

Taxonomy of Native Species of *Pyrus* in Taiwan¹⁾

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台湾の野生ナシの分類¹⁾

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Two native species of *Pyrus* are recognized in Taiwan; *P. calleryana* Decne., which has so far been known as *P. kawakamii* Hayata, and a new species, *P. taiwanensis* Iketani et Ohashi. They are distinguished by leaf serration, number of styles and size of pomes.

Since Hayata (1911) described *Pyrus kawakamii* Hayata from Taiwan, many authors have treated it to be the only species of the genus growing wild in the island (e.g., Kanehira 1936, Li 1963, Liu and Su 1977). But their descriptions of this species disagree on some characters. Based on a specimen with mature fruits (Type; T. Kawakami 4705, TI), Hayata described it as the leaf has crenulate-serrulate margin; and the fruit is about 9 mm in diameter and 2-3-seeded. Number of the carpel was not described by him, but the type was examined as having two or three. Later, Rehder (1920) described the number of styles of *P. kawakamii* as three based on Wilson 9835 (A). Kanehira (1936) described the species similarly as Hayata (1911), but, according to his figure 225, the fruit was illustrated larger (ca. 2 cm in diameter) than those of Hayata's description. Li (1963) illustrated the fruit in his figure 107 as about

2.5 cm in diameter, though it was described as 1.1 cm across in the description of the species on page 292. Liu and Su (1977) described it 1.5-2 cm in diameter, but its size seems to be ca. 3 cm in diameter in their figure 490. They described the leaf margin as serrulate, and the number of styles as three or four.

To resolve this disagreement we investigated *Pyrus kawakamii* and its related species in herbarium specimens kept in KYO, TI, TNS, and TUS, and in fresh materials that have been cultivated in Fruit Tree Research Station at Tsukuba.

We could recognize two forms of wild pear exist in Taiwan. One is characterized with crenulate to crenulato-serrulate leaves, smaller fruits (about 1 cm in diameter) and two or three styles in one flower. Another is characterized with serrate or serrulate leaves, larger fruits about 2-3 cm in

diameter and 3–4(–5) styles in one flower. Descriptions of Rehder (1920), Kanehira (1936) except for figure 225, and Li (1963) except for figure 107 correspond to the former form, while descriptions of Liu and Su (1977), Kanehira's figure 225 (1936) and Li's figure 107 (1963) agree with the latter form. The former form is identical with *P. kawakamii*, but the latter one cannot refer to any known species.

Pyrus kawakamii is very similar to *P. calleryana* Decne. Rehder (1920) stated that *P. kawakamii* is maybe a variety of *P. calleryana* (but, he did not make new combination for this variety). According to him, *P. kawakamii* differs from *P. calleryana* chiefly in ovate and obtuse or obtusish calyx-lobes, broadly elliptic to elliptic-oblong and more coriaceous leaves with more deeply and sharply crenate-serrulate leaf margin. But, *P. calleryana* shows a wide range of morphological variation and the distinctions suggested by Rehder are not maintainable. We think, therefore, *P. kawakamii* is conspecific with *P. calleryana*.

Koidzumi (1913) treated *P. kawakamii* as a synonym of *P. koehnei* Schneid. But, according to the original description by Schneider (1906), *P. koehnei* differs from *P. kawakamii* by (2–)3–4 (–5) styles in one flower. *P. koehnei* is originally described on the basis of a specimen in flowering stage. Challice and Westwood (1973) described the fruits of this species about 1 cm in diameter from the trees cultivated in Oregon State University. We examined three specimens of *P. koehnei* (W. T. Tang 20835 and 20943, KYO; X. W. Wang et al. 47, TUS) and they have 2–4 styles on one fruit and the fruit size is about 1 cm across. Fruit of *P. koehnei* is maybe about 1 cm in diameter. Yü and Ku (1974) pointed out that the fruits of *P. kawakamii* illustrated in Kanehira's figure 225 (1936) and Li's figure 107 (1963) have persistent sepals, and, hence, they did not treat *P. kawakamii*

as a synonym of *P. koehnei*. In our observation on cultivated *Pyrus*, however, sepals of *Pyrus* species are sometimes persistent on pomes, especially at young stage, even in the species that have the fruits of deciduous sepals. We think their figures agree with such features of *P. kawakamii*, and this species is belonging to the same group with *P. koehnei*. The fruit is less than 2 cm across and the style is always 2–3 (–5 only in *P. koehnei*) in so called the Asian pea pear (Bailey 1916) which contains *P. betulaefolia*, *P. calleryana* sensu lato (including *P. dimorphophylla*, *P. fauriei* and *P. kawakamii*), and *P. koehnei*.

On the other hand, the other plant that cannot refer to *P. kawakamii* in Taiwan is similar to several species of Asian *Pyrus* having 3–4 (–5) styles in one flower, serrate or serrulate leaf margin and medium-sized fruit (2–3 cm in diameter). They are *P. pashia* D. Don, *P. phaeocarpa* Rehd., *P. serrulata* Rehd., *P. hopeiensis* Yü, and *P. pseudopashia* Yü. These species have some differences from the Taiwan plant. *Pyrus pashia* differs from it in having 25–30 (–40) stamens in one flower and smaller flowers (2–2.5 cm in diameter); *P. phaeocarpa* in having villose leaves and branches when young; *P. serrulata* by almost or entirely persistent sepals in fruit; *P. hopeiensis* by a little setosely serrate leaf margin and persistent sepals in fruit; *P. pseudopashia* in having about 25 stamens in one flower and persistent sepals in fruit. From these facts the Taiwanese plant is treated as a new species. We name it *P. taiwanensis*.

Taxonomy of Asian species of *Pyrus* having medium-sized fruits still remains some problems. Several authors (e.g., Challice and Westwood 1973, Kikuchi 1948) think that these species are originated with natural hybridization between species of large-sized fruits (e.g., *P. pyrifolia* or *P. ussuriensis*) and those of small-sized ones (e.g., *P. betulaefolia* or *P. calleryana*). Kikuchi (1948)

produced artificial hybrids among several species and explicated the inheritance of taxonomic characters. He inferred that middle fruited species are maybe hybrids between large fruited species and small fruited ones. *Pyrus taiwanensis* has also possibility of hybrid origin, so further studies are need to explicate the origins of these intermediate pears.

Taxonomic treatments

Pyrus calleryana Decne. in Jard. Fruit. **1**: 329 (1871–72); Yü and Ku, Fl. Reip. Pop. Sin. **36**: 367 (1974); Kitamura and Murata, Col. Ill. Woody Pl. Jap. **2**: 46 (1979); Ohashi in Satake et al., Wild Flowers Jap. Woody Pl. **1**: 227 (1989).

P. dimorphophylla Makino in Bot. Mag. Tokyo **22**: 65 (1908).

P. kawakamii Hayata, Mat. Fl. Formos. **99** (1911); Icon Pl. Formos. **1**: 243 (1911), **syn. nov.** Rehder in J. Arn. Arb. **2**: 61 (1920); Kanehira, Formos. Trees rev. ed. 274 (1936), excl. fig. 225; Li, Woody Fl. Taiwan 290 (1963), excl. fig. 107.

P. koehnei auct. non Schneider: Koidzumi in J. Coll. Sci. Univ. Tokyo **34**: 57 (1913), p.p.; Rehder in Proc. Amer. Acad. **50**: 238 (1915), p.p.; Sasaki, List Pl. Formos. 214 (1928).

P. tsiukyoensis Koidz. in Bot. Mag. Tokyo **39**: 27 (1925).

Distribution: China (middle and south part), Vietnam (north part), Taiwan, Japan (central region of Honshu).

Specimens examined. CHINA: Chianghsi, Liu s.n., 15 July 1935, KYO; Fuchou, T. Nagasawa 18 and 19, KYO; Hunan, Yichang Dist., P'ing T'ou Shan T'sang Wan Village, W. T. Tsang 23655, TI; Kwangtung, Ho-yuen Dist., Ts'ung-shue Village, Nam Shan, W. T. Tsang 28793, TNS; Kwangtung, Lin t'aan, south River, F. A. McClure 1396, TI; Kwang-tung, Mei Dist., Yam Na Shan, W. T. Tsang 21340, KYO; Kwangtung, Sin-fung Dist., Hau T'ong Shan, W. T. Taam 773, KYO; Kwangtung, Tapu Dist., Tai Mo Shan, W. T. Tsang 21158, TI and KYO; Kwangtung, Yang Shan Dist., south of Linchow, T. M. Tsui 466, TI,

KYO; Kwangtung, Yang Dist., Yang Shan, T. M. Tsui 602, KYO; Kwangtung, Ying Tak Dist., Wan Tong Shan, T. M. Tsui 403, TI; T. M. Tsui 662, TI; T. M. Tsui 405, KYO; G. Q. Ding and K. L. Shi 1562, TUS.

JAPAN: Gifu Pref., Shimotado-mura, Namima s.n., Aug. 1930, TI; Prov. Mino, Shimotado-mura, Namima s.n., 16 Oct. 1933, KYO; G. Hama s.n., Oct 1933, KYO; G. Koidzumi s.n., 15 May 1927, KYO; Yoshida s.n., 23 Sept. 1940, TNS; Nagoya, Higashiyama, S. Okuyama 21329, TNS; Nagoya, G. Koidzumi s.n., 25 June 1933, KYO; Nagoya, J. Umamura 17, KYO; Nagoya, Naka-ku, G. Koidzumi s.n., 24 June 1933, KYO; J. Umamura 25, KYO (type of *P. tsiukyoensis*); Nagoya, Koen, Y. Okada s.n., Aug. 1934, KYO; Prov. Ise, Hadzuyama, K. Nakama and T. Makino s.n., 21 Apr. 1908, TI; Reimer and S. Tokuda s.n., Sept. 1917, TI; Prov. Ise, Hazu-mura, K. Murata s.n., 8 Apr. 1930, TNS; K. Murata s.n., 26 Apr. 1934, KYO; K. Murata s.n., 5 Apr. 1930, KYO; K. Murata s.n., 25 Apr. 1934, KYO; K. Nakahara s.n., Apr. 1908 (syntype of *P. dimorphophylla*), TI; Prov. Ise., K. Murata s.n., 1 May 1934, KYO; Prov. Ise, Shohoji, G. Koidzumi s.n., 22 Oct. 1937, KYO; Prov. Ise, Yokkaichi, K. Yato s.n., 15 May 1927, KYO; K. Murata s.n., 25 Apr. 1934, KYO; Prov. Ise, Tsubaki-mura, S. Okamoto s.n., 24 May 1938, KYO; Mie Pref., Toba, Funazu, C. Nakama s.n., 15 Aug. 1981, TI; C. Nakama s.n., 12 Apr. 1981, TI; H. Hara s.n., 30 Mar. 1981, TI; Mie Pref., K. Nakahara s.n., Apr. 1909, KYO; Mie Pref., Hazu-mura, K. Nakahara 17, 21 Apr. 1908, KYO; Kyoto, cult., M. Hiroe 13584, KYO; Ibaraki Pref., Tsukuba-shi, cultivated in the Fruit Tree Research Station, strain name 'Mamenashi 4', Iketani 2570, TUS; strain name 'Mamenashi 5', Iketani 2504 and 2571, TUS; strain name 'Mamenashi 6', Iketani 2573 and 2615, TUS; strain name 'Mamenashi 7', Iketani 2572 and 2614, TUS; strain name '*Pyrus dimorphophylla*', Iketani 2507 and 2564, TUS; strain name 'Tado 46', Iketani 2509 and 2574, TUS; strain name 'Aichi-mamenashi', Iketani 2565 and 2613, TUS; strain name 'Inunashi', Iketani 2508 and 2585, TUS.

TAIWAN: T. Kawakami 4705, TI (holotype of *P. kawakamii* Hayata); Keeling, K. Nagabuchi s.n., in 1925, TNS; Luigento, Tansui, S. Sasaki s.n., 3 May 1925, TNS.

Pyrus fauriei Schneid. is sometimes treated as conspecific with (e.g., Kitamura 1979) or as a variety (Rehder 1920) of *P. calleryana*. But, Zielinski (1965) and Westwood (1968) pointed out that *P. fauriei* is very distinct from *P. calleryana* in many characters, and they stated that it should be treated as a distinct species. At present, we cannot judge which opinions are plausible, so we withhold the taxonomic treatment of this species.

Pyrus taiwanensis Iketani et Ohashi, sp. nov. (Fig. 1).

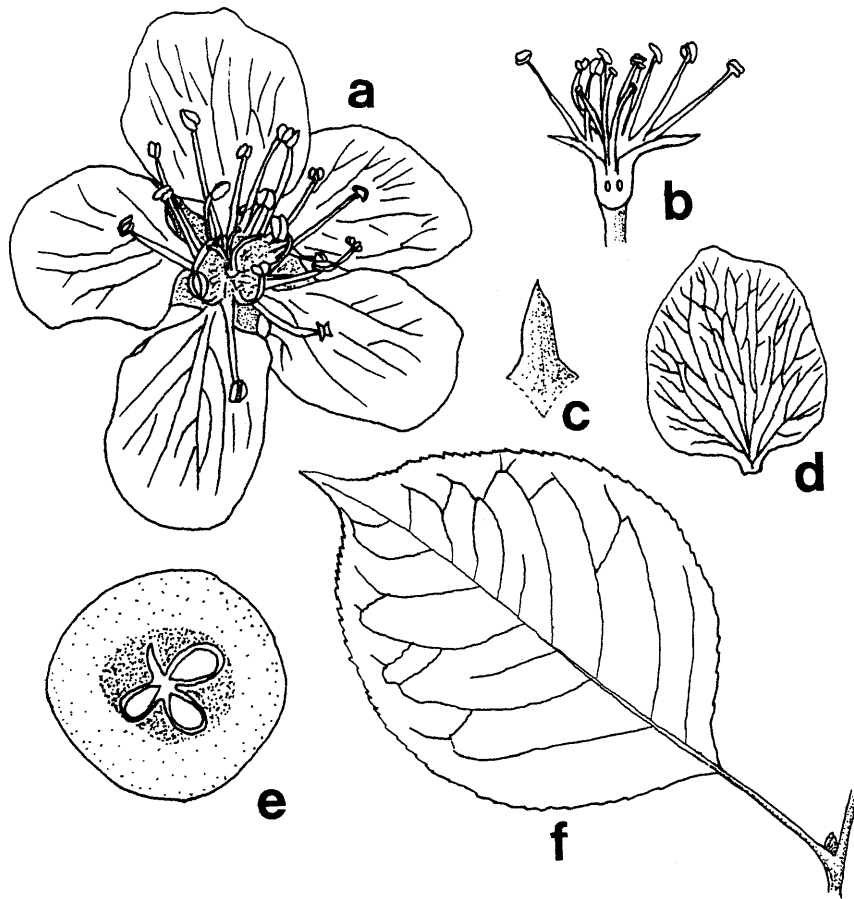


Fig. 1. *Pyrus taiwanensis*. a: flower, b: longisection of flower, c: sepal, d: petal, e: transection of the fruit, f: leaf on the long shoot. a–d: Iketani 2588, e, f: Iketani 2488. a–d: $\times 2$, e: $\times 1$, f: $\times 0.7$.

P. kawakamii auct. non Hayata: Liu et Su, Fl. Taiwan 3: 92, pl. 490 (1977); Kanehira, Formos. Trees rev. ed. fig. 255 (1936), cet. excl.; Li, Woody Fl. Taiwan fig. 107 (1963), cet. excl.

Affinis *Pyro kawakamii*, sed stylis numerosis, foliis serrulatis vel crenato-serrulatis, pomis magnis diversis; differt a *P. pashiae* staminibus paucibus, floribus magnis; a *P. phaeocarpae* follis et ramulis glaberis; a *P. serrulatae* sepalis deciduis; a *P. hopeiensi* foliis serrulatis vel crenato-serrulatis, sepalis deciduis; a *P. pseudopashiae* staminibus paucibus, sepalis deciduis.

Typus. Taiwan, Taichung Co.: Mt. Touko-

shan, alt. 500–850 m, Sept. 29, 1984 (Y. Tateishi, Y. Endo and T. Nemoto 21302 fr., holotype-TUS).

Deciduous or subevergreen medium-sized tree up to 6–10 m high. Branches glabrous, purple-brown, slender or a little lenticellate in this year's growth; purple-brown or dark brown, sparsely lenticellate in the old one. Buds ovate, 5–8 mm long; scales ovate or broadly ovate, glabrous except for the margin. Leaves alternate in the long shoot, 3–4 fasciculate in the short shoot, cartilaginous or sub-coriaceous, ovate or broadly ovate, 4–10 cm long, 3–6 cm wide, obtuse, acute or acuminate at the apex, obtuse or rounded at the base, glabrous

in both side from the beginning, serrulate or crenato-serrulate; midrib prominent beneath; the primary veins 8–12. Petioles 2–5 cm long, glabrous from the beginning; stipules shortly adnate at the base, linear-lanceolate, 5–10 mm long, caducous. Inflorescences in terminal corymbs, with 3–8 flowers; peduncles 1–2 cm long, glabrous. Pedicels 2–4 cm long, glabrous. Flowers about 3 cm across. Hypanthium cup-shaped, 4–5 mm long, glabrous. Sepals 5, triangular ovate or triangular lanceolate, acute at the apex, 4–6 mm long, glanduloso-denticulate, patent, glabrous or sparsely brown tomentose in the outer side, densely brown tomentose in the inner side. Petals 5, white, elliptic or broadly elliptic, shortly clawed at the base, entire or irregularly toothed near the apex, 12–15 mm long, 8–10 mm wide, glabrous, patent. Stamens about 20, about 5 mm long, erect-patent; anther elliptic, deep purple before dehiscence, pink to whitish after dehiscence. Styles 3–5, glabrous, about 6 mm long. Pomes globose, impressed at the apex, calyx usually deciduous, about 3 cm in diameter, yellow brown or brown, with many lenticells, pulp cream yellow, with many stone cells. Seeds laterally flattened, obovoid, about 8–9 mm long, 5–6 mm wide, chestnut-colored.

Specimens examined. TAIWAN: Kaohsiung Co., Tengchu – Mt. Tsyun-shan, alt. 800–1500 m, 21 Oct., 1982, H. Ohashi, Y. Tateishi, J. Murata, Y. Endo, T. Nemoto and Y. Ueno 13019, fr., TUS; Hsinchu, 11 Feb., 1924, cultivated, T. Ito s.n., fl., KYO; 9 Mar., 1924, cultivated, T. Ito s.n., fl. and fr., KYO. JAPAN: Ibaraki Pref., Tsukuba-shi, cultivated in the orchard of Fruit Tree Research Station, grown from the seeds collected in Taiwan, 14 Nov., 1989, H. Iketani 2488, fr., TUS; 27 Mar. 1990, H. Iketani 2502, fl., TUS; 10 Apr. 1991, H. Iketani 2588, fl., TUS; 18 Nov. 1991, H. Iketani 2738, fr., TUS.

Liu and Su (1977) described that the lower surface of the leaves and petioles are pubescent. We think it maybe intraspecific variation, because all

of our materials observed are glabrous on the portion.

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Endnote

¹⁾Contribution No. A-293 of the Fruit Tree Research Station.

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要旨

台湾に野生するナシ属植物としてはタイワンイヌナシ *P. kawakamii* Hayata の1種のみがこれ

まで知られてきた。この種は Hayata (1911) の原記載とタイプ標本によると葉は円鋸歯縁で果実は径約 9 mm であり, マメナシ *P. calleryana* Decne. に極めて近似している。しかし台湾イヌナシを扱ったその後の文献では, 本種の記載について不一致が見られる。Rehder (1920), 金平 (1936), Li (1963) は *P. kawakamii* について原記載と同様の記載をしているが, 金平の 225 図, Li の 107 図, Liu and Su (1977) の記載では

果実がより大きく葉は鋸歯縁であるとされている。この点を解決するために, 標本や自生地由来の栽培個体について検討した結果, 台湾には台湾イヌナシの他にもう 1 種の野生ナシが自生することが判明した。この種を *P. taiwanensis* Iketani et Ohashi sp. nov. として記載した。また, *P. kawakamii* についても検討した結果, この種は *P. calleryana* に含めるのが妥当であると結論した。