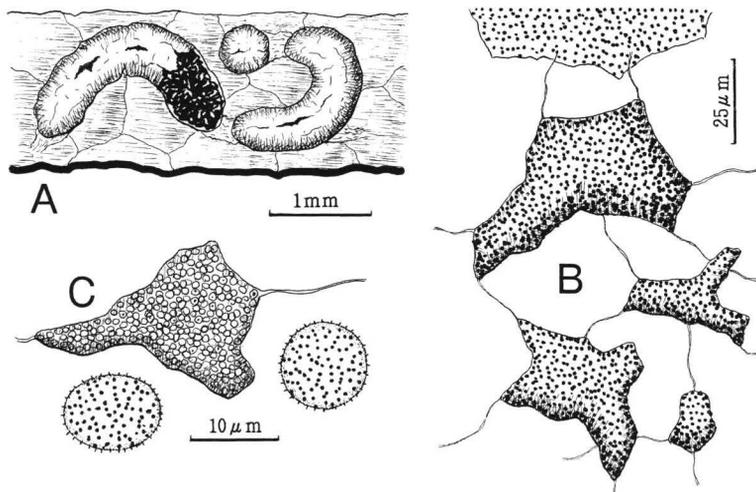


Fig. 13. *Physarum vermiforme* (YY-4259). A: Three sessile fructifications. B: Peridium and capillitium with four lime nodes. C: Lime node and two spores.

Etymology: Latin *sub*+*Physarum nutans* (from affinity to *Physarum nutans*).

13. ***Physarum vermiforme*** Y. Yamamoto, sp. nov. (Fig. 13)

Fructificationes plasmodiocarpiorum vel sporocarpiorum, gregariae, sessiles, cinereo-aurantiacae vel carneaе, fere globosae vel teretes, interdum ramificans, usque ad 0.6 mm diam., 9 mm long. Hypothallus albus, aliquantum calcareus. Peridium membranaceum, tenue, rugosum, flavidum luce transmissa, cum cinereo-aurantiacis vel brunneolis granulis calcareis. Dehiscencia irregularis superne. Capillitium abundans, reticulatum. Nodi calcarei plerumque parvi, cinereo-aurantiaci vel carnei vel brunneoli, angulares, connexi ab filis brevibus hyalinis. Sporae atrobrunneae luce reflexa, brunneo-cinereaе luce transmissa, irregulariter verruculosae vel imperfecte subreticulatae, 9.3–11.8  $\mu\text{m}$  diam. ubi globosae. Plasmodium ignotum.

Parum affine *Physaro lateritio*, sed cinereo-aurantiaco colore granulorum calcareorum differt.

Fructifications plasmodiocarpous to sporocarpous, gregarious, sessile, grayish-orange to flesh-colored, nearly globose with constricted base to terete, sometimes branched, up to 0.6 mm in diam., extending to 9 mm long. Hypothallus white, somewhat calcareous, sometimes indistinct. Peridium of one layer, membranous, thin, rugose, brittle, pale yellow by transmitted light, with grayish-orange to brownish lime granules. Dehiscence irregular from above. Columella and pseudocolumella none. Capillitium abundant, netted. Lime nodes grayish-orange, flesh-colored or brownish, usually small, angular, rarely rounded, sometimes branched, connected by hyaline threads. Spores dark brown in mass, brownish-gray by transmitted light, irregularly

verruculose to incompletely subreticulate, 9.3–11.8  $\mu\text{m}$  (mean=10.7, sd=0.59, n=20) in diam. when globose, ca.  $10 \times 12 \mu\text{m}$  when ellipsoid. Plasmodium not observed.

Specimen examined: YY-4259 (Kochi Pref., Kochi-shi, Ohtsu, Seki, on fallen leaves of *Myrica rubra*, 20 VII 1986, Y. Yamamoto. HOLOTYPE).

Although this species is somewhat similar to *Physarum lateritium* (Berk. et Rav.) Morgan in the appearance of fructifications, it is easily distinguished from *P. lateritium* which has reddish, orange or scarlet plasmodiocarps, pallid to yellow lime nodes with usually deep yellow or red centers and smaller, densely verruculose spores, 7–9  $\mu\text{m}$  in diam. The color of this new species is unique among the plasmodiocarpous species of *Physarum*.

Etymology: Latin *vermis*+*formis* (from the figure of this taxon).

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