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Notes on Malesian *Fabaceae* (*Leguminosae-Papilionoideae*) 18. The genus *Lespedeza*

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Key words

Campylotropis
Fabaceae
Flora Malesiana
Lespedeza
Southeast Asia
taxonomy

Abstract The genus *Lespedeza* is revised for the Flora Malesiana region. Differences between *Lespedeza* and *Campylotropis* are briefly discussed. The two genera are united and treated as one genus: *Lespedeza*. Two species are present in Malesia. A key to the species and some notes are provided.

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INTRODUCTION

Lespedeza Michx. s.lat. is a genus of c. 70 species of the *Leguminosae* (*Fabaceae*) subfam. *Papilionoideae* tribe *Desmodieae*. In Malesia it is represented by two species. The genus has been split several times into smaller genera, viz *Lespedeza* s.str., *Campylotropis* Bunge and *Kummerowia* Schindl. *Kummerowia* has usually been kept separate, however, the differences with *Lespedeza* are neglectable. The two other genera have been united and separated again several times (see Nemoto & Ohashi 1996). An overview of the important characters for separating *Campylotropis* and *Lespedeza* is given by Iokawa & Ohashi (2002a) who concluded that the genera are distinct.

CHARACTERS PREVIOUSLY USED FOR SEPARATING LESPEDEZA AND CAMPYLOTROPIS

Inflorescences

In *Lespedeza* s.str. the inflorescence is a pseudoraceme, while in *Campylotropis* it is raceme (Nemoto et al. 1995, Iokawa & Ohashi 2002a). However, Nemoto & Ohashi (1996) recorded the inflorescences of some species of *Campylotropis* as reduced pseudoracemes. These reduced pseudoracemes have one flower per node, but with an extra bract at the base of the pedicel. They observed this in *Campylotropis hirtella* (Franch.) Schindl. and in *C. macrocarpa* (Bunge) Rehder var. *hupehensis* (Pamp.) Iokawa & H.Ohashi. I observed similar extra bracts in *Lespedeza capillipes* Franch., *L. delavayi* Franch., *L. harmsii* (Schindl.) Craib, *L. sulcata* (Schindl.) Craib (according to Iokawa & Ohashi (2002a–c) all belonging to *Campylotropis*). In *Lespedeza* s.str. the inflorescences normally have two flowers per node each with their own bract. However, the second flower may not develop or develop very late. I observed this in *Lespedeza buergeri* Miq., *L. davidii* Franch., *L. thunbergii* (DC.) Nakai, *L. tomentosa* (Thunb.) Siebold ex Maxim., *L. virgata* (Thunb.) DC. Nemoto & Ohashi (1996) observed this in *L. juncea* (L.f.) Pers. (as *L. cuneata* (Dum.Cours.) G.Don): "*Lespedeza cuneata* often has inflorescences whose b1-phyllomes (= bracts to the brachyblasts/nodes) appear to subtend only one flower (Fig. 2e, 3a–c)."

There seems to be a gradual change from pseudoracemes with two flowers per node, via late or no development of a second flower at each node, followed by the loss of the second flower and the flower bracts, ending in a raceme with just one flower per node, where the bract to the node (or brachyblast) has become the bract to the flower.

A more general view on changes in inflorescence structure was discussed by Geesink (1984: 8–11, f. 4.1). He indicates possible steps from a panicle via a pseudoraceme to a raceme (series IIIa-IIIb-IIIc-IIId).

Flowers

a. Keel petals. According to Iokawa & Ohashi (2002a) the keel petals of *Campylotropis* are falcate, whereas those of *Lespedeza* are not. From the figures of Iokawa & Ohashi (2002a–c) it is obvious that in *Campylotropis* there is a great variation in degree of falcateness. The keel petals of some species are even not or only slightly falcate: *Campylotropis argentea* Schindl. (f. 13A, k), *C. howelii* Schindl. (f. 33A, k), *C. latifolia* (Dunn) Schindl. (f. 39B, k), *C. pinetorum* (Kurz) Schindl. (f. 40A, k), *C. sulcata* Schindl. (f. 47B, k). My own observations show keel petals that are only slightly (or not) falcate in: *Lespedeza bonatiana* Pamp. (= *Campylotropis trigonoclada* (Franch.) Schindl.), *Campylotropis decora* (Kurz) Schindl., *Lespedeza elliptica* Benth. ex Maxim. (= *L. formosana* (Vogel) Koehne subsp. *elliptica* (Benth. ex Maxim.) S.Akiyama & H.Ohba), *Campylotropis pinetorum* (including *Lespedeza velutina* Dunn). There seems to be a gradual change from not falcate to strongly falcate.

b. Pump mechanism for secondary pollen presentation. Although clearly present in flowers with falcate keel petals, this does not mean that it is absent in flowers with non-falcate keel petals. Of course, a character like this should be studied in the field. Herbarium specimens usually provide insufficient information.

c. Stamens. In several genus descriptions of *Campylotropis* as well as *Lespedeza* the stamens are described as diadelphous, 9 united and the vexilar one free (e.g., Bentham

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1852, Miquel 1855, Taubert 1894). However, I observed mainly monadelphous stamens (all 10 united in a tube), rarely I observed diadelphous ones. My observations make it clear that the vexilar filament is often only weakly adnate to the other nine and the expanding ovary simply pushes the vexilar one free. In older flowers of several species the stamens have become diadelphous. Nemoto et al. (1995) noted the presence of fenestrae at the base of the stamens in *Lespedeza*. *Campylotropis* should lack these fenestrae. A study of the material present at L shows that *Lespedeza* species, that are included in *Campylotropis*, lack indeed basal fenestrae. However, several species of *Lespedeza* s.str. (*L. cyrtobotrya* Miq., *L. elegans* Cambess., *L. polystachya* Michx., *L. repens* W.P.C.Barton, *L. sessiliflora* Michx., *L. thunbergii* Nakai, *L. virginica* (L.) Britton) have very inconspicuous basal fenestrae or none at all.

d. Disc. According to Nemoto et al. (1995) a floral nectary (disc) is absent in *Campylotropis* and present in *Lespedeza* s.str. Here the picture is probably more complicated as the discs of many species of *Fabaceae* are completely or almost completely adnate to the base of the stamen tube. In some cases it is hard to see whether there is a disc or not. The nectariferous tissue may be totally integrated in the tissue of the base of the filaments. In the species present in L discs are absent or very inconspicuous in the species included by other authors in *Campylotropis* and in *Lespedeza frutescens* (L.) Hornem., *L. patens* Nakai, *L. violacea* (L.) Pers. In many of the other species of *Lespedeza* s.str. discs are ± totally adnate to the base of the stamen tube and rather inconspicuous.

The four characters discussed above show a more or less gradual change from one extreme to another. Although several of the traits discussed may occur in the same species, there are also exceptions and the genera *Campylotropis* and *Lespedeza* are to some extent overlapping in these characters. In other characters there are mainly differences at the species level. General habit and fruits are very similar for both genera. A comprehensive molecular phylogeny is for the moment lacking and the true status of the genera is not well understood. For the Flora Malesiana treatment I decided to accept a broad genus concept and treat *Lespedeza* in a wide sense, including *Campylotropis*.

LESPEDEZA IN MALESIA

In this section only names, synonyms, notes, a key to the species, and excluded species will be given. Full genus and species descriptions will be given in Flora Malesiana and can be found in some of the literature cited.

Lespedeza

Lespedeza Michx. (1803) 70; Miq. (1855) 230; Taub. (1894) 332; Backer & Bakh.f. (1964) 613; Verdc. (1979) 383; O.N.Allen & E.K.Allen (1981) 384; G.P.Lewis et al. (2005) 435. — Lectotype (designated by Britton & Brown 1913): *Lespedeza sessiliflora* Michx. (= *L. virginica* (L.) Britton).

Campylotropis Bunge (1835) 157; Miq. (1855) 229; O.N.Allen & E.K.Allen (1981) 132; G.P.Lewis et al. (2005) 434. — *Lespedeza* Michx. sect. *Campylotropis* (Bunge) Taub. (1894) 332. — Type: *Campylotropis chinensis* Bunge (= *Lespedeza macrocarpa* Bunge).

Phlebosporium Jungh. (1845) 346 ('*Phlebosprium*'); Hassk. (1847) 508 ('*Phlebosporum*'). — Type: *Phlebosporium cytisoides* Jungh. (= *Lespedeza junghuhniana* Bakh.f.).

Notes — 1. Root nodules were observed in several species (Allen & Allen 1981).

2. *Phlebosporium* was accidentally spelled '*Phlebosprium*' in Junghuhn (1845). Hasskarl (1847) and Taubert (1894, in the synonymy of sect. *Campylotropis*) used '*Phlebosporum*'.

KEY TO THE SPECIES

1. Leaflets obovate or cuneate, 2.9–23 by 1.0–6.5 mm. Inflorescences 1–2 mm long, peduncle 0.4–0.5 mm long. Keel petals: claw 1.5–1.9 mm long; blade boat-shaped, 3.8–4.2 by 1.5–2 mm. Pods 2.5–3 by 1.8–2 by 1–1.1 mm . . . . . 1. *L. juncea*
1. Leaflets (narrowly) elliptic, 9–39 by 4.5–15 mm. Inflorescences 50–95 mm long, peduncle 6–20 mm long. Keel petals: claw 1.1–2.5 mm long; blade ± falcate, rarely narrowly elliptic, 5–8 by 1.5–3 mm. Pods 4.8–8 by 2.9–5 by 1.3–1.5 mm . . . . . 2. *L. junghuhniana*

1. *Lespedeza juncea* (L.f.) Pers.

Lespedeza juncea (L.f.) Pers. (1807) 318; Miq. (1855) 230. — *Hedysarum junceum* L.f. (1762) 7, t. 4; L. (1763) 1053. — Type (see Jarvis 2007): t. 4 in L.f. (1762).

Hedysarum sericeum Thunb. (1784) 287. — *Lespedeza sericea* (Thunb.) Miq. (1867) 49. — *Lespedeza juncea* (L.f.) Pers. subsp. *sericea* (Thunb.) Steenis (1955) 280; Backer & Bakh.f. (1964) 613. — *Lespedeza juncea* (L.f.) Pers. var. *sericea* (Thunb.) F.B.Forbes & Hemsl. (1887) 181. — Type: not indicated.

Anthyllis cuneata hort. ex Dum.Cours. (1811) 100. — *Lespedeza cuneata* (Dum.Cour.) G.Don (1832) 307; Verdc. (1979) 383; T.Nemoto & H.Ohashi (1990) 217. — Type: not indicated.

Notes — 1. A widespread species often split in several varieties. Some of these varieties are rightfully raised to species rank. However, the differences between *L. juncea, L. sericea* and *L. cuneata* are too small to separate them at any level.

2. Remarkable for this species are the very short, almost sessile inflorescences.

2. *Lespedeza junghuhniana* Bakh.f.

Lespedeza junghuhniana Bakh.f. (1961) 134; Backer & Bakh.f. (1964) 613. — *Phlebosporium cytisoides* Jungh. (1845) 346; Hassk. (1847) 508. — *Lespedeza cytisoides* (Jungh.) Benth. (1852) 230, nom. superfl., non Bertol. (1851: 278). — *Campylotropis cytisoides* (Jungh.) Miq. (1855) 229, t. 4, f. a; Iokawa & H.Ohashi (2002a) 210. — Type: *Junghuhn 77* (n.v.), Java.

Notes — 1. When *Phlebosporium cytisoides* was placed by Bentham (1852) in *Lespedeza* the name *Lespedeza cytisoides* Bertol. (1851) already existed. A new name was required. Bakhuizen van den Brink Jr. (1961) proposed to replace it by *Lespedeza junghuhniana*.

2. Iokawa & Ohashi (2002a) gave *Campylotropis virgata* Miq. as a synonym of *Lespedeza junghuhniana*. However, the specimens described by Miquel are different in several characters. Miquel's specimens belong to *Lespedeza cyrtobotrya* Miq. (see Excluded species).

EXCLUDED SPECIES

Lespedeza cyrtobotrya Miq.

Lespedeza cyrtobotrya Miq. (1867) 48. — Lectotype (designated by Akiyama & Ohba 2003): *Buerger s.n.* (lecto L0103926), Japan, Iwajajama ('Iwajagama').

Campylotropis virgata Miq. (1855) 230, nom. superfl., non *Lespedeza virgata* DC. (1825). — Lectotype (here designated): *Anon. s.n.* (lecto L0898007), Java.

Notes — 1.The name *Campylotropis virgata* was based by Miquel on a specimen he originally named *Lespedeza virgata*. A specimen with this name is present in L (L0898007). This specimen was according to the label collected in Java. An exactly similar specimen (L.2052882) bears the name *Campylotropis virgata*. This specimen was according to the label collected in Java, Hortus Bogoriensis. Probably the first specimen was also collected in the botanical garden of Bogor. The first

specimen was selected as lectotype of *Campylotropis virgata*. The species is a Japanese endemic.

2. Within *Lespedeza* the combination *Lespedeza virgata* (1825) already existed, which makes Miquel's name (1855) superfluous, and his (1867) heterotypous synonym *L. cyrtobotrya* has to be used instead.

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IDENTIFICATION LIST

1. *L. juncea* (L.f.) Pers.
2. *L. junghuhniana* Bakh.f.

Afriastini 1494: 1 – Arens 41: 2.

Backer 3820: 2; 6802: 2; 8404: 2; 9584: 2; 36526: 2 – Beumée A 50: 1 – Bhattacharyya 31200: 1 – Bois 309: 1 – Borgmann 410: 1 – BS series 5991 (Ramos): 1; 40204 (Ramos & Edaño): 1.

Chand 1090: 1 – Chow 76014: 1 – Cinatti 18: 1 – Coert 27: 2; 42: 2.

Danser 6604: 2 – De Voogd 804: 2; 1891: 1 – Dietrich 1489: 1.

Elbert 160: 2; 161: 2; 1687: 2; 1743: 2; 1923: 2.

Falconer 442: 1 – Fosberg 38104: 1.

Gisius 125: 2 – Griffith 1747/2: 1.

S.F. Huang 165: 1 – T.C. Huang 10033: 1.

Jeswiet 14: 2; 88: 2; 344: 1; 866: 2; 1157: 2 – Jeswiet-Hagedoorn 1095 (= Jeswiet 396): 2.

Kao 3748: 1 – Karo 289: 1 – Karsten 42: 2 – Kaspiew 25: 1; 575a: 1; 3404: 1 – Kleinhoonte 367: 2 – Koelz 19523: 1; 26260: 1 – Koorders 37649: 2 – Kuoh 12547.

Makino 49084: 1 – McBarron 7905: 1; 14889: 1 – McKee 10183: 1 – Monod de Froideville 1556: 1 – Murata 18541: 1.

Nair 34119: 1 – NGF series 1144 (L.S. Smith): 1; 6182 (Womersley et al.): 1 – Noguchi 3447: 1.

PNH series 4450 (Celestino et al.): 1.

Rappard 286: 1.

Sahna 21883: 1 – Schindler 163: 1 – Sino-American Guizhou Botanical Expedition 862: 1.

Tanaka & Shimada 11188: 1 – Teng 90417: 1; 90417B: 1; 90417C: 1 – Ting & Shih 736: 1.

Van de Veen 24: 2 – Van Steenis 7012: 2; 8001: 2; 18254: 1; 18391: 2; 18397: 1.

Walker 6922: 1 – Wieringa 1913: 2 – Wiriadinata 2080: 2.

Yoshida 1708: 2.

Zollinger 2290: 2.