Research paper

Eurya lui (Pentaphylacaceae), A New Species in Taiwan

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【**Abstract**】*Eurya lui* is a new species of Pentaphylacaceae endemic in Taiwan. It resembles *E. strigillosa*, but can be distinguished by its oblong leaves with pilose abaxial surface, evident petioles and 15-19 stamens within each flower. In this article, we provide line drawings, photographs of this new species, and a key to the species of *Eurya* in Taiwan.

【**Key words**】*Eurya lui*, Pentaphylacaceae, Taiwan, Plant Taxonomy.

研究報告

臺灣新種 (五裂木科) 植物：浸水營柃木

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【摘要】本文描述五裂木科的一個新種植物－浸水營柃木 (*Eurya lui*)，係分布於臺灣的一特有種，本種近似粗毛柃木 (*E. strigillosa*)，但可從葉橢圓形、背面被柔毛、具葉柄、每朵花雄蕊15~19枚作區分，文中提供臺灣產柃木屬植物檢索表，及本新種之彩色照片，手繪圖以供參考及鑑定之查索。

【關鍵詞】浸水營柃木，五裂木科，植物分類，臺灣

INTRODUCTION

The genus *Eurya* Thunb. (1783: 67) comprised ca. 130 species mainly distributed in tropical and subtropical Asia and the Pacific islands (Lin, 1998). A toal of thirteen species have been identified in Taiwan 2nd edition (Hsieh *et al*., 1996), and a new species *E. septata* C. C. Wu, Z. F. Hsu and C. H. Tsou was described in Wu *et al*. (2003:67-69). According to the intragenus classification of China taxa (Lin, 1998), these species were demarcated into two sections: sect. *Eurya* and sect. *Meristotheca* Vesque (1895:156). The diagnostic character between these sections was whether their anthers could be divided into locules (sect. *Meristotheca*) or not (sect. *Eurya*). Recently, we found a different taxon of sect. *Meristotheca* in southern Taiwan. After literature reviewed and inspected the specimens in the

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herbariums, we confirmed it is a new species and named it E. *lui* Y. H. Tseng & Y. H. Wu.

MATERIALS AND METHODS

Pollen morphology

Pollen morphology was examined under scanning electron microscope located at Laboratory of Forestry Plant Taxonomy and Ecology, Forestry department, National Chung-Hsing Univ., Taichung city, Taiwan. The pollen was collected from fresh materials, directly taped onto stub. After sputter-coated for 90 sec., the pollen was observed under scanning electron microscope S-3400N (HITACHI co., Japan) at 15 kV. Voucher specimens were deposited in herbarium of forestry department, National Chung-Hsing Univ. (TCF). Analysis and descriptive terminologies were followed Erdtman (1952) and Hesse *et al*. (2010).

TAXONOMIC TREATMENT

Key to species of *Eurya* in Taiwan.

1. Anther septate, style 3-5-lobed, ovary pubescent or glabrous ..... sect. *Meristotheca*-2
   -Anther not septate, style 3-lobed, ovary glabrous ..... sect. *Eurya*...7
2. branchlets terete 3
   -branchlets ridged..... 4
3. leaves subsessile, strigillose in the leaf abaxial surface, stamen 10-14 ..... *E. strigillosa*
   -leaves petiolate, sparsely pilose in the leaf abaxial surface; stamen 15-19 ..... *E. lui*
4. sepals and ovary pubescent..... 5
   -sepals and ovary glabrous..... 6
5. leaves rhomboid-lanceolate, petiole 4-7mm; style 4-5-fid. ..... *E. gnaphalocarpa*
   -leaves narrow-elliptic, petiole 2-3mm, style 3-fid. ..... *E. septata*
6. leaves oblong, petiole 4-6 mm, stamen 5-10 ..... *E. glaberrima*
   -leaves obovate, petiole 3-4 mm, stamen 15-20 ..... *E. emarginata*
7. Style 0.5-1.5mm long..... 8
   -Style 2-3mm long 9
8. Leaf obovate, 0.9-1.6cm long, sepal glabrous, style 0.5-1mm long, stamen 5-6 ..... *E.crenatifolia*
   -Leaf elliptic, 2-4cm long, sepal sparce pubescent, style 1-1.5mm long, stamen 6-8 ..... *E. leptophylla*
9. Sepal puberulent, margin ciliate..... *E. loquaiana*
   -Sepal glabrous, margin membranous..... 10
10. Style 1.5-2mm long..... 11
    -Style 2-3mm long 12
11. Branchlet and bud glabrous, leaf obovate-elliptic, stamen 9-12 ..... *E. japonica*
    -Branchlet and bud pubescent, leaf rhomboid-elliptic, stamen 12-15 ..... *E. chinensis*
12. Lateral vein inconspicuous at leaf abaxial surface, petiole 4-6 mm long 13
    -Lateral vein conspicuous at leaf abaxial surface, petiole 5-6 mm long..... 14
13. Leaf oblong-lanceolate, stamen 14-20 ..... *E. hayatai*
    -Leaf obovate, stamen 10-14..... *E. nanjenshanensis*

14. Leaf ovate-lanceolate petal violate, stamen 8-12.....*E. rengechiensis*
-Leaf rhomboid-elliptic, petal white, stamen 14-18..... *E. nitida*

SPECIES DESCRIPTION

Eurya lui Yen-Hsueh Tseng & Yi-Hung Wu, *sp. nova* (Fig. 2, 3)

Small trees. Branchlets terete, pilose. Young leaves red or green, abaxial surface pilose. Mature leaves coriaceous, oblong, 6.5-9 cm long, 1.5-2.5 cm wide, apex acute to acuminate, base acute, margin rather revolute, obtusely serrulate, teeth 32-42 pairs, sparsely puberulent in the abaxial surface. Venation brochidodromous, lateral veins 10-14 pairs, veins and veinlets prominent on both sides. Petioles 3-4 mm long, glabrous. Inflorescences axillary, solitary or glomerule with 2-5 flowers. Flowers dioecious. Staminate flowers: pedicels 1-1.5 mm long, pubescent, bracts 2, ovate, minute, persistent; sepals 5, widely ovate, imbricate, pubescent, dark green; petals 5, ovate, greenish white, 4-5.5 mm long; stamens 15-19, anthers sagittate, septate, filaments short. Pistillate flowers: ovary globose, pilose; style 1-1.5 mm long, 3-fid. Fruit globose 3.5-5 mm in diam., villous. Seeds polygonal 1-1.5 mm in diam., foveolate-pitted, shiny.

Holotype: -Taiwan. Pingtung County: Chunrih township, ca. 0.5 km of Shinsuiying ancient trail, 11 November 2004, *Yi Hung Wu 0356* (♀) (TCF)

Chinese name: 浸水營柃木

IUCN conservation status: According to IUCN Red List categories and criteria ver. 3.1 second edition (IUCN, 2001), *E. lui* was belong to vulnerable rank.

ETYMOLOGY

The species epithet “lui” commemorates Prof. Fu-Yuan Lu, for his contribution to plant taxonomy and a great taxonomist who addressed himself to Theaceae of Taiwan.

DISCUSSION

Eurya lui is a new species endemic to Taiwan, which so far has only been found in Shinsuiying ancient trail (fig. 1), a well-known plant diversity and study hot spot in Taiwan. Many endangered species were only found here, such as *Amentotaxus formosana* Li (1952:196), *Lithocarpus dodoniifolius* (Hayata 1913:181) Hayata (1916:72), *Litsea lii* C. E. Chang (1976:441), *Lithocarpus shinsuiensis* Hayata & Kaneh. (1921:30), *Blechnum fraseri* (A. Cunn. 1836:364) Luerss. (1836:364). Moreover, several new species and new recorded species such as *Swertia changii* S.Z. Yang, C. Fan Chan & Chih H. Chen (2008:155), *Camellia trichoclada* (Rehder 1927:176) S. S. Chien (1939:100) (Yang *et al*., 2011), and *Rhododendron farrerae* Sweet (1831:pl 95) (Lu *et al*., 2010) were discovered recently, including the new species *E. lui* in our research.

The morphology of *Eurya lui* was similar to *E. strigillosa* Hayata (1908:61) and *E. glaberrima* Hayata (1919:8), but *E. lui* with petioled leaves and 15-19 stamens (vs. sessile leaves and 10-14 stamens for *E. strigillosa* and petioled leaves and 6-10 stamens for *E. glaberrima*) were different from them. This species is also similar to *E. acutisepala* Hu (1994:642), an endemic species to mainland China, which could be distinguished by its pubescence and much shorter style (table 1).

But the pollen morphology showed different results, although the shape of *E. lui* was perprolate

(vs. prolate for the others) and its surface was seemingly more smooth than *E. strigillosa*, their pollen morphologies were similar to each other that couldn't be a well distinguished characters among them (fig. 4., table 2.).

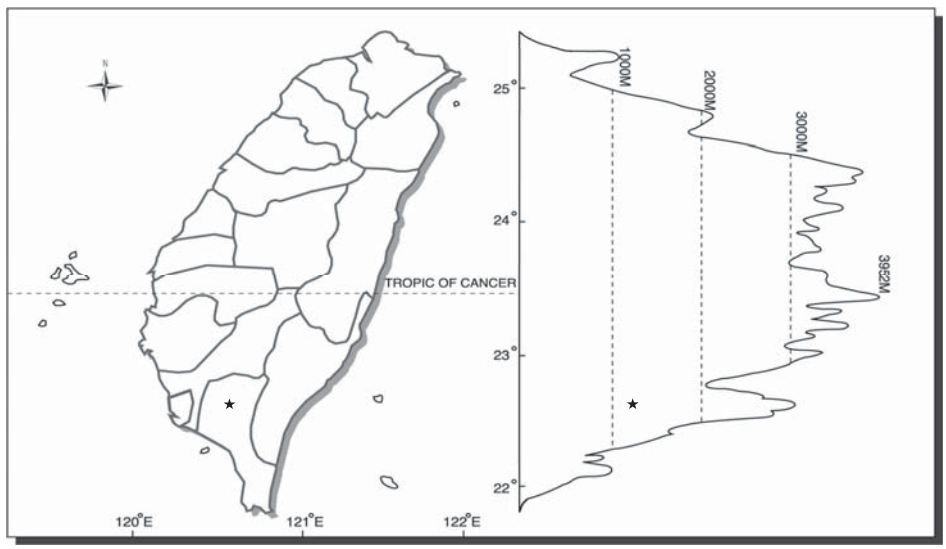

Fig. 1. Distribution map of *Eurya lui* Y. H. Tseng & Y. H. Wu in Taiwan.

Table 1. Comparison of *Eurya lui*, *E. glaberrima*, *E. strigillosa* and *E. acutisepala.*

	E. lui	*E. glaberrima*	*E. strigillosa*	*E. acutisepala*
branchlets				
shape	terete	ridged	terete	terete
indumentum	pilose	glabrous	strigillose	grabrescent
leaves				
shape	oblong	oblong to oblong lanceolate	lanceolate	oblong-oblanceolate
indumentum of abaxial surface	sparsely pilose	glabrous	strigillose	glabrescent
petiole (mm)	3-4	4-6	sessile	2-3.5
stamen	15-19	6-10	10-14	ca.15
style length (mm)	1-1.5	0.5-1	1	2.5-3
fruits				
shape	globose	globose	oblate-globose	ovate-ellipsoid
indumentum	villose	glabrous	densely pubescent	sparse pubescent
Distribution	Taiwan	Taiwan	Taiwan, Japan	China

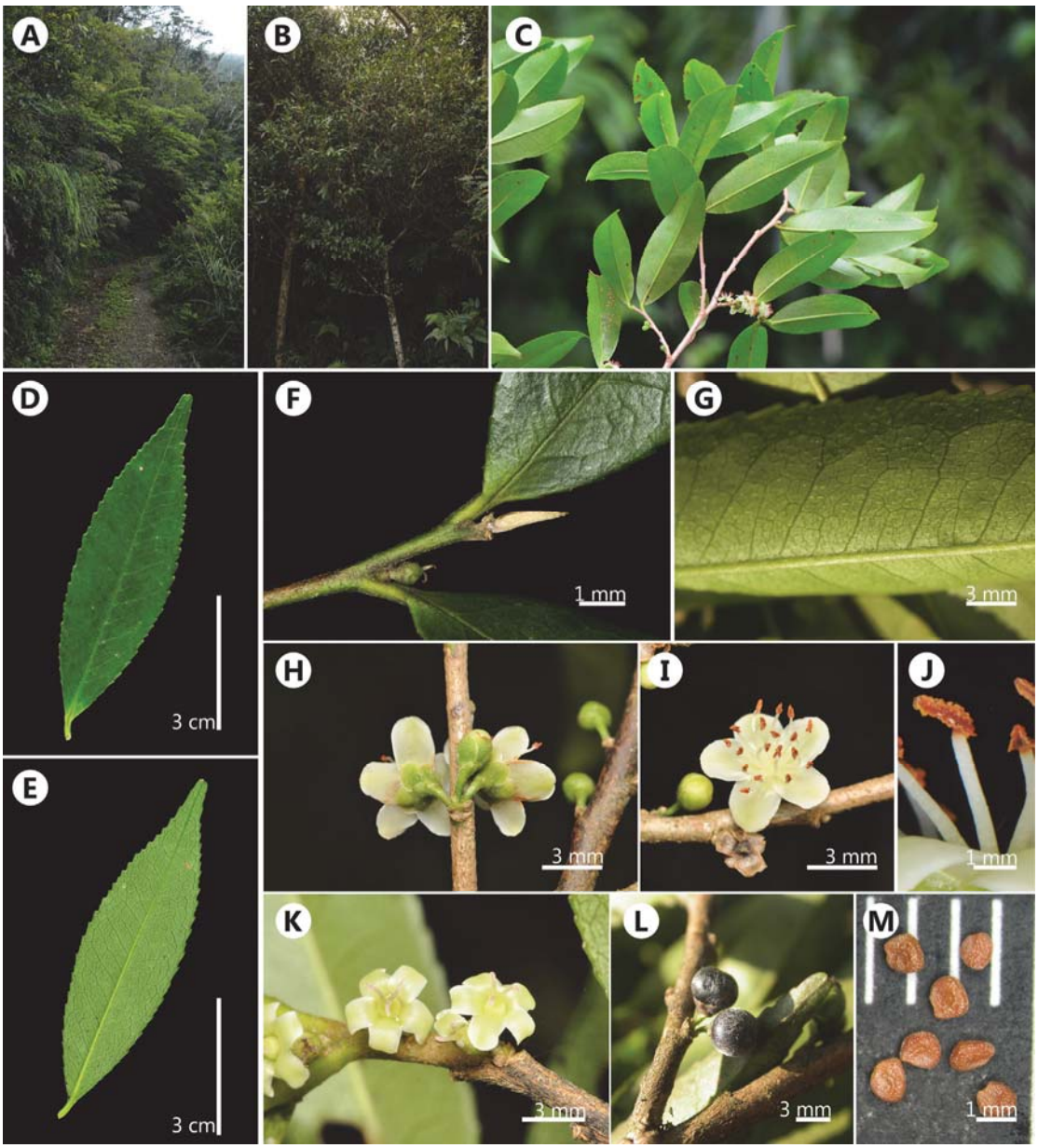

Fig. 2. *Eurya lui* Y. H. Tseng & Y. H. Wu. A, Habitat (Shinshuiying ancient trail); B, Habit; C, Branch; D, Leaf adaxial surface E, Leaf abaxial surface F, Terminal buds and bramchlets G, Indumentum of leaf abaxial surface; H, Inflorescences, back view showed bracts and calyx; I, Staminate flowers J, Stamen, shows the loculed anthers; K, Pistillate flowers; L, Fruits; M, Seeds.

Fig. 3. *Eurya lui* Y. H. Tseng & Y. H. Wu, *sp. nov*. A, Habit; B, Leaf adaxial surface, B', Leaf abaxial surface, C, Leaf margin, D, Terminal buds, E, Branchlets and indumentum; F, staminate flowers, G, Anthers, H, Pistillate flowers; I, Ovaries; J, Infructances, K, Fruits; L, Seeds. B, B', C, D, F, G,: *Y. H. Wu. 1056*, A, E, H, I, J, K, L,: *Y. H. Wu 0356*. Scale bar A=3 cm, B, B'= 1 cm, J=5 mm, others=1 mm.

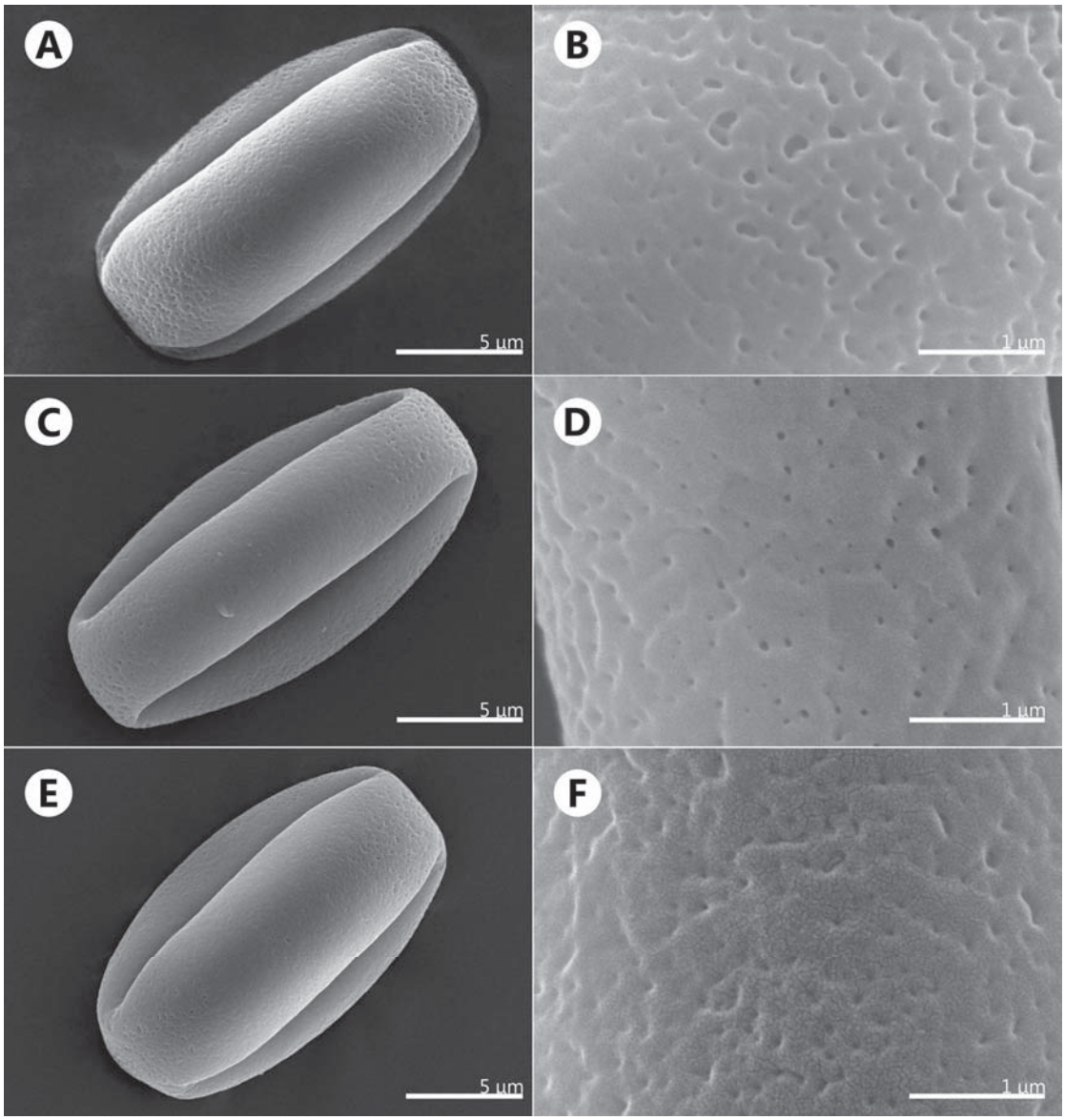

Fig. 4. Pollen morphology of *Eurya glaberrima*, *E. lui* and *E. strigillosa*. A, B, *E.glaberrima*, C, D, *E. lui*, E, F, *E. strigillosa*.

Table 2. Pollen morphology of *Eurya glaberrima*, *E. lui* and *E. strigillosa*

taxa	P axis (µm)	E axis (µm)	P/E	Size	Shape	Aperture	Sculpture
E. glaberrima	16.67	8.70	1.92	small	prolate	tricolpate	perforate
E. lui	18.15	8.78	2.06	small	perprolate	tricolpate	perforate
E. strigillosa	17.27	9.56	1.81	small	prolate	tricolpate	perforate

Paratype: -Taiwan. Pingtung County: Chunrih township, ca. 0.5 km of Shinsuiying ancient trail, 5 November 2013, *Yi Hung Wu 1056* (♂) (TCF), same loc., 24 Oct. 2013, *Yi Hung Wu 1097* (♂), same loc., 6 Nov. 2013, *Cien Ti. Chao 3321* (♂), 3326 (♀), same loc., 24 Oct. 2014, *Chien Ti Chao 3567* (♀), *3568* (♂). At road sign 20 km of Tahan logging trail, 24 Oct. 2014 *Chien Ti Chao 3572* (♂).

ACKNOWLEDGEMENTS

We thank Dr. Mong-Huai Su for useful suggestions; Mr. Chien-Ti Chao, Mr.

Te-Hsun Lin for field assistance; Ms. Li-Fang Lee for the excellent line drawings.

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