A NEW SPECIES OF PAULOWNIA FROM TAIWAN—

P. TAIWANIANA HU & CHANG

TA-WEI HU(1) and HUEY JU CHANG(2)

Abstract: A native taxon of Paulownia intermediate between P. fortunei and P. kawakamii has been known for some years and has been introduced into Indonesia and South America where it is being widely cultivated, but it does not have a scientific name and has never been published in any scientific journal. This taxon is now being named P. taiwaniana Hu et Chang.

INTRODUCTION

The earliest record of the genus Paulownia in Taiwan is found in Kawakami’s “A List of Plants of Formosa” (1910). At that time, he did not give a specific name to the specimens which he had collected. After two years, in 1912, Tokutaro Ito described the specimens of Paulownia collected by Kawakami from Hsinchu (新竹) and named it Paulownia kawakamii, he also described another species collected from Nantou (南投) and named it P. mikado (Ito, 1912). The latter is now treated by most authors as P. fortunei. We have checked all the taxonomic literature, and have only found these two native species to be reported from Taiwan. (Sasaki, 1928; Masamune, 1936; Kanehira, 1936; Chen, 1937; S.Y. Hu, 1961; Li, 1971; T.S. Liu, 1960; Y.C. Liu, 1970, 1972)

In the past decade the excellent properties of Paulownia lumber has caused the price of Paulownia wood to become very expensive and so now Paulownia is a very good cash crop. This situation has stimulated the staff of the Taiwan Forestry Research Institute to work together as a team on the research of this species. For the Provenance and Progeny tests, collections of specimens were made from more than 30 localities involving more than 100 trees. Through critical observation on the flowers, fruits, seeds, flowering twigs and leaves, we discovered a new population which possesses intermediate characteristics between P. kawakamii and P. fortunei. We have searched in vain for a name for this new taxon. However in “Colored Illustrations of Important Trees in Taiwan” (Y.C. Liu 1970) and “Woody Flora of Taiwan” (H.L. Li 1971), there are colored photographs and line-drawings of this new taxon, and in each case, they are under the name of Paulownia kawakamii. As far back as 1920, a silviculturist, Y.S. Lai (賴雲祥) reported that he had found a new Paulownia growing wild at an elevation of 600 m. in Miaoli (苗栗). He called the thin-leaved Paulownia because its leaves are thinner than those of P. kawakamii. He also described this species in several papers (Lai 1928, 1932 and 1938). From his detailed descriptions and from the trees planted by him, we can see that his thin-leaved Paulownia is the same as our new taxon; unfortunately he did not leave a type specimen nor give a formal publication of this taxon. Because of its fast growth rate as well as its adaptability to warm weather, it is not only widely cultivated in Taiwan but also has been introduced into South America and Indonesia.

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It is necessary to give this species an appropriate scientific name. It is commonly called Taiwan paulownia and its timber is also commercially called Taiwan paulownia. Therefore, we are giving this species the name *Paulownia taiwaniae*.

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**DESCRIPTION**

*Paulownia taiwaniae* Hu et Chang, sp. nov. (臺灣泡桐).

Arbor decidua, circiter 20 m. alta; ramis teretis, hornotinus 5-12 cm. diametro; lenticellis orbicularibus vel elliptis; foliis latovatis, 10-30 cm. longis, 8-30 cm. latis, integris vel 3-5 lobatis, basi cordatis, apice acutis vel acuminatis, chartaceis, petiolaribus 10-17 cm. longis, supra sparsis pilosis, pilis glandularibus, subtus dense tomentosis, pilis glandularibus capillaris, basi glaucis, subtus puberulis. Inflorescentiae pyramidalibus, terminalibus; Cymes 3-5-floribus, Pedunculis 5 mm. longis, Pedicellis 8-15 mm. longis, stellato-pilosis; Calycibus campanulatis, 1-1.5 cm. longis, 1 cm. latis, 5-lobatus, lobis deltoides, dense stellato-pilosis; Corollis infundibulo-campanulatis pallide-violaceis, 6.5-7 cm. longis, intus obscurae violaceo-maculatis, in fauces subitus omni 2 carinac fusco-flavas, extus stellato-pilosis et glandulosus, staminibus didynamis, filamentis basi compressis et contortis, glandulos-pilosis, antheris bilocularibus, thecis divergentibus; ovarii oblongo-ovoides, Stylo 4 cm. longo; Stigma Suburoceolate. Capsulis lignosis, oblongo-ovoides, apice rostratis, 3.4-4.5 cm. longis, 2 cm. latis. Calycibus persistentibus subinfundibulis, seminis alis inclusis 5.5 mm. longis, 3-3.5 mm. latis.

A deciduous tree up to 20 m. high, branchlets terete, glabrescent, the current year's growth 5-12 mm. in diameter, lenticels suborbicular or elliptic. Leaves opposite, the leaf-scars suborbicular, the leaf-trace V-shaped; mature leaves entire, chartaceous, broadly ovate, 10-30 cm. long, 8-30 cm. wide, the base cordate, the apex acute or abruptly acuminate, glabrescent above with few glandular hairs, moderately tomentose with dendroid hairs beneath; petioles 10-17 cm. long, fuscous and glabrescent; young leaves at anthesis glandular-hispid and with multilayered disk-like glands sparingly scattered near the base. Inflorescences paniculate, terminal, individual cymes simple or dichotomously branched, 3-5-flowered; peduncles of the cymes 5 mm. long, pedicels 8-15 mm. long, brown lanate with dendroid hairs, flowers fragrant, calyx campanulatus 1-1.5 cm. long, 1 cm. across the middle, 5-lobe, 1/3 divided, grey-brown, the lobes deltoid, 4-6 mm. long, 4 mm. wide, lanate, with dendroid hairs. Corolla infundibulo-campanulate light purple, the inside with deep violet specks, yellow on the throat, 6.5 cm. long, 2 cm. across the middle, and 6 cm. across the limb. the outside dendroid-pubescent and glandulos-papillos; limb 5-lobe, the lobes round, dendroid pilose; stamens didynamos; filaments compressed, twisted and genulate at the base, the longer pair 3.5 cm. long, and shorter pair 2.5 cm. long; anther white, 5-8 mm. long, 2-locular, opening lengthwise; style 4 cm. long; ovary oblong-ovoid, glandulos-papillos; Stigma terminal, truncate, cup-shaped. Capsules ovoid, 3.5-4.5 cm. long, 2 cm. across; pericarp woody; persistent calyx subindumentuliform, rugose, fuscous. Seeds including the wings 5-5.5 mm. long, 3-3.5 mm. wide.

**MIAOLI:** Erhpuensung (米埔鄉), *T. W. Hu* s. n. (Oct. 1972); *H. J. Chang* 2354. **TAICHUNG:** Kukuan (谷關), *H. J. Chang* 2323. **NATOU:** Wishe (武威), *H. J. Chang* 2362. **CHIAYI:**
<table>
<thead>
<tr>
<th>Characteristics</th>
<th><em>P. kawakamii</em> (Sect. Kawakamii)</th>
<th><em>P. taiwanae</em> (Sect. Paulownia)</th>
<th><em>P. fortunei</em> (Sect. Fortuneana)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowering twig</td>
<td>pyramidal with gradually smaller side branches</td>
<td>pyramidal with gradually smaller side branches</td>
<td>nearly cylindrical, side branches poorly developed</td>
</tr>
<tr>
<td>Inflorescence</td>
<td>cymes subsessile or umbelliform</td>
<td>cymes with conspicuous peduncles</td>
<td>cymes with conspicuous peduncles</td>
</tr>
<tr>
<td>Calyx</td>
<td>5-lobed, 2/3 divided, persistant calyx rotate, much reflexed</td>
<td>5-lobed, 1/3 divided, persistant calyx infundibular, sometimes reflexed</td>
<td>5-lobed, 1/3 divided, persistant calyx infundibular, sometimes reflexed</td>
</tr>
<tr>
<td>Corolla</td>
<td>3.5-4cm. long, white or pale lilac, throat yellow with 2 keels and purple straight lines</td>
<td>5-6cm. long, light purple throat yellow with 2 keels and deep purple spots</td>
<td>7-9cm. long, pale lilac, throat yellow with deep spots and a purple brown band in the center</td>
</tr>
<tr>
<td>Fruit</td>
<td>2.5-3.5cm long, globose-ovate pericarp cortaceous, very thin</td>
<td>3-4.5cm. long globose-ovate to ovate pericarp woody, tainer than <em>P. fortunei</em></td>
<td>5-8cm. long oblong-ellipsoid pericarp woody, thick</td>
</tr>
<tr>
<td>Seed</td>
<td>seed black, wing grey including the wing 2.5-3.5mm. long, 2.5mm. wide</td>
<td>seed black, wing white including the wing 5.5-8mm. long, 3-3.5mm. wide</td>
<td>seed black, wing white including the wing 5-5.5mm. long, 3-3.5mm. wide</td>
</tr>
<tr>
<td>Indumentum</td>
<td>mature leaves capitate glandular hairs and dendroid hairs</td>
<td>a few capitate glandular hairs, and dendroid hairs</td>
<td>dendroid hairs</td>
</tr>
<tr>
<td></td>
<td>calyx dendroid hairs yellow brown</td>
<td>deadroid hairs grey brown</td>
<td>dendroid hairs grey brown</td>
</tr>
<tr>
<td></td>
<td>corolla capitate glandular hairs</td>
<td>capitate glandular hairs and dendroid hairs</td>
<td>dendroid hairs</td>
</tr>
</tbody>
</table>

*---* Showing the similarity between species.
The authors suggest that Taiwan paulownia may be a natural hybrid between P. kawakamii and P. fortunei; the tree was introduced into Argentina in 1956. The foresters there consider it a hybrid and call it the “Hybrid paulownia”, (Mangieri 1971). Its subinfundibular corolla, obconic calyx, pedunculate inflorescence all suggest a close relationship with P. fortunei. Its pyramidal flowering twigs, corolla color and spotted pattern inside the tube, and hair texture of its leaves are all related to P. kawakamii. Thus it is usually misidentified as P. fortunei or P. kawakamii. As to the flowering twigs, they are very similar to P. tomentosa. According to S.Y. Hu (1951), this new species should belong to Sect. Paulownia (see Table 1).

**Key to the species of Paulownia native to Taiwan**
1. Capsules obovoid-ellipsoid, 5-7 cm. in length, pericarp woody.................................. P. fortunei
2. Calyx rotate, 2/3 divided, persistent calyx much reflexed........................................ P. kawakamii
3. Calyx obconic, 1/3 divided, persistent calyx infundibular ........................................ P. taiwaniana

**LITERATURE CITED**


Plate I. Comparisons of three morphological characters among 3 native *Paulownia* spp. upper, flowering twigs; middle, corolla opened; bottom, capsules.
Plate III. *Paulownia taiwaniana* 1. Fruiting twig. 2. Longitudinal section of the capsule. 3. Transverse section of the same. 4. Seed. 5. Leaf.