

Myxomycetes of the Yatsugatake Mts., Central Japan

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Abstract Twenty-six taxa, including *Arcyria monticola* sp. nov., were added to the myxomycete biota of the Yatsugatake Mts. This new species is characterized by yellow sporocysts and spores and by linearly expanding capillitia that are easily detachable from the calyculi. A checklist of the myxomycetes found in the Yatsugatake Mts. was compiled; it suggested that the biota of these mountains is rich in myxomycetes, the occurrence of which characterizes the subalpine zones of Japan.

Key words: Myxomycetes, *Arcyria monticola*, Japan, Yatsugatake Mts., subalpine.

Introduction

The Yatsugatake Mts. are located in Nagano Prefecture in Central Japan. They consist of several volcanoes and are composed of igneous rock. Mt. Aka-dake is the highest peak in these mountains (2899 m, 35°58'N and 138°22'E). The Yatsugatake Mts. are covered by a subalpine coniferous forest that occurs at an altitude greater than ca. 1800 m and by a cool-temperate deciduous broad-leaved forest as well as a Japanese larch plantation at an altitude below ca. 1800 m. In the subalpine zone, snow is present for approximately 6 months a year. The Yatsugatake Mts. are phytogeographically located in the Fossa Magna region (Maekawa, 1949). The presence of many endemic plant species is responsible for the vegetation of this region being one of the most interesting in Japan. Thus, remarkable differences in nature create a wide range of habitats for myxomycetes. Thus far, 106 myxomycete taxa have been reported from the Yatsugatake Mts. (Takahashi, 2001; Yamamoto, 2004).

In 2004, we had the opportunity to survey the myxomycete biota of the Yatsugatake Mts. as a part of a project of the National Science Museum

titled “Taxonomic research on flora in areas with remarkable biodiversity in Japan.” Fieldwork in the Yatsugatake Mts. was carried out chiefly at the lakesides of Lake Matsubara-ko and Lake Shirakoma-ike from May to December. Lake Matsubara-ko is situated at an altitude of ca. 1150 m and is surrounded by a deciduous broad-leaved forest mixed with Japanese red pine trees. On the other hand, Lake Shirakoma-ike is located at an altitude of ca. 2000 m and is surrounded by an evergreen coniferous forest mixed with birch trees. Approximately 380 myxomycete specimens were gathered during the course of the fieldwork. They were identified with 67 taxa belonging to 25 genera, including a new species. Of the 67 taxa, 26 were identified for the first time in the Yatsugatake Mts. In this paper, these 26 newly found taxa are listed and the characteristics of the myxomycete biota of the Yatsugatake Mts. are discussed. At the end of this paper, a checklist of the myxomycetes found in the Yatsugatake Mts. is appended. All the examined specimens are kept at the herbarium of the Department of Botany, National Science Museum, Tokyo (TNS).

List of species

Liceales

1. **Cribraria atrofusca** G.W. Martin & Lovejoy, J. Wash. Acad., **22**: 92 (1932).
MY-193, 194, 195, 196, 197, 198 & 199 (Matsubara-ko, ca. 1150 m alt., on dead wood, 9 XII 2004, coll. Miyama Kobayashi)
This species rather rarely occurs in Japan (Yamamoto, 1998). It appears in spring and fall on decaying wood both of conifers and deciduous broad-leaved trees.
2. **Cribraria filiformis** Nowotny & H. Neubert, in Neubert, Nowotny & Baumann, Myxom. Deutschl., **1**: 77 (1993).
MY-65, 66, 69, 70, 71, 72, 79, 80, 81 & 82 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 3 & 4 XI 2004, coll. Miki Kobayashi), MY-151, 152, 157, 158 & 159 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 14 XI 2004, coll. Miki Kobayashi & Miyama Kobayashi), and NYM-7, 64, 65, 66, 67, 68 & 69 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 10 & 12 X 2004, coll. Y. Yamamoto *et al.*)
3. **Cribraria languescens** Rex, Proc. Acad. Phila., **43**: 394 (1891).
NYM-20, 21 & 22 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 10 X 2004, coll. Y. Yamamoto *et al.*)
4. **Cribraria meylanii** Brandza, Bull. Soc. Myc. Fr., **44**: 274 (1929).
NYM-9, 10, 11 & 12 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 10 X 2004, coll. Y. Yamamoto *et al.*), and MY-39, 40 & 41 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 30 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)
This species is not so rare in Japan, though it was described to be rather rarely collected (Yamamoto, 1998). It occurs usually on dead conifers (*Tsuga sieboldii* Carr., *Abies firma* Sieb. et Zucc., etc.) in late fall at highland over 1000 m alt. in Japan.
5. **Cribraria montana** Nann.-Bremek., Proc. K. Ned. Akad. Wet. C., **76**: 476 (1973).
MY-19 & 53 (Matsubara-ko, ca. 1150 m alt., on dead wood, 14 & 30 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)
In Japan, this rare species was reported only once from Niigata Prefecture. (Yamamoto *et al.*, 1993). It occurs on decaying coniferous wood in summer and fall in the mountainous region.
6. **Cribraria purpurea** Schrad., Nov. Gen. Pl., **8** (1797).
MY-42, 43, 44, 45, 46, 47 & 48 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 30 X 2004, coll. Miki Kobayashi & Miyama Kobayashi), and MY-67 & 68 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 3 XI 2004, coll. Miki Kobayashi)
7. **Cribraria tenella** Schrad., Nov. Gen. Pl., **6** (1797).
MY-200 (Matsubara-ko, ca. 1150 m alt., on dead wood, 9 XII 2004, coll. Miyama Kobayashi)
8. **Cribraria violacea** Rex, Proc. Acad. Phila., **43**: 393 (1891).
MY-211p. (Matsubara-ko, ca. 1150 m alt., on dead wood, 9 XII 2004, coll. Miyama Kobayashi)

Trichiales

9. **Arcyria incarnata** (Pers. ex J.F. Gmel.) Pers., Obs. Myc., **1**: 58 (1796).
KSS-13 (Matsubara-ko, ca. 1150 m alt., on dead wood, 17 VI 2004, coll. Miki Kobayashi *et al.*)
10. **Arcyria monticola** Y. Yamamoto & H. Hagiwara, sp. nov. (Figs. 1 & 2)
Sporocarpia gregaria, stipitata, usque ad 4.0 mm alta. Sporocysta cylindrica, cinereo-flava, usque ad 2.7 mm alta, 0.57 mm diam. ante expansionem, expositans longa fila et multas spiras capillitii ubi expansa. Stipes saepe sinuosus, flavescens, longitudinaliter striatus, usque ad 1.3 mm longus, 0.15–0.2 mm diam., cum systis intus. Hypothallus membranaceus, communis coloniae,

fere hyalinus et incoloratus. Calyculus vadosus, cinereo-flavus luce reflexa, pallide flavidus vel fere incoloratus luce transmissa, radiatim plicatus, usque ad 0.57 mm diam., intus clare reticulatus. Capillitium filamentosum, ramosum, connatum et reticulum intricatum formans, saepe tumoribus globosis ad/prope axillas praeditum, 2.5–3 μm diam. sine sculpturis, cum annulis, semiannulis, spinulis et dentibus, elasticum et expansum lineare cum multis spiris filamentosis. Sporae fere globosae, cinereo-flavae luce reflexa, flavidae luce transmissa, minute verruculosae cum aliquot verruculis majoribus, 9.3–10.3 μm diam.; paries unilateraliter gracilior. Plasmodium ignotum.

Propinqua *Arcyria obvelatae*, sed sporis majoribus et filis capillitii longioribus atque spiralibus differt.

Holotypus: NYM-31 (Ad lignum mortuum arborum coniferarum, in montibus excelsis Shirakoma-ike, Prov. Nagano, ca. 2000 m alt., leg. Y. Yamamoto, H. Hagiwara, Miki Kobayashi et Miyama Kobayashi, 10 Oct. 2004, in TNS)

Fructification sporocarpous. Sporocarps gregarious, stalked, up to 4.0 mm tall. Sporocyst cylindrical, grayish-yellow, up to 2.7 mm tall, 0.57 mm diam. when unexpanded, long capillitium threads and also many capillitium coils are exposed when expanded. Stalk often sinuous,

pale yellow, longitudinally striate, up to 1.3 mm long, 0.15–0.2 mm diam., including cysts within. Hypothallus membranous, common to the colony, nearly transparent and colorless. Calyculus shallow, grayish-yellow by reflected light, very pale yellow or nearly colorless by transmitted light, radially plicate, up to 0.57 mm diam., distinctly reticulated inside. Capillitium filamentous, branched and fused to make an intricate net, often with globose swellings at/near the axils, 2.5–3 μm diam. without sculptures, marked by rings, half rings, spines and cogs, very elastic and expanding linearly, with many coils of capillitium threads. Spores nearly globose, grayish-yellow in mass, pale yellow by transmitted light, minutely verruculose with some larger wartlets, 9.3–10.3 μm (mean=9.9, sd=0.34, n=20) in diam.; spore-wall thinner on one side. Plasmodium not observed.

Specimens examined: NYM-30, 31, 32 & 33 (Shirakoma-ike, ca. 2000 m alt., on dead coniferous wood, 10 X 2004, coll. Y. Yamamoto *et al.*), and MY-23 & 24 (Shirakoma-ike, ca. 2000 m alt., on dead coniferous wood, 24 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)

Etymology: Latin *mons+cola*, dwellers in the mountain.

Note: This new species is closely allied to *Arcyria obvelata* (Oeder) Onsberg in its yellow

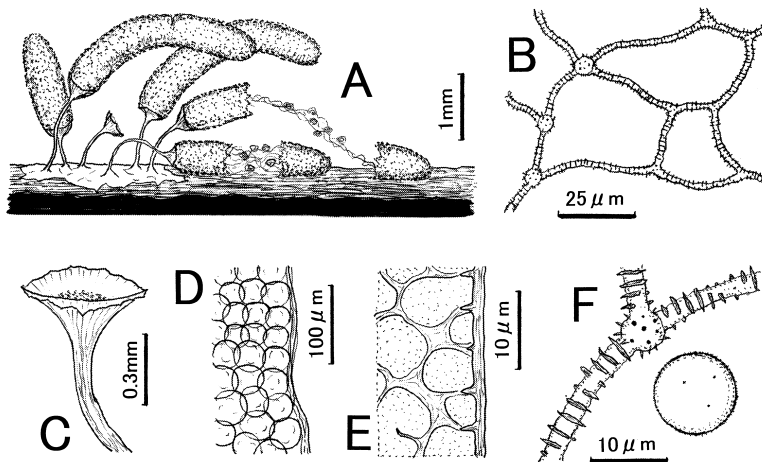


Fig. 1. *Arcyria monticola* (NYM-31, Holotype)

A: A cluster of stalked sporocarps. B: Part of capillitium. C: Calyculus and stalk. D: Cysts in the stalk. E: Part of calyculus. F: Part of capillitium and a spore.

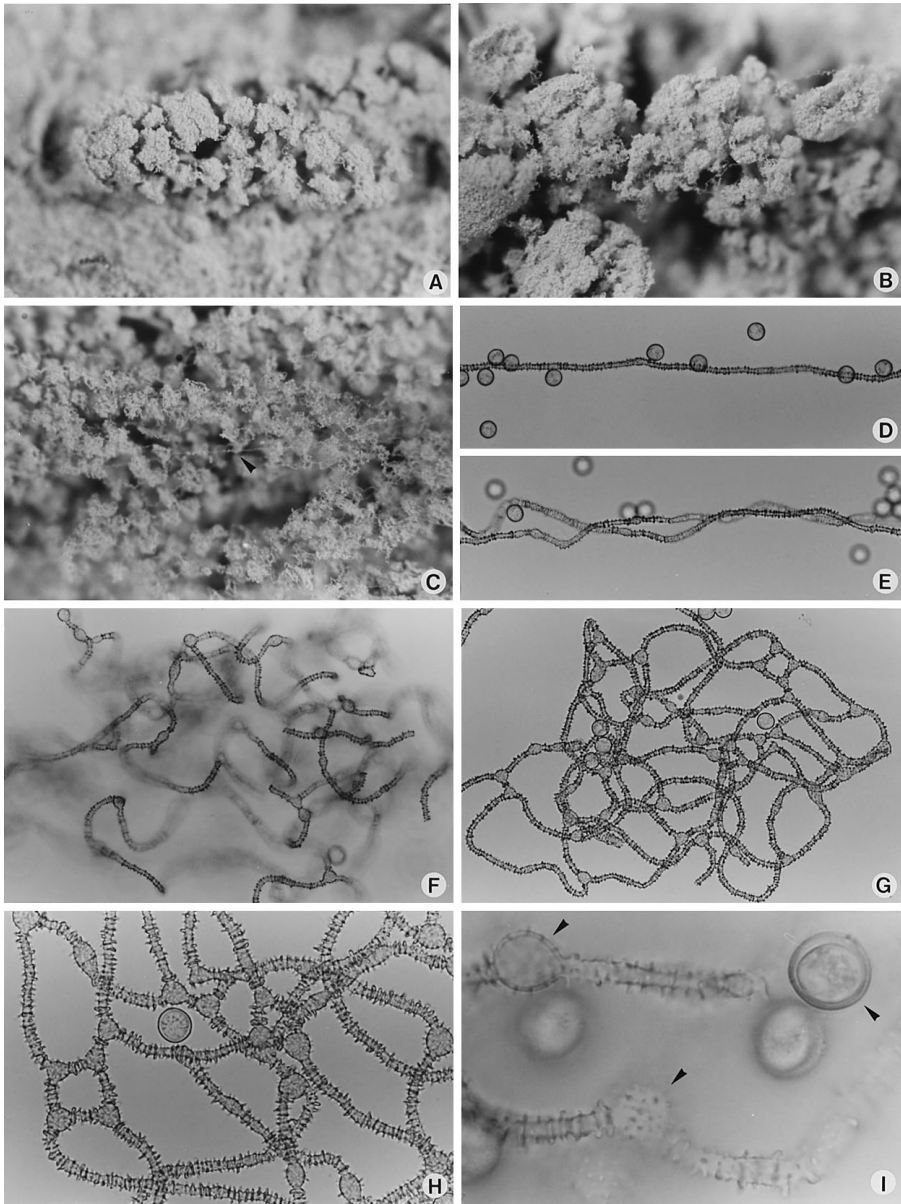


Fig. 2. *Arcyria monticola* (NYM-31, Holotype).

A: Stalked sporocarp not fully expanded. $\times 20$. B: Several clusters of coiled capillitium threads. $\times 20$. C: Coiled capillitium threads connected by long linear ones. An arrow indicates a linear capillitium thread. $\times 20$. D & E: Long linear capillitium thread(s) with few swellings. $\times 230$. F & G: Cluster of coiled capillitium threads with many swellings. $\times 230$. H: Part of a cluster of coiled capillitium threads. $\times 460$. I: Coiled capillitium threads and spores. Note the hollow swellings with verrucae and spore-wall thinner on one side, which are indicated with arrows. $\times 1150$.

sporocyst, yellow spores and easily detachable capillitia from calyculi, but differs in having larger spores and its capillitium expands linearly

with many coils. The linearly expanding capillitium is like that of *Arcyria stipata* (Schw.) Lister var. *imperialis* (G. Lister) Y. Yamam. (Syn.:

Hemitrichia imperialis G. Lister), but the capillitium threads lack spiral markings.

11. **Metatrachia floriformis** (Schwein.) Nann.-Bremek., Proc. K. Ned. Akad. Wet. C., **88**: 127 (1985).

MY-54 & 55 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 30 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)

12. **Trichia botrytis** (J. F. Gmel.) Pers., Neues Mag. Bot., **1**: 89 (1794).

MY-56, 190 & 191 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 30 X & 23 XI 2004, coll. Miki Kobayashi & Miyama Kobayashi)

13. **Trichia scabra** Rostaf., Mon., 258 (1875).

NYM-109 & 110 (Matsubara-ko, ca. 1150 m alt., on dead wood, 13 X 2004, coll. H. Hagiwara & Miyama Kobayashi), MY-4 (Matsubara-ko, ca. 1150 m alt., on dead wood, 14 X 2004, coll. Miki Kobayashi & Miyama Kobayashi), and MY-210, 211, 212 & 213 (Matsubara-ko, ca. 1150 m alt., on dead wood, 9 XII 2004, coll. Miyama Kobayashi)

Physarales

14. **Diachea splendens** Peck, Ann. Rep. N. Y. State Mus., **30**: 50 (1878).

NYM-116, 117, 118, 119, 120 & 126 (Matsubara-ko, ca. 1150 m alt., on plant litter, 13 X 2004, coll. H. Hagiwara & Miyama Kobayashi), and MY-12 (Matsubara-ko, ca. 1150 m alt., on plant litter, 14 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)

This species is very rare in Japan and reported from Tochigi Prefecture (Emoto, 1933) and Fukushima Prefecture (Yamamoto, 1998).

15. **Diderma aurantiacum** Y. Yamam. & Nann.-Bremek., in Nannenga-Bremekamp & Yamamoto, Proc. K. Ned. Akad. Wet. C., **93**: 267 (1990).

MY-34 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 24 X 2004, coll. Miki Kobayashi &

Miyama Kobayashi)

This species usually occurs on well-decayed wood of conifers in fall at mountainous regions in Japan.

16. **Diderma floriforme** (Bull.) Pers. var. **subfloriforme** (Cand. & Nann.-Bremek.) Y. Yamam., Myxom. Biota Jpn., 294 (1998).

MY-181 & 182 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 22 XI 2004, coll. Miki Kobayashi & Miyama Kobayashi)

In Japan, this variety occurs on dead broad-leaved trees such as *Fagus crenata* Blume in fall at highland much more frequently than the type variety (var. *floriforme*).

17. **Diderma umbilicatum** Pers., Syn. Fung., 165 (1801).

YH-4959 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 3 X 2004, coll. Y. Harakon)

18. **Elaeomyxa cerifera** (G. Lister) Hagelst., Mycologia, **34**: 593 (1942).

NYM-47 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 10 X 2004, coll. Y. Yamamoto *et al.*)

19. **Lepidoderma tigrinum** (Schrad.) Rostaf., in Fockel, Jahrb. Nass. Ver. Naturk., **27–28**: 73 (1873).

YH-4971 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 3 X 2004, coll. Y. Harakon)

20. **Physarum leucophaeum** Fr., Symb. Gast., 24 (1818).

MY-14 (Matsubara-ko, ca. 1150 m alt., on dead wood, 14 X 2004, coll. Miki Kobayashi & Miyama Kobayashi)

The sporocarps are slightly similar to those of *Physarum album* (Bull.) Chevall. (Syn.: *Physarum nutans* Pers.), but the sporocysts are more rounded and have robuster stalk and more netted capillitium.

21. **Physarum ovisporum** G. Lister, J. Bot., **59**: 90 (1921).

MY-13 (Matsubara-ko, ca. 1150 m alt., on

dead wood, 14 X 2004), coll. Miki Kobayashi & Miyama Kobayashi

The sessile fructifications are somewhat similar to those of *Physarum cinereum* (Batsch) Pers., but robuster, and the spores have sometimes pale line on the epispore.

Stemonitales

22. **Colloderma oculatum** (C. Lippert) G. Lister, J. Bot., **48**: 312 (1910).

MY-183 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 22 XI 2004, coll. Miki Kobayashi & Miyama Kobayashi)

This species is not rare in Japan, and usually occurs on moss covering dead conifers at highland in fall.

23. **Lamproderma columbinum** (Pers.) Rostaf., in Fuckel, Jahrb. Nass. Ver. Naturk., **27–28**: 89 (1873).

MY-38, 63, 64, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 131, 169, 184, 185 & 192 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 24 X–23 XI 2004, coll. Miki Kobayashi & Miyama Kobayashi), and NYM-44, 45, 46, 77, 78, 79, 80 & 81 (Shirakoma-ike, ca. 2000 m alt., on dead wood, 10 & 12 X 2004, coll. Y. Yamamoto *et al.*)

24. **Lamproderma zonatum** Mar. Mey. & Poulain, in Poulain, Meyer & Moreau, Bull. Soc. Myc. Fr., **119**: 277 (2003). (Fig. 3)

OKS-10, 11, 12 & 13 (Shirakoma-ike, ca. 2000 m alt., on plant litter, 8 V 2004, coll. S. Ono *et al.*)

This is a nivicolous species recently described (Poulain *et al.*, 2003). It is easily identified by its cylindrical to ovoid, sessile sporocarps and its cylindrical to ovoid, sessile sporocarps and its spore-size (10–12 μm).

25. **Stemonaria longa** (Peck) Nann.-Bremek., R. Sharma & Y. Yamam., in Nannenga-Bremekamp, Yamamoto & Sharma, Proc. K. Ned. Akad. Wet. C., **87**: 453 (1984).

NYM-122 (Matsubara-ko, ca. 1150 m alt., on dead wood, 13 X 2004, coll. H. Hagiwara & Miyama Kobayashi)

This species usually occurs on dead broad-leaved trees at lowland in summer. It is interesting that the specimen was collected at highland in fall.

26. **Stemonitis fusca** Roth, Mag. Bot. Roemer & Usteri, **1**(2): 26 (1787).

KSS-28 (Matsubara-ko, ca. 1150 m alt., on dead wood, 17 VI 2004, coll. Miki Kobayashi *et al.*), and NYM-123 & 124 (Matsubara-ko, ca. 1150 m alt., on dead wood, 13 X 2004, coll. H.

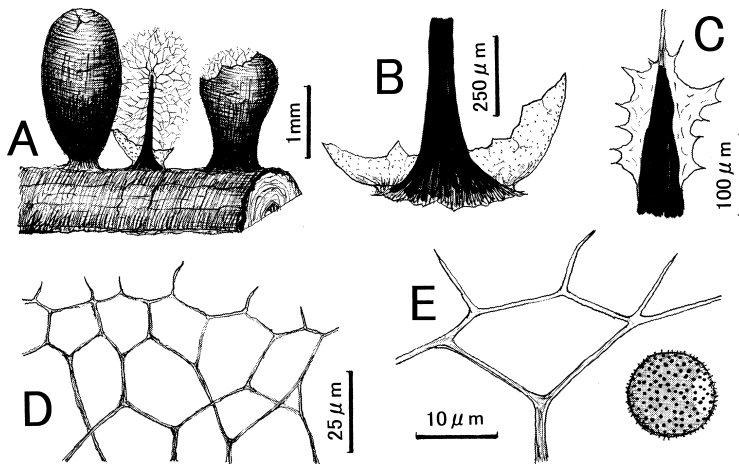


Fig. 3. *Lamproderma zonatum* (OKS-11).

A: Three sessile sporocarps. B: Basal part of columella and peridium. C: Apical part of columella. D: Peripheral part of capillitium. E: Peripheral part of capillitium and a spore.

Hagiwara & Miyama Kobayashi)

Characteristics of the myxomycete biota of the Yatsugatake Mts.

In this paper, 26 taxa were added to the myxomycete biota of the Yatsugatake Mts. As a result, a total of 132 taxa belonging to 31 genera have been reported from these mountains thus far (see Appendix). Of these, *Cribraria* is the largest genus comprising 16 taxa, and is followed by *Arcyria* (11 taxa), *Diderma* (11), *Didymium* (11), *Physarum* (11), *Trichia* (10), *Lamproderma* (10), and so on, in the order of the number of species per genus. According to Lado (2001), *Physarum* is the largest genus in Myxomycetes and accounts for 15% of all the currently recognized myxomycete species. However, only 11 taxa (8.3%) have been found in the Yatsugatake Mts. This suggests that *Physarum* may not be overwhelmingly dominant in the highlands. On the other hand, *Lamproderma* includes a relatively greater number of taxa of the myxomycete biota of the Yatsugatake Mts. This is because 7 taxa of nivicolous *Lamproderma*, namely, *L. aeneum*, *L. atrosporum*, *L. atrosporum* var. *pseudocribrarioides*, *L. ovoideum*, *L. sauteri*, *L. splendens*, and *L. zonatum*, are obtained from the subalpine zone of the Yatsugatake Mts.

Cribraria is known to be representative of myxomycetes that occur on decaying coniferous wood (Yamamoto, 2003). As mentioned above, it is the most dominant genus in the myxomycete biota of the Yatsugatake Mts. Therefore, using *Cribraria* species, the myxomycete biota of the Yatsugatake Mts. was compared with that of other Japanese mountains that had well-developed coniferous forests; these included 11 taxa of *Cribraria* that were reported from Mt. Ontake (Takahashi & Yamamoto, 2002), 16 from Mt. Fuji (Matsumoto, 2003) and 14 from the Kirishima Mts. (Yamamoto *et al.*, 2004). The location of these mountains is shown in Fig. 4. The comparison was carried out using the coefficient of community described by Stephenson (1988), i.e.,

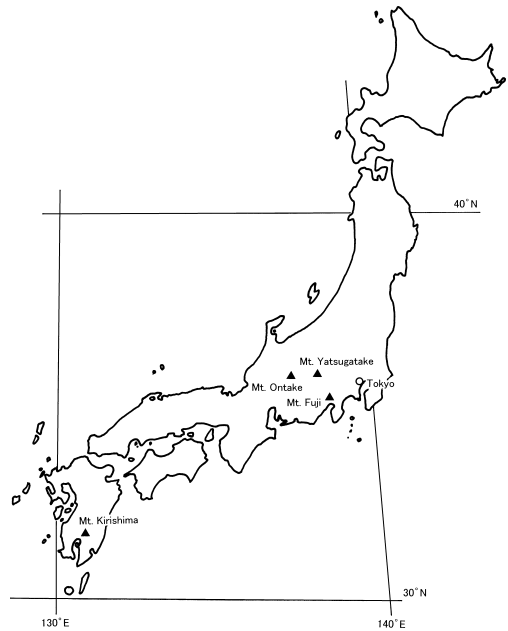


Fig. 4. Map showing the location of the Yatsugatake Mts., Mt. Fuji, Mt. Ontake and the Kirishima Mts.

$$\text{coefficient of community (CC)} = 2c / (a + b)$$

where a is the total number of species in the first community being considered, b is the total number of species in the second community, and c is the number of species common to both communities. The calculation results are shown in Table 1. The average value of the coefficient of community indices for all combinations of the 4 mountains was 0.52. The coefficient of community index between the Yatsugatake Mts. and Mt. Fuji was the highest. These 2 mountains occupy adjacent positions and have very similar vegetation. The indices between the Yatsugatake Mts. and Mt. Ontake and between the Yatsugatake and Kirishima Mts. were relatively lower, but generally equal to the average value. On the other hand, the index value between Mt. Ontake and the Kirishima Mts. was surprisingly quite low (Table 1). This could be explained by the fact that the survey in Mt. Ontake was carried out only in the subalpine zone (Takahashi & Yamamoto, 2002), while the Kirishima Mts. lack a

Table 1. Comparison of the myxomycete biota of the Yatsugatake Mts., Mt. Fuji, Mt. Ontake and the Kirishima Mts. using the coefficient of community indices.

	Ontake	Fuji	Kirishima
Yatsugatake	0.59	0.75	0.53
Ontake		0.59	0.16
Fuji			0.47

subalpine zone because of their location and altitude. These facts suggest that some *Cribraria* species favor subalpine zones as their habitats; however, none of these were found in the Kirishima Mts. Based on the comparison of the coefficient of community indices in the present study, like *Cribraria montana*, 7 *Cribraria* species, namely, *C. argillacea*, *C. dictyospora*, *C. ferruginea*, *C. macrocarpa*, *C. meylanii*, *C. mirabilis*, and *C. purpurea*, will be candidates for subalpine species. Of these, 6 species were identified in the Yatsugatake Mts. (see Appendix).

In addition to the above mentioned species of *Lamproderma* and *Cribraria*, many nivicolous and/or montanous myxomycetes were identified in the Yatsugatake Mts., namely, *Barbeyella minutissima*, *Colloderma oculatum*, *Diderma alpinum*, *D. aurantiacum*, *D. cinereum*, *D. floriforme* var. *subfloriforme*, *D. ochraceum*, *Didymium dubium*, *Elaeomyxa cerifera*, *Lepidoderma caestiae* var. *chailletii*, *L. granuliferum*, *L. tigrinum*, *Mucilago crustacean*, *Physarum newtonii*, and *Trichia alpina* (see Appendix). This suggests that the biota of the Yatsugatake Mts. is rich in myxomycetes, the occurrence of which characterizes the subalpine zones of Japan.

Acknowledgments

We deeply thank Miki Kobayashi, Miyama Kobayashi, Akira Shiokawa, Satoko Shiokawa, Shinpei Ono and Yuichi Harakon, who gave us many valuable specimens collected in the Yatsugatake Mts. We thank Dr. Ken Katsumoto for kindly correcting the Latin description. We also thank Kazunari Takahashi and Yuichi Harakon for their

critical suggestions to a checklist of the myxomycete biota of the Yatsugatake Mts.

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Appendix. Myxomycetes reported from
the Yatsugatake Mts. up to now.

Ceratiomyxales

Ceratiomyxa fruticulosa (O.F. Müll.) T. Macbr.
(T**, Y***)

Ceratiomyxa fruticulosa var. *flexuosa* (Lister) G.
Lister (Y)

Ceratiomyxa fruticulosa var. *porioides* (Alb. &
Schwein.) G. Lister (Y)

Echinosteliales

Barbeyella minutissima Meyl. (Y)

Clastoderma debaryanum A. Blytt (Y)

Liceales

Cribraria argillacea (Pers. ex J. F. Gmel.) Pers.
(Y)

**Cribraria atrofusca* G.W. Martin & Lovejoy

Cribraria aurantiaca Schrad. (Y)

Cribraria cancellata (Batsch) Nann.-Bremek. (T,
Y)

Cribraria dictyospora G.W. Martin & Lovejoy
(T, Y)

Cribraria ferruginea Meyl. (T)

**Cribraria filiformis* Nowotny & H. Neubert

**Cribraria languescens* Rex

Cribraria macrocarpa Schrad. (T)

**Cribraria meylanii* Brandza

Cribraria microcarpa (Schrad.) Pers. (Y)

**Cribraria montana* Nann.-Bremek.

**Cribraria purpurea* Schrad.

**Cribraria tenella* Schrad.

**Cribraria violacea* Rex

Cribraria vulgaris Schrad. (Y)

Licea pygmaea (Meyl.) Ing (Y)

Lycogala epidendrum (L.) Fr. (T, Y)

Reticularia splendens Morgan (Y)

Tubulifera arachnoidea Jacq. (T, Y)

Tubulifera dimorphotheca (Nann.-Bremek. &
Loer.) Lado (Y)

Trichiales

Arcyria affinis Rostaf. (Y)

Arcyria afroalpina Rammeloo (Y)

Arcyria cinerea (Bull.) Pers. (Y)

Arcyria denudata (L.) Wettst. (Y)

Arcyria globosa Schwein. (Y)

**Arcyria incarnata* (Pers. ex J. F. Gmel.) Pers.

**Arcyria monticola* Y. Yamam. & H. Hagiw.

Arcyria obvelata (Oeder) Onsberg (Y)

Arcyria pomiformis (Leers) Rostaf. (Y)

Arcyria stipata (Schwein.) Lister var. *imperialis*
(G. Lister) Y. Yamam. (Y)

Arcyria virescens G. Lister (Y)

Hyporhamma calyculata (Speg.) Lado (Y)

Hyporhamma clavata (Pers.) Lado (Y)

Hyporhamma intorta (Lister) Lado (Y)

Hyporhamma serpula (Scop.) Lado (Y)

**Metatrichia floriformis* (Schwein.) Nann.-
Bremek.

Metatrichia vesparium (Batsch) Nann.-Bremek.
(Y)

Perichaena chrysosperma (Curr.) Lister (Y)

Perichaena depressa Lib. (Y)

Trichia alpina (R. E. Fr.) Meyl. (Y)

**Trichia botrytis* (J. F. Gmel.) Pers.

Trichia contorta (Ditmar) Rostaf. var. *karstenii*
(Rostaf.) Ing (Y)

Trichia decipiens (Pers.) T. Macbr. (T, Y)

Trichia erecta Rex (T)

Trichia favoginea (Batsch) Pers. var. *persimilis*
(P. Karst.) Y. Yamam. (Y)

**Trichia scabra* Rostaf.

Trichia subfusca Rex (Y)

Trichia varia (Pers. ex J. F. Gmel.) Pers. (Y)

Trichia verrucosa Berk. (Y)

Physarales

Badhamia affinis Rostaf. var. *armillata* (Nann.-
Bremek.) Y. Yamam. (Y)

Badhamia macrocarpa (Ces.) Rostaf. (Y)

Badhamia panicea (Fr.) Rostaf. (Y)

Badhamia utricularis (Bull.) Berk. (Y)

Craterium aureum (Schumach.) Rostaf. (Y)

Craterium leucocephalum (Pers. ex J. F. Gmel.)
Ditmar var. *cylindricum* (Masse) G. Lister (Y)

Craterium leucocephalum var. *scyphoides*
(Cooke & Balf. f.) G. Lister (Y)

Craterium minutum (Leers) Fr. (Y)

Diachea leucopodia (Bull.) Rostaf. (Y)

**Diachea splendens* Peck

Diderma alpinum (Meyl.) Meyl. (Y)
 **Diderma aurantiacum* Y. Yamam. & Nann.-Bremek.
Diderma chondrioderma (de Bary & Rostaf.) G. Lister (Y)
Diderma cinereum Morgan (Y)
Diderma effusum (Schwein.) Morgan (Y)
 **Diderma floriforme* (Bull.) Pers. var. *subfloriforme* (Cand. & Nann.-Bremek.) Y. Yamam.
Diderma hemisphaericum (Bull.) Hornem. (Y)
Diderma ochraceum Hoffm. (Y)
Diderma spumarioides (Fr.) Fr. (Y)
Diderma testaceum (Schrad.) Pers. (Y)
 **Diderma umbilicatum* Pers.
Didymium clavus (Alb. & Schwein.) Rabenh. (Y)
Didymium comatum (Lister) Nann.-Bremek. (Y)
Didymium dubium Rostaf. (Y)
Didymium floccosum G.W. Martin (Y)
Didymium iridis (Ditmar) Fr. (Y)
Didymium leoninum Berk. & Broome (Y)
Didymium megalosporum Berk. & M.A. Curtis (Y)
Didymium minus (Lister) Morgan (Y)
Didymium nigripes (Link) Fr. (Y)
Didymium serpula Fr. (Y)
Didymium squamulosum (Alb. & Schwein.) Fr. (Y)
 **Elaeomyxa cerifera* (G. Lister) Hagelst.
Fuligo septica (L.) F.H. Wigg. f. *flava* (Pers.) Y. Yamam. (Y)
Lepidoderma carestianum (Rabenh.) Rostaf. var. *chailletii* (Rostaf.) G. Lister (Y)
Lepidoderma granuliferum (W. Phillips) R. E. Fr. (Y)
 **Lepidoderma tigrinum* (Schrad.) Rostaf.
Mucilago crustacea F.H. Wigg. (Y)
Physarum album (Bull.) Chevall. (Y)
Physarum bivalve Pers. (Y)
Physarum cinereum (Batsch) Pers. (Y)
Physarum contextum (Pers.) Pers. (Y)
Physarum melleum (Berk. & Broome) Masee f. *luteum* Y. Yamam. (Y)
 **Physarum leucophaeum* Fr.
Physarum newtonii T. Macbr. (Y)
 **Physarum ovisporum* G. Lister
Physarum pusillum (Berk. & M.A. Curtis) G. Lister (Y)

Physarum viride (Bull.) Pers. (T, Y)
Physarum viride f. *aurantium* (Bull.) Y. Yamam. (T, Y)

Stemonitales

**Colloderma oculatum* (C. Lippert) G. Lister
Comatricha alta Preuss (Y)
Comatricha elegans (Racib.) G. Lister (Y)
Comatricha laxa Rostaf. (Y)
Comatricha nigra (Pers. ex J. F. Gmel.) J. Schröt. (Y)
Enerthenema papillatum (Pers.) Rostaf. (Y)
Lachnobolus comatus (G. Lister & Brandza) Lado (Y)
Lamproderma aeneum Mar. Mey. & Poulain (Y)
Lamproderma arcyronema Rostaf. (Y)
Lamproderma atosporum Meyl. (Y)
Lamproderma atosporum var. *pseudocribrarioides* Mar. Mey., G. Moreno, A. Sanchez, H. Singer & Illana (Y)
 **Lamproderma columbinum* (Pers.) Rostaf.
Lamproderma ovoideum Meyl. (Y)
Lamproderma sauteri Rostaf. (Y)
Lamproderma scintillans (Berk. & Broome) Morgan (Y)
Lamproderma splendens Meyl. (Y)
 **Lamproderma zonatum* Mar. Mey. & Poulain
 **Stemonaria longa* (Peck) Nann.-Bremek., R. Sharma & Y. Yamam.
Stemonitis axifera (Bull.) T. Macbr. (T, Y)
Stemonitis axifera var. *smithii* (T. Macbr.) Hagelst. (Y)
 **Stemonitis fusca* Roth
Stemonitis marjana Y. Yamam. (Y)
Stemonitis pallida Wingate (T)
Stemonitis pallida var. *rubescens* Y. Yamam. (Y)
Stemonitis splendens Rostaf. (T, Y)
Stemonitis splendens var. *webberi* (Rex) Lister (Y)
Stemonitopsis hyperopta (Meyl.) Nann.-Bremek. (Y)
Stemonitopsis typhina (F.H. Wigg.) Nann.-Bremek. (Y)

* First-time reports in the present paper

** Takahashi (2001)

*** Yamamoto (2004)