

162.5–167.5 × 7.5–10.0 μm, 13–15-septate, mostly 15-septate. Paraphyses filiform, curved or circinate above. Setae dark-brown, 107–275 × 10.0–20.0 μm.

This is the most common, widely distributed species of the Geoglossaceae and is characterized by the velvety fruit bodies and dark brown ascospores which are generally 15-septate.

23. *Spathularia bifurcata* Otani sp. nov. (Fig. 2·6 a–d)

Ascomata solitaria vel gregaria, 5–9 cm longa, spathulata; clavulis lateraliter compressissimis, aureis vel brunneo-flavis, ad positus oppositos stipitis decurrentibus, margine rotundatis, undulatis, radiate rugosis; stipitibus bifurcatis, subteretibus, sursum compressis, basi circa 5 mm crassis, solidis, badiis, longitudinaliter leviter rugulosis, furfuraceis, cum myceliis aureis ad basim; ascis clavatis, apice attenuatis, poro iodo non caerulescentibus, 110–125 × 8.5–10.0 μm, octosporis; ascosporis parallele positis, hyalinis, levibus, acicularibus, rectis vel curvatis, 42–60 × 2.0–2.6 μm; paraphysibus filiformibus, hyalinis, ramosis, sursum circinatis vel uncinatis.

Holotypus. Ad humum in silvis pinetis vel mixtis, Dhunche–Sing Gompa, Sept. 18–20, leg. Otani No. H424, TNS.

This fungus is closely related to *Spathularia velutipes* Cooke et Farlow but is clearly distinguished by larger fruit bodies, dichotomously branched stipes and comparatively longer ascospores.

24. *Leotia lubrica* Fr. (Fig. 2·7 a–c)

Syst. Myc. 2: 29, 1922—Durand, Ann. Myc. 6: 446, t. 11, f. 106, t. 20, f. 213, 1908—Imai, Journ. Fac. Agr. Hokk. Imp. Univ. 45: 237, 1941—Nannfeldt, Ark. f. Bot. 30A: 45, 1942—Mains, Mycol. 48: 698, 1956—Batra and Batra, Univ. Kansas Sci. Bull. 44: 150, 1963.

Distribution. Europe, the Americas, Australia, India, Nepal, Japan, China.

Specimens examined. On soil in a forest, Dhunche–Sing Gompa, Sept. 18–20, 1980, coll. Otani No. H427, H435, TNS.

Fruit bodies 8–9 cm high, pileate, gelatinous. Pileus subhemisphaerical, somewhat furrowed or wrinkled, 1.0–1.5 cm in diameter, orange-yellow with a greenish tint when fresh. Stipes cylindrical, up to 8.6 cm in length, 0.3–0.6 cm in diameter, orange-yellow, smooth or slightly squamulose. Asci cylindrical, narrowing towards the base, the pores not blued by Melzer's reagent, 100–125 × 10–11 μm, containing 8 ascospores. Ascospores long fusoid, straight or slightly curved, hyaline, smooth, 17.5–22.5 × 5.0–7.5 μm, continuous at first, then 1–3-septate. Paraphyses filiform, straight, only slightly swollen above, septate and branched below.

This fungus is the most common and widely distributed species but it shows some variations especially in color. *Leotia marcida* Pers. sensu Teng appears to be a synonym of

Leotia lubrica.

25. *Leotia viscosa* Fr.

Syst. Myc. 2: 30, 1822—Mains, Mycol. 48: 700, f. 6, 1956. Syn. *Leotia lubrica* f. *viscosa* Imai emend, Journ. Fac. Agr. Hokk. Imp. Univ. 45: 240, 1941. *Leotia stipitata* Schröt., in Engler & Prantl, Nat. Pfl. Fam. I, 1*: 166, 1896—Durand, Ann. Myc. 6: 449, 1908—Batra and Batra, Univ. Kansas Sci. Bull. 44: 150, 1963. *Leotia lubrica* f. *aurantipes* Imai, Bot. Mag. Tokyo 50: 13, 1963. *Leotia aurantipes* (Imai) Tai, Lloydia 7: 157, 1944.

Distribution. Europe, the Americas, India, Nepal, China, Japan.

Specimens examined. On soil in a forest, Surjebinayak Kathmandu area, Sept. 12, 1980, coll. Otani No. B376, TNS.

Fruit bodies 2.0–3.0 cm high. Pileus dark green, stipes yellowish-orange. The species other characteristics are almost identical to those of *L. lubrica*.

26. *Leotia atrovirens* Pers. ex Fr.

Syst. Myc. 2: 30, 1822—Cooke, Mycogr. 219, pl. 102, f. 368, 1879—Rehm, Discom. 1166, 1896—Teng, Sinensia 5: 451, 1934—Tai, Lloydia 7: 161, f. 13, 19, 1944. Syn. *Leotia lubrica* f. *atrovirens* (Pers. ex Fr.) Imai, Journ. Fac. Agr. Hokk. Imp. Univ. 45: 244, 1941. *Leotia chlorocephala* Schw. ex Fr. Syst. Myc. 2: 30, 1822—Durand, Ann. Myc. 6: 450, t. 11, f. 110, t. 20, f. 211–212, 1908—Batra and Batra, Univ. Kansas Sci. Bull. 44: 150, 1963. *Leotia lubrica* f. *chlorocephala* Mass., Ann. Bot. 11: 290, 1897—Imai, Journ. Fac. Agr. Hokk. Imp. Univ. 45: 242, 1941.

Distribution. Europe, the Americas, India, Nepal, China, Japan.

Specimens examined. On soil in a forest, Surjebinayak, Kathmandu area, Sept. 12, 1980, coll. Otani No. B357, TNS.

Fruit bodies 2–5 cm in height, gelatinous, dark green. Pileus semispherical, 0.8–1.0 cm in diameter, wrinkled. Asci 130–137.5 × 10–12.5 μm, 8-spored. Ascospores long fusiform, 18.0–22.5 × 0.5 μm. Paraphyses filiform, straight, slightly enlarged at the tip.

This species is characterized by its dark green pileus with concolorous stipes. Some mycologists separate *Leotia chlorocephala* from *L. atrovirens*. According to Imai (1941), for example, specimens less than 1.5 cm in height belong to *L. atrovirens* and the rest to *L. chlorocephala*. However, Nannfeldt (1942) and Mains (1956) noticed, *L. atrovirens* and *L. chlorocephala* do not differ sufficiently to justify this distinction. Thus *L. chlorocephala* is included under the name *L. atrovirens* here. Batra and Batra (1963) reported *L. chlorocephala* from the Mussoorie Hills.

27. *Leotia himalayaensis* Otani sp. nov. (Fig. 2·8 a–b)

Ascomata gregaria, stipitata, pileata, gelatinoso-ceracea, circa 3.5 cm alta; pileus

convexus, irregulariter formatus vel pulvinatus, uvidus, atro-virens, circa 6 mm latus, margine obtuso: stipes subaequalis vel aliquantum incrassatus, circa 2 cm longus, 2 mm crassus, uvidus, subtranslucidus, succineus, dense atro-viridense verrucosus; ascis cylindraceo-clavatis, apice rotundatis, iodo non caerulescentibus, octosporis, $95.0-112.5 \times 10.0-12.5 \mu\text{m}$; ascosporis superne distichis, deorsum monostichis, subfusiformibus, rectis, subluteis, continuis, $15.0-22.5 \times 5.0-8.0 \mu\text{m}$; paraphysibus filiformibus, circa $2.5 \mu\text{m}$ crassis, ramosis, apice non vel vix incrassatis, curvatis, vel leviter uncinatis.

Holotypus. Inter muscos in regionem alpinam, Gosainkund (4200 m), Sept. 21, 1980, leg. Otani No. H716 (**Holotypus**), H702, TNS.

As other species of the *Leotia*, the ectal excipulum of the present fungus is composed of two layers, an outer layer of thin hyphae immersed in a gel, and an inner layer of non-gelatinous, broad thin-walled cells. It has a medullary excipulum of gelatinous cells. The greenish-black warts on the stipe are composed of aggregates of granular-walled hyphae.

The present fungus is closely related to *Leotia rutilans* (Imai et Minak.) Imai but can be distinguished by its dark green pileus and yellowish ascospores. It is also separated primarily from *L. lubrica* and related species by the curved apices of its paraphyses and yellowish ascospores.

References

- Balfour-Browne, F. L. 1955. Some Himalayan Fungi. Bull. Brit. Mus. (Nat. Hist.) Botany 1(7): 189-218.
 ——— 1968. Fungi of recent Nepal Expedition. Bull. Brit. Mus. (Nat. Hist.) Botany, 4(3): 99-141.
 Batra, L. R. 1954. Studies on Discomycetes of Mussoorie Hills I. Pezizaceae. M. Sc. (Hons.) Thesis, Punjab Univ. India.
 Batra, L. R. and S. W. T. Batra 1963. Indian Discomycetes. Univ. Kansas Sci. Bull. 44: 109-256.
 Berkeley, M. J. 1851. Decades of fungi. Decade XXXVI Sikkim Himalayan Fungi collected by Dr. Hooker. Hooker's J. of Bot. and Kew Gard. Misc. 3: 200-206.
 ——— 1854. Decades of fungi. Decades XLVII, XLVIII Indian Fungi. Hooker's J. of Bot. and Kew Gard. Misc. 6: 204-212.
 Dennis, R. W. G. 1978. British Ascomycetes. rev. ed. 1-585, Cramer.
 Dissing, H. 1966. The genus *Helvella* in Europe with special emphasis on the species found in Norden. Dansk Bot. Ark. 25: 1-172.
 Imai, S. 1941. Geoglossaceae Japoniae. Journ. Fac. Agr. Hokk. Imp. Univ. 45(4): 155-264.
 Korf, R. P. 1960. Nomenclatural notes. IV The generic name *Plicaria*. Mycologia 52: 648-651.
 Maas Geesteranus, R. A. 1965. Geoglossaceae of India and adjacent countries. Persoonia 4: 19-46.
 Mains, E. B. 1965. North American species of Geoglossum. Tribe Cudoniae. Mycologia 48: 694-710.
 Nannfeldt, J. A. 1937. Contributions of the mycoflora of Sweden 4. On some species of *Helvella*, together with a discussion of natural affinity within Helvellaceae and Pezizaceae Tribe Acetabuleae. Sv. Bot. Tidskr. 31: 47-66.
 Rifai, M. A. 1968. The Australasian Pezizales in the Herbarium of the Royal Botanic Gardens Kew. Verh. Ned. Akad. Wetensch 57: 1-295.
 Singh, S. C. and M. K. Adhikari. 1977. Some fleshy fungi Kathmandu (Nepal). Journ. Nat. Hist. Mus. Kathmandu, Nepal 1: 49-57.
 Teng, S. C. 1934. Notes on Discomycetes from China. Sinensia 5: 431-465.
 Thind, K. S. and L. R. Batra. 1957a. The Pezizaceae of Mussoorie Hills I. Journ. Ind. Bot. Soc. 36: 52-60.

- and J. S. Sethi. 1957b. The Pezizaceae of Mussoorie Hills II. Journ. Ind. Bot. Soc. 36: 196-206.
 ——— and ——— 1957c. The Pezizaceae of Mussoorie Hills III. Indian Phytopath. 10: 26-37.
 ——— and L. R. Batra. 1957d. The Pezizaceae of Mussoorie Hills IV. Journ. Ind. Bot. Soc. 36: 428-438.
 ——— and E. K. Cash, and J. S. Sethi. 1957e. The Pezizaceae of Mussoorie Hills V. Mycologia 49: 831-836.
 ——— and P. Singh. 1959a. The Pezizaceae of Mussoorie Hills VI. Ind. Bot. Soc. J. 38(1): 221-232.
 ———, E. K. Cash and P. Singh 1959b. The Pezizaceae of the Mussoorie Hills VII. Mycologia 51: 457-463.
 ——— E. K. Cash and P. Singh. 1959c. The Helotiales of Mussoorie Hills II. Mycologia 51: 833-839.
 ——— and H. Singh 1965. The Helotiales of India III. Journ. Ind. Bot. Soc. 43: 529-542.
 Waraich, K. S. and K. S. Thind 1977. Fungi of Nepal (Pezizales). Journ. Nat. Hist. Mus. Kathmandu, Nepal 1: 21-34.

straight, filiform, swelling to become globose at the tip, with orange granules.

This fungus was recorded from Sikkim by Berkeley (1851) and by Balfour-Browne (1968) from Ghar Khole, Nepal.

17. *Aleuria rheana* Fuckel (Fig. 1·12 a-b)

Symb. Myc. 325, 1870—Seaver, North Amer. cup-fungi, operc. 99, pl. 9, f. 2, 1928—Kobayasi, Nippon Enka-shokubutsu Dukan 321, 1939—Batra & Batra, Univ. Kansas Sci. Bull. 44: 135, 1963—Rifai, Verh. Ned. Akad. Wetensch 57: 153, f. 146-150, 1968—Eckblad, Nytt Mag. Bot. 15: 70, f. 32, 1968—Dennis, Brit. Ascom. rev. ed. 51, 1978.

Distribution. Europe, Australia, India, Nepal, Japan, the Americas.

Specimens examined. On soil in a forest, Dhunche-Sing Gompa, Sept. 18-20, 1980, coll. Otani No. H432, TNS.

Apothecia regular cup-shaped, 1.2-3.0 cm in diameter, occasionally lobed, with a short but distinct stipe, the hymenium mandarin orange to golden yellow, the outside paler. Asci cylindrical, 250-300 × 13-15 μm, containing 8 ascospores. Ascospores ellipsoidal, ornamented with a very coarse reticulum, 18-21 × 10-12 μm. Paraphyses narrowly cylindrical, sparsely septate, branching near the base, the apex slightly swollen, curved or hooked.

The curved paraphyses of the present species is characteristic. Thind and Singh (1959) reported this fungus from the Mussoorie Hills.

HELOTIALES

Geoglossaceae

18. *Geoglossum sphagnophilum* Ehrenb. (Fig. 2·1 a-b)

In Maas Geesteranus, Persoonia 4: 26, f. 6, 1965. Syn. *Geoglossum glabrum* Pers. ex Fr. sensu Nannfeldt, Ark. F. Bot. 30A: 29, 1942—Imai, Journ. Fac. Agr. Hokkaido Imp. Univ. 45: 207, pl. 8, f. 1-2, 1941.

Distribution. Europe, Nepal, Japan.

Specimens examined. Among moss in a forest, Gosainkund (ca. 3800 m), Sept. 21, 1980, coll. Otani No. H701, TNS.

Fruit bodies black, 2.5-3.5 cm long. Clavula 1.0-1.8 cm, lanceolate, compressed. Stipes cylindrical, slightly compressed, furfuraceous, 1-2 mm thick. Asci clavate-cylindrical, rounded above, with a short stipe, containing 8 ascospores in parallel fascicles, 187.5 × 22.5 μm. Ascospores clavate-cylindrical, dark brownish, slightly curved, 47.5-70.0 × 7.5-10.0 μm, 7-septate. Paraphyses agglutinated into a blackish layer above the asci, rather closely septate above, constricted at the septa, with globose apical cells, the contents of which are dark brown, apical cells 7.5-10.0 μm wide, often curved near the tips.

This species has frequently been included in *Geoglossum glabrum* Pers. ex Fr. sensu Durand, from which Nannfeldt (1942) distinguished the three species—*G. glabrum* Pers. ex Fr. sensu Nannfeldt, *G. cookeianum* Nannf. and *G. smile* Peck. Maas Geesteranus

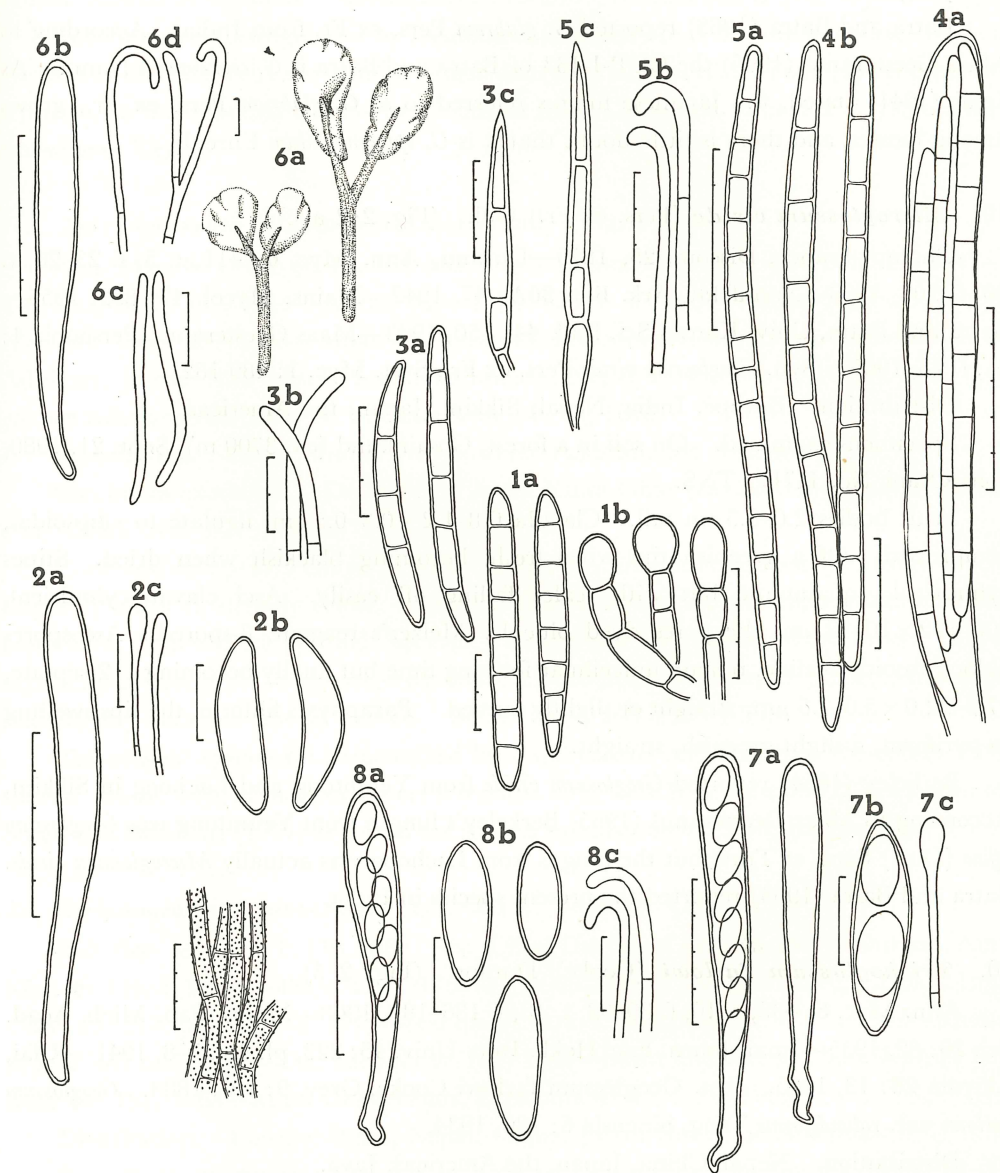


Fig. 2-1. *Geoglossum sphagnophilum*, a. ascospores, b. paraphyses; 2. *Microglossum viride*, a. ascus, b. ascospores, c. paraphyses; 3. *Trichoglossum farlowi*, a. ascospores, b. paraphyses, c. seta of apothecium; 4. *Trichoglossum velutipes*, a. ascus, b. ascospores; 5. *Trichoglossum hirsutum*, a. ascospores, b. paraphyses, c. hymenial seta; 6. *Spathularia bifurcata*, a. fruit body (×0.5), b. ascus, c. ascospores, c. paraphyses; 8. *Leotia himalayaensis*, a. ascus, b. ascospores, c. paraphyses, d. granular-walled hyphae of greenish black warts on the stipe. A graduation in scales represents 10 μm.