



红背漆, 福建漆树科一新种

陈新艳, 马良, 周承源, 陈彬, 陈世品

引用本文:

陈新艳, 马良, 周承源, 陈彬, 陈世品. 红背漆, 福建漆树科一新种[J]. 热带亚热带植物学报, 2023, 31(6): 863–869.

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红背漆, 福建漆树科一新种

陈新艳¹, 马良², 周承源³, 陈彬⁴, 陈世品^{3*}

(1. 三明市园林中心, 福建 三明 365000; 2. 福建卫生职业技术学院, 福州 350101; 3. 福建农林大学林学院, 福州 350002; 4. 华东野生濒危资源植物保育中心, 上海辰山植物园, 上海 201602)

摘要: 描述了福建省中北部山区漆树科(Anacardiaceae)漆树属(*Toxicodendron*)一新种: 红背漆(*Toxicodendron purpureum*), 该种与小漆树(*T. delavayi*)相近, 与小漆树不同之处在于叶长达 25 cm (vs 长达 13 cm); 小叶叶背紫红色, 稀绿色, 小叶柄长 2~5 mm (vs 叶背被白粉, 小叶柄长 1~2 mm); 花序长不超过叶长 1/3 (vs 与叶近等长); 花瓣不具暗褐色脉纹(vs 具暗褐色脉纹)。通过比较 4 相近种的形态学特征以及基于 29 物种的核基因片段 ITS 和 2 个质体基因片段(*trnL-F* 和 *ndhF*)构建的系统发育关系均支持该新种的成立。

关键词: 红背漆; 漆树科; 新种; 福建

doi: 10.11926/jtsb.4813

Toxicodendron purpureum, A New Species of Anacardiaceae from Fujian

CHEN Xinyan¹, MA Liang², ZHOU Chengyuan³, CHEN Bin⁴, CHEN Shipin^{3*}

(1. Sanming Garden Administration Bureau, Sanming 365000, Fujian, China; 2. Fujian Health College, Fuzhou 350101, China; 3. College of Forestry, Fujian Agriculture and Forestry University, Fuzhou 350002, China; 4. Eastern China Conservation Center for Wild Endangered Plant Resources, Shanghai Chenshan Botanical Garden, Shanghai 201602, China)

Abstract: *Toxicodendron purpureum*, a new species of Anacardiaceae from Shaowu County, Fujian Province of Eastern China, is described and illustrated here. The new species is similar to *T. delavayi*, but is distinguished from *T. delavayi* by leaves 25 cm (vs to 13 cm); leaflets papery, abaxially purplish red, rare green (vs abaxially glaucous, leaflet petiolule 1–2 mm); inflorescence as long as 1/3 pinnately compound leaf (vs as long as pinnately compound leaf); petals without brown featherlike venation pattern (vs petals with brown featherlike venation pattern). The comparison of morphological characteristics among four closely related species and phylogenetic analyses based on nuclear ITS and plastid sequences (*trnL-F* and *ndhF*) from 29 species both support the establishment of the new species.

Key words: *Toxicodendron purpureum*; Anacardiaceae; New species; Fujian

全世界漆树科(Anacardiaceae)植物超过 60 属, 600 多种^[1]。漆树属[*Toxicodendron* (Tourn.) Mill.]是比较小的属, 约 30 种, 分布于亚洲东部和北美至中美, 我国 17 种, 主要分布于长江以南各省区^[2-4]。漆树属植物分泌的乳液含漆酚, 易引起皮肤过敏。部分植物具有重要的经济价值, 例如漆树割取的天

然生漆, 在药用、化工、工业生产以及工艺制品等方面都具有重要的作用^[5-6]。

文献记载福建省产漆树属植物共 6 种: 少叶漆(*T. oligophyllum* S.L. Tang, Liang Ma & S.P. Chen)^[3]、刺果毒漆藤[*T. radicans* subsp. *hispidum* (Engl.) Gillis]、毛漆树[*T. trichocarpum* (Miq.) O.

收稿日期: 2023-06-06 接受日期: 2023-08-08

基金项目: 国家重点研发计划项目(2019YFD1000400); 中医药公共卫生服务补助专项([2019]39)资助

This work was supported by the National Key Research and Development Program of China (Grant No. 2019YFD1000400), and the Special Project for Chinese Medicine Resources Research in the Public Interest of China (Grant No. 2019-39).

作者简介: 陈新艳(1983 年生), 男, 高级工程师, 研究方向为植物资源学。E-mail: 303983900@qq.com

* 通讯作者 Corresponding author. E-mail: fjesp@163.com

Kuntze]、木蜡树 [*T. sylvestre* (Sieb. et Zucc.) O. Kuntze]、漆 [*T. vernicifluum* (Stokes) F. A. Barkl.] 和野漆 [*T. succedanea* (L.) O. Kuntze]^[7]。2019 年以来, 笔者在全省进行植物资源调查期间, 在福建省泰宁县和邵武县丹霞山发现 1 种漆树属植物, 在海拔 300~500 m 的林下或灌木丛中。该种均为灌木状, 树形上与小漆树相近, 不同之处在于叶更长, 被微毛, 叶背紫红色; 花序长不超过叶长 1/3; 花瓣不具暗褐色脉纹。该种与木蜡树、少叶漆相近, 不同之处在于树高不超过 1.8 m, 为落叶灌木; 小叶常具粗锯齿; 聚伞总状花序, 长度不超过叶长 1/3; 花瓣不具暗褐色脉纹。经查阅相关文献和本标^[3,6], 与相关种进行了形态特征比较(表 1)。结果表明, 该种与漆属其他种存在可以明显区分的特征, 可以作为独立的种。同时, 又开展了分子系统学研究。根据前人的分子系统学研究结果^[1,3], 本研究共选取 29 种物种, 其中外类群 9 种; 使用的分子标记包括核基因片段 ITS 和 2 个质体基因片段(*trnL-F* 和 *ndhF*), 共获得 26 条 ITS、29 条 *trnL-F* 和 28 条 *ndhF*; 相关样品的凭证标本和序列数据 GenBank 登录号见表 2。基于核基因 ITS 矩阵、质体基因片段联合矩阵和核基因质体联合矩阵, 分别构建最大似然法(maximum likelihood, ML)、最大简约法(maximum parsimony,

MP)和贝叶斯推断法(bayesian inference, BI)系统发育树。结果表明, 除基于质体基因片段联合矩阵构建的系统发育树外, 其余所有系统发育树均支持该新种与木蜡树以高支持率构成姐妹关系($BS_{ML} \geq 89$, $BS_{MP} \geq 85$, $PP \geq 0.99$)。综上, 该种为漆树属一新种, 现予以报道。

红背漆 新种 图 2, 3

Toxicodendron purpureum S. P. Chen, Xin Y. Chen & Liang Ma, sp. nov.

The new species is similar to *T. delavayi*, but is distinguished from *T. delavayi* by leaves 25 cm (vs to 13 cm); leaflets papery, abaxially purplish red, rare green (vs abaxially glaucous, leaflet petiolule 1–2 mm); inflorescence as long as 1/3 pinnately compound leaf (vs as long as pinnately compound leaf); petals without brown featherlike venation pattern (vs petals with brown featherlike venation pattern).

China. Fujian Province (福建省), Shaowu County (邵武县), Jiangshi Provincial Nature Reserve (邵武将石省级自然保护区), under the forest, elevation 327 m, 2 May 2021, *Xin Y. Chen & L. Ma* FAFU20210502 (holotype: FJFC); China. Fujian Province (福建省),

表 1 红背漆、木蜡树、少叶漆和小漆树的形态特征对比

Table 1 Morphological comparison of *Toxicodendron purpureum*, *T. sylvestre*, *T. oligophyllum* and *T. delavayi*

形态 Morphology	红背漆 <i>T. purpureum</i>	木蜡树 <i>T. sylvestre</i>	少叶漆 <i>T. oligophyllum</i>	小漆树 <i>T. delavayi</i>
茎 Stem	灌木, 高 0.4–1.8 m, 树皮灰色, 具椭圆形突起小皮孔, 幼枝被常被白粉, 被微绒毛 Deciduous shrub, 0.4–1.8 m tall; white latex, stem with small oval lenticels, branchlets often whitening, microvilli	乔木, 高达 10 m, 树皮灰褐色, 具皮孔, 幼枝和芽被黄褐色绒毛 Tree, to 10 m tall; young branchlets and terminal buds yellowish brown tomentose	乔木, 高达 12 m, 树皮灰色, 幼枝无毛 Tree, to 12 m tall; branch-lets and buds purple-brown, glabrous	灌木, 高 0.5–2 m, 树皮灰褐色, 具椭圆形突起小皮孔, 幼枝无毛 Shrub, 0.5–2 m tall; branchlets purplish red, often glaucous, glabrous
叶 Leaf	叶长达 25 cm, 小叶 3–5 对, 被微毛, 全缘或 1/3 处以上具粗锯齿, 叶背紫红色, 稀绿色, 小叶柄长 2–5 mm Leaves 25 cm; leaflets 3–5 pairs, papery, margin entire or 1/3 with coarse serrations on top, abaxially purplish red, rare green; leaflet petiolule 2–5 mm	叶长 18–30 cm, 小叶 3–7 对, 密被黄褐色绒毛, 全缘, 叶背密被短柔毛, 小叶无柄或具短柄 Leaf 18–30 cm; leaflets 3–7 pairs; densely yellow tomentose, margin entire, abaxially densely pubescent, leaflet petiolule sessile to short	叶长 10–15 cm, 小叶 1–2 对, 无毛, 全缘, 叶背被白粉, 小叶柄长 7 mm Leaf 10–15 cm; leaflets 1–2 pairs, glabrous, margin entire, abaxially glaucous, leaflet petiolule indistinct or 2–7 mm long	长达 13 cm, 小叶 2–5 对, 无毛, 全缘或上半部具疏锯齿, 叶背被白粉, 小叶柄长 1–2 mm Leaf to 13 cm; leaflets 2–5 pairs, glabrous, margin entire to sparsely serrate distally, abaxially glaucous, leaflet petiolule 1–2 mm
花序 Inflorescence	聚伞总状花序长 5–8 cm, 长不超过叶长 1/3 Inflorescence cymose racemose, 5–8 cm, as long as 1/3 pinnately compound leaf	圆锥花序长 8–15 cm, 长度不超过叶长一半 Inflorescence paniculate, as long as 1/2 pinnately compound leaf	圆锥花序长 10–15 cm, 与叶近等长 Inflorescence paniculate, 10–15 cm, as long as pinnately compound leaf	聚伞总状花序长 6–8.5 cm, 与叶近等长 Inflorescence cymose racemose, 6–8.5 cm, as long as pinnately compound leaf
花 Flower	花梗无毛, 长约 2.5 mm; 花瓣不具暗褐色脉纹 Pedicel glabrous, ca. 2.5 mm; petals without brown featherlike venation pattern	花梗被卷曲微柔毛, 长约 1.5 mm; 花瓣具暗褐色脉纹 Pedicel minutely pubescent, ca. 1.5 mm; petals with brown featherlike venation pattern	花梗长 4–5 mm; 花瓣具暗褐色脉纹 Pedicel 4–5 mm long; petals with brown featherlike venation pattern	花梗无毛, 长约 1 mm; 花瓣具暗褐色脉纹 Pedicel glabrous, ca. 1 mm; petals with brown featherlike venation pattern

表 2 本研究所用物种的标本信息及 GenBank 登录号

Table 2 Voucher information and GenBank accession No. for taxa used in this study

物种 Taxon	凭证标本 Voucher	ITS	<i>trnL-F</i>	<i>ndhF</i>
<i>Toxicodendron delavayi</i> (Franch.) F.A. Barkley	Nie & Meng 343 (KUN)	FJ945937	FJ945983	FJ945830
<i>T. diversilobum</i> (Torr. & A. Gray) Greene	Wen 6693 (F)	AY677202	AY677208	AY677205
<i>T. fulvum</i> (Craib) C.Y. Wu & T.L. Ming	Nie & Meng 332 (KUN)	FJ945921	FJ945967	FJ945814
<i>T. grandiflorum</i> C.Y. Wu & T.L. Ming	Nie & Meng 331 (KUN)	FJ945936	FJ945982	FJ945829
<i>T. griffithii</i> (Hook. f.) Kuntze	Nie & Meng 347 (KUN)	FJ945925	FJ945971	FJ945818
<i>T. hookeri</i> var. <i>microcarpum</i> (C.C. Huang ex T.L. Ming) C.Y. Wu & T.L. Ming	Nie & Meng 396 (KUN)	FJ945935	FJ945981	FJ945828
<i>Toxicodendron oligophyllum</i> S. L. Tang, Liang Ma & S. P. Chen	MA 20190519 (FJFC)	OM801491	OM793718	–
<i>T. pubescens</i> Mill.	Wen 9998 (US)	–	FJ946006	FJ945853
<i>T. radicans</i> (L.) Kuntze subsp. <i>hispidum</i> (Engler) Gillis	Nie & Meng 213 (KUN)	FJ945924	FJ945970	FJ945817
<i>T. radicans</i> subsp. <i>radicans</i> (L.) Kuntze	Nie & Meng 530 (KUN)	FJ945946	FJ945993	FJ945840
<i>T. rydbergii</i> (Small ex Rydb.) Greene	Wen 10495-4 (US)	–	FJ946010	FJ945857
<i>T. striatum</i> (Ruiz & Pavon) Kuntze	Wen 8712 (US)	FJ945948	FJ945996	FJ945843
<i>T. succedaneum</i> (L.) Kuntze	Nie & Meng 334 (KUN)	FJ945923	FJ945969	FJ945816
<i>T. sylvestre</i> (Sieb. & Zucc.) Kuntze	Nie & Meng 383 (KUN)	FJ945938	FJ945984	FJ945831
<i>T. trichocarpum</i> (Miq.) Kuntze	Nie & Meng 388 (KUN)	FJ945927	FJ945973	FJ945820
<i>T. vernicifluum</i> (Stokes) F.A. Barkley	Nie & Meng 229 (KUN)	FJ945939	FJ945985	FJ945832
<i>T. vernix</i> (L.) Kuntze	Wen 7146 (F)	AY541520	AY640471	AY643131
<i>T. wallichii</i> (Hook. f.) Kuntze var. <i>microcarpum</i> T.L. Ming	Nie & Meng 430 (KUN)	FJ945930	FJ945976	FJ945823
<i>T. yunnanensis</i> C.Y. Wu	Nie & Meng 426 (KUN)	FJ945932	FJ945978	FJ945825
<i>T. purpureum</i> S. P. Chen, Xin Y. Chen & Liang Ma	FAFU20210502	OR077122*	OR078424*	OR078423*
外类群 Outgroup				
<i>Actinocheita filicina</i> (D.C.) F.A. Barkley	Panero s. n. (CS)	AY641509	AY640460	AY643120
<i>Lithrea ternifolia</i> (Gillies) F.A. Barkley	Nee & Wen 53849	–	FJ946014	FJ945861
<i>Pistacia chinensis</i> Bunge	Wen 7090 (F)	DQ390466	DQ390470	DQ390462
<i>Pistacia weinmannifolia</i> Poisson	Ji 0174 (KUN)	DQ390469	DQ390473	DQ390465
<i>Rhus choriophylla</i> Wooton & Standl.	Miller 27 (CS)	AY641498	AY640450	AY643110
<i>Rhus sandwicensis</i> A. Gray	Wen 7052 (F)	AY641491	AY640445	AY643105
<i>Rhus typhina</i> L.	Wen 8557 (US)	FJ945920	FJ945966	FJ945813
<i>Searsia dentata</i> (Thunb.) F.A. Barkley	Wen 10090 (US)	FJ945963	FJ946018	FJ945866
<i>Searsia pyroides</i> (Burch.) Moffett	Luke 11693 (US)	FJ945952	FJ946002	FJ945849

*: 本研究获得

*: Obtained in this study

Taining County (泰宁县), Zhukou Town (朱口镇), Xufang Village (许坊村), elevation 340 m, 9 May 2023, B. Chen & Z. W. Zhu CB04558 (CSH).

落叶灌木, 高 0.4~1.8 m; 具白色乳汁, 在空气中暴露会变黑; 茎粗 1~1.6 cm, 具椭圆形突起小皮孔, 小枝紫色或绿白色, 常被白粉, 被微柔毛。奇数羽状复叶互生, 长达 25 cm; 叶柄长 4~8 cm, 基部明显枕状; 小叶 3~5 对, 对生, 纸质, 卵状披针形或披针形, 长 3~6 cm, 宽 2~3 cm, 先端尾尖或渐尖, 基部偏斜, 楔形, 下延, 全缘或 1/3 处以上具粗锯齿, 两面微被毛, 上面绿色, 成长叶背面紫红色, 稀绿色; 侧脉 10~17 对, 两面突起; 小叶柄长 2~5 mm。雌雄异株, 花序聚伞总状, 长 5~8 cm,

约为叶长的 1/3, 无毛, 总梗纤细, 长 4~5 cm, 苞片披针形, 长约 1 mm; 花小, 黄绿色, 径约 2 mm, 花梗无毛, 长约 2.5 mm; 花萼无毛, 裂片 5, 卵形, 先端钝, 长约 0.6 mm; 花瓣长圆形, 先端钝, 长约 2 mm, 开花时外卷; 雄花的雄蕊长 2 mm, 花丝线形, 伸出外卷的花冠外, 花药长圆形, 长约 1 mm, 雌蕊退化仅余扁平痕迹; 雌花的花药狭卵形, 花丝藏于花冠内, 雌蕊比花瓣短, 长约 1.7 mm; 花盘圆形, 无毛, 子房圆形, 径约 1 mm。核果偏斜, 压扁, 先端偏于一侧, 长约 8 mm, 宽 6~7 mm, 外果皮薄, 具光泽, 无毛, 中果皮蜡质, 果核坚硬。花期 4 月—5 月, 果期 6 月—8 月。

Deciduous shrub, 0.4–1.8 m tall; white latex,

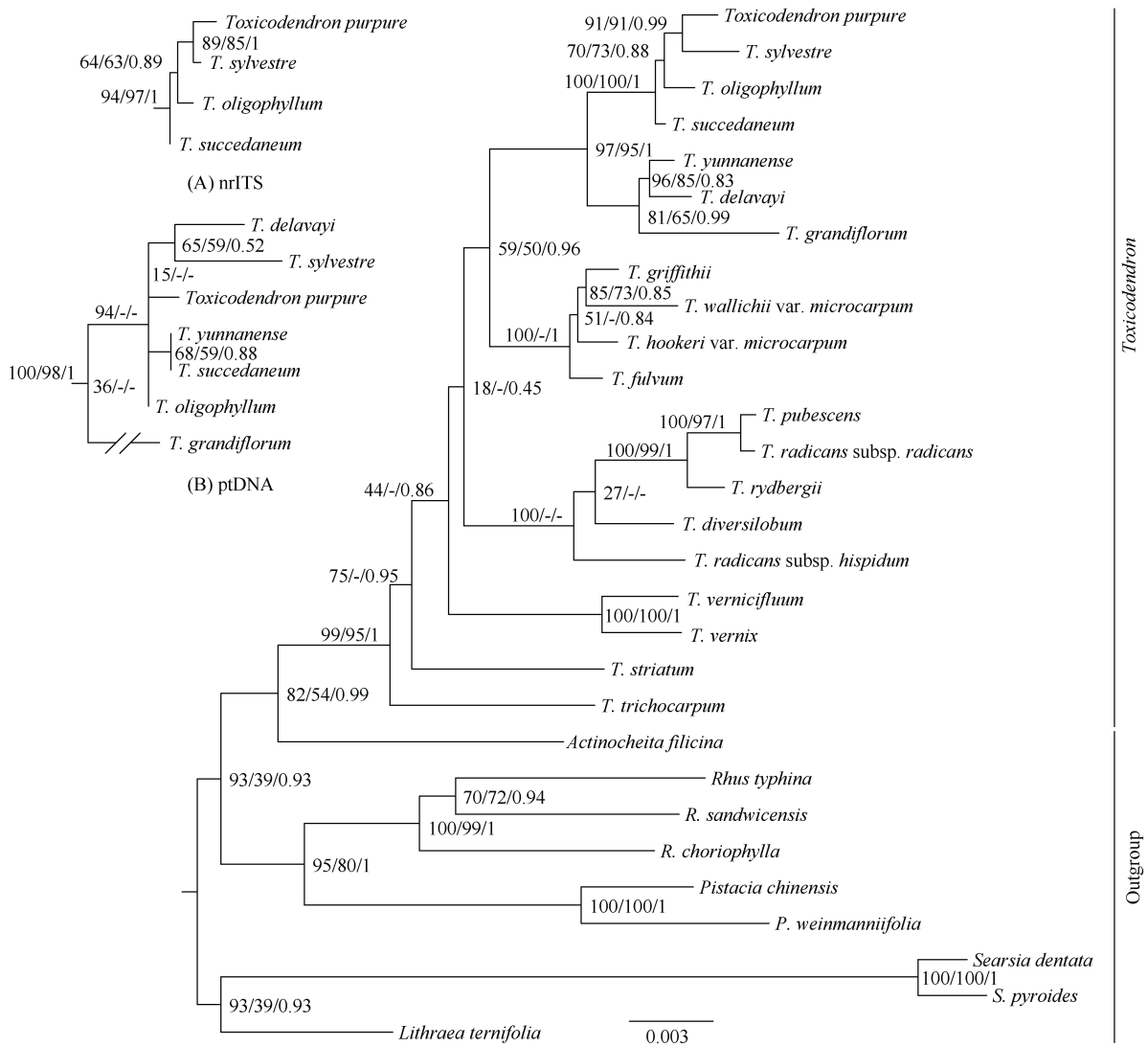


图 1 基于核基因组联合矩阵(ITS+trnL-F+ndhF)构建的最大似然法(ML)、最大简约法(MP)和贝叶斯推断法(BI)系统发育树。A: 核基因 ITS 序列(局部); B: 质体片段联合矩阵(trnL-F+ndhF)(局部); 节点旁数字为自展值和贝叶斯后验概率(BP_{ML}, BP_{MP}, PP); -: MP/ML 和贝叶斯树间的拓扑结构存在不一致。

Fig. 1 Phylogenetic tree obtained by ML, MP and BI analysis of nuclear and plastid combined matrix (ITS+trnL-F+ndhF). A: Separate combined nrITS (part of tree); B: Separate combined plastid (trnL-F+ndhF) (part of tree); the data near the nodes are bootstrap percentages and Bayesian posterior probabilities (BP_{ML}, BP_{MP}, PP); -: Node is inconsistent between the topology of the MP/ML trees and the Bayesian tree.

turning black upon air exposure; stem 1–1.6 cm in diam, with small oval lenticels, branchlets purple or green white, often whitening, puberulous. Leaves blade imparipinnately compound, to 25 cm; petiole 4–8 cm, base obvious occipital shape; leaflets 3–5, opposite, papery, leaflet blade ovate–lanceolate to lanceolate, 3–6 cm×2–3 cm, apex acute or acuminate, base oblique, cuneate, decurrence, margin entire or 1/3 with coarse serrations on top, sparsely pubescent on both surfaces, adaxial green, abaxially purplish red, rare green, lateral veins 10–17 pairs, prominent on both

surfaces; leaflet petiolule 2–5 mm. Inflorescence cymose racemose, 5–8 cm, as long as 1/3 pinnately compound leaf, glabrous, peduncle slender, 4–5 cm; dioecious, bracts lanceolate, ca. 1 mm; flowers small, yellowish green, 2 mm in diam; pedicel glabrous, ca. 2.5 mm; calyx glabrous, lobes ovate, obtuse apically, ca. 0.6 mm; petals oblong, ca. 2 mm, lobes ovate, obtuse apically, ca. 2 mm, roll out during flowering; stamens of male flowers ca. 2 mm; filaments linear, above corolla, anthers oblong, ca. 1 mm, pistil degeneration with only flat marks; anthers of female



图 2 红背漆。A: 植株; B: 茎; C: 叶背; D: 叶; E: 叶柄基部; F: 雄花; G: 雌花; H: 果序。

Fig. 2 *Toxicodendron purpureum* S. P. Chen, Xin Y. Chen & L. Ma. A: Plant; B: Stem; C: Leaf abaxially; D: Leaf; E: Petiole base; F: Male flower; G: Female flower; H: Inflorescence.

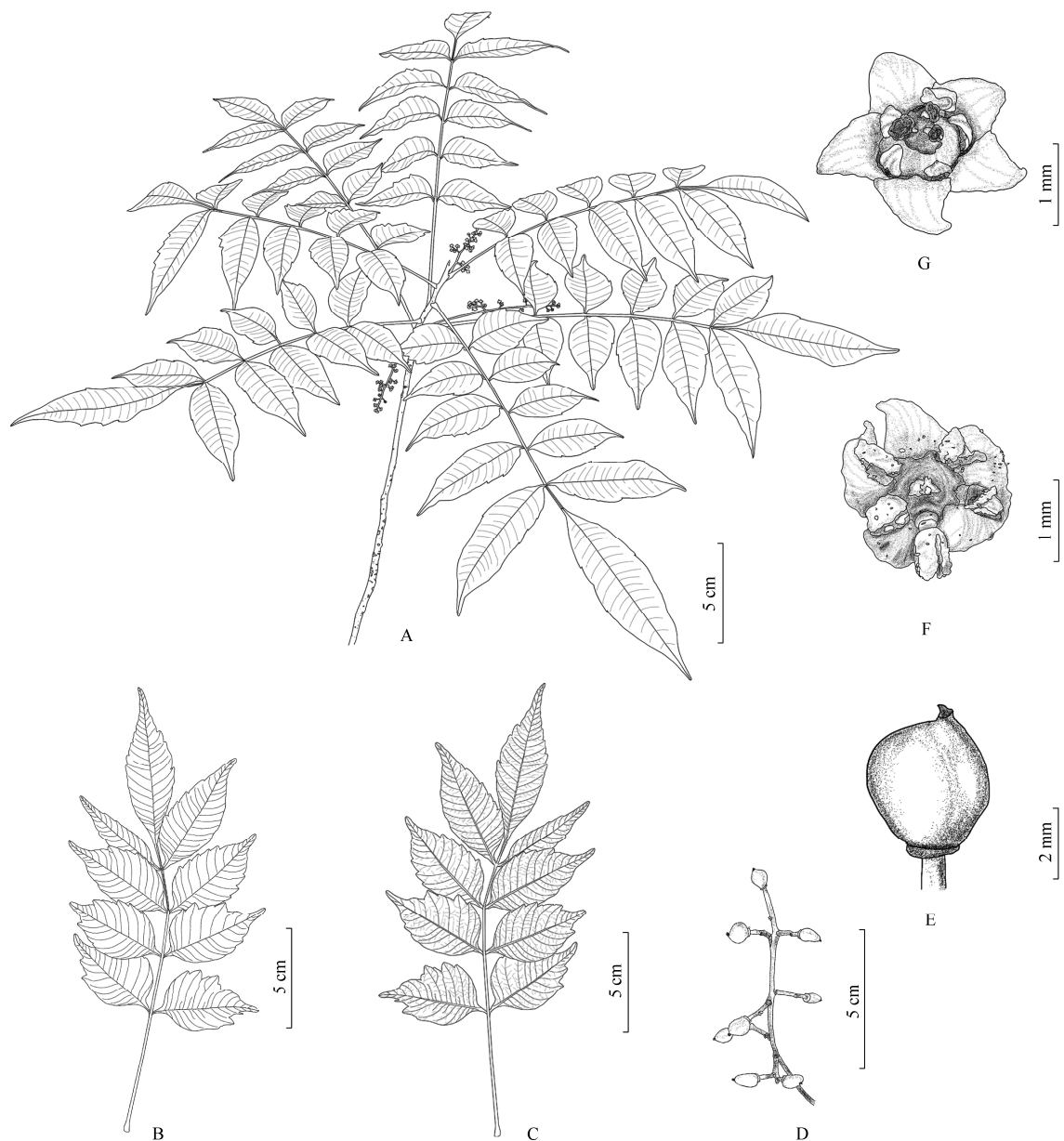


图3 红背漆。A: 植株; B-C: 叶; D: 果序; E: 果实; F: 雄花; G: 雌花。(兰雪静绘图)

Fig. 3 *Toxicodendron purpureum* S. P. Chen, Xin Y. Chen & L. Ma. A: Plant; B-C: Leaf; D: Inflorescence; E: Fruit; F: Male flower; G: Female flower. (Drawn by Lan Xuejing)

flowers narrowly ovate, filaments hidden within corolla, pistil shorter than petals, ca. 1.7 mm; disk glabrous, ovary globose, ca. 1mm in diam. Drupe oblique, compressed, apex eccentric, ca. 8 mm×6–7 mm, glabrous and lucid; epicarp thin, separating; mesocarp thick, waxy. Flowering in April to May and fruiting in June to August.

因该新种小叶叶背常为紫红色，稀绿色，故命名为红背漆(*Toxicodendron purpureum*)。红背漆目前只发现于福建省邵武县将石省级自然保护区和泰

宁县丹霞山地区，生长于丹霞山阔叶林下或山顶灌木丛中，调查区域种群数量大，居群性状稳定。该种均为灌木，调查的十几个居群，尚未发现高度超过 1.8 m，小叶常有粗锯齿，花序不超过叶长的 1/3，花瓣不具暗褐色脉纹，通过这些特征易与福建省广布常见的木蜡树区分开。而近年在福建省发现的少叶漆为乔木状，叶背有白粉，花序与叶等长等特征与该新种相区分。与同为灌木状的小漆树不同之处在于叶长达 25 cm，被微毛，叶背紫红色，稀绿色；花序长不超过叶长 1/3；花瓣不具暗褐色脉纹。更

多照片保存于“自然标本馆”(https://www.cfh.ac.cn/album/ShowSpAlbum.aspx?spid=96041), 可供进一步对照比较。

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