



New distribution records of *Selaginella* (Selaginellaceae) in Laos and Vietnam

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ABSTRACT

Southeast Asia represents a major center of diversity for ferns and lycophytes. Within this flora, the genus *Selaginella* comprises some of the most taxonomically challenging groups, frequently characterized by ambiguous, continuous, or cryptic morphological traits. These complexities commonly lead to misidentifications in both herbarium collections and the published literature. A comprehensive revision of herbarium specimens deposited in Russian and Vietnamese institutions has yielded significant clarifications and new records. Our study documents several previously unreported occurrences: *Selaginella subdiaphana*, *S. subeffusa* and *S. submonospora* are newly recorded for the flora of Vietnam, and *S. pulvinata* is reported for the first time in Laos. Furthermore, we identify novel, specific distribution points for *S. bodinieri* and *S. coriaceifolia* in Vietnam, and for *S. doederleinii* and *S. mairei* in Laos. To stabilize taxonomic nomenclature, lectotypes are designated for *S. mairei* and *S. elephantopus*.

Keywords: Eastern Indochina, lectotypification, plant diversity, plant geography

РЕЗЮМЕ

Шалимов А.П., Зайков В.Ф., Скапцов М.В., Аверьянов Л.В., Дан В.С., До В.Х., Чжан М.-Х., Чжан С.-Ч. Новые находки видов рода *Selaginella* (Selaginellaceae) в Лаосе и Вьетнаме. Юго-восточная Азия – один из центров разнообразия папоротников и плауновидных. Среди них род *Selaginella* является одной из наиболее сложных таксономических групп, представители которой часто обладают изменчивыми и недостаточно ясными отличительными признаками. В результате этого в гербариях и публикациях часто встречаются ошибочные определения. Изучение гербарных образцов в российских и вьетнамских гербариях, позволило нам обнаружить несколько новых находок видов рода для флоры Вьетнама и Лаоса. При этом виды *Selaginella subdiaphana*, *S. subeffusa* и *S. submonospora* были впервые найдены во Вьетнаме, а вид *S. pulvinata* впервые отмечен для Лаоса. Кроме того, мы нашли новые местонахождения *S. bodinieri* и *S. coriaceifolia* во Вьетнаме и *S. doederleinii* и *S. mairei* в Лаосе. Предложена лектотипификация для *S. mairei* и *S. elephantopus*.

Ключевые слова: Восточный Индокитай, лектотипификация, разнообразие растений, география растений

Taxonomic research on the genus *Selaginella* P. Beauv. in mainland Southeast Asia has been carried out by several authors, including Alston (1934a,b, 1951) for Indo-China, Tagawa & Iwatsuki (1979) for Thailand, Pham (1999) for Vietnam, Wong (1983, 2010) for Peninsular Malaysia, Zhang et al. (2013) for China and adjacent countries, Sun et al. (2014) for Cambodia, Khine et al. (2017) for Myanmar, and Newman et al. (2007) for Laos.

Over the past two decades, numerous new taxa have been described (Wu et al. 2017, Ye et al. 2020, Zhang et al. 2022, Shalimov et al. 2024), and new distribution records have been reported for Indochina and Peninsular Malaysia (Rachata & Boonkerd 2001, Zhang & Tan 2013, Phan et al. 2019, Chen et al. 2023, Shalimov & Zhang 2023).

The subgeneric classification of *Selaginella* has been subject to ongoing debate in recent years (Zhou & Zhang 2015,

Weststrand & Korall 2016, Zhou & Zhang 2023, Valdespino et al. 2024). The proposal by Zhou & Zhang to subdivide *Selaginella* into as many as 19 smaller genera has introduced significant taxonomic complexity. Our investigations of *Selaginella* in China and neighboring regions (Zhang 2004, Zhang et al. 2013, Shalimov & Zhang 2022a, b), complemented by herbarium studies in Laos and Vietnam, have led to the discovery of species previously unrecorded in eastern Indochina.

This study is based primarily on herbarium specimens deposited at LE, MHA, MW, HN, HNU, VNM, and VNMN. We also critically examined specimens of *Selaginella* from China and neighboring regions held at ASSAM, B, BM, CAL, E, GH, K, KUN, KYO, MO, P, PE, V, W, WU, and US, as well as digitized records accessible via the Global Biodiversity Information Facility (GBIF 2025).

Specimen identification was conducted through examination of protologues and relevant taxonomic literature (Alston 1951, Tagawa & Iwatsuki 1979, Wong 2010, Zhang et al. 2013, Sun et al. 2014, Shalimov & Zhang 2022a, b). Herbarium acronyms follow Thiers (2025).

The distribution of the studied taxa in Vietnam is given in accordance with the official administrative division of the country as provided by the Vietnam Administrative Atlas (Anonymous 2015) before the administrative reform of July 2025.

NEW RECORDS

Selaginella bodinieri Hieron., 1904, *Hedwigia* 43:6 (≡ *Hypopterygiopsis bodinieri* (Hieron.) Li Bing Zhang & X.M. Zhou, 2023, *Pl. Diversity* 45(6):667)

Type: CHINA: “habitat prope Gau-piu in provincial Kouy-Tcheou in excavation profundal, 20 IX 1897, L. Martin, E. Bodonier n. 1844” (holotype B [B 20 0129908] photo seen, isotypes E [E00414478] photo seen, P [P00279976, P00279974, P00279975, P00279973] photo seen).

Distribution and ecology. Previously treated as endemic to China where it was known from Chongqing, Guangxi, Guizhou, Hubei, Hunan, Sichuan, and Yunnan provinces (Zhang et al. 2013). However, recently Phan et al. (2019) reported *S. bodinieri* from Northeast Vietnam (Bac Me District of Ha Giang Province). Our examination of additional specimens indicates the occurrence of this species also in Cao Bang and Bac Kan Provinces of northern Vietnam. In China, this species can be found at elevations between 200 to 2100 m a.s.l. In Vietnam, it grows in primary broad-leaved evergreen forests on steep slopes near tops of remnant limestone ridges at elevations of 200–850 m a.s.l. (Phan et al. 2019).

Notes: *Selaginella bodinieri* is morphologically similar to *S. decipiens* Warb., from which differs by leaves with ciliate margins (vs. denticulate), and slightly dorsiventrally complanate strobili up to 16 mm long (vs. 4–6 mm).

Specimens examined. VIETNAM: CAO BANG PROVINCE “Thach An District, Duc Xuan Municipality (22°21'N 106°27'E), about 39 km to SSE from Cao Bang Town, 2 XII 1998. Averyanov, P.K. Loc, CBL821” (LE01284126, <https://en.herbariumle.ru/?t=occ&id=228261>), HN); “Trung Khanh District, Ngoc Khe Municipality, Pac Nga Village, around point 22°54'59"N 106°31'44"E, at elevation 800–850 m, 14 VI 2004. L. Averyanov, P.K. Loc, P.V. The, N.T. Vinh, HAL5732” (HNU); BAC KAN PROVINCE “Na Ri District, An Tinh Community, Kim Hy Nature Reserve, Na Duong Village, 3 XII 2013. Zhang et al., 6687” (VNMN).

Additional specimens examined. CHINA: SICHUAN PROVINCE “Emeishan, 3 VIII 1959, n. 453” (PE 00174962); *ibid.*, “1924, Du, 968” (PE 00174981); *ibid.*, “29 VIII 1963, Shing et al., 970” (PE 00174977); *ibid.*, “6 VIII 1940, Lee, 3202” (PE 00174974); *ibid.*, “Hongchunping, 1982, Wang, C308” (PE); *ibid.*, “Qingyin Pavilion, 3 VII 1984, Wang et al., C510” (PE 01866047); *ibid.*, “near Bailong Cave, 900 m, 1957, Yang, 56186” (PE); “Mingshan, Xindianzi, 5 XI 1956, Kong, 2122” (PE 00174972); “Daxiangling, Tongcheba Dam, Niba Mt., 13 VIII 1964, Kong, 4138” (PE 00174949); “Ya'an, alt. 500 m, 20 X 1956, Yang et al., 67” (PE 00174952); “Ya'an, alt. 700 m, 20 VII 1939, Zhang, 1.89” (PE 00174965); “Lushan, Dachuanchang limestone, alt. 1200 m, 29 VII 1958, Liu et al., 961” (PE 00174980); Tianquan County, Nangoutou, alt. 900 m, 17 IX 1963, Guan et al., 3511” (PE 00174976, PE 00174975); “Ebian, Longchi to Xinyang River, 24 X 1938, Liou, 12424” (PE 00174983); “Szechuan, reg. occ.: Huangnipu, ca. 900 m, 21 XI 1934, Smith, 1955” (BM001020060, photo seen); GUI-ZHOU PROVINCE “[Kweichow], Kweiyang, 11 VII 1930, Tsiang, 8505” (BM001020057, photo seen).

Selaginella coriaceifolia X.M. Zhou, N.T. Lu & Li Bing Zhang, 2020, *Phytotaxa* 453(2):125 (≡ *Hypopterygiopsis coriaceifolia* (X.M. Zhou, N.T. Lu & Li Bing Zhang) Li Bing Zhang & X.M. Zhou, 2023, *Pl. Diversity* 45:667)

Type: VIETNAM: QUANG BINH PROVINCE “Phong Nha – Ke Bang National Park, limestone mountain on the 37 km of the #20 Road, 7°24'55.82"N 106°13'29.74"E, 680–720 m, 5 XI 2014, L.-B. Zhang, L. Zhang & N.T. Lu 7307” (holotype: VNMN!, isotypes: CDBI, MO).

Distribution and ecology. Previously was reported only from the Phong Nha – Ke Bang National Park, Quang Binh Province of northern Vietnam (Ye et al. 2020). Our investigation shown that this species distributed also in Cao Bang, Hoa Binh and Thanh Hoa Provinces on northern Vietnam. In Vietnam, it grows in primary evergreen broad-leaved dry forests as terrestrial or lithophytic herb on limestone at elevations 400–1000 m a.s.l.

Notes: This species is distinctly different from other Vietnamese *Selaginella* species by leaves strongly leathery, ventral leaves imbricate on stem and branch throughout, apex of dorsal leaves often reflexed.

Specimens examined. VIETNAM: CAO BANG PROVINCE “Ha Lang District, Dong Loan Municipality, vicinities of Ban Lung and Lung Phuc (22°46'N 106°44'E), about 50 km to E from Cao Bang Town, 650–700 m, 25 XI 1998, L. Averyanov, P.K. Loc, N.X. Tam, CBL665” (LE; HN); QUANG BINH PROVINCE “Minh Hoa District, 72 km to NW from Dong Hoi, Thong Hoa Municipality, vicinities of Yen Son Village, limestone massif Ke Bang (17°40'N 105°57'E), 450–500 m, 16 V 1997, L. Averyanov, N.T. Hiep, P.K. Loc, VH 4657” (LE); *ibid.* “at alt. 400–500 m, 18 V 1997, L. Averyanov, N.T. Hiep, P.K. Loc, VH 4818” (HN); “Phong Nha-Ke Bang National Park, Tan Trach Commune, Bach Xanh Forest. 17.40343°N 106.22072°E, 777 m, 10 XII 2024, S. Tagine, V.S. Dang, P. Souladeth, P.Q. Trong, T. Yamamoto, T. Fujiwara, R. Masuda, K. Souvannakoumane, K. Phengmala, N1311” (VNM); HOA BINH PROVINCE “Da Bac District, to the SW of Doan Ket Village (20°54'01"N 105°04'19"E), 900–1000 m, 29 III 2001, N.T. Hiep, L. Averyanov, N.T. Vinh, D.T. Doan, HAL 370” (HN); THANH HOA PROVINCE “Thuong Xuan District, Bat Mot Commune, Vin Village, Xuan Lien Nature Reserve, 22 X 2014, Zhang et al., 7036” (VNMN).

Additional specimens examined. VIETNAM: QUANG BINH PROVINCE “Phong Nha – Ke Bang National Park, limestone mountain on the 37 km of the #20 Road, 7°24'55.82"N 106°13'29.74"E, 680–720 m, 5 XI 2014,

L.-B. Zhang, L. Zhang, N.T. Lu, 7307" (holotype: VNMN); "Phong Nha – Ke Bang National Park, Tân Trach, limestone mountain, 700 m, 6 XI 2014, L.-B. Zhang, L. Zhang, N.T. Lu, 7347" (paratype: VNMN); "Phong Nha – Ke Bang National Park, 41 km of #20 Road, 600 m, 8 XI 2014, L.-B. Zhang, L. Zhang, N.T. Lu, 7371" (paratype: VNMN)].

Selaginella doederleinii Hieron., 1904, Hedwigia 43:41 (≡ *Lycopodioides doederleinii* (Hieron.) H.S. Kung, 1988, Fl. Sichuan. 6:73; ≡ *Chuselaginella doederleinii* (Hieron.) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45(6):675)

Type: JAPAN: "[Ryukyu] Liukiu, [Amami-Oshima] Oshima Island, Döderlein s.n. s.d." (lectotype B [B 20 0129942], designated by Alston (1934b); isolectotypes BM [BM014130679, photo seen, from B], photo seen, LE!).

Distribution and ecology. Alston (1951) cited only single specimen for Laos "env. de Napè (Delacour)". However, Zhang et al. (2013) does not indicate this species for Laos. Here we indicate the second collection for this species from Laos. In Laos, it grows in broad-leaved evergreen forests mixed with bamboo at elevations of about 439 m a.s.l.

Specimens examined. LAOS: BOLIKHAMXAI PROVINCE "Viengthong District, Ban Hin Ngon, Nam Kading National Protected Area, 18.381867°N 104.433464°E, 439 m, 3 IX 2023, S. Tagane, P. Souladeth, T. Vingthavone, P. Phonpaseuth, T. Vuong, T. Yamamoto, D. Kongxaisavath, P.Q. Trong, S. Lorvanhkhham, Z179" (VNM00071226).

Additional specimens examined. VIETNAM: QUANG NINH PROVINCE "Ba Mun, 21°05'N 107°35'E, 250–300 m, 21 III 1987, L. Averyanov, E. Kudryvtseva, 147" (LE); "Tonkin, Taai Wong Mo Shan, near Chuk-phai Hacoï, 3 V – 22 VI 1939, W.T. Tsang, 29052" (LE); NGHE AN PROVINCE "Tuong Duong District, Tam Quang Municipality, Tung Huong Village, along Khe Mat Stream, around point 19°03'09"N 104°36'53"E, 355 m, 18 III 2007, L.V. Averyanov, P.K. Loc, N.V. Trai, N.V. Vinh, N.D. Phuong, A. Averyanova, HLF 6693" (LE); VINH PHU PROVINCE "Tam Dao, 31 III 1984, The Soviet-Vietnamese Expedition, LX-VN 1343" (LE); "Gia Lai – Kon Tum, Kbang, Tram Lap, 1 IV 1989, The Soviet-Vietnamese Expedition, LX-VN 4125" (LE); Quang Binh Province "Phong Nha – Ke Bang National Park, Cha Noi, 17.64607°N 106.0885°E, 515 m, 11 XII 2024, S. Tagane, V.S. Dang, P. Souladeth, P.Q. Trong, T. Yamamoto, T. Fujiwara, R. Masuda, K. Souvannakhoummane, K. Phengmala, N1379" (VNM00073646).

Selaginella mairei H. Lév., 1916, Sert. Yunnan.: 299; Cat. Pl. Yunnan, 172, f. 40. 1915–17 (≡ *Lycopodioides mairei* (H. Lév.) H.S. Kung, 1988, Fl. Sichuanica 6: 68; ≡ *Didichs mairei* (H. Lév.) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45:664)

Type: CHINA: "en face de Kin-tchong-chan, Colline aride, dénudé, calcaire, alt. 2600 m, Novembre, E.E. M[Maire] 129" (lectotype E [E00414479], designated here, photo seen).

= *Selaginella elephantopus* Hand.-Mazz., 1929, Symb. Sin. 6:6, t.1, f.1

Type: CHINA: "Yunnan: In demissis subtropicis fluminis Djinscha-djiang ("Yangtse") ad boreo-occid. Urbis Yunnanfu inter oppidum Yüenmou et vicum Hailo, 1050–1150 m, 10 IX 1914. Dr. H.F. v. Handel-Mazzetti (Diar. Nr. 809) 5047" (lectotype WU [WU 0031714], designated here, photo seen; isolectotypes W [W 1926-0010323], photo seen, US [US 00055189], photo seen).

Syntypes of *S. elephantopus*: CHINA: "Sichuan [Sichuan] Prov., Setschwan austro-ocid.: In declivitate subtropica infra vicum Oti in convalle fluminis Yalung ad septentriones

oppidi Yenyüen prope castellum Kwapi, 1800–1950 m, Dr. H.F. v. Handel-Mazzetti (Diar. Nr. 514) 2796" (syntypes: WU [WU 0031715], photo seen, W [W 0356949], photo seen; "China, Yunnan, derrière Tong-tchouan (Dungtschwan), colline aride dénudée, 2550 m, Août [VIII] 1913, Maire s.n." (syntype: W [W 0356947], photo seen, P [P01554262], photo seen); "China, Yunnan, En face de Kin-tchong-chan, colline aride, 2600 m, XI, Maire 129 (beide im Mus. Wien)" (syntype: W [W 0356948], photo seen, W [W 0356945], photo seen, probably syntype but altitudes on the label is 2550 m); G [G00349305], photo seen, with dates on label 1912).

Distribution and ecology. In Laos, it grows on primary dry evergreen and semideciduous broad-leaved forests on very steep rocky slopes near karstic hills top at elevation of about 520 m a.s.l.

Notes. In the flora of Indo-China, *Selaginella mairei* was cited by Alston (1951), with three specimens: two from Vietnam (Balansa 1.990 pp., Bon 5.130) and one from Laos (Poilane 2.422). However, Newman et al. (2007) did not report this species in its flora of Laos, while Zhang et al. (2013) limited its distribution to China (Guizhou, Sichuan, Yunnan) and Myanmar. Pham (1999), however, reported it for Vietnam. Our research has confirmed the presence of *S. mairei* in Laos and Vietnam.

Typification notes. *Selaginella mairei* was described by Augustin Abel Hector Leveillé in "Sertum Yunnanense" (1916:299) which was published as an appendix of the "Catalogue des plantes de Yun-Nan" (1915–1917). This species has been widely accepted in botanical literature, but the taxonomic treatments published by Alston (1934b, 1945) do not provide any additional information about the type of this name. According to Stafleu & Cowan (1979) in Taxonomic Literature vol. 2 (TL-2), the Catalogue des plantes de Yun-Nan, was published by several parts in the period from 1 December 1915 to 1917, with page 172 published in late 1916 to early 1917.

It is also stated there that, the Sertum Yunnanense dates of printing to 1917 (Stafleu, Cowan 1979), where the description of *S. mairei* was published. It is worth noting that, Merrill & Walker (1938) assumes that this is a separate leaflet, but despite this, the page numbering starts in "Catalogue..." and ends in "Sertum Yunnanense". Although, H. Lévillé in a short introduction to the "Sertum Yunnanense" mentions "Pour assurer la priorité de nos nouveautés, nous avons publié en mai 1916 les espèces suivantes que nous insérons dans le Catalogue des Plantes du Yun-Nan comme annexe" what means, "to ensure the priority of our novelties, in May 1916 we published the following species...". The description of *S. mairei* contained only a short morphological description, without indicating of the holotype or references to figures. However, in the "Catalogue des plantes de Yun-Nan" *S. mairei* is mentioned on pages 172 and 173 (fig. 40), the printing date of which according to Stafleu & Cowan (1979) in TL-2 is 31 October 1916. However, according to the botanical code, the illustration in the "Catalogue des plantes de Yun-Nan" cannot be original material of *S. mairei* (Turland et al. 2018). Since the protologue did not cite a holotype, but according to Stafleu & Cowan (1979) in TL-2 most H. Lévillé types are deposited in the Herbarium E (Royal Botanic Garden Edinburgh), after they were obtained through the purchase of the herbarium in 1919 (Lauener & Green 1961). According to Art. 9.12 (Turland et al. 2018) we propose to select specimen E [E00414479] as the lectotype, since we believe that figure 40 on page 173 was made from part of the plant placed in upper of left of this herbarium specimen that we think must have been used for preparation of the original description of *S. mairei*.

In conclusion, it is also worth noting, that Lauener (1983), who assessed the application of a large number of Lévillé's

names (in a long series of papers in Notes Roy. Bot. Gard. Edinburgh in period from 1961 to 1983 years), in the generalized catalogue “Catalogue of the names published by Hector Leveille: Index” did not deal with *Selaginella mairei* in his publications (John McNeill, personal communication). This species has also not been mentioned in any subsequent publications by McKean (1985–1989).

Specimens examined. LAOS: Khammoune Province “Boulapha District, Vang Maner Village, Palai Mountain Area, around point 17°30'13.6"N 105°49'23.9"E, 520 m, 8 V 2018, L. Averyanov, K.S. Nguyen, T. Maisak, L. Xaiyavongsa, S. Keovankham AL784” (LE01049210, <https://en.herbariumle.ru/?t=occ&id=1449>); “Gnommalath District, Pha Katai trail, 17.55299°N 105.1641°E, alt. 173 m, on limestone hill. 5 IX 2025, S. Tagane, P. Souladeh, V.S. Dong, K. Vounghavone Souvannakhommane, P. Phonpaseuth, Q.T. Phengmala Pham, T. Yamamoto, K. Yamazaki Z1631” (VNM00073395). **VIETNAM:** Nghe An Province “Con Cuong District, Luc Da Commune, Thac Kem, Pu Mat National Park, 27 X 2014, L.B. Zhang et al, 7133” (VNMN).

Additional specimens examined. CHINA: YUNNAN PROVINCE “Yunnan, 1910, Maire 6127 B” (LE); “Zhongdian Xian: Zhongxia (middle gorge) of Hutiaoxia (Tiger Leaping Gorge) on Jinsha Jiang (upper Chang Jiang), 27°15'13"N 109°9'11"E, 2000–2100 m, 25 VII 2006, D.E. Boufford, S.L. Kelley, R.H. Ree, H. Sun, B. Xu, J.P. Yue, L.L. Yue, D.C. Zhang, W.D. Zhu, 35219” (V0097845F, photo seen); “W of Likang, Shi-Ku, K.M. Feng, 9267” (BM000779604, photo seen); “Ho Ching, Ching 24518” (BM000779603, photo seen); SICHUAN PROVINCE “inter Hualinpin et Luthingchiao, ca. 1300 m, 2 VII 1934, Smith, 10360” (BM000779602, photo seen; MO103313507, photo seen); “Plants of Muli (Muli) Kingdom, Mountains between the Litang and Shou-Chu River, between Wa-Erh-Dje and Garn, 2775 m, VII–VIII 1928, Rock, 16908” (BM000779606, photo seen; US01393019, photo seen); **MYANMAR:** “Maymyo, 1934, Khanna, 7” (BM014131098, photo seen)].

Selaginella pulvinata (Hook. & Grev.) Maxim., 1859, Mém. Acad. Imp. Sci. St-Petersbourg Divers Savans 9:335 (≡ *Lycopodium pulvinatum* Hook. & Grev., 1831, Bot. Misc. 2:381; ≡ *Lycopodioides pulvinata* (Hook. & Grev.) H.S. Kung, 1988, Fl. Sichuanica 6:64; ≡ *Selaginella tamariscina* var. *pulvinata* (Hook. & Grev.) Alston, 1934, Bull. Fan Mem. Inst. Biol., Bot. 5:271; ≡ *Pulviniella pulvinata* (Hook. & Grev.) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45:660)

Type: INDIA: “Kumaon, Dr. Wallich s.n.” (holotype K [K001067430], photo seen).

Distribution and ecology. According Yang et al. (2022), *S. pulvinata* distributed in China, N India, W Nepal, and N Thailand, despite early this species also was reported for Vietnam (Zhang et al. 2013, Fraser-Jenkins et al. 2017). In Laos, it grows in primary broad-leaved evergreen forests on very steep rocky slopes of remnant mountains composed with highly eroded solid limestone at elevations of 1500–1750 m a.s.l. In Laos it has been found near the border with Thailand where this species can be also surely found.

Specimens examined. LAOS: VIENTIANE PROVINCE “Kasi Distr., Namken Village, Phachao Mt., around point 19°18'45.5"N 102°22'31.4"E, 1500–1750 m, 24 Mar. 2013, L. Averyanov, N.S. Khang, S. Lorphengsy, LA-VN 812” (LE 01288117).

Additional specimens examined. VIETNAM: DIEN BIEN PROVINCE “Tua Chua District, Trung Thu Municipality, Trung Thu Village, around point 21°55'38"N 103°18'05"E, 1350–1450 m, 10 IV 2011, L. Averyanov, P.K. Loc, N.Q. Hieu, N.T. Vinh, CPC 2135” (LE); HA GIANG PROVINCE “Yen Minh District, Lao Va Chai Municipality, vicinities of

Lao Chai Village, 23°07'N 105°08'E. 35.9 km to 27° of Ha Giang City, 1200 m, 9 XI 1999, N.T. Hiep, N.Q. Binh, L. Averyanov, NTH 3470” (LE); THUA THIEN HUE PROVINCE “A Luoi District, Hong Kim Community, Dut Village, about 3 km to NE from point 16°17'54"N 107°12'41"E near A Nor Waterfall at elevation of 700–800 m, 26 IV 2005, L. Averyanov, N.T. Hiep, P.K. Loc, P.V. The, A. Averyanova, N.T. Vinh, HAL 7540” (HNU 020989, HNU 016232).

Selaginella subdiaphana (Wall. ex Hook. & Grev.) Spring, 1843, Bull. Acad. Roy. Sci. Bruxelles 10:232 (≡ *Lycopodium subdiaphanum* Wall. ex Hook. & Grev., 1831, Bot. Misc. 2:401; ≡ *Hypopterygiopsis subdiaphana* (Wall. ex Hook. & Grev.) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45(6):670; = *Lycopodium subdiaphanum* Wall. nom. nud. 136)

Type: INDIA: “Montains of Sylhet and Kamoon, Dr. Wallich n. 136” (syntypes K, B [B 20 0147161–A], photo seen; LE [LE 01284180]).

= *Selaginella aggesta* Spring, 1850, Monogr. Lyc. II: 89, no. 31.

Type: INDIA: “Gorval, Griffith” (holotype K [001067489], photo seen).

= *Selaginella glauca* Spring, 1850, Mém. Acad. Roy. Sci. Belgique 24(2):252.

Type: INDIA: “Imperio Assam, Mack (H. Hooker)” (holotype K [K000009118], photo seen).

= *Selaginella schlagintweitii* Hieron., 1913, Bot. Jahrb. Engl. 50:2, 41, n. 17.

Type: INDIA: “Khasia, Oct. 1855, Schlagintweit 117” (holotype: B? [not seen]).

= *Selaginella namdaphaensis* Sarn. Singh & Panigrahi, 2005, Ferns Fern-Allies Arunachal Pradesh 1:64.

Type: INDIA: “Tirap District “[now Changlang District]”, Miao-Vijaynagar, 40th–41st mile, 800 m, 30 IX 1980, S. Singh 74317” (holotype CAL; isotype: ASSAM).

Distribution and ecology. According to Fraser-Jenkins et al. (2015, 2017), *S. subdiaphana* is widely distributed in India, Bhutan, Nepal, and Pakistan. Later, Zhang (2018) reported this species from China (Xizang, Yunnan) and also reported it for Myanmar. In Vietnam, this species was identified from old herbarium specimens collected in October 1933 by Petelot (4.952). In Vietnam it grows on mossy rocks under the shade of trees at elevation of about 1700 m a.s.l.

Notes: The specimens we studied were earlier wrongly identified and cited by Alston (1951) as *S. heterostachys*. Meanwhile they surely belong to *S. subdiaphana* and differs from *S. heterostachys* in a number of morphological features, namely the main stems creeping or suberect (vs. main stems erect or creeping, with fertile stems erect), ventral leaves ovate to ovate-lanceolate (vs. oblong-ovate), margin ciliate-dentate at base (vs. denticulate), dorsal leaves ovate (vs. ovate or ovate-lanceolate), leaf base obtuse or slightly subcordate (vs. cuneate or obliquely attenuate). In addition, *S. subdiaphana* has ventral leaves turned upwards, which are typical for this species.

Specimens examined. VIETNAM: LAO CAI PROVINCE “Tonkin, Province de Laokay, Sur tronc pousse dans un endroit tree humide, vers 1700 m. Route de la Garderie de Lo Qiu Ho, Environs de Chapa, X 1933, Petelot, 4.952” (VNM00031988, VNM00031998, VNM00021548, VNM00021545).

Additional specimens examined. CHINA: YUNNAN PROVINCE “Gonshang Drungzu Nuzu Zizhixian, Binzhongluo Xiang. Along the Niwa River gorge N or Bingzhongluo and Shimenguan (Stone Gate) on the W side of the Nu Jiang. E side of Gaoligong Shan. N facing 30–60-de-

gree slope, 1750 m, 28°2'33"N 98°34'45"E, 8 X 2002, Gaoligong Shan Biodiversity Survey, 17076" (KUN 1407307, KUN 1407306, KUN 1407305, photos seen); "Fugong Xian Lumadeng Xiang, Yaping Cun, S side of the N fork of Yamu He just above the confluence with the S fork Yamu He, E side of Gaoligong Shan. 27°7'47.4"N 98°49'45.9"E. 1780 m, 11 VIII 2005, Gaoligong Shan Biodiversity Survey, 27010" (KUN 1407309, photo seen); "Fugong Xian Lumadeng Xiang, Yaping Cun, below old Shibali on the N side of S fork of Yamu He, E side of Gaoligong Shan, 27°5'23"N 98°49'45.9"E, 2150 m, 21 VIII 2005, Gaoligong Shan Biodiversity Survey, 28756" (KUN 1407311, photo seen); "Gongshang Xian, Cikai Zheng. E side of Gaoligong Shan, in Dangdan park above Gonshang, 1600–1700 m, 27°44'23"N 98°39'33"E, 29 VI 2000, L. Heng, B. Bartholomew, P. Thomas, P. Fritsch, Z.L. Dao, Z.L. Wang, R. Li, 11791" (KUN 1407308, photo seen); **NEPAL**: DANG DISTRICT "Between Kurpani and Ghorai, 4000 ft., 4 IX 1952, O. Polunin, W.R. Sykes, L.H.J. Williams, 1331" (KYO, photo seen); Rasuwa District "Langtang: between Ramche and Betrawati, 800–1800 m, 9 IX 1986, T. Nakaike, 1427" (PE); KATHMANDU "Gokarna Ban, Kathmandu, 1350 m, 29 X 1988, T. Nakaike, 3559" (PE); "l.c., 3551" (PE); "Kathmandu, 1350 m, 3 IX 1954, A. Zimmermann, 1005" (KYO, photo seen); MAKAWANPUR DISTRICT "Balephi Khola, 27°50'N 85°46'E, 1000 m, 22 VIII 1971, J.F. Dobremez, DBR NEP 829" (E00670681); NUWAKOT DISTRICT "Berdawati [Betrawati], 850 m, 15 IX 1972, A. Maire, AMA450" (E00670578); DHANKUTA DISTRICT "Dhankuta, 26°50'N, 87°20'E, 400 m, 11 X 1971, J.F. Dobremez, DBR NEP 1371" (E00670582, E00670586); "Chittre, 27°06'N, 87°25'E, 2200 m, J.F. Dobremez, DBR NEP 1483" (E00668256); SUNSARI DISTRICT "Dharan-Sanguri Bhanjyang, 1300 m, 2 VI 1972, H. Kanai, H. Ohashi, K. Iwatsuki, H. Ohba, Z. Iwatsuki, P.R. Shakya, 725032" (E00670676); "Dharan, 26°49'N 87°18'E, 800 m, 4 IX 1971, J.F. Dobremez, DBR NEP 1779" (E00670604); "Dharan 400 m-Sanguri Bhanjyang 1300 m, 2 VI 1972, H. Kanai, H. Ohashi, K. Iwatsuki, H. Ohba, Z. Iwatsuki, P.R. Shakya, 725032 [872266]" (KYO, photo seen); MORANG DISTRICT "Chisapini, 500 m, 26°50'N 87°55'E, J.F. Dobremez, DBR NEP 1170" (E00670677, E00754782).

Selaginella subeffusa Shalimov & X.C. Zhang, 2022, Turczaninowia 25(3):58 (≡ *Hypopterygiopsis subeffusa* (Shalimov & X.C. Zhang) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45:670)

Type: CHINA: "Yunnan, Hekou, Dawei Mt., Sancha River, on forest slope, 1120 m, 5 X 1999, Yu-Min Shui et al., 11716" (holotype: PE [PE 01866084]).

Distribution and ecology. This species was described from Dawei Mountain located near Hekou City. In Vietnam, it was collected in degraded secondary forest at elevation of about 1050 m in shady humid places.

Specimens examined. VIETNAM: LAO CAI PROVINCE "Liem Phu Municipality, Khuoi Ngoa Village, ca. 1050 m, 21°59'31"N 104°19'05"E, 323–1050 m, 22 II 2001, D.K. Harder, P.K. Loc, L.V. Averyanov, G.E. Schatz, S. Bodine, 6666" (HN, MO (n.v.)).

Selaginella submonospora Shalimov & X.C. Zhang, 2022, Turczaninowia 25(1):154 (≡ *Hypopterygiopsis submonospora* (Shalimov & X.C. Zhang) Li Bing Zhang & X.M. Zhou, 2023, Pl. Diversity 45:670)

Type: CHINA: "Yunnan, Gongshan, Dulongjiang, 1300–1400 m, 23 I 2017, X.-C. Zhang et al. 8111" (holotype: PE).

Distribution and ecology. In Vietnam, it grows on mossy shady rocks at elevations of 1500–1550 m a.s.l. However, in China it was collected at elevations of 1300–1800 m.

Specimens examined. VIETNAM: LAO CAI PROVINCE "Ô Quý Hồ Pass, 17 I 1935, sine coll." (HN); "Tonkin. Massif du Sang ta Van. Chapa [Sa Pa Mt.]. Vers 1550 m Août. [VIII] 1933, Pételot, 4.948" (VNM00033956; VNM00033976; VNM00033986; VNM00034006; VNM00034016; VNM00034026); "Tonkin. Sur rochers siliceux vers 1500 m, Chapa [Sa Pa Mt.], Août [VIII] 1938, Pételot, 7.936" (VNM00033925; VNM00033935); BAC KAN PROVINCE "Na Phac District, 6 XII 2013, Zhang et al., 6780" (VNMN).

Additional specimens examined. CHINA: YUNNAN PROVINCE "Taron-Täru Divide, Tangtehwan, 1800 m, upon shady rocks, 27 VIII 1938, T.T. Yu, 19985" (PE 00244924).

Note. Initially this species was reported in China (Yunnan, Gongshan) by Zhang (2018) under the name *S. subdiaphana*. Later, our morphological investigations showed that this gathering is presented by two morphologically similar species, one of which was described as *S. submonospora* (Shalimov & Zhang 2022a). Both species can grow together, which is confirmed by the studied herbarium samples. In our study we managed to find four collections of *S. submonospora* represented by ten herbarium specimens. The earliest collections were made in the early 1930s in Lao Cai Province of Vietnam, later the species was collected also in Bac Kan Province.

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