

AUSTRALIAN BIOLOGICAL RESOURCES STUDY, CANBERRA



SPECIES PLANTARUM

FLORA OF THE WORLD

Part 4. SCHISANDRACEAE

by Richard M.K.Saunders



Department of the Environment and Heritage

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CONTRIBUTORS TO THIS PART

Text

Richard M.K. Saunders, Department of Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, China.

Illustrations

Hazel L. Wilks, Department of Ecology & Biodiversity, The University of Hong Kong, Pokfulam Road, Hong Kong, China.

Species Plantarum Steering Committee
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D.E. Boufford, Harvard University Herbaria, Cambridge, Mass., USA
L. Boulos, Dokki, Cairo, Egypt
R.K. Brummitt, Herbarium, Royal Botanic Gardens, Kew, UK
S. Castroviejo, Real Jardín Botánico, CSIC, Madrid, Spain
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T.S. Filgueiras, Reserva Ecológica do IBGE, Brasilia, Brazil
E. Forero, Universidad Nacional de Colombia, Bogota, Colombia
I. Friis, Botanical Museum and Library, Copenhagen, Denmark
A.S. George, Kardinya, WA, Australia
W. Greuter, Botanischer Garten und Botanisches Museum, Berlin, Germany
D.Y. Hong, Chinese Academy of Sciences, Beijing, China
K. Iwatsuki, Yokohama, Japan
B. Jonsell, Bergius Foundation, Stockholm, Sweden
B. Khayota, National Museums of Kenya, Nairobi, Kenya
J. Kirschner, Academy of Sciences, Pruhonice, Czechia
H.P. Linder, University of Cape Town, South Africa
P.-A. Loizeau, Conservatoire et Jardin Botaniques, Genève, Switzerland
J.L. Luteyn, New York Botanic Garden, Bronx, NY, USA
K. Marhold, Slovenskej Akademie Vied, Bratislava, Slovakia
P. Morat, Muséum National d'Histoire Naturelle, Paris, France
N.R. Morin, The Arboretum at Flagstaff, AZ, USA
H. Ohashi, Tohoku University, Sendai, Japan
A.E. Orchard, Australian Biological Resources Study, Canberra, ACT, Australia
R.J. Pankhurst, Royal Botanic Garden, Edinburgh, UK
M. Sanjappa, Botanical Survey of India, Calcutta, India
T. Santisuk, Royal Forest Department, Bangkok, Thailand
Sebsebe Demissew, Addis Ababa University, Addis Ababa, Ethiopia
J.H. Seyani, Commonwealth Secretariat, London/National Herbarium & Botanic Gardens of Malawi, Zomba, Malawi
G.F. Smith, National Botanical Institute, Pretoria, South Africa
W.D. Stevens, Missouri Botanical Garden, Saint Louis, Miss., USA
W.L. Wagner, Smithsonian Institution, Washington, DC, USA
K. Wilson, Royal Botanic Gardens, Sydney, NSW, Australia

INTRODUCTION

Species Plantarum aims to provide in concise format, and with standardised data fields, basic taxonomic information on the vascular plants of the world, including accepted names and synonyms with bibliographic data, types of names, keys and descriptions from family to varietal levels, geographical distributions, ecological information and other related matters, and to publish it in both hard copy and electronic form.

The format of the *Species Plantarum* is based on that of *Flora of Australia*, with some departures made necessary by the different scale of the project. Initially at least, the series is being edited and published for the Species Plantarum Project and IOPI by the Australian Biological Resources Study (ABRS), producers of *Flora of Australia*.

Treatments are contributed on a voluntary basis. Each part of *Species Plantarum* is intended to provide a complete account of a family, subfamily, large genus or other related taxonomic group. While treatments of small families may be shorter, it is intended that contributions will, in general, cover at least 50 to 100 species. The taxonomy adopted is that of the author, although the family delimitations recommended are initially those of R.K.Brummitt, *Vascular Plant Families and Genera* (1992). The order of taxa within families, genera and species in the *Species Plantarum* is intended to reflect natural relationships, so far as this is possible in a linear sequence.

Maps are provided for each species, or in those cases where infraspecific taxa are recognised, for each of the terminal taxa. Distribution maps are based on those in S.Hollis & R.K.Brummitt, *World Geographical Scheme for Recording Plant Distributions* (1992), and the 'countries' adopted are those of Level 3 and 4 of that work. Description of distribution follows the same work, with a two-digit code for regions and a three-letter code for the 'country'. Upper case letters for the 'country' indicate native distribution; lower case letters indicate that the taxon is only present in that 'country' as an introduced and naturalised plant. If a taxon is extinct in a 'country', this is indicated by a dagger. Distribution of species as cultivated plants is not included.

Misapplied and invalid names are, in general, omitted. Journal titles are abbreviated according to G.D.R.Bridson & E.R.Smith, *Botanico-Periodicum-Huntianum / Supplementum* (1991). Book titles are abbreviated according to F.A.Stafleu & R.S.Cowan, *Taxonomic Literature* (2nd edn) Vols 1–7, and *Supplements* (1976–), except that upper case initial letters are used for proper names and significant words. Authors of plant names are abbreviated according to R.K.Brummitt & C.E.Powell, *Authors of Plant Names* (1992).

A separate part, *Introduction to the Series*, provides a history of the project, a glossary, guide for contributors and key to the conventions used in describing distribution. These resources will also be available on the World Wide Web, initially through the ABRS site (currently <http://www.anbg.gov.au/abrs/flora/spplant/spplant.htm>) with links from the IOPI site (currently <http://life.csu.edu.au/iopi/iopihome>) and others.

Editor

Canberra, 2001

SCHISANDRACEAE

Richard M.K.Saunders¹

Schisandraceae Blume, *Fl. Javae* 32–33: 3 (1830), nom. cons., as *Schizandreae*

Type: *Schisandra* Michx.

[Menispermaceae] subfam. *Schisandroideae* Raf., *Anal. Nat.* 175 (1815), as *Schisandra*. T: *Schisandra* Michx.

[Menispermaceae] tribe *Schisandreae* DC., *Prodr.* 1: 104 (1824). T: *Schisandra* Michx.

Fam. *Kadsuraceae* Radogizky, Zhurn. Sadov. 6: 8, 10 (1849), as *Kadzuraceae*. T: *Kadsura* Juss.

¹⁴ See also the discussion of the relationship between the two in J. M. C. Gammie, ‘The Reformation and the English Revolution’, in *Reformation and Revolution*, 10–11.

Woody vines, monoecious or dioecious. Leaves alternate or clustered, exstipulate, petiolate, lamina simple. Flowers generally solitary and axillary to leaves on ultimate branches, or in axils of fugacious bracts near base of ultimate shoots, occasionally in pairs or in clusters of up to 8, unisexual, hypogynous, few to numerous parts generally spirally arranged, pedicellate. Perianth segments free, not as distinct sepals and petals, outermost and innermost sometimes reduced. Androecium very variable, of 4–80 stamens, sometimes of ±free stamens fused only at base of filaments, sometimes as head of fused stamens or free but tightly compressed stamens; anthers essentially basifix; thecae dehiscing by longitudinal slits; filaments at least basally fused into modified column of variable shape. Gynoecium of 12–300 carpels; carpels developmentally conduplicate; stigmatic crest as unvascularised "pseudostyle", sometimes modified as peltate "pseudostigma"; ovary unilocular; ovules 2–5 (–11), anatropous, ventrally attached or pendulous, bitegmic, crassinucellar. Fruit an aggregate of apocarps; receptacle ellipsoidal to elongate; apocarps with fleshy pericarp. Seeds usually 1–5, rarely more, ventrally attached or pendulous, laterally flattened, with copious oily endosperm.

A family of two genera and 39 species; one species indigenous to SE USA and the Sierra Madre of Mexico; all others indigenous to E Asia.

The family Schisandraceae (often incorrectly spelled "Schizandraceae") is most closely related to the Illiciaceae; these two families are generally classified in the order Illiciales. Various opinions have been expressed regarding the phylogenetic affinities of the Illiciales: cladistic analyses of morphological data typically indicate a relationship with the Winteraceae (Donoghue & Doyle, 1989; Loconte & Stevenson, 1991), whereas analyses of *rbcL* and 18S gene sequence data indicate a sister group relationship with the Austrobaileyaceae (Chase *et al.*, 1993; Qiu *et al.*, 1993; Soltis *et al.*, 1997).

A.C.Smith, The families Illiciaceae and Schisandraceae, *Sargentia* 7: 1–224 (1947); R.M.K.Saunders, Monograph of *Kadsura* (Schisandraceae), *Syst. Bot. Monogr.* 54: 1–106 (1998); R.M.K.Saunders, Monograph of *Schisandra* (Schisandraceae), *Syst. Bot. Monogr.* 58: 1–146 (2000).

KEY TO GENERA BASED ON MALE FLOWERS

- 1**: Androecium of free stamens, not compressed into an androecial mass

2: Apex of androecium without staminodes; pollen tricolpate **1. SCHISANDRA**

2: Apex of androecium with variable number of staminodes (occasionally absent); pollen hexacolpate **2. KADSURA**

1: Androecium of either connate or free but highly compressed stamens, forming an androecial mass

3: Androecium composed of connate stamens **1. SCHISANDRA**

3: Androecium composed of free but highly compressed stamens **2. KADSURA**

¹ The University of Hong Kong, Pokfulam Road, Hong Kong, P.R. China

KEY TO GENERA BASED ON FEMALE FLOWERS AND FRUITS

Floral receptacle cylindrical or conical-terete; aggregate fruits composed of apocarps attached to greatly elongated receptacle; apocarps always separate, never appressed

1. SCHISANDRA

Floral receptacle obovoid, subclavate, or ellipsoidal; aggregate fruits composed of apocarps attached to ±ellipsoidal or clavate receptacle; apocarps often closely appressed to form a spherical to ellipsoidal mass

2. KADSURA**1. SCHISANDRA**

Schisandra Michx., *Fl. Bor.-Amer.* 2: 218, t. 47 (1803), *nom. cons.*

Type: *Schisandra glabra* (Brickell) Rehder

Stellandria Brickell, *Med. Repos.* 6(3): 327 (1803). T: *Schisandra glabra* (Brickell) Rehder.

Sphaerostema Blume, *Bijdr. Fl. Ned. Ind.* 22 (1825). T: *Schisandra propinqua* subsp. *axillaris* (Blume) R.M.K.Saunders.

Maximowiczia Rupr., in C.J.Maximowicz, *Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 15: 142 (1856). T: *Schisandra chinensis* (Turcz.) Baill.

Woody vines, dioecious or monoecious, glabrous to partly pubescent or tomentose. Leaves alternate, exstipulate; lamina elliptic to ovate, papery to coriaceous; base acute to obtuse, often attenuate; margins denticulate to entire; apex acute to acuminate. Flowers generally solitary, unisexual, axillary to bracts or leaves. Tepals 5–20, imbricate. Male flowers with androecium of few to numerous (4–60) stamens; stamens ±free or partially or fully fused to form a fleshy synandrium; pollen tri- or hexocolpate, distally syncolpate. Female flowers with gynoecium of numerous (12–120) free carpels; stigmatic crest forming subulate pseudostyle, lacking a pseudostigma; ovary with 2 (or 3) ventrally attached ovules. Fruit an aggregate of apocarps attached to elongated receptacle; apocarps ellipsoidal to obovoid, ripening red (rarely blackish). Seeds (1–) 2 (–3), smooth to rugulose. $x = 7$.

A genus of 23 species; one species indigenous to N America; all other species occur in E Asia, extending from Hokkaido (Japan) and far-eastern Siberia in the NE, to Java and Bali in the S, and to Uttar Pradesh (India) in the W.

KEY TO SUBGENERA AND SECTIONS

- 1 Abaxial leaf lamina variably pubescent or tomentose (at least on primary and secondary veins)
 - 2 Hairs on abaxial leaf lamina restricted to primary and secondary veins; petioles and peduncles (of both flowers and fruits) glabrous
 - 3 Tepals narrow; largest tepal with length:width ratio 1.8–3.6 (–5.3); androecium of (4–) 5 (–7) stamens; apical stamens not connate; thecae extrorse-lateral; peduncles comparatively short: (6–) 11–20 (–28) mm (male), (7–) 25–35 mm (female)
 - Subg. 3. **SCHISANDRA** sect. **1. MAXIMOWICZIA**
 - 3: Tepals broad; largest tepal with length:width ratio 0.9–1.5; androecium of 14–28 stamens; apical stamens connate; thecae introrse-lateral; peduncles comparatively long: 23–52 mm (male), 50–71 mm (female)
 - Subg. 2. **SINOSCHISANDRA**
 - 2: Hairs on abaxial leaf lamina extending across entire surface; petioles and peduncles (of both flowers and fruits) pubescent or tomentose
 - Subg. 2. **SINOSCHISANDRA**
- 1: Abaxial leaf lamina without hairs
 - 4 Flowers sometimes solitary, but often with "secondary" flowers in axil of prophylls, occasionally in clusters; androecium of connate stamens
 - Subg. 3. **SCHISANDRA** sect. **3. SPHAEROSTEMA**

SCHISANDRACEAE (*Schisandra*)

- 4: "Secondary" flowers absent; androecium composed of essentially free stamens (apical stamens occasionally connate)
- 5: Stamens 5, radiating horizontally outwards from broad floral apex (forming pentamerous staminal "shield") Subg. 3. **SCHISANDRA** sect.
2. **SCHISANDRA**
- 5: Stamens (4–) 5–66 (–70), ±spirally arranged around elongate floral axis
- 6: Largest tepals (6–) 7.5–17 (–23) mm long; stamens 22–66 (–70); apical stamens not connate; pollen tricolpate; carpels (35–) 50–120; pseudostyles large and broad Subg. 1. **PLEIOSTEMA**
- 6: Largest tepals (3–) 3.5–10 (–13) mm long; stamens (4–) 5–46; apical stamens sometimes connate; pollen hexacolpate; carpels 14–65; pseudostyles small or narrow
- 7: Branches conspicuously angled or with lateral wings; perules relatively large, (sub) persistent Subg. 2. **SINOSCHISANDRA**
- 7: Branches not conspicuously angled, and without lateral wings; perules small, fugacious
- 8: Tepals narrow; largest tepal with length:width ratio 1.8–3.6 (–5.3); stamens (4–) 5 (–7); apical stamens not connate; thecae extrorse-lateral Subg. 3. **SCHISANDRA** sect.
1. **MAXIMOWICZIA**
- 8: Tepals broad; largest tepal with length:width ratio 0.8–1.8 (–2.1); stamens 7–35 (–40); apical stamens generally connate; thecae introrse-lateral or lateral Subg. 2. **SINOSCHISANDRA**

Subg. 1. Pleiostema

Schisandra subg. *Pleiostema* (A.C.Sm.) Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 246, 272 (1996)

Schisandra sect. *Pleiostema* A.C.Sm., *Sargentia* 7: 93 (1947), p.p. T: *S. grandiflora* (Wall.) Hook.f. & Thomson.

Male flowers with androecium of 22–70 ±free stamens (base of filaments sometimes partially adnate to receptacle), spirally arranged around floral axis; uppermost stamens not connate; thecae extrorse-lateral; pollen tricolpate. Female flowers with gynoecium of (35–) 50–120 free carpels; pseudostyles broad. Seed testa smooth.

A subgenus of four species at lower altitudes in the Himalayas (India, Nepal, Bhutan and Tibet) and central China (Hubei, Sichuan and Yunnan).

- 1 Lamina (3.5–) 4.5–8 (–12.5) cm long, 1.5–3 (–6.5) cm wide; stamens partially adnate with broad floral axis, only apically free with short filaments 4. **S. sphaerandra**
- 1: Lamina (5.5–) 7–11.5 (–15) cm long, (2–) 2.5–5.5 (–7.5) cm wide; stamens free
- 2 Perianth deep (purple-) red 2. **S. rubriflora**
- 2: Perianth cream, white or flesh-pink
- 3 Perianth cream or white, or somewhat pink-tinged; fruiting torus (13–) 16–18 (–25) cm long 1. **S. grandiflora**
- 3: Perianth flesh-pink; fruiting torus 5–7 (–11) cm long 3. **S. incarnata**



Figure 1. *Schisandra grandiflora*. A, flowering branch; B, androecium; C, gynoecium; D, isolated carpel (lateral view); E, fruit (apocarps slightly immature); F, seed (A, J.H.Lace 57, E; B, D.Chatterjee 230, L; C-D, O.Polunin 434, E; E, A.J.C.Grierson & D.G.Long 2555, E; F, D.G.Long et al. 710, E). Scale bars: A, E = 2 cm; B, F = 1 mm; C = 2 mm; D = 500 µm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Syst. Bot. Monogr.* 58, fig. 23 (2000), © The American Society of Plant Taxonomists.

SCHISANDRACEAE (*Schisandra*)

1. *Schisandra grandiflora* (Wall.) Hook.f. & Thomson, in J.D.Hooker, *Fl. Brit. Ind.* 1: 44 (1872), as *Schizandra*

Kadsura grandiflora Wall., *Tent. Fl. Napal.* 10 (1824); *Sphaerostema grandiflorum* (Wall.) Blume, *Fl. Javae* 17 (1830), as *S. grandiflоро*. T: Nepal [Mt Sheopore], 1821, N.Wallich 4985; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 52 (2000); isolecto: C, GH.

Illustrations: G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 69A (1891); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 247, fig. 70 (1996); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 54, fig. 23 (2000).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 55, fig. 24 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (9–) 11–22 (–30) mm long; lamina generally elliptic, (6.5–) 7.5–11 (–13) cm long, (2–) 2.5–4 (–5) cm wide, papery; base acute to attenuate, rarely obtuse; margins denticulate, rarely subentire; teeth (0–) 10–17 (–27) per side of leaf; apex short- to long-acuminate; secondary veins (4–) 5–6 (–8) pairs per leaf, (slightly) arcuate. Flowers solitary, borne in axils of fugacious bracts at the base of young shoots; peduncles (12–) 14–25 (–36) mm long (male), (20–) 35–47 mm long (female). Tepals 6–9, (cream-) white; sometimes pink-tinged; largest tepal (7.6–) 10–15 (–23) mm long, 7.4–15 mm wide. Male flowers with 30–50 stamens. Female flowers with 67–120 carpels; pseudostyles broad. Fruit peduncle 4–7 cm long; torus (13–) 16–18 (–25) cm long, (3.2–) 3.7–4 (–4.7) mm wide; apocarps (4.5–) 5–8.5 (–10.5) mm long, (4–) 4.5–7.5 mm wide, red. Seeds (1 or) 2 per apocarp, discoid to flattened-reniform, (3–) 3.2–3.6 (–4) mm long, 3.6–4 mm wide; testa smooth. n = 7, S.B.Malla *et al.*, in Á.Löve (ed.), *Taxon* 26: 443–452 (1977); P.S.Sandhu & S.K.Mann, in S.S.Bir (ed.), *J. Cytol. Genet.* 23: 219–228 (1988); P.S.Sandhu *et al.*, *Curr. Sci.* 58: 925–926 (1989). n = 14, V.K.Singhal *et al.*, in Á.Löve (ed.), *Taxon* 29: 347–367 (1980); P.S.Sandhu & S.K.Mann, in S.S.Bir (ed.), *J. Cytol. Genet.* 23: 219–228 (1988); P.S.Sandhu *et al.*, *Curr. Sci.* 58: 925–926 (1989). Fig. 1.

Himalayas (India, Nepal, Bhutan and S Tibet). 36. CHT. 40. BHU, IND, NEP. Scandent or climbing in broad-leaved, coniferous or mixed forests; (1800–) 2100–3300 (–4000) m. Flowers Apr.–June; fruits June–Oct. Map 1.

36. TIBET: Chunyima, Rong Chu valley, Pome [Bomi], F.Ludlow, G.Sherriff & H.H.Elliot 13707 (E). **40. EAST HIMALAYA:** Bhutan, SE of Sengor, Namning, A.J.C.Grierson & D.G.Long 2555 (A, E, K). INDIA: Sikkim, Lachen, K.Biswas 6642 (A); Uttar Pradesh, Siwalik and Jaunsar Divisions, Chakrata, B.C.Datta 1 (A); West Bengal, Darjeeling [Darjiling], Tonglo, R.Lepcha 1234 (E); Himachal Pradesh, Simla [Shimla] Distr., Bashahr State, Jahan, R.N.Parker 2799 (A). NEPAL: near Tibrikot, Bangthari, O.Polunin, W.R.Sykes & L.H.J.Williams 2123 (A, E).

The fruits of *S. grandiflora* are eaten locally (Watt, 1889–1896: 487; Arora & Pandey, 1996: 150). *Schisandra grandiflora* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

2. *Schisandra rubriflora* Rehder & E.H.Wilson, in C.S.Sargent, *Pl. Wils.* 1: 412 (1913)

T: China: Western Szechuan [Sichuan], Niu-tou-shan, W of Kuan Hsien [Guan Xian], Pan-lan Shan, 20 June 1908, E.H.Wilson 921b; holo: A.

Illustrations: O.Stapf, *Bot. Mag.* 152: pl. 9146 (1928), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: pl. 1 (2000); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 248, fig. 71, 10–17 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 59, fig. 26 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (10–) 12–26 (–30) mm long; lamina elliptic to obovate-elliptic, (5.5–) 7–11.5 (–15) cm long, 2.5–5.5 (–7.5) cm wide, papery; base acute to attenuate, rarely obtuse; margins denticulate to serrulate, rarely sinuous-serrulate; teeth (5–) 12–17 (–23) per side of leaf; apex (short-) acuminate; secondary veins (4–) 5–7 (–8) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles (10–) 18–32 (–50) mm long (male), 18–32 mm long (female). Tepals 6–9, deep (purple-) red; largest tepal 7.5–15.7 mm long, 7.1–10 (–13.3) mm wide. Male flowers with 34–66 stamens. Female flowers with 50–70 carpels; pseudostyles broad. Fruit peduncle (4–) 5–7 (–8) cm long; torus (6–) 9–12 (–15) cm

long, (1.2–) 2–4 (–5) mm wide; apocarps (4–) 5–8 (–11) mm long, (3–) 4–7 (–9) mm wide, dark (purple-) red. Seeds (1 or) 2 per apocarp, discoid to flattened-reniform, 2.7–3.6 mm long, (3.1–) 3.4–4 (–4.5) mm wide; testa smooth. $n = 14$, J.A.Ratter & C.Milne, *Notes Roy. Bot. Gard. Edinburgh* 35: 143–145 (1976).

NE Assam, N Myanmar [Burma] and China (W Sichuan and N Yunnan). 36. CHC. 40. ASS. 41. MYA. Scandent or climbing in forests, rocky slopes, ravines, etc.; (1500–) 2500–3000 (–3600) m. Flowers May–June; fruits July–Oct. Map 2.

36. CHINA SOUTH-CENTRAL: Sichuan, Nanchuan-hsien [Nanchuan Xian], *W.P.Fang* 831 (A, NY); Sichuan, Omei-hsien [Emei Xian], *W.P.Fang* 2788 (A); Yunnan, Salwin and Irrawady divide, Mt Kenichunpo, *J.F.Rock* 22018 (A, K, NY, UC); Yunnan, Yeh-Chih, Wei-si Hsien [Weixi Xian], *C.W.Wang* 67966 (A); Sichuan, SE of Tachien, Chui-Ting-Shan, Wa-shan, *E.H. Wilson* 921 (A, K). **40. ASSAM:** Delei valley, *F.K.Ward* 8210 (K). **41. MYANMAR:** Adung valley, *F.K.Ward* 9530 (A).

Schisandra rubriflora is used medicinally in China (Song & Xiao, 1982), and is cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

3. *Schisandra incarnata* Stapf, *Bot. Mag.* 152: sub fig. 9146 (1928), as *Schizandra*

T: China. Hupeh [Hubei]: without locality, June 1907, *E.H.Wilson* 2085; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 59 (2000); isolecto: A, K, NY, US.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 248, fig. 71, 1–9 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 59, fig. 26 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (12–) 20–25 (–35) mm long; lamina elliptic to obovate, (7–) 8–11 (–12.5) cm long, (3.5–) 4–5.5 cm wide, papery; base acute to attenuate; margins denticulate to serrulate; teeth 10–19 per side of leaf; apex short-(rarely long-) acuminate; secondary veins (4–) 5 or 6 (–7) pairs per leaf, slightly arcuate. Flowers solitary, borne in axils of fugacious bracts at the base of young shoots; peduncles 16–25 (–35) mm long (both sexes). Tepals 7 or 8, (deep) flesh-pink; largest tepal c. 10–17 mm long, 6–12 mm wide. Male flowers with c. 28 stamens. Female flowers with c. 70 carpels; pseudostyles broad. Fruit peduncle 3.5–5 cm long; torus 5–7 (–11) cm long, 1.4–3.5 mm wide; apocarps 8–10.5 mm long, 5.5–8.5 mm wide, red. Seeds 1 or 2 per apocarp, flattened-reniform, (3–) 3.2–3.7 mm long, (3.5–) 3.7–4.5 (–4.7) mm wide; testa smooth.

China (W Hubei). 36. CHC. Scandent or climbing in thickets and forests; 1600–2300 m. Flowers May–June; fruits Aug.–Sept. Map 3.

36. CHINA SOUTH-CENTRAL: Hubei, Shennongjia Forest Distr., between Qiujiaping and Mt Laojun, *Sino-American Expedition to Western Hubei Province* 645 (UC); Hubei, Wen Tsao Mtn, Hsing-shan Hsien [Xinshan Xian], *E.H.Wilson* 263 (A, E, K, US); Hubei, Fang Hsien [Fang Xian], *E.H.Wilson* 318 (A, K, US).

Schisandra incarnata is used medicinally in China (Song, 1990: 68–80). The fruits are eaten locally (Law, 1996: 250).

4. *Schisandra sphaerandra* Stapf, *Bot. Mag.* 152: sub fig. 9146 (1928), as *Schizandra*

Schisandra sphaerandra f. *typica* A.C.Sm., *Sargentia* 7: 109 (1947), nom. inval. T: China: NW Yunnan, eastern flank of Lichiang [Lijiang] range, May 1910, *G.Forrest* 5663; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 61 (2000); isolecto: E, US.

Schisandra grandiflora var. *cathayensis* C.K.Schneid., *Bot. Gaz.* 63: 522 (1917). T: China: Szechuan [Sichuan], Yalung, Hua-li, 28 May 1914, *C.K.Schneider* 3936; holo: not located.

Schisandra sphaerandra f. *pallida* A.C.Sm., *Sargentia* 7: 109–110 (1947). T: China: Yunnan, between Chien-chu'an plain and the Mekong drainage basin to La-chih-ming, May 1923, *J.F.Rock* 8595; holo: A; iso: NY, UC, US.

[*Schisandra glaucescens* auct. non Diels: *E.H.Wilson, J. Arnold Arbor.* 7: 237 (1926)]

[*Schisandra rubriflora* auct. non Rehder & E.H.Wilson: *E.H.Wilson, J. Arnold Arbor.* 7: 237 (1926)]

[*Schisandra grandiflora* auct. non (Wall.) Hook.f. & Thoms.: *H.R.E.Handel-Mazzetti, Symb. Sin.* 7: 244 (1931) p.p., as *Schizandra*]

SCHISANDRACEAE (*Schisandra*)

Illustrations: A.C.Smith, *Sargentia* 7: 105, fig. 17l–n (1947); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 251, fig. 72, 1–11 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 62, fig. 27 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (6–) 9–20 (–33) mm long; lamina elliptic to obovate-elliptic (rarely ovate-elliptic), (3.5–) 4.5–8 (–12.5) cm long, 1.5–3 (–6.5) cm wide, papery (rarely subcoriaceous); base acute (rarely obtuse in older leaves); margins denticulate to serrulate; teeth (1–) 5–10 (–27) per side of leaf; apex (short-) acuminate; secondary veins (4–) 5–7 (–9) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles 5–24 mm long (male), (6–) 10–25 (–44) mm long (female). Tepals (5–) 6–8 (–9), variably white, yellowish, pink, crimson, dark red or purplish; largest tepal (6–) 7.5–12.5 (–17.4) mm long, (4.3–) 6–11 mm wide. Male flowers with 22–42 (–70) stamens. Female flowers with (35–) 70–100 carpels; pseudostyles generally broad. Fruit peduncle (1.5–) 2.5–5.5 (–6.5) cm long; torus (2.5–) 6.5–10 (–15) cm long, (1.9–) 2.4–3 (–3.6) mm wide; apocarps 6–10.5 (–12) mm long, (4–) 5.5–7.5 (–9) mm wide, ripening scarlet to deep red. Seeds (1 or) 2 per apocarp, flattened-reniform (rarely discoid), (2.9–) 3.2–3.6 (–3.8) mm long, (3.6–) 3.7–4.1 (–4.3) mm wide; testa ±smooth.

China (S Sichuan and N Yunnan). 36. CHC. Scandent or climbing in open scrub and mixed and coniferous forests; (1000–) 2700–3600 (–3800) m. Flowers May–June; fruits (June–) Sept.–Oct. Map 4.

36. CHINA SOUTH-CENTRAL: Sichuan, SW of Muli, on trail to Leirong, Kaushu Shan, *J.F.Rock* 24092 (A, NY, UC); Yunnan, Yangtze watershed, Likiang [Lijiang] Distr., E slopes of Linkiang [Lijiang] Snow Range, *J.F.Rock* 3399 (A, NY, UC); Yunnan, Tonwa Territory, N of Chung-tien, Chung-tien [Zhongdian] Distr., *J.F.Rock* 24699 (A, K, NY UC); Yunnan, above Dali, below Longquan, *Sino-British Expedition to Cangshan* 526 (A, K); Yunnan, Yunnanphu, Wachin, Muli, *T.T.Yü* 14506 (A).

Schisandra sphaerandra is used medicinally in China (Song & Xiao, 1982), and is cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

Subg. 2. *Sinoschisandra*

Schisandra subg. *Sinoschisandra* Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 253, 272 (1996)

Type: *S. henryi* C.B.Clarke

Male flowers with androecium of 7–35 (–40) ±free stamens; uppermost stamens generally partially differentiated, appearing connate, forming a fleshy mass with marginal thecae; thecae of free stamens introrse-lateral or lateral; pollen hexocolpate. Female flowers with gynoecium of 14–65 (–70) carpels; pseudostyles small or narrow and subulate. Seed testa variably smooth, rugulose, or tuberculate.

A subgenus of 13 species; Nepal, India (Bengal, Sikkim, Manipur, Meghalaya), N Myanmar [Burma], N Thailand, N Vietnam, China (Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, Taiwan, Yunnan and Zhejiang) and Indonesia (Java).

- 1 Abaxial surface of lamina variably pubescent or tomentose (at least on primary and secondary veins)
 - 2 Hairs on abaxial surface of lamina restricted to primary and secondary veins; petiole and peduncles (of both flowers and fruits) glabrous
 - 3 Branches conspicuously angled or with narrow lateral wings; perules relatively large, (sub) persistent; abaxial surface of lamina variably glaucous; stamens 18–28; seeds with (very) tuberculate testa **16. *S. longipes***
 - 3: Branches not conspicuously angled and without lateral wings; perules small, fugacious; abaxial surface of lamina not glaucous; stamens 14–19; seeds with smooth or slightly rugulose testa **12. *S. pubinervis***

- 2: Hairs on abaxial surface of lamina extending across entire surface; petiole and peduncles (of both flowers and fruits) pubescent or tomentose
- 4: Abaxial surface of lamina, petiole and peduncles densely tomentose; perianth yellow **10. *S. tomentella***
- 4: Abaxial surface of lamina, petiole and peduncles variably pubescent; perianth cream, yellow, orange or red **11. *S. pubescens***
- 1: Abaxial surface of lamina glabrous
- 5: Branches conspicuously angled or with lateral wings; perules relatively large, (sub) persistent
- 6: Lamina (10–) 12–14.5 (–16.5) cm long, translucent; apocarps c. 9–12 mm long, c. 8.5–13 mm wide; seeds 3.7–4.5 mm long, c. 3.9–4.5 mm wide **17. *S. perulata***
- 6: Lamina (5.5–) 7.5–11.5 (–14) cm long, rarely translucent; apocarps 4.5–8.5 (–9.5) mm long, (3–) 3.5–6.5 (–7.5) mm wide; seeds (2.5–) 2.9–3.6 (–3.8) mm long, (2.9–) 3.2–3.9 (–4.6) mm wide **15. *S. henryi***
- 5: Branches not conspicuously angled, and without lateral wings; perules small, fugacious
- 7: Lamina (3–) 4–7.5 (–10) cm long; petiole (3–) 6–15 (–22) mm long; largest tepal (3–) 3.5–6.5 mm long; carpels 14–24
- 8: Lamina narrow, with length:width ratio (2–) 2.4–3.4 (–3.7); fruiting torus 3–5 (–6.5) cm long **13. *S. lancifolia***
- 8: Lamina broad, with length:width ratio (1–) 1.2–1.9 (–2.5); fruiting torus 1.5–3.5 cm long **14. *S. micrantha***
- 7: Lamina (4–) 5.5–12 (–15) cm long; petiole (7–) 11–27 (–46) mm long; largest tepal (4–) 5–9.5 (–12) mm long; carpels 20–56
- 9: Abaxial surface of lamina conspicuously glaucous **8. *S. glaucescens***
- 9: Abaxial surface of lamina not glaucous
- 10: Secondary veins of lamina strongly arcuate; outermost tepal highly reduced, 0.2–0.4 of length of largest **9. *S. elongata***
- 10: Secondary veins of lamina slightly arcuate; outermost tepal slightly reduced or not reduced, 0.5–1 of length of largest
- 11: Secondary and lower order veins of lamina not raised ab- or adaxially; seed testa ±smooth **6. *S. sphenanthera***
- 11: Secondary and lower order veins of lamina slightly raised abaxially and often adaxially; seed testa smooth or rugulose, rarely tuberculate
- 12: Leaf venation appearing dark after drying; apocarps (3–) 5–7 (–8.5) mm long, (3–) 3.5–5.5 (–7.5) mm wide **5. *S. neglecta***
- 12: Leaf venation appearing pale after drying; apocarps (5–) 7–9.5 (–11) mm long, (3.5–) 5–6.5 (–7) mm wide **7. *S. arisanensis***

5. *Schisandra neglecta* A.C.Sm., *Sargentia* 7: 127–129 (1947)

T: China: Yunnan, E of the Mekong, NE of Yeh-chih, mountains of A-wa-lo, June 1923, *J.F.Rock* 8933; holo: A; iso: UC, US.

?*Schisandra lancifolia* var. *polycarpa* Z.He, *J. SouthW. Agric. Univ.* 10: 294 (1988). T: China: Sichuan, Xide Xian Lake commune, 19 May 1981, *G.H.Tang & J.M.Tan* 11; syn: Herbarium, Sichuan Institute of Chinese Medicine, Chengdu, Sichuan; *idem*, 19 May 1981, *G.H.Tang & J.M.Tan* 12; syn: Herbarium, Sichuan Institute of Chinese Medicine, Chengdu, Sichuan; China: Sichuan, Xichang Xian, Luojishan, 21 Sept. 1981, *J.M.Tan* 22; syn: Herbarium, Sichuan Institute of Chinese Medicine, Chengdu, Sichuan.

[*Sphaerostema elongatum* auct. non Blume: J.D.Hooker. & T.Thomson, *Fl. Ind.* 1: 85 (1855); H.Drury, *Hand Book Ind. Fl.* 1: 648 (1864)]

SCHISANDRACEAE (*Schisandra*)

[*Schisandra elongata* auct. non (Blume) Baill.: Hook.f. & Thoms. in J.D.Hooker, *Fl. Brit. Ind.* 1: 44 (1872), as *Schizandra*; G.King, *Ann Bot. Gard. (Calcutta)* 3: 220 (1891), as *Schizandra*; E.H.Wilson, *J. Arnold Arb.* 7: 238 (1926)]

[*Schisandra propinqua* auct. non (Wall.) Baill.: H.R.E.Handel-Mazzetti, *Symb. Sin.* 7: 245 (1931), as *Schizandra*]

Illustrations: G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 69B (1891), as *Schizandra elongata*; A.C.Smith, *Sargentia* 7: 105, fig. 17g (1947); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 259, fig. 75, 11–20 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 65, fig. 28 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (7–) 11–20 (–30) mm long; lamina elliptic to ovate, (5–) 5.5–9.5 (–11) cm long, (2–) 3–4.5 (–6.5) cm wide, papery (rarely subcoriaceous); base acute (younger leaves) to obtuse (older leaves); margins denticulate to serrulate; teeth (4–) 6–12 (–18) per side of leaf; apex (short-) acuminate; secondary veins 4–7 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles (13–) 20–40 (–49) mm long (male), (21–) 25–65 mm long (female). Tepals 6–9 (–10), white, yellow, orange or pink; largest tepal 5.1–9.1 mm long, 4.5–7.4 mm wide. Male flowers with (12–) 20–35 (–40) stamens. Female flowers with 20–45 carpels; pseudostyles narrow. Fruit peduncle (3.5–) 4.5–6 (–7.5) cm long; torus (2–) 4–8 (–10.5) cm long, (0.8–) 1–2 mm wide; apocarps (3–) 5–7 (–8.5) mm long, (3–) 3.5–5.5 (–7.5) mm wide, red. Seeds 1 or 2 per apocarp, discoid to flattened-reniform, (2.7–) 2.8–3.4 (–3.6) mm long, (3.1–) 3.3–3.9 (–4.2) mm wide; testa ±smooth to rugulose, rarely ±tuberculate.

Nepal, NE India, N Myanmar [Burma] and China (Yunnan). 36. CHC. 40. ASS, EHM, NEP. 41. MYA. Scandent or climbing in thickets or mixed forests, often by streams and in ravines; (1300–) 1700–2900 (–3600) m. Flowers (Apr.–) May–July; fruits July–Nov. Map 5.

36. CHINA SOUTH-CENTRAL: Yunnan, NW Liangjiang [Lijiang], Tamichung, *R.C.Ching* 21484 (A); Yunnan, Muli, on the border of Chungtien [Zhongdian], Ngerya, Lamachang, *K.M.Feng* 2844 (A); Yunnan, hills to the E of Tengyueh [Tengchong], *G.Forrest* 7622 (K, MO); Yunnan, Wei-si Hsien, *C.W.Wang* 63549 (A). **40. INDIA:** East Bengal, *W.Griffith* 77 (C, GH, L); "Khasia", [without date], *J.D.Hooker & J.J.Thomson s.n.* (GH, NY). **EAST HIMALAYA:** Sikkim, Lepcha, Kaliteshingpat, *J.S.Gamble* 1891 (K). **NEPAL:** Arun valley, Hatiar, *J.D.A.Stainton* 432 (A). **41. MYANMAR:** Myitkyina, near Kangfang, *C.W.D.Kermode* 17289 (K); N Adung valley, *F.K.Ward* 9443 (A).

Schisandra neglecta is used medicinally in India (Rao, 1981: 4–9).

6. *Schisandra sphenanthera* Rehder & E.H.Wilson, in C.S.Sargent, *Pl. Wils.* 1: 414–415 (1913)

T: China: W Hupeh [Hubei], Patung Hsien [Badong Xian], May & Sept. 1907, *E.H.Wilson* 313; lecto: A, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 67 (2000); isolecto: E, K, US.

Schisandra chinensis var. *rubriflora* Franch., *Nouv. Arch. Mus. Hist. Nat.*, sér. 2, 8: 192–193 (1885), as *Schizandra*, reprinted in Franch., *Pl. David*. 2: 10 (1888); *Schisandra grandiflora* var. *rubriflora* (Franch.) C.K.Schneid., *Bot. Gaz.* 63: 523 (1917). T: China: Sichuan, Moupin [Mupin/Baoxing], Apr. & Jun 1869, *A.David s.n.*; lecto: P, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 67 (2000).

Schisandra flaccidiramosa C.R.Sun, *Bull. Bot. Res., Harbin* 8: 123–124 (1988). T: China: Gansu, near Daheba Forestry Centre, Dangchang County, 17 May 1973, *Z.X.Peng* 730053; holo: LZU.

Illustrations: J.E.Dandy, *Bot. Mag.* 34: pl. 8921 (1938), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: pl. 2 (2000); C.-R.Sun, *Bull. Bot. Res., Harbin* 8: 125 (1988).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 69, fig. 29 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole 15–27 (–35) mm long; lamina elliptic to ovate, rarely obovate, (4–) 5.5–11 (–13.5) cm long, (2–) 2.5–6 (–8) cm wide, papery; base acute (younger leaves) to obtuse or truncate (older leaves); margins (sinuous-) denticulate to (sinuous-) serrulate, rarely (sub) entire; teeth (0–) 5–11 (–15) per side of leaf; apex short- to long-acuminate; secondary veins (3–) 4–5 (–8) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles (8–) 13–34 (–54) mm long (male), (18–) 40–64 mm long (female). Tepals 5–8 (–9),

variably yellow, orange or red; largest tepal 6–9.5 (–11.3) mm long, (3.3–) 4–6.5 (–8.4) mm wide. Male flowers with (11–) 15–23 (–25) stamens. Female flowers with c. 25–45 carpels; pseudostyles small. Fruit peduncle (2–) 3–6.5 (–10) cm long; torus (2.5–) 4–14 (–22) cm long, (1–) 1.2–2.4 (–3) mm wide; apocarps (5.5–) 6.5–9 mm long, 4–8 mm wide, red. Seeds 1 or 2 per apocarp, discoid to flattened-reniform, (2.6–) 3–3.5 (–3.9) mm long, (3.2–) 3.5–4 (–4.3) mm wide; testa (±) smooth. *n* = 14, T.W.Whitaker, *J. Arnold Arbor.* 14: 376–385 (1933).

C China (Anhui, Gansu, Guizhou, Henan, Hubei, Hunan, Jiangsu, Shaanxi, Shanxi, Sichuan, Yunnan, and Zhejiang). 36. CHC, CHS. Scendent or climbing in forests; (200–) 700–2000 (–5100) m. Flowers (Mar.–) May–June (–July); fruits June–Oct. Map 6.

36. CHINA SOUTH-CENTRAL: Guizhou, Taiping River and along tributary streams, above the confluence with the Heiwan R., Jiangkou Xian, *Sino-American Guizhou Botanical Expedition* 196 (A, NY); Sichuan, between Hai-t'ang and Pin-yi-p'u, *H.Smith* 1964 (A); Hubei, Ichang and immediate neighbourhood, *A.Henry* 3446 (GH, K). **CHINA NORTH-CENTRAL:** Shaanxi, [W] of Da-cheng-hao, Yue-ba-xiang, Fo-ping, *J.S.Ying, K.Y.Lang & Y.F.Li* 242 (MO); Gansu, Wei-zi-gou Forestry Farm, Wu-dou, *J.S.Ying, K.Y.Lang & Y.F.Li* 851 (MO). **CHINA SOUTHEAST:** Henan, Neixiang Xian, Yangchang Gou, Baotianman Nature Reserve, *D.E.Boufford, H.X.Cheng, B.D.Liu, C.Y.Xi, T.S.Ying, C.J.Zhang & X.L.Zhu* 26097 (A); Zhejiang, foot of Feng-yang-shan, Long-quan, *S.Y.Chang* 4696 (MO); Jiangsu, Hai Wei, *R.C.Ching & C.L.Tso* 498 (A); Anhui, Chien Shan Hsien, Tien Chu Shan, *C.S.Fan & Y.Y.Li* 220 (A); Hunan, Hsikwangshchan Hsinhwa, *H.Handel-Mazzetti* 784 [11933] (A, C).

Schisandra sphenanthera is used medicinally in China (Song & Xiao, 1982; Song, 1988: 3–6), and the fruits are eaten locally and used in the preparation of wine and vinegar (Reis Altschul, 1973: 72; Yuan & Chao, 1996). Oils extracted from the fruits and seeds have also been used in the manufacture of soap and lubricants (Wang, 1980: 802). *Schisandra sphenanthera* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

7. *Schisandra arisanensis* Hayata, *Icon. Pl. Formosan.* 5: 1–2 (1915)

T: China: Formosa [Taiwan], between Funkiko and Taroyen, Mt Arisan, Apr. 1914, *B.Hayata* s.n.; lecto: TI, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 70 (2000); isolecto: TI.

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (10–) 13–27 (–34) mm long; lamina elliptic to ovate, (5–) 6.5–10.5 (–12.5) cm long, (2.5–) 3–5.5 (–7) cm wide, papery to subcoriaceous; base acute (younger leaves) to obtuse (older leaves), often slightly attenuate; margins (sinuous-) denticulate to (sinuous-) serrulate; teeth (2–) 4–10 (–14) per side of leaf; apex (long-) acuminate; secondary veins 4–6 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles (18–) 22–37 (–45) mm long (male), c. 35–40 mm long (female). Tepals (5–) 6–8 (–13), (white-) yellow, orange or red; largest tepal (3.9–) 5–9.7 (–12) mm long, (3.6–) 4.6–7.3 (–8.3) mm wide. Male flowers with (8–) 12–23 (–30) stamens. Female flowers with c. 22–56 carpels; pseudostyles short, narrow. Fruit peduncle (4–) 4.5–7 (–8) cm long; torus (3.5–) 5–10.5 (–15.5) cm long, (1–) 1.3–2.1 (–2.5) mm wide; apocarps (5–) 7–9.5 (–11) mm long, (3.5–) 5–6.5 (–7.5) mm wide, red. Seeds 1 or 2 per apocarp, discoid to flattened-reniform, rarely flattened-pyriform, 3–3.8 (–4) mm long, (3.2–) 3.5–4.2 mm wide; testa ±smooth to rugulose, rarely slightly tuberculate.

China. There are two subspecies.

Female flowers with c. 40–56 carpels

7a. subsp. *arisanensis*

Female flowers with c. 22–29 carpels

7b. subsp. *viridis*

SCHISANDRACEAE (*Schisandra*)

7a. *Schisandra arisanensis* Hayata subsp. *arisenensis*

Illustrations: B.Hayata, *Icon. Pl. Formosan.* 5: pl. 1 (1915); H.-L.Li, *Fl. Taiwan* 2: 402, pl. 351 (1976); H.-L.Li & S.M.Chaw, *Fl. Taiwan* 2nd edn 2: 426, pl. 197 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 72, fig. 30 (2000).

Tepals reddish-orange to yellow; outermost tepal 7.7–11.5 mm long, 5–8 mm wide, outermost tepal not reduced, 0.9–1.2 of length of largest tepal. Female flowers with gynoecium of c. 40–56 carpels. Seeds 3–3.4 mm long, 3.5–3.9 mm wide.

Taiwan. 38. TAI. Scandent or climbing in wet, deciduous forests, often on hillsides; 1600–2300 m; Flowers Apr.–May; fruits Aug.–Sept. Map 7.

38. TAIWAN: Arisan, Aridan, *J.L.Gressitt* 190 (A, K, L); Hsinchu Hsien, Wufeng Hsiang, Sheipa Natl Park, from Tapachienshan hiking entrance to a low ridge, *C.L.Huang, W.H.Hu & Y.Y.Lien* 72 (A); Hsinchu Hsien, Wufeng Hsiang, Sheipa Natl Park, Kuanwu, *C.L.Huang, W.H.Hu & Y.Y.Lien* 125 (MO); Yaoyuan, Mt Lalashan, *M.T.Kao* 10243 (A); Taichung, May-fong, *Ou & Kao* 9322 (MO); Hsinchu Hsien, Chienshih Hsiang, Yuanyanghu, mileage sign 13–17 km on Forest Road No. 100, *C.C.Wang & D.S.Hsu* 1335 (E, MO); Taoyuang Hsiang, Kaosiung Hsien, mileage sign 133–134 km on Provincial Road No. 20, *C.C.Wang, C.C.Liao & D.S.Hsu* 1060 (A).

Schisandra arisanensis subsp. *arisenensis* is used medicinally in China, and the fruits are eaten locally (Liu, 1960: 83).

7b. *Schisandra arisanensis* Hayata subsp. *viridis* (A.C.Sm.) R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 72–73 (2000)

Schisandra viridis A.C.Sm., *Sargentia* 7: 129–131 (1947). T: China: Kwangtung [Guangdong], Ho-yuen district, Ts'ung-shue, Nam Shan, 5–30 May 1938, *W.T.Tsang* 28783; holo: A; iso: P.

[*Schisandra sphenanthera* auct. non Rehder & E.H.Wilson: A.Rehder & E.H.Wilson, *J. Arnold Arbor.* 8: 110 (1927); E.D.Merrill & W.Y.Chun, *Sunyatsenia* 1: 57 (1930), as *Schizandra*; W.-C.Cheng, *Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot.* 9: 283 (1934)]

Illustrations: Y.-W.Law, *Sylva Sin.* 533, fig. 186 (1983); W.F.Huang, *Fl. Guangdong* 1: 25, fig. 25 (1987).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 72, fig. 30 (2000).

Tepals (white-) yellow, rarely red; outermost tepal 2.2–6.4 mm long, (1.2–) 2.6–3.6 (–5.7) mm wide, slightly or not reduced, 0.5–1 (–1.1) of length of largest tepal. Female flowers with gynoecium of c. 22–29 carpels. Seeds (3–) 3.2–3.8 (–4) mm long, (3.2–) 3.5–4.2 mm wide.

S and E China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hunan and Jiangxi). 36. CHC, CHS. Scandent or climbing in shrublands and forests, often on wet, poor soil on hillsides and in valleys; (150–) 240–1300 m. Flowers Apr.–June; fruits June–Sept. Map 8.

36. CHINA SOUTH-CENTRAL: Guizhou, Tsingchen, Wong-Kwan-Chou, *S.W.Teng* 90255 (A). CHINA SOUTHEAST: Zhejiang, 40 miles [c. 64 km] S of Siachu, Chen Chiong, *R.C.Ching* 1781 (A, K, UC); Central Fukien [Fujian], near Buong Kang, *S.T.Dunn* 2442 (A, HK, K); Anhui, Chien Shan Hsien, Tien Chu Shan, *C.S.Fan & Y.Y.Li* 221 (A); Jiangxi, Xing-zhou, Jing-gang-shan, *Jinggang Shan Team* 661226 (MO); Hunan, Ma-yang Co., Shan-shan, Xi-huang, *S.C.Lee* 203566 (MO); Guangdong, Wu-hua Co., Long-si-dian, Long-cun Gong-she, *S.Y.Li* 180617 (HKU, MO); Guangxi, Ling Yun Hsien, Chiu Fong, *A.N.Steward & H.C.Cheo* 213 (A, NY).

Schisandra arisanensis subsp. *viridis* is used medicinally in China (South China Institute of Botany, 1982: 62). The fruits are eaten locally (Zhang, 1991: 112).

8. *Schisandra glaucescens* Diels, *Bot. Jahrb. Syst.* 29: 323 (1900), as *Schizandra*

T: China: Setchuen [Sichuan], Nanch'uan [Nanchuan Xian], Chinfu-shan [Jinfu Shan], Lechia-p'ing, 29 July 1891, *C.Bock & A.von Rosthorn* 131 [2656]; holo: O.

[*Schisandra elongata* auct. non (Blume) Baill.: L.Diels, *Bot. Jahrb. Syst.* 29:322 (1900); A.E.Finet & F.Gagnepain, *Bull. Soc. Bot. France* 52, *Mém.* 4: 49 (1905), reprinted as *Contr. Fl. As. Or.* 2: 49 (1907)]

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: fig. 31 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petioles (9–) 12–22 (–26) mm long;

lamina elliptic to obovate, 6–8 (–9) cm long, 2.5–4 (–5) cm wide, papery, rarely subcoriaceous; abaxial surface conspicuously glaucous; base acute (–attenuate) in younger leaves, obtuse (–attenuate) in older leaves; margins (sinuous-) denticulate to serrulate; teeth (4–) 6–12 (–13) per side of leaf; apex short-acuminate; secondary veins 4 or 5 (–8) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles 24–33 mm long (male), c. 37–40 mm long (female). Tepals 6–8, white to yellow; largest tepal 6.5–9.7 mm long, 4–7.7 mm wide. Male flowers with 18–24 stamens. Female flowers with c. 42–50 carpels, pseudostyles small. Fruit peduncle 4.5–6 (–7) cm long; torus 3–12 cm long, 2–3 (–4.3) mm wide; apocarps (5–) 6–9 (–11) mm long, 4–6 (–8.5) mm wide, red. Seeds 1 or 2 (–3) per apocarp, flattened-reniform, (2.6–) 2.9–3.7 mm long, (3–) 3.3–4.1 (–4.3) mm wide; testa (±) smooth.

China (W Hubei and E Sichuan). 36. CHC. Scandent or climbing in thickets and woodlands; 1500–2600 m. Flowers May–June; fruits July–Oct. Map 9.

36. CHINA SOUTH-CENTRAL: Sichuan, Fengjie, Hanrui, *M.Y.Fang* 24594 (IBSC); Sichuan, Nanchuan-hsien, *W.P.Fang* 855 (A); Sichuan, Nanchuan, Jingfushan, *J.H.Xiong & Z.L.Zhou* 91079 (IBSC); Hubei, Gran-gia-gwan, *W.Y.Chun* 3820 (A); Hubei, Enshi, Hexi, Leibohan, *Y.J.Ma* 287 (IBSC); Hubei, Wufeng, Xiangdangping, *Y.J.Ma* 375 (IBSC); Hubei, Fang Hsien, *E.H.Wilson* 164a (A); Hubei, Patung [Badong], Changyang, *E.H.Wilson* 883 (A, K, NY).

Schisandra glaucescens is used medicinally in China (Song & Xiao, 1982; Song, 1988: 3–6), and the fruits are eaten locally (Smith, 1947; Yuan & Chao, 1996). *Schisandra glaucescens* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

9. *Schisandra elongata* (Blume) Baill., *Hist. Pl.* 1: 148 (1868)

Sphaerostema elongatum Blume, *Bijdr. Fl. Ned. Ind.* 23 (1825), as *Sphaerostemma*. T: Java. "in altis montis Burangrang Provinciae Krawang", [without date], *C.L.Blume s.n.*; lecto: L, *fide* R.M.K.Saunders, *Fl. Males. I.* 13: 206 (1997); isolecto: K.

Illustrations: C.L.Blume, *Fl. Javae [Schizandreae]*, fig. 5 (1830), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: pl. 3 (2000); C.G.G.J.van Steenis, *Endeavour* 21: pl. 4.6 (1962), reproduced in C.G.G.J.van Steenis, *Mountain Fl. Java* pl. 2.10 (1972).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 77, fig. 32 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (13–) 16–25 (–46) mm long; lamina ovate, occasionally elliptic, (7–) 9–12 (–15) cm long, (3.5–) 4.5–7 (–8.5) cm wide, (thin) papery; base obtuse to truncate (acute in younger leaves), often short-decurrent; margins denticulate, occasionally entire; teeth 0–11 (–15) per side of leaf; apex acuminate; secondary veins (3–) 4 or 5 pairs per leaf, conspicuously arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles 24–38 (–42) mm long (male), (30–) 58–65 mm long (female). Tepals 8–10, yellow (outermost greenish and highly reduced); largest tepal 7–8.2 mm long, 4.6–10 mm wide. Male flowers with c. 27–30 stamens. Female flowers with 20–45 carpels; pseudostyles narrow. Fruit peduncle 4–6.5 cm long; torus 3–7.5 cm long, 1.3–1.8 (–2) mm wide; apocarps 7–8.5 mm long, 4.5–6.5 mm wide, red. Seeds 2 per apocarp, discoid, 2.6–3.3 mm long, 2.8–3.3 mm wide; testa rugulose.

Java. 42. JAW. Scandent or climbing in submontane to montane humid forests; 1000–2000 m. Flowers Apr.–Oct.; fruits Jan.–July. Map 10.

42. JAWA: G. Lembaeng, *C.A.Backer* 12291 (L); Sarangan, G. Lawae, Madive, *J.D.Dorgelo* 137 (L); Tjibodas [Cibodas], *J.G.Hallier* 750 (L, NY); Kamodjan, *C.Holstvoogd* 611 (L); G. Boender, Batavia [Jakarta], *C.G.G.J. van Steenis* 4032 (L); G. Papandajan (borem Tjissoeraepan), Res. Priangau, *C.G.G.J. van Steenis* 4050 (L); beneden Bergtuin Tjibodas [Cibodas], Rarahan, Buitenzorg [Bogor], *C.G.G.J. van Steenis* 12272 (L).

10. *Schisandra tomentella* A.C.Sm., *Sargentia* 7: 119–120 (1947)

T: China: Szechuan [Sichuan], Ma-pien Hsien, 23 May 1930, *W.P.Fang* 408; holo: A; iso: E, K, NY, US.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 257, fig. 74, 1–8 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 75, fig. 31 (2000).

SCHISANDRACEAE (*Schisandra*)

Plant partly tomentose. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (10–) 18–27 mm long, tomentose; lamina elliptic to obovate-elliptic, (6–) 7–10 (–10.5) cm long, 4–5 (–6) cm wide, papery, abaxially densely tomentose; base acute-attenuate (younger leaves) to obtuse-attenuate (older leaves); margins denticulate; teeth (5–) 8–15 per side of leaf; apex short- to long-acuminate; secondary veins (4–) 5 (–7) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles 24–43 mm long (male), c. 20–45 mm long (female), tomentose. Tepals 5–7, yellow; outermost tepals tomentose abaxially; largest tepal 5.4–10 mm long, 4.4–6.5 mm wide. Male flowers with 16–22 stamens. Female flowers with 45–70 carpels; pseudostyles small. Fruit peduncle c. 5.5 cm long, tomentose; torus c. 4.5 cm long, c. 2.8–3.2 mm wide; apocarps c. 3–4 mm long, c. 4–5 mm wide, red. Seeds 2 per apocarp, discoid, 2.7–3.1 mm long, 3.2–3.5 mm wide; testa smooth.

China (S Sichuan). 36. CHC. Scendent or climbing in thickets and woodlands on mountain slopes; 1300–2200 m. Flowers May (based on limited data); fruits Aug. (based on limited data). Map 11.

36. CHINA SOUTH-CENTRAL: Sichuan, Ma-pien Hsien, *F.T.Wang* 22845 (A); Sichuan, Ma-pien Hsien, *F.T.Wang* 23052 (A); Sichuan, Qinghexiang Co., Leibo, *Q.-S.Zhao* 1341 (NY).

11. *Schisandra pubescens* Hemsl. & E.H.Wilson, *Kew Bull.* 1906: 150 (1906), as *Schizandra*

Schisandra pubescens var. *typica* A.C.Sm., *Sargentia* 7: 118–119 (1947), nom. inval. T: China: Hupeh [Hubei], Changyang, Patung [Badong], June 1907, *E.H.Wilson* 2234; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 78 (2000); isolecto: A, E, NY.

Schisandra vestita Pax & K.Hoffm., in F.Pax, *Repert. Spec. Nov. Regni Veg. Beih.* 12: 381 (1922), as *Schizandra*. T: China: Szetschwan [Sichuan], Yatschou fu, Tal des Ya ho bei Ming kan schan, 9 June 1914, *W.Limpricht* 1572; holo: WRSL; fragment of holo: A.

Illustrations: C.Y.Cheng, in W.-P.Fang, *Icon. Pl. Omeiensium* 1(2): pl. 72 (1944); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 257, fig. 74, 9–19 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 80, fig. 33 (2000).

Plant partly pubescent. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petioles (15–) 22–35 (–43) mm long, pubescent; lamina elliptic to ovate, (7–) 8–11 (–11.5) cm long, (3.5–) 4.5–7.5 (–8.5) cm wide, papery, abaxially sparsely pubescent; base obtuse to truncate; margins denticulate; teeth (8–) 9–13 (–19) per side of leaf; apex short- to long-acuminate; secondary veins (4–) 5 or 6 (–8) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles 20–30 mm long (male), 18–62 mm long (female), pubescent. Tepals 7 or 8, cream, yellow, orange or red; outermost tepals pubescent abaxially; largest tepal 6.9–10 mm long, 6.6–10 mm wide. Male flowers with 14–24 stamens. Female flowers with 40–62 carpels; pseudostyles narrow. Fruit peduncle 4–6 cm long, pubescent; torus 5–11 cm long, (1.6–) 1.8–3.2 (–3.4) mm wide; apocarps 4.5–8 mm long, (3–) 3.5–6 (–7) mm wide, red. Seeds 2 per apocarp, discoid to flattened-reniform, 2.5–3.1 mm long, 2.9–3.4 mm wide; testa smooth.

China (Hubei and Sichuan). 36. CHC. Scendent or climbing in thickets; 1000–1900 (–2400) m. Flowers May–July; fruits June–Sept. Map 12.

36. CHINA SOUTH-CENTRAL: Hubei–Sichuan border, Metasequoia Area, *W.C.Cheng* & *C.T.Hwa* 823 (A, UC); Sichuan, Nanchuan-hsien, *W.P.Fang* 1395 (A, NY); Sichuan, Omei-hsien [Emei Xian], *W.P.Fang* 2632 (A, NY); Sichuan, Ngo-pi-hsien, *W.P.Fang* 7362 (A, IBSC); Sichuan, Nanchuan, Jingfushan, Tiewashi temple, *J.H.Xiong* & *Z.L.Zhou* 91648 (IBSC); Sichuan, Nanchuan, Xiaohe, Shancaicun, *J.H.Xiong* & *Z.L.Zhou* 92143 (IBSC); Sichuan, Mt Omei [Emei Shan], Laizipo, *G.H.Yang* 55026 (IBSC); Sichuan, O-pien Hsien, *T.T.Yü* 844 (A); Hubei, Patung [Badong] Distr., Ichang, *A.Henry* 1785 (K); Hubei, Wu-meitze, Patung [Badong] Hsien, *E.H.Wilson* 158 (A).

Schisandra pubescens is used medicinally in China (Song & Xiao, 1982).

12. *Schisandra pubinervis* (Rehder & E.H.Wilson) R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 81–82 (2000)

Schisandra sphenanthera var. *pubinervis* Rehder & E.H.Wilson, in C.S.Sargent, *Pl. Wils.* 1: 415 (1913); *Schisandra pubescens* var. *pubinervis* (Rehder & E.H.Wilson) A.C.Sm., *Sargentia* 7: 119 (1947). T: China: W Szech'uan [W Sichuan], near Monkong Ting, 19 June 1908, E.H.Wilson 2551; holo: A; iso: E, K, US.

Illustration: C.Y.Cheng, in W.-P.Fang, *Icon. Pl. Omeiensium* 1(2): pl. 71 (1944), as *Schizandra sphenanthera* var. *pubinervis*.

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 80, fig. 33 (2000).

Plant partly pubescent (leaf veins only). Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (10–) 15–30 (–40) mm long; lamina elliptic to ovate, (5–) 6.5–11 (–13.5) cm long, (3–) 3.5–6 (–7) cm wide, papery, abaxially glabrous except for pubescent primary and secondary veins; base acute (younger leaves) to obtuse or truncate (older leaves); margin (sinuous-) denticulate to serrulate; teeth (5–) 6–10 (–13) per side of leaf; apex short- to long-acuminate; secondary veins (3–) 4 or –5 (–6) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles 28–52 mm long (male), 50–60 mm long (female). Tepals 7–10, yellow; largest tepal 6.7–9.8 mm long, 6.4–8.8 mm wide. Male flowers with 14–19 stamens. Female flowers with 36–50 carpels; pseudostyles narrow. Fruit peduncle (4.5–) 6–7.5 (–10) cm long; torus (2–) 4–10 (–15.5) cm long, 1.3–2.1 (–3) mm wide; apocarps 4–5 (–6) mm long, 3–4 (–5) mm wide, red. Seeds (1 or) 2 per apocarp, variably flattened-reniform, discoid or rarely flattened-pyriform, 2.4–3 (–3.6) mm long, (2.6–) 2.8–3.3 (–4) mm wide; testa smooth to slightly rugulose.

China (Hubei and Sichuan). 36. CHC. Scendent or climbing in thickets and forests; 1000–2000 (–2600) m. Flowers June–July; fruits July–Aug. Map 13.

36. CHINA SOUTH-CENTRAL: Sichuan, Kuan-hsien [Guan Xian], *W.P.Fang* 2171 (A, NY); Sichuan, Hung-ya-hsien, *W.P.Fang* 8330 (K); Sichuan, Chiu-lao-tung, Mt Omei [Emei Shan], *S.C.Sun & K.Chang* 236 (A); Sichuan, Sikang, Tianshuan, Erlangshan, *H.L.Tsiang & Hsiung* 34331 (IBSC); Sichuan, Mt Omei [Emei Shan], *T.H.Tu* 153 (IBSC); Sichuan, Chiu-lao-tung, Mt Omei [Emei Shan], *L.Y.T.Tui* 118 (A); Sichuan, Mt Omei [Emei Shan], *F.T.Wang* 23281 (A, IBSC); Sichuan, Leibo Co., Xining, *Q.-S.Zhao* 1065 (A, NY); Hubei, vicinity of Shui-sa-pa, *J.L.Gressitt* 2444 (A); Hubei, Hsing Shan, *A.Henry* 6447 (A, K).

13. *Schisandra lancifolia* (Rehder & E.H.Wilson) A.C.Sm., *Sargentia* 7: 133–135 (1947)

Schisandra sphenanthera var. *lancifolia* Rehder & E.H.Wilson, in C.S.Sargent, *Pl. Wils.* 1: 415–416 (1913). T: China: Szech'uan [Sichuan], Mupin, June 1908, E.H.Wilson 2552; holo: A; iso: K, US.

[*Schisandra sphenanthera* auct. non Rehder & E.H.Wilson: E.H.Wilson, *J. Arnold Arbor.* 7: 237 (1926)]

Illustrations: A.C.Smith, *Sargentia* 7: 105, fig. 17a–c (1947); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 263, fig. 76, 10–17 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 83, fig. 34 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (3–) 6–12 (–14.5) mm long; lamina elliptic to ovate, (3.5–) 4.5–7.5 (–10) cm long, 1.5–3 (–4) cm wide, papery; base acute (younger leaves) to obtuse (older leaves); margins denticulate to serrulate; teeth (4–) 5–9 (–17) per side of leaf; apex acute to (short-) acuminate; secondary veins 4–6 (–7) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles (9–) 12–31 (–36) mm long (male), (24–) 30–40 (–56) mm long (female). Tepals 6–8, white, yellow, orange, red or pink; largest tepal 3.7–5.2 (–6.1) mm long, (3–) 3.4–4.7 (–5.1) mm wide. Male flowers with 8–19 stamens. Female flowers with 14–24 carpels; pseudostyles narrow. Fruit peduncle 3–4.5 (–5.5) cm long; torus 3–5 (–6.5) cm long, (0.6–) 0.8–1.2 (–1.6) mm wide; apocarps (4.5–) 6.5–9.5 mm long, (4–) 4.5–7 mm wide, red. Seeds (1 or) 2 per apocarp, (discoid-) flattened-reniform, 2.9–3.3 mm long, 3.2–3.6 mm wide; testa ±smooth to slightly rugulose.

China (Sichuan and Yunnan). 36. CHC. Scendent or climbing in thickets and woods, often on steep slopes and in ravines; 1350–2900 m. Flowers Apr.–July; fruits Oct.–Nov. Map 14.

SCHISANDRACEAE (*Schisandra*)

36. CHINA SOUTH-CENTRAL: Yunnan, Chien-chuan-Mekong divide, *G.Forrest* 21524 (A); Yunnan, Mt Mung Hua, Long Yu, *McLaren's collector L106A* (C, K, UC); Yunnan, Yangtze watershed, Prefectural Distr. of Likiang [Lijiang], eastern slopes of Likiang [Lijiang] Snow Ra., *J.F.Rock* 4299 (A, NY, UC); Yunnan, SE of the Yangtze bend at Shiku, Mt Lauchunshan, *J.F.Rock* 9602 (A, NY, UC); Yunnan, SW of the Yangtze bend at Shiku, Mt Lauchunshan, *J.F.Rock* 9603 (A, UC); Yunnan, Li-kiang Hsien [Lijiang Xian], *C.W.Wang* 71297 (A); Sichuan, Tachien lu [Kangding], *E.H.Wilson* 1268 (A); Sichuan, Mian-ning Hsien, *T.T.Yü* 1771 (A); Yunnan, Juei-she Hsien, *T.T.Yü* 1047 (A); Sichuan, Ta-tsien-lou [Kangding], *J.A.Soulié* 453 (K).

Schisandra lancifolia is used medicinally in China (Song & Xiao, 1982). The fruits are eaten locally (Yuan & Chao, 1996).

14. Schisandra micrantha A.C.Sm., *Sargentia* 7: 135–136 (1947)

T: China: Yunnan, P'ing-pien Hsien, 17 May 1934, *H.T.Tsai* 55161; holo: A.

Schisandra elongata var. *dentata* Finet & Gagnep., *Bull. Soc. Bot. France* 52: 49 (1905), as *Schizandra*, reprinted in *Contr. Fl. As. Or.* 2: 49 (1907). T: China: Yunnan, "environs de Yunnan-sen", 9 June 1899, *F.Ducloux* 5854; lecto: P, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 84 (2000).

Schisandra gracilis A.C.Sm., *Sargentia* 7: 132–133 (1947). T: Myanmar [Burma]: Magok, Katha Distr., Sagaing, May 1934, *F.G.Dickason* 5016; holo: A.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 263, fig. 76, 1–9 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 83, fig. 34 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (5.5–) 7.5–15 (–22) mm long; lamina elliptic to ovate, (3–) 4–6.5 (–7.5) cm long, 2.5–4 (–6) cm wide, thinly papery to subcoriaceous; base acute (younger leaves) to obtuse or truncate (older leaves); margins (sinuous-) denticulate to (sinuous-) serrulate; apex acute or (short-) acuminate; secondary veins (3–) 4 or 5 (–7) pairs per leaf, (slightly) arcuate; teeth (3–) 4–10 (–12) per side of leaf. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles (12–) 15–31 (–38) mm long (male), (14–) 22–48 (–61) mm long (female). Tepals 5–9, yellow, sometimes tinged pink or orange; largest tepal (2.8–) 3.5–6.6 mm long, 3.1–6 (–6.5) mm wide. Male flowers with 7–14 stamens. Female flowers with 14–22 carpels; pseudostyles narrow. Fruit peduncle 3–5.5 cm long; torus 1.5–3.5 cm long, 0.7–1.4 mm wide; apocarps 4.5–7.5 mm long, 3.5–7 mm wide, red. Seeds 1 or 2 per apocarp, discoid to flattened-reniform, 2.9–3.5 mm long, 3.5–4 mm wide; testa slightly tuberculate.

N India (Manipur), N Myanmar [Burma] and S China (Yunnan). 36. CHC. 40. ASS. 41. MYA. Scandent or climbing on slopes and in ravines, often near streams; 1200–2900 m. Flowers May–July; fruits Aug. (based on limited data). Map 15.

36. CHINA SOUTH-CENTRAL: Yunnan, environs de Yunnan-sen, *F.Ducloux* 2588 (P); Yunnan, environs de Tou-dza, *F.Ducloux* 2764 (P); Yunnan, environs de Lawngy-tsin, *F.Ducloux* 2765 (P); Yunnan, Mengtse, *A.Henry* 11211 (A, K, NY); Yunnan, La-Kou, *E.E.Maire* 33 (A); Yunnan, Tché-hay, *E.E.Maire* 177 (A); Yunnan, Ping-pien Hsien, *H.T.Tsai* 60136 (A); Yunnan, Cheng-kiang, Huang-t'u-p'u, *H.Wang* 41426 (A). **40.** ASSAM: Manipur, Sirhoi, *F.K.Ward* 17680 (A, NY). **41.** MYANMAR: Lashi Co., Naung-chaung valley, Htawgaw, *F.K.Ward* 1594 (E).

Schisandra micrantha is used medicinally in China (Song & Xiao, 1982).

15. Schisandra henryi C.B.Clarke, *Gard. Chron.*, ser. 3 38: 162 (1905), as *Schizandra*, reprinted in *Repert. Spec. Nov. Regni Veg.* 4: 172. (1907)

T: China: Yunnan, Meng-tzu, SE mountains, [without date], *A.Henry* 9193B; lecto: K, *fide* A.C.Smith, *Sargentia* 7: 112 (1947); isolecto: A.

Schisandra elongata var. *longissima* Dunn, *J. Linn. Soc., Bot.* 38: 354 (1908), as *Schizandra*. T: China, Yunnan, SE mountains, Meng-tzu, *A.Henry* 9193B; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 86 (2000); isolecto: A.

Plant glabrous throughout. Lateral branches narrowly or conspicuously winged, with variably persistent perules at base; branches continuing growth in subsequent years. Leaves: petiole (12–) 17–38 (–62) mm long; lamina elliptic to ovate, (5.5–) 7.5–11.5 (–14) cm long, (3–) 4.5–7.5 (–9) cm wide, thinly papery, rarely subcoriaceous; abaxial surface variably

glaucous; base acute (-attenuate) (younger leaves) to obtuse (-attenuate) or truncate (older leaves); margins (sinuous-) denticulate to serrulate, rarely (sub) entire; teeth (0–) 4–11 (–16) per side of leaf; apex (short-) acuminate, rarely long-acuminate; secondary veins 4–6 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of (semi-) persistent perules at the base of young shoots or in axils of leaves; peduncles (17–) 21–49 (–62) mm long (male), 32–47 mm long (female). Tepals 6–10, yellow or orange; inner tepals often red; largest tepal (5.4–) 6.8–10 (–12.8) mm long, (3.6–) 5.5–9.5 (–12.7) mm wide. Male flowers with 12–46 stamens. Female flowers with 28–65 carpels; pseudostyles narrow. Fruit peduncle (3.5–) 6–10 (–14.5) cm long; torus (1.5–) 3.5–10.5 (–11) cm long, (1–) 1.3–2.4 (–3.6) mm wide; apocarps 4.5–8.5 (–9.5) mm long, (3–) 3.5–6.5 (–7.5) mm wide, red. Seeds 1 or 2 per apocarp, discoid to flattened-reniform, rarely flattened-pyriform, (2.5–) 2.9–3.6 (–3.8) mm long, (2.9–) 3.2–3.9 (–4.6) mm wide; testa variably rugulose to very tuberculate.

China. There are three subspecies.

Schisandra henryi is used medicinally in China (Song & Xiao, 1982; Song, 1988), and the fruits are eaten locally (Clarke, 1905; Reis Altschul, 1973: 72). *Schisandra henryi* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

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| <p>1 Lamina not glaucescent on abaxial surface; perianth orange, or yellow and red; male flowers with 8–10 tepals</p> <p>1: Lamina variably glaucescent on abaxial surface; perianth yellow, without red pigmentation; male flowers with 6 or 7 (–8) tepals</p> <p>2 Young branches conspicuously winged; stamens 23–46; seed testa generally rugulose, rarely tuberculate</p> <p>2: Young branches angled or narrowly winged; stamens 12–19; seed testa rugulose to tuberculate</p> | <p>15b. subsp. <i>yunnanensis</i></p> <p>15a. subsp. <i>henryi</i></p> <p>15c. subsp. <i>marginalis</i></p> |
|--|--|

15a. *Schisandra henryi* C.B.Clarke subsp. *henryi*

Schisandra henryi var. *typica* A.C.Sm., *Sargentia* 7: 114 (1947), nom. inval. *Schisandra elongata* var. *longissima* Dunn, *J. Linn. Soc., Bot.* 38: 354 (1908), as *Schizandra*. T: China: Yunnan, Meng-tzu, SE mountains, [without date], A.Henry 9193B; lecto: K, *fide* A.C.Smith, *Sargentia* 7: 112 (1947); isolecto: A.

Schisandra hypoglauca H.Lév., *Repert. Spec. Nov. Regni Veg.* 9: 459 (1911), as *Schizandra*. T: China: Kouy-Tchéou [Guizhou], 7 May 1904, J.Esquiroz 58; holo: E; iso: A, K.

Illustrations: C.Y.Cheng, in W.-P.Fang, *Icon. Pl. Omeiensium* 1(2): pl. 70 (1944); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 254, fig. 73, 1–12 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 89, fig. 35 (2000).

Young branches conspicuously winged, with large perules, persistent (at least until fruiting stage). Leaf lamina variably glaucescent on abaxial surface. Male flowers with 6 or 7 (–8) tepals; perianth yellow; stamens 23–46. Seed testa generally rugulose, rarely tuberculate.

C China (Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Sichuan and Yunnan). 36. CHC, CHS. Scendent or climbing in thickets and mixed and evergreen forests; (450–) 750–2100 m. Flowers Apr.–Aug.; fruits Aug.–Oct. Map 16.

36. CHINA SOUTH-CENTRAL: Sichuan, Dujiangyan Municipality [Guan Xian], Lingyan Mtn, *D.E.Boufford, B.Bartholomew, G.Li & G.H.Zhu* 24074 (A, NY); Sichuan, Mt Omei [Emei Shan], *H.-C.Chow* 12010 (A); Yunnan, Megze [Mengzi], A.Henry 9193 (A, K); Hubei, Xianen, Maoba, *H.J.Li* 2432 (IBSC); Guizhou, in valley above Zhangjiba on the W side of the Fanjing Shan mountain range, Huguoishi, Yinjiang Xian, *Sino-American Guizhou Botanical Expedition* 1406 (A, NY, MO); Guizhou, Liang Feng Yah, *A.N.Steward, C.Y.Chiao & H.C.Cheo* 132 (A, NY). **CHINA SOUTHEAST:** Guangxi, N Hin Yen, Tsin Hung Shan, *R.C.Ching* 6994 (A, NY, UC); Jiangxi, Wu Gong Shan, *X.M.Gao* 1682 (MO); Hunan, Changning Hsien, Yang-Shan, *C.S.Fan & Y.Y.Li* 280 (A, L); Henan, Ji-gong-keng, Qing-qi-dong, Ru-yuan Co., *X.G.Liu* 28955 (MO).

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15b. *Schisandra henryi* C.B.Clarke subsp. *yunnanensis* (A.C.Sm.) R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 89–90 (2000)

Schisandra henryi var. *yunnanensis* A.C.Sm., *Sargentia* 7: 116 (1947). T: China: S Yunnan, mountains E of Szemao [Simao], 30 May [year unknown], A.Henry 12022; holo: A; iso: NY, US.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 254, fig. 73, 13–29 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 89, fig. 35 (2000).

Young branches angled or narrowly winged, with medium-sized perules, variably persistent. Leaf lamina not glaucous. Male flowers with 8–10 tepals; perianth yellow (outer tepals) and red (inner tepals), or orange; stamens 24–34. Seed testa rugulose to tuberculate.

SW China (Yunnan). 36. CHC. Scandent or climbing in thickets or woods, generally in ravines and by streams; 1100–1800 (–2300) m. Flowers May–June; fruits July–Oct. Map 17.

36. CHINA SOUTH-CENTRAL: Yunnan, Szemao [Simao], A.Henry 12022B (A, K, NY); Yunnan, Kien-shuei Hsien [P'ing-pien Hsien], H.T.Tsai 53321, 55101, 60658, 61106 (all A); Yunnan, Lan-Tsang Hsien, C.W.Wang 76756 (A); Yunnan, Shunning, T.T.Yü 16093 (A); Yunnan, Wenpishan, Mienning, T.T.Yü 17763 (A); Yunnan, Poshang, Mienning, T.T.Yü 18069 (A).

15c. *Schisandra henryi* C.B.Clarke subsp. *marginalis* (A.C.Sm.) R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 90 (2000)

Schisandra henryi var. *marginalis* A.C.Sm., *Sargentia* 7: 115 (1947). T: China: Chekiang [Zhejiang], 50 li [c. 80 km] north of Hsien-chü (Siachu), 22–25 May 1924, R.C.Ching 1606; holo: A; iso: E, UC, US.

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 89, fig. 35 (2000).

Young branches angled or narrowly winged, with medium-sized perules, variably persistent. Leaf lamina variably glaucous on abaxial surface. Male flowers with 6 or 7 tepals; perianth yellow; stamens 12–19. Seed testa rugulose to tuberculate.

S and E China (Fujian, Guangdong, Guangxi, Guizhou, Hunan and Zhejiang). 36. CHS. Scandent or climbing in sparse woodland or shrubland; 650–1500 (–1800) m. Flowers Apr.–May; fruits July–Oct. Map 18.

36. CHINA SOUTHEAST: Guangxi, near border with Guizhou, In-Tung, Miu Shan, N Luchen, R.C.Ching 6236 (A, UC); Zhejiang, Chang-hua, Lin-an, P.L.Chiu 493 (MO); Guangxi, Yu-Long, Jiu-wan-shan, Chi-dong-xiang, San-fang-qu, Da-miao-shan, S.H.Chun 14631 (MO); Fujian, Mang-dang-shan, Nan-ping, G.S.He 6270 (MO); Hunan, Hengshan [Nanyue Mtn], Q.Lin 974 (HKU); Guangdong, Lian-nan Co., Long-gui-zhai, Ban-gou, Bai-mang-xiang, P.X.Tan 58965 (IBSC, MO); Hunan, Zhi-jiang Co., Wu-lang-qi, P.X.Tan 62490 (MO); Guangdong, Xin-yi Co., Da-yin-ding, Z.M.Wu 218 (MO); Hunan, Nan-yue City to Ma-ji-si, Heng-shan, H.D.Zhang 3172 (MO); Zhejiang, Feng Yang Mtn, H.Y.Zou 433 (A).

16. *Schisandra longipes* (Merr. & Chun) R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 90–92 (2000)

Schisandra sphenanthera var. *longipes* Merr. & Chun, *Sunyatsenia* 2: 5–6 (1934); *Schisandra henryi* var. *longipes* (Merr. & Chun) A.C.Sm., *Sargentia* 7: 115–116 (1947). T: China: Kwangtung [Guangdong], Lochang/Lo-ch'ang, 14 Apr. 1930, C.L.Tso 20530; lecto: NY, fide R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 90 (2000); isolecto: NY.

Illustration: W.F.Huang, *Fl. Guangdong* 1: 26, fig. 26 (1987).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 91, fig. 36 (2000).

Plant partly pubescent (leaf veins only). Lateral branches conspicuously angled or narrowly winged, with variably persistent perules at base; branches continuing growth in subsequent years. Leaves: petiole (19–) 24–41 (–59) mm long; lamina elliptic to ovate, (7.5–) 8–11.5 (–13) cm long, (3.5–) 4.5–6.5 (–7.5) cm wide, papery, rarely thinly papery or subcoriaceous; abaxial surface glabrous except for pubescent primary and secondary veins, glaucous; base acute (in younger leaves) to obtuse or truncate (in older leaves); margins (sinuous-) denticulate; teeth 7–11 (–13) per side of leaf; apex acuminate; secondary veins (4–) 5 or 6 (–7) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of (semi-) persistent perules at the base of young shoots or in axils of leaves; peduncles glabrous, 23–48 mm long (male),

54–71 mm long (female). Tepals 6–8, pale yellow; largest tepal 7.6–10.8 mm long, 6–10.4 mm wide. Male flowers with 18–28 stamens. Female flowers with 36–55 carpels; pseudostyles elongated, narrow. Fruit peduncle 7.5–13.5 cm long; torus 7.5–10.5 cm long, 1.5–1.8 mm wide; apocarps 2.5–6 mm long, 2.5–4.5 mm wide, red. Seeds 1 or 2 per apocarp, (discoid) flattened-reniform, 3.1–3.5 mm long, 3.4–3.9 mm wide; testa very tuberculate.

S China (N Guangdong and N Guangxi). 36. CHS. Scendent or climbing in dense or sparse woodland, often near streams; 500–1400 m. Flowers Apr.–May; fruits July–Aug. Map 19.

36. CHINA SOUTHEAST: Guangdong, Lian-yang Co., Cheng-su-chang-qiao, Ling-bei Gong-she, *Y.Q.Chen* 170354 (MO); Guangdong, Jiu-zhao, Le-chang, *S.H.Chun* 3142 (HKU, IBSC, MO); Guangxi, Yao-ren-chong, Da-di-xiang, Long-sheng, *Guang Fu Forest Team* 231 (MO); Guangdong, Ruyuan, Dalingjiao, *S.P.Ko* 53043 (IBSC); Guangdong, Ru-wen Co., Ban-feng-shan, Luo-yang-xiang, *Y.G.Liu* 596 (MO); Guangxi, Longshen, Dadi, *H.F.Qing & Z.T.Li* 70010 (IBSC); Guangdong, Yang-shan Co., San-cha-song, Jia-heng, Le-yu-chang, Cheng-jia, *P.X.Tang & X.X.Huang* 354 (IBSC, MO); Guangdong, Lechang Co., Lok Chong, *C.L.Tso* 20679 (HK, NY); Guangdong, Le-chang Co., Jiu-feng, Hong-qi-gong-she, *S.Z.Wu* 70033 (MO); Guangdong, Ruyuan, Wuzhishan, *Yue-71 Expedition* 543 (IBSC).

17. *Schisandra perulata* Gagnep., in H.Humbert, *Fl. Gén. Indo-Chine (Suppl.)* 1(1): 55 (1938)

T: Vietnam: Tonkin, Lo Lui Ho, near Cha Pa, Aug. 1933, *A.Pételet* 4788; lecto: P, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 92 (2000); isolecto: P, NY.

[*Schisandra grandiflora* auct. non Hook.f. & Thoms.: E.D.Merrill, *J. Arnold Arbor.* 19: 28 (1938)]

Illustration: F.Gagnepain, in H.Humbert, *Fl. Gén. Indo-Chine (Suppl.)* 1(1): 53, fig. 6, 3–4 (1938).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 91, fig. 36 (2000).

Plant glabrous throughout. Lateral branches conspicuously winged, with (semi-) persistent perules at base; branches with extensive growth in subsequent years, resulting in long internodes. Leaves: petiole 16–40 mm long; lamina elliptic to ovate, (10–) 12–14.5 (–16.5) cm long, (4.5–) 6.5–8.5 (–10) cm wide, thinly papery; base acute (younger leaves) to obtuse (older leaves); margin (sub) entire to denticulate or serrulate; teeth 0–12 per side of leaf; apex (short-) acuminate; secondary veins 4–6 (–7) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncle 26–66 (–88) mm long (male). Tepals 7 or 8, yellow or red; largest tepal c. 8.4 mm long, c. 5.3 mm wide. Male flowers with 22–30 stamens. Female flowers not seen. Fruit peduncle c. 12–14 cm long; torus c. 12–14 cm long, c. 2.8–3.4 mm wide; apocarps c. 9–12 mm long, c. 8.5–13 mm wide, red. Seeds 1–3 per apocarp, discoid, c. 3.7–4.5 mm long, 3.9–4.5 mm wide; testa rugulose.

N Thailand and N Vietnam. 41. THA, VIE. Scendent or climbing in evergreen forest; 1400–1500 m. Fruits Aug. (based on limited data). Map 20.

41. THAILAND: Chiang Mai Prov., Jawa Tong Distr., Mae Soi Subdistr., Mae Soi ridge, *J.F.Maxwell* 92-211 (E, GH); near Doi Chang, Nae Hong Son, Pai, *T.Santisuk* 1108 (A). VIETNAM: Chapa, Apr. 1925, *A.Pételet* s.n. (A, P).

Subg. 3. *Schisandra*

Schisandra subg. *Schisandra*

Type: *S. glabra* (Brickell) Rehder

Male flowers with androecium of (4–) 5–18 stamens, with some degree of fusion, either restricted to base of filaments, or of entire stamens; thecae lateral; pollen hexocolpate. Female flowers with gynoecium of 12–75 carpels; pseudostyles narrow and subulate, or slightly broadened. Seed testa rugulose or tuberculate.

Six species; China (Guangxi, Hebei, Hunan, Nei Mongol [Inner Mongolia], Jilin, Liaoning, Shanxi, Yunnan and Zhejiang), Japan, Korea, Russia (Amurskaya Oblast', Khabarovskiy Kray, Primorskiy Kray and Sakhalinskaya Oblast'), USA (Alabama, Arkansas, Florida,

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Georgia, Louisiana, Mississippi, North Carolina, South Carolina and Tennessee) and Mexico (Sierra Madre).

For key to Sections, see p. 2

Sect. 1. Maximowiczia

Schisandra sect. *Maximowiczia* (Rupr.) Nakai, *Fl. Sylv. Koreana* 20: 101 (1933), as *Schizandra*.

Maximowiczia Rupr., in C.J.Maximowicz, *Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 15: 142 (1856); *Schisandra* subg. *Maximowiczia* (Rupr.) Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 250–252, 272 (1996). T: *S. chinensis* (Turcz.) Baill.

Male flowers with androecium of (4–) 5 (–7) stamens, apparently free, although base of filaments probably ±connate; thecae extrorse-lateral; pollen hexocolpate. Female flowers with gynoecium of 14–40 carpels; pseudostyles variably narrow and subulate to slightly broadened. Seed testa smooth.

One species; NE China (Hebei, Jilin, Liaoning, Nei Mongol [Inner Mongolia] and Shanxi), Korea, Russia (Amurskaya Oblast', Khabarovskiy Kray, Primorskiy Kray and Sakhalinskaya Oblast'), and Japan (Hokkaido and Honshu).

18. *Schisandra chinensis* (Turcz.) Baill., *Hist. Pl.* 1: 148 (1868), as *Schizandra*

Kadsura chinensis Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 7: 149 (1837); *Maximowiczia chinensis* (Turcz.) Rupr. ex Maxim., *Mém. Acad. Imp. Sci. Saint-Pétersbourg* 9: 31–32 (1859); *Schisandra chinensis* var. *typica* Nakai, *Fl. Sylv. Koreana* 20: 105 (1933), nom. inval., as *Schizandra*. T: China: [precise locality not known], P.Y.Kirolov s.n.; holo: KW.

Sphaerostema japonicum Sieb. & Zucc., *Abh. Bayer. Akad. Wiss., Math.-Naturwiss. Kl.* 4: 188 (1845), nom. nud.

Maximowiczia amurensis Rupr., in C.J.Maximowicz, *Bull. Cl. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 15: 124 (1856), reprinted in *Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Pétersbourg* 2: 412 (1856). T: Russia: Am mittleren und südlichen Amur, C.J.Maximowicz s.n.; holo: K; iso: GH, NY.

Sphaerostema japonicum A.Gray, *Mem. Amer. Acad. Arts*, n.s. 6: 380 (1859). T: Japan: Oshima, Hakodate, June 1855, C.Wright s.n.; holo: GH; iso: K, L, NY.

?*Maximowiczia sinensis* W.Robinson, *Garden* 6: 583 (1874). T: Russia: Amur, M.O.Putz s.n.; n.v.

Schisandra chinensis var. *glabrata* Nakai ex Mori, *Enum. Pl. Corea* 166 (1922), as *Schizandra*, nom. nud. Based on: Korea: Heihoku, Mt Hakuhekizan, T.Ishidoya s.n.; n.v.

Schisandra chinensis var. *leucocarpa* P.H.Huang & L.H.Zhou, in L.H.Zhou et al., *Bull. Bot. Res., Harbin* 14: 35–36 (1994). T: China: Heilongjiang, Jiu-lian Forest, Tieli Forestry Bureau, 10 Aug. 1993, P.-H.Huang 93150; n.v.

Illustrations: Y.-W.Law, *Sylva Sin.* 535, fig. 187 (1983); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 251, fig. 72, 12–20 (1996); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 96, fig. 37 (2000), Y.Sakata et al. (eds), *Wild Fl. Jap. Woody Pl.* 1: pl. 129, 4–7 (1989).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 97, fig. 38 (2000).

Plant partly pubescent (leaf veins only). Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (9–) 11–23 (–40) mm long; lamina elliptic to obovate (4.5–) 5.5–8 (–10.5) cm long, (2.5–) 3.5–5 (–6.5) cm wide, thinly papery, glabrous or rarely sparsely pubescent on primary and secondary veins adaxially; base acute to attenuate (occasionally obtuse in older leaves); margins denticulate to (sinuous-) serrulate; teeth (5–) 6–10 (–16) per side of leaf; apex short-acuminate; secondary veins (3–) 4–6 (–7) pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles glabrous, (6–) 11–20 (–28) mm long (male), (7–) 25–35 mm long (female). Tepals (5–) 6–9, white to yellow; largest tepal 6.5–10.1 (–11.1) mm long, 2.1–4.8 mm wide. Male flowers with (4–) 5 (–7) stamens. Female flowers with 14–40 carpels; pseudostyles variably narrow to slightly broadened. Fruit peduncle 2–4.5 (–7.5) cm long; torus (1.5–) 2–6 (–9.5) cm long, 0.7–1.2 (–1.7) mm wide; apocarps 5–7.5 mm long, 4–5 (–6) mm wide, pinkish red. Seeds 1 or 2 per apocarp, flattened-

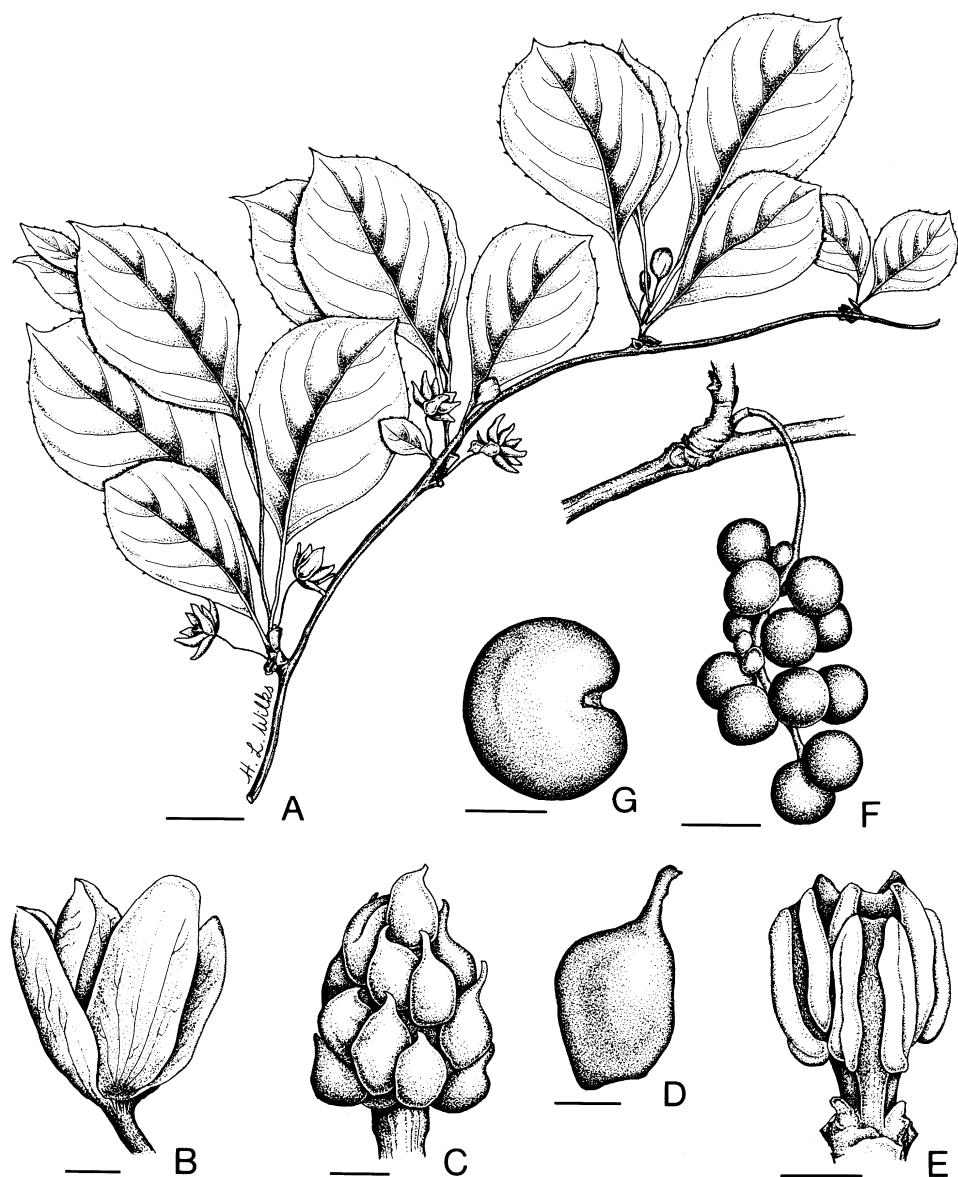


Figure 2. *Schisandra chinensis*. **A**, flowering branch; **B**, flower; **C**, gynoecium; **D**, isolated carpel (lateral view); **E**, androecium; **F**, fruit; **G**, seed (**A**, **E**, H.Takahashi 4079, C; **B**, H.Takahashi 1181, C; **C–D**, N.Palczewsky 3617, C; **F**, H.Takahashi & O.Asahara 3716, C; **G**, J.Ohwi & K.Okamoto 1782, C). Scale bars: **A** = 2 cm; **B**, **G** = 2 mm; **C**, **E** = 1 mm; **D** = 500 µm; **F** = 1 cm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Syst. Bot. Monogr.* 58, fig. 37 (2000), © The American Society of Plant Taxonomists.

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reniform, rarely round, (2.9–) 3.2–3.8 (–4) mm long, (3.6–) 4.4–4.8 (–5) mm wide; testa smooth. $2n = 28$, C.D.Darlington & A.P.Wylie, *Chrom. Atlas Fl. Pl.* 14 (1955); N.S.Probatova *et al.*, *Bot. Zhurn. SSSR* 74: 1675–1678 (1989); R.-Y.Chen *et al.*, *Chrom. Atlas Chin. Princ. Econ. Pl.* 1: 319–320 (1993); X.Li *et al.*, *J. Wuhan Bot. Res.* 11: 289–292 (1993). Fig. 2.

NE China (Hebei, Heilongjiang, Jilin, Liaoning, Nei Mongol [Inner Mongolia] and Shanxi), Korea, E Russia (Amurskaya Oblast', Khabarovskiy Kray, Primorskiy Kray and Sakhalinskaya Oblast') and N Japan (Hokkaido, central and N Honshu). 31. KHA, PRM, SAK. 36. CHI, CHM, CHN. 38. JAP, KOR. Scandent or climbing in wet-temperate, deciduous, coniferous or mixed forests; 100–1800 m. Flowers May–July; fruits Aug.–Sept. Map 21.

31. KHABAROVSK: Amur R., c. 200 km NE of Khabarovsk, Slavyanka, *T.S. Elias & D. Murray* 11050 (NY). PRIMORYE: near Vladivostok, *N.Palczewsky* 3617 (A, C, MO, NY). SAKHALIN: Korsakof, *U.Faurie* 497 (A, P). **36.** NEI MONGOL [INNER MONGOLIA]: Da-qing-shan, Hu-he-hao, *Q.R.Wu* 78 (MO). MANCHURIA: Jilin, Changbaishan, *B.B.Wan & K.S.Chow* 81027 (MO, NY). CHINA NORTH-CENTRAL: Shanxi, Lin-shih Hsien, Mien-shan, *T.Tang* 972 (A); Beijing Municipality, Men Tou Gou Qu, Xiao Long Men, *Z.T.Wang et al.* 213 (MO, NY). **38.** JAPAN: Hokkaido, Atsukeshi-gun, Hamanaka-cho, Kiritappu, *K.Deguchi* 6454 (A, NY); Honshu, Kai Prov., Misaka Pass, *E.H.Wilson* 6924 (A, K). KOREA: Keiki, near Suigen, Ha-zan, *E.H.Wilson* 8479 (A).

Schisandra chinensis is widely used for medicinal purposes (Saunders, 2000: 36–37, and references therein), and a viscid derivative of the fruits was previously used as a pomade in hair-dressing (Hooper, 1929). The fruits are eaten locally (Gorokhova, 1982; Crawford, 1992: 10), and an infusion of the fruits is drunk as tea (Tanaka, 1976: 668). Fibres from the stems have been used in the manufacture of rope (Wang, 1980: 803). *Schisandra chinensis* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

Sect. 2. *Schisandra*

Schisandra sect. *Schisandra*

Type: *Schisandra glabra* (Brickell) Rehder

Male flowers with androecium of 5 sessile stamens; stamens radiating horizontally from a broad floral apex; thecae lateral; pollen hexacolpate. Female flowers with gynoecium of 12–75 carpels; pseudostyles narrow and subulate. Seed testa rugulose or tuberculate.

Three species; China (Guangxi, Hunan, Yunnan and Zhejiang), S Japan (Honshu, Kyushu, Shikoku, etc.), S Korea (Cheju-do (Quelpart) Is.), SE USA and Mexico (Sierra Madre).

- | | | |
|----|--|------------------------------|
| 1 | Perianth red; female flowers with (8–) 10–12 tepals | 19. <i>S. glabra</i> |
| 1: | Perianth greenish white to yellow (at least outer tepals); female flowers with 6–10 tepals | |
| 2: | Lamina (7–) 7.5–10.5 (–12) cm long; outermost tepal slightly reduced, 0.5–0.7 of length of largest tepal; carpels 52–75; apocarps red, 10–16 mm long, 10–16 mm diam. | 21. <i>S. bicolor</i> |
| 2: | Lamina (3.5–) 5–7 (–8.5) cm long; outermost tepal highly reduced, 0.2–0.4 of length of largest tepal; carpels 12–17; apocarps black, 6–13 mm long, 6–11 mm diam. | 20. <i>S. repanda</i> |

19. *Schisandra glabra* (Brickell) Rehder, *J. Arnold Arbor.* 25: 131 (1944)

Stellandria glabra Brickell, *Med. Repos.* 6(3): 327 (Feb.–Mar. 1803). T: USA. Georgia: Savannah, J.Brickell; holo: PH [Muhlenberg herbarium].

Schisandra coccinea Michx., *Fl. Bor.-Amer.* 2: 219 (Mar. 1803). T: Michaux's illustration (1803: fig. 47); *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 100 (2000).

Illustrations: J.Sims, *Bot. Mag.* 34: pl. 1413 (1811), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: pl. 4 (2000); D.E.Stone, *J. Elisha Mitchell Sci. Soc.* 84: 354, figs 5–12 (1968); J.L.Panero & P.D.Aranda, *Brittonia* 50: 89, fig. 1 (1998).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 101, fig. 39 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole 17–45 (–50) mm long; lamina ovate to elliptic, rarely obovate-elliptic, (6–) 8–11 (–13) cm long, (2.5–) 3.5–6.5 (–9) cm wide, thinly papery or membranous; base acute (younger leaves) to obtuse, truncate or slightly cordate (older leaves); margins subentire to denticulate, often lobed; teeth (0–) 4–5 (–8) per side of leaf; apex (short-) acuminate; secondary veins 4 or 5 (–6) pairs per leaf, slightly arcuate, rarely highly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots or in the axils of leaves; peduncles (17–) 23–35 mm long (male), 33–44 (–70) mm long (female). Tepals 8–14, red; largest tepal (3.5–) 4.8–6.2 (–6.7) mm long, (3.3–) 3.5–4.8 (–5.8) mm wide. Male flowers with 5 stamens. Female flowers with (12–) 18–24 (–27) carpels; pseudostyles narrow. Fruit peduncle 2.5–3.5 cm long; torus 2–4.5 cm long, 1.2–2 mm wide; apocarps 5–8 mm long, 4–6 mm wide, red. Seeds (1 or) 2 per apocarp, reniform, 3.4–3.9 (–4.1) mm long, 4.4–5.1 mm wide; testa ±rugulose. $n = 14$, D.E.Stone, *J. Elisha Mitchell Sci. Soc.* 84: 351–356 (1968). $2n = 28$, D.E.Stone, *in Anon. (ed.), Madroño* 18: 12–126 (1965); D.E.Stone, *J. Elisha Mitchell Sci. Soc.* 84: 351–356 (1968).

SE USA and Mexico (Sierra Madre). 78. ALA, ARK, FLA, GEO, KTY, LOU, MSI, NCA, SCA, TEN. 79. MXC. Scandent or climbing in forests, near ravines, levees and streams; from sea level to 500 m (USA), to 1800 m (Sierra Madre or Mexico). Flowers June–July; fruits Aug.–Sept. Map 22.

78. ALABAMA: Clarke Co., W slope of Salt Mtn, *R.M.Harper* 3377 (A, GH, MO, NY). ARKANSAS: Phillips Co., near Helena, Crowley's Ridge, *E.J.Palmer* 25094 (A, MO). FLORIDA: Jackson Co., Three Rivers State Park, L. Seminole, *J.Wen & A.K.Gholson* 945 (A). GEORGIA: Stephens Co., SW of Yonah L. (Tugaloo R.), S side of Panther Ck, *D.E.Boufford & E.W.Wood* 16697 (MO). LOUISIANA: St. Helena Parish, 4¾ miles [7.7 km] NW of Chipola, *C.M.Allen* 1950 (A). MISSISSIPPI: Forrest Co., Ragland Hills, *K.E.Rogers* 8609 (GH, NY). NORTH CAROLINA: Martin Co., Williamston, *D.E.Stone* 1822 (NY). SOUTH CAROLINA: Buckingham, *J.H.Mellichamp* 10446 (A, NY). TENNESSEE: Covington, 1 May 1889, *J.Byars s.n.* (NY). **79.** MEXICO CENTRAL: Hidalgo, 3.6 km al E de la carretera Pachuca-Zacualtipán-Tampico sobre la carretera a Tianguistenco, Metztitlán, *J.L.Panero & I.Calzada* 6562 (NY).

Schisandra glabra is cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

20. *Schisandra repanda* (Siebold & Zucc.) Radlk., *Sitzungsber. Math.-Phys. Cl. Königl. Bayer. Akad. Wiss. München* 16: 303 (1886)

Trochostigma repanda Siebold & Zucc., *Abh. Math. Phys. Cl. Königl. Bayer. Akad. Wiss.* 3: 728 (1843). T: Japan: precise locality not known, *H.Bürger s.n.*; holo: K; iso: M.

Schisandra nigra Maxim., *Bull. Acad. Imp. Sci. Saint-Pétersbourg* 17: 144–145 (1872), as *Schizandra*. T: Japan: Kiusiu [Kyushu], Kundsho-san, 1863, *C.J.Maximowicz s.n.*; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 103 (2000); isolecto: GH.

?*Schisandra discolor* Nakai, *Fl. Sylv. Koreana* 20: 103 (1933), as *Schizandra*. T: Japan: Aki, Miyajima, *B.Hayata s.n.*; holo: TI.

Illustration: A.C.Smith, *Sargentia* 7: fig. 27a–j (1947); Y.Sakate *et al.* (eds), *Wild Fl. Jap. Woody Pl.* 1: pl. 130, 1–3 (1989), as *S. nigra*.

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 104, fig. 40 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches without significant growth in subsequent years. Leaves: petiole (13–) 15–32 (–57) mm long; lamina elliptic to ovate, (3.5–) 5–7 (–8.5) cm long, (2.5–) 3–5.5 cm wide, thinly

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papery, rarely subcoriaceous; base acute (younger leaves) to obtuse or truncate (older leaves); margins (sinuous-) denticulate to (sinuous-) serrulate, rarely subentire; teeth (0–) 3–5 (–7) per side of leaf; apex (short-) acuminate; secondary veins (3–) 4 or 5 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles (13–) 19–30 (–36) mm long (male), 25–70 mm long (female). Tepals 6–12, pale yellowish-green; largest tepal 4.1–8.6 mm long, 3.6–6.4 mm wide. Male flowers with 5 stamens. Female flowers with 12–17 carpels; pseudostyles narrow. Fruit peduncle 3.5–8 cm long; torus 2.5–7 cm long, 1.2–2.1 (–2.9) mm wide; apocarps 6–13 mm long, 6–11 mm wide, blackish. Seeds 1 or 2 per apocarp, flattened-reniform, (3.6–) 4.2–4.8 mm long, (4.7–) 5–5.8 (–6) mm wide; testa rugulose to very tuberculate. $2n = 28$, H.Okada, *J. Sci. Hiroshima Univ., Ser. B, Div. 2, Bot.* 15: 115–200 (1975).

Japan (Hokkaido to Kyushu) and S Korea. 38. JAP, KOR. Scendent or climbing in thickets and woods; 600–1300 m. Flowers May–July; fruits Aug.–Nov. Map 23.

38. JAPAN: Honshu, Jizogatake, *U.Faurie* 5391 (A, UC); Kyushu, Prov. Satuma, Mt Sibi, *S.Hatusima* 14036 (A); Honshu, Yamanashi Pref., between Mt Mitsutooge and Takara copper mine, Minamitsuru-gun, *H.Kanai* 6350 (A); Honshu, Shizuoka Pref., Haibara-gun, Honkawane-cho, O-o-ma, along the O-o-ma forest road in O-o-ma R. valley, *F.Konta & S.Kusaka* 119 (A); Honshu, Kyoto Pref., Kyoto-shi, Sakyoku, Mt Hiei, *G.Murata* 44542 (A); Honshu, Kyoto Pref., Funai-gun, Wachi-cho, Kamiotomi, Mt Choro, *S.Tsugaru & T.Takahashi* 17921 (MO); Shikoku, Tosa, Nanokawa, 12 July 1889, *K.Watanabe s.n.* (GH); Honshu, Hyogo Pref., en route from Fukusada to the NE foot of Mt Hyonosen, Sekino-miya-cho, Yabu-gun, *E.W.Wood & D.E.Boufford* 3874 (A). KOREA: Quelpaert Is. [Cheju-do], monastery and over the top of Hallai-san and down to Mushroom House, *E.H.Wilson* 9446 (A).

The fruits are eaten locally and an infusion is drunk as tea (Tanaka, 1976: 668). *Schisandra repanda* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

21. *Schisandra bicolor* W.-C.Cheng, *Contr. Biol. Lab. Chin. Assoc. Advancem. Sci.*, Sect. Bot. 8: 137–140 (1932)

T: China: Chekiang [Zhejiang], near Sienting, W Tienmu-Shan, 1 July 1932, *W.-C.Cheng* 3656; holo: NAS.

Schisandra wilsoniana A.C.Sm., *Sargentia* 7: 122–123 (1947). T: China: Yunnan: S of Li-chiang [Lijiang], mountains W of Hao-ch'ing, 25–28 May 1922, *J.F.Rock* 4039; holo: A; iso: UC, US.

Schisandra tuberculata Y.-W.Law, *Bull. Bot. Res., Harbin* 3: 148–149 (1983); *Schisandra bicolor* var. *tuberculata* (Y.-W.Law) Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 269, 273 (1996). T: China: Guangxi, Long Sheng, 28 June 1958, *Z.-Y.Chun* 51104; holo: PE.

[*Schisandra elongata* auct. non Baill.: E.H.Wilson, *J. Arn. Arbor.* 7: 238 (1926)]

Illustrations: Y.-W.Law, *Bull. Bot. Res., Harbin* 3: 150 (1983), as *S. tuberculata*; Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 268, fig. 78, 1–24 (1996); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 107, fig. 41 (2000).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 108, fig. 42 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches without significant growth in subsequent years. Leaves: petiole (13–) 20–50 (–67) mm long; lamina variably elliptic, ovate-elliptic or obovate-elliptic, (7–) 7.5–10.5 (–12) cm long, (3.5–) 4.5–7 (–8) cm wide, (thinly) papery, rarely subcoriaceous; base acute (younger leaves) to obtuse (older leaves); margins entire to (sinuous-) denticulate; teeth 0–6 (–12) per side of leaf; apex short-acuminate; secondary veins 4–6 pairs per leaf, slightly arcuate. Flowers solitary, in axils of fugacious bracts at the base of young shoots; peduncles 17–42 mm long (male), c. 50–55 mm long (female). Tepals 6–11, green-white or yellow (outer), red-purple (inner); largest tepal 4.1–8.5 mm long, 3.6–6.2 mm wide. Male flowers with 5 stamens. Female flowers with 52–75 carpels; pseudostyles narrow. Fruit peduncle 2.5–6.5 cm long; torus 3.5–15 cm long, 1–1.6 mm wide; apocarps 10–16 mm long, 10–16 mm wide, red. Seeds 1 or 2 per apocarp, (discoid) flattened-reniform, (3.1–) 3.5–5.2 (–5.6) mm long, 3.9–6.5 (–7.3) mm wide; testa tuberculate. $2n = 28$, Z.Wu & C.Huang, *Guishaia* 15: 47–51 (1995). Fig. 3.

China (Guangxi, Hunan, Jiangxi, Yunnan and Zhejiang). 36. CHC, CHS. Scendent or climbing in sparse woodlands, often in river valleys; 750–1300 m. Flowers May–July; fruits Aug.–Nov. Map 24.

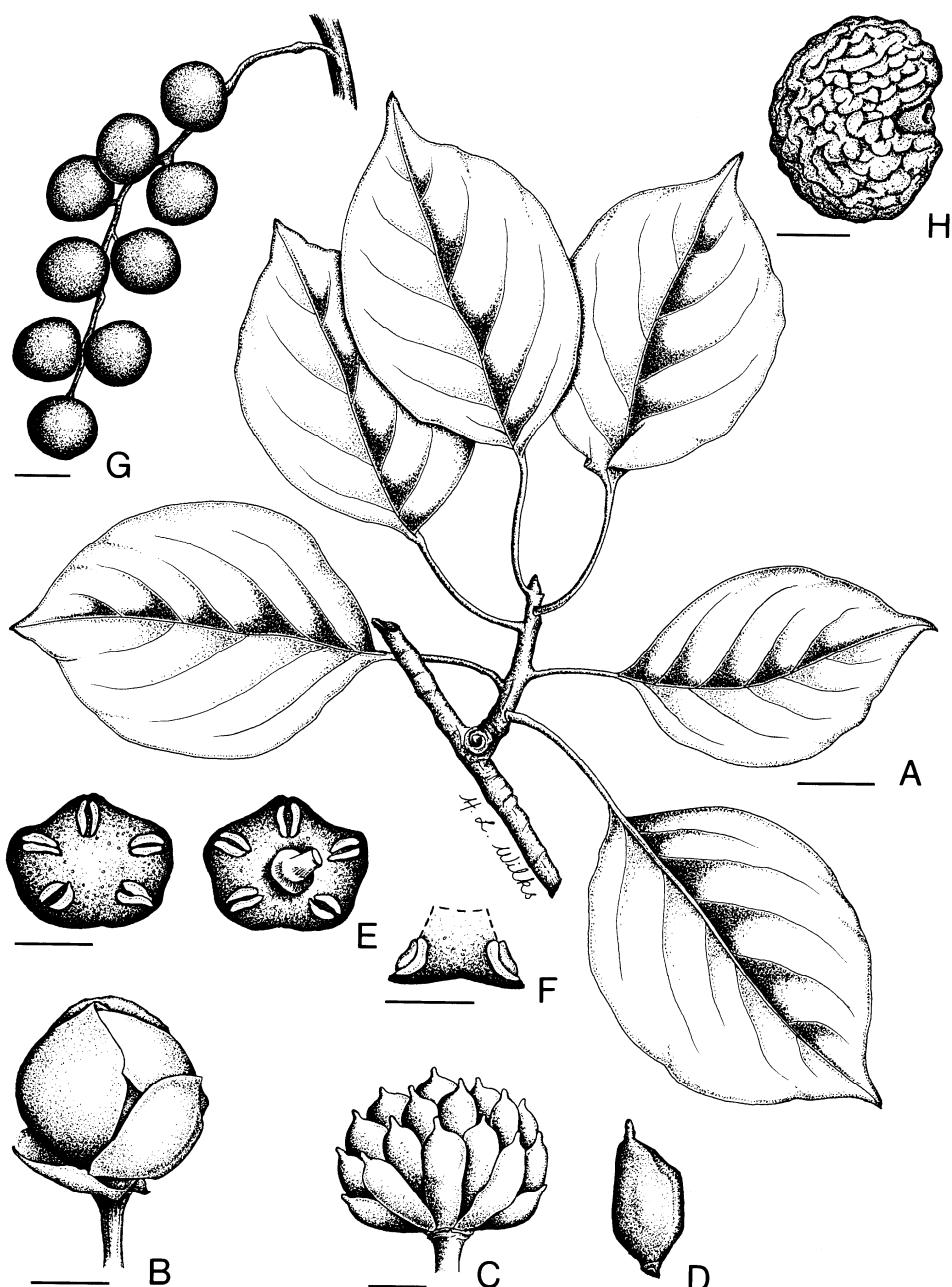


Figure 3. *Schisandra bicolor*. A, branch; B, flower; C, gynoecium; D, isolated carpel (lateral view); E, androecium (abaxial and adaxial views); F, isolated stamen, showing area of fusion (dotted line); G, fruit; H, seed (A, H.F.Tan & S.L.Tu 700658, IBSC; B, P.C.Tam 63323, IBSC; C, redrawn from Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1), fig. 78.16 (1996); D, Guangfu Expedition 872, IBSC; E–F, P.C.Tam 63323, IBSC; G, P.H.Liang & H.H.Hsue 85161, IBSC; H, L.U.Liou & K.C.Ho 16342, IBSC). Scale bars: A = 2 cm; B, E, F, H = 2 mm; C, D = 1 mm; G = 1 cm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Syst. Bot. Monogr.* 58, fig. 41 (2000), © The American Society of Plant Taxonomists.

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36. CHINA SOUTH-CENTRAL: CHINA SOUTHEAST: Zhejiang, Chang-hua Forestry Farm, Lin-an, *P.L.Chiu* 20 (MO); Zhejiang, Heng-tang, Tian-mu-shan, *P.L.Chiu* 376 (MO); Guangxi, Cu-jiang, Da-di-xiang, Long-sheng, *Guang Fu Forest Team* 872 (IBSC, MO); Guangxi, Longsheng, *H.F.Tan & S.L.Yu* 700658 (IBSC); Hunan, Yizhang, *M.X.Huang* 112217 (IBSC); Hunan, Yizhang, *B.H.Liang & H.H.Hsue* 85161 (IBSC, MO); Hunan, Wugang, *L.U.Liou & K.C.Ho* 16342 (IBSC); Hunan, *P.C.Tam* 63323 (IBSC); Hunan, Cheng-bu Co., Shu-chuang-shan, Ai-shang, Men-ping, *P.X.Tan* 63781 (MO).

Schisandra bicolor is used medicinally in China (Song & Xiao, 1982; Song, 1990).

Sect. 3. *Sphaerostema*

Schisandra sect. *Sphaerostema* (Blume) Nakai, *Fl. Sylv. Koreana* 20: 101 (1933), as *Schizandra*

Sphaerostema Blume, *Bijdr. Fl. Ned. Ind.* 22 (1825); *Schisandra* subg. *Sphaerostema* (Blume) Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 264, 272 (1996). T: *Schisandra propinqua* subsp. *axillaris* (Blume) R.M.K.Saunders.

Schisandra subg. *Plena* Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 272–273 (1996) [as subg. *Plenischisandra* on p. 265, sphalm.]. T: *S. plena* A.C.Sm.

Male flowers with 4–18 stamens fused into carnosae mass; anthers either sessile (in *S. plena*) or on short free connectives (in *S. propinqua*). Female flowers with 18–52 carpels; pseudostyles narrow and subulate. Seed testa smooth.

Two species; India (Uttar Pradesh, Arunachal Pradesh, Meghalaya and Nagaland), Nepal, E Myanmar [Burma], N Thailand, China (Gansu, Guizhou, Hubei, Hunan, Yunnan, Shanxi, Sichuan) and Indonesia (Java and Bali).

Lamina without prominent venation adaxially; androecial mass (sub) globose; thecae introrse-lateral, borne on free connectives arising from cavities on the surface of androecium; fruiting torus 2–6.5 cm long; apocarps 4.5–9 mm long, 4–8.5 mm diam.; seeds (3.2–) 3.7–4.5 (–5.4) mm long, (3.5–) 4.2–4.9 (–5.5) mm wide

22. *S. propinqua*

Lamina with intricate tertiary and quaternary venation, prominent adaxially; androecial mass elongate; thecae sessile, located on opposing sides of cavities on the surface of androecium; fruiting torus 5–17 cm long; apocarps c. 10 mm long, 12 mm diam.; seeds 5.5–6 mm long, 7–7.5 mm wide

23. *S. plena*

22. *Schisandra propinqua* (Wall.) Baill., *Hist. Pl.* 1: 148 (1868), as *Schizandra*

Kadsura propinqua Wall., *Tent. Fl. Napol.* 11 (1824); *Sphaerostema propinqua* (Wall.) Blume, *Fl. Javae [Schizandreae]* 15 (1830), as *S. propinquo*. T: Nepal: Sankoo [Sanku], Mt Sheopore, [without date], N.Wallich 4986; lecto: K-W, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 276 (1997); isolecto: C, K.

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petiole (4–) 8–16.5 (–27) mm long; lamina elliptic to ovate, (5–) 7–11.5 (–20) cm long, (1–) 2–4 (–8.5) cm wide, variably papery to coriaceous; base obtuse to truncate (acute in younger leaves); margins (sub) entire to denticulate-serrulate, rarely serrate; teeth 0–7 (–13) per side of leaf; apex short-acuminate; secondary veins (4–) 4.5–6.5 (–9) pairs per leaf, variably straight or arcuate. Flowers solitary, occasionally with secondary flower in axil of prophyll, or in clusters, in axils of fugacious bracts at the base of young shoots or in axils of leaves; peduncles 2–17 mm long (male), 3–14 mm long (female). Tepals (7–) 8–15 (–17), cream, yellow, orange, pink, or purplish; largest tepal (3.1–) 5–9 (–12.5) mm long, (2.4–) 3–7 (–10) mm wide. Male flowers with (4–) 8–18 stamens; androecial mass (1.8–) 2.4–3.5 (–4.3) mm diam.; anthers borne on free connectives, arising from cavities. Female flowers with 18–52 carpels; pseudostyles flat-subulate. Fruit peduncle 0.5–3 cm long; torus 2–6.5 cm long, 0.8–1.7 mm wide; apocarps 4.5–9 mm long, 4–8.5 mm wide, red to purple. Seeds 1 or 2 per apocarp, discoid, (3.2–) 3.7–4.5 (–5.4) mm long, (3.5–) 4.2–4.9 (–5.5) mm wide; testa ±smooth. Fig. 4.

Himalayan India to C and SE China, and with a disjunction in Java. Four subspecies.

Schisandra propinqua is used medicinally in SE Asia and China (Perry & Metzger, 1980: 382; Song & Xiao, 1982; Song, 1988) and the fruits are eaten locally (Hooker, 1851; Yuan & Chao, 1996). *Schisandra propinqua* is also cultivated as an ornamental climber (Krüssman, 1985: 195; Cullen & Howe, 1989: 318).

- | | |
|---|--------------------------------------|
| 1 Flowers solitary or in clusters; androecium c. 1.8–2.4 mm diam., with 4–11 stamens | 22c. subsp. <i>sinensis</i> |
| 1: Flowers solitary, rarely with secondary flower in axil of prophyll; androecium c. 2.6–4.3 mm diam., with 10–18 stamens | |
| 2 Female flowers with 14–17 tepals | 22a. subsp. <i>propinqua</i> |
| 2: Female flowers with 9–14 tepals | |
| 3 Lamina generally papery; peduncles 4–12 mm long | 22b. subsp. <i>intermedia</i> |
| 3: Lamina generally coriaceous; peduncles (2–) 3–5 (–12) mm long | 22d. subsp. <i>axillaris</i> |

22a. *Schisandra propinqua* (Wall.) Baill. subsp. *propinqua*

Schisandra propinqua var. *typica* A.C.Sm., *Sargentia* 7: 151 (1947), *nom. inval.*

Illustrations: J.Lindley, *Edward's Bot. Reg.* 20, pl. 1688 (1834), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: frontispiece (2000); W.J.Hooker, *Bot. Mag.* 77: fig. 4614 (1851), reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 58: pl. 5 (2000); G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 41A (1891).

Maps: R.M.K.Saunders, *Edinburgh J. Bot.* 54: 279, fig. 11 (1997); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 112, fig. 43 (2000).

Lamina (6–) 8.5–10.5 (–13) cm long, (2–) 2.5–4 (–4.5) cm wide, generally papery; margins denticulate to serrulate, rarely (sub) entire; teeth (0–) 1–8 (–13) per side of leaf. Flowers solitary in axil of leaf, rarely with secondary flower in axil of prophyll; peduncle 4.5–12.5 mm long. Male flowers: largest tepals 3.5–7.2 mm long, 3.7–6.7 mm wide; androecium of 10–18 stamens fused into carnose mass 3.2–4.3 mm diam. Female flowers with 14–17 tepals; largest tepals 7.2–12.5 mm long, 5.5–10 mm wide. Fruit peduncle up to c. 10 mm long; apocarps c. 7–8 mm long, 7–8 mm wide.

NW India (Uttar Pradesh) and E Nepal. 40. IND, NEP. Scandent or climbing in open areas in scrublands and mixed woodlands; 1220–1830 m. Flowers May–July; fruits Oct.–Nov. Map 25.

40. INDIA: Uttar Pradesh, Siwalik and Jaunsar Divisions, Mandali, *B.C.Datta* 2 (A); Uttar Pradesh, Gurhwal, *H.Falconer* 80 (A, C, GH, K, L); Uttar Pradesh, Siwalik and Jaunsar Divisions, Mussoorie, *C.S.Rawat* 4 (A); Uttar Pradesh, Kumaon, Shaidevi, *R.Strachey & J.E.Winterbottom* 2 (GH); Uttar Pradesh, Siwalik and Jaunsar Divisions, Mussoorie, *N.K.Tripathi* 4 (E). NEPAL: E Nepal, Iladanda-Selap, *H.Kanai*, *G.Murata* & *M.Togashi* 6303834 (A, K); Doti, *B.Ram* 423 (A, NY); Kathmandu valley, Godavari, *A.D.Schilling* & *C.D.Sayers* 558 (K); Kathmandu valley, Godavari, *A.D.Schilling* & *C.D.Sayers* 561 (K); Pasgam, *J.D.A.Stainton*, *W.R.Sykes* & *L.H.J.Williams* 5933 (E, L).

22b. *Schisandra propinqua* (Wall.) Baill. subsp. *intermedia* (A.C.Sm.) R.M.K.Saunders, *Edinburgh J. Bot.* 54: 278–280 (1997)

Schisandra propinqua var. *intermedia* A.C.Sm., *Sargentia* 7: 152 (1947). T: China; Yunnan, outskirts of lava bed west of T'eng-yüeh [Tengchung], May 1912, *G.Forrest* 7692; holo: A; iso: E, K.

[*Sphaerostema axillare* auct. non Blume: J.D.Hooker & T.Thomson, *Fl. Ind.* 1: 86 (1855); H.Drury, *Handb. Ind. Fl.* 1: 649 (1864)]

Illustrations: G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 41A (1891), as *S. axillaris*; A.C.Smith, *Sargentia* 7: 155, fig. 29a–c (1947), as *S. propinqua* var. *intermedia*; Y.-W.Law, *Sylva Sin.* 537, fig. 189 (1983).

Maps: R.M.K.Saunders, *Edinburgh J. Bot.* 54: 279, fig. 11 (1997); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 112, fig. 43 (2000).

Lamina (5–) 7–11 (–20) cm long, (1–) 2–4.5 (–8.5) cm wide, generally papery; margins entire to denticulate or serrulate, rarely serrate; teeth 0–7 (–11) per side of leaf. Flowers

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solitary in axil of leaf, rarely with secondary flower in axil of prophyll; peduncle 4–12 mm long. Male flowers: largest tepals 4–7.4 mm long, 2.4–5.2 mm wide; androecium of 10–12 (–16) stamens fused into carnose mass c. 2.6–2.8 mm diam. Female flowers with 9–12 tepals; largest tepals 6.3–10.9 mm long, 5.6–6.6 mm wide. Fruit peduncle 7–12 mm long; apocarps 6–9 mm long, 5.5–8.5 mm wide.

NE India (Meghalaya and Nagaland), E Myanmar [Burma], N Thailand and China (Yunnan). 36. CHC. 40. ASS. 41. MYA, THA. Scendent or climbing in mixed woodlands and open scrublands, often near rocky areas; (820–) 1070–2130 m. Flowers May–July; fruits Sept. Map 26.

36. CHINA SOUTH-CENTRAL: Yunnan, Xundian, *Y.P.Chang* 869 (IBSC); Yunnan, Tchong chan, Yunnansen, *F.Ducloux* 468 (UC); Yunnan, Lengyueh, *G.Forrest* 11845 (A, UC). 40. ASSAM: Meghalaya, Khasia, *J.D.Hooker & J.J.Thomson s.n.* (E, GH, K, NY); Nagaland, between Pushing and Kangkoi, *F.K.Ward* 17495 (A). 41. MYANMAR: Maymyo Plateau, *J.H.Lace* 5432 (E, K); Maymyo Plateau, *J.H.Lace* 5875 (E, K); Maymyo, Singaungle, *C.G.Parkinson* 12176 (K). THAILAND: Loei, Phu Kradung, trail between Samhaek and Mangpae, *N.Fukuoka* T-63689 [508] (A); Loei, Phu Kradung, near Langpae, *H.Takahashi* T-63507 [1314] (A).

22c. *Schisandra propinqua* (Wall.) Baill. subsp. *sinensis* (Oliv.) R.M.K.Saunders, *Edinburgh J. Bot.* 54: 280–282 (1997)

Schisandra propinqua var. *sinensis* Oliv., *Hooker's Icon. Pl.* 18: pl. 1715 (1887), as *Schizandra*. T: China: Hupeh [Hubei], vicinity of I-ch'ang, 1885–88, *A.Henry* 1544; lecto: GH, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 280 (1997); isolecto: E, GH, K.

Schisandra propinqua var. *linearis* Finet & Gagnep., *Bull. Soc. Bot. France* 52, Mém. 4: 51 (1905), as *Schizandra*, reprinted in *Contr. Fl. As. Or.* 2: 51 (1907). T: China: Hupeh [Hubei], vicinity of I-ch'ang, 1885–88, *A.Henry* 1544; lecto: GH, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 280 (1997); isolecto: E, GH, K. *Embelia valbrayi* H.Lév., *Cat. Pl. Yun-nan* 177 (1916). T: China: Yunnan, La-kou, July [1912], *E.E.Maire* s.n.; lecto: E, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 281 (1997); isolecto: A.

Illustrations: D.Oliver, *Hooker's Icon. Pl.* 18: pl. 1715 (1887), as *S. propinqua* var. *sinensis*; A.C.Smith, *Sargentia* 7: 155, fig. 29j–l (1947), as *S. propinqua* var. *sinensis*; Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 266, fig. 77, 1–10 (1996).

Maps: R.M.K.Saunders, *Edinburgh J. Bot.* 54: 279, fig. 11 (1997); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 112, fig. 43 (2000).

Lamina (5.5–) 7–11 (–12.5) cm long, (1–) 1.5–3.5 (–4.5) cm wide, papery to subcoriaceous; margins serrulate, occasionally denticulate, rarely (sub) entire or serrate; teeth (0–) 2–7 (–10) per side of leaf. Flowers solitary or in clusters in axil of leaf; peduncle 3–16 mm long. Male flowers: largest tepals 3.1–5.8 mm long, 2.4–3.5 mm wide; androecium of 4–11 stamens fused into carnose mass c. 1.8–2.4 mm diam. Female flowers with 8–15 tepals; largest tepals 4.6–6.2 mm long, 3.6–5.1 mm wide. Fruit peduncle 14–30 mm long; apocarps 4.5–8.5 mm long, 4–8.5 mm wide.

C and W China (Gansu, Guizhou, Hubei, Hunan, Shanxi, Sichuan, Xizang [Tibet] and Yunnan). 36. CHC, CHN, CHS, CHT. Scendent or climbing in woods (generally broad-leaved), often near ridges, slopes and ravines; 400–2600 (–3100) m. Flowers May–Sept.; fruits Aug.–Dec. Map 27.

36. CHINA SOUTH-CENTRAL: Yunnan, La-kou, *E.E.Maire* 2923 (NY, UC); Yunnan, Tong-tchouan, *E.E.Maire* 3650 (UC); Sichuan, Tianquan, *D.Y.Peng* 45343 (IBSC); Sichuan, Pao-hsin-hsien, Mupin, *T.P.Soong* 39439 (IBSC); Guizhou, Anlong, *Guizhou Expedition* 4336 (IBSC); Hubei, Xingshan, *M.H.Nieh & Q.-H.Li* 264 (IBSC). CHINA NORTH-CENTRAL: Shanxi, Lüeyang, *C.Y.Chang* 17810 (IBSC); Gansu, Wenxian, *J.-X.Yang* 3643 (IBSC). CHINA SOUTHEAST: Hunan, Dayong, *S.C.Lee* 204722 (IBSC). TIBET: Jilong, *Qingzang Expedition* 4609 (IBSC).

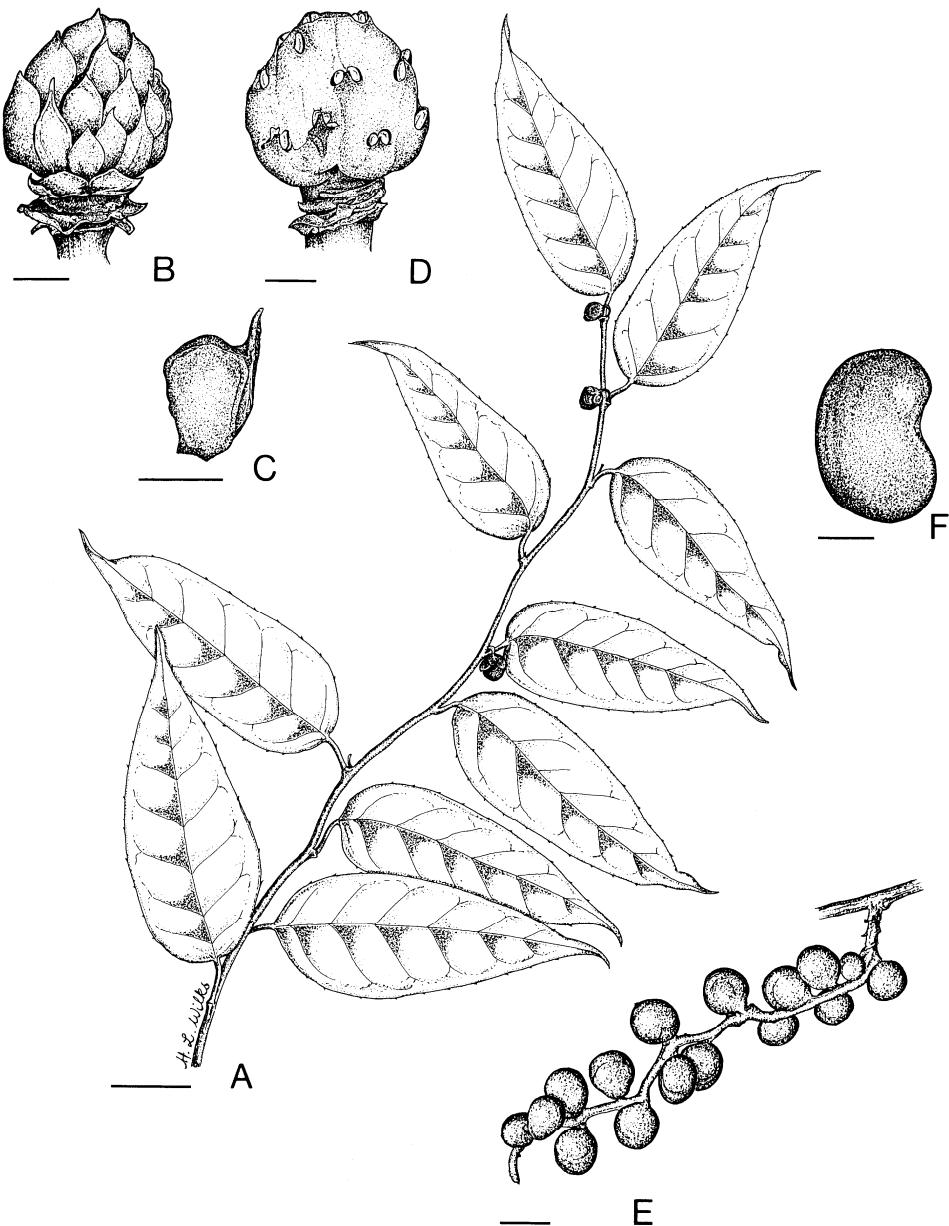


Figure 4. *Schisandra propinqua* subsp. *axillaris*. A, flowering branch; B, gynoecium; C, isolated carpel (lateral view); D, androecium; E, fruit; F, seed (A, C.L.Blume s.n., [without date], L; B-C, J.H.Coert 944, L; D, R.Brinkman 874a, L; E-F, C.A.Backer 3656, L). Scale bars: A = 2 cm; B, D = 1 mm; E = 5 mm; F = 2 mm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Fl. Males. I*, 13, fig. 2 (1997), © Rijksherbarium/Hortus Botanicus, Leiden.

SCHISANDRACEAE (*Schisandra*)

22d. *Schisandra propinqua* (Wall.) Baill. subsp. *axillaris* (Blume) R.M.K.Saunders, *Edinburgh J. Bot.* 54: 282–283 (1997)

Sphaerostema axillare Blume, *Bijdr. Fl. Ned. Ind.* 22 (1825), as *Sphaerostema axillaris*; *Schisandra axillaris* (Blume) Hook.f. & Thomson, in J.D.Hooker, *Fl. Brit. Ind.* 1: 45 (1872), as *Schizandra*, quoad basionym. *Sphaerostema pyrifolium* var. *denticulatum* Blume ex Koord., *Exkurs.-Fl. Java* 2: 243 (1912), *nom. inval.*, *publ. pro syn.* T: Java: Goenoeng Tjareme, ["in sylvis altis montis Tjerimai Provinciae Cheribon"], [without date], *C.L.Blume* 66; lecto: BO, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 282 (1997).

Sphaerostema pyrifolium Blume, *Fl. Javae [Schizandreae]* 16 (1830). *Uvaria pyrifolia* Reinw. ex Blume, *Fl. Javae [Schizandreae]* 16 (1830), *nom. inval.*, *publ. pro syn.* T: Java: Tjiandjoer, [without date], *C.G.C.Reinwardt* s.n.; lecto: L, *fide* R.M.K.Saunders, *Edinburgh J. Bot.* 54: 282 (1997); isolecto: L.

Illustrations: C.L.Blume, *Fl. Javae [Schizandreae]* figs 3–4 (1830), as *Sphaerostema axillaris* and *Sphaerostema pyrifolium*; C.G.J.van Steenis, *Mountain Fl. Java* fig. 29.4 (1972), as *S. axillaris*; R.M.K.Saunders, *Fl. Males. I.* 13: 205, fig. 2 (1997), reproduced in R.M.K.Saunders, *Edinburgh J. Bot.* 54: 273, fig. 10 (1997) and R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 116, fig. 44 (2000).

Maps: R.M.K.Saunders, *Edinburgh J. Bot.* 54: 283, fig. 12 (1997); R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 117, fig. 45 (2000).

Lamina 6–11.5 cm long, 2–4.5 (–5) cm wide, generally coriaceous; margins entire, occasionally denticulate; teeth 0–6 (–8) per side of leaf. Flowers solitary in axil of leaf; peduncle (2–) 3–5 (–12) mm long. Male flowers comparatively large; largest tepals 4.3–7.5 mm long, 4.1–7 mm wide; androecium of 10–13 (–17) stamens fused into carnose mass 2.8–3.9 mm diam. Female flowers with 10–14 tepals; largest tepals c. 4.8–7.8 mm long, 5–6 mm wide. Fruit peduncle 3–8 mm long; apocarps 6.5–8.5 mm long, 6.5–8 mm wide. Fig. 4.

Java and Bali. 42. JAW, LSI-BA. Scendent or climbing in submontane to montane forests; 1200–2200 m. Flowers Mar.–Oct. Map 28.

42. JAWA: E Java, Mt Ijen, *J.J.Afriastini* 1484 (L); G. Imeroe, *C.A.Backer* 3656 (L); Papandayang, *C.L.Blume* 750 (L); [precise locality not known], *C.L.Blume* 1601 (L); Kedoe, *R.Brinkman* 874a (L); Lawae, G. Kendih, *J.H.Coert* 746 (L); Lawae Larangas, *J.H.Coert* 944 (L); Telomojo, Lemarang, *S.H.Koorders* 28047b (L); Preanger, Talom Ridoe, *Soegandiredjo* 128 (L). LESSER SUNDA IS.: Bali, G. Batoekaoe, *Sarip* 368 (L).

23. *Schisandra plena* A.C.Sm., *Sargentia* 7: 154 (1947)

T: China: Yunnan, Ssu-mao [Sze-mao], 14 May [without year], *A.Henry* 10854; holo: A; iso: MO, NY, US.

[*Schisandra propinqua* auct. non Baill.: C.S.Sargent, *Pl. Wilson.* 1: 416 (1913)]

Illustrations: A.C.Smith, *Sargentia* 7: 155, fig. 29d–i (1947); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 266, fig. 77, 11–15 (1996).

Maps: R.M.K.Saunders, *Edinburgh J. Bot.* 54: 284, fig. 13; R.M.K.Saunders, *Syst. Bot. Monogr.* 58: 118, fig. 46 (2000).

Plant glabrous throughout. Lateral branches lacking wings, with fugacious perules at base; branches continuing growth in subsequent years. Leaves: petioles 13–16 (–19) mm long; leaf lamina (ovate-) elliptic, (8–) 8.5–13.5 (–14) cm long, 3.5–5 cm wide, papery to subcoriaceous; base obtuse (acute in younger leaves); margins entire; apex (short-) acuminate; secondary veins 5–7 pairs per leaf, (slightly) arcuate; tertiary and quaternary venation very intricate and prominent above. Flowers solitary or in clusters, axillary to leaves; peduncles 7–15 mm long (male); female peduncles not seen. Tepals 12–15 (–17), white or pale yellow, red at base; largest tepal 8.6–9.7 mm long, 4–4.2 mm wide. Male flowers with c. 8 stamens; androecial mass 4.5–6 mm long, 3–4 mm wide; anthers sessile, narrowing towards base; thecae on opposing sides of cavity. Female flowers with c. 31 carpels; pseudostyles subulate. Fruit peduncle 1–1.5 cm long; torus 5–17 cm long (*fide* A.C.Smith, 1947: 156); apocarps c. 10 mm long, c. 12 mm wide, (orange-) red. Seeds 1 or 2 per apocarp, flattened-elliptic, 5.5–6 mm long, 7–7.5 mm wide, testa ±smooth.

NE India (Arunachal Pradesh) and China (Yunnan). 36. CHC. 40. ASS. Scendent or climbing in dense woodlands; 600–1520 m. Flowers Apr.–May; fruits Aug.–Sept. Map 29.

36. CHINA SOUTH-CENTRAL: Yunnan, *Anonymous* s.n. (IBSC 174186); Yunnan, *A.Henry* 11749 (A); Yunnan, *A.Henry* 11893 (A, K); Yunnan, *A.Henry* 12192 (A, K); Yunnan, Mengla, 12 Dec. 1983, *C.-J.Liao* s.n.

(IBSC); Yunnan, Menghai Xian, Z.H.Tsi 92-392 (A); Yunnan, Keng-Ma, C.W.Wang 73145 (A); Yunnan, Che-li Hsien, Dah-meng-lung, Maan-bang, C.W.Wang 76340 (A); Yunnan, Che-li Hsien, C.W.Wang 78784 (A).
40. ASSAM: Arunachal Pradesh, Delei Valley, F.K.Ward 8009 (K).

Doubtful names

Schisandra chinensis (Turcz.) Baill. var. *rubra* Sprenger, *Mitt. Deutsch. Dendrol. Ges.* 16: 68 1908 ["1907"], as *Schizandra*.

T: China: Shen-si [Shaanxi], [date not known], G.Giraldi [collection number not known]; type not located.

Schisandra elongata (Blume) Baill. var. *marmorata* Hallier f., *Bull. Herb. Boissier* 6: 214 (1898), as *Schizandra*.

T: based on a sterile plant cultivated at the botanical garden in Buitenzorg [Bogor].

SCHISANDRACEAE (*Kadsura*)

2. KADSURA

Kadsura Juss., *Ann. Mus. Hist. Nat.* 16: 340 (1810).

Schisandra sect. *Kadsura* (Juss.) Baill., *Hist. Pl.* 1: 189 (1868), as *Schizandra* sect. *Kadsura*. T: *Kadsura japonica* (L.) Dunal.

Pulcheria Noronha, *Verh. Batav. Gen.* 5, art 5: 3 (1791), *nom. nud.*

Sarcocarpum Blume, *Bijdr. Fl. Ned. Ind.* 21 (1825). T: *Kadsura scandens* (Blume) Blume.

Pauslowia Wight ex Arn., *Mag. Zool. Bot.* 2: 546 (1838), *nom. illeg.*

Cosbaea Lem., *Ill. Hort.* 2: 71 (1855). T: *Kadsura coccinea* (Lem.) A.C.Sm.

Woody lianes, dioecious or monoecious, glabrous (except *K. induta*). Leaves alternate, exstipulate; lamina elliptic to ovate, papery to coriaceous; base cuneate (especially when young), obtuse, truncate or subcordate; margins denticulate to entire; apex acute or acuminate. Flowers unisexual, in axils of leaves or fugacious bracts, generally solitary, occasionally with secondary flower growing in axils of bract, or in clusters of 2–4 forming glomerules, occasionally cauliflorous. Tepals 7–24, imbricate at anthesis with outermost and innermost tepals ±reduced, suborbicular, elliptic or ovate, rarely obovate, white, cream, yellow, pink or red; outer tepals often green. Male flowers with androecium of numerous (13–80) stamens; stamens sometimes ±free but adnate at base of filaments and occasionally with several subulate appendages attached to distal apex of receptacle; stamens sometimes aggregated into subglobose head with connectives either broader than thick with thecae of adjacent stamens contiguous, or with connective as broad as thick with thecae of adjacent stamens not contiguous; pollen grains hexocolpate, distally syncolpate. Female flowers with gynoecium of numerous (17–c. 300) free carpels; receptacle obovoid or subclavate or ellipsoidal, only slightly longer than broad; stigmatic crest forming subulate or laterally flattened "pseudostyle", or modified as subpetiolate or irregular "pseudostigma". Ovary with 1–5 (–11) pendulous or ventrally attached ovules. Fruit a subglobose aggregate of apocarps attached to ellipsoidal or clavate receptacle; apocarps subglobose to obovoid or elongate-obvoid, ripening red or yellow. Seeds 1–5 (–11), smooth. $x = 14$.

A genus of 16 species; E Asia, extending from Sri Lanka eastwards to the Philippines, and from Java and the Lesser Sunda Is. northwards to S Korea and Japan.

KEY TO SUBGENERA AND SECTIONS

- | | | |
|----|---|---|
| 1 | Androecium composed of ±free stamens; filaments only basally adnate; apex of receptacle of male flowers generally bearing up to 22 sterile subulate appendages, these occasionally absent | Subg. 1. COSBAEA |
| 1: | Androecium composed of stamens tightly aggregated into subglobose head; filaments ±adnate but anthers free; apical appendages absent | |
| 2: | Connectives broader than thick; thecae lateral, those of adjacent stamens contiguous | Subg. 2. KADSURA
sect. 1. KADSURA |
| 2: | Connectives as broad as thick; thecae dorsolateral, those of adjacent stamens not contiguous | Subg. 2. KADSURA
sect. 2. SAROCARPON |

Subg. 1. Cosbaea

Kadsura subg. *Cosbaea* (Lem.) Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 234, 272 (1996).

Cosbaea Lem., *Ill. Hort.* 2: 71 (1855); *Kadsura* sect. *Cosbaea* (Lem.) A.C.Sm., *Sargentia* 7: 162 (1947). T: *Kadsura coccinea* (Lem.) A.C.Sm.

Plant glabrous throughout. Flowers with elongate-conical receptacles. Male flowers with (10–) 20–70 stamens, ±free, although ±adnate at base of filaments; anthers free; connectives comparatively narrow; apex of receptacle with 0–14 (–22) sterile subulate appendages (staminodes). Female flowers with 50–70 carpels; pseudostyles narrow, subulate.

One species; S China, Indo-China, Thailand and Myanmar [Burma].

1. *Kadsura coccinea* (Lem.) A.C.Sm., *Sargentia* 7: 166–167 (1947)

Cosbaea coccinea Lem., *Ill. Hort.* 2: 71 (1855). T: icon in C.Lemaire, *Ill. Hort.* 2: 71 (1855).

Kadsura chinensis Hance ex Benth., *Fl. Hongkong.* 8 (1861), p.p. T: Hong Kong: below Victoria Peak, June 1859, H.F.Hance 601; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 41 (1998); isolecto: GH.

Schisandra hanceana Baill., *Hist. Pl.* 1: 150 (1868), as *Schizandra*. T: not cited.

Kadsura cavaleriei H.Lév., *Repert. Spec. Nov. Regni Veg.* 9: 459 (1911). T: [China:] Kweichow/Kouy-Tchéou [Guizhou], P'ing-fa [Pin-Fa], 28 May 1903, *J.Cavalerie* 3046; lecto: E, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 41 (1998); E; isolecto: K.

Kadsura hainanensis Merr., *Philipp. J. Sci., Bot.* 23: 240–241 (1923). T: [China:] Hainan, Fan Ta, 13 May 1922, F.A.McClure 9542; holo: PNH, destroyed; lecto: UC, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 41 (1998); isolecto: E, HK, K, LU [held in SYS].

Kadsura ananosma Kerr, *Kew Bull.* 1936: 34 (1936). T: Siam [Thailand]: Thanon Thong Chai Range, west-southwest of Chiang Mai, Mê Ka Pak drainage, Doi Ang Ka (Doi Inthanon), 10 Apr. 1935, H.B.G.Garrett 940; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 41 (1998); isolecto: A, E, K, L.

Kadsura chinensis var. *annamensis* Gagnep., in H.Humbert, *Fl. Gén. Indo-Chine (suppl.)* 1: 58 (1938), *nom. inval.* Based on: [Vietnam]. Annam: Blao pro: du Haut Donai, 22 Jan. 1933, *E.Poilane* 21755; P, IBSC, NY.

Kadsura calophylla A.C.Sm., *Sargentia* 7: 171–172 (1947). T: Myanmar [Burma]: Amherst District, Tenasserim, Dawna Hills, slopes of Mulayit Peak, 2 Feb. 1927, *C.E.Parkinson* 5123; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 41 (1998); isolecto: K.

Kadsura coccinea var. *sichuanensis* Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 236, 272 (1996). T: China: Sichuan, Mt Emei [Emei Shan], *W.P.Fang* 16680; holo: SZ.

[*Kadsura roxburghiana* auct. non Arn.: F.Gagnepain, in H.Humbert, *Fl. Gén. Indo-Chine (suppl.)* 1: 58 (1938)].

Illustrations: C.Y.Cheng, in W.-P.Fang, *Icon. Pl. Omeiensium* 1(2): pl. 73 (1944), as *K. chinensis*; Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 235, fig. 66, 1–5 (1996), as *K. ananosma*; R.M.K.Saunders, *Syst. Bot. Monogr.* 54: figs 5A–B, & 43, fig. 19 (1998).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 44, fig. 20 (1998).

Plant glabrous throughout. Leaves: petiole (9–) 10–30 (–41) mm long; lamina elliptic, rarely ovate-elliptic or ovate, 7–16 (–19) cm long, 2.5–7.5 (–10) cm wide, papery to coriaceous; base acute to obtuse, rarely truncate; margins entire, rarely denticulate; teeth 1–17 per side of leaf; apex acute to short-acuminate, rarely obtuse; secondary veins (3–) 5–8 (–12) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of leaves, often at base of short shoot, never cauliflorous. Tepals (8–) 10–16 (–24), white, red or purple-red (occasionally yellowish); largest tepal (7.9–) 12–22.4 (–22.8) mm long, (6–) 6.4–12 (–14.9) mm wide, peduncles (4.5–) 8–20 (–31) mm long (male), 7–38 mm long (female). Male flowers with (10–) 20–70 stamens; apex of receptacle with 0–14 (–22) sterile (occasionally partly fertile) subulate appendages (staminodes). Female flowers with 20–70 carpels; pseudostyles narrow, subulate, without pseudostigmas. Fruit peduncle 26–49 mm long; apocarps sessile, c. 14–24 mm long, 7–17 mm wide, red or purple-red; pericarp greatly thickened distally. Seeds 1 or 2 per apocarp, pyriform, 10–18 mm long, 7.5–11 mm wide. Fig. 5.

S China (Guangxi, Guizhou, Hunan, Jiangxi, Sichuan and Yunnan), Vietnam, Laos, N Thailand and Myanmar [Burma]. 36. CHC, CHH, CHS. 41. MYA, LAO, THA, VIE.

SCHISANDRACEAE (*Kadsura*)

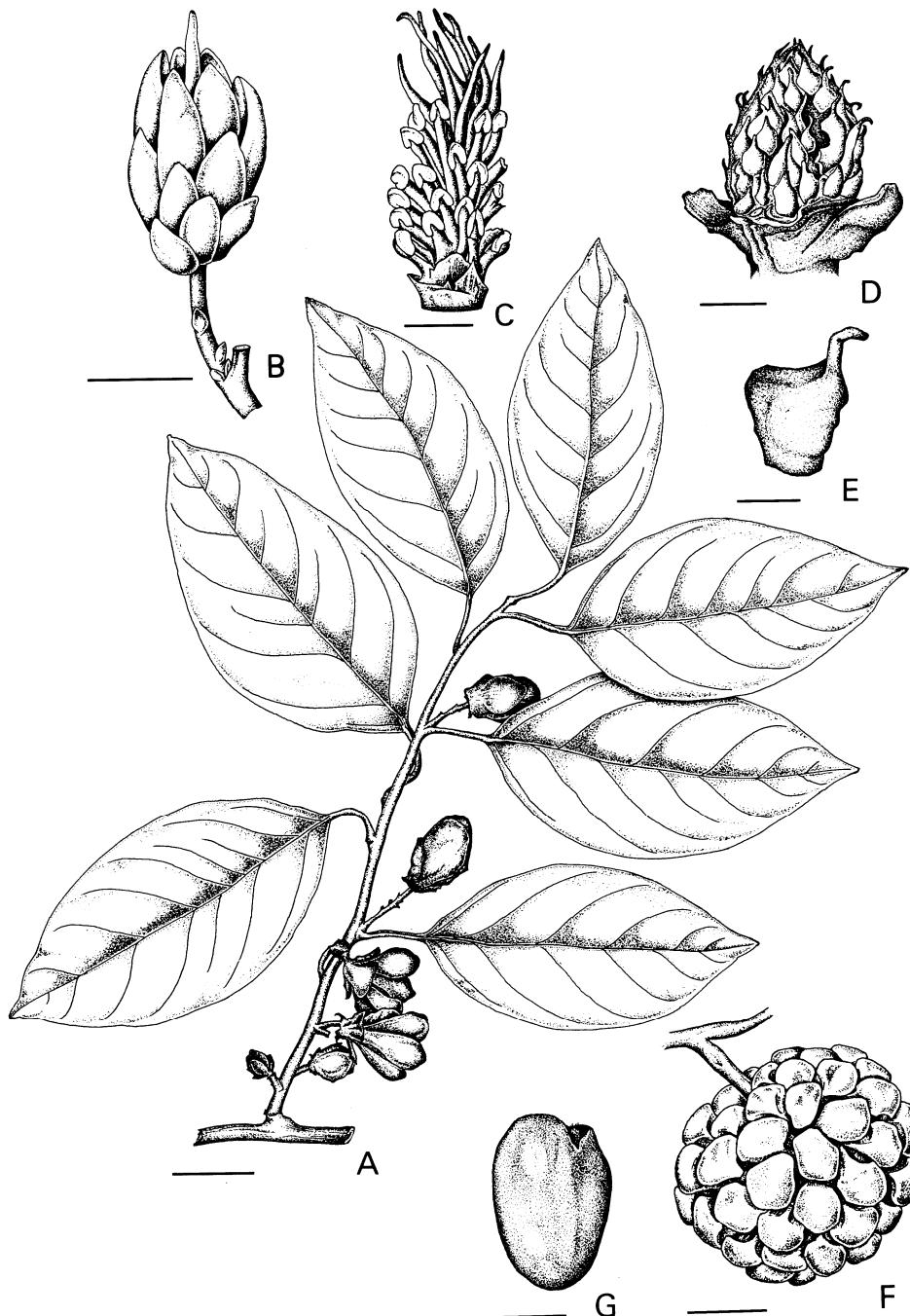


Figure 5. *Kadsura coccinea*. A, flowering branch; B, flower; C, androecium; D, gynoecium; E, isolated carpel, showing subulate pseudostyle; F, fruit; G, seed (A, A.Pételot 6860, P; B, redrawn from C.Lemaire, *Ill. Hort.* 2, fig. 1 (1855); C, W.T.Tsang 20617, IBSC; D-E, C.L.Tso 20393, IBSC; F, S.K.Lau 2725, A, redrawn from A.C.Smith, *Sargentia* 7, fig. 33m (1947); G, C.Wang 43892, IBSC). Scale bars: A = 2 cm; B = c. 10 mm; C = 3 mm; D = 2 mm; E = 0.5 mm; F = 3 cm; G = 5 mm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Syst. Bot. Monogr.* 54, fig. 19 (1998), © The American Society of Plant Taxonomists.

Scandent or climbing in semi-open shrubland and forests, often on slopes and in ravines; (200–) 400–1400 (–1900) m. Flowers May–July; fruits Oct.–Dec. Map 30.

36. CHINA SOUTH-CENTRAL: Yunnan, Yuanyang, *S.C.Ho* 85186 (IBSC); Sichuan, Mt Omei [Emei Shan], *K.H.Yang* 54509 (IBSC). HAINAN: Lam Ko-Chung Mai Distr., Paak Shek Shan, Taai Young Kwo Shan Lung, *W.T.Tsang* 725 [=LU 17474] (A, E, IBSC, L, MO, NY, SING, UC, US). CHINA SOUTHEAST: Jiangxi, Kit-tan to Hong San, *J.L.Gressitt* 1424 (A, E, MO, UC); Hunan, Dongkou, *P.C.Tam* 62771 (IBSC); Guangdong, Lok Chong, Lechang, *C.L.Tso* 20393 (IBSC, MO, NY); Guangxi, Pingnan, Yao Shan, *C.Wang* 39219 (A, IBSC). **41.** MYANMAR: above Akhail, Uring Bum, *F.K.Ward* 20955 (A). THAILAND: Me Ka Pak drainage, Doi-Angka, *H.B.G.Garrett* 940 (A, E, K, L). VIETNAM: Annam, c. 25 km from Tourane, Mt Bana [Banais], *J.Clemens & M.S.Clemens* 3768 (A, K, NY, UC).

Kadsura coccinea is used medicinally in China (Saunders, 1998: 27). The fruits are eaten locally in China (Reis Altschul, 1973: 73).

Subg. 2. *Kadsura*

Kadsura subg. *Kadsura*.

Type: *K.japonica* (L.) Dunal

Plant glabrous throughout (except *K. induta*). Flowers with subglobose receptacles. Male flowers with 15–74 stamens, aggregated into subglobose head; filaments ±adnate; anthers free, connectives broad; sterile apical appendages (staminodes) absent. Female flowers with 17–200 (–300) carpels; pseudostyles either narrow and subulate or broad with subpetiolate pseudostigmas.

15 species; E Asia, extending from Sri Lanka eastwards to the Philippines, and from Java and the Lesser Sunda Is. northwards to S Korea and Japan.

For key to sections, see p. 31.

Sect. 1. *Kadsura*

Kadsura sect. *Kadsura*.

Type: *K.japonica* (L.) Dunal

Male flowers with 24–74 stamens; connectives broader than thick, with lateral thecae so that thecae of adjacent stamens contiguous. Female flowers with 17–72 carpels; pseudostyles broad with subpetiolate pseudostigmas.

Eight species; S Korea and Japan southwards to Java and Bali, and from Sri Lanka eastwards to the Philippines, Sulawesi and the Moluccas.

- | | | |
|-----------|--|----------------------------------|
| 1 | Young shoots and abaxial leaf surfaces pubescent-tomentose | 3. <i>K. induta</i> |
| 1: | Entire plant glabrous | |
| 2: | Fruits large: apocarps (7–) 10–22 mm long, (6–) 8–14 (–15.5) mm wide; seeds variably pyriform, round or reniform, 4.2–7.5 (–8.5) mm long, 4.3–7.7 (–8.6) mm wide; carpels 28–c. 80 | |
| 3: | Lamina narrow, with length:width ratio (2.2–) 2.5–4.1 (–5.2); torus apex in staminate male flowers covered with stamens; seeds invariably round | |
| 4: | Lamina elliptic to oblong, highly papery; secondary veins conspicuously arcuate | 5. <i>K. renchangiana</i> |
| | Lamina narrowly elliptic, papery to subcoriaceous; secondary veins slightly arcuate | 4. <i>K. angustifolia</i> |

SCHISANDRACEAE (*Kadsura*)

- 3 Lamina broad, with length:width ratio (1.6–) 1.8–2.8 (–3.2); torus apex in staminate male flowers generally lacking stamens, and with short extension; seeds variably pyriform, round or reniform **2. *K. heteroclita***
- 2: Fruits small: apocarps (2.5–) 5–11.5 (–15) mm long, (2.5–) 3–7.5 (–11) mm wide; seeds invariably reniform, 2.4–4.6 mm long, 3.2–5.5 (–6.1) mm wide; carpels 17–58
- 5 Peduncles (12–) 16–40 (–64) mm long (male), and (10–) 30–50 (–162) mm long (female); tepals 10–15 (–20) **6. *K. longipedunculata***
- 5: Peduncles 8–27 mm long (male), 10–40 mm long (female); tepals 8–13
- 6 Lamina 2–3 cm wide, with length:width ratio (2.3–) 2.9–3.6 (–4) **9. *K. oblongifolia***
- 6: Lamina (2.5–) 3–5 (–6.5) cm wide, with length:width ratio 1.7–2.5 (–3.2)
- 7 Fruiting apocarps with very thin pericarp (shape of seeds apparent through pericarp when dried) **8. *K. japonica***
- 7: Fruiting apocarps with thick pericarp (shape of seeds not apparent) **7. *K. philippinensis***

2. *Kadsura heteroclita* (Roxb.) Craib, *Fl. Siam.* 1: 28 (1925 ["1931"])

Uvaria heteroclita Roxb., *Fl. Ind.*, 2nd edn 2: 455 (1832). T: [Bangladesh:] Silhet [Sylhet], Garrow Hills, "Assam", [without date] [1812, *fide* Roxburgh 1814: 43], M.R.Smith s.n.; holo: BM.

Kadsura roxburghiana Arn., *Mag. Zool. Bot.* 2: 546 (1838). T: [Bangladesh:] Silhet [Sylhet], [without date], [F.de Silva s.n.] (N.Wallich, *Cat. No.* 4987); lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 46 (1998); isolepto: A, NY.

Kadsura wightiana Arn., *Mag. Zool. Bot.* 2: 546 (1838). T: [India:] Madras, Malabar District, 1836, R.Wight 2478; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 46 (1998); isolepto: E, K, NY.

Sphaerostema blumiana Griff., *Notul. Pl. Asiat.* 4: 714 (1854), as *Sphaerostemma*. T: not cited.

Kadsura wattii C.B.Clarke, *J. Linn. Soc., Bot.* 25: 4 (1889). T: [India:] North Muneypoor [Manipur], Kaithenubee, 18 Nov. 1885, C.B.Clarke 42082; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 47 (1998); isolepto: K.

Kadsura championii C.B.Clarke, *J. Linn. Soc., Bot.* 25: 4 (1889). T: Hong Kong: [without date], J.G.Champion 36; lecto: K, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 47 (1998); isolepto: K.

Kadsura roxburghiana var. *macrocarpa* P.Parment., *Bull. Sci. France Belgique* 27: 237 (1896). T: not cited.

Kadsura acuminata P.Parment., *Bull. Sci. France Belgique* 27: 238, 315 (1896). T: [India:] Assam, [without date], F.Jenkins s.n.; lecto: P, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 47 (1998); isolepto: CAL, E, L, NY.

?*Schisandra crassifolia* Pierre ex Finet & Gagnep., *Bull. Soc. Bot. France* 54: 85 (1907), as *Schizandra*. T: Laos: bassin d'Attopeu, [without date], F.J.Harmand 1419 "in herb. Pierre sub nos. 2927 et 3321"; holo: P.

Kadsura parvifolia A.Agostini, *Atti Reale Accad. Fisiocrit. Siena*, ser. 10 1: 193 (1926). T: [Indonesia:] Sumatra, Mt Singalan, June–July 1878, O.Beccari 367; holo: FI-B; iso: K, L.

Kadsura billitonensis A.Agostini, *Atti Reale Accad. Fisiocrit. Siena*, ser. 10 1: 193–194 (1926). T: [Indonesia:] Billiton [Belitung], 1876, J.G.F.Riedel s.n.; holo: FI-B.

Kadsura polysperma Y.C.Yang, *Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot.* 12: 104 (1939). T: China: Szechuan [Sichuan], Hung-tsen-ping, Mt Omei [Emei Shan], Oct. 1938, C.W.Yao 3312; holo: PE.

Kadsura interior A.C.Sm., *Sargentia* 7: 178–179 (1947). T: China: Yunnan, Tehloching, Shunning, 5 June 1938, T.T.Yü 16138; holo: A; iso: E.

[*Kadsura japonica* auct. non Dunal: N.Wallich, *Tent. Fl. Napol.* 12 (1824)]

[*Kadsura lanceolata* auct. non King: A.E.Finet & F.Gagnepain, in P.H.Lecomte, *Fl. Gén. Indo-Chine* 1: 42 (1907)]

Illustrations: C.B.Clarke, *J. Linn. Soc., Bot.* 25: pl. 1 (1889), as *K. wattii*; Y.C.Yang, *Contr. Biol. Lab. Chin. Assoc. Advancem. Sci., Sect. Bot.* 12: 107, fig. 5 (1939), as *K. polysperma*; R.M.K.Saunders, *Syst. Bot. Monogr.* 54: figs 5D–E & 49, fig. 21 (1998).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 50–51, figs 22–23 (1998).

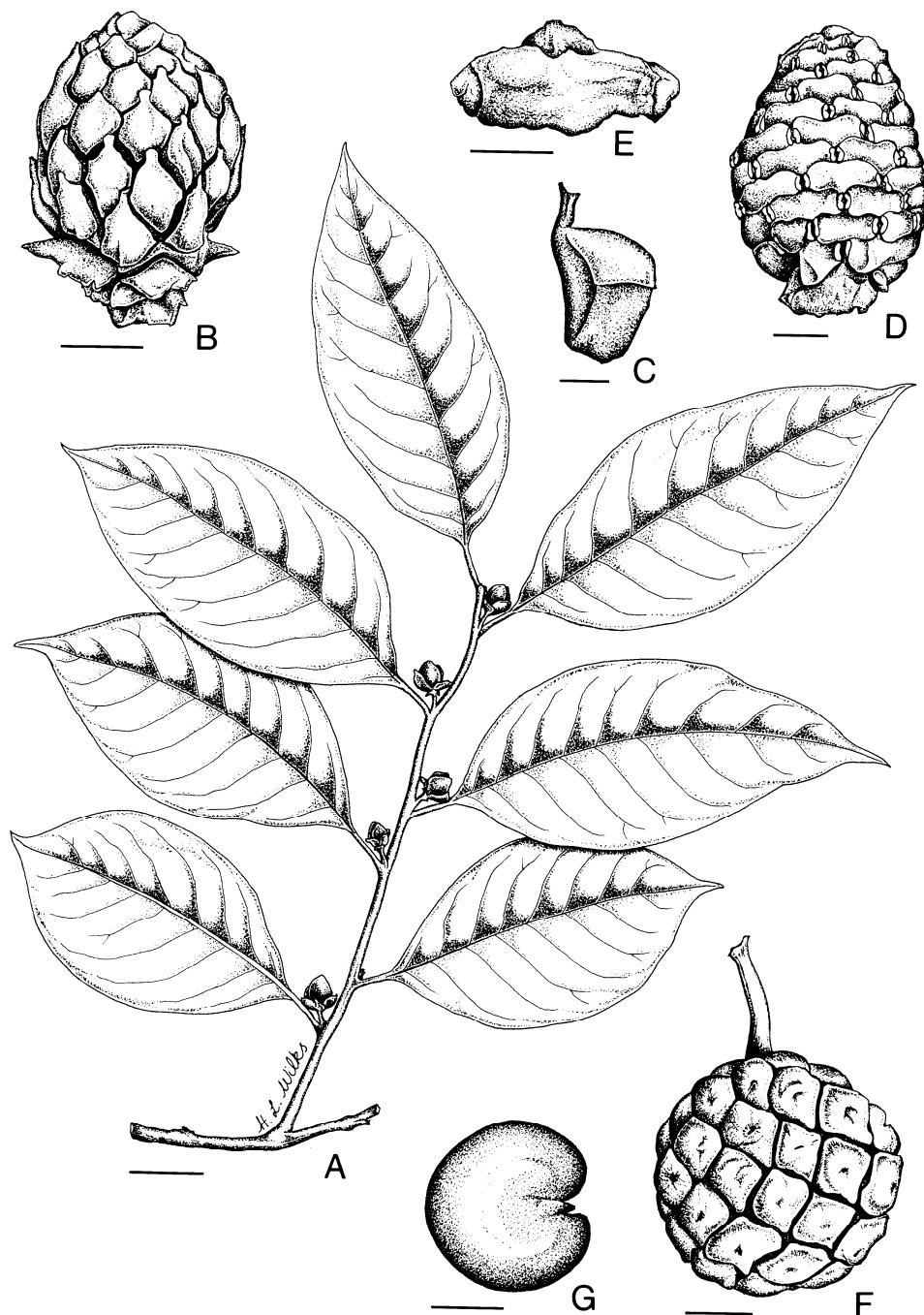


Figure 6. *Kadsura heteroclita*. A, flowering branch; B, gynoecium; C, isolated carpel; D, androecium; E, isolated stamen; F, fruit; G, seed (A, E.H.Wilson s.n., 10 Sept. 1921, A; B, P.W.Korthals s.n., [without date], L; C, F.J.Harmond 1419, P; D, E.Hennipman 3897, L; E, W.Meijer 3566, L; F, redrawn from Y.-W.Law, *Sylva Sin.*, fig. 184.2 (1983); G, Mrs N.E.Parry 426, K). Scale bars: A = 2 cm; B = 1 mm; C = 0.5 mm; D = 1 mm; E = 0.5 mm; F = c. 1 cm; G = 3 mm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Syst. Bot. Monogr.* 54, fig. 21 (1998), © The American Society of Plant Taxonomists.

SCHISANDRACEAE (*Kadsura*)

Plant glabrous throughout. Leaves: petiole (7–) 10–20 (–29) mm long; lamina elliptic, rarely ovate-elliptic, (6.5–) 7.5–13.5 (–16) cm long, (2.5–) 3.5–6.5 (–9.5) cm wide, ± papery to subcoriaceous; base cuneate to obtuse, often short-attenuate; margins entire to denticulate with 0 (–11) teeth per side; apex acute to (short-) acuminate; secondary veins 5–9 (–16) pairs per leaf, ± straight to arcuate. Flowers solitary, in axils of leaves, occasionally with secondary flower borne in axil of bract, always on young growth; peduncles (1.5–) 3–20 (–35) mm long (male), 4–33 mm long (female). Tepals 10–17 (–25), white, cream or yellow; largest tepal 4.7–20.5 mm long, (3.6–) 4.5–12 (–15) mm wide. Male flowers with 40–62 (–74) stamens, absent from apex of torus (rarely present); torus often forming an extension. Female flowers with 28–72 carpels; pseudostigmas broad, subpeltate. Fruit peduncle c. 14–46 mm long; apocarps sessile, c. (7–) 10–22 mm long, (6–) 8–10 (–15) mm wide, red. Seeds pyriform, discoid or reniform, 1 or 2 (–11) per apocarp, 4.2–5.7 (–7.6) mm long, 4.3–6.5 (–7.2) mm wide. Fig. 6.

Malesia (Java, Malay Peninsula, Sarawak and Sumatra), Indochina, S China (Fujian, Guangdong, Guizhou, Hunan, Shaanxi, Sichuan and Yunnan), Himalayan India and Sri Lanka. 36. CHC, CHH, CHS. 40. ASS, EHM, SRL. 41. LAO, THA, VIE. 42. BOR, MLY, SUM. Scendent or climbing in submontane to montane forests; 800–2000 m. Flowers and fruits throughout the year (dependent on latitude). Map 31.

36. CHINA SOUTH-CENTRAL: Yunnan, Szemao, *A.Henry* 12312 (IBSC, MO, NY, US). HAINAN: Lin Fa Mtn, *W.T.Tsang* 267 [=LU 17016] (IBSC, UC, US). CHINA SOUTHEAST: Fujian, Mang-dang-shan, Nan-ping-shi, *G.S.He* 4658 (MO). 40. ASSAM: Lushai Hills, Sialsuh, *N.E.Parry* 426 (K). SRI LANKA: Sabaragamuwa, Ratnapura Distr., Deniyaya, Sinharaja Forest above Beverley Estate, *A.H.M.Jayasuriya & S.Balasubramaniam* 3244 (A, MO, NY, PDA). 41. THAILAND: Chiang Mai, Doi Sutep, *A.F.G.Kerr* 3296 (C, E, K, UC). VIETNAM: Route de Laokay à Chapa, *A.Pételet* 8646 (A, P). 42. BORNEO: Sarawak, 3rd Div., Kapit Distr., Bukit Tibang, Ulu Balleh [Balang] ridge, *Ilias bin Paie* S.28587 (A, E, K, L). MALAYA: Pahang, Ulu Jeriau, Fraser's Hill, *T.C.Whitmore* FRI 20407 (A, SING). SUMATERA: Lampung, G. Subaijuh, *H.S.Yates* 1505 (NY, UC).

Kadsura heteroclita is used medicinally in China (Saunders, 1998: 27). The fruits are eaten locally in Himalayan India (Arora & Pandey, 1996: 129).

3. *Kadsura induta* A.C.Sm., *Sargentia* 7: 173–174 (1947)

T: China: Yunnan, P'ing-pien Hsien, 18 July 1934, *H.T.Tsai* 60946; holo: A.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 237, fig. 67, 1–9 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 56, fig. 25 (1998).

Young shoots pubescent-tomentose. Leaves: petiole (17–) 21–26 mm long, pubescent-tomentose; lamina elliptic, 11–15.5 cm long, 5–7 cm wide, ± papery, pubescent-tomentose on abaxial surface (especially on veins); base obtuse to truncate (acute in younger leaves); margins variably entire to denticulate; teeth 0–14 per side of leaf; apex (short-) acuminate; secondary veins 7–9 pairs per leaf, slightly arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles 11–18 mm long (male). Tepals 17–19; largest tepal 10–12 mm long, 6–7 mm wide. Male flowers with c. 66–72 stamens; anthers absent from apex of torus, with apex of torus forming short extension. Female flowers not seen. Fruit peduncle c. 40 mm long; apocarps sessile, c. 18–22 mm long, 14–16 mm wide, red. Seeds 3 or 4 per apocarp, variably reniform to pyriform, 6.5–8.4 mm long, 6.6–8.2 mm wide.

China (Guangxi and Yunnan). 36. CHS. Scendent or climbing in dense forests in valleys; 700–1500 m. Flowers July (based on limited data); fruits Nov. (based on limited data). Map 32.

36. CHINA SOUTH-CENTRAL: Yunnan, P'ing-pien Hsien [Pingbian], *H.T.Tsai* 60847 (A), *H.T.Tsai* 60946 (A). CHINA SOUTHEAST: Guangxi, Mubian [Napo], *C.C.Chang* 12512 (IBSC); Guangxi, Tianlin, Nanzhidi 5176 (IBSC).

4. *Kadsura angustifolia* A.C.Sm., *Sargentia* 7: 177–178 (1947)

T: [Vietnam:] Tonkin, near Cha Pa, Col de Lô-qui-Hô, 28 July 1926, *E.Poilane* 12624; holo: A; iso: K, P.
Kadsura guangxiensis S.F.Lan, *Acta Sci. Nat. Univ. Sunyatseni* 1983(2): 121 (1983). T: China: Guangxi, Longsheng Xian, Huapin Linqu, 4 July 1962, *S.F.Yuan & L.F.Liu* 5476; holo: SYS; iso: IBSC.

[*Kadsura oblongifolia* auct. non Merr.: F.Gagnepain, in H.Humbert, *Fl. Gén. Indo-Chine (suppl)* 1: 58 (1938)].

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 57, fig. 26 (1998).

Plant glabrous throughout. Leaves: petiole 10–17 mm long; lamina narrowly elliptic, 9.5–14 cm long, 2.5–4.5 cm wide, papery to subcoriaceous; base acute; margins variably subentire, denticulate, serrulate or serrate; teeth 2–10 per side of leaf; apex (long-) acuminate; secondary veins 7–13 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles c. 9–10 mm long (male), c. 10–12 mm long (female). Tepals 9–15, whitish; largest tepal c. 7.6–8.4 mm long, 5–6.2 mm wide. Male flowers with c. 50 stamens; anthers present on apex of torus. Female flowers with c. 80 carpels; pseudostyles broad. Fruit peduncle c. 40 mm long; apocarps sessile, c. 9–10.5 mm long, 8–9.5 mm wide, colour not known. Seeds 1 per apocarp, round, c. 6–7.7 mm long, 6.4–7.2 mm wide.

S China (Guangxi) and N Vietnam. 36. CHS. 41. VIE. Scandent or climbing in forests; 960–1800 m. Flowers June (based on limited data); fruits Sept. (based on limited data). Map 33.

36. CHINA SOUTHEAST: Guangxi, Longsheng Xian, Huapin Linqu, *Z.Z.Chen* 51123 (IBSC); Guangxi, Guanyang, *Z.Z.Chen* 52322 (IBSC); Guangxi, Longsheng Xian, Huapin Linqu, *S.-L.Yu & H.F.Tan* 700566 (IBSC), *S.F.Yuan & L.F.Liu* 5476 (IBSC). **41. VIETNAM:** Tonkin, between Hanoi and Bac-Ninh, *B.Balansa* 4831 (P); Phuong Mai, 15 Nov. 1882, *R.P.Bon s.n.* (P); near Cha Pa, Col de Lô-qui-Hô, *E.Poilane* 12624 (A, K, P).

Kadsura angustifolia is used medicinally in China (Saunders, 1998: 27).

5. *Kadsura renchangiana* S.F.Lan, *Acta Sci. Nat. Univ. Sunyatseni* 1983(2): 120 (1983)

T: China: Guangxi, N Luchen, SW of Shan Fang, Chu Feng Shan, 9 June 1928, *R.C.Ching* 5847; holo: SYS; iso: IBSC, NY.

Illustration: Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 241, fig. 69, 1–6 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 56, fig. 25 (1998).

Plant glabrous throughout. Leaves: petiole (10–) 12–18 (–25) mm long; lamina elliptic to oblong, (10–) 11–14 (–15.5) cm long, (2.5–) 3.5–4.5 (–5.5) cm wide, very papery; base acute (especially in younger leaves) to obtuse; margins subentire to denticulate or serrulate, occasionally lobed-serrulate; teeth (0–) 5–9 (–10) per side of leaf; apex long- (rarely short-) acuminate; secondary veins 7–9 pairs per leaf, strongly arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles 29–40 mm long (male), to 110 mm long (female). Tepals 9–15, yellow; largest tepal 9.8–10.4 mm long, 7.7–9.3 mm wide. Male flowers with 42–50 stamens; anthers invariably present at apex of torus. Female flowers with 42–70 carpels. Fruit peduncle (20–) 100–165 mm long; apocarps sessile, 10–15 (–20) mm long, (8.5–) 9.5–14 (–15.5) mm wide, red to black. Seeds 1 per apocarp, round, (6.3–) 6.8–7.5 (–8.5) mm long, (6.7–) 7.1–7.7 (–8.6) mm wide.

China (Guangxi). 36. CHS. Scandent or climbing in dense woodland; 900–1300 m. Flowers June (based on limited data); fruits Nov. (based on limited data). Map 34.

36. CHINA SOUTHEAST: Guangxi, Damiaoshan [Jinxiu], *T.C.Chen* 870 (IBSC); Guangxi, Damiaoshan [Jinxiu], *S.H.Chun* 14268 (IBSC), *S.H.Chun* 15229 (IBSC); Guangxi, Jinxiu, *Dayaoshan Expedition* 13063 (IBSC); Guangxi, Damiaoshan [Jinxiu], *C.H.Lui* 2524 (IBSC); Guangxi, Longsheng, *Guangfu Expedition* 781 (IBSC); Guangxi, Ying-kiang, Fan-ching Shan [Fanjingshan], *S.S.Sin* 51409A (IBSC); Guangxi, Longsheng, *H.F.Tan* 700851 (IBSC), *H.F.Tan* 700863 (IBSC).

SCHISANDRACEAE (*Kadsura*)

6. *Kadsura longipedunculata* Finet & Gagnep., *Bull. Soc. Bot. France* 52, Mém. 4: 53 (1905), reprinted in *Contr. Fl. As. Or.* 2: 53 (1907), as *K. longepedunculata*

T: China: Su-tchuen [Sichuan], Tchen-kéou-tin [Chengkou] district, [without date], *P.G.Farges s.n.*; holo: P. *Kadsura discigera* Finet & Gagnep., *Bull. Soc. Bot. France* 52, Mém. 4: 52 (1905), reprinted in *Contr. Fl. As. Or.* 2: 52 (1907). T: China: Su-tchuen oriental [Sichuan], Tchen-kéou-tin [Chengkou] district, [without date], *P.G.Farges s.n. ("A")*; lecto: P, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 58 (1998).

Kadsura peltigera Rehder & E.H.Wilson, in C.S.Sargent, *Pl. Wils.* 1: 410 (1913). T: China: Kiangsi [Jiangxi], below Kuling, 1 Aug. 1909, *E.H.Wilson* 1736; lecto: A, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 58 (1998); isolepto: A, E, IBSC, K, US.

Kadsura omeiensis S.F.Lan, *Acta Sci. Nat. Univ. Sunyatseni* 1983(2): 122 (1983). T: China: Sichuan, Mt Omei [Emei Shan], 22 Sept. 1952, *C.H.Hsing et al.* 32878; holo: SZ; iso: IBK.

[*Kadsura japonica* auct. non Dunal: S.T.Dunn & W.J.Tutcher, *Kew Bull., Addit. Ser.* 10: 29 (1912); H.Handel-Mazzetti, *Symb. Sin.* 7: 245 (1931)]

[*Schisandra axillaris* auct. non Hook.f. & Thoms.: L.Diels, *Bot. Jahrb. Syst.* 29: 322 (1900), as *Schizandra*]

Illustrations: C.Y.Cheng, in W.-P.Fang, *Icon. Pl. Omeiensium* 1(2): pl. 74 (1944), as *K. peltigera*; Y.-W.Law, *Sylva Sin.* 528, fig. 183 (1983); Y.-W.Law, *Fl. Reipubl. Popularis Sin.* 30(1): 239, fig. 68, 9–15 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 60, fig. 27 (1998).

Plant glabrous throughout. Leaves: petiole (6–) 8.5–17 (–30) mm long; lamina elliptic (occasionally ovate-elliptic or obovate-elliptic), (5.5–) 6.5–12 (–15) cm long, (2–) 2.5–4.5 (–6.5) cm wide, variably papery to coriaceous; base acute (rarely obtuse in older leaves); secondary veins (4–) 5–7 (–8) pairs per leaf, (slightly) arcuate; margins variably subentire to denticulate, serrulate or serrate; teeth (0–) 3–8 (–10) per side of leaf; apex short-to long-acuminate. Flowers solitary, in axils of leaves, always on young growth; peduncles (12–) 16–40 (–64) mm long (male), (10–) 30–50 (–162) mm long (female). Tepals 10–15 (–20), (pale) yellow, occasionally reddish; largest tepal (4–) 5–7 (–12.9) mm long, (3.1–) 3.5–6 (–10) mm wide. Male flowers with 26–54 stamens; anthers usually present on apex of torus. Female flowers with (20–) 32–58 carpels; pseudostyles ±broad. Fruit peduncle 25–95 mm long; apocarps sessile, 6.5–11.5 (–15) mm long (4.5–) 5.5–6.5 (–11) mm wide, red, purple (rarely black); pericarp thin. Seeds 1–3 per apocarp, reniform, 3.4–4.6 mm long, 4.8–5.5 (–6.1) mm wide. 2n = 28, Z.Wu & C.Huang, *Guiaia* 15: 47–51 (1995).

China (Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan and Zhejiang). 36. CHC, CHH, CHS. Scandent or climbing in woodlands, generally near rivers; 100–1300 (–1700) m. Flowers June–Aug.; fruits (Sept.–) Oct. onwards. Map 35.

36. CHINA SOUTH-CENTRAL: Sichuan, Mt Omei [Emei Shan], *Hsiung, Chang & Tsiang* 33544 (IBSC); Guizhou, near Lengjiaba, Songtao Xian, *Sino-American Guizhou Botanical Expedition* 1891 (NY). HAINAN: Tunchang, *G.A.Fu* 4102 (IBSC). CHINA SOUTHEAST: Fujian, "Bo Gan" Valley, Baek-liang and vicinity, *H.C.Chen* 3127 (UC); Zhejiang, between Ping Yung and Tai Suan, *R.C.Ching* 2176 (IBSC, UC, US); S Anhwei [Anhui], W Chemen, Li kan, *R.C.Ching* 3159 (UC); Hunan, near Cao-jia, Su-yuan-bao, Yi-zhang, *S.H.Chun* 2115 (MO); Guangxi, Zu-fu-shan, Di-jia, Jiu-wan-shan, Luo-dong-xiang, San-fang region, Da-miao-shan, *S.H.Chun* 14448 (MO); Guangdong, Loh Fau Mountain (Lofaushan), *E.D.Merrill* 11015 (NY, UC); Jiangxi, Yun Lun Feng, Lushan, *K.Yao* 8571 (K, NY, MO).

Kadsura longipedunculata is used medicinally in China (Saunders, 1998: 27). Fragrant oils are derived from the stems, leaves and fruit, and the stems have been used in the manufacture of rope (Wang, 1980: 803). The fruits are eaten locally in China (Reis Altschul, 1973: 73).

7. *Kadsura philippinensis* Elmer, *Leafl. Philipp. Bot.* 1: 277 (1908)

T: Philippines: Luzon, Benguet, near the barrio of Bacong, 5 miles [c. 8 km] north of Baguio, [without date], *A.D.E.Elmer* 8700; holo: PNH, destroyed; lecto: A, *fide* R.M.K.Saunders, *Fl. Males. I*, 13: 198 (1997); isolepto: A, E.

Kadsura paucidenticulata Merr., *Philipp. J. Sci., Bot.* 5: 176–177 (1910). T: Philippines: Luzon, Benguet, Mt Pauai [Pawoi], June 1909, *R.C.McGregor* 8498; holo: PNH, destroyed; lecto: K, *fide* R.M.K.Saunders, *Fl. Males. I*, 13: 198 (1997); isolepto: L, NY.

Kadsura macgregorii Merr., *Philipp. J. Sci., Bot.* 5: 177 (1910). T: Philippines: Luzon, Benguet, Mt Pauai [Pawoi], June 1909, *R.C.McGregor* 8340; holo: PNH, destroyed.

Kadsura sorsogonensis Elmer ex Merr., *Enum. Philipp. Fl. Pl.* 2: 153 (1923), *nom. illeg.*

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 63, fig. 28 (1998).

Plant glabrous throughout. Leaves: petiole (6.5–) 7.5–15 (–17) mm long; lamina elliptic, rarely ovate-elliptic or ovate, (6.5–) 7–10 (–11.5) cm long, 3–5 (–6) cm wide, ± papery; base cuneate to obtuse; apex acute to acuminate; margins entire to denticulate; teeth 0–4 (–6) per side of leaf; secondary veins 5–6 (–7) pairs per leaf, often indistinct due to presence of intersecondary veins, slightly arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles 10–27 mm long (male), 16–26 mm long (female). Tepals 10–12, reddish (outer), white or yellow (inner); largest tepal 4.2–10.6 mm long, 4.7–8.4 mm wide. Male flowers with c. 24–42 stamens, absent from apex of torus. Female flowers with 17–36 carpels; pseudostigmas broad, subpetiolate. Fruit peduncle c. 28–38 mm long; apocarps sessile or on short stipe, to c. 1.2 mm, c. (2.5–) 5–6 mm long, (2.5–) 3–3.5 (–5) mm wide, white to brown; pericarp thick. Seeds 1 or 2 per apocarp, reniform, c. 2.6–4.2 mm long, 3.4–4.7 mm wide.

Philippines (Luzon and Mindanao). 42. PHI. Scandent or climbing in submontane to montane forests; 850–2100 m. Flowers Mar.–Dec.; fruits Nov.–Dec. Map 36.

42. PHILIPPINES: Luzon, Abra Prov., Massisiat-Mt Pultoc, *G.L.Alcasid et al.* 304 (= PNH 1701) (A, PNH), *G.L.Alcasid et al.* 312a [=PNH 1594] (A, PNH); Mindanao, L. Lanao, Camp Keithly, *M.S.Clemens* 1145 (A, BO, US); Mindanao, Davao Distr., Todaya (Mt Apo), *A.D.E.Elmer* 11498 (A, E, L, NY, US); Luzon, Sorsogon Prov., Irosin (Mt Bulusan), *A.D.E.Elmer* 17032 (A, C, L, NY, UC); Luzon, Benguet, Sablang, Balacbac, *E.Fénix* 12629 (L); Luzon, Rizal Prov., *A.Lohr* 13000 (A, UC); Luzon, Benguet, Pauai [Pawoi], *R.C.McGregor* 8498 (K, L, NY); Luzon, Albay, Mayon Volcano, *D.R.Mendoza* 1044 [=PNH 18173] (L, PNH); Luzon, Sorsogon Prov., *M.Ramos* 23531 (A, L, NY, US).

8. *Kadsura japonica* (L.) Dunal, *Monogr. Anon.* 57 (1817)

Uvaria japonica L., *Sp. Pl.* 536 (1753). T: icon in E.Kaempfer, *Amoen. Exot.* 477 (1712).

Kadsura matsudai Hayata, *Icon. Pl. Formosan.* 9: 4 (1920). T: Formosa [Taiwan]: Ariko, Jan. 1917, Y.Matsuda s.n.; type: not located.

Illustrations: A.Schnizlein, *Icon. Fam. Nat. Regni Veg.* 3: pl. 175 (1843); T.-S.Liu, *Ill. Native Introd. Lign. Pl. Taiwan* 1: 82, pl. 68 (1960); H.-L.Li, *Fl. Taiwan* 2: 400, pl. 350 (1976), reproduced in H.-L.Li & S.-M.Chaw, *Fl. Taiwan* 2nd edn, 2: 424, pl. 196 (1996).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 66, fig. 30 (1998).

Plant glabrous throughout. Leaves: petiole (6.5–) 11–17 (–23) mm long; lamina elliptic, rarely ovate-elliptic or obovate-elliptic, (6–) 7.5–10.5 (–12.5) cm long, (2.5–) 3–5 (–6.5) cm wide, papery to subcoriaceous; base acute (younger leaves) to obtuse (older leaves); margins subentire to denticulate, serrulate or serrate, rarely lobed-serrulate; teeth (0–) 4–6 (–10) per side of leaf; apex (short-) acuminate; secondary veins 5–7 (–8) pairs per leaf, often indistinct due to presence of intersecondary veins, (slightly) arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles (11–) 14–26 mm long (male), 13–39 mm long (female). Tepals 8–12, yellow; largest tepal (6.1–) 7.2–8.6 (–11.8) mm long, (4.3–) 5.7–6.8 (–7.5) mm wide. Male flowers with 28–50 stamens; anthers either present or absent from apex of torus; when stamens absent, apex lacks extension. Female flowers with 30–48 carpels; pseudostyles variably broad and subpetiolate. Fruit peduncle (20–) 26–40 (–61) mm long; apocarps sessile, 5.5–7.5 (–10) mm long, 5.5–7.5 mm wide, red to purple; pericarp very thin, not distally thickened. Seeds 1–3 per apocarp, reniform, 3.2–3.9 mm long, 4.4–4.9 (–5.5) mm wide. $2n = 28$, T.W.Whitaker, *J. Arnold Arbor.* 14: 376–385 (1933); H.Okada, *J. Jap. Bot.* 46: 29–33 (1971); H.Okada, *J. Sci. Hiroshima Univ., Ser. B, Div. 2, Bot.* 15: 115–200 (1975); R.-Y.Chen et al., *Chrom. Atlas Chin. Princ. Econ. Pl.* 1: 321–322 (1993).

S Japan, S Korea, Nansei-Shoto and Taiwan. 38. JAP, KOR, NNS, TAI. Scandent or climbing in forests, often near water; sea level to 500 m (Japan and Korea), to 2000 m (Taiwan). Flowers Apr.–Oct.; fruits Oct.–Dec. Map 37.

38. JAPAN: Kyushu, Kagoshima Pref., Yakushima Is., along Suzukawa R. from Onoaida to Janokuchi-taki waterfall, Yaku-cho, *D.E.Boufford & S.Mitsuta* 20185 (MO); Honshu, Ishikawa Pref., Kaga-shi, Shioya-machi, Kashima-jinja, *K.Deguchi* 5508 (MO); Honshu, Osaka Pref., Takatsuki-shi, Kawakubo, *M.Hotta & H.Koyama* 800 (C, E, MO, NY, UC); Kyushu, Nagasaki Pref., Tsushima Is., Shimoagata-gun, Kyozuka to

SCHISANDRACEAE (*Kadsura*)

Komoda, *H.Ohashi, H.Ohba & Y.Tateishi* 141 (E, NY, UC). KOREA: South Korea, Hongno, *T.Taquet* 2592 (E, K). NANSEI-SHOTO: Loochoo [Ryukyu] Is., Sakishima-Gunto, Ishigaki Is., *J.L.Gressitt* 613 (NY); Okinawa Is., near Nago, Kunigami, *E.H.Walker, S.Sonohara, S.Tawada & T.Amano* 6366 (US). TAIWAN: Taichung Co., Chia Yang Nursery, *Edinburgh Taiwan Expedition (1993)* 129 (E); Botel Tobago, Mt Hon-tou, *T.C.Huang & M.T.Kao* 6199 (MO).

Kadsura japonica is used medicinally (Saunders, 1998: 27). A viscid derivative of the bark was previously used as a pomade for hair-dressing in Japan (Walker, 1976: 472), and a mucilaginous extract from the leaves was used in traditional Japanese *washi* paper manufacture (Kaempfer, 1729: 254). The fruits are eaten locally in Japan (Hatushima & Amano, 1958) and Taiwan (Liu, 1960: 82). *Kadsura japonica* is the only species in the genus of horticultural significance (Krüssman, 1985: 195; Cullen & Howe, 1989: 318), generally grown for its foliage and scarlet fruits.

9. *Kadsura oblongifolia* Merr., *Philipp. J. Sci., Bot.* 23: 241 (1923)

T: China: Hainan, Na-ta [Nodoa], [without date], *F.A.McClure* 1668 (=8011); holo: PNH, destroyed; lecto: UC, *fide* R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 67 (1998); isolecto: MO.

Illustrations: A.C.Smith, *Sargentia* 7: 177 fig. 36a–e (1947); Y.-W.Law, *Sylva Sin.* 527, fig. 182 (1983); W.F.Huang, *Fl. Guangdong* 1: 23, fig. 22 (1987).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 68, fig. 31 (1998).

Plant glabrous throughout. Leaves: petiole (5–) 6–9 (–14) mm long; lamina elliptic, rarely oblong-elliptic, (6–) 7.5–8.5 (–10) cm long, 2–3 cm wide, papery to subcoriaceous; base acute, rarely obtuse; margins (sub) entire, rarely denticulate; teeth 0 (–5) per side of leaf; apex rounded, acute or short-acuminate; secondary veins (4–) 5 or 6 pairs per leaf, often indistinct due to presence of intersecondary veins, (slightly) arcuate. Flowers solitary, in axils of leaves, always on young growth; peduncles 8–15 mm long (male), 10–30 mm long (female). Tepals 11–13, yellow to pink; largest tepal 4.5–8 mm long, 3.5–5.5 mm wide. Male flowers with c. 24–25 stamens; anthers present on apex of torus. Female flowers with 30–50 carpels; pseudostyles broad. Fruit peduncle 20–32 (–37) mm long; apocarps sessile, (3.5–) 5–6 (–8) mm long, 3.5–4.5 mm wide, red; pericarp very thin, not distally thickened. Seeds 1 or 2 per apocarp, reniform, 2.4–3.3 (–3.8) mm long, (3.2–) 3.5–4 (–4.5) mm wide.

S China (Hainan, Guangdong, Guangxi). 36. CHH, CHS. Scandent or climbing in dense to sparse woods, often on hillsides, and typically on dry soils; 150–900 m. Flowers and fruits July–Nov. Map 38.

36. CHINA SOUTHEAST: Guangxi, Bebai, *S.Q.Chun* A63283 (IBSC); Guangdong, Wen-fu-she, Da-bu Co., Bu-cheng, *S.C.Lee* 202745 (IBSC, MO); Guangdong, near Yue-shan, Huai-ji Co., *Y.G.Liu* 3013 (IBSC, MO); Guangdong, Yangchun, *C.Wang* 38415 (IBSC), *C.Wang* 42076 (IBSC); Guangxi, Lang-ping, Bo-bai, *S.Q.Zhong* B30 (MO). HAINAN: Nor-Tai-See, "Chinese collector, comm. C. Ford 441" (NY); Ching Mai Distr., Tung Pin Tin, Tai Wong Ling, *C.I.Lei* 205 (IBSC, SING, NY, UC, US); Lin Fa Shan, Tsai-keng, *W.T.Tsang* 357 [=LU 15856] (IBSC, UC); Lam Ko Distr., Lin Fa Shan and vicinity, *W.T.Tsang* 557 [=LU 15856] (NY).

Kadsura oblongifolia is used medicinally in China (Saunders, 1998: 27). The fruits are eaten locally in China (Reis Altschul, 1973: 73).

Sect. 2. *Sarcocarpon*

Kadsura sect. *Sarcocarpon* (Blume) A.C.Sm., *Sargentia* 7: 163–164 (1947).

Sarcocarpon Blume, *Bijdr. Fl. Ned. Ind.* 21 (1825). T: *Kadsura scandens* (Blume) Blume.

Male flowers with 15–57 stamens; connectives as broad as thick, with thecae of adjacent stamens not contiguous. Female flowers with 18–200 (–300) carpels; pseudostyles either narrow and subulate (*K. lanceolata* and *K. borneensis*) or broad with subpeltate pseudostigmas (other species).

Seven species; Indochina, Thailand and W Malesia.

- 1 Stamens 15–32; carpels 18–68; pseudostyles narrow, subulate
- 2 Lamina (5.5–) 6.5–13 (–14.5) cm long, (2.5–) 3–5.5 (–6) cm wide, with (3–) 4–6 (–9) pairs of secondary veins per leaf; flower peduncle (2–) 4–11 (–15) mm long
 - 10. *K. lanceolata***
- 2: Lamina (10.5–) 12–17.5 (–21.5) cm long, 6.5–11 (–15) cm wide, with (5–) 7 or 8 (–9) pairs of secondary veins per leaf; flower peduncle 0–1.5 mm long
 - 11. *K. borneensis***
- 1: Stamens 21–57; carpels 35–200 (–300); pseudostyles broad with subpeltate pseudostigmas
 - 3 Lamina length:width ratio (1.7–) 1.8–2.6 (–2.7); outer tepals 4–8.9 mm long, 2.3–7.3 mm wide, slightly reduced to 0.4–0.7 of length of largest
 - 14. *K. acsmithii***
 - 3: Lamina length:width ratio (1.1–) 1.4–2.1 (–3); outer tepals 1.5–3.8 mm long, 2–4.7 mm wide, very reduced to 0.1–0.4 of length of largest
 - 16. *K. celebica***
 - 4 Flower peduncles 2–15 mm long in female flowers; outer tepal broad, with length:width ratio 0.6–0.8
 - 5 Carpels 35–40
 - 15. *K. marmorata***
 - 5: Carpels 100–200 (–300)
 - 4: Flower peduncles usually more than 15 mm long in female flowers (to 62 mm); outer tepal narrow, with length:width ratio 0.7–1.2
 - 6 Leaf intercostal venation indistinct adaxially, prominent abaxially; apocarps subglobose, (3.5–) 7–11 (–12) mm long, (3.5–) 6–10 (–12) mm wide, with length:width ratio of 0.9–1.3, borne on stipes (1.8–) 2.9–10.8 (–15.2) mm long; carpels (20–) 44–55
 - 13. *K. verrucosa***
 - 6: Leaf intercostal venation prominent both ad- and abaxially; apocarps elongate, 9.5–22 (–30) mm long, 6.5–14 (–17.5) mm wide, with length:width ratio of 1.2–1.8 (–2.1), sessile; carpels 50–82 (–110)
 - 12. *K. scandens***

10. *Kadsura lanceolata* King, *J. Asiatic. Soc. Bengal* 58: 376 (1889)

T: [no locality or date], "Dr King's collector" [H.H.Kunstler] 3463; lecto: K, *fide* A.C.Smith, *Sargentia* 7: 204 (1947).

Kadsura ultima A.C.Sm., *Sargentia* 7: 207–208 (1947). T: [Indonesia: Moluccas], Amboina [Ambon], Hatalae, 24 Oct. 1913, C.B.Robinson 2005; holo: US; iso: K, L.

Illustration: G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 73B (1891).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 70, fig. 32 (1998).

Plant glabrous throughout. Leaves: petiole (5–) 7–18 (–22) mm long; lamina (ovate-) elliptic, rarely ovate, (5.5–) 6.5–13 (–14.5) cm long, (2.5–) 3–5.5 (–6) cm wide, coriaceous; base obtuse, rarely truncate (cuneate in younger leaves); margins entire; apex acuminate, rarely acute; secondary veins (3–) 4–6 (–9) pairs per leaf, slightly arcuate. Flowers solitary, in axils of leaves, occasionally with secondary flower borne in axil of bract, always on young growth; peduncles 2–6 (–15) mm long (male), c. 5–10 mm long (female). Tepals 7–14, pink to dark red (outer), cream to yellow (inner); largest tepal 5–7.8 (–13.5) mm long, 3.5–6.3 (–14.7) mm wide. Male flowers with 15–32 stamens. Female flowers with 18–68 carpels; pseudostyles subulate, without pseudostigmas. Fruit peduncle 4–14 mm long; apocarps sessile, 5–6.5 mm long, 4–6 mm wide, red or yellow; pericarp ±uniform in thickness or slightly thicker distally. Seeds 1–3 per apocarp, discoid to pyriform, (3.7–) 4.1–4.5 (–5.2) mm long, (3–) 3.4–5 mm wide.

Malesia (Borneo, Malay Peninsula, Moluccas, Sulawesi and Sumatra). 42. BOR, MLY, MOL, SUL, SUM. Scandent or climbing in tropical to submontane forests, occasionally in montane and subalpine forests; to 1400 (–2900) m. Flowers Apr.–Nov.; fruits May–Dec. Map 39.

SCHISANDRACEAE (*Kadsura*)

42. BORNEO: Sarawak, 1st/2nd Div. boundary, Ulu Simunjan, G. Buri, *P.Chai et al.* S.36771 (K, L); Sabah, Mt Kinabalu, Dallas, *J.Clemens & M.S.Clemens* 27272 (A, K, L, NY, UC); Kalimantan Timur, Sg. Susuk region, E Kutei, *A.Kostermans* 5719 (L). MALAYA: Pahang, Fraser's Hill, *H.Keng, C.Y.Weer & students* 10676 (SING); Perak, Larut, "Dr King's collector" [H.H.Kunstler] 3700 (K). MOLUCCAS: Halmahera, G. Sembilan, *D.R.Pleyte* 344 (K, L, SING). SULAWESI: Central Sulawesi, Upper Sopu Valley, *M.M.J.van Balgooy* 3536 (L). SUMATERA: Lampung, Mt Tanggamus, *M.Jacobs* 8229 (K, L); Sumatera Barat, Air Sirah on watershed above Padang, Barisan Ra., *E.F.de Vogel & P.Vermeulen* 7420 (L); Aceh, G. Leuser Nature Reserve, Upper Mamas R. Valley, c. 15 km W of Kutacane, *W.J.J.O.de Wilde & B.E.E.de Wilde-Duyfjes* 19038 (L).

11. *Kadsura borneensis* A.C.Sm., *Sargentia* 7: 205 (1947)

T: [Malaysia:] British North Borneo [Sabah], Mt Kinabalu, 15 Aug. 1933, *J.Clemens & M.S.Clemens* 34425; holo: UC; iso: A, K, L, NY.

Illustration: A.C.Smith, *Sargentia* 7: 206, fig. 41a (1947).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 73, fig. 33 (1998).

Plant glabrous throughout. Leaves: petiole (14.5–) 16.5–32 mm long; lamina elliptic to ovate, (10.5–) 12–17.5 (–21.5) cm long, 6.5–11 (–15) cm wide, very coriaceous; base obtuse to truncate; margins entire; apex acute to acuminate; secondary veins (5–) 7 or 8 (–9) pairs per leaf, arcuate. Flowers solitary, either in axils of leaves or in axils of fugacious bracts, on young growth; peduncles 0–1.5 mm long (both sexes). Tepals 12–20, yellow; largest tepal 5.8–12.3 mm long, 4–11.7 mm wide. Male flowers with 18–28 stamens. Female flowers with c. 35 carpels; pseudostyles subulate, without pseudostigmas. Fruit peduncle short; apocarps sessile, (10.5–) 14–22 (–24) mm long, (9–) 9.5–11.5 (–12.5) mm wide, reddish-purple; pericarp greatly thickened distally. Seeds 1 per apocarp, reniform, c. 7.4 mm long, 8 mm wide.

Borneo (Mt Kinabalu, Sabah). 42. BOR. Scandent or climbing in tropical montane forests; to 2000 m. Flowers Aug.–Sept. Map 40.

42. BORNEO: Sabah, Mt Kinabalu, Mahandui R., *C.E.Carr* 26291 (SING); Sabah, Mt Kinabalu, Mesilau R., *W.L.Cheew & E.J.H.Corner* 4114 (SING); Sabah, Mt Kinabalu, *W.L.Cheew, E.J.H.Corner & A.Stainton* 173 (K); Sabah, Ulu Liwagu and Ulu Mesilau, Mt Kinabalu, *W.L.Cheew, E.J.H.Corner & A.Stainton* 2508 (K, L, SING); Sabah, Mt Kinabalu, Mesilau Cave, *W.L.Cheew & E.J.H.Corner* 4711 (K, L, SING); Sabah, Mt Kinabalu, *J.Clemens & M.S.Clemens* 30555 (A, L, NY, UC), *J.Clemens & M.S.Clemens* 31889 (K, L, NY, UC), *J.Clemens & M.S.Clemens* 34425 (A, K, L, NY, UC); Sabah, Upper Kinabalu, Dehobong R., *J.Clemens & M.S.Clemens* 40493 (A); Sabah, Ranau, Kinabalu, *H.T.Sinanggul* 38367 (K, L).

12. *Kadsura scandens* (Blume) Blume, *Fl. Javae [Schizandreae]* 9–11 (1830)

Sarcocarpion scandens Blume, *Bijdr. Fl. Ned. Ind.* 21 (1825); *Kadsura scandens* var. *normalis* Kuntze, *Revis. Gen. Pl.* 1: 6 (1891), nom. inval.; *Kadsura wallichii* Korth. ex Koord., *Exkurs.-Fl. Java* 2: 242 (1912), nom. inval., publ. pro syn.; *Pulcheria rosea* Noronha ex Steenis & Steen.-Krus., *Regnum Veg.* 71: 369 (1970), nom. inval., publ. pro syn. T: [Indonesia:] Java, without date], *C.L.Blume* s.n.; lecto: L, fide R.M.K.Saunders, *Fl. Males. I.* 13: 199 (1997); isolepto: K, NY.

Kadsura cauliflora Blume, *Fl. Javae [Schizandreae]* 11–12 (1830); *Kadsura scandens* var. *cauliflora* (Blume) Kuntze, *Revis. Gen. Pl.* 1: 6 (1891). T: [Indonesia:] Java, [Mt Boerangrang, without date], *C.L.Blume* s.n.; lecto: L, fide R.M.K.Saunders, *Fl. Males. I.* 13: 199 (1997); isolepto: K, L.

Kadsura scandens var. *intermedia* Kuntze, *Revis. Gen. Pl.* 1: 6 (1891). T: [Indonesia:] Java, Sagaranten-Rambai, 26 June 1875, *O.Kuntze* 521; lecto: NY, fide R.M.K.Saunders, *Fl. Males. I.* 13: 199 (1997).

Schisandra ovalifolia Parment., *Bull. Sci. France Belgique* 27: 237, 312 (1896), as *Schizandra*. T: [Indonesia:] Sumatra, Padang, Ajer Mantjoer, Aug. 1878, *O.Beccari* 667; holo: MEL; iso: K, L.

[*Schisandra axillaris* auct. non Hook.f. & Thoms.: C.E.O.Kuntze, *Revis. Gen. Pl.* 1: 6 (1891), as *Schizandra*]

Illustrations: C.L.Blume, *Fl. Javae [Schizandreae]* pl. 1–2 (1830), in part as *K. cauliflora*; pl. 1 reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 54: frontispiece (1998); G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 71 (1891); R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 75, fig. 34 (1998).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 76, fig. 35 (1998).

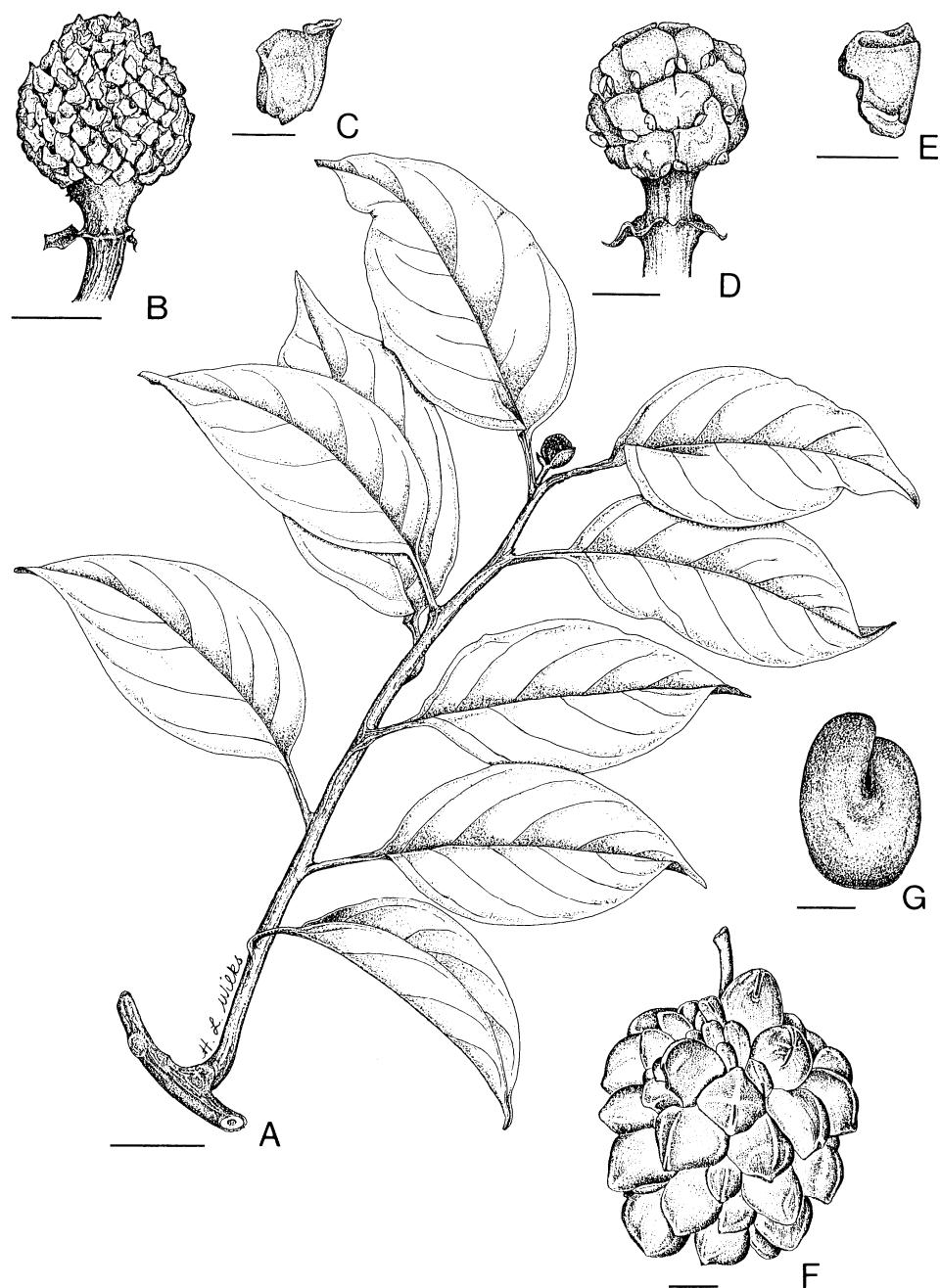


Figure 7. *Kadsura scandens*. A, flowering branch; B, gynoecium; C, isolated carpel (lateral view); D, androecium; E, isolated stamen (lateral view); F, fruit; G, seed (A, H.N.Ridley 6354, SING; B–C, M.Nur 26103, SING; D–E, P.W.Korthals s.n., L; F, redrawn from C.G.G.J.van Steenis, *Mount. Fl. Java*, fig. 29.3 (1972); G, N.Wirawan 134, L). Scale bars: A = 3 cm; B = 3 mm; C, E = 1 mm; D = 2 mm; F = 1 cm; G = 2 mm. Drawn by H.L.Wilks. Reproduced from R.M.K.Saunders, *Fl. Males. I*, 13, fig. 1 (1997), © Rijksherbarium/Hortus Botanicus, Leiden.

SCHISANDRACEAE (*Kadsura*)

Plant glabrous throughout. Leaves: petiole (7.5–) 11.5–30 (–48) mm long; lamina elliptic to ovate, (9–) 10–15 (–21) cm long, (4.5–) 5–9 (–15) cm wide, papery to coriaceous; base obtuse to truncate (cuneate in younger leaves); margins entire; apex acute to acuminate; secondary veins 4–6 (–8) pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of leaves or fugacious bracts, occasionally with secondary flower in axil of bract, occasionally cauliflorous; peduncles (4–) 8–13 (–18) mm long (male), 12–62 mm long (female). Tepals 10–18 (–24), white, pale yellow or red; largest tepal (7.4–) 9–16 (–18.9) mm long, (4.7–) 7–12 (–14.3) mm wide. Male flowers with 24–52 stamens. Female flowers with 50–82 (–110) carpels; pseudostyles broad with subpeltate pseudostigmas. Fruit peduncle 21–25 mm long; apocarps sessile, 9.5–22 (–30) mm long, 6.5–14 (–17.5) mm wide, red; pericarp greatly thickened distally. Seeds 1 or 2 per apocarp, pyriform, discoid or reniform, (4.5–) 5–8.5 (–10) mm long, (4–) 5–9 (–11) mm wide. Fig. 7.

Malesia (Bali, Java, Malay Peninsula and Sumatra). 42. JAW, LSI, MLY, SUM. Scendent or climbing in tropical montane forests; to 2400 m. Flowers Mar.–Nov.; fruits Nov.–Jan. Map 41.

42. JAWA: Kandang Badata to Tjibeureun, *H.S.Yates* 2881 (NY, SING, UC). MALAYA: Malacca, *W.Griffith* 74 (K); Pahang, G. Ulu Kali, *K.M.Kochummen* FRI 16187 (A, K, L); Perak, Bukit Maxwell, Larut, *B.C.Stone* 15461 (L); Selangor, Ulu Langat F.R.G. Nuang, *T.C.Whitmore* FRI 12180 (L). SUMATERA: Sumatera Selatan, G. Dempoe, Palembang, *Ajoeb* 479 (L); Aceh, Takenigeum, *W.N.Bangham & C.M.Bangham* 703 (A, NY); Padang, Ajer mantjoer [Ayer mancior], *O.Beccari* 667 (K, L); Sumatera Barat, Kerintji region, Rawah Bento near Kaju Aro, Pajakumbuh, *W.Meijer* 6637 (L); Sumatera Utara, Asahan, Loeban Ria, *Rahmat Si Boeea* 7605 (A).

Kadsura scandens is used medicinally (Saunders, 1998: 27). The fruits are eaten locally in the Malay Peninsula (Heyne, 1950: 626; Burkhill, 1966: 1296).

13. *Kadsura verrucosa* (Gagnep.) A.C.Sm., *Sargentia* 7: 195–196 (1947)

Schisandra verrucosa Gagnep., *Notul. Syst. (Paris)* 8: 66 (1939), as *Schizandra*. T: [Vietnam:] Tonkin, Binh Lu, 28 Mar. 1936, *E.Poilane* 25429, lecto: P, *fide* R.M.K.Saunders, *Fl. Males.* I, 13: 201 (1997); isolecto: A, K.

[*Kadsura cauliflora* auct. non Blume: G.King, *J. Asiatic. Soc. Bengal*, Pt. 2, *Nat. Hist.* 58: 375 (1889); G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: 222 (1891); H.N.Ridley, *Fl. Malay Penin.* 1:20 (1922)].

Illustration: G.King, *Ann. Roy. Bot. Gard. (Calcutta)* 3: pl. 72 (1891), as *K. cauliflora*.

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 79, fig. 36 (1998).

Plant glabrous throughout. Leaves: petiole (14–) 15.5–30 (–60) mm long; lamina elliptic to ovate, (8.5–) 10–15 (–21) cm long, (4–) 4.5–12.5 (–14) cm wide, coriaceous; base obtuse to truncate; margins entire, rarely subdentate; apex acute to acuminate; secondary veins (4–) 5–7 (–8) pairs per leaf, arcuate. Flowers either solitary in axils of leaves or in axils of fugacious bracts, occasionally cauliflorous and in glomerules on trunk; peduncles 10–22 mm long (male), 23–35 mm long (female). Tepals 12–16 (–19), yellow, cream or pink; largest tepal 11.3–15 (–21.5) mm long, 9.6–14 (–19.7) mm wide. Male flowers with 40–57 stamens. Female flowers with (20–) 44–55 carpels; pseudostyles broad with subpeltate pseudostigmas. Fruit peduncle 20–50 mm long; apocarps borne on (1.8–) 2.9–10.8 (–15.2) mm long stipes, articulate at apex of stipe, (3.5–) 7–11 (–12) mm long, (3.5–) 6–10 (–12) mm wide, red or yellow; pericarp ±uniform in thickness, not distally thickened. Seeds (1 or) 2 per apocarp, discoid to reniform, 5–6.5 mm long, 5–6.6 (–7.8) mm wide.

Indochina (Laos and Vietnam) and Malesia (Java, Malay Peninsula and Sumatra). 41. LAO, VIE. 42. JAW, MLY, SUM. Scendent or climbing in tropical submontane forests, rarely montane; to 1300 (–2000) m. Flowers and fruits throughout the year. Map 42.

41. LAOS: Ching Lawang, Tawrenj, *A.F.G.Kerr* 20906 (K, L). THAILAND: Salut, Kao Kao Ra., *A.F.G.Kerr* 14500 (K). VIETNAM: Tonkin, Binh Lu, *E.Poilane* 25429 (A, K, P). 42. JAWA: Tjiapoes, Buitenzorg, *J.G.Hallier* 751 (L, NY). MALAYA: Kedah, Bt. Bintang Gunong Tebu Forest Reserve, *Y.C.Chan* FRI 25072 (A, L); SE coast of Johore, Padang Mulud, *M.Shah & A.Shukor* MS.2479 (SING); Selangor, Klang, Telok Forest Reserve, *J.Sinclair* 40108 (E, L, SING). SUMATERA: Riau, Kuala Belillas, *P.Buwalda* 6761 (L); Sumatera Barat, Kerintji region, G. Tudjuh, Pajakumbuh, *W.Meijer* 6586 (L); Aceh,

G. Leuser Nature Reserve, Putjuk Lau Monkudu, c. 25 km NNW of Kutatjane, Seldok, G. Bandahara, W.J.J.O.de Wilde & B.E.E.de Wilde-Duyfjes 12933 (BO, L).

14. *Kadsura acsmithii* R.M.K.Saunders, *Blumea* 42: 109–110 (1997)

T: [Malaysia:] Sarawak, 2nd Division, Lubok Antu, Ulu Engkari, Sg. Kaup, 9 Mar. 1974, P.Chai S.33578; holo: L; iso: K, KEP, MO, SAN.

Illustration: R.M.K.Saunders, *Blumea* 42: 108, fig. 1 (1997).

Maps: R.M.K.Saunders, *Blumea* 42: 110, fig. 2 (1997); R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 73, fig. 33 (1998).

Plant glabrous throughout. Leaves: petiole 20–35 (–41) mm long; lamina elliptic to ovate, (11–) 13.5–18.5 cm long, 5.5–10.5 cm wide, papery to coriaceous; base acute to obtuse (occasionally cuneate); margins entire; apex acute to long-acuminate; secondary veins (3–) 4–6 pairs per leaf, (slightly) arcuate. Flowers solitary, in axils of leaves or fugacious bracts, occasionally cauliflorous; peduncles (7–) 13–17 (–31) mm long (male), c. 37 mm long (female). Tepals (9–) 12–17, pale (yellowish) green, tinged red (outer), pink to deep red (inner); largest tepal 10.1–14.6 mm long, 7.9–11.3 mm wide. Male flowers with 22–53 stamens. Female flowers with 35–110 carpels; pseudostyles ±broad with subpetiolate pseudostigmas. Fruit peduncle 30–50 mm long; apocarps sessile, 7–8 mm long, 6–7.5 mm wide, reddish-purple; pericarp ±uniform in thickness or slightly thicker distally. Seeds 1 or 2 per apocarp, discoid or reniform, 5.8–6.5 mm long, 6.8–7 mm wide.

Malesia (Borneo). 42. BOR. Scendent or climbing in tropical lowland to submontane forests; sea level to 1160 m. Flowers Mar.–Dec.; fruits Nov. (based on limited data). Map 43.

42. BORNEO: Sarawak, 5th Div., *W.M.A.Brooke* 10530 (L); Sarawak, 2nd Div., Lubok Antu, Ulu Engkari, Sg. Kaup, *P.Chai* S.33578 (K, L, MO); Kalimantan Timur, between Long Bawan and Panado, *R.Geesink* 9001 (A, L); Kalimantan Timur, East, near G. Redels, Berau, *A.Kostermans* 21751 (A, K, L); Sarawak, 4th Div., G. Mulu Natl Park, *B.Lee* S.38112 (K, L); Kalimantan Barat, 60–80 km NW of Tumbang Samba, upper Samba R., Bukit Raya and upper Katingan (Mendawai) R., *J.P.Mogea* 3737 (L), *J.P.Mogea* & *W.J.J.O.de Wilde* 4068 (K, L); Kalimantan Barat, Bukit Raya, *H.P.Nooteboom* 4024 (BO, L), 112°45'E, 0°45'S, *H.P.Nooteboom* 4089 (A, L).

15. *Kadsura marmorata* (Hend. & A.A.Hend.) A.C.Sm., *Sargentia* 7: 196–197 (1947)

Sphaerostema marmoratum Hend. & A.A.Hend., *Ill. Bouquet* 2: pl. 40 (1859–61); *Schisandra marmorata* (Hend. & A.A.Hend.) Hemsl., *Garden* 8: 271 (1875), as *Schizandra*. T: icon in E.G.Henderson & A.A.Henderson, *Ill. Bouquet* 2: pl. 40 (1859–61).

Kadsura apoensis Elmer, *Leafl. Philipp. Bot.* 8: 2748 (1915). T: Philippines: Mindanao, Davao, Mt Apo, Todaya, toward Sibulan River, Mainit Creek, Sept. 1909, *A.D.E.Elmer* 11718; lecto: GH, *fide* R.M.K.Saunders, *Fl. Males. I*, 13: 197 (1997); isolepto: A, E, F, K, L, MO, NY.

Kadsura sulphurea Elmer, *Leafl. Philipp. Bot.* 8: 2750 (1915). T: Philippines: Mindanao, Agusan, Mt Urdaneta, Cabadbaran, Aug. 1912, *A.D.E.Elmer* 13505; lecto: GH, *fide* R.M.K.Saunders, *Fl. Males. I*, 13: 197 (1997); isolepto: A, E, F, K, L, MO, NY, UC.

Kadsura clemensiae A.C.Sm., *Sargentia* 7: 206–207 (1947). T: [Malaysia:] Sarawak, Upper Rejang River, Gat, 1929, *J.Clemens* & *M.S.Clemens* 22115; holo: A; iso: K, NY.

[*Kadsura scandens* auct. non Blume: E.D.Merrill, *Philipp. J. Sci., Bot.* 2: 422 (1907); E.D.Merrill, *Bibl. Enum. Born. Pl.* 251–252 (1921)]

Illustrations: E.G.Henderson & A.A.Henderson, *Ill. Bouquet* 2: pl. 40 (1859–61), as *Sphaerostema marmoratum*, reproduced in R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 83, fig. 37 (1998); A.C.Smith, *Sargentia* 7: 206, fig. 41f–k (1947).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 84, fig. 38 (1998).

Plant glabrous throughout. Leaves: petiole (15–) 19–33 (–79) mm long; lamina elliptic to ovate, (10–) 13–18 (–21) cm long, (5–) 6–11 (–18) cm wide, ±coriaceous; base obtuse to truncate; margins entire; apex acute to acuminate; secondary veins (3–) 5 or 6 (–8) pairs per leaf, generally arcuate. Flowers solitary in axils of leaves or fugacious bracts, occasionally cauliflorous, often in glomerules on trunk; peduncles 5–17 mm long (male), 2–6 mm long (female). Tepals 13–21, yellowish; outermost tepal sometimes greenish; largest tepal (6.3–) 9–13 mm long, 6.1–9.7 mm wide. Male flowers with 38–53 stamens. Female flowers

SCHISANDRACEAE (*Kadsura*)

with c. 100–200 (~300) carpels; pseudostyles broad with subpeltate pseudostigmas. Fruit peduncle short; apocarps sessile, (16–) 19–39 mm long, 6–14 mm wide, cream to dull yellow or red; pericarp very thickened distally. Seeds 1 or 2 per apocarp, discoid to pyriform, 5–8.6 mm long, 4.6–5.2 (~6.6) mm wide.

Malesia (Philippines, Sabah and Sarawak). 42. BOR, PHI. Scandent or climbing in tropical submontane forests; to 1500 m. Flowers Apr.–Aug.; fruits Feb.–Oct. Map 44.

42. BORNEO: Sarawak, G. Gading, Lundu, *P.Chai S.18494* (K, L, SING); Sarawak, Upper Rejang R., Gat, *J.Clemens & M.S.Clemens 22115* (A, K, NY); Sabah, Tenompok, Mt Kinabalu, *J.Clemens & M.S.Clemens 29354* (A, BO, L, NY, UC); Sabah, Elphinstone Prov., Tawao, *A.D.E.Elmer 21696* (A, C, K, L, NY, SING, UC). PHILIPPINES: Mindanao, Davao Prov., Todaya [Mt Apo], *A.D.E.Elmer 11718* (A, GH, K, L, NY); Mindanao, Agusan Prov., Cabadbaran [Mt Urdaneta], *A.D.E.Elmer 13505* (A, GH, K, L, NY, UC); Mindanao, Zamboanga del Norte, *C.O.Frake 578 [=PNH 38132]* (A, L, PNH), *C.O.Frake 805 [=PNH 38361]* (A, L, PNH); Palawan, Mt Beaufort, *C.E.Ridsdale SMHI 39* (A, L, UC, PNH); Palawan, Aborlan, Panacan, Victoria Mtns, *M.D.Sulit 3728* (A, L, PNH).

16. *Kadsura celebica* A.C.Sm., *Sargentia* 7: 202–203 (1947)

T: [Indonesia: Sulawesi] Minahassa, Tomohon, Oct. 1894, *K.F.Sarasin & P.B.Sarasin 584*; holo: K.

Illustration: A.C.Smith, *Sargentia* 7: 206, fig. 41b–e (1947).

Map: R.M.K.Saunders, *Syst. Bot. Monogr.* 54: 84, fig. 38 (1998).

Plant glabrous throughout. Leaves: petiole c. 15 mm long; laminas ovate, c. 13 cm long, 9 cm wide, subcoriaceous; base obtuse to truncate; apex acute to short-acuminate; margins entire; secondary veins c. 5 or 6 pairs per leaf, arcuate. Flowers solitary, occasionally with secondary flower borne in axil of bract or in axils of leaves or fugacious bracts; peduncles c. 15 mm long. Tepals c. 12; largest tepal c. 12.5 mm long, 8 mm wide. Male flowers with c. 35 stamens. Female flowers with c. 40 carpels; pseudostyles irregularly broad with ±subpeltate pseudostigmas. Fruit and seed not seen.

Malesia (Sulawesi). 42. SUL. Only known from type collection, lacking habitat data. Map 45.

Excluded species

Kadsura blancoi Azaola, in F.M.Blanco, *Fl. Filip.*, 2nd edn 594 (1845) = *Phytocrene blancoi* (Azaola) Merr., *Philipp. J. Sci., Bot.* 2: 432 (1907) (Icacinaceae).

Kadsura pubescens Miq., *Fl. Ned. Ind., Eerste Bijv.* 620 (1861) = *Actinidia miquelii* King, *J. Asiat. Soc. Bengal* 59: 196 (1890) (Actinidiaceae).

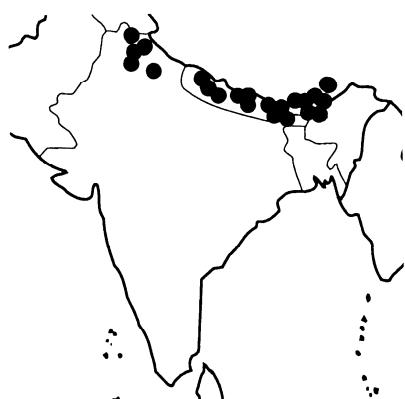
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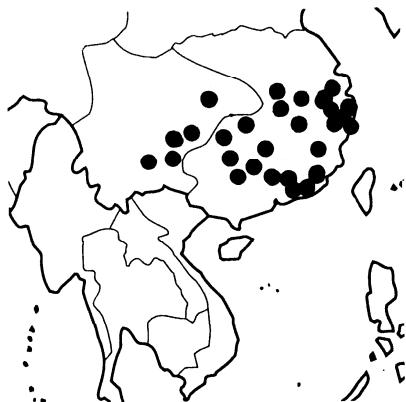
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Number in brackets refers to page on which the taxon is described.

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7. *Schisandra arisanensis* subsp. *arisanensis* (10)



8. *Schisandra arisanensis* subsp. *viridis* (11)



9. *Schisandra glaucescens* (11)



10. *Schisandra elongata* (12)



11. *Schisandra tomentella* (12)



12. *Schisandra pubescens* (13)

13. *Schisandra pubinervis* (14)14. *Schisandra lancifolia* (14)15. *Schisandra micrantha* (15)16. *Schisandra henryi* subsp. *henryi* (16)17. *Schisandra henryi* subsp. *yunnanensis* (17)18. *Schisandra henryi* subsp. *marginalis* (17)



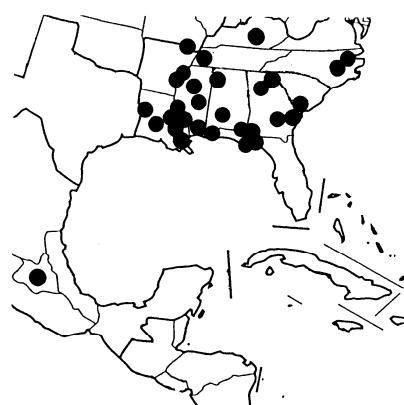
19. *Schisandra longipes* (17)



20. *Schisandra perulata* (18)



21. *Schisandra chinensis* (19)



22. *Schisandra glabra* (22)

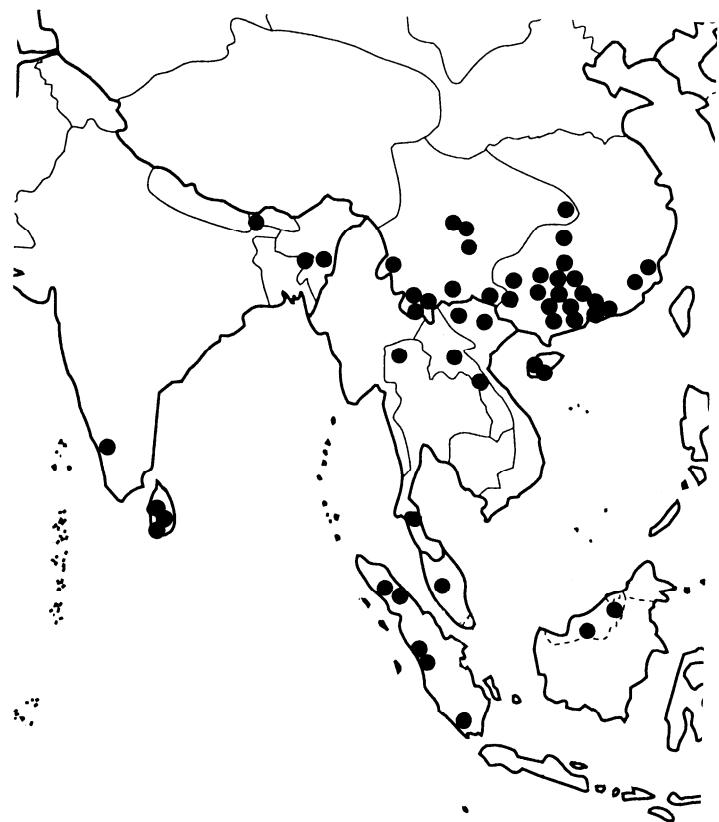


23. *Schisandra repanda* (22)



24. *Schisandra bicolor* (23)

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32. *Kadsura heterocarpa* (37)



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