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Bryophytes of the Imperial Palace, Tokyo, Japan, 2025

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Abstract. The bryophyte flora of the Imperial Palace, Tokyo, Japan, was surveyed in 2021–2025. A total of 117 species were recognized, including 16 newly recorded for this area. When combined with records from the two previous surveys, 149 bryophyte species in total have been documented. The Imperial Palace harbors the richest bryophyte flora within the urban districts of Tokyo Metropolis (i.e., the 23 wards). Comparison of the occurrence of epiphytic species among the three surveys suggests that the environment within the Imperial Palace has remained stable over the past three decades.

Keywords: bryophytes, flora, Imperial Palace, Japan

The Imperial Palace is the largest wooded area within the urban districts of Tokyo Metropolis (i.e., the 23 wards). The bryophyte flora of the Imperial Palace has been investigated since 1995, with two major surveys conducted during 1995–1999 and 2009–2013 (Higuchi and Furuki, 2000, 2014). According to these surveys, a total of 133 bryophyte species were recorded in this area. These studies revealed that the Imperial Palace harbors the richest bryophyte flora within the urban districts of Tokyo Metropolis. Bryophytes, especially epiphytic species, are highly sensitive to environmental changes and are therefore well suited as indicator organisms for monitoring the dynamic urban environment (Taoda, 1972; LeBlanc and Rao, 1975; Żołnierz et al., 2022). In their first report on the bryophyte flora of the Imperial Palace, Higuchi and Furuki (2000) proposed conducting surveys focusing on epiphytic species as a means of documenting future environmental changes. Long-term surveys of their occurrence are crucial for conserving the natural environment of the Imperial Palace.

As the third phase of biotic surveys in the Imperial Palace, an investigation of the bryophyte flora was conducted in 2021–2025. This study provides a list of bryophyte species confirmed during the third survey and discusses the temporal changes in the bryophyte flora documented across the three surveys.

Materials and Methods

Field investigations were conducted in 2021–2025, and a total of 950 specimens were collected. The main sites investigated are listed as follows.

1: Fukiage Imperial Garden ［吹上御苑］
2: Inui Pass ［乾通り/乾門通り］
3: Pass along Shimo-dokan-bori ［下道灌濠沿いの管理道］
4: Kyuden-nishi-mikurumayose ［宮殿西御車寄］
5: Hokutei Pass ［北庭通り］
6: Nantei Pass ［南庭通り］
7: Hisagoike Pond and its surrounding area ［瓢池およびその周辺］
8: Omichi Garden ［大道庭園］
9: Biological Laboratory ［生物学研究所］
10: Fukiage-nishi Pass ［吹上西通り］
11: Hanzomon Gate and its surrounding area ［半蔵門およびその周辺］
12: Dokan-shinmichi ［道灌新道］
13: The square on the south side of Kashiko-dokoro ［賢所南側の広場］

Morphological observations were made using dissecting and bright-field microscopes. The complete set of specimens is preserved in the herbarium of the National Museum of Nature and Science (TNS), with some duplicates in the herbarium of Natural History Museum and Institute, Chiba (CBM).

Results and Discussion

The bryophytes recognized in this study comprise 117 species (79 mosses, 37 liverworts and 1 hornwort). We added 16 species to the bryophyte flora of the Imperial Palace. When combined with records from the two previous surveys, 149 bryophyte species (101 mosses, 46 liverworts and 2 hornworts) in total have been documented.

List of species recorded in 2021–2025

The following list is based on the collection by the authors in 2021–2025. Species are arranged alphabetically in Bryophyta, Marchantiophyta and Anthocerotophyta. The scientific names and their taxonomic placement follow World Flora Online Plant List June 2025 (The World Flora Online Consortium et al., 2025). Each species name is followed by the place names which are generally abbreviated in Materials and Methods, the substrata, the specimen number(s), and in some instances, miscellaneous notes. Newly recorded species from the area are marked with asterisks. The substrata and collectors are abbreviated below.

Abbreviations of substrata: a (asphalt of road), b (boulder), c (concrete), dl (decaying log), ds (decaying stump), h (humus), l (log), r (rock), rc (rock cliff), s (soil), sw (stone wall), tr (tree root), tt (tree trunk).

Abbreviations of collectors: mh (Masanobu Higuchi), tf (Tatsuwo Furuki), yi (Yuya Inoue).

Bryophyta

Atrichum undulatum (Hedw.) P.Beauv.

2: s, mh-58328; sw, yi-9207. **3:** s, mh-58145. **6:** s, mh-57986; s, yi-8621. **7:** s (covering stone wall), yi-8627. **11:** s, mh-58346.

Barbula unguiculata Hedw.

3: sw, mh-58140. **6:** b, mh-57988. **7:** s, yi-8645.

Brachythecium buchananii (Hook.) A.Jaeger

6: s, mh-57985.

Brachythecium novae-angliae (Sull. & Lesq.) Austin

3: sw, mh-58147. **7:** h, mh-58001. **9:** h, mh-57865.

Brothera leana (Sull.) Müll.Hal.

1: s, yi-8475; tree stump, yi-9257. **7:** s, yi-8647. **11:** tt (*Pinus thunbergii*), mh-58354.

Bryum argenteum Hedw.

2: c, yi-9889. **5:** sw, mh-57859. **9:** c, mh-57606.

Calohypnum plumiforme (Wilson) Jan Kučera & Ignatov

2: tr (*Pinus thunbergii*), mh-58326; s, yi-9895; sw, yi-9226. **9:** h, mh-57864; s, yi-8458. **10:** tt, yi-9910. **13:** s, yi-8652.

Campylopus sinensis (Müll.Hal.) J.-P.Frahm

6: tt (*Pinus thunbergii*), mh-57987.

Campylopus umbellatus (Arn.) Paris

2: sw, yi-9229.

Ceratodon purpureus (Hedw.) Brid.

8: s, yi-8539.

Chenia leptophylla (Müll.Hal.) R.H.Zander

2: sw, yi-9171.

****Claopodium aciculum*** (Broth.) Broth. (Fig. 1A)

8: s, yi-8537.

In Tokyo, this species has been recorded from Shibuya (Higuchi and Kawai, 2013) and Suginami (Koike and Yazawa, 1990) Wards, as well as Hachioji City (Mizushima, 1957; Noguchi, 1964; Watanabe et al., 1995; Hori, 2010, 2016), and Hachijo Island of Izu Islands (Noguchi, 1964).

Climacium dendroides (Hedw.) F.Weber & D.Mohr

1: h, mh-57618; h, yi-8482.

Cratoneuron filicinum (Hedw.) Spruce

1: b, mh-57625; b, mh-57620; stake, mh-57622; b, yi-8493.

Didymodon schensianus (Müll.Hal.) J.A.Jiménez, M.J.Cano & Y.Inoue

2: sw, yi-9894. **8:** c, mh-57828. **9:** cement board of roof, mh-57605.

Entodon challengeri (Paris) Cardot

1: b, mh-57870; dl, mh-58174; tt, mh-57879. **2:** sw, yi-9206; tt, yi-9233; tt, yi-9901. **3:** tt, yi-8728. **7:** c (stairs), mh-58003. **8:** dl, mh-57849. **9:** tt,

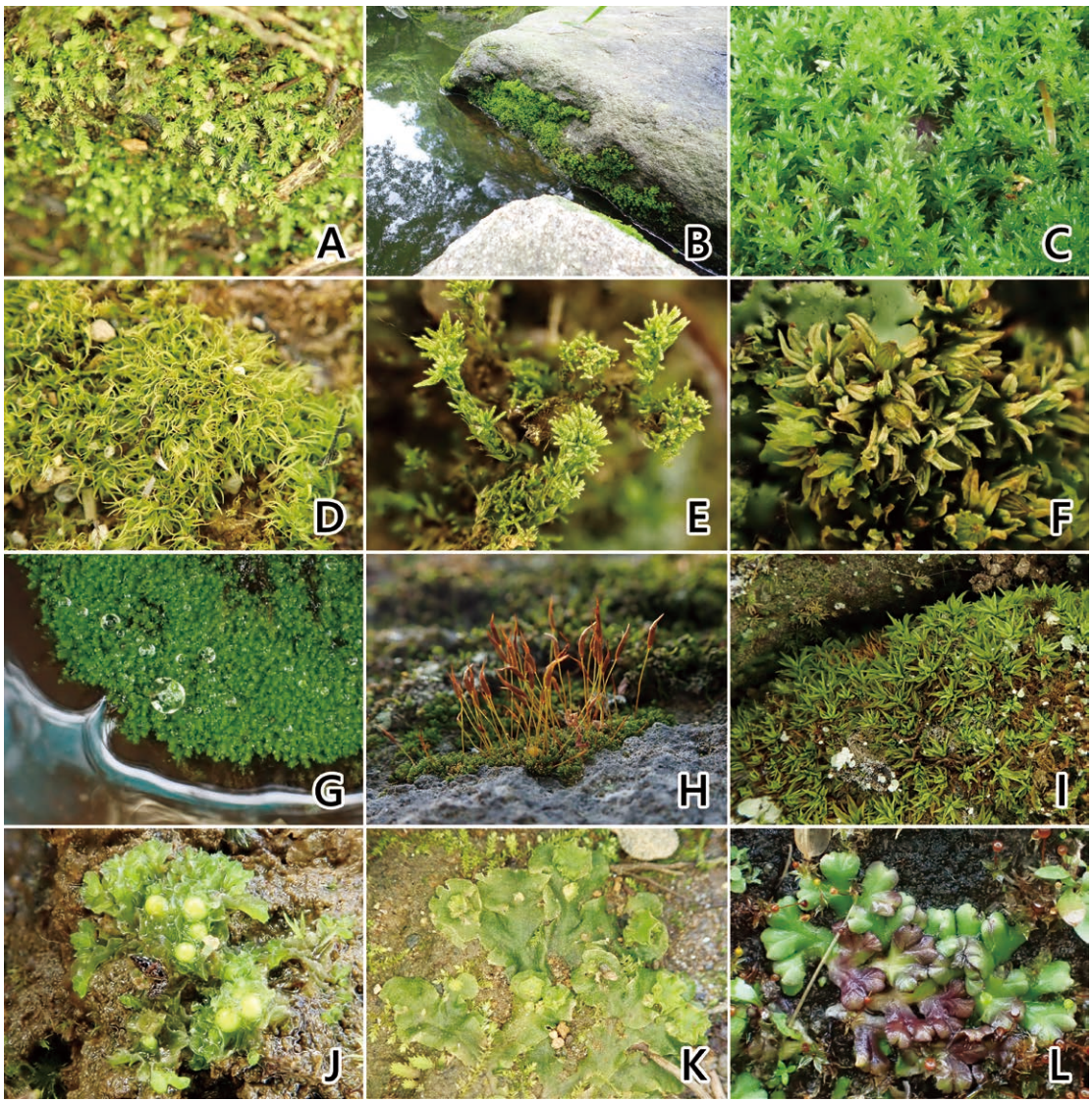

Fig. 1. Bryophytes confirmed during the survey (2021–2025) in the Imperial Palace. A. *Claopodium aciculum* (Broth.) Broth. B, C. *Hydrogonium subcomosum* (Broth.) P.C.Chen. D. *Leptobryum pyriforme* (Hedw.) Wilson. E. *Okamuraea brachydictyon* (Cardot) Nog. F. *Orthotrichum consobrinum* Cardot. G. *Philonotis hastata* (Duby) Wijk & Margad. H. *Tortula obtusifolia* (Schwägr.) Mathieu. I. *Trichostomum platyphyllum* (Broth. ex Ihsiba) P.C.Chen. J. *Fossombronia japonica* Schiffn. K. *Monosolenium tenerum* Griff. L. *Ricciocarpos natans* (L.) Corda

yi-8453; tt (*Diospyros kaki*), mh-57588; cement board of roof, mh-57602. **10:** a, mh-58341; tt, mh-58339. **11:** a, yi-9921.

****Entodon luridus*** (Griff.) A.Jaeger

1: boulder, mh-57621.

This species is characterized by the robust, densely and teretely foliate stems, the deeply cataneous setae and the peristome which is striolate below and papillose above, and its habitat is wet rocks in or beside streams (Mizushima, 1960 as *E. okamurae* Broth.). In Tokyo, the species has been recorded from Okutama Town, and Hachioji and Ome Cities (Mizushima 1960).

Entodon sullivantii (Müll.Hal.) Lindb.

2: c (gutter), mh-58323; sw, yi-10578. **3:** sw, mh-58133; sw, mh-58157; tt, yi-8733. **10:** c, yi-9912. **11:** sw, mh-58350.

Epipterygium nagasakense Broth.

9: s, yi-10913.

Fabronia matsumurae Besch.

1: tt, mh-57877. **2:** tt, yi-9891. **6:** sw, yi-8615. **7:** tt, mh-58007. **8:** tt, yi-8551. **9:** tt, (*Diospyros kaki*), mh-57592; tt (*Diospyros kaki*), mh-57590; cement board of roof, mh-57603. **10:** tt, mh-58340. **11:** sw, yi-9928.

Fissidens bryoides var. ***esquirolii*** (Thér.) Z.Iwats. & Tad.Suzuki

2: sw, yi-10567.

Fissidens geminiflorus Dozy & Molk.

1: b, mh-57633; b, yi-8490.

Fissidens linearis var. ***obscuriretis*** (Broth. & Paris) I.G.Stone

2: sw, yi-9181.

Fissidens taxifolius Hedw.

1: rc, mh-57629; s, yi-8474. **2:** s, yi-9885. **3:** s, yi-8740. **7:** s, yi-8637. **8:** s, mh-57831. **9:** s, yi-8456. **10:** s, yi-9905. **11:** s, mh-58344.

Fissidens tosaensis Broth.

2: s, mh-58331. **3:** s, mh-58156. **6:** s, mh-57970; s, mh-57971. **7:** s, yi-8634; s (covering stone wall), mh-57996. **8:** b, mh-57833; s, mh-57829; s, mh-57834.

Gemmabryum exile (Dozy & Molk.) J.R.Spence & H.P.Ramsay

5: sw, yi-8559. **8:** s, yi-8538. **9:** s, yi-8438.

Glyphomitrium humillimum (Mitt.) Cardot

1: sw, yi-10149; tt, mh-57878; tt, mh-58173. **2:** tt (*Pinus thunbergii*), mh-58327; tt, yi-9234. **4:** tt, yi-10119. **5:** sw, mh-57856; sw, yi-8556. **6:** sw, mh-57965; tt (*Pinus thunbergii*), mh-57974. **7:** tt, yi-8642. **8:** tt, yi-8549; tt (*Cerasus*), mh-57854. **9:** tt (*Pinus thunbergii*), mh-57863; tt, yi-8442. **10:** tt (*Cerasus* × *yedoensis* 'Somei-yoshino'), mh-58336.

Grimmia pilifera P.Beauv.

2: sw, yi-9180. **5:** sw, yi-8562. **6:** sw, mh-57977.

Haplocladium angustifolium (Hampe & Müll. Hal.) Broth.

1: b, mh-57869; b, yi-8487; rc, mh-57628. **2:** sw, yi-9230. **3:** sw, mh-58148; sw, mh-58166. **6:** tt (*Pinus thunbergii*), mh-57984. **11:** s, yi-9917.

Haplocladium microphyllum (Sw. ex Hedw.) Müll.Hal.

1: dl, mh-57610; tt, mh-58170. **7:** s, yi-8635; sw, mh-58004. **9:** s, yi-8440.

Haplohymenium triste (Ces.) Kindb.

1: tt, yi-9256. **2:** sw, yi-9197; tt (*Acer buergerianum*), mh-58332. **3:** sw, yi-8707. **10:** tt (*Cerasus* × *yedoensis* 'Somei-yoshino'), mh-58338.

Herpetineuron toccoae (Sull. & Lesq.) Cardot

1: b, yi-8489; dl, mh-57624. **2:** sw, yi-9183. **3:** sw, mh-58150; sw, yi-8732. **6:** sw, mh-57964; sw, mh-57978. **13:** s, yi-8650.

****Hydrogonium subcomosum*** (Broth.) P.C.Chen (Fig. 1B, C)

1: b, yi-10136.

This species is characterized by the acute leaf-apex, the well-developed adaxial stereid band of costa and the quadrate to short-oblong, papillose cells of adaxial surface of the costa (Saito, 1975 as *Barbula subcomosa* Broth.). In Tokyo, the species has been recorded from Miyake Island in the Izu Islands (Saito, 1975). Although the species was recognized as a calcareous moss (Tanaka, 2012 as *B. subcomosa*), it was found growing on submerged stepping stones in the pond at Fukiage Imperial Garden (1) in the present survey.

Hyophila involuta (Hook.) A.Jaeger

2: c, mh-58322. **11:** a, yi-9922.

Hyophila propagulifera Broth.

1: b, yi-8483. **2:** sw, yi-9170. **4:** sw, yi-10118. **6:** s, mh-57972; sw, mh-57981. **7:** c, yi-8636; c (stairs), mh-58002; sw, mh-58009. **8:** c, mh-57827. **9:** c, yi-8571. **10:** a, mh-58343; b, yi-9911.

Hypnum leptothallum Paris

2: tr, yi-9893; tr (*Pinus thunbergii*), mh-58325; sw, yi-9208. **3:** sw, yi-8702.

Isopterygium albescens (Hook.) A.Jaeger

1: l, yi-8467.

****Leptobryum pyriforme*** (Hedw.) Wilson (Fig. 1D)

8: s, yi-8545.

This species is characterized by the subulate or linear leaves and nodding, pyriform capsules, and its habitat is ground near human habitation and on roadside in forest (Noguchi and Iwatsuki, 1988). In Tokyo, the species has been recorded from Hachioji City (Hori, 2010).

Leptodictyum riparium (Hedw.) Warnst.

7: c, mh-57998; c, mh-57999; c, mh-58000; c, yi-8646.

Leskeella pusilla (Mitt.) Nog.

2: tt, yi-9890. **3:** c (wall), mh-58132; sw, yi-8727. **9:** tt, yi-8448.

Merceyopsis cataractae (Mitt.) Brinda, Ignatov & Fedosov

1: r, yi-8574; s, yi-8478; sw, yi-10135; gravel, mh-57617; gravel, mh-57872. **2:** sw, yi-9218. **4:** sw, yi-10116. **7:** s, yi-8622; copper gutters, mh-57992. **9:** s, yi-10912.

Mnium lycopodioides Schwägr.

7: sw, mh-57995.

Myuroclada maximowiczii (G.G.Borshch.) Steere & W.B.Schofield

2: sw, yi-9231.

Niphotrichum barbuloides (Cardot) Bedn.-Ochyra & Ochyra

1: sw, yi-10148.

****Okamuraea brachydictyon*** (Cardot) Nog. (Fig. 1E)

2: sw, yi-9232; tt, yi-9898. **3:** sw, mh-58149; sw, yi-8714.

This species is characterized by the brood branchlets or several innovations at shoot apex (Noguchi, 1953; Noguchi et al., 1991). In Tokyo, the species has been recorded from Hachioji City (Watanabe et al., 1995; Hori, 2010, 2016).

****Orthotrichum consobrinum*** Cardot (Fig. 1F)

2: tt, yi-9900. **10:** tt, yi-9906. **11:** sw, yi-9929. **12:** dl, mh-58167.

This species has been recorded from Minato (Higuchi and Furuki, 2019), Itabashi (Suga and Ohashi, 1992), Edogawa (Suga and Ohashi, 1992) and Shibuya (Higuchi and Kawai, 2013) Wards, Hachioji (Mizushima, 1957; Watanabe et al., 1995; Hori, 2010, 2016), Ome (Suga and Ohashi, 1992) and Higashikurume (Kito and Uzawa, 2023) Cities, and Hinode (Suga and Ohashi, 1992) and Okutama (Nagano and Kiguchi, 1977) Towns.

Oxyrrhynchium hians (Hedw.) Loeske

1: rc, mh-57631. **3:** sw, mh-58146. **6:** sw, mh-57979. **8:** s, mh-57853; s, mh-57832.

Oxyrrhynchium savatieri (Schimp. ex Besch.) Broth.

7: c, mh-57993.

****Philonotis hastata*** (Duby) Wijk & Margad. (Fig. 1G)

9: c, mh-57598.

This species is characterized by the wide thin-walled cells and blunt geminate teeth and the costa ending before leaf apex or weakly percurrent in innovation leaves (Koponen, 2009). In Japan, the species has been recorded in limestone area from Honshu, Shikoku and Kyushu (Iwatsuki, 1977), but there has been no record from Tokyo. In the present survey, we found it growing on concrete gutters at Biological Laboratory (9).

Philonotis turneriana (Schwägr.) Mitt.

2: sw, yi-9169. **3:** sw, yi-8718. **6:** s (covering stone wall), mh-57975. **7:** s (covering stone wall), yi-8624. **11:** s, yi-9923.

Physcomitrium japonicum (Hedw.) Mitt.

9: s, yi-10915.

Physcomitrium sphaericum (C.Ludw.) Brid.

9: s, mh-57595; s, mh-57584; s, mh-57585; s, yi-10917.

Plagiomnium acutum (Lindb.) T.J.Kop.

1: s, mh-57608; s, mh-58169; s, yi-8479; gravel, mh-57868. **2:** s, mh-58324; s, yi-9884. **3:** sw, mh-58152. **5:** a, yi-8564. **7:** h, mh-57990; s, yi-8630. **9:** s, mh-57587; s, yi-8435. **10:** a, mh-58342; s, yi-9914.

Plagiomnium vesicatum (Besch.) T.J.Kop.

1: b, mh-57626; b, yi-8496; h, mh-57614. **12:** s, mh-58168.

Plagiothecium nemorale (Mitt.) A.Jaeger

2: sw, yi-9193. **3:** s, mh-58155; sw, yi-8720.

****Pohlia bulbifera*** (Warnst.) Warnst.

1: s, mh-57874.

This species is characterized by the incurved leaf primordia, forming dome-shaped cavity over apex of bulbil (Smith, 2004; Akiyama and Yamaguchi, 2008). In Tokyo, the species has been recorded from Shibuya Ward (Higuchi and Kawai, 2013).

Pohlia proligera (Kindb. ex Breidl.) Lindb. ex Arnell

1: s, mh-57875; s, yi-8573. **2:** sw, yi-9219. **3:** s, mh-58144. **5:** s (covering stone wall), mh-57861; s (covering stone wall), mh-57860. **8:** s, mh-57852; s, yi-8544. **9:** s, yi-10914. **11:** s, mh-58352.

Pseudotaxiphyllum pohliicarpum (Sull. & Lesq.) Z.Iwats.

3: s, yi-8742.

Ptychomitrium sinense (Mitt.) A.Jaeger

1: b, yi-8753. **2:** tr (*Acer buergerianum*), mh-58334; sw, yi-9174. **3:** c (wall), mh-58131; sw, mh-58164; sw, yi-8744. **5:** sw, mh-57855; sw, yi-8561. **6:** sw, mh-57976; sw, yi-8610. **11:** sw, yi-9926.

Pylaisiadelpha tenuirostris (Bruch & Schimp. ex Sull.) W.R.Buck

1: dl, yi-10922; tt (*Castanopsis sieboldii*), mh-57609. **10:** tt (*Cerasus* × *yedoensis* 'Somei-yoshino'), mh-58337.

Pylaisiadelpha yokohamae (Broth.) W.R.Buck

1: tt, mh-58172; tt, yi-8468; tt, yi-8580; tt, yi-8750. **2:** tt (*Cerasus* × *yedoensis* 'Somei-yoshino'), mh-58335; tt (*Cerasus Sato-zakura* Group 'Sekiyama'), mh-58329; tt, yi-9882. **3:** tt (*Cerasus* × *yedoensis* 'Somei-yoshino'), mh-58143; tt, yi-8710. **5:** tt (*Cerasus*), mh-57862. **6:** sw, mh-57968; tt (*Pinus thunbergii*), mh-57973; tt, yi-8618. **7:** tt, yi-8644. **8:** tt, yi-8550. **9:** tt, yi-8455. **11:** tt, yi-9919.

Rhynchostegium inclinatum (Mitt.) A.Jaeger

1: dl, mh-57611; dl, mh-58176; rc, mh-57632; tt, mh-58171; tt (*Acer*), mh-57615; tt (*Zelkova serrata*), mh-57616. **3:** sw, mh-58138; sw, mh-58154; sw, mh-58165.

Rhynchostegium pallidifolium (Mitt.) A.Jaeger

1: b, mh-57873; b, mh-57867. **3:** s, mh-58163; s, mh-58141. **5:** sw, mh-57857. **11:** s, mh-58347.

Rosulabryum capillare (Hedw.) J.R.Spence

2: sw, yi-9184. **3:** sw, mh-58158. **5:** sw, mh-57858; sw, yi-8557. **6:** sw, mh-57969; sw, yi-8616.

Schistidium strictum (Turner) Loeske ex Mårtensson

5: sw, yi-8563.

Sciuro-hypnum plumosum (Hedw.) Ignatov & Huttunen

1: b, mh-57871. **6:** sw, mh-57966; sw, mh-57989. **8:** s, mh-57826. **9:** c, mh-57599.

Sematophyllum subhumile (Müll.Hal.) M.Fleisch.

1: dl, mh-57612; tt, yi-8756; tt, yi-8749. **2:** tt, yi-9881; tt (*Cerasus Sato-zakura* Group 'Sekiyama'), mh-58330. **10:** tt, yi-9907.

Syntrichia pagorum (Milde) J.J.Amann

2: sw, yi-10568.

Taxiphyllum taxirameum (Mitt.) M.Fleisch.

1: dl, mh-58175; s, yi-8481. **11:** s, mh-58349.

Thuidium kanedae Sakurai

1: b, mh-57637; h, mh-57619.

Tortula obtusifolia (Schwägr.) Mathieu (Fig. 1H)

2: sw, yi-9195. **5:** sw, yi-10128.

Trachycystis microphylla (Dozy & Molk.) Lindb.

2: sw, yi-9186. **3:** sw, mh-58161. **6:** s, mh-57983.

Trematodon longicollis Michx.

1: s, yi-8575. **7:** s, mh-57997; s, yi-8631.

****Trichostomum platyphyllum*** (Broth. ex Ihsiba) P.C.Chen (Fig. 1I)

3: sw, yi-8713. **4:** sw, yi-10120.

This species is characterized by the black stem and leaves being always widest at, or just above the middle portion (Saito, 1975). In Tokyo, the species has been recorded from Okutama Town (Nagano and Kiguchi, 1977; Ashida, 2001).

Venturiella sinensis (Venturi) Müll.Hal.

1: tt, mh-57876. **2:** sw, yi-9177; tt, yi-9883; tt (*Acer buergerianum*), mh-58321. **9:** tt (*Diospyros kaki*), mh-57591; cement board of roof, mh-57604.

Weissia controversa Hedw.

4: s, yi-10117. **6:** sw, yi-8620. **8:** s, mh-57836; s, mh-57830; s, yi-8543. 9: s, mh-57586; s, yi-8568. **11:** s, mh-58345.

****Weissia edentula*** Mitt.

2: sw, yi-9190; sw, yi-9194; sw, yi-9196. **6:** sw, yi-8612. **8:** s, yi-8542. **9:** s, yi-10916.

This species is characterized by the capsule without peristome teeth, and the narrow-lanceolate leaves and the narrowly incurved leaf-margin in distal 3/4–4/5 (Saito, 1975). In Tokyo, the species has been recorded from Hachioji City (Hori, 2010).

****Weissia japonica*** (G.Roth) Y.Inoue & H.Tsubota

5: s, yi-10129. **9:** s, yi-8567.

This species is characterized by the immersed, ovoid to subovoid capsule with an annulus (Inoue and Tsubota, 2017a, b). Although the species has not been recorded from Tokyo, reexamination of the specimens identified as *Astomum crispum* (Hedw.) Hampe or *Weissia crispa* (Hedw.) Mitt. is necessary.

****Weissia kiiensis*** (S.Okamura) Y.Inoue & H.Tsubota

1: s, yi-10150. **8:** s, yi-8540. **9:** s, mh-57866; s, yi-8566.

This species has a similar appearance to *W. japonica* in having the capsules deeply immersed among the perichaetial leaves, but it can be distinguished from *W. japonica* by the spherical capsule without an annulus (Inoue and Tsubota, 2017a, b). In Tokyo, the species has been recorded from Nishitokyo City (Inoue and Tsubota, 2017b).

Marchantiophyta

Acrolejeunea pusilla (Steph.) Grolle & Gradst.

1: rc, mh-57630; rc, tf-25829; tt (*Prunus*), tf-25847. **2:** tt, yi-9236; tt (*Cerasus*), tf-26135; tt (*Salix*), tf-26123. **5:** r, tf-25846. **6:** sw, tf-25853; sw, tf-25855; tt, yi-8619. **8:** r, tf-25843. **10:** tt, yi-9908; tt (*Cinnamomum*), tf-26137. **11:** r, tf-26146.

Acrolejeunea sandvicensis (Gottsche) Steph.

3: sw, mh-58135; sw, tf-25967; sw, yi-8703.

Apopellia endiviifolia (Dicks.) Nebel & D.Quandt

1: b, yi-9252. **6:** s, tf-25864. **7:** s, mh-58008. **8:** s, mh-57851; s, tf-25838.

****Calypogeia tosana*** (Steph.) Steph.

4: s, tf-26340.

In Tokyo, this species is recorded from Bunkyo (Nakamura, 1981), Ota (Makino, 1897 as *Kantia tosana* Steph.), Shibuya (Higuchi and Kawai, 2013), Kita (Tokyo-to Kita-ku Kankyo-hozen-ka, 1987) and Nerima (Nakamura, 1981) Wards, Hachioji City (Hiraoka et al., 1996; Hori, 2010), and Okutama Town (Inoue, 1986).

Cololejeunea japonica (Schiffn.) Mizut.

4: tt, tf-26341. **6:** sw, tf-25856.

Cololejeunea raduliloba Steph.

1: rc, tf-25826.

Conocephalum orientale H.Akiyama

1: rc, tf-25823; s, tf-25849; s, tf-26342. **2:** sw, tf-26130. **3:** sw, tf-25976. **6:** s, tf-25862. **9:** s, mh-57601. **10:** r, tf-26144; s, tf-26142.

Dumortiera hirsuta (Sw.) Nees

1: s, mh-57613; s, yi-8470; s, tf-25819; s, tf-26343. **2:** sw, tf-26125; sw, yi-9221. **3:** s, mh-58153; s, tf-25981; s, yi-8741; sw, mh-58162. **10:** r, tf-26143.

****Fossombronia japonic***a Schiffn. (Fig. 1J)

4: s, tf-26339. **9:** s, yi-8444.

In Tokyo, this species is recorded from Minato (Nakamura, 1981 as *F. cristula* Aust.; Higuchi and Furuki, 2019), Shinjuku (Nakamura, 1981 as *F. cristula*; Inoue, 1980 as *F. cristula*), Bunkyo (Schiffner, 1899; Nakamura, 1981 as *F. cristula*; Kitagawa, 1998 as *F. foveolata* var. *cristula* (Aust.) Schust) and Shibuya (Nakamura, 1981 as *F. cristula*) Wards, and Hachioji (Hori, 2010, 2016 as *F. foveolata* var. *cristula*) and Chofu (Nakamura, 1981 as *F. cristula*) Cities.

Frullania inflata Gottsche

3: sw, tf-25971; sw, tf-25972. **6:** sw, tf-25851; sw, tf-25857; sw, tf-25859.

Frullania muscicola Steph.

1: rc, tf-25828. **2:** tt (*Pinus thunbergii*), mh-58333. **6:** sw, tf-25854. **11:** tt (*Pinus thunbergii*), mh-58353. **12:** fallen branch, yi-8745.

Frullania parvistipula Steph.

1: tt (*Prunus*), tf-25848. **2:** tt, yi-9896. **9:** tt, yi-8443.

Heteroscyphus argutus (Reinw., Blume & Nees) Schiffn.

1: rc, tf-25824; s, tf-26344; b, yi-8484. **2:** sw, tf-26126; sw, yi-9172. **3:** sw, tf-25968. **12:** c, yi-8746.

Lejeunea japonica Mitt.

1: b, yi-8495; rc, tf-25827. **2:** sw, yi-9173; sw, tf-26127; sw, tf-26128; sw, tf-26131. **3:** sw, tf-25965; sw, tf-25973; sw, tf-25974; sw, tf-25975; sw, tf-25978; sw, yi-8701; sw, yi-8736.

Liochlaena subulata (A.Evans) Schljakov

3: sw, tf-25970.

Lophocolea minor Nees

1: tt, yi-8572. **2:** sw, yi-9216. **3:** c, yi-8706; sw, tf-25966. **5:** r, tf-25845. **6:** sw, mh-57967; sw, tf-25852; tt, yi-8617.

Lunularia cruciata (L.) Dumort. ex Lindb.

3: s, tf-25980. **4:** s, tf-26337; s, tf-26338. **8:** s, mh-57837; s, yi-8532; s, tf-25837.

Marchantia paleacea subsp. ***diptera*** (Nees & Mont.) Inoue

2: sw, tf-26134. **7:** s, tf-25868. **13:** s, mh-58011.

Marchantia papillata subsp. ***grossibarba*** (Steph.) Bischl.

9: s, mh-57594.

Marchantia polymorpha subsp. ***ruderalis*** Bischl. & Boissel.-Dub.

1: s, yi-10144; s, tf-25808; s, tf-25814; s, tf-25820. **2:** sw, yi-9200. **8:** s, yi-8547; s, tf-25839. **9:** s, yi-8463. **13:** s, yi-8653.

Metzgeria lindbergii Schiffn.

1: b, mh-57627; b, yi-8492; rc, tf-25825. **3:** sw, mh-58160; sw, tf-25979; sw, yi-8735.

Monosolenium tenerum Griff. (Fig. 1K)

6: s, tf-25860. **7:** s, mh-58005; s, yi-8654. **8:** s, mh-57835; s, yi-8528; s, tf-25836; s, tf-25840.

This species is designated as Near Threatened (NT) by the Ministry of the Environment, Japan (2025).

Nardia assamica (Mitt.) Amakawa

7: s, tf-25867. **13:** s, yi-8651.

Porella ulophylla (Steph.) S.Hatt.

1: tt, yi-9259. **8:** tt, yi-8553. **9:** tt (*Diospyros kaki*), mh-57589.

Radula tokiensis Steph.

1: b, yi-8488; rc, tf-25982.

Reboulia hemisphaerica subsp. ***orientalis*** R.M. Schust.

2: sw, yi-9185; sw, tf-26129. **3:** sw, mh-58137; sw, tf-25969; sw, yi-8712. **4:** s, tf-26334. **6:** s, mh-57982; s, tf-25863. **8:** s, tf-25842. **9:** s, yi-8464. **11:** s, yi-9916.

****Riccia beyrichiana*** Hampe ex Lehm.

4: s, tf-26336.

This species is similar to *R. bifurca* Hoffm., which was reported in the first and second surveys (Higuchi and Furuki, 2014). However, the species can be distinguished from *R. bifurca* by its larger spores (75–105 µm) and the colorless marginal hairs of the thallus (Tominaga and Furuki, 2014; Furuki, 2020). In Tokyo, the species has been recorded from Hachioji City (Tominaga and Furuki, 2014).

Riccia fluitans L.

1: s, tf-25811. **2:** s (covering stone wall), yi-9205; sw, tf-26124.

Riccia huebeneriana Lindenb.

9: s, tf-25818. **10:** s, tf-26136; s, tf-26138; s, tf-26141.

Riccia lamellosa Raddi

1: s, tf-25821. **4:** s, tf-26335. **7:** s, tf-25865; s, tf-25869. **8:** s, tf-25841.

Riccia miyakeana Schiffn.

9: s, tf-25812; s, tf-25815. **10:** s, tf-26139.

Riccia nigrella DC.

1: s, tf-25822. **8:** s, tf-25844; s, yi-8554.

Riccia nipponica S.Hatt.

9: s, tf-25813.

Riccia sorocarpa Bisch.

9: s, tf-25810.

****Ricciocarpos natans*** (L.) Corda (Fig. 1L)

9: s, mh-57593; s, tf-25816.

In Tokyo, this species has been recorded from Hachioji (Hori et al., 2012; Hori, 2016), Higashikurume (Kito and Uzawa, 2023) and Akiruno (Hori et al., 2012) Cities. The species is designated as Near Threatened (NT) by the Ministry of the Environment, Japan (2025).

Sandea japonica Steph. ex Yoshin.

2: sw, yi-9176; sw, tf-26132. **4:** s, tf-26333. **6:** s, tf-25861. **7:** s, mh-58006; s, yi-8638. **9:** s, mh-57600; s, yi-8465. **10:** s, tf-26140.

Solenostoma truncatum (Nees) R.M.Schust. ex Váňa & D.G.Long

2: sw, tf-26133; sw, yi-10566. **3:** sw, tf-25977. **6:** c, tf-25858. **7:** r, tf-25866. **10:** r, tf-26145.

Anthocerotophyta

Notothylas orbicularis (Schwein.) Sull.

1: s, tf-25809; s, tf-25817.

Temporal Changes in Bryophyte Flora

In the first survey (1995–2000), a total of 107 species were recorded, comprising 77 mosses, 29 liverworts, and one hornwort. In the second survey (2009–2013), 107 species were recorded, consisting of 67 mosses, 39 liverworts, and one hornwort. Based on these records and the results of the present survey, the occurrence history of each species is summarized in Table 1. In the present survey, 16 species were newly recorded (14 mosses and two liverworts). These species have also been reported from mainland Tokyo, except for *Hydrogonium subcomosum* and *Philonotis hastata*. Since some of these species are small in size and highly seasonal, they may have been overlooked in the previous surveys.

Table 1. Occurrence (presence = 1 / absence = 0) of bryophyte species in the Imperial Palace based on three surveys (Phase I: 1995–2000; Phase II: 2009–2014; Phase III: 2021–2025). Accepted names with underlining indicate epiphytic species.

Accepted name	I	II	III	Synonym and taxonomic note
Bryophyta				
Atrichum undulatum (Hedw.) P.Beauv.	1	1	1	
Barbula unguiculata Hedw.	0	1	1	
Brachythecium buchananii (Hook.) A.Jaeger	1	1	1	
Brachythecium helminthocladum Broth. & Paris	1	0	0	
Brachythecium noesicum Besch.	1	0	0	*Bryhnia tokubuchii* (Broth.) Paris
Brachythecium novae-angliae (Sull. & Lesq.) Austin	1	1	1	*Bryhnia novae-angliae* (Sull. & Lesq.) Grout
Brothera leana (Sull.) Müll.Hal.	1	0	1	
Bryum argenteum Hedw.	1	1	1	
Callicladium haldanianum (Grev.) H.A.Crum	0	1	0	
Calohypnum plumiforme (Wilson) Jan Kučera & Ignatov	1	1	1	*Hypnum plumiforme* Wilson
Campylopus sinensis (Müll.Hal.) J.-P.Frahm	1	1	1	*Campylopus japonicus* Broth.
Campylopus umbellatus (Arn.) Paris	1	0	1	
Ceratodon purpureus (Hedw.) Brid.	1	1	1	
Chenia leptophylla (Müll.Hal.) R.H.Zander	1	1	1	
Claopodium aciculum (Broth.) Broth.	0	0	1	
Climacium dendroides (Hedw.) F.Weber & D.Mohr	1	1	1	
Cratoneuron filicinum (Hedw.) Spruce	1	1	1	
Dicranella heteromalla (Hedw.) Schimp.	1	1	0	
Didymodon schensianus (Müll.Hal.) J.A.Jiménez, M.J.Cano & Y.Inoue	1	1	1	*Didymodon constrictus* sensu auct. Jap. non (Mitt.) K.Saito (Jiménez et al., 2024)
Ditrichum pallidum (Hedw.) Brockm.	0	1	0	
Entodon challengeri (Paris) Cardot	1	1	1	
Entodon luridus (Griff.) A.Jaeger	0	0	1	
Entodon scabridens Lindb.	1	0	0	
Entodon sullivantii (Müll.Hal.) Lindb.	1	1	1	
Ephemerum spinulosum Bruch & Schimp.	0	1	0	
Epipterygium nagasakense Broth.	1	1	1	*Epipterygium tozeri* sensu auct. Jap. non (Grev.) Lindb. (Hanusch et al., 2020)
Fabronia matsumurae Besch.	1	1	1	
Fissidens bryoides Hedw. var. *bryoides*	0	1	0	
Fissidens bryoides var. *esquirolii* (Thér.) Z.Iwats. & Tad. Suzuki	0	1	1	
Fissidens bryoides var. *lateralis* (Broth.) Z.Iwats. & Tad. Suzuki	1	0	0	
Fissidens gardneri Mitt.	1	1	0	*Fissidens microcladus* Thwaites & Mitt.
Fissidens geminiflorus Dozy & Molk.	0	1	1	
Fissidens hyalinus Wilson & Hook.	0	1	0	
Fissidens linearis var. *obscuriretis* (Broth. & Paris) I.G.Stone	1	1	1	*Fissidens obscuriretis* Broth. & Paris
Fissidens taxifolius Hedw.	1	1	1	
Fissidens teysmannianus Dozy & Molk.	1	0	0	*Fissidens adelphinus* Besch.
Fissidens tosaensis Broth.	1	1	1	
Gemmabryum exile (Dozy & Molk.) J.R.Spence & H.P.Ramsay	1	1	1	*Brachymenium exile* (Dozy & Molk.) Bosch & Sande Lac.
Glyphomitrium humillimum (Mitt.) Cardot	1	1	1	
Grimmia pilifera P.Beauv.	1	1	1	
Haplocladium angustifolium (Hampe & Müll.Hal.) Broth.	1	1	1	
Haplocladium microphyllum (Sw. ex Hedw.) Müll.Hal.	1	1	1	
Haplohymenium triste (Ces.) Kindb.	1	0	1	
Hedwigia ciliata (Hedw.) Boucher	0	1	0	
Herpetineuron toccoae (Sull. & Lesq.) Cardot	1	1	1	
Hydrogonium subcomosum (Broth.) P.C.Chen	0	0	1	
Hyophila involuta (Hook.) A.Jaeger	1	0	1	
Hyophila propagulifera Broth.	1	1	1	
Hypnum leptothallum Paris	1	1	1	*Eurohypnum leptothallum* (Paris) Ando
Isopterygium albescens (Hook.) A.Jaeger	1	1	1	*Isopterygium minutirameum* (Müll.Hal.) A.Jaeger
Leptobryum pyriforme (Hedw.) Wilson	0	0	1	
Leptodictyum riparium (Hedw.) Warnst.	0	1	1	

Table 1. Continued

Accepted name	I	II	III	Synonym and taxonomic note
Leskeella pusilla (Mitt.) Nog.	1	0	1	
Merceyopsis cataractae (Mitt.) Brinda, Ignatov & Fedosov	1	1	1	*Scopelophila cataractae* (Mitt.) Broth.
Micromitrium megalosporum Austin	0	1	0	
Mnium lycopodioides Schwägr.	1	0	1	
Myuroclada maximowiczii (G.G.Borshch.) Steere & W.B.Schofield	1	1	1	
Niphotrichum barbuloides (Cardot) Bedn.-Ochyra & Ochyra	0	1	1	*Racomitrium barbuloides* Cardot
Okamuraea brachydictyon (Cardot) Nog.	0	0	1	
Orthotrichum consobrinum Cardot	0	0	1	
Oxyrrhynchium hians (Hedw.) Loeske	1	1	1	*Eurhynchium hians* (Hedw.) Sande Lac.
Oxyrrhynchium savatieri (Schimp. ex Besch.) Broth.	1	1	1	*Eurhynchium savatieri* Schimp. ex Besch.
Philonotis hastata (Duby) Wijk & Margad.	0	0	1	
Philonotis turneriana (Schwägr.) Mitt.	1	1	1	
Physcomitrium japonicum (Hedw.) Mitt.	1	1	1	
Physcomitrium sphaericum (C.Ludw.) Brid.	1	1	1	
Plagiomnium acutum (Lindb.) T.J.Kop.	1	1	1	
Plagiomnium maximoviczii (Lindb.) T.J.Kop.	1	1	0	
Plagiomnium vesicatum (Besch.) T.J.Kop.	1	0	1	
Plagiothecium nemorale (Mitt.) A.Jaeger	1	1	1	
Pogonatum neesii (Müll.Hal.) Dozy	1	0	0	
Pohlia bulbifera (Warnst.) Warnst.	0	0	1	
Pohlia flexuosa Harv.	1	0	0	
Pohlia proligera (Kindb. ex Breidl.) Lindb. ex Arnell	1	1	1	
Pseudoleskeopsis zippelii (Dozy & Molk.) Broth.	1	0	0	
Pseudotaxiphyllum pohliicarpum (Sull. & Lesq.) Z.Iwats.	1	1	1	
Ptychomitrium sinense (Mitt.) A.Jaeger	1	1	1	
Pylaisiadelpha tenuirostris (Bruch & Schimp. ex Sull.) W.R.Buck	1	0	1	
Pylaisiadelpha yokohamae (Broth.) W.R.Buck	1	1	1	This species was reported as *P. tenuirostris* in previous studies (Higuchi and Furuki, 2000, 2014). However, reexamination of the voucher specimens revealed that only specimen mh-28713 was *P. tenuirostris*, whereas the others were *P. yokohamae*.
Rauiella fujisana (Paris) Reimers	1	0	0	
Rhynchostegium contractum Cardot	1	1	0	
Rhynchostegium inclinatum (Mitt.) A.Jaeger	0	1	1	
Rhynchostegium pallidifolium (Mitt.) A.Jaeger	1	1	1	
Rosulabryum capillare (Hedw.) J.R.Spence	1	1	1	*Bryum capillare* Hedw.
Schistidium strictum (Turner) Loeske ex Mårtensson	0	1	1	
Sciuro-hypnum plumosum (Hedw.) Ignatov & Huttunen	1	1	1	*Brachythecium plumosum* (Hedw.) Schimp.
Sematophyllum subhumile (Müll.Hal.) M.Fleisch.	1	1	1	*Sematophyllum pulchellum* (Cardot) Broth. / *Sematophyllum subhumile* subsp. *japonicum* (Broth.) Seki
Symblepharis crispifolia (Mitt.) Fedosov, M.Stech & Ignatov	1	0	0	*Oncophorus crispifolius* (Mitt.) Lindb.
Syntrichia pagorum (Milde) J.J.Amann	1	0	1	*Tortula pagorum* (Milde) De Not.
Taxiphyllum alternans (Cardot) Z.Iwats.	1	1	0	
Taxiphyllum taxirameum (Mitt.) M.Fleisch.	1	1	1	
Thuidium cymbifolium (Dozy & Molk.) Dozy & Molk.	1	0	0	
Thuidium kanedae Sakurai	1	1	1	
Tortula obtusifolia (Schwägr.) Mathieu	1	0	1	
Trachycystis microphylla (Dozy & Molk.) Lindb.	1	1	1	
Trematodon longicollis Michx.	1	0	1	
Trichostomum platyphyllum (Broth. ex Ihsiba) P.C.Chen	0	0	1	
Venturiella sinensis (Venturi) Müll.Hal.	1	1	1	
Vesicularia flaccida (Sull. & Lesq.) Z.Iwats.	1	0	0	
Weissia controversa Hedw.	1	1	1	
Weissia edentula Mitt.	0	0	1	
Weissia japonica (G.Roth) Y.Inoue & H.Tsubota	0	0	1	
Weissia kiiensis (S.Okamura) Y.Inoue & H.Tsubota	0	0	1	

Table 1. Continued

Accepted name	I	II	III	Synonym and taxonomic note
Marchantiophyta				
Acrolejeunea pusilla (Steph.) Grolle & Gradst.	1	1	1	
Acrolejeunea sandvicensis (Gottsche) Steph.	0	1	1	*Trocholejeunea sandvicensis* (Gottsche) Mizut.
Apopellia endiviifolia (Dicks.) Nebel & D.Quandt	1	1	1	*Pellia endiviifolia* (Dicks.) Dumort.
Calypogeia tosana (Steph.) Steph.	0	0	1	
Cephalozia hamatiloba Steph.	0	1	0	*Cephalozia otaruensis* Steph.
Cololejeunea japonica (Schiffn.) Mizut.	1	1	1	
Cololejeunea raduliloba Steph.	0	1	1	
Conocephalum orientale H.Akiyama	1	1	1	*Conocephalum conicum* auct. Jap. non (L.) Dumort. (Akiyama and Odrzykoski, 2020; Akiyama, 2022) / *Conocephalum sp.*
Douiniella spinicaulis (Douin) Bakalin, Maltseva & A.V.Troitsky	0	1	0	*Cephaloziella spinicaulis* Douin
Dumortiera hirsuta (Sw.) Nees	1	1	1	
Fossombronia japonica Schiffn.	0	0	1	
Frullania hamatiloba Steph.	1	0	0	
Frullania inflata Gottsche	1	1	1	
Frullania muscicola Steph.	1	1	1	
Frullania parvistipula Steph.	1	1	1	
Frullania usamiensis Steph.	0	1	0	
Heteroscyphus argutus (Reinw., Blume & Nees) Schiffn.	1	1	1	
Lejeunea discreta Lindenb.	0	1	0	
Lejeunea japonica Mitt.	1	1	1	
Liochlaena subulata (A.Evans) Schljakov	0	1	1	
Lophocolea minor Nees	1	1	1	*Chiloscyphus minor* (Nees) J.J.Engel & R.M.Schust.
Lunularia cruciata (L.) Dumort. ex Lindb.	1	1	1	
Marchantia paleacea subsp. *diptera* (Nees & Mont.) Inoue	1	0	1	
Marchantia papillata subsp. *grossibarba* (Steph.) Bischl.	1	1	1	*Marchantia emarginata* subsp. *tosana* (Steph.) Bischl.
Marchantia polymorpha subsp. *ruderalis* Bischl. & Boissel.-Dub.	0	1	1	
Metzgeria lindbergii Schiffn.	1	1	1	
Microlejeunea ulicina (Taylor) Steph.	1	1	0	*Lejeunea ulicina* (Taylor) Gottsche, Lindenb. & Nees
Monosolenium tenerum Griff.	1	1	1	
Nardia assamica (Mitt.) Amakawa	0	1	1	
Porella ulophylla (Steph.) S.Hatt.	1	1	1	*Macvicaria ulophylla* (Steph.) Hatt.
Radula japonica Gottsche ex Steph.	0	1	0	
Radula tokiensis Steph.	1	1	1	
Reboulia hemisphaerica subsp. *orientalis* R.M.Schust.	1	1	1	
Riccia beyrichiana Hampe ex Lehm.	0	0	1	
Riccia bifurca Hoffm.	1	1	0	
Riccia fluitans L.	1	1	1	
Riccia glauca L.	0	1	0	
Riccia huebeneriana Lindenb.	1	0	1	
Riccia lamellosa Raddi	0	1	1	
Riccia miyakeana Schiffn.	1	1	1	
Riccia nigrella DC.	1	1	1	
Riccia nipponica S.Hatt.	1	1	1	
Riccia sorocarpa Bisch.	0	1	1	
Ricciocarpos natans (L.) Corda	0	0	1	
Sandea japonica Steph. ex Yoshin.	1	1	1	*Conocephalum japonicum* (Thunb.) Grolle
Solenostoma truncatum (Nees) R.M.Schust. ex Váňa & D.G.Long	1	1	1	*Jungermannia truncata* Nees
Anthocerotophyta				
Anthoceros agrestis Paton	0	1	0	
Notothylas orbicularis (Schwein.) Sull.	1	0	1	

Six species were previously recognized as rare or endangered in the Imperial Palace (Higuchi and Furuki, 2000). We reexamined their original localities and investigated their habitats in other areas. Although *Syntrichia pagorum* and *Tortula obtusifolia* were not recorded in the second survey (2009–2013), they were confirmed in the present survey. These species were observed on stone walls along Inui Pass (2), and *T. obtusifolia* was also found on stone walls along Hokutei Pass (5). *Monosolenium tenerum*, *Radula tokiensis*, and *Riccia fluitans* were confirmed again in the present survey, as in the first and second surveys. *Monosolenium tenerum* was found growing on moist soil in Nantei Pass (6), Hisagoike Pond and its surrounding area (7), and Omichi Garden (8) where the species had also been recorded in the earlier surveys. *Riccia fluitans* was observed on moist soil covering the bottom of a roadside ditch along Inui Pass (2). *Radula tokiensis* was found on a boulder near Otaki Waterfall in Fukiage Imperial Garden (1). In addition, *Ricciocarpos natans*, designated as Near Threatened (NT) by the Ministry of the Environment, Japan (2025), was newly found at the Biological Laboratory (9). In contrast, *Taxiphyllum alternans* (Cardot) Z.Iwats. was not recorded in the present survey.

Suga and Ohashi (1992) examined epiphytic bryophytes in Tokyo and, by comparing their results with those of Taoda (1972) two decades earlier, demonstrated an increase in the number of epiphytic species within the 23 wards, attributing this change to reductions in air pollution. Among the epiphytic species recorded in the Imperial Palace, 22 of the 26 species documented in either the first or second survey were also confirmed in the present survey (Table 1). In contrast, four species — *Entodon scabridens* Lindb., *Rauiella fujisana* (Paris) Reimers, *Frullania hamatiloba* Steph., and *Microlejeunea ulicina* (Taylor) Steph. — were not detected. These species had previously been found only on a limited number of host trees within the Imperial Palace, and it is likely that they have disappeared due to tree felling. In the case of *M. ulicina*, its extremely small size also makes it highly plausible that the species is overlooked during field surveys. In any case, it is unlikely that the reduction in species number is attributable to air pollution, suggesting that the environment within the Imperial Palace has remained stable over the past three decades. Furthermore, two species — *Okamuraea brachydictyon* (Cardot) Nog. and *Orthotrichum consobrinum* Cardot — were newly recognized in the present study. These species are relatively rare in urban areas (Taoda, 1979), and their occurrence supports the notion that the air quality within the Imperial Palace remains comparatively clean, even in the central wards of Tokyo.

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皇居のコケ植物(2025)

井上侑哉・古木達郎・樋口正信

皇居のコケ植物フロラを2021年から2025年にかけて調査した．今回の調査により，本地域から117種を確認し，そのうち16種は皇居のコケ植物フロラに新たに加わる記録であった．これまでの知見を総合すると，皇居には計149種のコケ植物が認められ，東京都区内において最もコケ植物フロラが豊富な地域であることが示された．さらに，一般に大気汚染に対して感受性が高いとされる樹幹着生種を対象として，過去2回の調査結果と種組成を比較したところ，本地域の環境が過去30年にわたり安定的に維持されてきたことが示唆された．