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Supplements to the Pteridophytes in Taiwan (II): A Newly Recorded Species *Diplazium crassiusculum* Ching (Athyriaceae)

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ABSTRACT: A newly recorded species, *Diplazium crassiusculum* Ching, in northern Taiwan is described and illustrated in this paper. It can be distinguished from other congeners by its coriaceous fronds, free terminal pinna, serrate margins, oblong-lanceolate pinnae, and sori solely formed at the acroscopic side of the first veinlet in each venous set. A key is provided to distinguish the morphologically related species of Taiwan. This species is apparently rare and is known only in one location in Taiwan.

KEY WORDS: Athyriaceae, *Diplazium*, *Diplazium crassiusculum*, New record, Pteridophyta, Taiwan.

INTRODUCTION

The delimitation of *Diplazium* and other related genera, with base chromosome number x = 41, is controversial up to now. The genus in its broadest sense comprises over 400 species widely spread throughout the tropical and subtropical regions (Kato and Kramer, 1990). However, it had ever been split into several genera, e.g., *Allantodia*, *Callipteris*, *Diplaziopsis*, *Monomelangium*, and *Diplazium* s. s. (Ching, 1964a, 1964b; Chu et al., 1999). The very narrow *Diplazium* defined by Chu et al. (1999) consists of ca. 30 species only. Nevertheless, according to recent molecular phylogenetic studies (Sano et al., 2000a, 2000b; Wang et al., 2003), it seems better to treat *Diplazium* as a middle-size genus in which *Allantodia* and *Callipteris* were included but *Diplazium subsinuatum* and *D. tomitaroanum* excluded. This concept is adopted here.

Of the genus, 21 to 28 species have been documented in Taiwan (Shieh et al., 1994; Kuo, 1985, 1999; Yang and Liu, 2002; Boufford et al., 2003). At a recent inventory, one additional species, *Diplazium crassiusculum* Ching, was found in northern Taiwan. The species can be distinguished from other congeners by its coriaceous fronds, serrate margin, oblong-lanceolate lateral pinnae, and sori solely formed at the acroscopic side of the first veinlet in each venous set. Taxonomic description, distribution information, line drawing, and photographs are provided for this newly recorded species. A key to morphologically related species of Taiwan is also made to aid its identification.

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TAXONOMIC TREATMENT

Diplazium crassiusculum Ching, Lingnan Sci. J. **15**(2): 279. 1936; Icon. Corm. Sin. **1**: 188. *f. 376*. 1972; Kurata & Nakaike, Illus. Pterid. Jap. **1**: 88 & 89. 1982; Iwatsuki, Ferns & Fern Allies Jap. 251. *pl. 168. f. 5*. 1992; Nakaike, New Fl. Jap. Pterid., Rev. & Enlar. 368. *pl. 368*. 1992; Kato, Fl. Jap. **1**: 223 & 234. 1995; Chu et al., Fl. Reip. Pop. Sin. **3**(2): 490. *pl. 119. f. 11*. 1999.--Type: CHINA. Kwangtung: Lungt'au-shan near Iu, *Y. K. Wang 31699* (HOLOTYPE: PE n.v.; ISOTYPE: SYS n.v.). 厚葉雙蓋蕨 Figs. 1 & 2

Athyrium crassiusculum (Ching) T. J. Liu, Res. Bull. Fujian **3**: 58. 1952.
Diplazium crassiusculum forma *simplex* Ching, Lingnan Sci. J. **15**(2): 281. 1936.

Evergreen fern; rhizome short, erect to ascending. Frond pinnate with terminal pinna, or seldom simple. Stipes tufted, 10-40 cm long, pale brown, base black; scales persistent only at stipe base, linear lanceolate or lanceolate, dentate, dark brown, 3-8 mm long and less than 0.5 mm broad,

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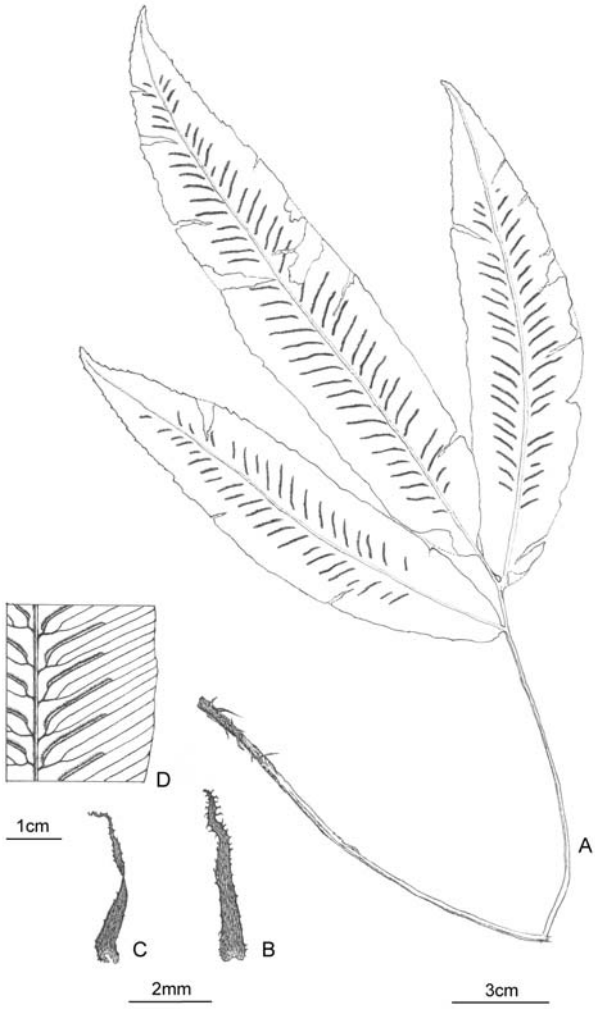


Fig. 1. *Diplazium crassiusculum* Ching (Athyriaceae). A: Fertile frond. B & C: Scales on the stipe base and rhizome. D: Venation and sori.

toothed at margin. Lamina ovate or oval, 25-40 cm long, 15-25 cm broad, coriaceous. Pinnae alternate, oblong-lanceolate or falcate, 15-25 cm long, 2.8-4.5 cm broad, sessile or with a short stalk, cuneate or obliquely cuneate at base, acute or acuminate at apex, margin scarcely denticulate or crenate but serrate at near apex; when young, pinna scarcely attached with hairlike, black, ca. 1 mm-long scales at costal position, and with multicellular hair on abaxial surface; pinna stalk 0-5 mm long; costa with groove and connected with rachis, prominent on abaxial surface; vein usually twice to triple forked, visible beneath. Sori usually solely formed at the acroscopic side of the first veinlet in each venous set, linear, from pericostal to medial or supramedial position; indusia linear, open acroscopically, entire at margin. Spores anisopolar, bilateral, monolete; perispore forming a continuous winglike fold, anastomoses few, surface subsmooth.

Specimens examined: CHINA: Kwangtung, Lung T'au Shan, Iu village, Lingnan, June 5, 1924, *To and Ts'ang 12372* (PE, paratype). TAIWAN: Taoyuan County: Fuhsin, Mt. Peichatienshan, ca. 1200 m, under the broad-leaved forest, Nov. 14-15, 2003, *H.-M. Chang 5887* (TAIF), *H.-M. Chang 5888* (TAIF, TNU, Taiwan Endemic Species Research Institute); around the same locality, Aug. 7, 1992, *S.-J. Moore 15042* (TNU).

Notes: Our specimens are identical to a paratype (*To and Ts'ang 12372*) (Fig. 3). *Diplazium crassiusculum* is widely distributed over southern China, Vietnam and southern Japan. This finding in Taiwan makes its distribution pattern more continuous. The species is very rare in Taiwan, only one population with less than 20 individuals found in the northern part so far (Fig. 4). It is also rare in Japan (Kurata and Nakaike 1983), however, the rareness status is unclear in mainland China.

Tagawa (1941) mentioned a possible dwarf individual of *D. crassiusculum* according to the specimen (*Faurie 165*) collected by U. Faurie from northern Taiwan. However, it is sure now that the specimen is *D. maonense* Ching (Moore et al., 2002).

Key to *Diplazium crassiusculum* and other morphologically related taxa of Taiwan

1. Fronds simple, or pinnate with free lateral and terminal pinna, terminal pinna similar to lateral ones …….…….. 2
1. Fronds bipinnatifid to decompound, or pinnate with apex pinnatifid ……...…...…… Other *Diplazium* in Taiwan
2. Fronds linear, simple and entire in the lower part …..... ……. *D. crassiusculum*
2. Fronds simply pinnate …..……..… 3
3. Terminal pinna entire or sub-entire in the lower part, cuneate at base ……..…… 4
3. Terminal pinna undulate or lobed in the lower part, obtuse to cordate at base …...……...…….……..... 6
4. Pinnae scarcely denticulate or crenulate at margins; sori from pericostal to medial or supramedial position ..... ……..…….. *D. crassiusculum*
4. Pinnae entire at margins, except the upper part; sori always reaching the submarginal position .....……...…… 5
5. Veins on abaxial surface obvious ……..…… *D. donianum*
5. Veins on abaxial surface usually invisiable …….. ……..…….. *D. donianum* var. *aphanoneuron*
6. Pinnae crenulate at margins and serrate near the apex; pinna usually more than 4 pairs …..……..…….. *D. maonense*
6. Pinnae entire at margin, or serrate near the apex; pinna usually less than 4 pairs ……..…....…… *D. lobatum*

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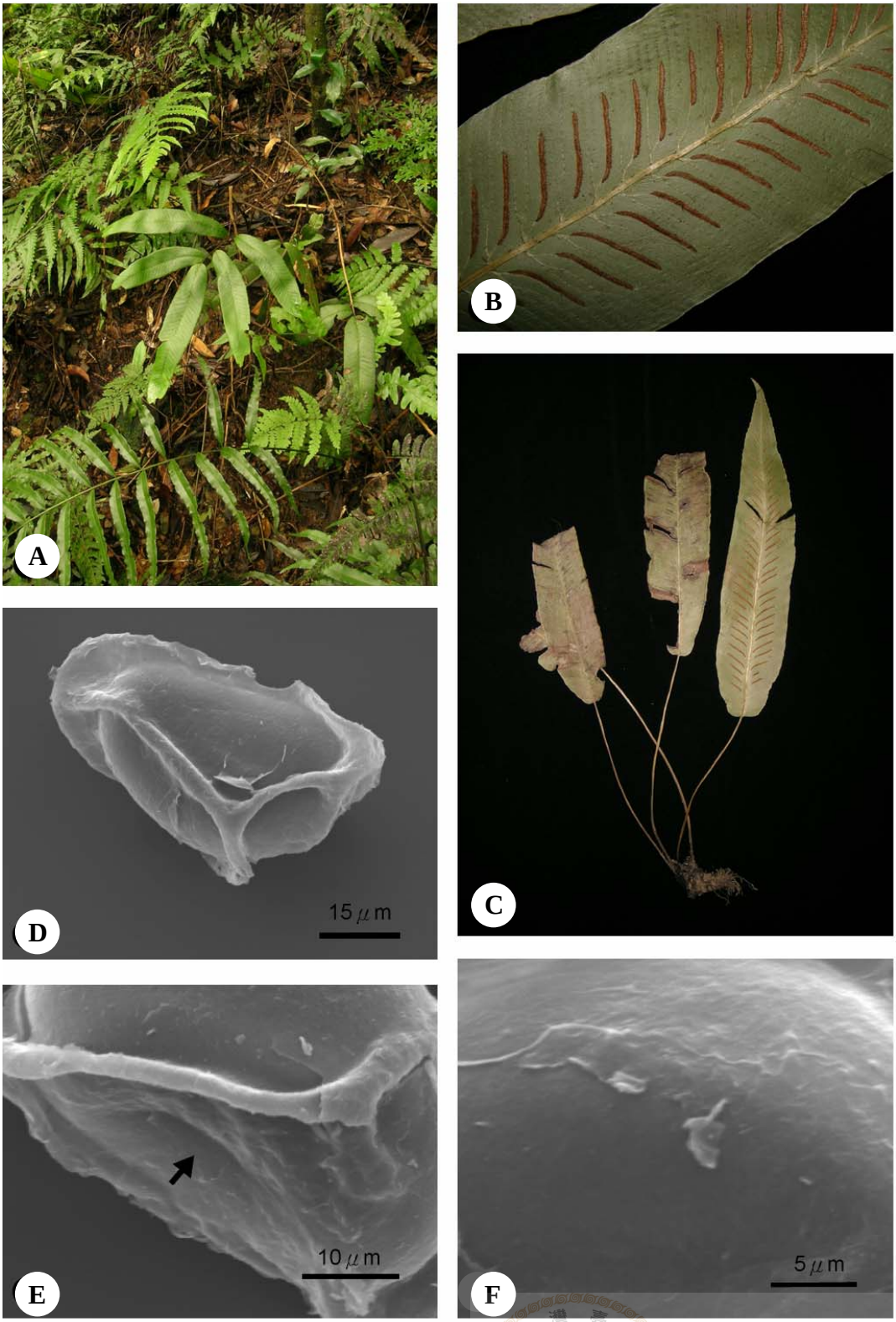


Fig. 2. *Diplazium crassiusculum* Ching. A: Habit. B: Venation and sori. C: Simple-frond form. D, E & F: SEM micrographs of spores. D: Lateral view. E: Proximal view and aperture (arrow). F: Surface structure of lateral view.

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Fig. 3. Paratype of *Diplazium crassiusculum* Ching. (Kwangtung, Lung T'au Shan, Iu village, Lingnan, June 5, 1924, *To and Ts'ang 12372*).

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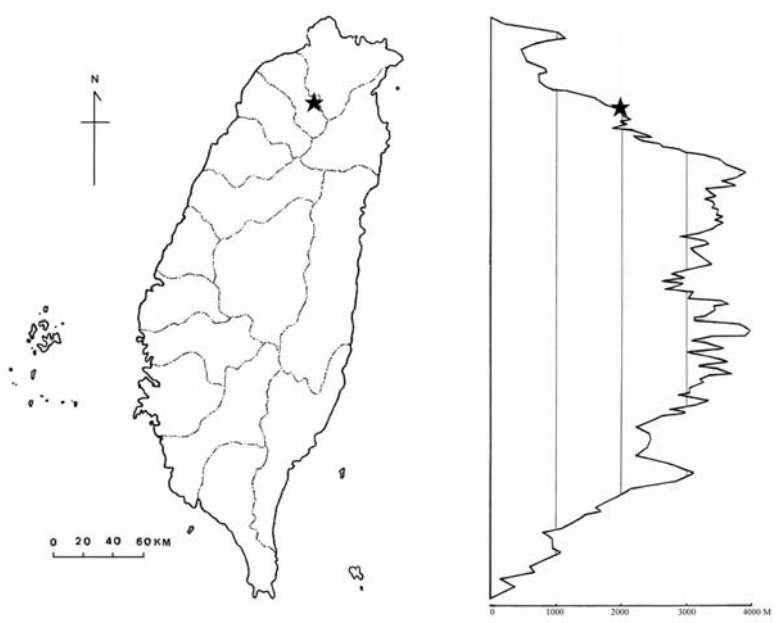


Fig. 4. Distribution of *Diplazium crassiusculum* Ching in Taiwan.

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臺灣蕨類植物補遺（二）：新紀錄種厚葉雙蓋蕨（蹄蓋蕨科）

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摘　　要

本文新紀錄一種產於臺灣北部之雙蓋蕨屬(*Diplazium*)植物－厚葉雙蓋蕨 (*D. crassiusculum* Ching)。本種可藉由革質葉片、獨立頂羽片、羽片長橢圓狀披針形、邊緣鋸齒狀及孢子囊群發育於每組側脈最基部朝羽片先端之小脈等特徵與臺灣產同屬其他相似種區分。本文提供其分類描述、手繪圖、照片與分布圖，以及其與近似種類之檢索表。此物種在臺灣極為稀有，目前僅在一處發現。

關鍵詞：蹄蓋蕨科、雙蓋蕨屬、厚葉雙蓋蕨、新紀錄、蕨類、臺灣。

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