

Validation of Hao's New Chinese Taxa in *Salix* (Salicaceae)

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ABSTRACT. Thirty-four previously invalidly published taxa of Chinese *Salix* are validated. These include 14 sections (*Allochroae*, *Biondianae*, *Cathayanae*, *Cheilophilae*, *Chingianae*, *Dodecandrae*, *Doliae*, *Eriocladae*, *Ernestia*, *Floccosae*, *Tangia*, *Tetradeniae*, *Variegatae*, and *Wilsonia*), 15 species (*S. acuminatOMICROPHYLLA*, *S. amnematchinensis*, *S. chingiana*, *S. crenata*, *S. forrestii*, *S. hupehensis*, *S. kansuensis*, *S. lamashanensis*, *S. ovatomicrophylla*, *S. pseudowolohoensis*, *S. shansiensis*, *S. schneideriana*, *S. tangii*, *S. wangiana*, and *S. wuiana*), 4 varieties (*S. atopantha* var. *glabra*, *S. caprea* var. *dentata*, *S. caprea* var. *sinica*, and *S. caprea* var. *subsessilis*), and 1 form (*S. spodiophylla* f. *liocarpa*).

In his outstanding "Synopsis of Chinese *Salix*," Hao (1936) described several new sections, species, and infraspecific taxa and provided excellent descriptions in English but failed to provide Latin diagnoses for any of his new taxa. Therefore, according to Article 36.1 of the *International Code of Botanical Nomenclature* (Greuter et al., 1994), none of his new taxa is validly published. Unfortunately, many of his new species have been widely used in local Chinese floras even though they are invalid. In some cases, Hao (1936) cited two specimens as types, one staminate and the other pistillate, but this contradicts Article 37, making these names also invalid. Fortunately, Hao provided photographs of the types of the new taxa, and that helped in the typification process. The present paper validates all of the new taxa proposed by Hao. The English descriptions are not repeated here; the interested reader should refer to Hao's publication for those and the photographs.

NEW SPECIES AND INFRASPECIFIC TAXA

Salix acuminatOMICROPHYLLA K. S. Hao, sp. nov.
TYPE: China. Yunnan: Montes Motung, Yangtze-Mekong divortium, J. F. Rock 10346 (holotype (♀), B). See Hao (1936: 53, fig. 16).

Fruticulus ad 3 cm altus; ramis luteobrunneis, procumbentibus, glabris; gemmis obtusis, glabris. Folia rigide coriacea, elliptico-lanceolata, basi apiceque acuta, supra viridia glabra, subtus pallida, integerrima, 2.5–3.5 mm longa, 1.5–2 mm lata, subsessilia. Amenta feminea sessilia, ca. 3 mm longa crassaque, 2–3-flora; rhachidi glabra; glandula ventralis anguste oblonga; ovarium glabrum breviter pedicellatum, stylo brevi apice bilobo. Amenta mascula usque ad 5 mm longa, ca. 3 mm crassa, 3- vel 4-flora; rhachidi villosa; bracteis oblongo-spathulatis, obtusis, utrinque glabris, longitudinem ca. ½ filamenti aequantibus. Flos masculis glandulis 2, filamentis glabris vel basi pilosis, antheris ellipsoideis.

Salix amnematchinensis K. S. Hao, sp. nov.
TYPE: China. Qinghai: Cheihki gan ba, 4500 m, 27 Aug. 1930, K. S. Hao 1039 (holotype (♀), PE). See Hao (1936: 74, fig. 44).

Frutex pumilus erectus, ramis brunneis glabris. Folia elliptico-ovata 8–20 mm longa, 6–12 mm lata, apice acuta, basi late cuneata, utrinque margine integra, utrinque glabra, supra viridia, subtus glauca vel viridula; petiolo 2–5 mm longo, flavescente glabro. Amenta feminea capitata, ca. 10 mm longa; bracteis orbiculatis, utrinque pilosis, longitudinem ca. ½ ovarii aequantibus. Flos femineus ovario piloso, sessili, stylo et stigmatibus indistinctis. Capsula ovoidea ca. 3.5 mm longa.

Salix atopantha C. K. Schneider var. ***glabra*** K. S. Hao, var. nov. TYPE: China. Zhejiang: Tien mu shan, K. K. Troong 63 (holotype (♀), PE). See Hao (1936: 70).

Haec varietas a typo speciei bracteis glaberrimis apice ovatis differt.

Salix caprea L. var. ***dentata*** K. S. Hao, var. nov.
TYPE: China. Hebei: Hsiao wu tai shan, on the moist slope, 29 May 1930, H. W. Kung 149 (holotype, PE). See Hao (1936: 91, fig. 66).

Folia ovata margine dentata, basi rotundata, apice obtusa, 7–10 cm longa, 5–6 cm lata.

Salix caprea L. var. ***sinica*** K. S. Hao, var. nov.
TYPE: China. Hebei: Wu ling shan, alt. 1270 m, 31 May 1931, Liou 49 (holotype, PE). See Hao (1936: 91, fig. 67).

Folia anguste lanceolata vel rhombico-lanceolata, basi attenuata, apice acuta, margine integerrima, 3.5–6(–8) cm longa, 1.5–2.5(–3.2) cm lata. Infructescencia pedicellis 2.5–3 mm longis, capsula 8–9 mm longa.

Salix caprea L. var. **subsessilis** K. S. Hao, var. nov. TYPE: China (as Chakar). Yü hsien, *Liou* 2405 (holotype, PE). See Hao (1936: 92).

Folia ut in varietate praecedente. Infructescencia pedicellis usque ad 0.5 mm tantum longis. Capsula ca. 4 mm longa.

Salix chingiana K. S. Hao, sp. nov. TYPE: China. Gansu: Lan ze cheon kou, near Sining, alt. 2650–3100 m, 23 July 1923, *R. C. Ching* 584 (holotype (♀), A). See Hao (1936: 86, fig. 60).

Arbuscula ad 7 m alta; ramulis atro-purpureis glabris. Folia lanceolata, 7–10 cm longa, 17–20 mm lata, apice acuta, basi attenuata, vulgo utrinque glabra, supra viridia, subtus pallentia, margine glanduloso-serrata, petiolo ca. 13 mm longo, glabro glandifero. Amenta feminea elongata, ad 10 cm longa (in fructu), rhachidi pilosa pedunculo basi 2–3 foliis suffulto; bracteis ovatis utrinsecus parce pilosis. Flos femineus glandula 1 ventrali cylindrica, pedicellum fere aequanti; ovario glabro, elliptico-oblongo, longe pedicellato.

Salix crenata K. S. Hao, sp. nov. TYPE: China. Yunnan: Yangtze watershed district of Lijiang, W slope of Lijiang Snow Range, May–Oct. 1922, *J. F. Rock* 4948 (holotype (♂), B). See Hao (1936: 50, fig. 11).

Frutex pronus. Folia ovata, utrinque ovata vel obtusa, margine crenulata, 6–7 mm longa, 3–4 mm lata, supra atroviridia nitida, subtus viridula utrinque quam nervoso-rugosa. Amenta mascula capitata pauciflora; bracteis ellipticis, 3-nerviis, glabris, longitudinem fere ½ staminum aequantibus. Flos masculus glandulis cylindricis, glandula ventrali quam dorsali multo longiore, staminibus 2 inaequalibus, filamentis glabris.

Salix forrestii K. S. Hao, sp. nov. TYPE: China. Yunnan: without locality, *Forrest* 5718 (holotype (♀), B). See Hao (1936: 69, fig. 38).

Frutex erectus, ramis brevibus plus-minusve tomentosis. Folia oblongo-lanceolata, basi rotundata vel late cuneata, apice acuta, margine integerrima, supra laete viridia et secus nervos pilosa, subtus glauca parce pilosa, 4–6 cm longa, 15–20 mm lata. Amenta feminea sessilia, 1–3 foliis subtus sericeis suffulta, 7–8 cm longa, 8–11 mm crassa, rhachidi tomentosa; bracteis orbiculatis extus dense intus leviter pilosis, longitudinem dimidiam ovarii aequantibus. Flos femineus glandula ventrali elliptica fusca.

Salix hupehensis K. S. Hao, sp. nov. TYPE: China. Hubei: Chang Yang, *Wilson* 685 (holotype (♀), B). See Hao (1936: 106, fig. 80).

Frutex erectus; ramis nigrato-brunneis, glabris, ramulis villosis. Folia ovato-lanceolata usque lineari-lanceolata, 3–5 cm longa, 10–14 mm lata, apice acuminata vel acuta, basin versus attenuata vel late cuneata, margine integra, supra atroviridia secus costas parce pilosa, subtus sericeo-tomentosa, petiolo 3–5 mm longo. Amentum femineum cum pedunculo ca. 4 cm longum, 4 mm crassum, basi 2 vel 3 foliis normalibus suffultum; bracteis elliptico-oblongis, extra dense pubescentibus, intra subglabris, fere ovarium aequantibus vel leviter superantibus. Flos femineus glandula 1 ventrali orbiculata; ovario sessili piloso, ovato-elliptico, ca. 1.5 mm longo, stylo brevi, stigmatibus 2 gracilibus bilobis.

Salix kansuensis K. S. Hao, sp. nov. TYPE: China. Gansu: Wu tu hsien, Lan shan, alt. 2500 m, 19 June 1930, *K. S. Hao* 462 (holotype (♀), PE). See Hao (1936: 61, fig. 26).

Arbor ad 6 m alta; ramis glabris atro-purpureis, gemmis elliptico-oblongis atro-purpureis. Folia ovata usque elliptica vel ovato-elliptica, basi rotundata vel cordata, apice ovata, margine serrata, 7–10 cm longa, 4.5–7 cm lata, supra viridia glabra subtus viridula secus costas pubescentia, petiolo piloso vel glabrescente 10–15 mm longo supra sulcato. Amenta fructificantia ad 12 cm longa, ca. 10 mm crassa, rhachidi glabra; bracteis ellipticis utrinque pilosis, pedicello paulo longioribus. Flos femineus nectario ventrali ovato-elliptico brunneo longitudinem ½ pedicelli aequante; pedicello brevi; ovario glabro ovato-orbiculato, stylo indistincto, stigmatibus 2 apice bifidis.

Paratype. CHINA. **Shanxi:** Ning shan hsien, alt. 2000 m, 25 July 1933 (♀), *H. W. Kung* 3224 (PE).

Salix lamashanensis K. S. Hao, sp. nov. TYPE: China. Gansu: Minchow Lamashan, alt. 3500 m, 5 July 1930, *K. S. Hao* 650 (holotype (♀), PE). See Hao (1936: 99, fig. 77).

Arbuscula, ramis nigrescentibus glabris. Folia spatulato-lanceolata, 4–6 cm longa, apice acuta, basi anguste attenuata, supra viridia glabra, subtus viridula, margine revoluta, remote serrata. Amenta feminea subsessilia capitata, basi folio integro suffulta; bracteis elliptico-oblongis, longitudinem ca. ½ ovarii aequantibus, extra parce pilosis, intra glabris. Flos femineus glandula 1 ventrali cylindrica; ovario sessili, pubescente ovoideo-ovato; stylo brevi, stigmate indistincto.

Salix ovaticophylla K. S. Hao, sp. nov. TYPE: China. Yunnan: Yangtze watershed, prefectural district of Lijiang, 4000 m, Aug. 1914, *Schneider* 2318 (holotype (♂ ♀), B). See Hao (1936: 53, fig. 15).

Frutex nanus ad 3 cm altus; ramis humifusis flavescens- ti-brunneis, glabris; gemmis obtuse ovatis, glabris. Folia coriacea, elliptica, 3–6 mm longa, 1.5–2.5 mm lata, apice obtusa, supra atroviridia glabra, subtus pallida vel glauca, petiolo 1–4 mm longo. Amenta mascula 3–5-flora, ca. 6 mm longa et crassa, stamina filamentis liberis glabris, glandulae 2. Amenta pistillata capitata, ca. 3 mm longa et crassa, sessilia, pauciflora. Flos femineus glandula 1;

ovario ovato-elliptico subsessili glabro, stylo et stigmatibus brevibus. Capsula ca. 3 mm longa, sessilis.

***Salix pseudowolohoensis* K. S. Hao, sp. nov.**

TYPE: China. Yunnan: Yangtze watershed, prefectural district of Lijiang, E slope of Lijiang Snow Range, May–Oct. 1922, *J. F. Rock* 3353 (holotype (♀), B). See Hao (1936: 80, fig. 56).

Frutex erectus, ramis tomentosis. Folia lanceolato-oblonga, supra atro-viridia pilosa, subtus sericeo-tomentosa, 3–5 cm longa, 8–15 mm lata, utroque acuta; petiolo brevissimo ver nullo. Amenta feminea terminalia, basi foliis 4 vel 5 subtus sericeis integris suffulta; bracteis ovatis utrinque glabris, pedicello paulo longioribus. Flos femineus glandula 1 ventrali elliptica; ovario glabro, breve pedicellato, ovoideo-obovoideo; stylo brevissimo, stigmatibus subcapitato. Capsula ovoidea, pedicellata.

***Salix shansiensis* K. S. Hao, sp. nov. TYPE: China. Shansi, Chiao cheng, Yun ting shan, ca. 2100 m, *H. Smith* 7739 (holotype, UPS). See Hao (1936: 102).**

Frutex, ramis flexibilibus viridibus glabris; gemmis purpurascens coriaceis lucidis ovatis ca. 5 mm longis. Folia linearia 10–12 cm longa, 2–4 mm lata, supra lucide viridia, subtus dilute viridia, utrinque glabra, margine serrata, in petiolum glabrum lutescentem ad 10 mm longum sensim attenuata.

***Salix schneideriana* K. S. Hao, sp. nov. TYPE: China. Yunnan: ad passas in reg. Tali-fu, 2300 m, Oct. 1914, *C. Schneider* 3273 (holotype (♂), B). See Hao (1936: 110, fig. 84).**

Frutex erectus, ramis puberulis serius, glabrescentibus; gemmis brunneis, pubescentibus, petiolis longioribus. Folia spatulato-oblonga, 2.5–4.5 cm longa, 4–9 mm lata, supra lucide viridia, subtus cinerascens vel glauca, sparse pilosa, margine revolutum remote glanduloso-serratum, nervo mediano subtus lato glabro lutescente, petiolo ca. 4 mm longo pubescente. Amenta mascula sessilia, 2–3.5 cm longa, 6–7 mm crassa, densa. Flos masculus filamentis 2 connatis, sed antheris separatis, glabris.

***Salix spodiophylla* Handel-Mazzetti f. *liocarpa* K. S. Hao, forma nov. TYPE: China. Sichuan: open bouldery alpine meadows on the mountain E of Yung ning, *Forrest* 21263 (holotype (♀), E). See Hao (1936: 88).**

Haec forma a typo speciei ovario glabro differt.

***Salix tangii* K. S. Hao, sp. nov. TYPE: China. Shanxi: southern part, alt. 1800 m, Ping yao hsien, 19 May 1929, *T. Tang* 794 (holotype (♀), A). See Hao (1936: 78, fig. 53).**

Arbuscula 1.5–2 m alta; cortice cinereo-viridi laevi; ra-

mis purpureo-fuscis glabris. Folia oblonga vel elliptico-oblonga, glabra, supra viridula, subtus albescentia, apice acuta vel obtusa, basi rotundata vel late attenuata, 1.5–4 cm longa, 10–15 mm lata; petiolo 4–5 mm longo, glabro. Amenta feminea gracilia, cylindrica, ca. 3.5 cm longa, ca. 4 mm crassa, rhachidi villosa; bracteis latius orbiculatis, utrinque glabris. Flos femineus glandula 1 ventrali cylindrica, longitudinem $\frac{1}{2}$ bractee subaequante; ovario sessili, glabro, ovoideo-obovato; stylo brevissimo, stigmatibus subcapitato.

***Salix wangiana* K. S. Hao, sp. nov. TYPE: China. Shanxi: Tai Pai Shan, alt. 2700 m, 4 Aug. 1933, *T. P. Wang* 1769 (holotype (♀), P). See Hao (1936: 81).**

Frutex 2–3 m altus; ramis vulgo erectis nigrescentibus glabris. Folia ovata vel elliptica, glabra, apice rotundata, basi late attenuata vel rotundata, 3–5 cm longa, 2.5–3.5 cm lata, supra obscure viridia, subtus glauca, margine remote denticulata; petiolo glabro, 5–15 mm longo. Amenta fructifera ca. 5–6 cm longa, subsessilia, basi foliis suffulta; bracteis elliptico-oblongis, utrinque glabris, ovario triplo brevioribus. Flos femineus glandula 1 ventrali; ovario sessili, glabro, elliptico-oblongo; stylo gracili, ca. 1.5 mm longo, stigmatibus 2.

***Salix wuiana* K. S. Hao, sp. nov. TYPE: China. Shansi: Tai pai shan, *W. Purdom* 979 (holotype (♀), A). See Hao (1936: 95, fig. 72).**

Frutex erectus, ramis anni praecedentis purpureo-rubris, glabris, lucidis, ramulis junioribus pubescentibus; gemmis orbicularibus rubris parvulis ca. 1.5 mm in diametro, glabris. Folia rhombico-ovata 1.5–3.5 cm longa, 1–2.5 cm lata, apice acuta, supra laete viridia, subtus, praesertim juniora, plus minusve pubescentia; petiolo ca. 5 mm longo. Amenta feminea subsessilia 4–5 cm longa, ca. 6 mm crassa; bracteis rotundatis, extus longe pilosis, intus subglabris. Flos femineus glandula ventrali cylindrica; ovarium breviter pedicellatum pubescens; stylus brevis, stigma oblongum.

NEW SECTIONS

***Salix* sect. *Allochroae* K. S. Hao, sect. nov. TYPE: *Salix allochroa* C. K. Schneider. See Hao (1936: 62).**

Species huius sectionis a speciebus sect. *Magnificarum* ovario tomentoso differunt.

***Salix* sect. *Biondianae* K. S. Hao, sect. nov. TYPE: *Salix biondiana* Seemen. See Hao (1936: 74).**

Frutices humiles ramosissimi. Folia ovata ad obovato-elliptica, utrinque obtusa, margine integro, petiolo $\frac{1}{2}$ – $\frac{1}{3}$ longitudinis laminae. Amenta breviter 10–15 mm longa, 6–8 mm crassa. Flos femineus ovario vulgo sessili piloso.

***Salix* sect. *Cathayanae* K. S. Hao, sect. nov. TYPE: *Salix cathayana* Diels. See Hao (1936: 78).**

Frutex. Folia lanceolata vel oblonga, rarius obovata, serrata vel denticulata, ad anthesin ca. 10–15 cm longa, 4–6 mm lata. Amenta mascula 2–7 cm longa, feminea 4–10 cm longa. Flos masculus femineusque glandula unica; ovario glabro sessili vel breviter pedicellato.

Salix sect. **Cheilophilae** K. S. Hao, sect. nov.
TYPE: *Salix cheilophila* Schneider. See Hao (1936: 102).

Folia linearia, 3–12 cm longa, 2–5 mm lata. Amenta capitata usque cylindrica, 5–15 mm longa, basi 1–5 foliis integris suffulta. Flores glandula 1 ventrali; filamentis connatis; ovario sessili piloso (praeter *S. microstachyam*), stylo indistincto.

Salix sect. **Chingianae** K. S. Hao, sect. nov.
TYPE: *Salix chingiana* Hao. See Hao (1936: 85).

Arbores vel frutices. Folia lanceolata apice acuta vel longe acuminata, glabra, petiolo 6–15 mm longo. Amenta elongata 4–6 cm longa, basi 3–5 foliis normalibus suffulta. Flores masculi glandula unica, filamentis liberis 2; feminei ovario glabro. Capsula ovoidea.

Salix sect. **Dodecandrae** K. S. Hao, sect. nov.
TYPE: *Salix dodecandra* Léveillé. See Hao (1936: 45).

Folia lineari-lanceolata, petiolo brevi eglanduloso. Amenta mascula coaetanea; amenta feminea rhachidi tomentosa, bracteis pilosis. Flos masculis glandulis 2 (ventrali longiore); flos femineus glandulis 2 plus minusve connatis, ovario glabro, stylo indistincto.

Salix sect. **Doliae** K. S. Hao, sect. nov. TYPE:
Salix dolia C. K. Schneider. See Hao (1936: 95).

Frutices erecti. Folia ovalia ad linearia. Amenta breviter cylindrica. Flores masculi glandula 1 ventrali, filamentis liberis; feminei glandula 1, ovario sessili pubescente, stylo brevi, stigmate oblongo.

Salix sect. **Eriocladae** K. S. Hao, sect. nov. TYPE:
Salix erioclada Léveillé. See Hao (1936: 69).

Frutex vel arbuscula. Folia elliptica usque lanceolata, sub anthesi 8–20 mm longa, subtus sericea vel sericeo-tomentosa raro glabra, petiolo brevi vel fere nullo. Amenta cylindrica densiflora. Flores masculi glandulis 2, diandri. Flos femineus glandula 1 ventrali; ovario sessili sericeo vel tomentoso; stylo bipartito vel bilobo stigmate bifido.

Salix sect. **Ernestia** K. S. Hao, sect. nov. TYPE:
Salix ernestii C. K. Schneider. See Hao (1936: 67).

Folia tomentosa vel dense pilosa saltem subtus, lanceolata, apice acuminata 8–20 cm longa, petiolo elongato. Amenta 7–12 cm longa, 10–12 mm crassa, ramulos foli-

iferos terminantia. Flores masculi ac feminei glandulis 2 (in femineis glandula dorsali interdum deficiente); ovario sessili sericeo vel tomentoso, stylo brevi, stigmate gracili.

Salix sect. **Floccosae** K. S. Hao, sect. nov. TYPE:
Salix floccosa Burkill. See Hao (1936: 54).

Frutex pumilus 30–100 cm altus. Folia ovata usque obovata secus marginem glandulose crenato-serrata; petiolo longitudinem $\frac{1}{3}$ laminae aequante. Amenta terminalia. Flores masculi glandulis 2; flos femineus glandula 1 ventrali, ovario sessile (praeter *S. calyculatam* Hooker).

Salix sect. **Tangia** K. S. Hao, sect. nov. TYPE:
Salix tangii K. S. Hao. See Hao (1936: 74).

Frutices. Folia ovato-oblonga margine integro (*S. characta* C. K. Schneider excepta), utrinque acuta vel obtusa, vulgo glabra, petiolo 2–5 mm longo. Amenta gracilia 2.3–4.5 cm longa, 4–6(–8) mm crassa, distincte pedunculata, mascula laxiflora. Flores glandulis singulis (in *S. dissa* glandulis duabus); flores feminei glandulis ventralibus tantum, ovario glabro sessili.

Salix sect. **Tetradeniae** K. S. Hao, sect. nov.
TYPE: *Salix tetradenia* Handel-Mazzetti. See Hao (1936: 63).

Folia lineari-lanceolata vel lanceolata, margine integro vel serrato, subtus saepissime pilosa. Amenta sessilia, gracilia, 2–6 cm longa, 3–6 mm crassa; bracteis orbicularibus utrinque glabris. Flores masculi cum glandulis 2 vel 4, filamentis basi pilosis; flos femineus ovario sessili glabro.

Salix sect. **Variegatae** K. S. Hao, sect. nov. TYPE:
Salix variegata Franchet. See Hao (1936: 109).

Folia parva sessilia, obovata vel spatulato-oblonga, 5–20(–45) mm longa, margine revoluta glandulose denticulata, supra glabra subtus pilosa. Amenta mascula elliptico-oblonga, densiflora subsessilia basi 1 vel 2 foliis suffulta. Flos femineus glandula ventrali tantum, ovario sessili piloso, stylo brevi.

Salix sect. **Wilsonia** K. S. Hao, sect. nov. TYPE:
Salix wilsonii Seemen. See Hao (1936: 41).

Folia elliptico-lanceolata. Amenta mascula gracilia, laxiflora; bracteis parvis, ca. dimidium pedicelli aequantibus. Flos masculus glandulis 2, femineus vulgo unica; ovario glabro, lineari usque lanceolato; pedicello ovarium aequante vel paulo superante.

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