

CHAPTER 11

FAMILY MALMIDEACEAE

Characteristics of the Family Malmideaceae

Thallus: corticolous, green-grey or gray, smooth or densely verrucose, continuous; epruina; Soralia and Isidia absent; Verrucae: absent or whitish, often several confluent and sometimes ramificated, dull to slightly shiny or orange yellow, burst open and release soredia-like granules; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus whitish; **Apothecia**: scattered and entire, sessile, rounded or rounded to flexuose; disc plane to slightly convex, chocolate brown, to dark grey-brown and slightly prominent, whitish grey at margin; epruina; with biatorine (proper exciple), margin of *granifera*-type ; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa, incrustated with grayish to ochraceous-yellow hydrophobic granules, nubilous only partly dissolving in KOH with K⁺ orange yellowish to greenish lemon yellow reaction; Parathecium: indistinct; Epihymenium: brown; Hymenium: hyaline; Subhymenium: hyaline to olive brown or brown; Hypothecium brown or blackish brown; Paraphyses: simple, not swollen; Asci: clavate; **Ascospores**: (4-) 6- (-)8 per ascus, hyaline, ellipsoid, wall equally thickened, but a few spores with a minor thickening at the ends, simple with halonate,

but a few spores with a slight thickening at the ends, (60.1)60.2-66.6-73.1(77.4) \times (12.1)12.9-13.7-15.3(16.4) μm ; **Pycnidia** and **Conidia** not observed.

Description of the Genus *Malmidea*

Malmidea Kalb, Rivas Plata & Lumbsch (inpress)

Thallus: corticolous, green-grey or gray, smooth or densely verrucose, continuous, 50.0-220.0 μm thick; epruina; Soralia and Isidia absent; Verrucae: absent or whitish, often several confluent and sometimes ramificated, dull to slightly shiny or orange yellow, burst open and release soredia-like granules, 0.1-0.4 mm high and 0.1-0.3 mm wide; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus whitish; **Apothecia**: scattered and entire, sessile, rounded or rounded to flexuose; disc plane to slightly convex, chocolate brown, to dark grey-brown and slightly prominent, whitish grey at margin; epruina, 0.2-1.1 mm diam.; with biatorine (proper exciple), margin of *granifera*-type; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 30-150 μm broad, incrustated with grayish to ochraceous-yellow hydrophobic granules, nubilous only partly dissolving in KOH with K⁺ orange yellowish to greenish lemon yellow reaction; Parathecium: indistinct; Epihymenium: brown, 4.5-7.5 μm thick; Hymenium: hyaline, 75.0-150.0 μm high; Subhymenium: hyaline to olive brown or brown, 15.0-50.0 μm high;

Hypothecium brown or blackish brown, 40.0-130.0 μm high; Paraphyses: simple, not swollen, 30.5-40.5 μm high; Asci: clavate, 10.0-23.0 μm high; **Ascospores:** (4-) 6- (-)8 per ascus, hyaline, ellipsoid, wall equally thickened, but a few spores with a minor thickening at the ends, simple with halonate (halo 1.0-3.0 μm), but a few spores with a slight thickening at the ends, (10.3)13.1-15.5-19.4(23.6) \times (6.3)7.9-8.7-10.3(13.4) μm ; **Pycnidia** and **Conidia** not observed.

Chemistry: Atranorin, anthraquinone and many unknown xantholepinones.

Habitat: predominantly corticolous.

Distribution: Tasmania, Southern South America, Thailand, Philippines, and New Zealand.

Key to Species of Malmidea

- 1a. Excipulum lacking a medullary layer; *piperis*-type exciple.....2
- 1b. Excipulum with medulary layer throughout or in papillae; *granifera*-type exciple3
- 2a. Disc dark brown, hypothecium brown *Malmidea microspora*
- 2b. Disc brown-grey, hypothecium hyaline*Malmidea perplexa*
- 3a. Hypothecium brown.....4
- 3b. Hypothecium blackish brown.....5
- 4a. Disc dark brown, medulla of thallus white; K+ yellowish.....
..... *Malmidea bakeri*

- 4b. Disc brown, medulla of thallus cream; K+ dark orange.....
 *Malmidea eeuuae*
- 5a. Medulla of thallus and verrucae whitish or orange yellow.....6
- 5b. Medulla of thallus white.....7
- 6a. Medulla of thallus and verrucae whitish; K+ orange.....
 *Malmidea coralliformis*
- 6b. Medulla of thallus and verrucae orange yellow; K+ orange red.....
 *Malmidea piaae*
- 7a. Disc chocolate brown..... *Malmidea* PL.1
- 7b. Disc bay-coloured..... *Malmidea duplomarginata*

Description of the Species

1. *Malmidea bakeri* (Vain.) Kalb, Rivas Plata & Lumbsch

Lecidea bakeri Vain., Ann. Acad. Sci. Fenn. Ser. A, 15: 128 (1921).

(see Figure 45)

Thallus: corticolous, grey, verrucose, continuous, 100.0-180.0 µm thick; epruina; Soralia and Isidia absent; Verrucae: indistinct, 0.2-0.2 mm high and 0.2-0.2 mm wide; Prothallus not visible; Photobiont chlorococcoid; Medulla of thallus white; **Apothecia**: scattered and entire, sessile, rounded to flexuose; disc plane to slightly convex, dark brown and slightly prominent, white to cream at margin; epruina, 0.5-1.0 mm diam.; with biatorine (proper exciple), margin of *granifera*-type, first entire, becoming granular with age, thick, slightly prominent, whitish grey, darker towards the disk; Excipulum

hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 90-150 μm broad, incrustated with yellowish hydrophobic granules, nubilous but dissolving in KOH with K+ lemon yellow to greenish yellow reaction; Parathecium: indistinct; Epihymenium: brown, 4.5-7.0 μm thick; Hymenium: hyaline, 80.0-110.0 μm high; Subhymenium: hyaline to olive brown, 15.0 μm high; Hypothecium brown, 100.0-130.0 μm high; Paraphyses: simple, not swollen, 30.9-35.5 μm high; Asci: clavate, 18.0-23.0 μm high; **Ascospores**: (6-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, but a few spores with a minor thickening at the ends, simple with halonate (halo 1.0-1.5 μm), (11.1)11.3-13.5-15.4(15.6) \times (5.9)6.0-6.5-7.0(9.2) μm .; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K+ yellow, C-, KC-; containing atranorin and unknown xantholepinones.

Habitats: on barks in mixed deciduous forests and lower montane rain forests at 397-787 meter from sea level.

Distribution: Thailand, and Philippines.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Huai Nam San, on trunk of an unidentified tree, 11 November 2008, Varaporn Sriprang—RU010538(RAMK); *ibid.*, Nam Chan Forest Ranger Station, on trunk of an unidentified tree, 28 July 2009, Chutamat Phraphuchamnong—CP768, CP0091, CP0094 & CP0099(RAMK); *ibid.*, Phuluang Wildlife Research Station, on trunk of an unidentified tree, 12 November 2008, Varaporn Sriprang—VC0142, VC0143, VC0144, VC045 & VC046(RAMK).

Observation: *Malmidea bakeri* is close to *M. subaurigera*, but that

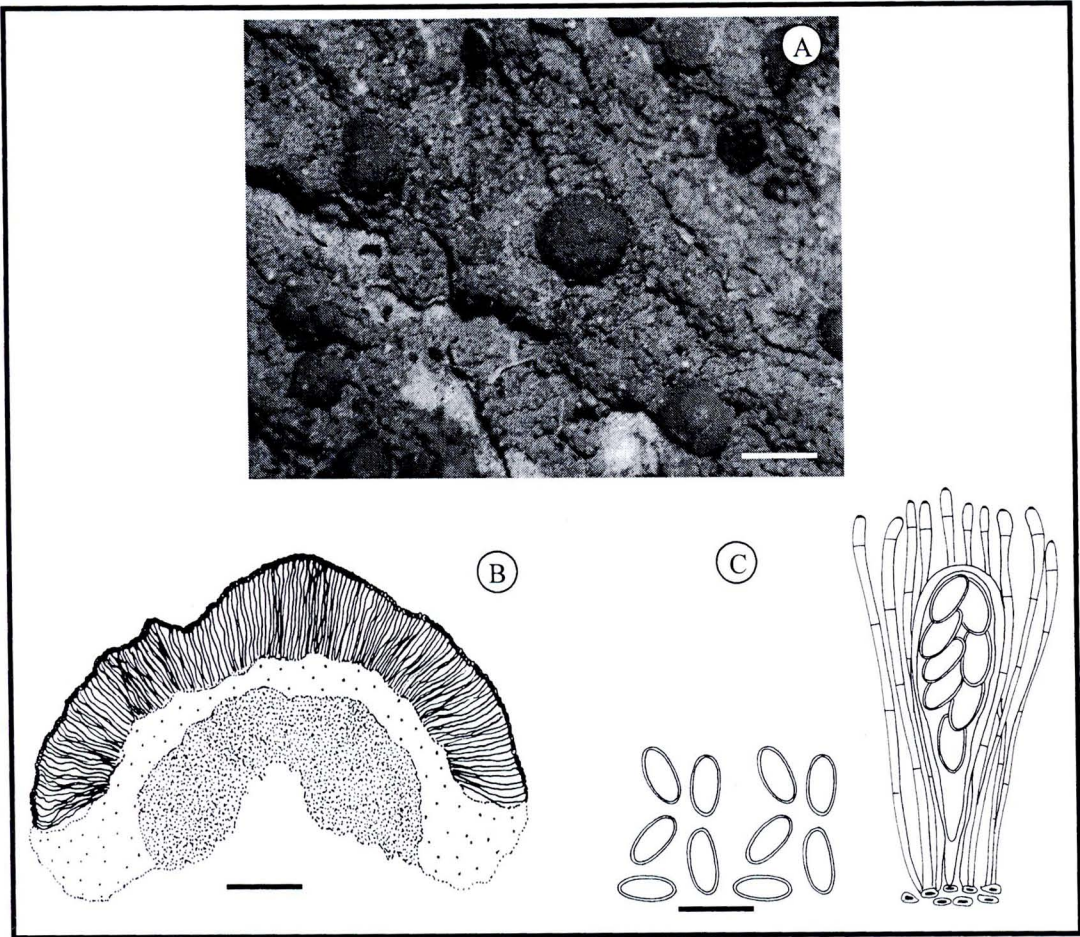


Figure 45 *Malmidea bakeri* (Vain.) Kalb, Rivas Plata & Lumbsch

Note. A = Apothecia biatorine, sessile, dark brown, margin of *granifera*-type

[RU010538(RAMK)] (scale = 1 mm)

B = Illustration of vertical section of apothecia [RU010538(RAMK)]

(scale = 13.15 μm).

C = Illustration of ascus with paraphyses and ascospores

[RU010538(RAMK)] (scale = 5.77 μm)

species has larger ascospores (17-21 x 9-13 μm) and an orange-yellow medulla.

2. *Malmidea coralliformis* Kalb (inpress)

(see Figure 46)

Thallus: corticolous, green-grey, densely verrucose, continuous, 50.0-75.0 μm thick; epruina; Soralia and Isidia absent; Verrucae: whitish, 0.2-0.3 mm high and 0.1-0.3 mm wide; Prothallus not visible; Photobiont chlorococcoid; Medulla of thallus white; **Apothecia**: scattered and entire, sessile, rounded; disc plane to slightly convex, chocolate brown, to dark grey-brown and slightly prominent, whitish grey at margin; epruina, 0.7-1.1 mm diam.; with biatorine (proper exciple), margin of *granifera*-type, entire, first 0.1 mm broad and slightly prominent, later thin, 50 μm thick, and the same high as the disk, whitish, to whitish grey; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 50-70 μm broad, incrustated with grayish hydrophobic granules, nubilous but partly dissolving in KOH with K⁺ greenish yellow reaction; Parathecium: indistinct; Epihymenium: brown, 5.0-7.0 μm thick; Hymenium: hyaline, 75.0-100.0 μm high; Subhymenium: brown, 15.0 μm high; Hypothecium blackish brown, 50.0-70.0 μm high; Paraphyses: simple, not swollen, 32.9-35.5 μm high; Asci: clavate, 13.0-15.0 μm high; **Ascospores**: (6-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, simple with halonate (halo 1.0 μm), (10.2)10.3-12.8-15.4(16.3) \times (7.3)7.4-8.9-10.5(10.7) μm ; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P⁻, K⁺ orange, C⁻, KC⁻; containing atranorin.

Habitats: on barks in mixed deciduous forests, lower montane scrub

and lower montane rainforests at 569-1,501 meter from sea level.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Phuluang Wildlife Research Station, on trunk of an unidentified tree, 12 November 2008, Varaporn Sriprang—VC999, VC988, VC820, VC00601, VC00602, CP008-1, CP008-2, CP00071, CP0089-1, CP0777 & CP0778 (RAMK); *ibid.*, Huai Lat, on trunk of an unidentified tree, 30 July 2009, Varaporn Sriprang—VC916, VC957, VC959, VC0080, VC0081, VC945, VC946, VC947, VC948 & VC949(RAMK); *ibid.*, Phu Ho Forest Station, on trunk of an unidentified tree, 29 July 2009, Mattika Sodamuk and Chutamat Phraphuchamnong—CP0009 & CP00091(RAMK).

Observation: *Malmidea coralliformis* is very similar to *M. aurigera*, but that species contains atranorin and has smaller ascospores (10-13 x 6-8 μ m).

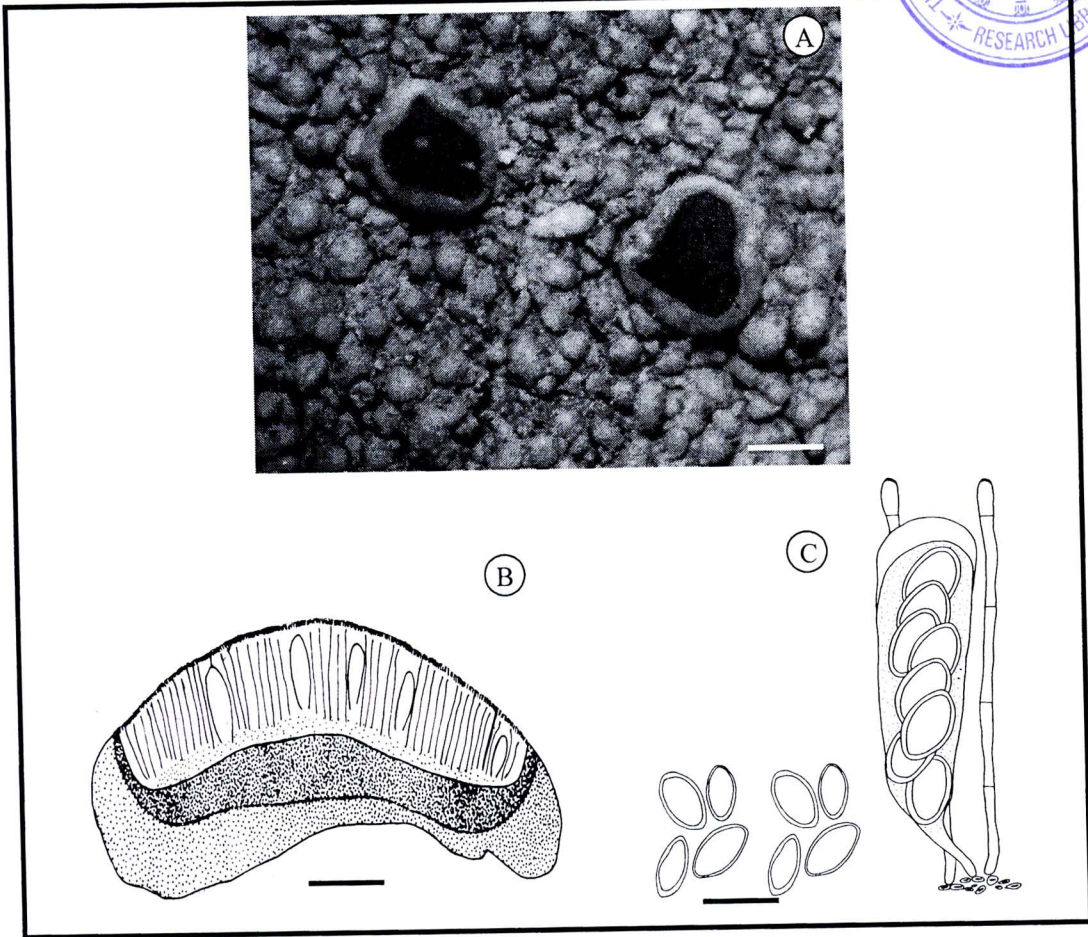


Figure 46 *Malmidea coralliformis* Kalb (inpress)

Note. A = Apothecia biatorine, sessile, dark grey-brown, margin of *granifera*-type [VC820(RAMK)] (scale = 0.73 mm)

B = Illustration of vertical section of apothecia [VC820(RAMK)]
(scale = 11.76 μm)

C = Illustration of ascus with paraphyses and ascospores
[VC820(RAMK)] (scale = 4.66 μm)

3. *Malmidea duplomarginata* (Papong & Kalb) Kalb & Papong

Malcolmiella duplomarginata Papong & Kalb, *Mycotaxon* 110: 116 (2009).

(see Figure 47)

Thallus: corticolous, green-grey, densely verrucose, continuous, 50.0-70.0 µm thick; epruina; Soralia and Isidia absent; Verrucae: whitish, 0.1-0.4 mm high and 0.1-0.3 mm wide; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus white; **Apothecia**: scattered and entire, sessile, rounded; disc plane to slightly convex, bay-colored and slightly prominent, whitish grey at margin; epruina, 0.7-1.5 mm diam.; with biatorine (proper exciple), margin of *granifera*-type, slightly prominent, white to cream colored; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 70-95 µm broad, incrustated with whitish to creamy hydrophobic granules, nubilous but partly dissolving in KOH with K⁺ yellow reaction; Parathecium: indistinct; Epihymenium: brown, 5.0-7.0 µm thick; Hymenium: hyaline, 100.0-120.0 µm high; Subhymenium: brown, 25.0 µm high; Hypothecium blackish brown, 40.0-65.0 µm high; Paraphyses: simple, not swollen, 32.5-37.5 µm high; Asci: clavate, 18.0-22.0 µm high; **Ascospores**: (4-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, simple with halonate (halo 2.0-3.0 µm), (18.7)18.9-20.4-22.3(23.7) × (11.0)11.2-13.2-15.0(15.2) µm; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K⁺ orange, C-, KC-; containing atranorin.

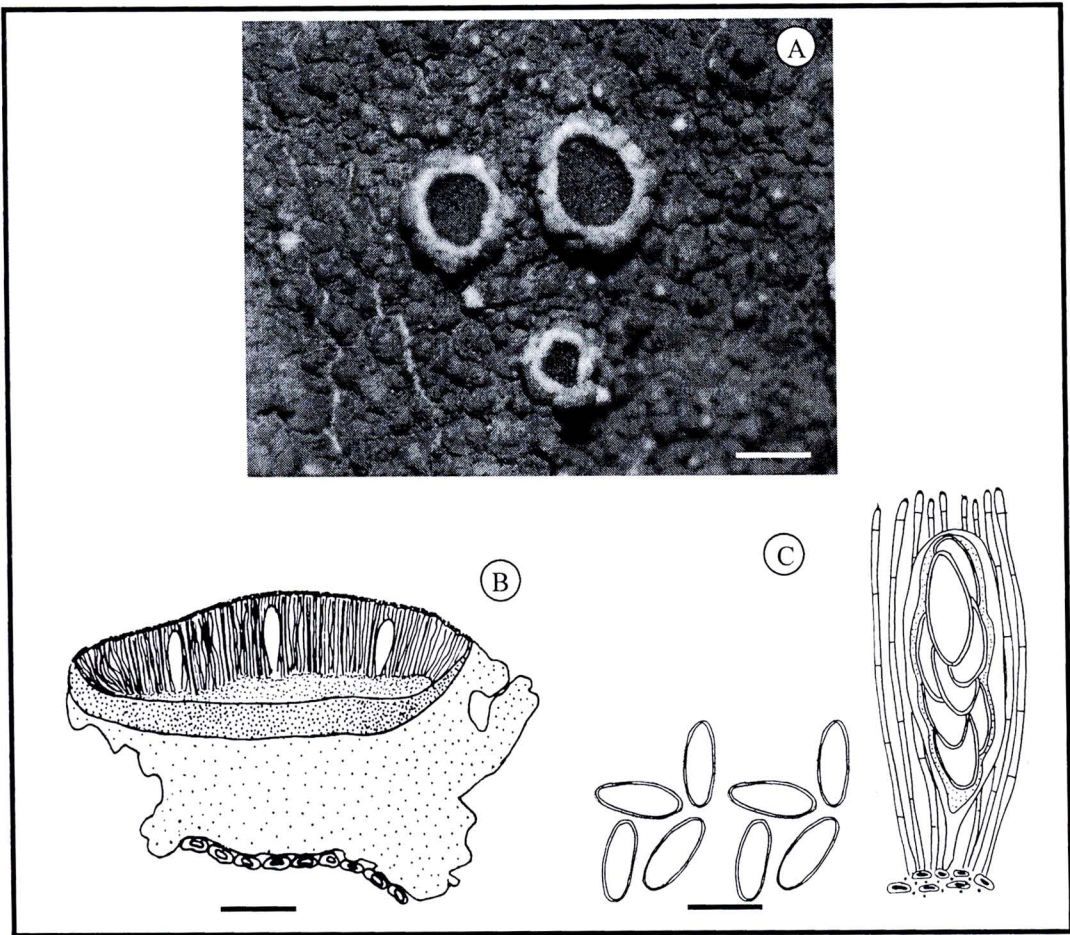


Figure 47 *Malmidea duplomarginata* (Papong & Kalb) Kalb & Papong

Note. A = Apothecia biatorine, sessile, brown, margin of *granifera*-type [CP765 (RAMK)] (scale = 1 mm).

B = Illustration of vertical section of apothecia [CP765 (RAMK)] (scale = 20.9 μm).

C = Illustration of ascus with paraphyses and ascospores [CP765 (RAMK)] (scale = 8.55 μm).

Habitats: on barks in mixed deciduous forests at 397 meter from sea level.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province.
 Nam Chan Forest Ranger Station, on trunk of an unidentified tree, 28 July
 2009, Chutamat Phraphuchamnong—CP765(RAMK).

4. *Malmidea eeuuae* Kalb (inpress)

(see Figure 48)

Thallus: corticolous, green-grey, densely verrucose, continuous,
 150.0-180.0 μm thick; epruina; Soralia and Isidia absent; Verrucae: indistinct,
 0.1-0.15 mm high and 0.1-0.25 mm wide; Prothallus whitish; Photobiont
 chlorococcoid; Medulla of thallus cream; **Apothecia**: scattered and entire,
 sessile, rounded to flexuose; disc plane to slightly convex, leather brown to
 tawny and prominent, whitish grey at margin; epruina, 0.2-0.5 mm diam.;
 with biatorine (proper exciple), margin of *granifera*-type, first entire and
 prominent, later recurved and becoming warty, thin, whitish to cream-colored;
 Excipulum hyaline at periphery, internally with medullary layer composed of
 loosely arranged periclinal hyphae with constricted septa 30-50 μm broad,
 incrustated with yellowish to ochraceous-yellow hydrophobic granules,
 nubilous but dissolving in KOH with K⁺ yellowish to greenish reaction;
 Parathecium: indistinct; Epihymenium: brown, 4.5-7.5 μm thick; Hymenium:
 hyaline, 100.0-120.0 μm high; Subhymenium: chocolate brown to olive
 brown, 50.0 μm high; Hypothecium brown, 50.0-75.0 μm high; Paraphyses:
 simple, not swollen, 32.7-37.5 μm high; Asci: clavate, 16.0-20.0 μm high;
Ascospores: 4-6 (-8) per ascus, hyaline, ellipsoid, wall equally thickened,

simple with halonate (halo 1.0-1.5 μm), but a few spores with a slight thickening at the ends, (14.1)15.0-16.0-17.8(20.0) \times (9.46)9.7-10.4-11.18(11.2) μm ; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K+ orange, C-, KC-; containing atranorin.

Habitats: on barks in mixed deciduous forests, lower montane rain forests and lower montane scrub between 787 and 1,501 m.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Huai Nam San, on trunk of an unidentified tree, 11 November 2008, Varaporn Sriprang—VC698(RAMK); *ibid.*, Khok Huai Toei, on trunk of an unidentified tree, 27 June 2008, Varaporn Sriprang—RU010533(RAMK); *ibid.*, Huai Lat, on trunk of an unidentified tree, 30 July 2009, Varaporn Sriprang—VC917(RAMK); *ibid.*, Phu Ho Forest Station, on trunk of an unidentified tree, 29 July 2009, Varaporn Sriprang —VC708, VC709, VC710, VC716, VC702, VC736, VC498, VC175, VC176, VC177, VC178, CP0015, CP0016, CP0017, CP0018, CP0019, CP550-1, CP550-2, CP555, CP009-5, VC0777, VC0778, VC0779, VC0800, CP990 & CP991-1(RAMK).

Observation: *Malmidea eeuuae* is similar to *M. coralliformis*, but differs by having larger ascospores (10.2)10.3-12.8-16.3(15.4) \times (7.3)7.4-8.9-10.5(10.5) μm in *M. coralliformis*.

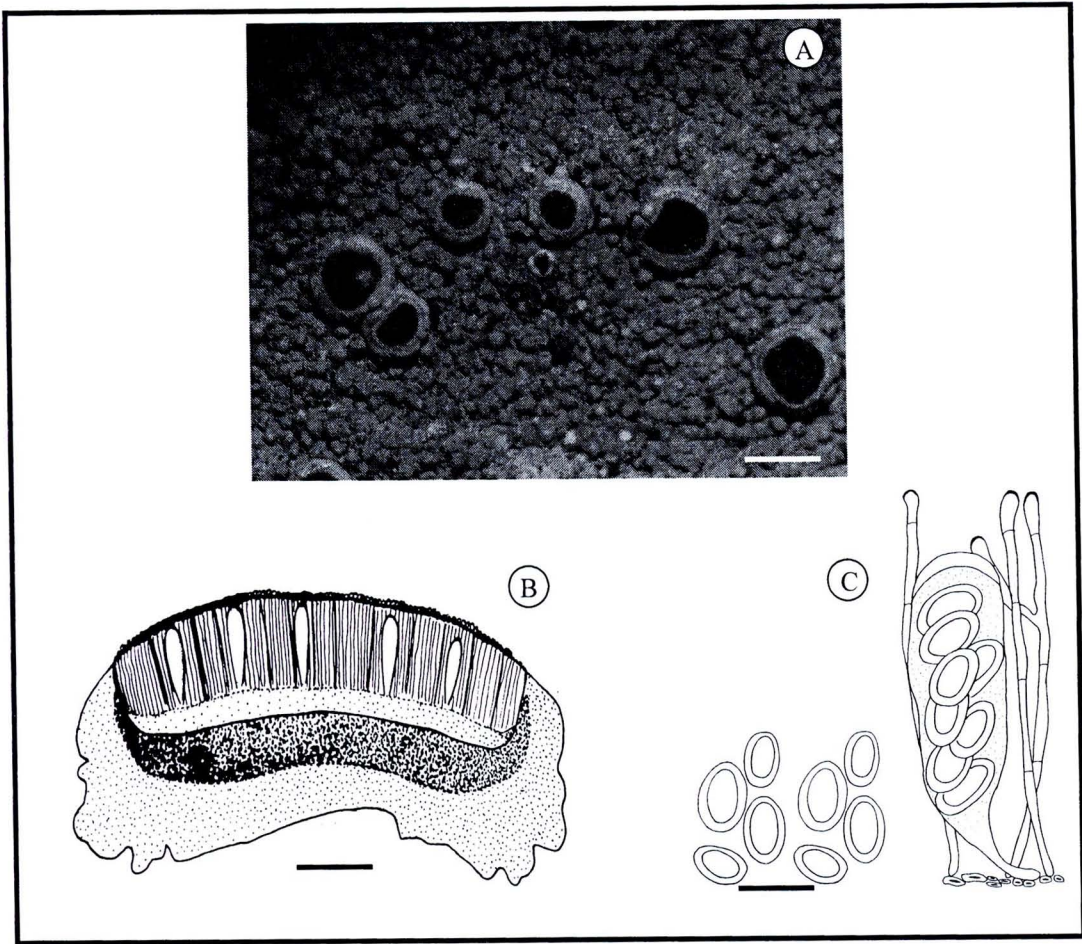


Figure 48 *Malmidea eeuuae* Kalb (inpress)

Note. A = Apothecia biatorine, sessile, brown, margin of *granifera*-type

[VC716(RAMK)] (scale = 0.62 mm)

B = Illustration of vertical section of apothecia [VC716(RAMK)]

(scale = 9.73 μ m)

C = Illustration of ascus with paraphyses and ascospores

[VC716(RAMK)] (scale = 5.23 μ m)

5. *Malmidea microspora* (ined.)

(see Figure 49)

Thallus: corticolous, grey, densely verrucose, continuous, 100.0-200.0 μm thick; epruina; Soralia and Isidia absent; Verrucae: indistinct, 0.2-0.2 mm high and 0.2-0.2 mm wide; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus white; **Apothecia**: scattered and entire, sessile, rounded to flexuose; disc plane to slightly convex, dark brown and slightly prominent, whitish grey at margin; epruina, 0.5-1.0 mm diam.; with biatorine (proper exciple), margin of *piperis*-type, first entire, becoming granular with age, thick, slightly prominent, whitish grey, darker towards the disk; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 90-110 μm broad, incrustated with yellowish hydrophobic granules, nubilous but dissolving in KOH with K+ lemon yellow to greenish yellow reaction; Parathecium: indistinct; Epihymenium: brown, 4.5-7.5 μm thick; Hymenium: hyaline, 80.0-110.0 μm high; Subhymenium: hyaline to olive brown, 15.0 μm high; Hypothecium brown, 100.0-130.0 μm high; Paraphyses: simple, not swollen, 32.9-38.5 μm high; Asci: clavate, 18.0-23.0 μm high; **Ascospores**: (6-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, but a few spores with a minor thickening at the ends, simple with halonate (halo 1.0-1.5 μm), (11.3)11.2-13.2-15.5(15.6) \times (5.7)6.0-7.5-6.0(9.5) μm .; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K-, C-, KC-; No lichen substance.

Habitats: on barks in lower montane scrub forests at 1,501 meter from

sea level.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province.

Huai Lat, on trunk of an unidentified tree, 30 July 2009, Varaporn Sriprang—VC915(RAMK).

Observation: *Malmidea microspora* is close to *M. subaurigera*, but that species has larger ascospores (17-21 x 9-13 µm) and an orange-yellow medulla.

6. *Malmidea perplexa* Kalb (inpress)

(see Figure 50)

Thallus: corticolous, green-grey, smooth, continuous, 100.0-220.0 µm thick; epruina; Soralia and Isidia absent; Verrucae: absent, absent; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus white; **Apothecia:** scattered and entire, sessile, rounded; disc plane to slightly convex, brown-grey to sooty and prominent, whitish grey at margin; epruina, 0.4-0.7 mm diam.; with biatorine (proper exciple), margin of *piperis*-type, thin, 20 µm thick, thick, slightly prominent, whitish grey to dark brownish grey; Excipulum hyaline, internally without medullary layer 30-70 µm, without hydrophobic granules; Parathecium: indistinct; Epihymenium: brown, 4.5-7.5 µm thick; Hymenium: hyaline, 75.0-120.0 µm high; Subhymenium: light brown, 20.0 µm high; Hypothecium hyaline, 30.0-75.0 µm high; Paraphyses: simple, not swollen, 30.5-39.5 µm high; Asci: clavate, 10.0-15.0 µm high;

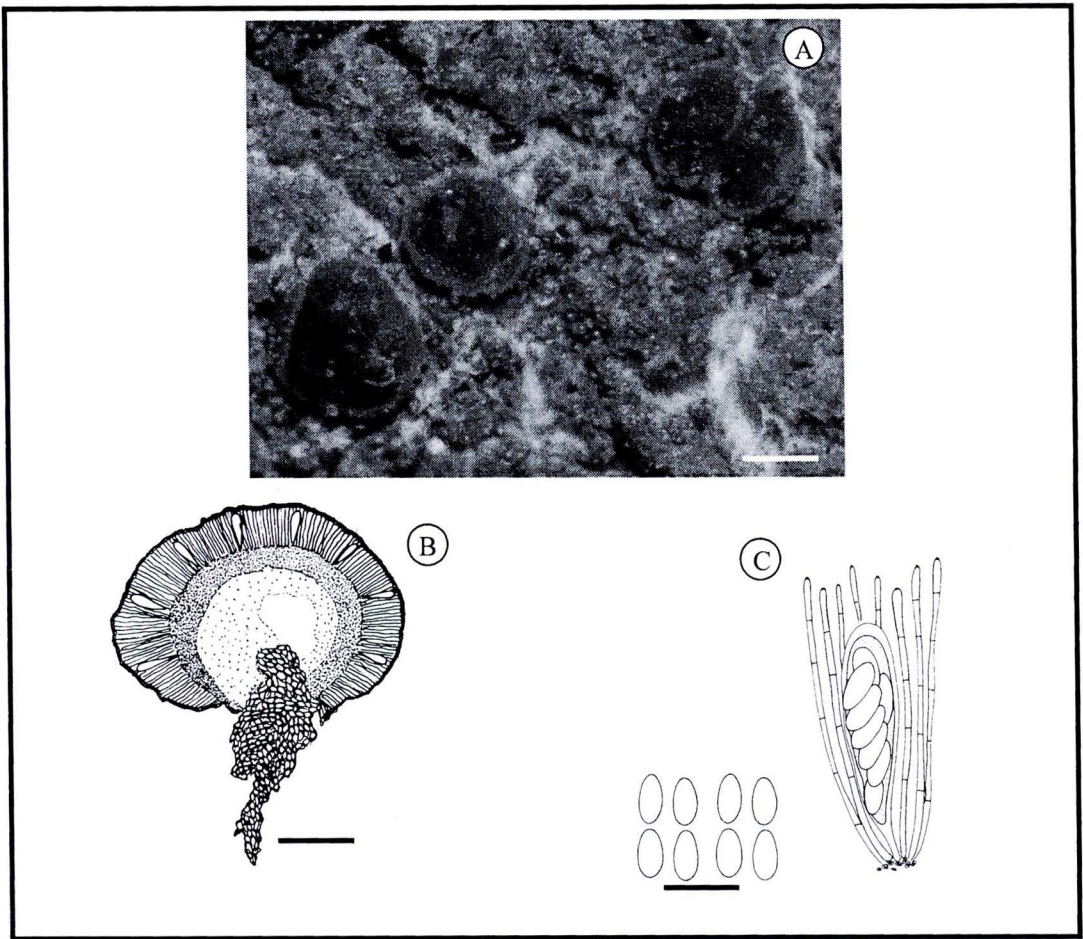


Figure 49 *Malmidea microspora* (ined.)

Note. A = Apothecia biatorine, sessile, dark brown, margin of *piperis*-type

[VC915(RAMK)] (scale = 0.83 mm)

B = Illustration of vertical section of apothecia [VC915(RAMK)]

(scale = 17.1 μ m)

C = Illustration of ascus with paraphyses and ascospores

[VC915(RAMK)] (scale = 5.03 μ m)

Ascospores: (6-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, simple with halonate (halo 0.5 μ m), (8.8)9.4-11.6-14.3(15.4) \times (4.6)5.1-6.02-7.4(8.6) μ m; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K-, C-, KC-; No lichen substance.

Habitats: on barks in lower montane scrub at 1,468 meter from sea level.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Khok Nok Kraba Forest Ranger Station, on trunk of an unidentified tree, 13 November 2008, Varaporn Sriprang—VC0065-1, VC0066, VC746, VC810, VC902 & VC906(RAMK).

Observation: *Malmidea perplexa* is similar to *M. leptoloma*, but this species has darker discs with often blackish margins and usually a rugulose thallus.

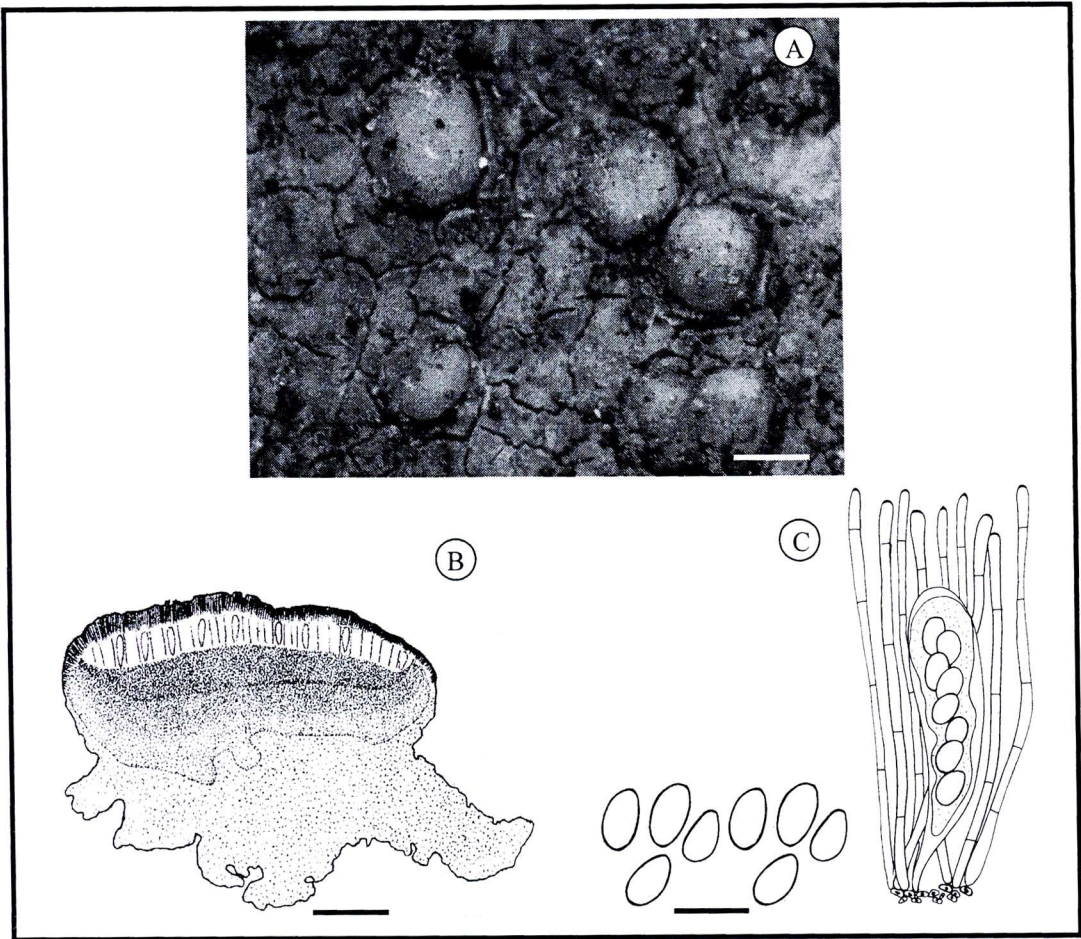


Figure 50 *Malmidea perplexa* Kalb (inpress)

Note. A = Apothecia biatorine, sessile, brown-grey, margin of *piperis*-type
[VC810(RAMK)] (scale = 0.7 mm)

B = Illustration of vertical section of apothecia [VC810(RAMK)]
(scale = 11.89 μm)

C = Illustration of ascus with paraphyses and ascospores
[VC810(RAMK)] (scale = 8.41 μm)

7. *Malmidea piae* (Kalb) Kalb (inpress)

Malcolmiella piae Kalb, *Mycotaxon* 110: 117(2009)

(see Figure 51)

Thallus: corticolous, green-grey, verrucose, continuous, 15.0-20.0 µm thick; epruina; Soralia and Isidia absent; Verrucae: orange yellow, burst open and release soredia-like granules, 0.1-0.1 mm high and 0.1-0.2 mm wide; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus orange yellow; **Apothecia**: scattered and entire, sessile, rounded to flexuose; disc plane to slightly convex, dark brown to blackish and slightly prominent, whitish grey at margin; epruina, 0.7-1.0 mm diam.; with biatorine (proper exciple), margin of *granifera*-type, first entire, becoming granular with age and almost partly or entirely disappearing, whitish to cream-colored; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 110-130 µm broad, incrustated with grayish to ochraceous-yellow hydrophobic granules, nubilous only partly dissolving in KOH with K⁺ orange yellowish to greenish lemon yellow reaction; Parathecium: indistinct; Epihymenium: brown, 4.5-7.5 µm thick; Hymenium: hyaline, 130.0-150.0 µm high; Subhymenium: brown, 20.0 µm high; Hypothecium brown, 100.0-120.0 µm high; Paraphyses: simple, not swollen, 30.5-39.5 µm high; Asci: clavate, 15.0-20.0 µm high; **Ascospores**: (4-) 6-(-)8 per ascus, hyaline, ellipsoid, wall equally thickened, simple with halonate halo 1.0-2.0 µm, (12.8)12.9-16.5-20.5(21.7) × (7.4)7.7-9.9-12.5(12.9) µm; **Pycnidia** and **Conidia** not observed.

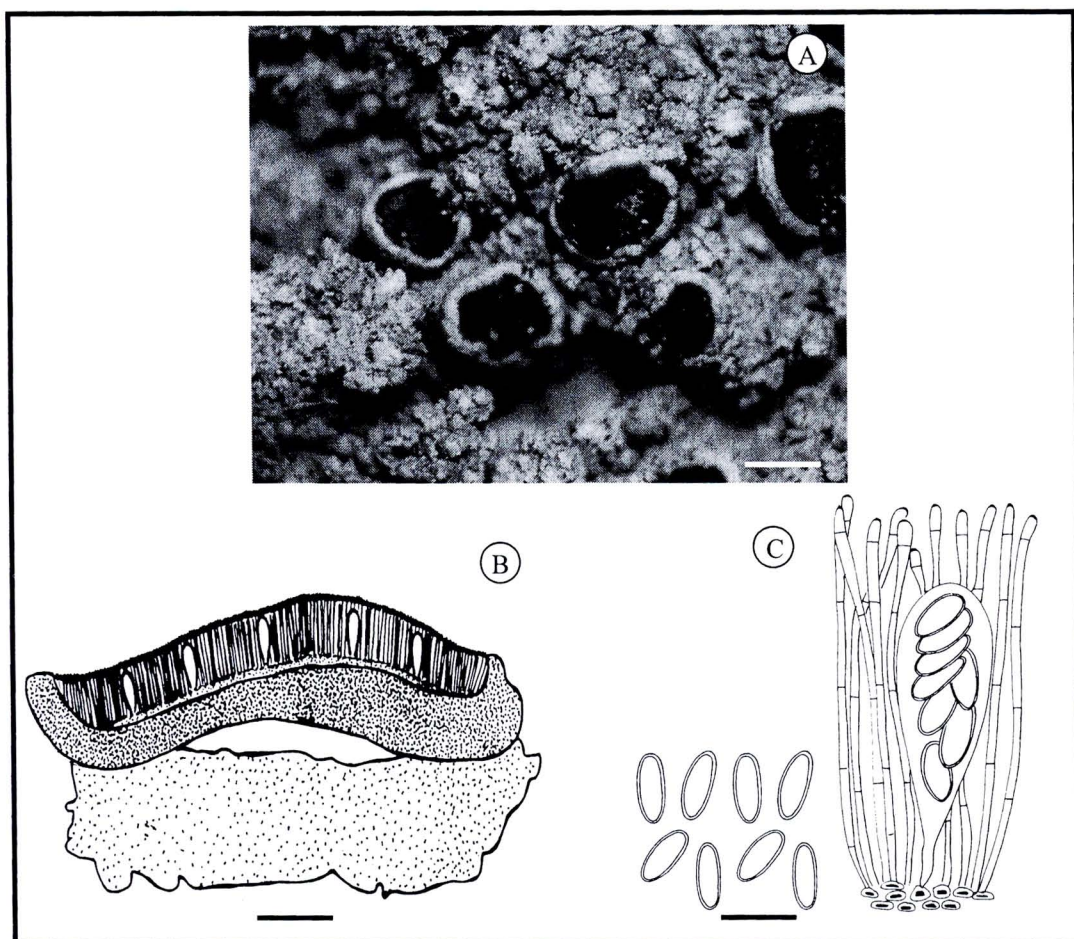


Figure 51 *Malmidea piae* (Kalb) Kalb (inpress)

Note. A = Apothecia biatorine, sessile, dark brown, margin of *granifera*-type [MSPL256(RAMK)] (scale = 1 mm)

B = Illustration of vertical section of apothecia [MSPL256(RAMK)] (scale = 20.32 μm)

C = Illustration of ascus with paraphyses and ascospores [MSPL256(RAMK)] (scale = 6.32 μm)

Chemistry: thallus P-, K+ orange, C-, KC-; containing atranorin and xantholepinones.

Habitats: On barks in a dry evergreen forests at 360 meter from sea

level.

Distribution: Thailand, and Australia.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Pak Dang Forest Ranger Station, on trunk of an unidentified tree, 22 May 2009, Sanya Meesim and Kawinnat Buaruang—MSPL256(RAMK).

Observation: *Malmidea piae* is similar to *M. granifera*, but the latter has a considerable different chemistry.

8. *Malmidea* PL.1

(see Figure 52)

Thallus: corticolous, green-grey, densely verrucose, continuous, 50.0-70.0 μm thick; epruina; Soralia and Isidia absent; Verrucae: whitish, often several confluent and sometimes ramificated, dull to slightly shiny, 0.2-0.3 mm high and 0.1-0.3 mm wide; Prothallus whitish; Photobiont chlorococcoid; Medulla of thallus whitish; **Apothecia**: scattered and entire, sessile, rounded; disc plane to slightly convex, chocolate brown, to dark grey-brown and slightly prominent, whitish grey at margin; epruina, 0.7-1.1 mm diam.; with biatorine (proper exciple), margin of *granifera*-type, entire, first 0.1 mm broad and slightly prominent, later thin, 50 μm thick, and the same high as the disk, whitish, to whitish grey; Excipulum hyaline at periphery, internally with medullary layer composed of loosely arranged periclinal hyphae with constricted septa 50-70 μm broad, incrustated with grayish hydrophobic granules, nubilous but partly dissolving in KOH with K^+

greenish yellow reaction; Parathecium: indistinct; Epihymenium: brown, 4.5-7.0 μm thick; Hymenium: hyaline, 75.0-100.0 μm high; Subhymenium: brown, 15.0 μm high; Hypothecium blackish brown, 50.0-70.0 μm high; Paraphyses: simple, not swollen, 30.9-40.5 μm high; Asci: clavate, 13.0-15.0 μm high; **Ascospores**: (6-) 8 per ascus, hyaline, ellipsoid, wall equally thickened, simple with halonate (halo 1.0 μm), (10.2)10.3-12.8-16.3(17.4) \times (12.1)12.9-13.7-15.3(16.4) μm ; **Pycnidia** and **Conidia** not observed.

Chemistry: thallus P-, K+ orange, C-, KC-; containing unknown xantholepinones.

Habitats: on bark in tropical rainforests at 787 meter from sea level.

Distribution: Thailand.

Specimens examined: Phu Luang Wildlife Sanctuary, Loei Province. Huai Nam San, on trunk of an unidentified tree, 11 November 2008, Varaporn Sriprang—VC697(RAMK).

Observation: the new species is Similar to *Malmidea microspora*, but this species has smaller ascospores, a *piperis*-type exciple and a darker disc of the apothecium.

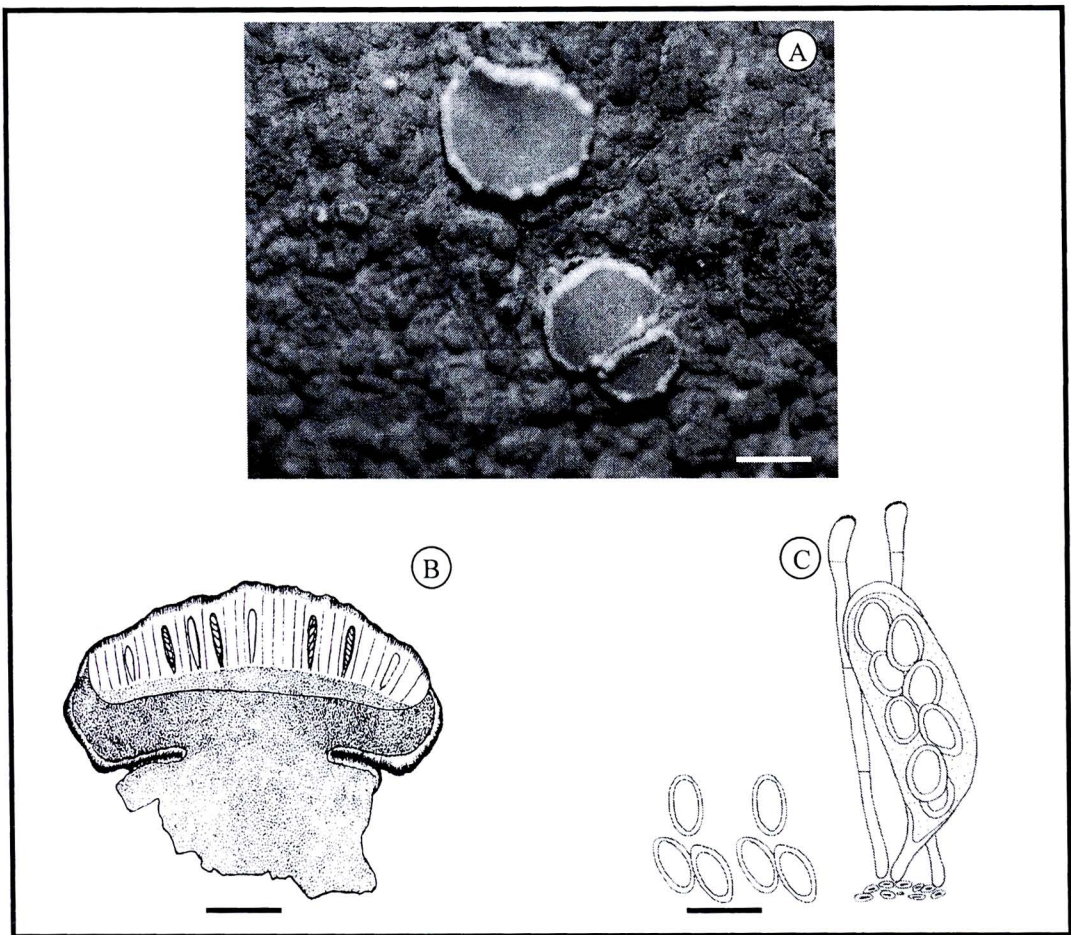


Figure 52 *Malmidea* PL.1 nov.

Note. A = Apothecia biatorine, sessile, grey-brown, margin of *granifera*-type
[VC697(RAMK)] (scale = 0.68 mm)

B = Illustration of vertical section of apothecia [VC697(RAMK)]
(scale = 12.08 μ m)

C = Illustration of ascus with paraphyses and ascospores
[VC697(RAMK)] (scale = 6.07 μ m)