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NOTE

New Additions to the Fern Flora of Taiwan

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ABSTRACT: Two fern taxa of Dryopteridaceae, *Polystichum chunii* and *P. tenuius*, are reported as new records of Taiwan. Morphological descriptions, synonyms, taxonomic notes, line-drawings and photographs of living material, and IUCN Red List Category are provided herein.

KEY WORDS: Fern, IUCN, new records, *Polystichum chunii*, *Polystichum tenuius*, Taiwan, taxonomy.

INTRODUCTION

After the publication of the Flora of Taiwan vol. 1 (Li et al., 1975), the taxonomy of Taiwanese lycophytes and monilophytes has been reassessed at least five times (Kuo, 1985, 1997; Huang et al., 1994; Lu and Yang, 2005; Knapp, 2011). However, new taxa were still continuously discovered, e.g. Chang et al., 2011; Hsu and Chang, 2011; Chang et al., 2012a & b; Chao et al., 2012.

In our recent vascular plant surveys of Taiwan, we found and collected two unrecognized ferns. After looking them up in the floras of the adjacent areas or countries and examining the specimens deposited in several herbaria, including BM, LBG, P, PE, TAI, TAIF, and US, we concluded that these unknown leptosporangiate ferns are *Polystichum chunii* Ching and *P. tenuius* (Ching) L. B. Zhang (Dryopteridaceae), respectively.

This paper presents relevant information, including the detailed descriptions, line drawings, diagnostic photos and the adopted category (rareness status) in Taiwan according to the IUCN Red List criteria (IUCN, 2001; 2003) on these two newly recorded species.

TAXONOMIC TREATMENT

Polystichum chunii Ching (1929: 2-3); Hu and Ching (1930: 25-26, pl. 13); Christensen (1934: 162); Kung et al. (2001: 15, pl. 4: 7–12).

陳氏耳蕨　Figs. 1–2

Type: CHINA. Guangxi: Luchen, Dar-Young Kiang, 27 Jun 1928, *R. C. Ching 6256* (holotype: PE-00044672 photo!; isotypes: LBG-00117425 photo!, US-00065510 photo!).

Morphology: Plants terrestrial or lithophytic, to 40 cm tall. Rhizomes erect or ascending, densely scaly toward stipe bases. Scales on rhizomes and stipe bases polymorphic, apex caudate-acuminate; larger ones ovate, concolorous or bicolorous, margin fimbriate; medium ones oblong-lanceolate, often bicolorous, margin fimbriate; smaller ones linear-lanceolate, often concolorous, margin almost entire. Stipes clustered, 5–15 cm long, grooved on upper surface. Lamina bipinnatifid to bipinnate, linear-lanceolate, 20–30 × 3–6 cm, long acuminate toward apex, with basal 1–2 pinna pairs slightly shortened and reflexed. Rachis densely covered with linear or lanceolate scales on both sides, grooved on the adaxial surface, often with a scaly bulbil near the top. Pinnae 25–40 pairs, basal 4–12 pairs pinnate, otherwise pinnatifid; the longest ones 1.5–3.0 × 0.5–1.0 cm, thickly coriaceous, stiff; adaxial surface dark green, glossy, glabrous, with very sparse linear scales on mid-vein; abaxial surface grayish green, sparsely covered with small ovate-lanceolate scales, margin aristate. Pinnules rhomboid-ovate, sessile, acute, spiny at apex, the most proximal acroscopic one usually larger and auriculiform. Venation free, veinlets simple or forked. Sori round. Indusia round, peltate, ca. 1 mm in diam., often shrunk or deciduous when old, margin serrulate.

Distribution: Southern China, northern Vietnam, and Taiwan.

Habitat: Semi-shaded mountain slopes under subalpine coniferous forest at 2200–2900 m elev.

Voucher specimens from TAIWAN: Ilan: Tatong Township, between Mt. Shenmachen and Chilieting, *T. C. Hsu 2856*; *3228* (TAIF); Chilieting, *T. C. Hsu 5981* (TAIF).

Adopted category based on IUCN: **EN** D.

Taxonomic note: Among the *Polystichum* species in Taiwan (Knapp, 2011), *P. chunii* most closely resembles *P. prionolepis* Hayata in sharing small to

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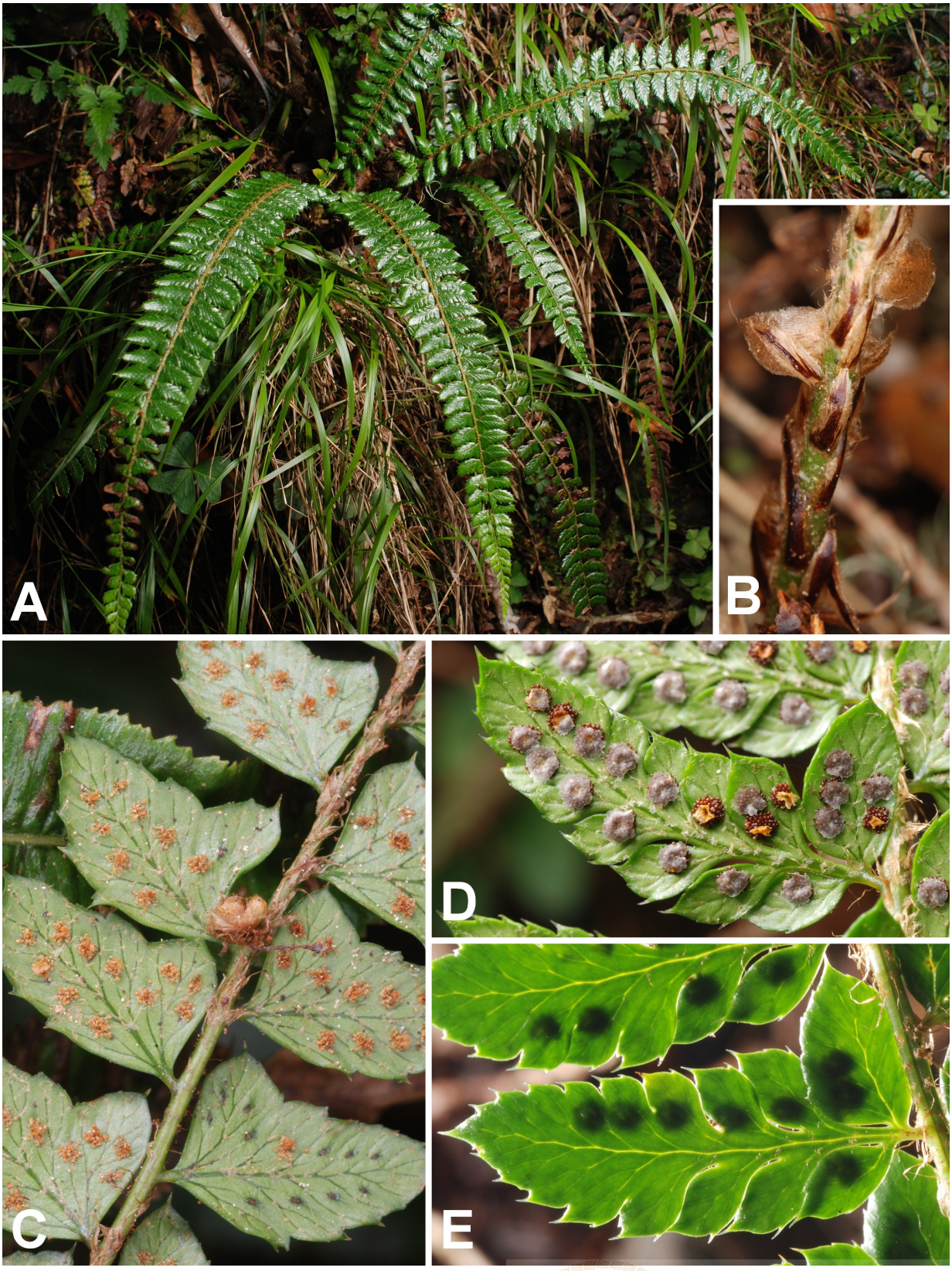


Fig. 1. ***Polystichum chunii*** **(from** ***T. C. Hsu 2856*****). A: Habit** ***in situ*****. B: Scales on stipe base. C: Apical part of pinnae and bulbil. D: Abaxial surface of pinnae. E: Adaxial surface of pinnae with transmitted light. Photographed by Tian-Chuan Hsu.**

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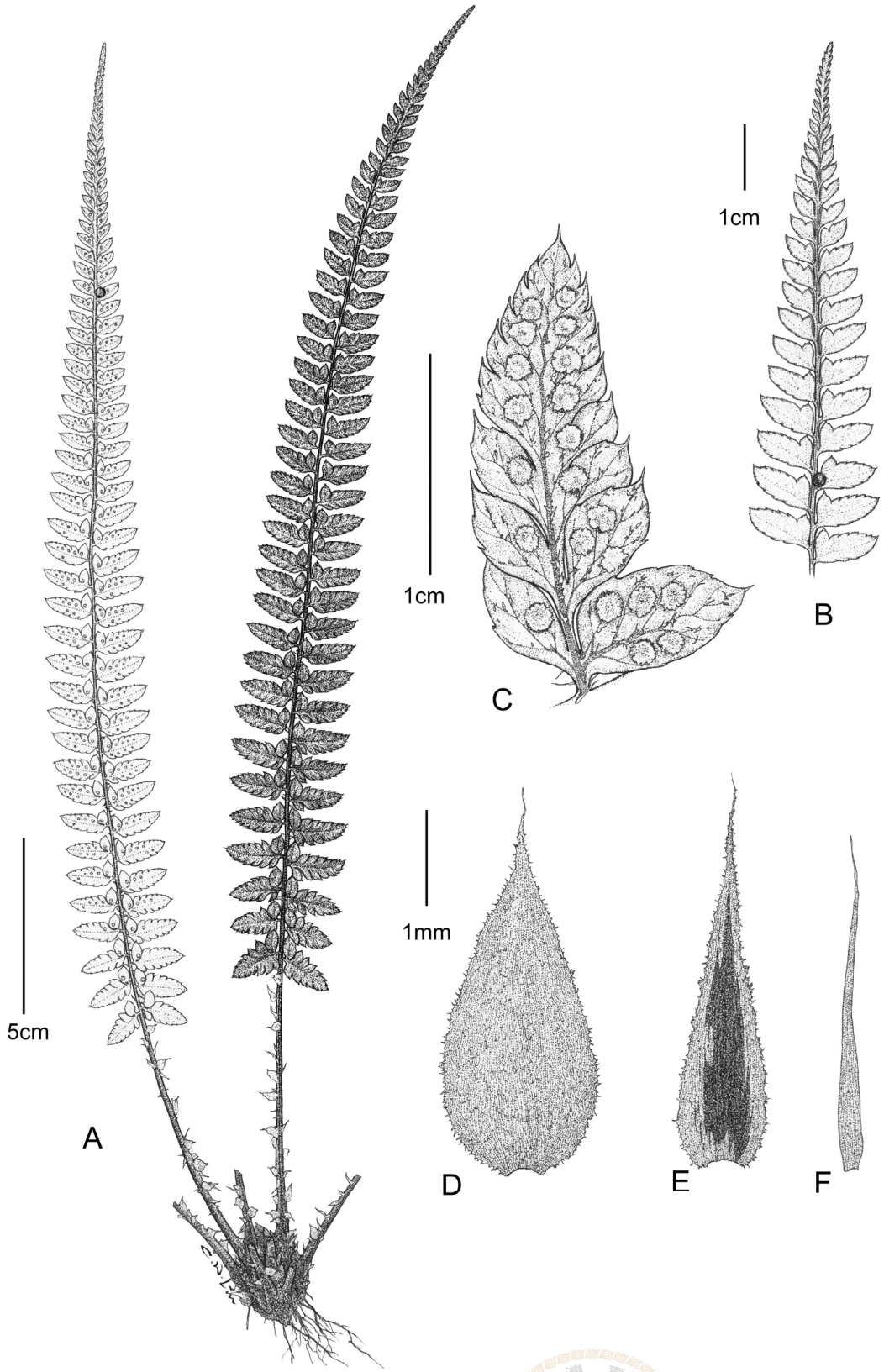


Fig. 2. *Polystichum chunii* (from *T. C. Hsu 2856*). A: Habit. B: Apical part of frond. C: Proximal fertile pinna. D-F: Scales on stipe base. Illustrated by Che-Wei Lin.

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medium habit size, bipinnate lamina and the presence of an apical bulbil. The former, however, significantly differs from the later in having obviously bicolorous (vs. mostly concolorous) scales on stipe bases, monomorphic (vs. subdimorphic) leaves, narrower lamina (3–6 cm vs. 5–10 cm wide) with a linear-lanceolate (vs. oblong-lanceolate) outline, and much more pairs of pinna (25–40 vs. 8–20).

Polystichum tenuius (Ching) L. B. Zhang (2012: 59).
離脈柳葉蕨 Figs. 3–4

Basionym: *Cyrtogonellum tenuius* Ching (1938: 329, t. 7: 2, as ‘‘*tenuium*’’).

Type: VIETNAM. Tonkin, Massif du Pia-Quac, Jul 1922, *Herb. de l'ecole superieure d'agriculture et de sylviculture (Hanoi) 552* (holotype : BM photo!).

Synonym: *Cyrtogonellum caducum* Ching (1938: 330, t. 7: 3); Hsieh (2001: 178). Type: CHINA, Guangxi, Linyen, Lanlon, 2 Aug 1928, *R. C. Ching 6649* (lectotype: PE-00984598 photo!; isotypes: LBG-00117390 photo!, PE-00984597 photo!), lectotype designated by Zhang (2012).

Synonym: *Cyrtogonellum salicifolium* Ching ex Y. T. Hsieh in Hsieh & Li (1989: 16); Hsieh (2001: 179, f. 51: 1–4). Type: CHINA. Chongqing: Nanchuan, Jinfo Shan, *J. H. Xiong 81829* (holotype: PE, not found).

Synonym: *Cyrtogonellum falcilobum* Ching ex Y. T. Hsieh in Hsieh & Li (1989: 17); Hsieh (2001: 179, f. 51: 5–7). Type: CHINA. Guizhou: Pintang, Xiangshuidon, *X. Y. Hou 1852* (holotype: PE, not found).

Morphology: Plants lithophytic or terrestrial, to 50 cm tall. Rhizomes short, erect, densely scaly. Scales tan-brown, ovate-triangular or ovate-lanceolate, margin serrulate or fimbriate. Stipes clustered, ca. 15–30 cm, basal portion covered with scales the same as the rhizomatic ones and gradually reduced in size upwards. Laminae oblong-lanceolate, 15–40 × 5–10 cm, pinnate. Rachis grooved on adaxial surface, groove not confluent with the costal ones. Pinnae 7–16 pairs, petiolate, coriaceous, margin subentire, crenate or serrate, glabrous on adaxial surfaces, sparsely covered with small scales on abaxial surfaces, acroscopic base round or slightly cuneate, basiscopic base often acutely cuneate, sometimes round; the largest pinnae 4–10 × 1–1.5 cm; tip of distal pinnae gradually reduced to caudate. Venation free, the ends of veinlets not reaching to margins. Sori round, borne at the end of acroscopic veinlets, in one medial row on each side of costa. Indusia round, peltate, brown, ca. 0.5 mm in diam., often shrunk or deciduous when aged.

Distribution: Southern China, northern Vietnam, and Taiwan.

Habitat: Semi-shaded, mountain slopes on calcareous substrates at 1000–1400 m elev.

Voucher specimens from TAIWAN: Hualien: Sioulin Township, between Tatong Village and the entrance of trail to Mt. Chingshui: *M. L. Weng 1957* (TAI), *T. C. Hsu 2675*; *3765* (TAIF).

Additional specimens examined: **CHINA.** Hunan: Longshan, *B. Zhang et al. 090520069* (TAIF); Sangzhi, *J. B. Zhang et al. 20100430012* (TAIF); Cili, *J. B. Zhang et al. 20100525065A* (TAIF). Guizhou: Lipo, *K. M. Lan 84-1153* (TAIF). Yunnan: Xishuangbanna Tropical Botanical Garden, *P. F. Lu 19814* (TAIF); Malipo, *L. Y. Kuo 3071* (TAIF). **VIETNAM.** Cao Bang: Bao Lac, *L. Averynov et al. CBL283* (P).

Adopted category based on IUCN: **EN** D.

Taxonomic note: Morphologically, *P. tenuius* is very similar to *P. fraxinellum* which has been well-known in Taiwan. However, the former could be easily discriminated from the latter by having more pairs (7–16 vs. 4–8) of lateral pinnae, laminae pinnate with pinnatifid apices (vs. laminae imparipinnate with apical pinnae of the same shape as lateral pinnae), and free venation (vs. reticulate venation with at least one row of areolae along each side of costa).

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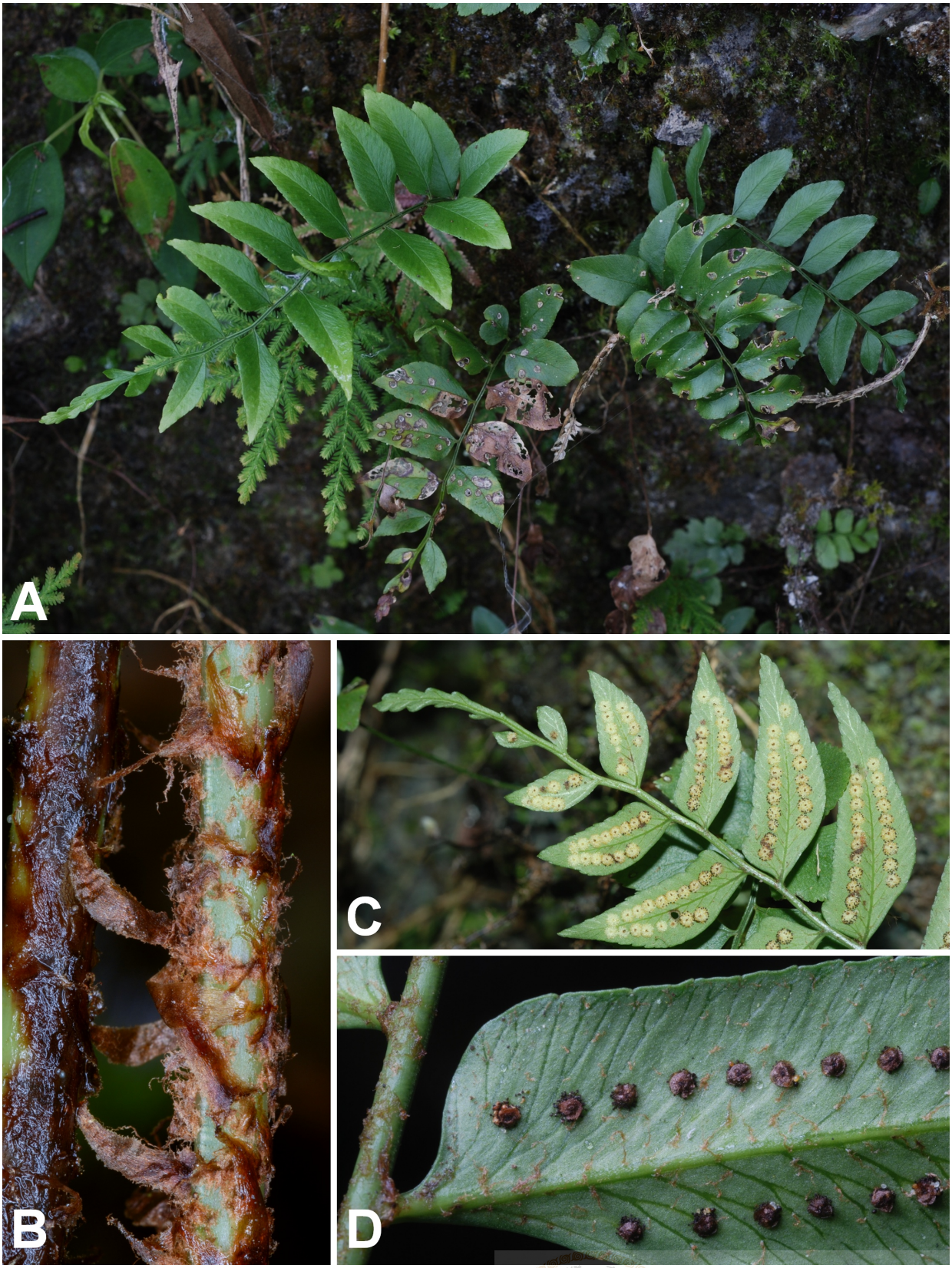


Fig. 3. ***Polystichum tenuius*** **(from** ***T. C. Hsu 2675*****). A: Habit** ***in situ*****. B: Scales on stipe base. C: Apical part of frond. D: A part of lateral pinna showing venation and sori arrangement. Photographed by Tian-Chuan Hsu.**

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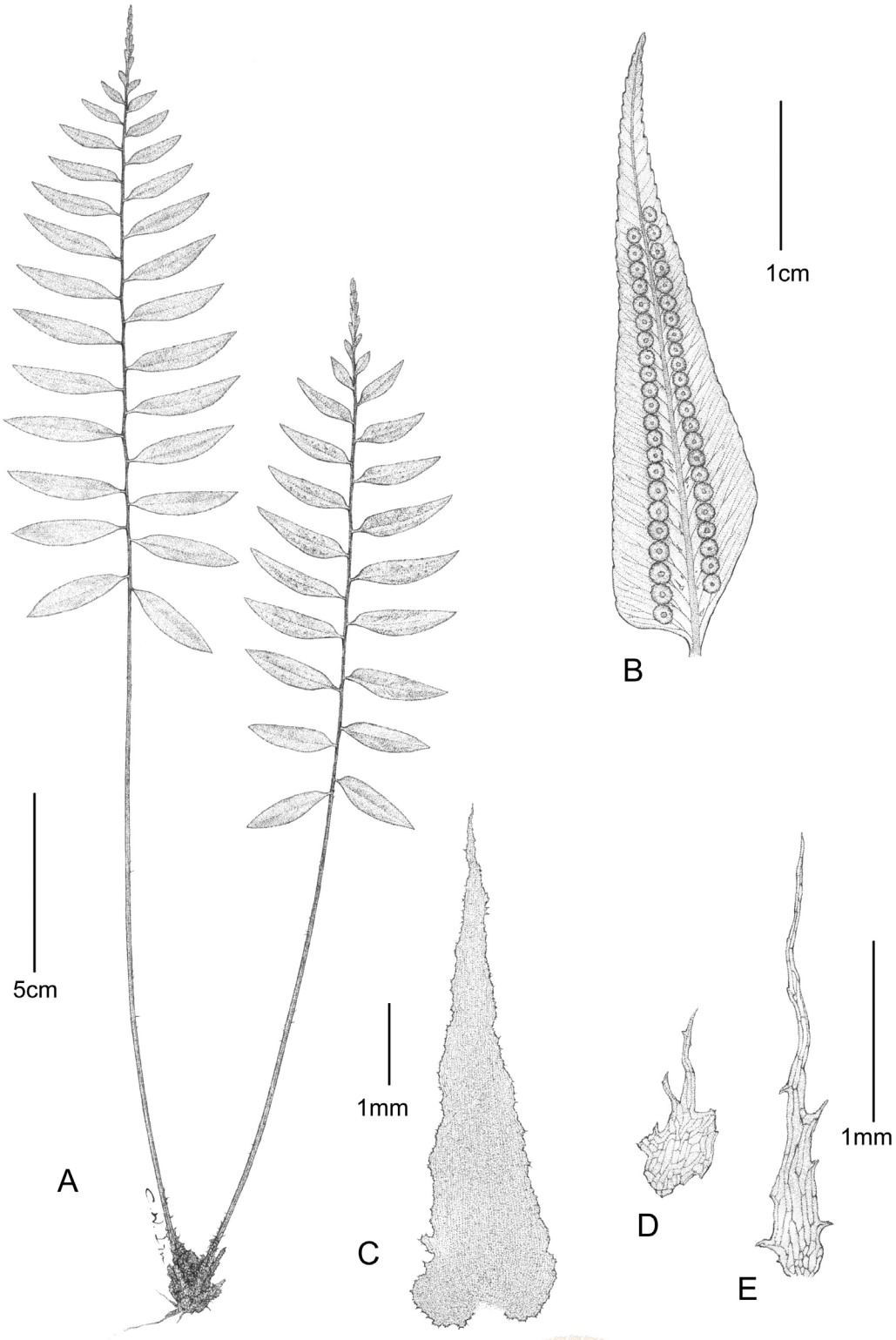


Fig. 4. *Polystichum tenuius* (from *T. C. Hsu 2675*). A: Habit. B: Fertile lateral pinna. C: Scale on stipe base. D-E: Scales on lower surface of lamina. Illustrated by Che-Wei Lin.

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臺灣蕨類植物誌增註

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摘要：本文報導兩種臺灣的新紀錄鱗毛蕨科植物，即陳氏耳蕨 (*Polystichum chunii* Ching) 與離脈柳葉蕨 (*P. tenuius* (Ching) L. B. Zhang)。除分別簡述其模式資訊、形態與分類特徵、生境、世界分布、引證標本外，並提供相關照（圖）片以利鑑別；同時也根據國際自然保育聯盟（IUCN）的評估準則，針對上述二種植物提出在臺灣的稀有及保育等級建議。

關鍵詞：蕨類、國際自然保育聯盟、新紀錄、陳氏耳蕨、離脈柳葉蕨、臺灣、分類學。

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