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腸蕨属(Diplaziopsis C. Chr.)的研究

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长期以来,蕨类植物中的腸蕨属(*Diplaziopsis*)一直被認为是个单种的属,即仅有腸蕨(*D. javanica* [Bl.] C. Chr)一种,产于热带亚洲,向北分布到云南南部。1906年,瑞士植物学家格莱斯德(H. Christ)从研究法国神父在貴州采集的植物标本中,发現了本属的第二个种,叫貴州腸蕨(*D. cavaleriana* [Christ] C. Chr.),可是这个种,在以后的一个时期里,并未获得植物学家的普遍承認,而是往往作为腸蕨的一个地理变种看待的。現在有充分的材料証明这种看法显然是錯誤的。近来,在准备編写中国植物志的过程中,在清理标本室材料中,又发現了二个新种,即中間腸蕨(*D. intermedia* Ching)和海南腸蕨(*D. hainanensis* Ching)。这样,过去被認为单种属的腸蕨属現在已有四个組成的种,均产于中国南部和西南部,其中除腸蕨广布于热带亚洲各地外,海南腸蕨也分布于菲律宾,貴州腸蕨向东經南岭山脉达于日本,而中間腸蕨則为川、黔两省的特有种。这是腸蕨属目前分布区的輪廓,而中国南部和西南部又无疑是本属的現代地理分布中心。这是本属在中国植物地理上极为有意义的新情况。

从系統发育的观点看,腸蕨属是代表蕨类植物中的双盖蕨型(diplazioid type)主干的一个小小的分枝,而且是一个較为年輕的分枝,因为它和双盖蕨属(*Diplazium* Sw.)在形态学上有許多重要的共同性状,特别同它的另一个分枝,叫做网蕨属(*Dictyodroma* Ching)的亲緣关系最为密切,其形态学上的主要区别在于本属的叶片为奇数一回羽状,叶柄和羽軸光滑,不被有节的透明粗毛以及不同类型的网状叶脉。因此,本属在系統分类的位置問題上,可以說不存在着任何置疑之点。

这里有必要澄清一下关于本属的囊羣盖的形态学問題。在現有的文献中,本属的外形象腊腸的囊羣盖常被描写为它是以两側边着生于叶脉的,当孢子囊羣成熟时,它的拱圓形的背部作不規則的破裂,放出孢子。但事实并不完全如此。正如其他双盖蕨型的蕨属一样,例如 *Allantodia* R. Br.,本属的膜質囊羣盖在外形上为典型的腊腸形,其远軸(即下側边)的一边着生于叶脉上,而其近軸(即上側边)的一边却并不着生于叶脉上,而是分离的,不过被紧压于发育着的孢子囊羣之下。当孢子囊羣成熟时,囊羣盖的拱圓形的背部受到了愈来愈大的膨胀着的孢子囊羣对它內背壁所产生的压力,最后,由于它的上側边被紧压在膨胀的孢子囊羣的下面,以致无法自由地张开的緣故,孢子囊羣才从里面向外終于突破了膜質的囊羣盖的背部,放出孢子囊內的孢子。但在同一植株上(或同一羽片上)也时常可以观察到另一种情况,即当孢子囊羣在发育成长的过程中,随着它对于包围着的囊羣盖的压力的不断增大,囊羣盖往往从它的上側边被孢子囊羣完整地推开了,并被継續推向其背面,暴露出孢子囊羣。后一种囊羣盖的张开情况应該認为是典型的双盖蕨的囊羣盖张开的正常方式,而前一种情况倒可以認为是不正常的,或者也許可以說是偶然現象。

随着植物分类学研究的逐漸深入細致，特别是細胞分类学方法的采用，过去正統分类学上所謂"单种属"的說法将不断地被証明在很大程度上缺乏足够的科学根据。腸蕨属从过去的"单种属"成为今日的一个有四个种的属这一事实也又一次証明了这一点。

分 种 检 索 表

1(4) 側生羽片长达 14 厘米或更长，寬 2.5—3.7 厘米，主脉与叶边之間有 3 行网眼。

2(3) 羽片頂端为尾状；每組 2 条側脉出自主脉，常彼此分离或有时基部稍合生，略斜展；孢子囊羣远离主脉，略斜展，各对間有 1 条出自主脉的不育側脉；产云南南部。……1. 腸蕨 **D. javanica** (Bl.) C. Chr.

3(2) 羽片頂端为长漸尖；每組 1 条側脉在基部以上分为二叉，斜向上；孢子囊羣几出自主脉，斜向上，各对間不具出自主脉的 1 条側脉；产四川、貴州。……2. 中間腸蕨 **D. intermedia** Ching

4(1) 側生羽片长达 9 厘米，寬約 1.5 厘米或略多，主脉与叶边之間有 2 行网眼。

5(6) 側生羽片 8—10 对；孢子囊羣从接近主脉处生出，下側 1 条不育脉出自孢子囊羣的中部；产四川、貴州。……3. 貴州腸蕨 **D. cavaleriana** (Christ) C. Chr.

6(5) 側生羽片 1—2(3) 对；孢子囊羣从离主脉稍远处生出，下側 1 条不育脉出自孢子囊羣的下端或更下处；产海南島。……4. 海南腸蕨 **D. hainanensis** Ching

1. 腸蕨　图版二，图 5—7

Diplaziopsis javanica (Bl.) C. Chr. Ind. Fil. (1905) 227; v. A. v. R. Mal. Ferns (1908) 140; Tard.-Blotet C. Chr. in Fl. Indo-Chine VII, ii (1939) 282, pl. 25, f. 1-2; Ching, Sunyatsenia V (1940) 237; Cop. Gen. Fil. (1947) 152; 傅书遐，中国蕨类植物志属(1954) 13 頁。——*Asplenium javanicum* Bl. Enum. pl. Jav. (1828) 175.——*Allantodia javanica* Trevis, Nuov. Giorn. Bot. Ital. VII (1875) 159; Bedd. Ferns Brit. Ind. Suppl. (1876) 13; Handb. Ferns Brit. Ind. (1883) 195, f. 97; Clarke, Trans. Linn. Soc. ser. 2, Bot. I (1880) 505; Christ, Farnkr. d. Erde (1897) 213; Diels in Engl. u. Prantl, Nat. Pflanzenfam. I, iv, (1899) 229. —— *Allantodia brunoniana* Wall. Pl. Asiat. Rar. I (1830) 44, t. 52; J. Sm. in Hook. Journ. Bot. IV (1852) 177; Hook. Gen. Fil. (1842) t. 120 A; Moore, Ind, Fil. (1867) 43; Bedd. Ferns S. Ind. (1864) 159, t. 154; Hook. et Bak. Syn. Fil. (1874) 426.——*Asplenium brunonianum* Mett. Fil. Lips. (1856) 71 et Farngatt. Aspl. (1859) 170.——*Athyrium brunonianum* Milde, Bot. Zeit. (1870) 353.——*Asplenium reticulatum* Wall. Cat. (1828) n. 188, nom. nud.

植株高达 1 米，側生羽片通常 5—8 对，相距 4—5 厘米，长 11—17 厘米，寬 2.5—3.7 厘米，长圓披針形，先端尾状；孢子囊羣长約 5 毫米左右，相距約 4 毫米，生于每組側生叶脉的上側 1 脉，下側 1 脉不育，远离主脉，略斜展。

广布于热带亚洲，在中国仅产云南南部的元江河谷雨林中。

2. 中間腸蕨　图版二，图 3—4

Diplaziopsis intermedia Ching, sp. nov. Pl. II, fig. 3—4

Species *D. cavalerianae* (Christ) C. Chr. arcte affinis, a qua recedit multo majore, pinnis lateralibus usque ad 14 cm. longis, 2.5 cm. medio latis, venis lateralibus utroque costae latere inter se magis remotis, venulis 3 series areolarum inter costam marginem-

que formantibus, soris inter se etiam magis distantibus et ramum posticum furcae venae lateralis non tangentibus.

Tota planta usque ad 65 cm. alta. Rhizomate oblique adscendenti, crasso, dense radicoso, apice cum basi stipitis squamis late-lanceolatis, fusco-brunneis, ca. 5 mm. longis, firmulis dense obtecto. Frondibus fasciculatis, stipite 18—22 cm. longo, ca. 2 mm. crasso, herbaceo, virente, glabro, nudo, supra late sulcato suffultis; lamina ca. 40 cm. longa, 26 cm. lata, oblonga, acuminata, basi vix angustata, impari-pinnata; pinnis 7—9-jugis, alternis, patentibus, 3—5 cm. inter se remotis, spatio ca. 2 cm. lato separatis, omnibus ambitu fere similibus, breve (ca. 2 mm. longis) petiolatis, vel supremis sessilibus aut paulo ad rachin adnatis (pinna terminali lateralibus ambitu simili), usque ad 14 cm. longis, 2.5 cm. medio latis, lanceolatis, apicem versus longe acuminatis, basi late rotundo-truncatis vel oblique truncatis, aequalibus, margine integris vel leviter undulatis; venis lateralibus utroque costae latere inter se remotis, supra basin furcatis, venulis anastomosis 3 series areolarum subhexagonalium obliquarum inter costam marginemque formantibus (areolis secus costam majoribus, deltoideisque). Pagina frondis textura tenuiter herbacea, in statu sicco obscure viridi, utrinque glabra nudaque. Soris linearibus, crassis, 4—5 mm. longis, obliquis, late separatis, ramum posticum furcae venarum non tangentibus, indusiis conformibus, turgidis, juventute griseo-membranaceis, maturis firmulis nigresecentibus, persistentibusque.

Szechuan: Mt. Omei (九十九道拐), S. C. Chen (郑学經) *30057* (typus in Herb. Inst. Bot. Academiae Sinicae servatus) on rocks under forest, alt. 1300 m, 4, VI, 1955. **Kweichow:** Wei-shui Hsien, Y. Tsiang (蔣英) *4390*, in wooded ravine, 24, XI, 1930.

植株高达 65 厘米。根状茎粗短，直立，先端有深棕色披針形鱗片密生。叶簇生，柄长 18—22 厘米，青禾稈色，干后压扁，粗約 2 毫米，基部略有少数鱗片，向上光滑。叶片长約 40 厘米，中部寬約 26 厘米，闊披針形，漸尖头，奇数一回羽状；羽片 7—9 对，互生，相距 3—5 厘米，斜展，具短柄(长 1—2 毫米)，上部的无柄或与叶軸略合生，基部 1 对稍短，中部羽片长达 14 厘米，中部寬 2.5 厘米，披針形，先端长漸尖，基部闊圓截形，对称，全緣，頂生羽片和側生的同形同大，有柄(长 1 厘米)。叶脉两面可見，側脉彼此远离，基部以上处分叉，向外联結成 3 行网状脉。叶薄草質，干后褐綠色，两面光滑。孢子囊羣粗綫形，长 4—5 毫米，通常位于側脉分叉点以上的上側 1 条小脉，稍离主脉，彼此相距 3—4 毫米，斜向上；囊羣盖灰棕色，膜質，宿存。

产四川，峨眉山；貴州，惠水县。

本新种近似貴州腸蕨 *D. cavaleriana* (Christ) C. Chr.，但羽片較大，側脉彼此远分开，在主脉与叶边之間形成 3 行网眼，孢子囊羣通常生于側脉分叉点以上的上側 1 条小脉，并远离主脉，故易区别。

3. 貴州腸蕨　　图版二，图 1—2

Diplaziopsis cavaleriana (Christ) C. Chr. Ind. Fil. Suppl. 1 (1913) 25; Tagawa, Acta Phytotax. et Géobot. IX (1940) 109; Col. Illustr. Jap. Pterid. (1959) 141, t. 58, f. 315.—— *Allantodia cavaleriana* Christ, Bull. Acad. Géogr. Bot. Mans (1906) 243, cum

fig.——*Diplaziopsis javanica* var. *cavaleriana* Tagawa, Acta Phytotax. et Géobot. V (1936) 194.—— *Diplaziopsis javanica* auctt. non C. Chr. 1905: Ogata, Ic. Fil. Jap. VI (1935) t. 262; H. Ito, Fil. Jap. Illustr. (1944) t. 172.

植株高达 120 厘米。叶片长 35—70 厘米，中部寬 15—19 厘米，披針形，側生羽片 8—15 对，无柄，互生，斜展，基部 1—3 对略縮短，相距 5—9 厘米，中部羽片較接近（相距 3—5 厘米），长 8—9 厘米，基部寬約 1.5 厘米或略較寬，披針形，漸尖头，基部圓楔形或近截形，对称，全緣；叶脉在主脉与叶边之間形成 2 行的斜方形网眼。孢子囊羣粗綫形，长达 4 毫米，斜向上；囊羣盖褐棕色，成熟时从上側边张开，宿存。

产四川（峨眉山，紅椿坪）、貴州中部、福建北部（武夷山）。越南北部及日本（本州、九州、四国）均有分布。生山谷密林下，海拔 1200 米左右。

4. 海南腸蕨 图版三

Dipalziopsis hainanensis Ching, sp. nov. Pl. III

Species distinctissima, a *D. javanicae* (Bl.) C. Chr. differt multo minore, pinnis lateralibus solum 1—2-jugis, parvis, venis sparsis, supra basin bifurcatis, venulis inter costam et marginem pinnae pauci-areolatis.

Tota planta ca. 30 cm. alta. Rhizomate brevi, adscendente, dense radicoso, apice squamis paucis, lanceolatis, fuscobrunneis vestito. Frondibus caespitosis, stipite gracili, usque ad 15 cm. longo, 1.5 mm. diametro, herbaceo, virente nudoque; lamina ca. 15 cm. longa, 6 cm. medio lata, subovata, imparipinnata; pinnis lateralibus plerumque 1—2-jugis, alternis, obliquis, 3 cm. inter se remotis, breviter petiolatis, 5—6 cm. longis, 1—1.5 cm. latis (pinna terminali aliquantulum majore), oblongo-lanceolatis, apice acuminatis, basi rotundatis, aequalibus, margine integris; venis lateralibus utroque costae latere sparsis, subhorizontaliter patentibus, ca. 5 mm. inter se remotis, supra basin bifurcatis, venulis inter costam et marginem 2 series areolarum subhexagonalium formantibus (areolis secus costam majoribus, deltoideis). Pagina frondis textura membranacea, utrinque glabra, in sicco obscure viridi. Soris sparsis, utrinsecus ca. 13—15-jugis, 3—5 mm. longis, linearibus, rectis, remote separatis, patentibus, in ramis anticis furcae venae lateralis sitis; indusiis griseo-brunneis, membranaceis, usque ad medium latitudinis pinnae porrectis.

Hainan: Five Finger Mountain. C. Wang (黄志) *35761* (typus in Herb. Inst. Bot. Academiae Sinicae servatus), along stream side under forest, 21, XII, 1933.

Philippine Islands: Luzon, Mt. Banajao, *PPE 105* ex Herb. Copeland, I, 1909.

植株高約 30 厘米。根状短，斜升，先端疏被深棕色披針形鱗片。叶簇生，叶柄纤細，长約 15 厘米，粗約 1.5 毫米，草質，浅綠色。叶片近卵圓形，长約 15 厘米，中部寬約 6 厘米，奇数一回羽状；側生羽片通常 1—2 对，有短柄，互生，斜展，相距 2—3 厘米，长圓披針形，长 5—6 厘米，寬 1—1.5 厘米（頂生羽片較大），漸尖头，基部圓形，近对称，全緣。側脉稀疏，相距約 5 毫米，在离基部較远处分叉，于主脉与叶边之間形成 2 行网眼，沿主脉两側的网眼較大并为三角形，其余的为六角形，較小。叶膜質，两面光滑，干后草綠色。孢子囊羣疏生，每羽片 13—15 对，斜向上，粗綫形，长 3—5 毫米，通直，从主脉稍远处生出，下側

1条不育脉出自孢子囊羣的下端或更下处；囊羣盖膜質，灰棕色，宿存。

产海南島，五指山。生林下溪边。也产菲律宾(吕宋)。

本新种为本属最小也是最有趣的一种。其簡单而細小的形体都与其他三种有很大区别。菲律宾的植物与海南島的模式极为一致。

ON THE GENUS DIPLAZIOPSIS C. CHR.

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Summary

The fern genus *Diplaziopsis* C. Chr. of Index Filicum has long been considered as a monotypic one, with the sole species, *D. javanica* (Bl.) C. Chr. from tropical Asia. In 1906, H. Christ described a second species, *Allantodia cavaleriana* Christ (=*D. cavaleriana* C. Chr.) from Kweichow, West China, but this was since not fully recognized by fern students in general, being often considered as a variety of the first species. This is certainly a mistake, as is shown by ample herbarium specimens today. In the recent work on the genus, the writer has found among the herbarium material two additional new species from China, thus bringing the genus up to four species in Asia, mainly from China, where, as it is, the genus has its center of development from the long past.

Phylogenetically, *Diplaziopsis* C. Chr. represents one of the offshoots from the great stock of diplazioid ferns, of which the genus *Diplazium* Sw. constitutes the main body of the group and from which our genus differs chiefly in its leaves of a thin texture with reticulated venation, but not so much in its type of indusium as it has generally been emphasized by most botanists in the past, for, as it is, the type of indusium in *Diplaziopsis* also prevails in many species of *Diplazium*, for which C. B. Clarke (Trans. Linn. Soc. ser. 2, Bot. I:495, 1880) created, but really superfluously, a subgenus *Pseudallantodia*, about which the writer will dwell in another paper in the near future. Suffice it to say here that the indusium in *Diplaziopsis* as revealed by the species treated here is, indeed, typical of diplazioid ferns, only often, as it happens, with its adaxial edge pressed so tight under the expanding sorus that it is unable to open freely along its upper free edge and, as a result, its thin vaulted back bursts open from the pressure of the expanding sorus underneath.

As a result of the present study, following four species of the genus have been recognized.

Diplaziopsis javanica (Bl.) C. Chr. Ind. Fil. (1905) 227.

Wide spread in tropical Asia, northwardly to Bakbo and the southern part of Yunnan, China.

D. cavaleriana (Christ) C. Chr. Ind. Fil. Suppl. I (1913) 25.

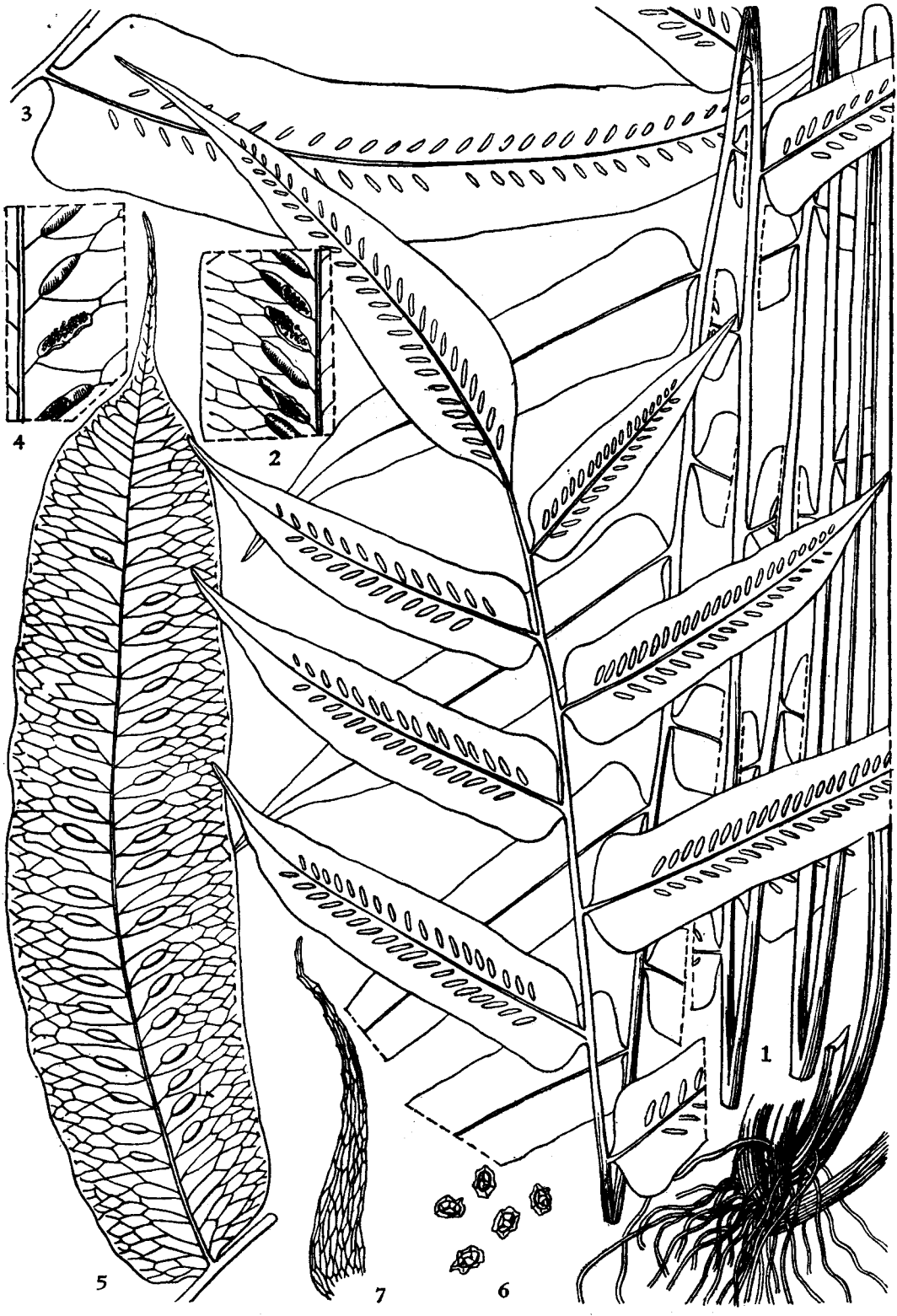
Ranges from West China through northern part of Fukien of East China to Japan.

D. intermedia Ching, sp. nov.

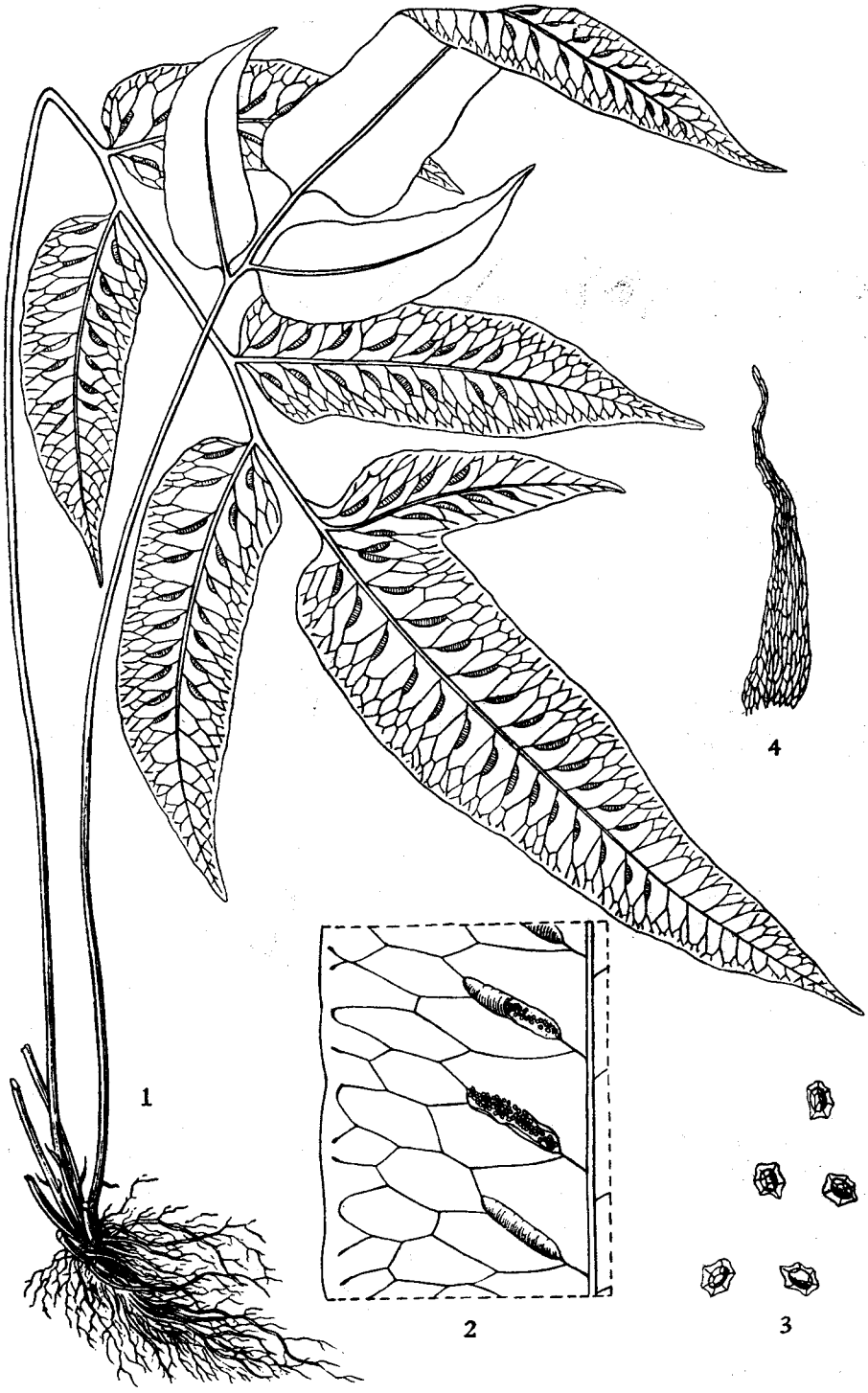
Endemic in West China: Mt. Omei, Szechuan, and Kweichow.

D. hainanensis Ching, sp. nov.

In conclusion, it may be pointed out that with the modern plant taxonomy pursued in a more efficient manner than in the past, and especially by the introduction of the cytotaxonomic methods, the so-called "monotypic genera", as conceived by the orthodox systematists, will continue to prove, to a great extent, to be lack of enough scientific ground. The fact that the "monotypic genus" of *Diplaziopsis* C. Chr. is now found to be a genus of four well-defined species is once again an instance to illustrate the point at issue.



1—2, **貴州腸蕨 Diplaziopsis cavaleriana** (Christ) C. Chr., 1.植株全形，×1； 2.羽片的一部分，表示叶脉与孢子囊羣的着生位置，×2。 3—4, **中間腸蕨 Diplaziopsis intermedia** Ching, 3.羽片，×1； 4.羽片的一部分，表示叶脉与孢子囊羣的着生位置，×2。 5—7, **腸蕨 Diplaziopsis javanica** (Bl.) C. Chr., 5. 羽片，×1； 6. 孢子，×100； 7. 叶柄基部的鱗片，×10。



海南腸蕨 Diplaziopsis hainanensis Ching, 1. 植株全形，×1； 2. 羽片的一部分，表明叶脉与孢子囊羣的着生位置，×3；3. 孢子，×100；4. 叶柄基部的鱗片，×10。