Tzu-tsung CHEN* & Hiroyoshi OHASHI*: **Two forms in *Desmodium laxiflorum* DC. (Leguminosae)**

陳 子聰*・大橋広好*: *Desmodium laxiflorum* の2型について**

Desmodium laxiflorum DC. belongs to the section Angustistipulosa of the subgenus Desmodium (Ohashi 1973). The species differs from others of the section primarily in having 3-foliolate leaves. It distributes widely in the Himalayas, India, Burma, Thailand, Indo-China, China, Taiwan, the Philippines, Malaysia, Indonesia and New Guinea, and is common at sunny places under dry or wet conditions along paths or roadsides in open forests, thickets or grassland at low altitude. The species is most polymorphic among the subgenus as mentioned by Ohashi (1973).

During our studies on the Leguminosae of Taiwan we found that the plants which have hitherto been referred to *D. laxiflorum* are different from those of the typical one. The type specimens of *D. laxiflorum* was collected by Wallich in Nepal in 1821. According to IDC microfishe edition of "De Candolle: Prodromi Herbarium", there are four sheets of types of *D. laxiflorum*. These type specimens show remarkable features in having ovate or elliptic terminal leaflets with an acute apex, long, simple racemes with lax flower-fascicles (i.e., internodes prominent) and long, filiform pedicels. Plants similar to the type specimens can be found frequently in Nepal and many specimens of the typical forms of *D. laxiflorum* collected in Nepal were examined in TI and TUS. The Taiwanese plants are distinguished from the typical ones as follows:

Typical *D. laxiflorum*: Terminal leaflets ovate or elliptic, acute at the apex, (5.5–)8–20 cm long and 3–10 cm wide. Primary bracts more than 7 times longer than the broad, glabrous or nearly so outside. Flowers (4–)5–6 mm long when dry; pedicels (4.5–)5–11 mm long (usually slightly elongated after flowering); upper calyx-lobes entire or almost entire at the top. Pods rugulose, vertically jointed, hardly constricted between seeds. Seeds rim-arillate, hilum about 0.3 mm across.

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Taiwanese *D. laxiflorum*: Leaves smaller than the typical one. Terminal leaflets ovate to sometimes broadly ovate, obtuse or sometimes acute at the apex, (2.5-)3-11 cm long and (1.5-)2-6 cm wide. Primary bracts narrowly triangular, less than 6 times longer than the broad, hairy outside as in the margin. Flowers 4-4.5 mm long when dry; pedicels 3-6(-7) mm long (usually slightly elongated

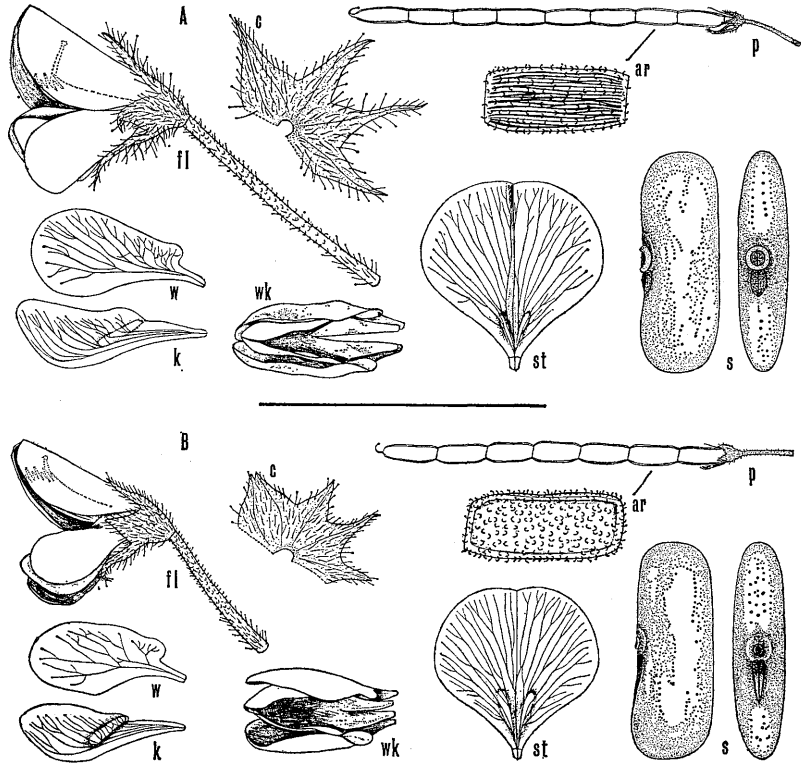

Fig. 1. Typical form (A) and Taiwanese form (B) of *Desmodium laxiflorum*. fl: flower ×4, st: standard ×4, w: wing ×4, k: keel-petal ×4, wk: a feature (almost natural but somewhat expanded from the base of petals) of coherence between the keel-petal (inside) and the wing (outside), and between each of the keel-petals. The degree of coherence is slightly different. View from upside ×4. c: calyx dissected, left is the upper lobe. View from outside ×4. p: pod ×1.2, ar: a segment of pod, showing lateral surface ×4, s: seed, lateral and upper surface, showing hilum and rim-aril ×8. A: c, fl, st, w, k, wk—Nepal. H. Ohashi et al. 771132 (TUS); p, ar, s—Nepal. Y. Tateishi 8586 (TUS). B: c, fl, st, w, k, wk—Taiwan. H. Ohashi et al. 13486 (Holotype TUS); p, ar—Taiwan. H. Ohashi et al. 13563 (TUS); s—Taiwan. C. E. Chang 15321 (TUS).

after flowering) ; upper calyx-lobes 2-toothed at the apex. Pods flat on the surfaces, obliquely jointed, more or less constricted between seeds. Seeds not or hardly rim-arillate, hilum about 0.15 mm across.

These distinctions are useful for separating *D. laxiflorum* into two forms. The Taiwanese form is not confined in Taiwan, but we found it from Nepal, Sikkim, Burma, Vietnam, Laos, the Philippines and Sumatra. The typical form occurs not only in Nepal but also in Sikkim, Thailand, Vietnam, Laos, Indonesia, the Philippines and New Guinea. Both forms are found in Nepal, Sikkim, Vietnam, Laos and the Philippines so far as we examined specimens. However, we could not find the typical form but only the Taiwanese form in Taiwan by examinations of about 100 herbarium specimens.

The Taiwaenes form is similar to *D. diffusum* DC. which is generally considered as a synonym of *D. laxiflorum* since the treatment by Bentham in 1852 as well explained by van Meeuwen (1962). *D. diffusum* DC. is different from *D. diffusum* (Willd.) DC. De Candolle published the first *D. diffusum* in January 1825. This name was taken from Roxburgh's name *Hedysarum diffusum* which appeared in his Hortus Bengalensis (1814). The second *D. diffusum* (Willd.) DC. was published in November 1825 based on *Hedysarum diffusum* Willd. (1803). Accordingly, *D. diffusum* (Willd.) DC. is the later homonym of *D. diffusum* DC. and now is regarded as a synonym of *D. dichotomum* (Willd.) DC.

The type specimens of *D. diffusum* DC. are, according to the Prodromi Herbarium, composed of three sheets with five plants of which one was from Nepal (Wallich 1821), three were from India (Lambert 1816) and the remaining one from unknown source or probably also from Nepal, because this plant is mounted on the same sheet with that collected by Wallich. These types of *D. diffusum* bear no fruits, but the terminal leaflets are apparently smaller than those of the type specimens of *D. laxiflorum* and the pedicels are shorter than those of the types of *D. laxiflorum*. We compared *D. diffusum* with *D. laxiflorum* by the De Candolle's description on page 335 in Prodromus. Both are distinguished only by the length of pedicels as follows: *D. laxiflorum*—pedicellis calyce multo longioribus; *D. diffusum*—pedicellis calyce duplo longioribus. The Taiwanese form of *D. laxiflorum* may be considered as identical with *D. diffusum* in having smaller terminal leaflets and shorter pecidels, though both species are not constantly separable by these characters. However, the more explicit distinctions we found in pods and seeds between the typical and Taiwanese

forms of *D. laxiflorum* can not be identified in the type specimen of *D. diffusum*.

Hosokawa (1932) recognized *D. recurvatum* (Roxb.) Wight & Arn. as distinct from *D. laxiflorum* in Taiwan. This species had been considered to be a synonym of *D. laxiflorum* since Baker (1876) in his Leguminosae in Hooker's Flora of British India. Hosokawa did not mention by what character(s) he distinguished both.

D. recurvatum was first named by Roxburgh (1814) in Hortus Bengalensis as *Hedysarum recurvatum*. Next, Graham in Wallich's Catalogue (1831-32) recognized it in *Desmodium* as *D. recurvatum*. In Roxburgh's Flora Indica (ed. Carey) the leaflets of *Hedysarum recurvatum* was described as ovate and oval, rather acute. Also, Wight & Arnott, Prodromus (1834) described the leaflets of *Desmodium recurvatum* as ovate or oval. Probably Hosokawa noted this character. The shape of terminal leaflets appears to generally be different between the typical form and the Taiwanese one as mentioned above. The voucher specimens of no. 5717 of Wallich's Catalogue are composed of two sheets and both, i.e., 5717 A and 5717 B, are similar to the Taiwanese form of *D. laxiflorum*. However, we could not examine the pods and seeds of these types and, therefore, we did not refer the Taiwanese form to *D. recurvatum*.

The flower of the Taiwanese form was illustrated by Ohashi (1973, on page 97, fig. 25, 1-4) showing a range of variation in the flower of the Taiwanese form of *D. laxiflorum*.

We consider that the Taiwanese form is a subspecies of *D. laxiflorum* based on the system of Ohashi (1973). To avoid future confusion we designate this subspecies with a new description and new type specimens.

Desmodium laxiflorum DC. in Ann. Sci. Nat. 4: 100 (Jan. 1825); Prodr. 2: 335, no. 87 (Nov. 1825): [literature cited in Ohashi (1973) is excluded]—Maxim. in Mél. Biol. 12: 440 (1887) — Forbes & Hemsley in J. Linn. Soc. 23: 173 (1887) — Prain ex King in J. Asiat. Soc. Beng. 66, pt. 2, no. 1: 141 (1897) — Ito & Matsumura, Tent. Fl. Lutchu. 414 (1899) — Matsumura & Hayata in Enum. Pl. Formos. 107 (1906) — Hayata, Icon. Pl. Formos. 1: 186 (1911) — Merrill, Enum. Philip. Fl. Pl. 2: 286 (1923) — Chuang & Huang, Leg. Taiwan 42 (1965) — Icon. Cormophyt. Sin. 2: 447 (1972) — Ohashi in Ginkgoana 1: 101 (1973) — Huang & Ohashi, Fl. Taiwan 3: 262 (1977) — Ohashi in Hara & Williams, Enum. Flow. Pl. Nepal 2: 118 (1979) — Verdc., New Guinea Legum. 401 (1979).

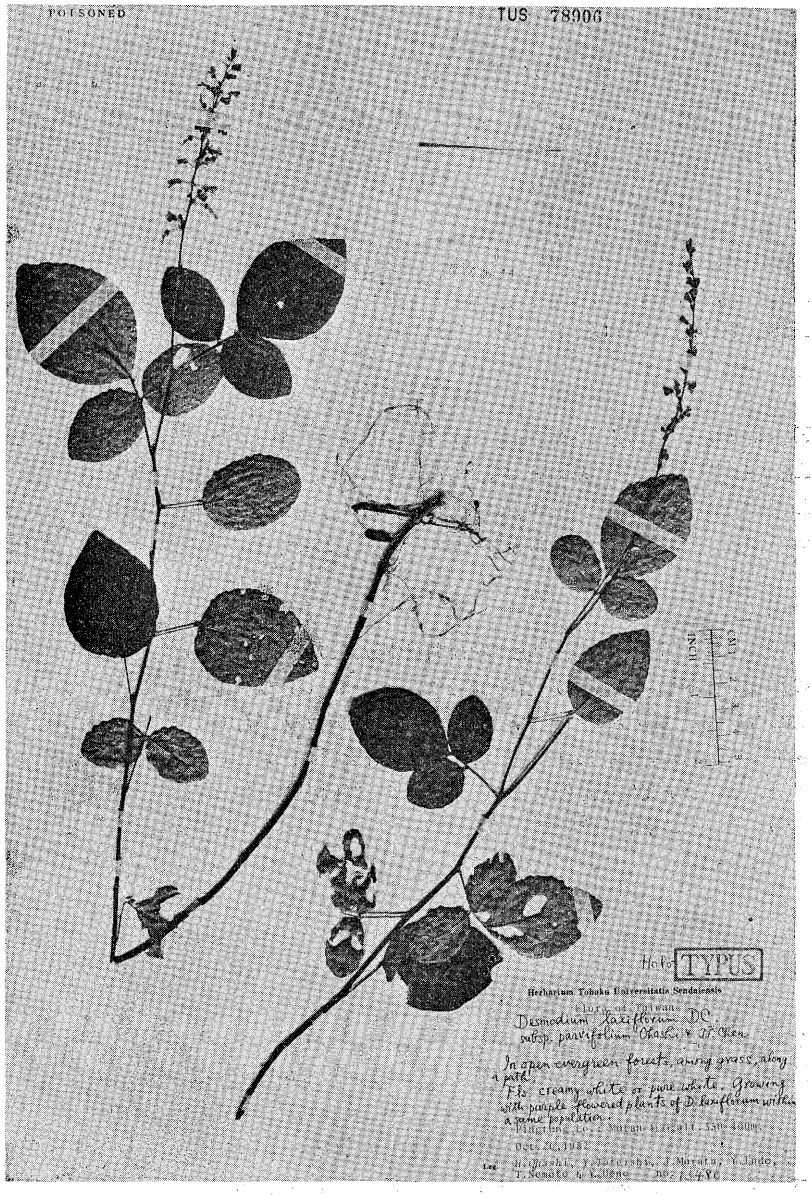

Fig. 2. Holotype of *Desmodium laxiflorum* subsp. *parvifolium* in TUS.

subsp. **parvifolium** Ohashi et T. T. Chen, subsp. nov. (Figs. 1 and 2)

A typo differt foliolis plerumque minoribus (2.5–11 cm longis, 1.5–6 cm latis), ovatis, obtusis; floribus minoribus (4–4.5 mm longis), pedicellis brevibus (3–7 mm longis); calycis lobis superioribus apice bidentatis; leguminibus haud rugosis; seminibus non arillatis, hilo rotundato ca 0.15 mm diametro.

Typus. Taiwan. Pingtung Co.: Mutan, alt. 350–400 m. In open evergreen forest, among grass, along a path. Fls. creamy white or pure white. Growing with purple flowered plants of *D. laxiflorum* within a same population. Oct. 26, 1982. H. Ohashi, Y. Tateishi, J. Murata, Y. Endo, T. Nemoto & Y. Ueno no. 13486 (Holotype—TUS, Isotype—TUS, TI, TAI).

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1982年に文部省科学研究費海外学術調査費57041006の援助をうけて台湾産マメ科植物の調査を行った。大橋が研究代表者となり，日本から立石庸一（東北大，理），邑田仁（東大，理）両氏がメンバーで，台湾からは黄増泉教授（台湾大学理学院植物学系）に参加していただいた。10月から12月に現地調査を行い，東北大大学院生の遠藤泰彦，根本智行および研究生上野雄規（宮城県白石市立福岡小学校）3君の協力を得た。調査の全体については東北大学理科報告第4輯，生物学 38巻4号（1984）に記録しておく予定である。

台湾のマメ科植物は黄教授と大橋によって Flora of Taiwan vol. 3 (1977) にまとめられている。これは短時間でまとめざるを得なかったために，不完全な部分を残した形で出版された。このため大橋は1975年頃から台湾のマメ科植物を全面的に再検討したいと考えていた。これまでに台湾の種類を含む東アジアあるいはヒマラヤの *Dolichos*（コウシュンフジマメ属），*Rhynchosia* および *Mucuna* についての研究を発表し，先の Flora of Taiwan のマメ科の一部を訂正してきた。今後，今回の調査で得られた新資料をも加えて，台湾産マメ科植物について研究してゆきたいと考えている。

本論文ではヌスビトハギ属の *Desmodium laxiflorum* DC. について扱った。本種はヒマラヤ，インド，東南アジア，ニューギニア，中国，台湾に分布し，台湾では全島にわたって主に低山地の，多少とも日の当る林中や林縁あるいはやぶ，ときには草地などの

道ばたやがけなどにかなりふつうにみられる。しかし，これまで台湾で *D. laxiflorum* に当てていた植物は典型的な *D. laxiflorum* と異なることが明らかとなった。

本種のタイプ標本はネパールで1821年に Wallich によって採集された。形態的にタイプによく一致する個体は中部や東部ネパールではふつうに見られる。葉は3小葉で，ときに1小葉のこともあり，頂小葉は狭卵形または狭楕円形から卵形で，先端は尖っており，長さは 5.5–20 cm，幅は 3–10 cm ある。花序は頂生と腋生の総状花序で長く伸びており，節間は長い。小花柄は糸状で，長さ 4.5–11 mm あってよく目立つ。

このタイプ標本によく一致する個体をタイプ型と呼び，これと異なる台湾の *D. laxiflorum* を台湾型と呼べば，両型は次の点で異なっている。台湾型は萼の上側（向軸側）に位置する裂片が先端で2裂しており，節果の表面にはしわがなく，種子の臍（直径約 0.15 mm）のまわりに rim-aril がない。これに反して，タイプ型では萼の上側の裂片は先端が2裂することなく，節果の表面にはしわがあって，種子の臍（直径約 0.3 mm）のまわりに rim-aril が発達する。この他にも両型は葉や第一苞の形と大きさ，花や小花柄の長さなどによっても区別できることが多い。

これらの相違点に基づいて，改めて *D. laxiflorum* を分布域全体で見直してみると，タイプ型はネパール，ダージリン，タイ，ベトナム，ラオス，インドネシア，フィリピン，ニューギニアにあり，台湾型を台湾以外にもネパール，ダージリン，ビルマ，ベトナム，ラオス，フィリピン，スマトラで見い出した。ヒマラヤ，インドシナ，フイリピンではタイプ型と台湾型とが混生している。

台湾以外には分布域内各国からの標本が充分には調べられなかったので，現段階では両型の分布について明らかでない。台湾の *D. laxiflorum* については，東北大，東大と台湾大学の標本および今回のコレクションを100点以上について精査できたが，その結果それらはすべて台湾型であり，タイプ型は発見できなかった。台湾にはタイプ型はないといえるのではないかと思う。なお，ネパールのもの約30点のうちではほぼ 1:1 の割合でタイプ型と台湾型とがみられ，タイからの標本12点はすべてタイプ型であった。

以上のように，台湾型は形態的に区別できる明らかな型であり，*D. laxiflorum* の亜種として区別することが適当であると考えられる。したがって，葉がタイプよりも小形であることが一番目につきやすい性質であるから，subsp. **parvifolium** Ohashi et T. T. Chen と命名し，発表することとした。タイプ標本は東北大，東大，台湾大のハーバリウムに入れる。

終わりに，所蔵標本を研究させていただいた東大と台湾大のハーバリウム関係者と，台湾産マメ科植物調査に協力していただいた方々に感謝します。