

NOTES ON THE LICHEN GENUS *SPHAEROPHORUS* PERS.
OF TAIWAN, WITH DESCRIPTIONS OF
THREE NEW SPECIES

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Abstract: Six species of the lichen genus *Sphaerophorus* of Taiwan are treated, of which *S. digitatus*, *S. taiwanensis* and *S. yangii* are described as new.

INTRODUCTION

Sphaerophorus is the only genus of Sphaerophoraceae as it is represented in Taiwan. Spores of the order Caliciales (Coniocarpiidae of Zahlbruckner system) in which the present genus and a few other genera belong to are characterized by forming a powdery mass called a mazaedium with fragments of asci and paraphyses. Three species of this genus have previously been reported from Taiwan, viz. *S. diplotypus* Vain., *S. formosanus* (Zahlbr.) Asah. and *S. melanocarpus* (Sw.) DC. (cf. Wang-Yang & Lai 1973). Critical examination of collections from various localities in this island during past few years has indicated that new additions of this genus should be made to the lichen flora of our area.

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SPHAEROPHORUS Pers. in Ann. Bot. Usteri 7: 23, 1974.

Thallus fruticose, more or less erect and shrubby, the branches flattened to round, medullary tissue forming a solid or hollow central cord in cross section, uniform or differentiated into an axis and phyllocladia, with or without cephalodia. Apothecia borne within thalline receptacles on the more or less swollen tips of the branches, the receptacle at length opening irregularly above, the disk convex to flat, black. Asci clavate, disintegrating early; spores 8, hyaline, spherical, non-septate, as they mature lying loose in the apothecium and forming a powdery mazaedium. Algae protozoocoid. Mostly in cool moist regions and centered in the Southern Hemisphere. Species about 10.

KEY TO THE SPECIES OF *SPHAEROPHORUS* IN TAIWAN

1. Thallus hollow in cross section.....2
2. Thallus 0.8-1 cm high, apothecia absent *S. diplotypus*
2. Thallus larger, 2-2.5 cm high, fertile branches frequently present..... *S. digitatus*
1. Thallus solid in cross section.....3
1. Thallus flattened and dorsiventral, sparsely branched4
4. Thallus with cephalodia..... *S. yangii*
4. Thallus without cephalodia..... *S. melanocarpus*
3. Axes cylindrical, branches more or less flattened, frequently branched above5
5. Plant robust, 6-8 cm high..... *S. taiwanensis*
5. Plant smaller, 2-2.5 cm high *S. formosanus*

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1. *Sphaerophorus digitatus*, *species nova* (Pl. I, Fig. 3)

Descriptio holotypi: Thallus canus, nitidulus, usque ad 2-2.5 cm altus, 1.5-2 mm latis, paucis ramosus, axes et rami cylindrici, cavi, medulla alba, I-. Apothecia terminalia, crebra, ca. 2-2.5 mm lata; discus niger, convexus, margine receptaculi digitato, digita 3 mm alta; sporae sphaericae, diam. 5 μ .

Thallus whitish gray, glossy, 2-2.5 cm high, 1.5-2 mm wide, sparsely branched, axes and branches cylindrical, hollow in cross section, medulla whitish, I-. Apothecia terminal, very numerous, 2-2.5 mm in diameter, disc black, convex, the margin of receptacle digitate, digitus 3 mm long; spores spherical, 5 μ in diameter.

On bark in a mixed *Chamaecyparis* forest, at the elevation ca. 1600 m.

ILAN: No. 42 Compartment of Chilan Forest Station, leg. M.J. Lai 8108 (TAI, holotypus). NANTOU: Chitou to Alishan, 17 K, Lai 8243. HWALIEN: Mt. Chingsuei, Nakanura 619.

Very near to *S. diplotypus* in having hollow thallus, but the present species differs from it in its much larger plant body, and with digitate receptacle and frequent fertile branches.

2. *Sphaerophorus diplotypus* Vain. in *Hedwigia* 37: 36, 1897 & in *Bot. Mag. Tokyo* 35: 75, 1921; Yasuda, *Flecht. Japan*, 1, Pl. I, Fig. 1, 1925; Sato in *J. Jap. Bot.* 10: 424, 1934; Mituno in *J. Jap. Bot.* 14: 669, 1938; Asahina & Sato in *Asahina, Nippon Inkwasoyokubutu Dukan* 623, Pl. 299, Fig. 1, 1939; Wang-Yang & Lai in *Taiwania* 18(1): 96, 1973.

Thallus whitish gray, 8-10 mm high, 0.8-1.2 mm wide, more or less cylindrical, dichotomously branched, hollow in cross section, medulla K-, I-. Apothecia unknown. Usually associated with bryophytes on bark of trees.

Distribution: Taiwan and Japan.

ILAN: Yuenyang Lake, Lai 6002. HWALIEN: Hoping, Lai 2036. CHIAYI: Mt. Alisan, Lai 7248.

3. *Sphaerophorus formosanus* (Zahlbr.) Asah. in *J. Jap. Bot.* 14: 667, 1938; Wang-Yang & Lai in *Taiwania* 18(1): 96, 1973.

Sphaerophorus melanocarpus (Sw.) DC. subsp. *formosanus* Zahlbr. in *Fedde, Repert.* 31: 206, 1933; Sato in *J. Jap. Bot.* 10: 425, 1934.

Thallus 2-2.5 cm high, frequently branched above, base of the erect thallus round, branches more or less flattened. Medulla I-.

Distribution: Taiwan and Japan.

TAIPEI: Rarasan, Suzuki 12721, 12729. ILAN: Yuenyang Lake, Lai 6023. TAOYUAN: Mt. Peichatienshan, Lai 5530. HWALIEN: Hoping, Lai 2039.

4. *Sphaerophorus melanocarpus* (Sw.) DC. *apud* Lam. & DC., *Flor. Franc.*, edit. 2., VI: 178, 1805; Sato in *J. Jap. Bot.* 10: 425, 1934; Mituno in *J. Jap. Bot.* 14: 666, 1938; Asahina & Sato in *Asahina, Nippon Inkwasoyokubutu Dukan* 623, Pl. 299, Fig. 1, 1939; Wang-Yang & Lai in *Taiwania* 18(1): 96, 1973.

Sphaerophoron compressum Ach., *Method. Lich.* 135, 1803.

Sphaerophorus compressus Körber, *Syst. Lich. Germ.* 52, 1855; Vanio in *Bot. Mag. Tokyo* 35: 74, 1921; Yasuda, *Flecht. Japan*, 2, pl. I, fig. 3, 1925; Asah., *Mater. Lich. Fl. Jap.* I, 46, pl. XIII, fig. 1-3, 1931.

Thallus flattened and dorsiventral, 1.5-2 cm high, 2-2.5 mm wide, medulla I-. Apothecia terminal on the ventral surfaces, disc 1.5-3 mm in diameter; spores spherical, 6-8 μ .

Distribution: Taiwan, Japan, Europe, North America and New Zealand.

TAOYUAN: Mt. Peichatienshan, Lai 5639.

5. *Sphaerophorus taiwanensis*, species nova (Pl. I, Fig. 1, 2)

Descriptio holotypi: Thallus sat robustus, erectiusculus, nitidulus, flavo-canus, usque ad 6-8 cm altus, 2-3 mm latis, increbre ramosus supra, ramis subindivisis, compressis, sed axiis cylindricis, medulla alba, solida, I-. Apothecia terminalia, ca. 2 mm lata, discus niger, convexus, sporae sphaericae, diam. 5-7 μ .

Thallus rather robust, somewhat erect, glossy, yellowish-gray, 6-8 cm high, 2-3 mm wide, frequently branched above, branches subdivided, more or less flattened, but axes mostly cylindrical, medulla solid, whitish, I-. Apothecia 2 mm in diameter, discs convex, black; spores spherical, 5-7 μ in diameter.

TAITUNG: Kweihu, leg. K. S. Hsu s. n. July 1970 (TAI, holotypus).

Closely resembles *S. formosanus*, but this new species differs from it in its much larger plant body.

6. *Sphaerophorus yanglii*, species nova

Descriptio holotypi: Thallus canus, usque ad 2-2.5 cm altus, 2 mm latis, compressus, sed rami fertilius cylindrici, cephalodia sat crebra. Apothecia ca. 2 mm lata, discus niger, convexus, sporae sphaericae, diam. 4-5 μ .

Thallus gray, 2-2.5 cm high, 2 mm wide, flattened but fertile branches cylindrical, with minute cephalodia. Apothecia 2 mm in diameter, discs convex; spores spherical, 4-5 μ in diameter.

HWALIEN: Hoping, leg. M. J. Lai 6712. (TAI, holotypus).

This new species is striking in its cephalodiate thallus. The specific epithet is given in memory of the late Professor Bao-Yu Yang of the Botany Department, National Taiwan University.

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Plate I.

Fig. 1. Fertile thallus of *Sphaerophorus taiwanensis* ($\times 2/3$).

Fig. 2. Sterile thallus of ditto ($\times 3/4$).

Fig. 3. Fertile thallus of *Sphaerophorus digitatus* ($\times 1$).