

# A New Species of *Fontanesia* (Oleaceae) from China and Taxonomic Revision of the Genus

Kim, Ki-Joong

Department of Biology, Yeungnam University, Kyeongsan, Kyeongbuk 712-749, Korea

*Fontanesia longicarpa* K.-J. Kim is newly described from China. This distinctive species is known only from the Zhejiang province and differs from other species in the genus by the size and shape of its fruit. As currently circumscribed, the genus now consists of three taxa; *F. longicarpa*, *F. philliraeoides* Labill. var. *philliraeoides* and *F. philliraeoides* var. *fortunei* (Carr.) Koehne. A revisionary study of the genus is provided, including a key and pertinent synonymy.

**Keywords:** Oleaceae, *Fontanesia*, *F. longicarpa*, *F. philliraeoides*

During a molecular systematic study of the Oleaceae I encountered an unusual species of *Fontanesia* from China which was positioned in this genus with difficulty. The fruit shape of this unusual species different from previously described species of *Fontanesia*. With its description here, I have had to enlarge the circumscription of *Fontanesia*. I have summed up this report with a revisionary study of the genus.

## MATERIALS AND METHODS

A total of 320 herbarium specimens representing all taxa of *Fontanesia* was obtained from the herbaria of BM, GH, K, NY, and P. Different developmental stages of flowers and fruits were compared for the description. All descriptive characters were measured from all available specimens. In addition to the herbarium specimens, living materials of *Fontanesia* in Arnold Arboretum and Kew Gardens were also used for flower and fruit descriptions.

## RESULTS AND DISCUSSION

### Generic Description of *Fontanesia*, Emended

Densely branched deciduous shrubs or small trees. Branches and branchlets slender, 4-angled. Leaves simple, opposite, sessile or short petiolate, entire or minutely serrate. Inflorescences axillary racemes or

terminal panicles. Flowers small, pedicellate. Bracts small, deciduous. Calyx deeply 4-lobed, persistent. Corolla deeply 4-lobed, united only at the base, deciduous. Stamens 2, exserted, adnate at the base of corolla. Ovary 2-celled with 2 pendulous ovules in each locule. Style and forked stigma persistent. Fruit compressed, narrowly elliptic to ovate or lanceolate to obovate, with emarginate or taperedly forked tips, winged or wingless. Seed 1 in each locule, endosperm fleshy, the radicles upward.

### Key to the Species and Varieties of *Fontanesia*

- 1a. Fruit narrowly elliptic or lanceolate with forked, tapered tips, wingless, 1.6-2.5 cm in length . . . . . **1. *F. longicarpa***
- 1b. Fruit widely elliptic or obovate, rounded or emarginated tips, winged, 0.5-1.0 cm in length
  - 2a. Leaf apex acute to acuminate; distribution in Mediterranean and West Asia . . . . . **2. *F. philliraeoides* var. *philliraeoides***
  - 2b. Leaf apex acute to elongate-acuminate; distribution in China . . . . . **3. *F. philliraeoides* var. *fortunei***

**1. *Fontanesia longicarpa* K.-J. Kim, sp. nov.**  
TYPE: China: Zhejiang, Shaoahing, 3 Sep. 1927, Y. L. Keng 1184 (holotype, GH)

Similis *F. philliraeoides* var. *fortunei* (Carr.) Koehne, sed habens fructum elongatum sine alis, apice furcato et contracto.

\*Corresponding author: Fax +82-53-816-0126  
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Densely branched shrubs up to 10 m high. Young twigs slender, angular, glabrous. Leaves elliptic-lanceolate, 4–7 cm long  $\times$  1–2 cm wide, base cuneate, margins entire, apex acute to acuminate, primary veins 2–5 on each side of midrib; veins indistinct. Inflorescences terminal panicles or axillary racemes; terminal panicles 2–6 cm long; axillary ones 1.4–4.0 cm long; peduncles 4.0–7.0 mm long; bracts 0.5–1.5 mm long, deciduous. Pedicels slender, 1.5–2.0 mm long. Flowers bisexual. Calyx minute, green, deeply 4-lobed; lobes ovate, 0.5–0.8 mm long  $\times$  0.4–0.6

mm wide. Corolla creamy white, deeply 4-lobed; lobes ovate, 2.5–3.0 mm long  $\times$  1.0–1.8 mm wide. Filaments adnate at the base of corolla, 2–3 mm long. Stamens basifixed, exerted. Styles 1.5–3.0 mm long; stigmas with forked tips, tips ca. 0.5 mm long. Fruits narrowly elliptic or linear-lanceolate, 1.6–2.5 cm long  $\times$  0.2–0.5 cm wide, slightly curved, tapered and forke tip, wingless, greenish brown, forked apex 4–6 mm long. Flowering May to June, fruiting June to Sep.

*Paratype*: China: Zhejiang, west Tien-mu, 23 June 1927, H. H. Ha 1698 (GH)

Considering its distinctive fruit morphology of *F. longicarpa*, a modification of the generic description is needed as emenden as above. Ovary structure in the flower and early developing stages of the fruit is similar to those of *F. philliraeoides*, however, the ovary shape at the middle stages of fruit development is quite different from the latter. According to the developmental stages of the ovary, it is clear that the elongation of fruit is not only due to the expansion of the ovary itself, but also due to the growth of both style and stigma. Except for the fruit morphology, *F. longicarpa* is quite similar to *F. philliraeoides* var. *fortunei* and the two taxa can hardly be recognized without fruit.

**2. *Fontanesia philliraeoides* Labill. var. *philliraeoides***, *Icono. Pl. Syr.* 1:9, t.1 (1791)

Syn. *F. angustifolia* Dippel, *Handb. Laubholz.* 1: 104, f. 59 (1889)

*F. philliraeoides* Labill. var. *longifolia* Dippel, *ibid.*, 103 (1889)

*F. phillyreoides* var. *miditerranea* Lingelsh. in Engler, *Pflanzenreich* 72: 7-9 (1920)

Densely branched shrubs up to 3 m high. Young twigs slender, angular, reddish-brown, glabrous. Leaves elliptic-lanceolate, 1.5–6.5 cm long  $\times$  0.6–2.0 cm wide, base cuneate, margins entire, apex acute to acuminate, primary veins 2–5 on each side of midrib; veins indistinct. Inflorescences terminal panicles or axillary racemes; terminal panicles 2–6 cm; axillary ones 1.4–4 cm long; peduncles 4–7 mm long; bracts 0.5–1.5 mm long, deciduous. Pedicels slender, 1.5–2.0 mm long. Flowers bisexual. Calyx minute, green, deeply 4-lobed; lobes ovate, 0.5–0.8 mm long  $\times$  0.4–0.6 mm wide. Corolla creamy white, deeply 4-lobed, ovate, 2–3 mm long  $\times$  1–2 mm wide. Filaments adnate at the base of corolla, 2–3 mm



**Fig. 1.** General descriptive characters of *Fontanesia*. A–D. *F. longicarpa* K.- J. Kim (from Holotype). A. Habit (x1/3). B. Flower (x10). C. Pistil (x10). D. Fruit (x2). E. Fruit of *F. philliraeoides* var. *fortunei* (x2).

long; Stamens basifixed, exserted. Styles 1.5~3.0 mm long; stigmas with forked tips, tips ca. 0.5 mm long. Fruit yellowish-brown, fan-shaped, ovate, winged, apex rounded or emarginate, 6~9 mm long  $\times$  5~9 mm wide. Flowering May to June, fruiting June to Sep.  $2n=26$ .

Distribution: S. E. Sicilia, Latakia and Lebanon of Mediterranean area, Anatolia of Turkey and Syria (Green, 1972; Post, 1932; Yaltirik, 1978).

**3. *Fontanesia philliraeoides* Labill. var. *fortunei* (Carr.) Koehne**, Dendrol. 505 (1893)

Syn.: *F. fortunei* Carr., Rev. Hort. 30: 43 (1859)

*F. chinensis* Hance, J. Bot. 17: 136 (1879)

*F. argyi* Leveille, Mem. Acad. Ci. Art., Barcelona, 12(22): 17 (1916)

*F. philliraeoides* Labill susp. *fortunei* (Carr.) Yalt. in Davis, Fl. Turkey (1978)

Densely branched shrubs up to 8 m high. Young twigs slender, angular, glabrous. Leaves lanceolate, ovate-lanceolate or narrowly ovate, 3~12 cm long  $\times$  0.8~2.6 cm wide, base cuneate, margins entire, apex acute to acuminate, primary veins 2~8 on each side of midrib. Inflorescences terminal panicles and axillary racemes, terminal panicles 2~6 cm long, axillary ones 1.4~4.0 cm long, peduncles 4~7 mm long, bracts 0.5~1.5 mm long, deciduous. Pedicels slender, 1.5~2.0 mm long. Flowers bisexual or polygamous. Calyx minute, green, deeply 4-lobed; lobes ovate, 0.5~0.8 mm long  $\times$  0.4~0.6 mm wide. Corolla

creamy or greenish white, deeply 4-lobed; lobes ovate, 2~3 mm long  $\times$  1~2 mm wide. Filaments adnated at the base of corolla, 2~3 mm long. Stamens basifixed, exserted. Styles 1.5~3.0 mm long, stigmas with forked tips, tips 0.5 mm long. Fruits yellowish-brown, fan-shaped to ovate, winged, apex rounded or emarginated, 7~10 mm long  $\times$  6~10 mm wide. Flowering Apr. to June, Fruiting June to Oct.  $2n=26$ .

Distribution: Anhui, Hebei, Hanan, Jiangsu, Shaanxi, Shandong and Zhejiang provinces of China (Chang *et al.*, 1996).

This Chinese variety has been treated as species, or subspecies, or variety depending on the systematist (Lingelsheim, 1920; Yaltirik, 1978). The Chinese var. *fortunei* is difficult to recognize from the Mediterranean var. *philliraeoides*. The former display a larger leaf with more elongate-acuminate apices, as compared to the latter (Yaltirik, 1978). Such characters, however, show a wide range of variation, even in a single individual depending on the degree of fruiting. There is a strong tendency to produce small leaves in heavily fruiting branches and large leaves in non-flowering branches. The critical difference between the two varieties is geographical distribution. The var. *fortunei* occurs primarily in Eastern and Central China (Chang *et al.*, 1996), while var. *philliraeoides* is restricted to the E. Mediterranean and S.W. Asian regions (Green, 1972; Post, 1932; Yaltirik, 1978). This disjunct distribution pattern is quite interesting because similar disjunctions also occur in *Syringa* and *Forsythia*, which also belong to the Oleaceae (Kim, 1998; Kim and Jansen, 1998). I adhere to the geographical variation concepts as espoused by most American workers and treat these taxa at the varietal level.

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Fig. 2. Typical leaf shapes of *F. philliraeoides* var. *fortunei* (A,  $\times 1$ ) and var. *philliraeoides* (B,  $\times 1$ ).

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