

***IANHEDGEA* (BRASSICACEAE), A NEW GENERIC
NAME REPLACING THE ILLEGITIMATE
*MICROSISYMBRIUM***

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The generic name *Microsisymbrium* O.E. Schulz was illegitimate when described because it included the type of *Guillenia* Greene. The monotypic *Ianhedgea* is proposed to include one of the 12 species previously assigned to *Microsisymbrium*, i.e. *M. minutiflorum* (Hook.f. & Thomson) O.E. Schulz. The proper generic placement of the remaining 11 species of *Microsisymbrium* is presented. The following new combinations are made: *Ianhedgea minutiflora* (Hook.f. & Thomson) Al-Shehbaz & O'Kane, *I. minutiflora* subsp. *brevipedicellata* (Hedge) Al-Shehbaz & O'Kane, and *Neotorularia quingshuiheense* (Ma & Z.Y. Zhu) Al-Shehbaz, O'Kane & G. Yang.

Keywords. Brassicaceae, Himalaya, *Ianhedgea*, *Microsisymbrium*, new generic name.

INTRODUCTION

Of the four species treated in his original account of *Microsisymbrium* O.E. Schulz, Schulz (1924) included three central Asian and Himalayan species and one, *M. lasiophyllum* (Hook. & Arn.) O.E. Schulz, from the western United States (Washington, Oregon, California, Arizona, Nevada, Utah) and Baja California, Mexico. In establishing the genus *Guillenia* Greene, Greene (1906) included five species, the first of which, *G. lasiophylla* (Hook. & Arn.) Greene, is clearly the generic type because he (Greene, 1904: 86) stated that: 'In arranging the sequence of species my custom is to place those first which seem to have the clearest claim to represent a genus; and therefore these stand as its type.' Payson (1923) and Rollins (1979) were correct in listing *G. lasiophylla* as the type of *Guillenia*. As pointed out by Al-Shehbaz (1973), Schulz (1924, 1936) maintained *Guillenia* even after removing its type to *Microsisymbrium*; therefore, according to Article 52.1 of the ICBN, *Microsisymbrium* is illegitimate because it includes the generic type of *Guillenia*.

Bonnet (1983) transferred all the Himalayan species of *Microsisymbrium* to *Guillenia*, and his account was followed by Hajra *et al.* (1993). Payson (1923), Al-Shehbaz (1973), and Rollins (1993) have reduced *Guillenia* to synonymy of *Caulanthus* S. Watson, whereas Buck (1995) maintained both genera. That does not mean, however, that all of the Asian species of *Microsisymbrium* should be automatically transferred to *Caulanthus* or *Guillenia*. Rather, a critical examination of the characteristics of all taxa involved clearly indicates that the Asian *Microsisymbrium* is a heterogeneous assemblage of taxa that belong to at least five genera (see below),

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of which none is related to the North American *Guillenia* or *Caulanthus*. As defined by Greene (1904), *Guillenia* clearly belongs to the group of genera previously placed in the *Thelypodieae* (Al-Shehbaz, 1973; Hauser & Crovello, 1982; Al-Shehbaz, 1985), a tribe exclusively restricted to the New World. If *Guillenia* were to be maintained, it should be very closely associated with *Caulanthus* (Al-Shehbaz, 1973).

All except one of the eleven species previously placed in *Microsisymbrium* can easily be assigned to other genera. The single species, *M. minutiflorum* (Hook.f. & Thomson) O.E. Schulz, clearly stands alone, and we propose to place it in the monotypic *Ianhedgia*, a genus named in honor of Ian C. Hedge, an outstanding expert of the Old World *Brassicaceae* (*Cruciferae*).

IANHEDGIA

Ianhedgia Al-Shehbaz & O'Kane, **gen. nov.**

Herba annua, pilis ramosis dendroidis. Folia pinnatisecta vel trisecta, petiolata; lobis integris filiformis, linearis, anguste oblongis, vel oblanceolato-linearis. Racemi fructiferi laxi, ebracteati, flexuosi. Sepala erecta, nonsaccata. Petala alba vel pallide lilacina. Fructus lineares, teres, torulosi; septum completum, hyalinum; stylo nullo vel minuto. Semina uniseriata, humidate nonmucilaginosa; cotyledones incumbentes. Type: *Ianhedgia minutiflora* (Hook.f. & Thomson) Al-Shehbaz & O'Kane.

Herbs annual. *Trichomes* branched, finely dendritic. *Stems* erect, slender, often branched above. *Basal leaves* petiolate, not forming a rosette, finely pinnatisect or 3-sect; lobes 3 or 5, sparsely to densely dendritic. *Cauline leaves* short petiolate, similar to basal leaves in division and pubescence, reduced in size upward and becoming 3-lobed. *Inflorescences* few- to several-flowered, ebracteate corymbose raceme, elongated considerably in fruit; rachis strongly or rarely slightly flexuous or straight. *Fruiting pedicels* slender, sometimes thickened and nearly as wide as fruit, erect to divaricate. *Sepals* oblong, erect, base of inner pair not saccate, margin membranous. *Petals* white to lavender, distinctly longer than sepals; blade oblanceolate, apex obtuse; claw obscurely distinct from blade. *Stamens* 6, tetradynamous; filaments filiform; anthers broadly ovate, not apiculate. *Nectar glands* confluent and subtending bases of all stamens. *Ovules* (6-)10-20 per ovary. *Fruits* dehiscent, linear, terete, torulose, divaricate to appressed to rachis, sessile; valves papery, veinless or with an obscure midvein; septum complete, membranous; style absent to obsolete; stigma capitate, entire. *Seeds* 2-8 per locule, uniseriate, wingless, oblong, plump; seed coat nearly smooth, not mucilaginous when wetted; cotyledons incumbent.

Ianhedgia minutiflora (Hook.f. & Thomson) Al-Shehbaz & O'Kane, **comb. nov.**

Basionym: *Sisymbrium minutiflorum* Hook.f. & Thomson, J. Linn. Soc., Bot. 5: 158 (1861). Lectotype (here designated): western Tibet, Prov. Zanskar, *T. Thomson s.n.* (K!).

Microsisymbrium minutiflorum (Hook.f. & Thomson) O.E. Schulz var. *dasycarpum* O.E. Schulz, Pflanzenreich IV. 105 (Heft 86): 161 (1924). Type: Afghanistan, Erak, Griffith 1390 (holo. B!; iso. K!, W!).

Herbs (2-)4-20(-30)cm tall, sparsely to moderately pubescent with finely branched trichomes to 0.1mm long. *Stems* slender, branched above or rarely simple; branches filiform. *Basal and lowermost cauline leaves* with 1 or 2 pairs of lateral lobes; petiole 5-12mm long; lobes linear, filiform, narrowly oblong, to oblanceolate-linear, (1-)3-9(-12)mm long, 0.2-0.8(-1.3)mm wide, margin entire or very rarely obtusely 1-toothed, apex obtuse. *Upper and middle cauline leaves* 3-lobed, similar to lowermost leaves, always 3-lobed. *Infructescence* axis strongly flexuous, rarely straight or slightly flexuous. *Fruiting pedicels* (0.5-)3-8(-12)mm long, slender or thickened, narrower or rarely nearly as wide as fruit, erect to divaricate, straight or slightly curved. *Sepals* oblong, (0.6-)0.8-1(-1.2)mm long, 0.4-0.5mm wide. *Petals* white to lavender, (0.9-)1.1-1.5(-1.8)mm long, 0.3-0.5mm wide, oblanceolate, apex obtuse. *Filaments* white, 0.8-1.1mm long; anthers broadly ovate, c.0.2mm long. *Fruit* (0.4-)0.7-1.8(-2.5)cm long, 0.5-0.8mm wide; valves glabrous or sparsely pubescent; style absent to obsolete, rarely to 0.1mm long. *Seeds* brown, oblong, 0.9-1.1(-1.2)mm long, 0.4-0.5(-0.6)mm wide. Fl. May-Aug, fr. June-Aug.

Ianhedgia minutiflora grows on limestone, marble outcrops, and scree slopes at altitudes of 2600-4200m in Afghanistan, China, India, Iran, Pakistan, and Tajikistan. The species is highly variable in the density of indumentum, degree to which the infructescence rachis is flexuous, length, orientation, and thickness of fruiting pedicels, fruit length, number of seeds per locule, plant height, and stem branching. Except for the fruiting pedicels and infructescence rachis, however, the variation in all other characters is continuous in nature and does not appear to have any taxonomic significance. On the basis of length, orientation, and thickness of fruiting pedicels, as well as the degree at which the infructescence rachis is flexuous, the species can be easily divided into the following well-defined subspecies.

Key to subspecies

- 1a. Fruiting pedicels divaricate, slender, distinctly narrower than fruit,
(2.5-)4-9(-12)mm long; infructescence axis strongly flexuous _____
_____ **subsp. minutiflora**
- 1b. Fruiting pedicels erect to ascending, rarely divaricate, stout and nearly as thick
as fruit, 0.5-1.5(-3)mm long, infructescence axis straight or slightly flexuous
_____ **subsp. brevipedicellata**

Ianhedgia minutiflora* subsp. *minutiflora

Distribution. Afghanistan, China, India, Iran, Pakistan, and Tajikistan.

Specimens examined. AFGHANISTAN. Prov. Badakhshan: W of Anjuman Pass, *Podlech* 12417 (M). Prov. Bamian: Band-i-Amir, Kohe Jak Ruya, *Dieterle* 1225 (G, M), *Dieterle* 1099 (G, M); Shibar Pass, Koh-i-Baba Mts., *Furse* 6651 (K, LE); Koh-i-Baba Mts, *Gilli* 986 (W); Koh-i-Baba, Darrah Bod Chur, SW of Bamian, *Breckle* 2618 (M); Bei Baraki Nawor, *Neubauer* 12 (W). Prov. Deh Kund: Khonak, *Rechinger* 36652 (W). Prov. Ghazni: Dasht-i-Nawar, *Breckle* 1921a (M); Dasht-i-Nawar, Saperlebuli, *Rechinger* 37352 (B, M, W); Dasht-i-Nawar, NW Ghazni, *Kasg* 59 (W); Kadjicak Pass, *Palmer* 76 (K, W). Prov. Jaji: between Qasim Khel and Dobandi, *Rechinger* 32349 (W). Prov. Kabul: Qala-e Wazier, between Sari Chashma and Unai, *Rechinger* 18101 (W); Unai, *Rechinger* 36030 (B, E, G, LE, M, W, Z); Unai, Kuh-i-Qhalandaran, *Hedge & Wendelbo* 4509 (E, LE); Salang, *Rechinger* 31430 (W), *Rechinger* 37479 (G, M, W); Farakulum, *Köie* 2563 (W). Prov. Kunar: Bashgal-Quelltaler, Darrah-i-Pushal, *Podlech* 16424 (G, LE, M, W); Pushal-Tal, *Moh. Rasoul* 3541 (E, W). Prov. Maidan: Maidan-Tal, Unai-Kotal, *Breckle* 2271 (M); Unai Pass, *Furse* 8598 (K), *Gilli* 985 (W), *Neubauer* 513, 525 (W), *Volk* 1629 (W).

CHINA. Tibet (Xizang): Zanskar, *Thomson s.n.* (K).

INDIA. Lahul: near Kyelang, about Baralacha Pass, *Stewart* 430a (NY); without locality, *Thomson s.n.* (K, P, W).

IRAN. Qashqai: Kohrueh 25–36km, between Shahreza and Semirom, *Rechinger* 47333 (W). Elburz: Talyhan, *Klein* 3005 (W). Fars: Dena-Sicani Pass, *Behboudi* 988E (W). [Tehran]: M. Tuchal (as Totschal), *J. & A. Bornmüller* 6159 (B, E, G, K, LE, P, W).

PAKISTAN. Chitral: Barum Gol, above Shokor Shal, 18 vi 1950, *Wendelbo s.n.* (BM).

TAJIKISTAN. Pamir: Badakhshan, vicinity of Khorag, 21 vi 1966, *Kamelin s.n.* (LE); same area, 24 vi 1966, *Kamelin s.n.* (LE); Badakhshan, Andarob valley of river Garm-Chazma, near Zevdz, *Sultanov* 1215 (LE); Badakhshan, Alay, Khargugi Pass, *Lukanenkova* 189 (LE).

***Ianhedgia minutiflora* subsp. *brevipedicellata* (Hedge) Al-Shehbaz & O'Kane, stat. et comb. nov.**

Basionym: *Microsisymbrium minutiflorum* (Hook.f. & Thomson) O.E. Schulz var. *brevipedicellatum* Hedge in Hedge and K. H. Rechinger, *Fl. Iranica* 57: 319 (1968). Type: Afghanistan, Bamian, W Panjao, Kotal-e Nalgis, 3100m, *Hedge & Wendelbo* 4957 (holo. E!; iso. BG).

Microsisymbrium murgabicum Ikonn., *Opred. Vyssh. Badakhshana* 180 (1979). Syn. nov. Type: Tajikistan, Pamir, Badachshan, 3700m, 10 vii 1958, *Y. Gusev* 5233 (holo. LE!).

Distribution. N. Afghanistan and adjacent Tajikistan.

Specimens examined. AFGHANISTAN. Prov. Bamian: Band-i Amir, *Rechinger* 18382 (W); between Unai and Hajigak, *Hedge & Wendelbo* 4594 (E). Prov. Panjao: 12km E of Panjao, *Rechinger* 36196 (B, G, M, W). Prov. Ghour, E of Laal Sar Jangal, *Hedge & Wendelbo* 8755(K). Prov. Lugar, Ekberg 9166(E).

TAJIKISTAN. Pamir: Badachshan, *Gusev* 5233 (LE).

The monotypic *Ianhedgia* is most closely related to *Neotorularia* Hedge & J. Léonard, which it resembles in having linear, terete, torulose fruits, valves pubescent with branched trichomes, uniseriate, non-mucilaginous seeds, and incumbent cotyledons; however, it consists of very slender annuals with finely pinnatisect or trisect leaves, flexuous infructescence, few- to several-seeded fruits, dendritic trichomes, and confluent nectar glands. In contrast, *Neotorularia* includes coarse to robust annuals with

variously divided but never finely pinnatisect or trisect leaves, nonflexuous infructescences, many-seeded fruits, often a mixture of simple and forked but never dendritic trichomes, and nonco-fluent lateral glands without median nectaries. *Ianhedgia* is somewhat similar to *Descurainia* which it resembles in having pinnatisect leaves and dendritic trichomes, but the latter has 2- or 3-pinnatisect leaves, mucilaginous seeds, and often unicellular glandular trichomes. *Ianhedgia* has 1-pinnatisect or trisect leaves, non-mucilaginous seeds, and glandular trichomes.

Ianhedgia also resembles the monotypic *Dichasianthus* Ovcz. & Junussov in consisting of slender small annuals with minute flowers and flexuous infructescences; however, it has dendritic trichomes, terete fruits, and white to lavender flowers, whereas *Dichasianthus* has puberulent, simple trichomes, flattened fruits, and blue flowers. Blue flowers are very rare in the *Brassicaceae* and found in only a few genera, including the south African *Heliophila* L. and the Chinese *Solmslaubachia* Muschl. The superficial similarity between *Ianhedgia* and *Dichasianthus* is so remarkable that one collection, *Rechinger* 31976 (W), of *D. subtilissimus* (Popov) Ovcz. & Junussov was cited by Hedge (1968) as *Microsisymbrium minutiflorum* (= *I. minutiflora*). This collection represents the first record of *Dichasianthus* from Afghanistan. *Dichasianthus subtilissimus* is previously known to be endemic to Tajikistan. The limits of *Dichasianthus* were expanded by Soják (1982) to include plants now assigned to *Neotorularia*, but this action is unwarranted because *Neotorularia* clearly differs by having terete, torulose, pubescent fruits, white to lavender flowers, and branched trichomes, whereas *Dichasianthus* has flattened, glabrous, smooth fruits, blue flowers, and simple trichomes.

GENERIC ASSIGNMENTS OF SPECIES PREVIOUSLY PLACED IN *MICROSISYMBRIUM*

- Microsisymbrium angustifolium* Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 113 (1956) = *Crucihimalya wallichii* (Hook.f. & Thomson) Al-Shehbaz, O'Kane & Price, Novon 9: 301 (1999).
- M. axillare* (Hook.f. & Thomson) O.E. Schulz, Pflanzenreich IV. 105 (Heft 86): 160 (1924) = *Crucihimalya axillaris* (Hook.f. & Thomson) Al-Shehbaz, O'Kane & Price, Novon 9: 301 (1999).
- M. bracteosum* Jafri, Notes Roy. Bot. Gard. Edinburgh 22: 112 (1956) = *Crucihimalya axillaris* (Hook.f. & Thomson) Al-Shehbaz, O'Kane & Price, Novon 9: 301 (1999).
- M. duthiei* O.E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1089 (1927) = *Crucihimalya lasiocarpa* (Hook.f. & Thomson) Al-Shehbaz, O'Kane & Price 9: 300 (1999).
- M. flaccidum* O.E. Schulz, Notizbl. Bot. Gart. Berlin-Dahlem 9: 1090 (1927) = *Arabis* sp. but too immature for a definite determination.

- M. griffithianum* (Boiss.) O.E. Schulz, Pflanzenreich IV. 105 (Heft 86): 161 (1924) = *Olimarabidopsis pumlia* (Stephan) Al-Shehbaz, O'Kane & Price Novon 9: 300 (1999).
- M. lasiophyllum* (Hook. & Arn.) O.E. Schulz, Pflanzenreich IV. 105 (Heft 86): 162 (1924) = *Caulanthus lasiophyllus* (Hook. & Arn.) Payson, Ann. Missouri Bot. Gard. 9: 303 (1923).
- M. minutiflorum* (Hook.f. & Thomson) O.E. Schulz, Pflanzenreich IV. 105 (Heft 86): 160 (1924) = *Ianhedgea minutiflora* (Hook.f. & Thomson) Al-Shehbaz & O'Kane.
- M. murgabicum* Ikonn., Opred. Vyssh. Badakhshana 180 (1979) = *Ianhedgea minutiflora* (Hook.f. & Thomson) Al-Shehbaz & O'Kane subsp. *brevipedicellata* (Hedge) Al-Shehbaz & O'Kane.
- M. pulchellum* Rech.f. & Koeie, Anz. Math.-Nat. Kl. Österr. Akad. Wiss. 7: 6 (1954) = *Neotorularia aculeolata* (Boiss.) Hedge & J. Léonard, Bull. Jard. Bot. Nat. Belg. 56: 393 (1986).
- M. qingshuiheense* Ma & Z.Y. Zhu, Acta Sci. Nat. Univ. Intramongoli. 20: 538 (1989) = *Neotorularia qingshuiheense* (Ma & Z.Y. Zhu) Al-Shehbaz, O'Kane & G. Yang, **comb. nov.** Type: China. Nei Mongol. Ulanqab Meng, Qinshuihe, Jicia Zhang, 16 vii 1988, Z.Y. Zhu 88-003 (holo. HIMC).
- In all aspects of trichomes, leaves, fruits, and habit, *Neotorularia qingshuiheense* is perfectly at home in *Neotorularia*. The slightly flexuous inflorescence is unusual in *Neotorularia*, but this feature alone does not justify the inclusion of the species in *Ianhedgea*, and plants of the rather rare *I. minutiflora* subsp. *brevipedicellata* usually do not have typically flexuous infructescences.
- M. taxkorganicum* Z.X. An, Fl. Xinjian. 2(2): 380 (1995) = *Sisymbriopsis mollipila* (Maxim.) Botsch., Not. Syst. Pl. Vasc. 3: 122 (1966).
- M. yechengnicum* C.Z. An, Bull. Bot. Res. North-East Forest Inst. 1(1-2): 99 (1981) = *Sisymbriopsis yechengnica* (C.Z. An) Al-Shehbaz, Z.X. An, & G. Yang, Novon 9: 312 (1999).

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