

Taxonomic revision of *Syringa pinetorum* complex (Oleaceae)

^{1,2,3}Jin-Yong CHEN ²Zuo-Shuang ZHANG ¹De-Yuan HONG*

¹(State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, Chinese Academy of Sciences, Beijing 100093, China)

²(Beijing Botanical Garden, Beijing 100093, China)

³(Graduate University of Chinese Academy of Sciences, Beijing 100049, China)

Abstract Five species of the *Syringa pinetorum* complex described by previous authors are revised. *Syringa wardii* W. W. Sm., *S. mairei* (H. Lév.) Rehder, *S. rugulosa* McKelvey and *S. chuanxiensis* S. Z. Qu & X. L. Chen are treated as synonyms of *S. pinetorum* on the basis of population sampling, character analysis and principal coordinate analysis, and *S. mairei* is a new synonym. Only one variable species, *S. pinetorum*, is here recognized in the complex.

Key words *Syringa*, *Syringa pinetorum*, *S. mairei*, new synonymy.

Syringa pinetorum complex refers to *Syringa* L. species native to Yunnan, Sichuan and Xizang (Tibet) of China, which belong to ser. *Pubescentes* (C. K. Schneid.) Lingelsh. It differs from the others (*S. pubescens* complex) of the series in having anthers yellow and capsule generally glabrous.

Smith (1916) described *S. pinetorum* and *S. wardii* as new based on the specimens from north-western Yunnan. Meanwhile, Lévillé (1916) described *Ligustrum mairei* as new based on a specimen collected by Maire also from Yunnan. McKelvey (1925) described *S. rugulosa* as new based on Maire's other specimens. After examining Maire's specimens, Rehder (1934) made the combination *Syringa mairei*, with *S. rugulosa* as synonymy. Qu and Chen (Chen et al., 1989) described *S. chuanxiensis* as new based on the specimens from Sichuan Province.

Chang and Chen (1990) and Chang (1992) recognized two species, *S. mairei* and *S. pinetorum*, with *S. wardii* as synonymy of the latter, considering *S. wardii* having leaf blades scarcely different from *S. pinetorum*. However, based on shape and size of leaf blades and indumentum on the leaf surfaces, Green and Chang (1995) and Chang et al. (1996) recognized three species: *S. mairei*, *S. pinetorum* and *S. wardii*, with *S. chuanxiensis* as synonymy of the first.

The current taxonomy of this complex is unsatisfactory probably because it has been based on few available specimens in the herbaria without extensive field observation and population sampling undertaken for intensive revision. To reveal the variation pattern and range of morphological characters of the complex, five populations (Table 1: XJ, XC, XG, DE and LI)

were sampled across northern Yunnan and western Sichuan according to the type localities. About one hundred herbarium specimens from Sichuan, Yunnan and Xizang were examined. The specimens from the Lancangjiang Valley represent the population DI, those from Xizang region represent the population XZ, and the others were incorporated into the previous five populations. Therefore, a total of seven populations were used in the analysis.

Size and shape of leaf blades were often used to distinguish *S. wardii* from *S. pinetorum*. Smith (1916) described the former by its leaf blades suborbicular, 1–2 cm long and broad (vs. ovate, 2–3.5×1–1.6 cm in the latter). Green and Chang (1995) described *S. pinetorum* having leaf blades 1.5–3×0.6–1.8 cm; *S. wardii*, 1.2–2.2×1.2–2.2 cm; and *S. mairei*, (2–)4–4.5(–6)×(1.5–)2–2.5(–3) cm. Our observation and analysis show that length, width and the ratio of length to width of leaf blades vary continuously among the populations (Table 1). Thus the size and shape of leaf blades are unsuitable to distinguish the above three species.

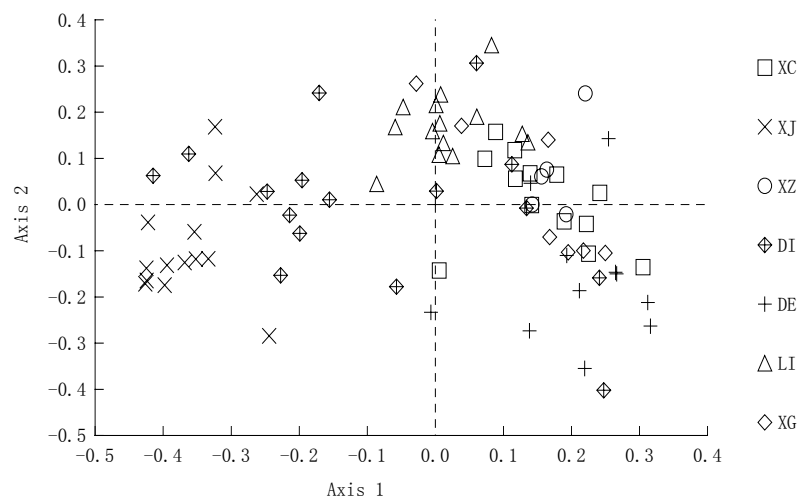
Green and Chang (1995) and Chang et al. (1996) considered leaf blades densely pubescent abaxially in *S. mairei*, while glabrous abaxially except along midribs and primary veins in *S. pinetorum*. From our extensive observation, leaf blades are usually densely pubescent on both sides in the population XJ, glabrous adaxially and usually from glabrous to sparsely pubescent abaxially in XC, XZ, XG and DE, while from glabrous to densely pubescent on both sides in DI and LI (Table 1). Indumentum on leaf surfaces varies continuously among the populations, thus unsuitable to delimit the above species.

Other characters also show no distinct differences among the populations. Populations show continuous

Table 1 Character variation among populations of *Syringa pinetorum* complex*

Population	Indumentum on adaxial surface of leaf blades	Indumentum on abaxial surface of leaf blades	Length of leaf blades (cm)	Width of leaf blades (cm)	Ratio of length to width of leaf blades
XJ	1(1); 3(7); 4(11)	4(20)	(2.6-)3.2-4.9(-6)	(1.3-)1.5-2.2(-2.5)	(1.5-)1.8-2.5(-3.1)
XC	0(12)	0(8);1(3);2(1)	(1.4-)1.6-3.4(-4.5)	(0.9-)1-1.8(-1.9)	(1.2-)1.4-2.2(-2.4)
XZ	0(12)	0(12);2(1); 4(1)	(0.9-)1.1-3.3(-4.3)	(0.6-)0.7-2.3(-3.5)	(1-)1.2-1.8(-2)
XG	0(7);4(1)	0(6);2(2)	(1.1-)1.6-2.5(-2.6)	(0.9-)1-1.6(-1.8)	1.2-2(2.1)
DE	0(11)	0(9);1(1);2(1)	1.5-2.7(-3.5)	1-2.1(-2.7)	(1.1-)1.2-1.5(-1.7)
DI	0(8); 2(2); 3(4); 4(16)	0(6); 1(1); 2(1); 3(2); 4(19)	(1.4-)2.6-7.8(-9.5)	(0.8-)1.7-4.8(-6.1)	(1-)1.2-2(-2.6)
LI	0(5); 1(3); 2(2); 3(2); 4(2)	1(1); 2(9); 3(2); 4(2)	(1.9-)2.1-3(-3.4)	(0.6-)0.9-1.6(-1.9)	(1.6-)1.7-2.8(-3.8)

* XJ, Xiaojin, Sichuan; XC, Xiangcheng, Sichuan; XZ, Xizang; XG, Shangri-La, Yunnan; DE, Dêqên, Yunnan; DI, Lancangjiang valley, Yunnan; LI, Lijiang, Yunnan. Indumentum is coded from 0 (glabrous) to 4 (densely pubescent) according to density and the number in the parenthesis stands for individuals observed; quantitative characters are listed as mean \pm stand deviation and the range of variation.

**Fig. 1.** Scatter plot of principal coordinates 1 against 2 for *Syringa pinetorum* complex (population explanation see Table 1).

transition and no distinct group can be detected in the principal coordinate plot resulted from analysis of 27 characters (Fig. 1). Therefore, only one variable species is recognized here.

Syringa pinetorum W. W. Sm. in Notes Bot. Gard. Edinburgh 9: 132. 1916. Type: China. Yunnan (云南): Lijiang (丽江), alt. 3050–3350 m, 1914-06, *G. Forrest 12472* (holotype, E!).

Syringa wardii W. W. Sm. in Notes Bot. Gard. Edinburgh 9: 132. 1916. Type: China. Yunnan (云南): Dêqên (德钦), Tungchuling, alt. 3050 m, *K. Ward 312* (holotype, E!).

Syringa rugulosa McKelvey in Journ. Arn. Arb. 6: 153. 1925. Type: China. Yunnan (云南): Tcha-Ho, alt. 2600 m, 1914-07, *E. E. Maire 169* (holotype, E!); Telong-tsin, alt. 3000 m, *E. E. Maire 503* (Paratype, A, K!).

Syringa mairei (H. Lév.) Rehder in Journ. Arn. Arb. 15: 302. 1934, syn. nov. — *Ligustrum mairei* H.

Lév., Cat. Pl. Yun-Nan: 181. 1916. Type: China. Yunnan (云南): Tcha-Ho, alt. 2600 m, *E. E. Maire s.n.* (holotype, E!).

Syringa chuanxiensis S. Z. Qu & X. L. Chen in Bull. Bot. Res., Harbin 9: 39. 1989. Type: China. Sichuan (四川): Xiaojin (小金), *Sichuan Econ. Pl. Exped.* (四川经济植物考察队) (59) 0178 (lectoholotype designated here, PE!; lectoisotype, CDBI!, KUN!), *X. S. Zhang & Y. X. Ren* (张秀实, 任有铤) 5866 (lectoparatype, CDBI!, SZ!), *K. T. Xiang et al.* (相开太等) 10741 (lectoparatype, SCFI; photo, K!).

Shrub up to 6 m tall. Leaves lanceolate, elliptic, ovate to suborbicular, 0.9–9.5×0.6–6.1 cm, apex acuminate, acute to obtuse, base cuneate to rounded, glabrous to pubescent, lateral veins 3–7 pairs; petiole 0.2–1 cm long. Inflorescences developed from two lateral buds, usually without leaves at base, 2.6–20×1.5–17 cm; rachis pubescent; calyx 1–3×1–2 mm; corolla tube usually cylindrical, 5–14 mm long and 1–2 mm in diameter, lobes often elliptic, purple,

pink to whitish, 2–5×1–3 mm; anthers yellow, 0–4 mm below throat; pistil 1–3 mm long. Capsule oblong to conic, 9–17×2.5–5 mm, glabrous to minutely lenticellate.

It is distributed in Sichuan, Xizang and Yunnan of China, growing in open thickets, forests or forest margins, at an altitude between 2000 and 3600 m. Flowering in May.

Representative specimens examined:

China. Sichuan (四川): Dajin (大金), Kasa (卡撒), X. Li (李馨) 77666 (PE, WUK); Kangding (康定), S. Jiang (姜恕) 2942 (KUN, PE); Xiangcheng (乡城), J. Y. Chen (陈进勇) 05065, 05074 (PE), Z. G. Liu (刘照光) 0010 (CDBI); Xiaojin (小金), E. H. Wilson 2583 (K), Sino-Scottish Exped. (中国-苏格兰考察队) 4039 (E), Rilong (日隆), X. S. Zhang (张秀实) 07104 (CDBI, PE, SZ), Shuangbai (双柏), J. Y. Chen (陈进勇) 05080, 05089 (PE). **Yunnan** (云南): Dêqên (德钦), Lancangjiang (澜沧江), Alden et al. 697 (E), K. M. Feng (冯国楣) 5736 & 6390 (KUN), 8841 (KUN, PE), G. Forrest 20336 (K), Qinghai-Tibet Exped. (青藏队) 2867, 3063 (KUN), Yunling (云岭), J. Y. Chen (陈进勇) 05051, 05061 (PE); Jiren (吉任), T. T. Yu (俞德浚) 11294 (KUN); Lijiang (丽江), Baishuihe (白水河), J. Y. Chen (陈进勇) 05041, 05044 (PE), Lijiang Botanical Garden (丽江植物园) 100056 (KUN), Mekong-Salween divide, G. Forrest 14157, 14159 (KUN), 20135 (K), J. F. Rock 8710 (E); Shangri-La (香格里拉), T. T. Yu (俞德浚) 13417 (PE), Dongwang (东旺), Y. S. Yang (杨意思) s.n. (KUN), Haba (哈巴), K. M. Feng (冯国楣) 1301 (KUN), Zhongdian Exped. (中甸队) 63-3082 (KUN), Nixi (尼西), J. Y. Chen (陈进勇) 05062, 05064 (PE), Panbi (畔必), T. T. Yu (俞德浚) 8178 (KUN, PE); Weixi (维西), Yangtze-Mekong divide (长江-澜沧江分水岭), G. Forrest 21606 (E, K); Wengshui (翁水), Alden et al. 417 (E); Yongning (永宁), J. F. Rock 17186 (E). **Xizang** (西藏): Jomda (江达), P. C. Kuo (郭本兆) 21582 (WUK); Qamdo (昌都), Qinghai-Tibet Exped. (青藏队) 7385, 11613, 11614 (PE), Y. W. Tsui (崔友文) 5544, 5574 (PE); Zayü (察隅): Anonymous 6026 (KUN), Qinghai-Tibet Exped. (青藏队) 10926 (KUN), Q. W. Wang (王启元) 65400 (PE).

The holotype of *Syringa chuanxiensis* was designated as *X. S. Zhang* & *Y. X. Ren* 5860 (CDBI) by

Qu and Chen. But the specimen bearing this number in CDBI is *Populus trinervis* Z. Wang & S. L. Tung. Hence one of the syntypes, *Sichuan Econ. Pl. Exped. (59) 0178* (PE), is here designated as the lectotype.

Acknowledgements We thank the curators and staffs of the herbaria CDBI, E, K, KUN, PE, SZ and WUK for their assistance in examining specimens. This work was supported by the National Natural Science Foundation of China, Grant No. 30500036, and Beijing Municipal Administrative Centre of Parks.

References

- Chang M-C (张美珍). 1992. *Syringa* L. In: Flora Reipublicae Popularis Sinicae (中国植物志). Beijing: Science Press. 61: 50–84.
- Chang M-C (张美珍), Chen X-L (陈新露). 1990. Studies on Chinese *Syringa* 1. Investigatio et Studium Naturae (考察与研究) 10: 32–40.
- Chang M-C (张美珍), Qiu L-Q (邱莲卿), Green PS. 1996. Oleaceae. In: Wu Z-Y, Raven PH eds. Flora of China. Beijing: Science Press; St. Louis: Missouri Botanical Garden Press. 15: 280–286.
- Chen X-L (陈新露), Zhao X-Y (赵祥云), Qu S-Z (曲式曾). 1989. New materials for genus *Syringa* L. Bulletin of Botanical Research (植物研究) 9: 39–41.
- Green PS, Chang M-C. 1995. Some taxonomic changes in *Syringa* L. (Oleaceae), including a revision of series *Pubescentes*. Novon 5: 329–333.
- Léveillé AH. 1916. Catalogue des Plantes du Yunnan. Le Mans.
- McKelvey SD. 1925. *Syringa rugulosa*, a new species from western China. Journal of the Arnold Arboretum 6: 153–154.
- Rehder A. 1934. Notes on the ligneous plants described by Léveillé from eastern Asia. Journal of the Arnold Arboretum 15: 302–303.
- Smith WW. 1916. Diagnoses Specierum Novarum in Herbario Horti Regii Botanici Edinburgensis Cognitarum (Species Chinensis). Notes from the Royal Botanic Garden Edinburgh 9: 132–133.

木犀科松林丁香复合体的分类修订

^{1,2,3}陈进勇 ²张佐双 ¹洪德元*

¹(系统与进化植物学国家重点实验室, 中国科学院植物研究所 北京 100093)

²(北京植物园 北京 100093)

³(中国科学院研究生院 北京 100049)

摘要 对松林丁香 *S. pinetorum* W. W. Sm. 复合体内各学者发表的5个新种进行了分类修订。根据居群取样、性状分析和主坐标分析结果, 圆叶丁香 *S. wardii* W. W. Sm., *S. mairei* (H. Lév.) Rehder, *S. rugulosa* McKelvey 和川西丁香 *S. chuanxiensis* S. Z. Qu & X. L. Chen 被处理为松林丁香的异名, 其中 *S. mairei* 为新异名。此复合体只有一种, 即松林丁香。

关键词 丁香属; 松林丁香; 皱叶丁香; 新异名