

Five new species of the lichen genus *Graphis* (Lichenized Ascomycota; Graphidaceae) from the Mariana Islands, Micronesia

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Abstract Five species of the lichen genus *Graphis* are described as new from the Mariana Islands, Micronesia: *G. albocolpata* Nakanishi et H. Harada sp. nov., *G. dicarpoides* Nakanishi et H. Harada sp. nov., *G. fissurata* Nakanishi et H. Harada sp. nov., *G. pandanicola* Nakanishi et H. Harada sp. nov., and *G. saipanensis* Nakanishi et H. Harada sp. nov.

Key words: lichens, lichenized Ascomycota, Graphidaceae, *Graphis*, Mariana Islands, Micronesia, taxonomy, flora.

In 1992, a biological expedition to the northern Mariana Islands was conducted by the Natural History Museum and Institute, Chiba, in cooperation with the Department of Natural Resources, the Commonwealth of the Northern Mariana Islands, and with the Marine Laboratory of Guam University (Asakura *et al.*, 1994). About 900 lichen specimens have been collected during this expedition and a short stay in 1991 on Saipan Isl. and Guam Isl. Based on the collection, 171 taxa including 15 species of *Graphis* were preliminarily reported (Harada, 1994). Now the specimens of *Graphis* have been reexamined, and five new species were recognized. They are described as new in this paper.

Materials and Methods

Air-dried herbarium specimens were examined. They are deposited in the herbarium of the Natural History Museum and Institute, Chiba (CBM). For external morphology, air-dried material was observed with the naked eye or under a dissecting stereomicroscope. Sections of the thalli and apothecia were made with a razor blade under the stereomicroscope, and mounted in GAW (glycerol: ethanol: water = 1:1:1) or in lactophenol cotton-blue (abbreviated as LPCB). The LPCB preparations were used for anatomical

descriptions and drawings, except for the color descriptions which were based on the GAW preparations. For the color tests, droplets of the K solution (c. 10% aqueous solution of KOH) were added to the GAW preparations of sections of thalli and apothecia.

Taxonomy

1. *Graphis albocolpata* Nakanishi et H. Harada sp. nov.

(Fig. 1)

Thallus crustaceus, epiphloeodes, uniformis, continuus, expansus, substrato bene adhaerens, tenuis, laevigatus vel ob substratum rugulosus, albus vel glauco-cinereus, opacus, KOH+ sanguineus, acidum norsticticum continens. Apothecia creberrima, lirellina, sessilia, simplicia, aniso-dichotomiter vel anisotrichotomiter ramosa, flexuosa vel curvata, partim fracta, 2–5.5 mm longa et 0.2–0.35 mm lata, apicibus rotundatis vel angustorotundatis, margin thallino crassiusculo, integro, albido, partim prominulo, superne excipulo nigro, nudo, opaco, laevi vel interdum longitudinaliter albido-striato, disco primum rimiformi et impressulo, dein paululo aperto, fusco-nigro, epruinoso. Excipulum dimidiatum, inferne deficiens, labiis erectis, integris, fuliginis, rectis vel leviter curvatis, in medio ca. 30

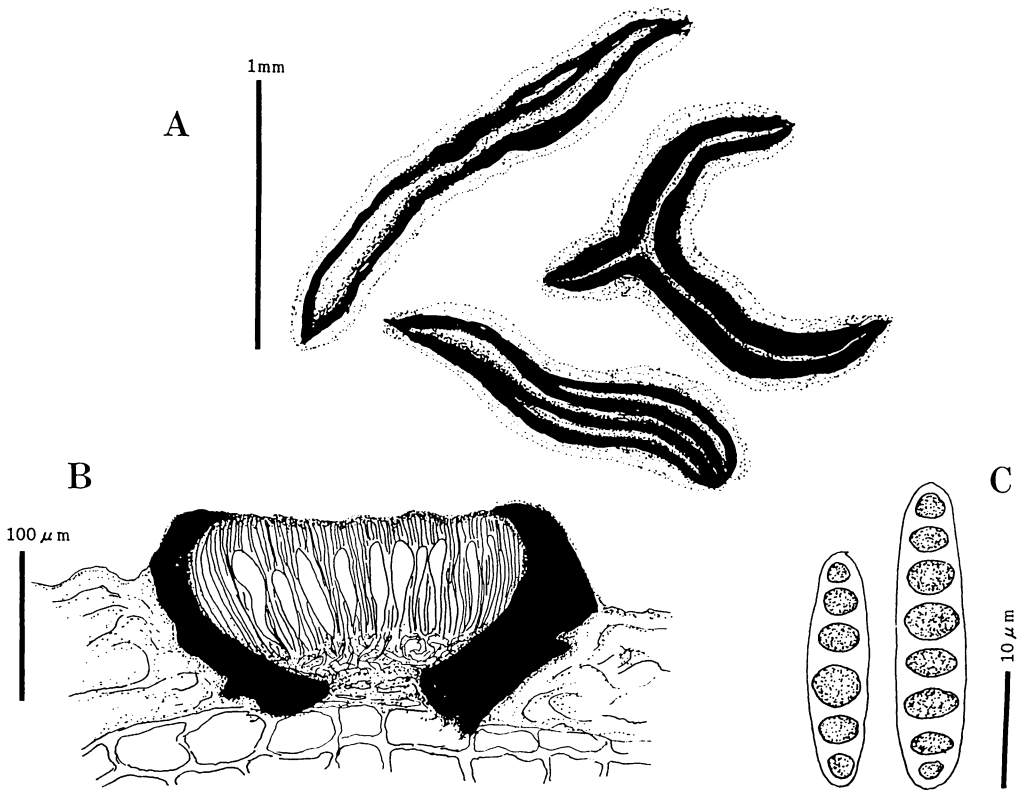


Fig. 1. *Graphis albocolpata* sp. nov. A, habit; B, cross section of apothecium; C, ascospores. (A-C, drawn from holotype. A, air-dried material; B-C, LPCB preparations).

μm latis, inferne planis, superne paululo incurvis vel leviter curvatis, extus a margin thallino pro 2/3 obductis. Hypothecium ca. 20 *μm* altum, subincolor vel dilute fuscescens. Hymenium in sectione transversali late ellipticum, ca. 200 *μm* altum, superne fusco-pulverulentum, ceterum subincolor. Paraphyses filiformes, simplices, densae, ad apicem modica clavatae et fulvescentes. Ascosporae oblongo-fusiformes, rectae, ad apicem rotundatae vel angustato-rotundatae, incolores, 6-8-loculares, 20-25 *μm* longae et 5-6 *μm* latae.

Typus. Micronesia, Saipan Isl., Mt. Takpochao, 400 m alt., on trunk of *Pandanus* sp., 17 May 1991, H. Harada 11786 (CBM-FL-5544—holotypus).

External Morphology. Thallus crustose, epiphloeodal, uniform, continuous, tightly attached to the substratum, thin, smooth to rugulose, white or ash-gray, opaque. Apothecia much crowded, lirelliform, sessile, unbranched, anisotomic dichotomously or ani-

sotomic trichotomously branched, flexuous or curved, partly broken, 2-5.5 mm long and 0.2-0.35 mm wide, rounded or narrowly rounded at apices; thalline margin moderately thick, entire, whitish, slightly elevated; exciple blackish, exposed, opaque, sometimes with longitudinal white stria; disc shaped like a cleft and sunken at first, then a little opened, brownish black, epruinose.

Anatomy. Exciple dimidiate, lacking at base; labia upright, entire above, dirty brown, straight or slightly curved, ca. 30 *μm* wide in the middle, flat below, slightly extended outwards at base, slightly incurved above, 2/3 covered by thalline margin. Hypothecium ca. 20 *μm* high, almost colorless to pale brownish. Hymenium in cross section broadly elliptic, ca. 200 *μm* high, slightly with brownish grains above, almost colorless in the remainder. Paraphyses filiform, unbranched, dense, moderately clavate and yellowish brown at apices. Ascospores oblong-fusiform, straight, rounded to narrowly rounded at apices,

colorless, 6–8-loculate, 20–25 μm long and 5–6 μm wide.

Chemistry. Thallus K+ reddish; norstictic acid.

Distribution. Known only by the type.

Habitat. On bark of *Pandanus* sp. in an open forest locally dominated by *Pandanus* trees at 400 m alt. near the top of Mt. Takpochao (439 m), the highest mountain of Saipan Isl., associated with two other new species of *Graphis*, *G. dicarpoides* Nakanishi et H. Harada and *G. pandanicola* Nakanishi et H. Harada.

Remarks. *Graphis albocolpata* Nakanishi et H. Harada is characterized by the following characters: (1) thallus smooth to rugulose, (2) containing norstictic acid; (3) apothecia often having an uneven stria on the surface of each labium (Fig. 1A), and with a slightly open disc; (4) exciple dimidiate (Fig. 1B); (5) ascospores colorless, 6–8-loculate, and 20–25 \times 5–6 μm (Fig. 1C).

This new species is similar to *G. guimaranana* Vain. (1921) from Ins. Guimaras in the Philippines. However, the latter species lacks longitudinal striae on apothecia and has rather large ascospores (28–47 \times 8 μm).

2. *Graphis dicarpoides* Nakanishi et H. Harada sp. nov.

(Fig. 2)

Thallus crustaceus, epiphloeodes, uniformis, continuus, sat expansus, substrato bene adhaerens, tenuis, laevigatus, ochrascenti-albidus, parum nitidus, KOH+ sanguineus, acidum norsticticum continens. *Apothecia* dispersa, elongato-lirellina, adpresso-sessilia, primum incolor, dein fuliginea, 2–10 mm longa, 0.2–0.3 mm lata, aniso-dichotomiter vel iso-dichotomiter ramosa, saepe curvata flexuosa vel undulata, apicibus vulgo angusto-acutatis, margin thallino crassiusculo, integro, cum thallo concolore excipulum cingenti, superne excipulo dilute ochraceo aut nigro, nudo, opaco, laevi, disco rimiformis, pallido vel fulvido, pruinoso. *Excipulum* integrum, pallidum, saepe fuliginium superne, ad basim planato-rotundatum, lutescens. *Labia* pallida erecta, superne dilatata, arcuatim convergentia, a margin thallino crassiusculo usque ad verticem obducta, ac labia fulginea superne nuda, superne subangustata, ad basim subdecolorantia,

a margin thallino pro 2/3 obducta. *Hypothecium* ca. 12 μm altus, subflavescens. *Hymenium* in sectione transversali semi-ellipticum, superne concavulum vel subplanum, ca. 120–180 μm latum et ca. 80 μm altus, superne fuscopulverulentum, ceterum incolor. *Paraphyses* filiformes, simplices, densae, ad apicem modica clavatae et fulvescentes. *Ascosporae* fusiformi-oblongae, rectae, ad apicem rotundatae, incolores, 6–8-loculares, 24–30 μm longae et 5–6 μm latae.

Typus. Micronesia, Mariana Islands, Saipan Isl., Mt. Takpochao, 400 m alt., on trunk of *Pandanus* sp., 17 May 1991, Harada 11789 (CBM-FL-5546—holotypus).

External Morphology. Thallus crustose, epiphloeodal, uniform, continuous, moderately expanded, tightly attached to substratum, thin, smooth, yellow-brownish white, \pm slightly glossy. Apothecia scattered, elongated lirelliform, appressed-sessile, colorless at first, becoming blackish brown, 2–10 mm long and 0.2–0.3 mm wide, anisotomic dichotomously or isotomic dichotomously branched, often flexuous to undulate, generally pointed at apices; thalline margin moderately thick, entire, concolorous with thallus, encircling exciple; exciple yellowish brown or blackish, exposed, opaque, smooth; disc shaped like a cleft, pale to somewhat tawny, pruinose.

Anatomy. Exciple entire, pale and then frequently becoming blackish brown, plane to rounded below; pale labia upright, expanded upward, archedly converging, covered by a thick thalline margin up to the top; blackish brown labia exposed and somewhat narrowed above, somewhat paler at base, 2/3 covered by a thalline margin. Hypothecium ca. 12 μm high, yellowish. Hymenium in cross section semi-elliptic, concave above to almost flat, 120–180 μm wide and ca. 80 μm high, with brownish grains above, colorless in the remainder. Paraphyses filiform, unbranched, dense, moderately clavate and yellowish brown at apices. Ascospores fusiform-oblong, straight, rounded at apices, colorless, 6–8-loculate, 24–30 μm long and 5–6 μm wide.

Chemistry. Thallus K+ reddish; norstictic acid.

Distribution. Known only by the type.

Habitat. On bark of *Pandanus* sp. See also

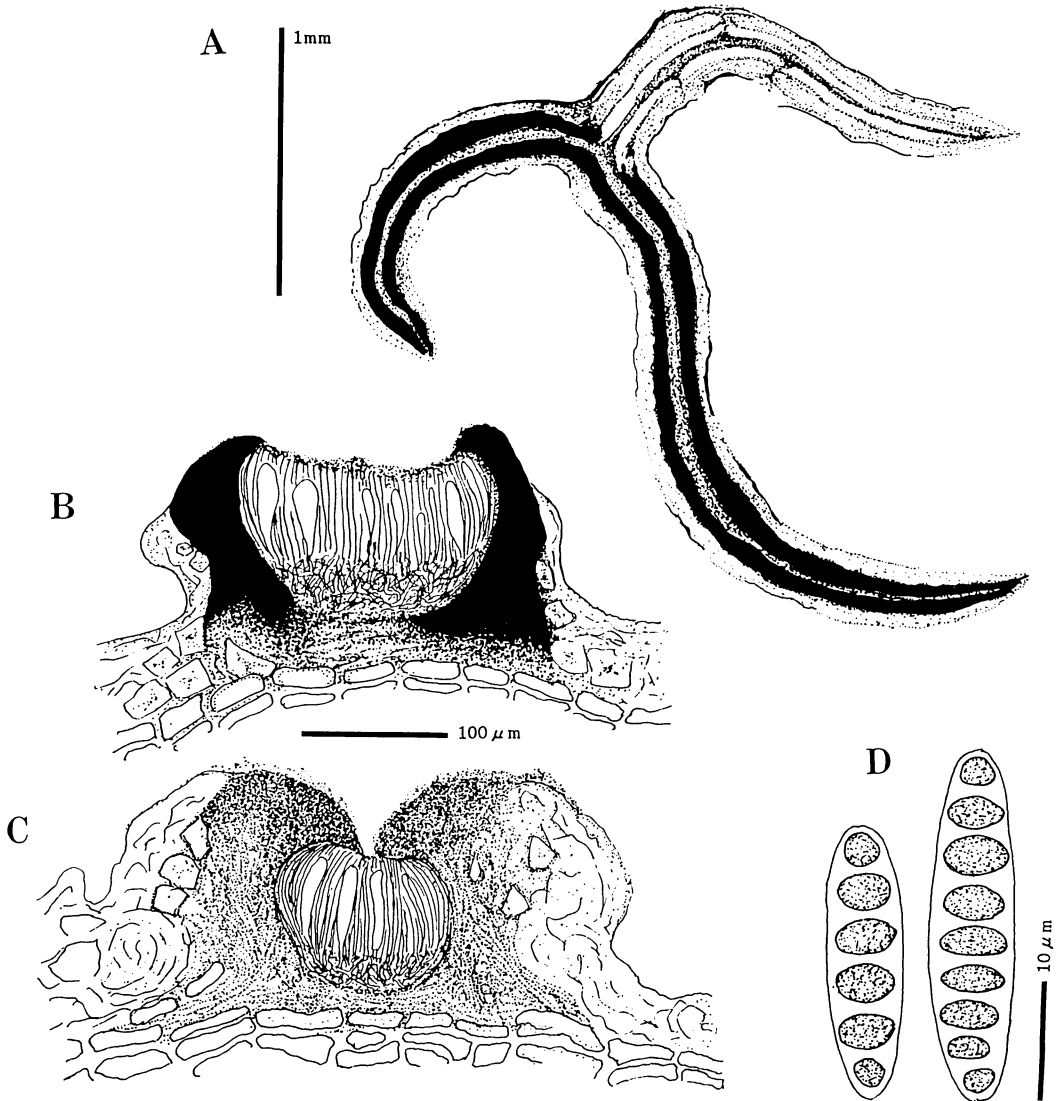


Fig. 2. *Graphis dicarpoides* sp. nov. A, habit; B-C, cross sections of apothecium; D, ascospores. (A-D, drawn from holotype. A, air-dried material; B-D, LPCB preparations).

under *Graphis albocolpata*.

Remarks. *Graphis dicarpoides* Nakanishi et H. Harada is very unique by having an exciple which is usually pale but occasionally dark externally. The exciple is pale over the entire length for most apothecia, and is pale in one part and dark in the other for some apothecia (Fig. 2A), but apothecia with a dark exciple for the whole length were not found. In cross sections, the exciple is yellowish brown throughout for the pale one (Fig. 2C), while it is blackish above for the

dark one (Fig. 2B). An intermediate form could not be found either externally or in cross sections, so that this species appears to be dimorphic for ascomata.

This species is also characterized by the following characters: (1) thallus smooth, (2) containing norstictic acid; (3) exciple in cross section usually entire or almost dimidiate (Fig. 2B, C); (4) ascospores colorless, 6-8-loculate, and $24-30 \times 5-6 \mu\text{m}$ (Fig. 2D).

This new species is very similar to *Graphis aphanes* Mont. et v.d. Bosch (1855) from Java

and *G. oshioi* Nakanishi (1966) from Japan. However, the latter two species always have pale ascocarps, with no exception. In addition, *G. aphanes* has larger ascospores (17–20-loculate, $72\text{--}79 \times 7\text{--}9 \mu\text{m}$), and *G. oshioi* has a dimidiate exciple.

Graphis dicarpoides, when the exciple is dark, resembles *G. subdisserpens* Nyl. (1873) from Ins. Andaman, South Asia. But the latter has longer ascospores ($45\text{--}60 \times 9 \mu\text{m}$).

**3. *Graphis fissurata* Nakanishi et
H. Harada sp. nov.**

(Fig. 3)

Graphis sp. 3 *pro minor parte* in Harada (1994).

Thallus crustaceus, epiphloeodes, uni-formis, continuus, expansus, substrato bene adhaerens, laevigatus, subchondroideus, glaucescenti-ochraceus, subopacus, KOH+ sanguineus, acidum norsticticum continens. Apothecia crebra, lirellina, sessilia, plerumque simplicia, interdum aniso-dichotomiter ramosa, gracilia, longe recta vel arcuata vel parce undulata, 0.5–2 mm longa et 0.1–0.15 mm lata, apicibus rotundatis vel angustatis, margin thallino crassiusculo, integro, albo, primum prominulo, superne excipulo nigro, nudo, opaco, convexo, laevi vel uni albostriato usque ad verticem obducto, disco rimiformi, impresso, nigro, epruinoso. Excipulum subintegrum vel hinc inde fere dimidiatum, ad basim subplanatum, angustum vel subdeficiens, labiis erectis, fuliginis, extrorsum angulosis, in medio ca. $30 \mu\text{m}$

latis, superne bifurcatis, segmentis introrsum arcuatis. Hypothecium ca. $20 \mu\text{m}$ altum, subincolor. Hymenium in sectione transversali cordato-rotundatum, ca. $50 \mu\text{m}$ altum et ca. $70 \mu\text{m}$ latum, superne obscure fuscopulverulentum, ceterum incolor. Paraphyses filiformes, simplices, densae, ad apicem modica clavatae et fulvescentes. Ascosporae oblongo-fusiformes, rectae, ad apicem rotundatae, incolores, 6–8-loculares, $16\text{--}20 \mu\text{m}$ longae et $4\text{--}5 \mu\text{m}$ latae.

Typus. Micronesia, Mariana Islands, Asuncion Isl., S side, 70 m alt., on bark of *Hibiscus tiliaceus* in forest, 7 June 1992, Harada 12898 (CBM-FL-6173—holotypus).

External Morphology. Thallus crustose, epiphloeodal, uniform, continuous, expanded, tightly attached to substratum, thin, smooth, sub-chondroid, grayish brown, almost dull. Apothecia numerous, lirelliform, sessile, usually unbranched, occasionally anisotomic-dichotomously branched, slender, straight lengthwise or arched to moderately undulate, 0.5–2 mm long and 0.1–0.15 mm wide, rounded or narrowed at apices; thalline margin moderately thick, entire, whitish, slightly elevated; exciple black, opaque, exposed, convex, smooth, or with a white stria; disc shaped like a cleft, depressed, black, epruinose.

Anatomy. Exciple almost entire or locally dimidiate, narrowed to almost lacking, flat below; labia upright, dirty brown to blackish, strongly angled outwards at the side, ca. 30

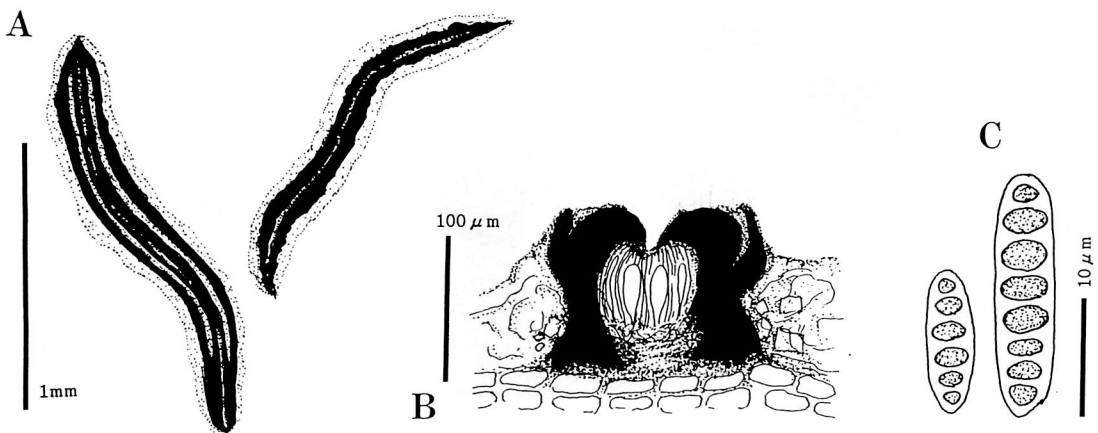


Fig. 3. *Graphis fissurata* sp. nov. A, habit; B, cross section of apothecium; C, ascospores. (A–C, drawn from holotype. A, air-dried material; B–C, LPCB preparations).

μm wide in the middle, frequently furcate above with inner branch arched inward. Hypothecium ca. $20\ \mu\text{m}$ high, colorless to brownish. Hymenium in cross section rounded heart-shaped, ca. $50\ \mu\text{m}$ high and $70\ \mu\text{m}$ wide, covered with brownish grains above, colorless in the remainder. Paraphyses filiform, unbranched, dense, moderately clavate and yellowish brown at apices. Ascospores oblong-fusiform, straight, rounded at apices, colorless, 6–8-loculate, $16\text{--}20\ \mu\text{m}$ long and $4\text{--}5\ \mu\text{m}$ wide.

Chemistry. Thallus K+ reddish; norstictic acid.

Distribution. Known only by the type.

Habitat. On bark of *Hibiscus tiliaceus* in a coastal forest on a volcanic island, associated with *Coccocarpia pellita* (Ach.) Müll. Arg., *Collema rugosum* Krempelh., *Leptogium cyane-scens* (Ach.) Körb., other species of Graphidaceae.

Remarks. *Graphis fissurata* Nakanishi et H. Harada is characterized by the following characters: (1) thallus smooth, (2) containing norstictic acid; (3) apothecia slender, usually unbranched (occasionally branched), often with only a single stria on each labium (Fig. 3A); (4) exciple in cross section almost entire or locally dimidiate (Fig. 3B); (5) ascospores colorless, 6–8-loculate, and small ($16\text{--}20 \times 4\text{--}5\ \mu\text{m}$) (Fig. 3C).

This new species resembles *Graphis schiffneri* Zahlbr. from Java (Zahlbruckner, 1929; Nakanishi, 1981) in having striate slender

ascocarps, and containing norstictic acid. However, *G. schiffneri* has immersed apothecia, and usually 2 or 3 striae on each labium.

4. *Graphis pandanicola* Nakanishi et H. Harada sp. nov.

(Fig. 4)

Thallus crustaceus, epiphloeodes, uniformis, continuus, vel late expansus, substrato optime adhaerens, membranaceus, sublaevigatus vel laevis, ochrascenti-glaucescens, subopacus vel subnitidulus, KOH+ sanguineus, acidum norsticticum continens. Apothecia crebra, aequaliter disposita, lirellina, semiemergentia vel adpresso-sessilia, simplicia, aniso-dichotomiter vel aniso-trichotomiter ramosa, subrecta, arcuata, 2–3.5 mm longa et ca. 0.15 mm lata, apicibus obtusis vel vulgo angusto-acutatis, margin thallino crassiusculo, integro, cum thallo concolore, excipulum cingenti, superne excipulo nigro, nudo, laevi, plus minus convexulo, disco rimiformi et impresso, fusconigro, epruinoso. Excipulum subintegrum, fuliginium, inferne late planatum, labiis erectis, integris, fulgineis, rectis vel leviter curvatis, in medio ca. $35\ \mu\text{m}$ latis, extus usque $3/4$ a margin thallino obductis, superne nudis. Hypothecium ca. $20\ \mu\text{m}$ altum, subincolor. Hymenium in sectione transversali cordatorotundatum, ca. $110\ \mu\text{m}$ altum et $120\ \mu\text{m}$ latum, superne obscure fusco-pulverulentum, ceterum incolor. Paraphyses filiformes, simplices, densae, ad apicem modica clavatae

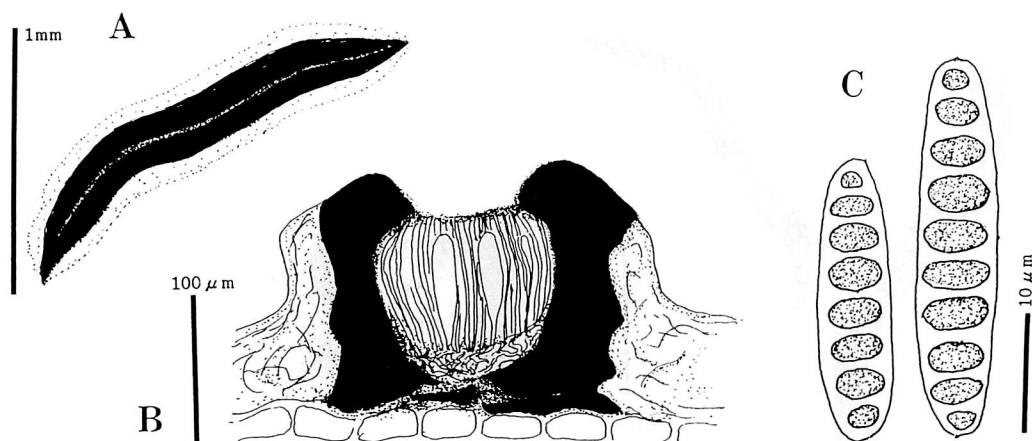


Fig. 4. *Graphis pandanicola* sp. nov. A, habit; B, cross section of apothecium; C, ascospores. (A–C, drawn from holotype. A, air-dried material; B–C, LPCB preparations).

et fulvescentes. Ascosporae oblongo-fusi-formes, rectae, ad apicem rotundatae, incolores, 8–10-loculares, 24–32 µm longae et 6–6.5 µm latae.

Typus. Micronesia, Mariana Islands, Saipan Isl., Mt. Takpochao, 400 m alt., on bark of *Pandanus* sp., 17 May 1991, Harada 11767 (CBM-FL-5526—*holotypus*).

External Morphology. Thallus crustose, epiphloeodal, uniform, continuous, widely expanded, well attached to the substratum, membranous, almost smooth, yellow-brownish gray, almost dull to glossy. Apothecia crowded, uniformly distributed, lirelliform, semi-emergent to appressed-sessile, unbranched or anisotomic dichotomously or anisotomic trichotomously branched, almost straight to arched, 2–3.5 mm long and ca. 0.2 mm wide, obtuse to narrowly pointed at apices; thalline margin moderately thick, entire, concolorous with thallus, encircling exciple; exciple black, exposed, smooth, flat or slightly convex; disc shaped like a cleft and depressed, brownish black, epruinose.

Anatomy. Exciple almost entire, dirty brown, more or less closed below, widely flat below; labia upright, entire, dirty brown to blackish, straight to slightly curved, pointed outwards at base, ca. 35 µm wide in the middle, 3/4 immersed in thalline margin. Hypothecium ca. 20 µm high. Hymenium in cross section rounded heart-shaped, with blackish brown grains above, colorless in the remainder, ca. 110 µm high and 120 µm wide. Paraphyses filiform, unbranched, dense, moderately clavate and yellowish brown at apices. Ascospores oblong-fusiform, straight, rounded at apices, colorless, 8–10-loculate, 24–32 µm long, 6–6.5 µm wide.

Chemistry. Thallus K+ reddish; norstictic acid.

Distribution. Known only by the type.

Habitat. On bark of *Pandanus* sp. See also under *Graphis albocolpata*.

Remarks. *Graphis pandanicola* Nakanishi et H. Harada is characterized by the following characters: (1) thallus almost smooth, (2) containing norstictic acid; (3) apothecia surrounded by a low and smooth thalline margin; (4) exciple in cross section black and more or less entire (Fig. 4B); (5) ascospores colorless, 8–10-loculate, 24–32 × 6–6.5 µm

(Fig. 4C).

This new species is similar to *G. assimilis* Nyl. (Nylander, 1863a, b) from Nova Granata (=New Granada), northern South America. However, the latter has a rough and thin thalline margin.

5. *Graphis saipanensis* Nakanishi et H. Harada sp. nov.

(Fig. 5)

Thallus crustaceus, epiphloeodes, uniformis, continuus, expansus, substrato bene adhaerens, tenuis, laeviter vel sat laevigatus, albidus, subnitidulus, KOH+ sanguineus, acidum norsticticum continens. Apothecia sat sparsa, lirellina, primum subimmerso-emergentia, dein adpresso-sessilia, simplicia aut anisodichotomiter ramosa, vel dichotome ramosa, saepe curvata aut flexuosa, 2–3 mm longae et 0.2–0.3 mm latae, apicibus vulgo angustacutatis, margin thallino crasso, thallum distincte superans, integro, cum thallo concoloro, excipulum cingenti, fissuram secus excipulum efficienti, superne excipulo primum diu laevi, demum stria una tenuissime pruinosa, disco leviter impresso, rimiformi aut vulgo demum anguste aperto, concavo aut planiusculo, fusconigro, tenuiser caesio-pruinoso. Excipulum integrum vel hinc inde fere dimidiatum, nigro-fuscum, ad basim planum, labiis erectis, primum integris, fuligineis, in medio ca. 35 µm lato, dein extrorsus incisus, a margin thallino crystallata magna, incoloria, crebera includenti usque ad vertium obductis. Hypothecium ca. 30 µm altum, indistinctum, dilute fuscescens. Hymenium in sectione transversali rotundatum, ca. 210 µm altum, superne paulo nigro-vel fusco-obscuratum, ceterum incolor. Paraphyses filiformes, simplices, densae, ad apicem clavatum et fulvescentes. Ascosporae fusiformi-oblongae, rectae, ad apicem obtusae, incolores, 8-loculares, 24–30 µm longae et ca. 6.5 µm latae.

Typus. Micronesia, Mariana Islands, Saipan Isl., Mt. Takpochao, 430 m alt., on bark, 9 May 1992, Harada 12320 (CBM-FL-5596—*holotypus*).

External Morphology. Thallus crustose, epiphloeodal, uniform, continuous, expanded, tightly attached to the substratum, thin, lightly or moderately smooth, whitish, somewhat glossy. Apothecia moderately sparse,

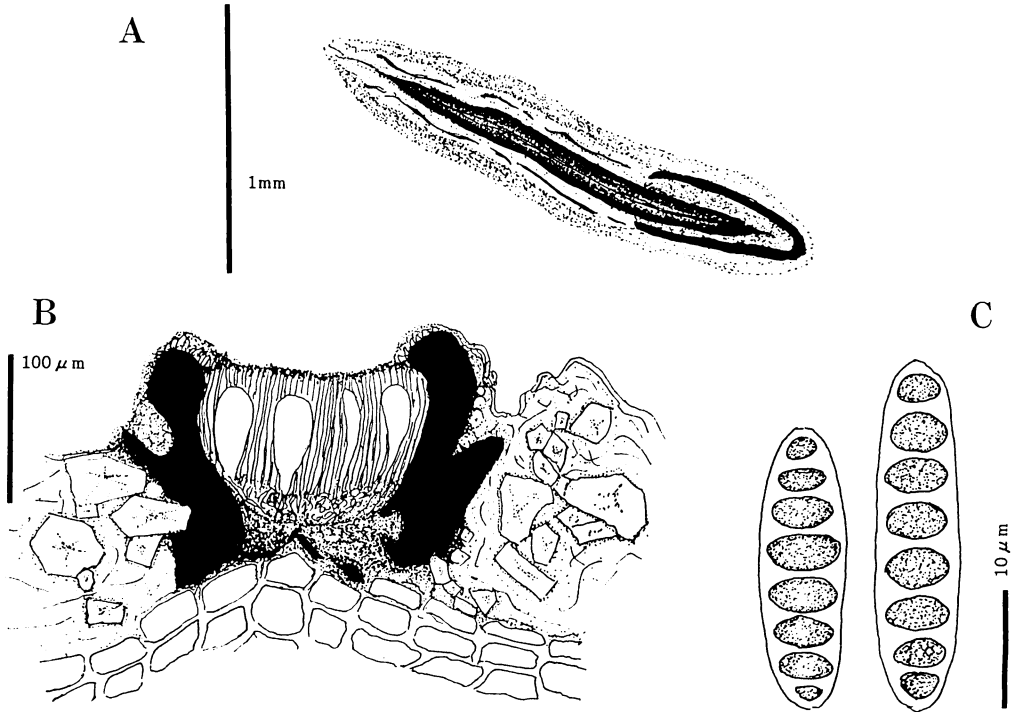


Fig. 5. *Graphis saipanensis* sp. nov. A, habit; B, cross section of apothecium; C, ascospores. (A–C, drawn from holotype. A, air-dried material; B–C, LPCB preparations).

lirelliform, somewhat embedded to emergent at first, becoming appressed-sessile, unbranched or anisotomic dichotomously branched, or dichotomously branched, often curved or flexuous, 2–3 mm long and 0.2–0.3 mm wide, generally narrowly pointed at apices; thalline margin thick, entire, distinctly elevated, concolorous with thallus, sharply delimited from exciple by fissures; exciple black, almost exposed, opaque, smooth for a long time at first, then with a very thinly pruinose stria; disc slightly depressed, shaped like a cleft or narrowly opened, concave or entirely flat, brownish black, thinly pruinose.

Anatomy. Exciple entire or locally dimidiate, blackish brown, flat below; labia almost upright, slightly incurved, incised at one time outside, slightly extended outwards below, ca. $35\ \mu\text{m}$ wide in the middle; the thalline margin having dense, large, hyaline crystals. Hypothecium ca. $30\ \mu\text{m}$ high, indistinct, slightly brownish. Hymenium in cross section rounded, ca. $210\ \mu\text{m}$ high, slightly with black or blackish brown grains above,

colorless in the remainder. Paraphyses filiform, unbranched, dense, clavate and yellowish brown at apices. Ascospores fusiform-oblong, straight, obtuse at apices, colorless, 8-loculate, $24\text{--}30\ \mu\text{m}$ long and ca. $6.5\ \mu\text{m}$ wide.

Chemistry. Thallus K+ reddish; norstictic acid.

Distribution. Known only by the type.

Habitat. On bark at a rather exposed site near the top of Mt. Takpochao, the highest mountain of Saipan Island, associated with *Coccocarpia pellita* (Ach.) Müll. Arg., *Parmotrema pacificum* (Kurok.) Kurok., *Heterodermia japonica* (Sato) Swinscow et Krog, and other species of Graphidaceae.

Remarks. *Graphis saipanensis* Nakanishi et H. Harada is characterized by the following characters: (1) thallus smooth, (2) containing norstictic acid; (3) apothecia blackish, covered by a thalline margin (concolorous with the thallus) nearly to the top, and apparently separated from the thalline margin by distinct cracks (Fig. 5A); (4) exciple in cross section blackish brown, entire or dimidiate (Fig. 5B); (5) ascospores colorless, 8-loculate,

24–30 × ca. 6.5 μm (Fig. 5C).

This new species is closely related to *Graphis ficicola* Vain. (1921) from Philippines. However, the latter constantly contains salazinic acid rather than norstictic acid, and lacks a crack between the thalline margin and exciple.

Acknowledgments

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References

- Asakura, A., T. Ohba, S. Miyano, T. Furuki, T. Kurozumi and H. Harada. 1994. Outline of the biological expedition to the northern Mariana Islands, Micronesia. *Natural History Research, Special Issue* (1): 1–11.
- Harada, H. 1994. Preliminary list of lichens in the Mariana Islands, Micronesia. *Natural History Research, Special Issue* (1): 91–101.
- Montagne, C. et R. B. van den Bosch. 1855. Lichenes apud Junghuhn. *Plantae Junghuhnianae* 4: 427–494.
- Nakanishi, M. 1966. Taxonomical studies on the family Graphidaceae of Japan. *J. Sci. Hiroshima Univ., ser. B, div. 2(Bot.)*, 11(1): 51–126, pls. I–V.
- Nakanishi, M. 1981. Notes on lichen species of *Graphis* of the Yaeyama Islands, Japan. *Hikobia, suppl.* (1): 211–220.
- Nylander, W. 1863a. Lichenographiae Novo-Granatensis prodromus. *Acta Soc. Sci. Fenn.* 7: 415–504.
- Nylander, W. 1863b. Lichenes. *In* Triana, J. et J. E. Planchon (eds.), *Prodromus Florae Novo-Granatensis ou Énumération des plantes de la Nouvelle-Grenade avec description des espèces nouvelles.* *Ann. Sci. Nat., sér. 4 (Bot.)*, 19: 286–382.
- Nylander, W. 1874 (“1873”). Lichenes Insularum Andaman. *Bull. Soc. Linn. Normandie, sér. 2*, 7: 162–182.
- Vainio, E. 1921. Lichenes Insularum Philippinarum, III. *Annal. Acad. Sci. Fenn. ser. A*, 15(6): 1–368.
- Zahlbruckner, A. 1928. Neue und ungenugend beschriebene javanische Flechten. *Ann. cryptog. exot.* 1: 101–212.

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マリアナ諸島産のモジゴケ属 地衣類の5新種

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千葉県立中央博物館が中心となって1992年に挙行した北マリアナの生物相調査 (Asakura *et al.*, 1994) とそれに伴うグェム島・サイパン島・ロタ島の調査によって約900点の地衣類標本が得られた。その資料に基づく仮目録ではモジゴケ属15種を含む地衣類171種を認めた (Harada, 1994)。今回、モジゴケ属を再検討した結果、以下の5新種を認めることができたので、本報で記載する。*Graphis albocolpata* Nakanishi et H. Harada sp. nov., *G. dicarpoides* Nakanishi et H. Harada sp. nov., *G. fissurata* Nakanishi et H. Harada sp. nov., *G. pandanicola* Nakanishi et H. Harada sp. nov., *G. saipanensis* Nakanishi et H. Harada sp. nov.