


Lectotypification of *Phillipsia straminea* (Sarcoscyphaceae, Ascomycota), an extinct fungus from Chichijima Island, Ogasawara Islands

YUKITO TOCHIHARA^{1,*}, TAKAHITO KOBAYASHI² & KOHTAROH SHUTOH²

¹Natural History Museum and Institute, Chiba, Aoba-cho 955-2, Chuo-ku, Chiba, Chiba 260-8682, Japan

²The Hokkaido University Museum, Hokkaido University, Kita 10, Nishi 8, Kita-ku, Sapporo, Hokkaido 060-0810, Japan

✉ y_tochihara@chiba-muse.or.jp;  <https://orcid.org/0000-0001-6535-2259>

✉ takobayashi@museum.hokudai.ac.jp;  <https://orcid.org/0000-0002-6256-0834>

✉ shutoh@museum.hokudai.ac.jp;  <https://orcid.org/0000-0003-2601-4374>

*Corresponding author

Abstract

Phillipsia straminea has not been reported since its original description from Chichijima Island in 1937. Examination of the Fungal Herbarium of the Hokkaido University Museum, Hokkaido University located specimens corresponding to the original materials, and one specimen was designated as the lectotype. Morphological observations of the lectotype clarified its diagnostic features, supporting its distinction from related species.

Key words: type specimen, Hokkaido University, nomenclature, SAPA, syntype

Introduction

In October and November 1936, the Japanese botanists and mycologists Dr. Seiya Ito (1883–1962) and Dr. Sanshi Imai (1900–1976) collected approximately 300 fungal specimens from the Ogasawara (Bonin) Islands (Ito & Imai 1937a). Based on these specimens, they published 62 new species and two new forms from 1937 to 1940 (Ito & Imai 1937a, 1937b, 1939, 1940a, 1940b). Seventeen species have never been recorded again and are listed as extinct on the Japanese Red List (Ministry of the Environment, Japan 2025).

Ito & Imai (1937a) noted that the voucher specimens were deposited in the Herbarium of the Faculty of Agriculture, Hokkaido Imperial University, where both worked between the 1930s and the 1940s. The collection was transferred to the Fungal Herbarium of the Hokkaido University Museum, Hokkaido University (SAPA; Kobayashi 2020), but most of the voucher specimens remained untraced and unnumbered in the SAPA. Hosaka *et al.* (2018) attempted to locate the type specimens of *Hysterangium hahashimense* S. Ito & S. Imai (1937a: 15) in the SAPA but were unable to find them.

Most species listed by Ito & Imai (1937a, 1937b, 1939, 1940a, 1940b) were basidiomycetes; only three were discomycetes (Sarcoscyphaceae Le Gal ex Eckblad (1968: 103), Pezizales J. Schröter (1897: 173), Ascomycetes): *Phillipsia domingensis* (Berkeley (1852: 201)) Berk. ex Denison (1969:293), *P. straminea* S. Ito & S. Imai (1937b: 57) as a new species, and *Boedijnopeziza insititia* (Berkeley & M.A. Curtis (1860: 127)) S. Ito & S. Imai (1937b: 58) (currently termed as *Cookeina insititia* (Berkeley & M.A. Curtis) Kuntze (1891: 849)). *Phillipsia domingensis* and *C. insititia* are currently very frequently found on the forest floor of Ogasawara Island (Ohmae 2019 and Tochihara, unpublished data). However, *P. straminea*, characterized by straw-yellow hymenia, has not been recorded since its original description (Ito & Imai 1937b).

In the protologue of *P. straminea* (Ito & Imai 1937b), a single gathering was referred to as ‘on decorticated decaying branches of trees in shady woods. Chichishima: Fukurozawamura-Kobikidani (Nov. 15, 1936)’. Although the authors did not explicitly designate its type in the protologue, the indication of type based on a single gathering would be acceptable according to ICN Art. 40.2 (Turland *et al.* 2025). Therefore, the referred gathering includes the holotype or syntypes of *P. straminea*, but the condition of specimens corresponding to this type has long been unknown. Furthermore, because the protologue was so brief, the diagnostic differences between related species remain unclear.

In 2022, the first author found a genus cover noted as ‘*Phillipsia*’ (Figure 1A) in SAPA, which contained ten unnumbered specimens mounted on four separate herbarium sheets (Figure 1B, 1C). Among these, two specimens on one herbarium sheet were annotated as *P. straminea*, probably from the handwriting of S. Imai (Figure 1B), whereas eight specimens mounted on three herbarium sheets were annotated as *P. domingensis* (Figure 1C). We assigned new SAPA herbarium numbers to the 10 specimens: eight specimens annotated as *P. domingensis*, SAPA 25.10.3.1–25.10.3.8 (Figure 1C); two as *P. straminea*: SAPA 25.10.3.9 (upper panel, Figure 1B1) and SAPA 25.10.3.10 (lower panel, Figure 1B2).



FIGURE 1. Specimens of *Phillipsia* found in SAPA. (A) Genus cover of *Phillipsia*. (B) Herbarium sheet of *P. straminea* (labeled as ‘*Ph. patri*’ in bottom right). Two specimens B1 (SAPA 25.10.3.9; isoelectotype) and B2 (SAPA 25.10.3.10; lectotype) are mounted. (C) Specimens of *P. domingensis*. (SAPA 25.10.3.1–25.10.3.8). (D) Specimen label of B1 (SAPA 25.10.3.9). (E) Specimen label of B2 (SAPA 25.10.3.10, lectotype). (F) Damaged apothecium in a small bottle (arrowhead). (B1; SAPA 25.10.3.9). (G) wrapping paper, labeled as ‘N.41 *Peziza*’. (B2; SAPA 25.10.3.10) (H) Apothecia of *P. straminea* (B2; SAPA 25.10.3.10).

The collection locality and date of the two specimens annotated as *P. straminea* were identical to those of the protologue of the species. The upper specimen (Figure 1B1, 1D) contained only one blackened apothecium placed in a small bottle (Figure 1F). The lower specimen (Figure 1B2) was annotated in red as ‘Type (Larger one)’ in its label (Figure 1E) and contained two samples of decorticated decaying woods respectively attached with yellow apothecia (Figure 1H). On the label of both specimens, the original species epithet ‘*patri*’ were crossed out with double red lines, and ‘*straminea*’ were written over them (Figure 1D, 1E).

These two specimens were applicable to the original materials of *P. straminea* based on the coincidence of the collection locality, date, and identification with its protologue (Ito & Imai 1937b). Although the annotation ‘Type (Larger one)’ (Figure 1B2) obviously specified either of two yellow apothecia, we regarded them as one specimen because they had one label and were wrapped in a packet according to Art. 8.2. We regarded these two specimens as syntypes of the species because the referred gathering consisted of two specimens, according to Art. 40.3 Note 3. It is unclear whether ‘Larger’ refers to a wood fragment or to a yellow apothecium.

In this study, we designated the lower specimen (Figure 1B2, SAPA 25.10.3.10) as the lectotype of *P. straminea*, considering the annotation as ‘Type (Larger One)’ by the authors. The lectotype contained two larger apothecia in better condition than only one small and deteriorated apothecium in the upper specimen (Figure 1B1). The upper specimen (Figure 1B1, SAPA 25.10.3.9) is an isoelectotype of this species.

Furthermore, we reexamined the ascospore surface structure, which represents an important taxonomic character in *Phillipsia* because it was not addressed in the original description. The surface structures of the ascospores of SAPA 25.10.3.10 were examined using an optical microscope (OM) and a scanning electron microscope (SEM). Optimal microscopy examination was performed using an Olympus BH-2 (Olympus, Tokyo, Japan) equipped with Nomarski interference. Ascospores were soaked in 70% ethanol for half a day for rehydration and examined using cotton blue dissolved in lactic acid. The SEM observation was performed using a JSM-6390LV Scanning Electron Microscope (JEOL, Tokyo, Japan). To avoid artifacts caused by chemical pretreatment, the dried specimens were directly sputter-coated with platinum. A single, fully dried apothecium was mounted on an SEM stub using double-sided adhesive tape and coated with a JFC-1600 Auto Fine Coater (JEOL). Observations were performed using a JSM-6390LV Scanning Electron Microscope (JEOL).

During several field surveys conducted by the first author near the type locality, no specimens identifiable as *P. straminea* were found. Based on the lack of collection after the publication of this species more than 50 years ago, the species should be treated as extinct. Therefore, their taxonomic position and field occurrence should be carefully examined and monitored on an ongoing basis.

Typification

Phillipsia straminea S. Ito & S. Imai in Trans. Sapporo Nat. Hist. Soc. 15(2): 57 (1937).
MycoBank no.: MB 278938.

Lectotype (designated here):—JAPAN. Tokyo, Ogasawara, Chichijima Island, Fukurozawa-mura, Kobikidani (currently a valley to the southwest of Mt. Tsutsuji Yama, Yano *et al.* 2011), containing two yellow apothecia, each occurring on different decorticated, decaying, and blackened branches of trees in shady woods to form pseudosclerotial plates, 15 November 1936, S. Ito, S. Imai & K. Hino s.n. (SAPA 25.10.3.10!).

Isolectotype:—*ibid.* (SAPA 25.10.3.9), only one severely deteriorated apothecium preserved in a small bottle.

Japanese name:—Nettai-ki-chawantake (= tropical, yellow, disc-shaped fungi; Ito & Imai 1937).

Distribution:—Known only from the type locality.

Morphological remarks:—Asci 8-spored. Ascospores remarkably ornamented with fine longitudinal bands, similar to *P. domingensis* under OM and SEM examination (Figure 2).

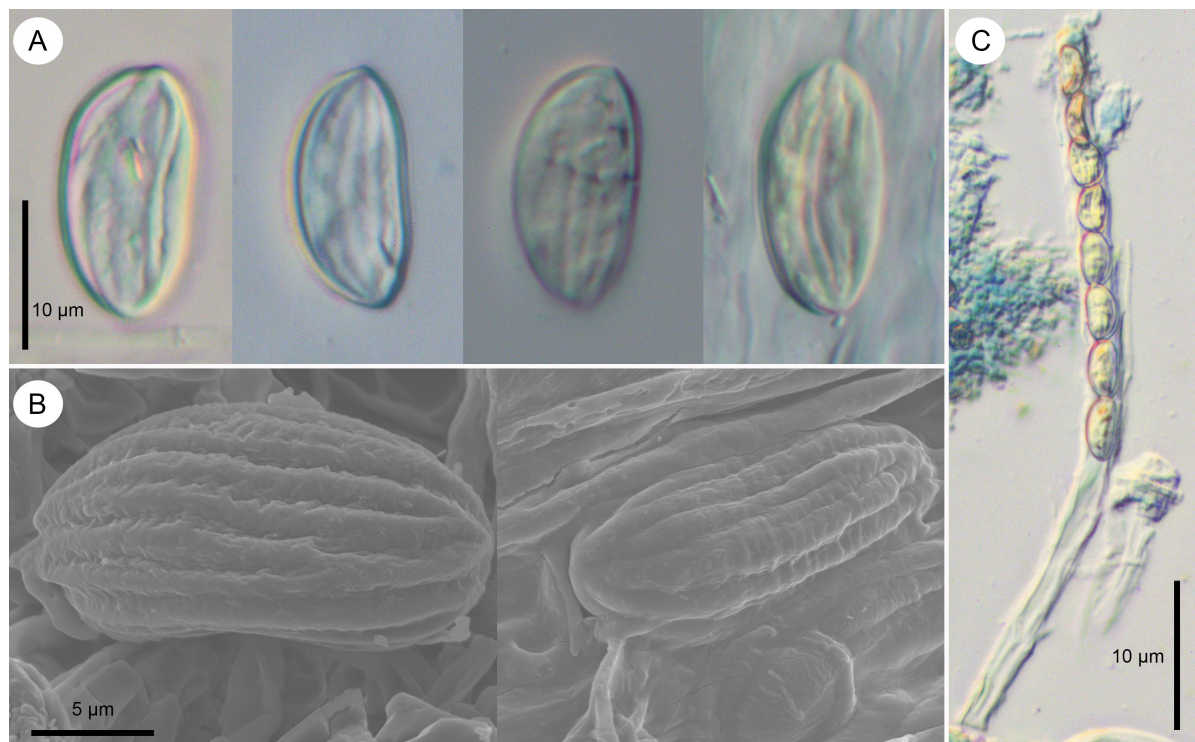


FIGURE 2. Micrographs of *Phillipsia straminea* (SAPA 25.10.3.10). (A)(B) Ascospores with fine longitudinal ornaments. (C) 8-spored ascus. Observed in OM (A, C) mounted in CB/LA; in SEM (B).

Notes:—In the Ogasawara Islands, *P. domingensis* with a purple to pink hymenium are very commonly found. Although dried specimens of *P. domingensis* may fade to whitish, pink, or buff (Denison 1969), there have been no reports of the hymenium appearing yellow or white in the fresh state. Considering that Ito & Imai (1937a) stated that ‘*P. straminea* is easily distinguished from other species in this genus by the straw-yellow hymenium’, it is highly probable that *P. straminea* is distinct from *P. domingensis*.

In *Phillipsia*, *P. brasiliensis* (Rick (1904:246)) Le Gal (1953:262), *P. dochmia* (Berkeley & M.A. Curtis (1868: 364)) Seaver (1928:184), *P. lutea* Denison (1969:296), and *P. rugospora* Paden (1977:2685) also have yellow hymenia (Denison 1969, Ekanayaka *et al.* 2017, Paden 1977). However, *P. lutea* has larger ascospores ((30–)34–40(–42) × (12–)13–14(–15) vs. 22.5–30 × 12–13.5 µm) and 4-spored asci (Denison 1969), whereas *P. straminea* was found to have 8-spored asci in this study (Figure 2C). Ascospores of *P. brasiliensis* are smaller (16.5–23.5 × 9–13 µm vs. 22.5–30 × 12–13.5 µm) (Le Gal 1953). The ascospores of *P. dochmia* and *P. rugospora* are nearly the same in size as those of *P. straminea*. However, their surfaces appeared smooth or only slightly wrinkled under a light microscope (Le Gal 1953; Paden 1977), whereas the ascospores of *P. straminea* exhibited conspicuous longitudinal ridges even at OM examination (Figure 2A). This strongly suggests that *P. straminea* is distinct from these four species with yellow hymenia.

Disclosure

The authors declare no conflict of interest. All experiments undertaken in this study complied with the current laws of Japan, including the access and benefit-sharing agreement and the Plant Protection Act of Japan.

Acknowledgements

We are very thankful to Dr. Akihiro Tuji at the National Museum of Nature and Science and Mr. Yuki Kurosaki at the University of Tsukuba for technical support with SEM.

References

- Berkeley, M.J. (1852) Enumeration of some fungi from St. Domingo. *Annals and Magazine of Natural History Series* 9 (2): 192–203.
- Berkeley, M.J. & Curtis, M.A. (1860) Characters of new fungi, collected in the North Pacific exploring expedition by Charles Wright. *Proceedings of the American Academy of Arts and Sciences* 4: 111–130.
- Berkeley, M.J. (1868) On a collection of fungi from Cuba. Part II, including those belonging to the families Gasteromycetes, Coniomycetes, Hyphomycetes, Physomycetes, and Ascomycetes. *Journal of the Linnean Society, Botany* 10: 341–392.
<https://doi.org/10.1111/j.1095-8339.1868.tb00648a.x>
- Denison, W.C. (1969) Central American Pezizales. III. The genus *Phillipsia*. *Mycologia* 61 (2): 289–304.
<https://doi.org/10.2307/3757123>
- Eckblad, F.E. (1968) The genera of the operculate discomycetes: A re-evaluation of their taxonomy, phylogeny, and nomenclature. *Nytt Magasin for Botanikk* 15 (1–2): 1–191.
- Ekanayaka, A.H., Bhat, D.J., Hyde, K.D., Gareth, J.E.B. & Zhao, Q. (2017) The genus *Phillipsia* from China and Thailand. *Phytotaxa* 316 (2): 138–148.
<https://doi.org/10.11646/phytotaxa.316.2.3>
- Engler, H.G.A. & Prantl, K.A.E. (1897) *Die Natürlichen Pflanzenfamilien nebst ihren Gattungen und wichtigeren Arten, insbesondere den Nutzpflanzen. Nachträge zum II. IV. Teil I.* Leipzig, 513 pp.
- Hosaka, K., Kobayashi, T., Castellano, M.A. & Orihara, T. (2018) The status of voucher specimens of mushroom species thought to be extinct from Japan. *Bulletin of the National Museum of Nature and Science. Series B, Botany* 44: 53–66. [https://www.kahaku.go.jp/albums/abm.php?d=1292&f=abm00001738.pdf&n=L_BNMNS_B44-2_53.pdf]
- Kobayashi, T. (2020) Fungi. In: Hokkaido University Museum (Ed.) *Amazing Specimens of the Hokkaido University Museum*. Hokkaido Shimbun Press, Sapporo, pp. 44–64. [in Japanese]
- Kuntze, C.E.O. (1891) *Revisio Generum Plantarum. Vol. 2.* Arthur Felix, Leipzig, 429 pp.
- Ito, S. & Imai, S. (1937a) Fungi of the Bonin Islands I. *Transactions of the Sapporo Natural History Society* 15: 1–12. [<http://hdl.handle>]

net/2115/64209]

- Ito, S. & Imai, S. (1937b) Fungi of the Bonin Islands II. *Transactions of the Sapporo Natural History Society* 15: 52–59. [<http://hdl.handle.net/2115/64218>]
- Ito, S. & Imai, S. (1939) Fungi of the Bonin Islands III. *Transactions of the Sapporo Natural History Society* 16: 9–20. [<http://hdl.handle.net/2115/64254>]
- Ito, S. & Imai, S. (1940a) Fungi of the Bonin Islands IV. *Transactions of the Sapporo Natural History Society* 16: 45–56. [<http://hdl.handle.net/2115/64264>]
- Ito, S. & Imai, S. (1940b) Fungi of the Bonin Islands V. *Transactions of the Sapporo Natural History Society* 16: 120–137. [<http://hdl.handle.net/2115/64271>]
- Le Gal, M. (1953) *Les discomycètes de Madagascar. Prodrôme à une flore mycologique de Madagascar et dépendances. IV*. Muséum national d'histoire naturelle, Paris, 465 pp.
- Ministry of the Environment, Japan (2025) *The 5th Red Databook Fungi: Threatened wildlife of Japan*. Ministry of the Environment. Tokyo, 529 pp.
- Ohmae, M. (2019) A record of the eld trip of sequestrate fungi in Bonin Islands, Japan. *Truffology* 2 (1): 26–32. [in Japanese] [https://jats-truffles.org/wp-content/uploads/truffology/vol_2/T2019-07_Ohmae.pdf]
- Paden, J.W. (1977) Two new species of *Phillipsia* from Central America. *Canadian Journal of Botany* 55 (21): 2685–2692. <https://doi.org/10.1139/b77-307>
- Rick, J. (1904) Über einige neue und kritische Pilze Süd-Amerikas. *Annales Mycologici* 2 (3): 242–247.
- Seaver, F.J. (1928) *The North American cup-fungi (Operculates)*. Self-published, New York, 377 pp. <https://doi.org/10.2307/3753859>
- Turland, N.J., Wiersema, J.H., Barrie, F.R., Gandhi, K.N., Gravendyck, J., Greuter, W., Hawksworth, D.L., Herendeen, P.S., Klopfer, R.R., Knapp, S., Kusber, W.-H., Li, D.-Z., May, T.W., Monro, A.M., Prado, J., Price, M.J., Smith, G.F. & Zamora Señoret, J.C. (2025) *International Code of Nomenclature for algae, fungi, and plants (Madrid Code)*. Accepted by the Twentieth International Botanical Congress, Madrid, Spain, July 2024. The University of Chicago Press, Chicago, 303 pp.
- Yano, O., Shimizu, A. & Ikeda, H. (2011) Cyperaceae collected from Tokyo Prefecture in the Herbarium of the University of Tokyo (TI) I. From Ogasawara (Bonin) Islands. *The journal of Japanese Cyperology* 16: 41–68. [in Japanese]