

19. KYLLINGA Rottbøll, Descr. Icon. Rar. Pl. 12. 1773, nom. cons., not *Killinga* Adanson (1763).

水蜈蚣属 shui wu gong shu

Dai Lunkai (戴伦凯); Gordon C. Tucker, David A. Simpson

Herbs, perennial or rarely annual, with rhizomes or only fibrous roots. Culms tufted or scattered, usually slightly slender, rarely slightly stout. Leaves basal, 3-ranked; ligule absent; leaf blade elongated or reduced. Involucral bracts spreading, leaflike. Inflorescences terminal, capitate, with 1–3 spikes. Spikes sessile, capitate, with densely numerous spikelets. Spikelets short, compressed, each usually with 1 or 2(–5) bisexual flowers; rachilla articulate near base, deciduous at articulation when mature. Glumes distichous, persistent on rachilla and deciduous with it, basal 2 without a flower, apicalmost rarely with a male flower, remaining ones each with a bisexual flower. Flowers without perianth bristles or scalelike perianth parts. Style base not swollen, deciduous; stigmas 2. Nutlet compressed biconvex, one angle toward rachilla.

About 75 species: tropics and warm temperate regions worldwide; seven species (one introduced) in China.

- 1a. Glumes abaxially keeled.
 - 2a. Perennials, with rhizomes; glumes with membranous spiny denticulate wings 6. *K. nemoralis*
 - 2b. Annuals, with fibrous roots; glumes with papery broadly dentate wings shaped like a cockscomb 7. *K. squamulata*
- 1b. Glumes not abaxially keeled.
 - 3a. Rhizomes short; culms tufted; spikes (1–)3; glume abaxial keel without spinules.
 - 4a. Middle spike broadly ovoid, 5–6 mm; lateral spikes globose, 3–4 mm; spikelets oblong, 1-flowered; glumes greenish yellow and reddish brown maculate 1. *K. bulbosa*
 - 4b. Middle spike oblong-cylindric to oblong, 6–14 mm; lateral spikes oblong, ca. 6 mm; spikelets ovoid-ellipsoid to ovoid, 1- or 2-flowered; glumes greenish yellow to yellowish white and not reddish brown maculate 2. *K. cylindrica*
 - 3b. Rhizomes long and creeping; culms scattered, single at each node of rhizome; spike 1(–3); glume abaxial keel spinulose.
 - 5a. Rhizomes thin; culms 5–30 cm tall, slender, compressed 3-angled; leaves bladeless on basal 2 sheaths, with a 5–15(or more) cm blade on apical 2 or 3 leaf sheaths; nutlet brown at maturity, obovoid 5. *K. brevifolia*
 - 5b. Rhizomes thick; culms 30–120 cm tall, stout, very compressed 3-angled or nearly compressed; leaves bladeless or with a shorter than 15 cm blade on apical 1 or 2 sheaths; nutlet black at maturity, oblong to obovoid-oblong.
 - 6a. Involucral bracts 3; leaf sheaths purplish 3. *K. melanosperma*
 - 6b. Involucral bracts 5–8; leaf sheaths brown 4. *K. polyphylla*

1. *Kyllinga bulbosa* P. Beauvois, Fl. Oware 1: 11. 1804.

三头水蜈蚣 san tou shui wu gong

Kyllinga nana Nees.

Perennials. Rhizomes short. Culms tufted, 5–30 cm tall, compressed 3-angled, smooth, base swollen, bulbous, and clothed with persistent brown leaf sheath remains splitting into fibers. Leaves shorter than culm; leaf blade 2–3 mm wide, flaccid, folded or flat, apical margin sparsely denticulate. Involucral bracts 2 or 3, leaflike, longer than inflorescence, ± horizontal, downward reflexed after anthesis. Spikes usually 3, with numerous spikelets congested into a capitate shape; middle spike broadly ovoid, 5–6 mm; lateral spikes globose, 3–4 mm. Spikelets radially arranged, oblong, 2–2.5 mm, 1-flowered. Glumes greenish yellow and reddish brown maculate, ovate to ovate-ellipsoid, 2–2.5 mm, concave, keel abaxially green, veins 2 or 3 on each side of keel, apex mucronate. Stamens 1–3. Style short; stigmas 2, longer than style. Nutlet yellowish brown, oblong, 2/3–3/4 as long as subtending glume, compressed plano-convex, with punctate processes. Fl. and fr. Jul–Oct. $2n = 14$.

Wet places at field margins. Guangdong, Hainan [Bangladesh, India, Malaysia (Peninsular), Myanmar, Pakistan, Sri Lanka, Thai-

land, Vietnam; tropical Africa].

Kyllinga bulbosa is naturalized in E Australia and Malaysia.

The name *Kyllinga triceps* Rottbøll (Descr. Icon. Rar. Pl. 14. 1773) has been misapplied to this species (e.g., in FRPS 11: 185. 1961). That name was nomenclaturally superfluous when published and is therefore illegitimate because, in the protologue, Rottbøll cited the older name *Scirpus glomeratus* Linnaeus (Sp. Pl. 1: 52. 1753) as a synonym.

2. *Kyllinga cylindrica* Nees in Wight, Contr. Bot. India, 91. 1834.

圆筒穗水蜈蚣 yuan tong sui shui wu gong

Cyperus sesquiflorus (Torrey) Mattfeld & Kükenthal var. *cylindricus* (Nees) Kükenthal; *Kyllinga odorata* Vahl subsp. *cylindrica* (Nees) T. Koyama; *K. sesquiflora* Torrey subsp. *cylindrica* (Nees) T. Koyama.

Perennials. Rhizomes short. Culms tufted, 8–32 cm tall, slightly slender, 3-angled, smooth, base few leaved. Leaves shorter than culm; sheath short; leaf blade 2.5–4 mm wide, flat, margin denticulate. Involucral bracts 3(or 4), ± horizontal, sometimes reflexed. Spikes (1–)3, congregate, with numerous densely arranged spikelets; middle spike oblong-cylindric to

oblong, 6–14 × 4–6 mm; lateral spikes oblong, ca. 6 mm. Spikelets ovoid-ellipsoid to ovoid, ca. 2.2 mm, slightly turgid, 1- or 2-flowered. Glumes greenish yellow to yellowish white, broadly ovate, ca. 2 mm, concave, veins several, keel not spinulose, apex mucronate. Stamens 2; anthers broadly linear. Style of medium length; stigmas 2. Nutlet at first yellow but dark brown when mature, ellipsoid to obovoid-ellipsoid, compressed biconvex, with punctate processes. Fl. and fr. May–Jul.

Wet places along trails, river margins, ditch margins; near sea level to 2000 m. Fujian, Guangdong, NE Guizhou, SE Jiangxi, Taiwan, S Yunnan [Bhutan, India, Indonesia, Japan (Ryukyu Islands), Nepal, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; tropical Africa, Madagascar].

3. *Kyllinga melanosperma* Nees in Wight, Contr. Bot. India, 91. 1834.

黑籽水蜈蚣 hei zi shui wu gong

Cyperus melanospermus (Nees) J. V. Suringar.

Perennials. Rhizomes thick, long creeping, internodes short, clothed with brown scales, with 1 culm at each node. Culms distant, 30–120 cm tall, very compressed 3-angled to nearly compressed, smooth, base bulbous, clothed with long leaf sheaths. Leaf sheath brown, cylindric, margin scarious, mouth obliquely truncate, apex mucronate, apical 1 or 2 with a blade; leaf blade ca. 5 cm × 3–5 mm or shorter, flat, apical margin denticulate. Involucral bracts 3, leaflike, spreading to downward reflexed. Spike 1, ovoid, oblong-ovoid, or subglobose, 6–12 × 6–8 mm, with numerous densely arranged spikelets. Spikelets narrowly ellipsoid-ovoid, ca. 3 mm, 1- or 2-flowered. Glumes straw-colored with rusty brown striae, ovate-lanceolate, ca. 3 mm, 5–7-veined, keel ± spinulose, apex mucronate. Stamens 3; anthers shortly linear; connective prominent beyond anthers. Style long; stigmas 2, shorter than style. Nutlet yellowish white at first but black when mature, oblong to obovoid-oblong, ca. 1/2 as long as subtending glume, plano-convex, with dense punctate processes, apex mucronate. Fl. and fr. Apr–Sep.

Wet places along trails, water margins, sandy areas; below 100–1000 m. Guangdong, S Guangxi, Hainan, Yunnan [India, Indonesia, Malaysia, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; Africa, NE Australia, Madagascar].

4. *Kyllinga polyphylla* Kunth, Enum. Pl. 2: 134. 1837.

水蜈蚣 shui wu gong

Cyperus aromaticus (Ridley) Mattfeld & Kükenthal; *Kyllinga aromatica* Ridley; *K. erecta* Schumacher var. *polyphylla* (Kunth) Hooper.

Perennials. Rhizomes thick, horizontally long creeping, internodes short, clothed with brown to purple or blackish scales, with 1 culm at each node. Culms scattered, 25–90 cm tall, 3-angled, smooth, base bulbous, clothed with long leaf sheaths. Leaf sheath purplish, cylindric, margin scarious, mouth obliquely truncate, apex subacute, apical 1 or 2 with a blade; leaf blade 3–5(–15) cm × 2–6 mm or shorter, flat, apical margin denticulate. Involucral bracts 5–8, leaflike, longest to 15 cm, ± horizontal to slightly reflexed. Spikes 1–3, hemispheric to subglobose, 6–12 × 6–8 mm; lateral spikes much smaller, with nu-

merous densely arranged spikelets. Spikelets narrowly ellipsoid-ovoid, ca. 3 mm, 1- or 2-flowered. Glumes straw-colored with rusty brown striae, ovate-lanceolate, 3–4 mm, 5–7-veined, midvein ± spinulose, apex mucronate. Stamens 3; anthers shortly linear; connective prominent beyond anthers. Style long; stigmas 2, shorter than style. Nutlet yellowish white at first but black when mature, oblong to obovoid-oblong, ca. 1/2 as long as subtending glume, plano-convex, densely punctulate, apex apiculate. Fl. and fr. Jul–Oct.

Naturalized in moist or brackish sandy areas; below 300 m. Hong Kong, Taiwan [native to tropical Africa, Indian Ocean islands, and Madagascar].

Kyllinga polyphylla is also naturalized in tropical America, Asia, Australia, and Pacific islands.

5. *Kyllinga brevifolia* Rottbøll, Descr. Icon. Rar. Pl. 13. 1773.

短叶水蜈蚣 duan ye shui wu gong

Perennials. Rhizomes slender, long creeping, clothed with brown, membranous scales, internodes 1–2.5 cm, with 1 culm at each node. Culms serially arranged, sometimes also laxly tufted, 2–30 cm tall, compressed 3-angled, smooth, base not swollen, with 4 or 5 leaf sheaths. Leaves shorter to slightly longer than culm; sheaths brown, mouth obliquely truncate, apex acuminate, basal 2 bladeless, apical 2 or 3 with a blade; leaf blade 5–15 cm × 2–4 mm, flaccid, flat, midvein and apical margin spinulose. Involucral bracts 3, leaflike, longest erect to oblique or horizontal. Spike 1(–3), globose to ovoid-globose, 5–11 × 4–10 mm, with numerous densely arranged spikelets. Spikelets narrowly oblong-ovoid to narrowly ovoid, ca. 3 × 1 mm, compressed, 1- or 2-flowered. Glumes white and rusty brown maculate or rarely straw-colored, ovate, 2.8–3 mm, keel spinulose or not, veins 2 or 3 on each side of keel, apex with a strict or recurved mucro or not mucronate. Stamens 1–3; anthers linear, ca. 0.7 mm. Style long; stigmas 2, less than 1/2 as long as style. Nutlet obovoid-oblong, 1–1.5 mm, biconvex, densely punctate. Fl. and fr. May–Oct.

Under shrubs or forests, grasslands, swamps, meadows, mountain slopes, valleys, wet places along trails, ditch margins, shallow water, river margins, wet places at seashores, paddy field margins; near sea level to 2800 m. Anhui, Chongqing, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xisha Qundao, S and SE Xizang, Yunnan, Zhejiang [Afghanistan, Bangladesh, Bhutan, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Russia (Far East), Sri Lanka, Thailand, Vietnam; tropical Africa, Atlantic Ocean islands, Australia, Central, North, and South America, Indian Ocean islands, Madagascar, Pacific islands].

Kyllinga brevifolia var. *yunnanensis* E. G. Camus (Notul. Syst. (Paris) 1: 239. 1910) could not be treated here because no material was seen by the present authors.

- 1a. Culms 2–6 cm tall; spike 4–6 mm wide, with several to 20 or more spikelets; spikelets 1- or 2-flowered 5c. var. *stellulata*
- 1b. Culms 5–30 cm tall; spike 4.5–10 mm wide, with numerous spikelets; spikelets 1-flowered.

- 2a. Keel of glumes spinulose, apex recurved mucronate; longest involucrel bract erect to oblique 5a. var. *brevifolia*
2b. Keel of glumes not spinulose, apex without a mucro or sometimes with a strict mucro; longest involucrel bract oblique to horizontal 5b. var. *leiolepis*

5a. *Kyllinga brevifolia* var. *brevifolia*

短叶水蜈蚣(原变种) duan ye shui wu gong (yuan bian zhong)

Cyperus brevifolius (Rottbøll) Endlicher ex Hasskarl.

Culms 5–30 cm tall. Longest involucrel bract erect to oblique. Spike 5–11 × 4.5–10 mm, with numerous spikelets. Spikelets 1-flowered. Glumes with a spinulose keel, apex recurved mucronate. Fl. and fr. May–Oct. $2n = 18$.

Under shrubs or forests, grasslands, swamps, meadows, mountain slopes, valleys, wet places along trails, ditch margins, shallow water, river margins, paddy field margins; 100–2800 m. Anhui, Chongqing, Fujian, S Gansu, Guangdong, Guangxi, Guizhou, Hainan, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Sichuan, Taiwan, Xisha Qundao, S and SE Xizang, Yunnan, Zhejiang [Afghanistan, Bangladesh, Bhutan, India, Indonesia, Japan, Korea, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; tropical Africa, Atlantic Ocean islands, Australia, Central, North, and South America, Indian Ocean islands, Madagascar, Pacific islands].

5b. *Kyllinga brevifolia* var. *leiolepis* (Franchet & Savatier) H. Hara, J. Jap. Bot. 14: 339. 1938.

无刺鳞水蜈蚣 wu ci lin shui wu gong

Kyllinga monocephala Rottbøll var. *leiolepis* Franchet & Savatier, Enum. Pl. Jap. 2: 108. 1877; *Cyperus brevifolius* var. *gracillimus* (Miquel) Kükenthal; *K. brevifolia* var. *leiocarpa* Kitagawa; *K. gracillima* Miquel; *K. monocephala* var. *leiocarpa* Kitagawa.

Longest involucrel bract oblique to horizontal. Spikelets slightly broad and turgid. Glumes not spinulose on keel, apex without a mucro or sometimes with a strict mucro. Fl. and fr. May–Oct.

Along trails, grassland slopes, river margins, shallow water, wet places at seashores, paddy field margins; near sea level to 1200 m. Anhui, Fujian, Gansu, Hebei, Henan, Hubei, Jiangsu, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, NW Yunnan, Zhejiang [Japan, Korea, Nepal, Russia (Far East)].

Naturalized in E North America, this variety has a more northerly distribution than the others and has been treated as a species, *Kyllinga gracillima*, in some floras (e.g., Fl. N. Amer. 23: 193–194. 2002).

5c. *Kyllinga brevifolia* var. *stellulata* (J. V. Suringar) Ohwi, Bot. Mag. (Tokyo) 56: 199. 1942.

小星穗水蜈蚣 xiao xing sui shui wu gong

Cyperus brevifolius var. *stellulatus* J. V. Suringar, Cyperus, 48. 1898; *Kyllinga intermedia* R. Brown.

Culms 2–6 cm tall. Spike globose, 4–6 mm wide, with several to 20 or more spikelets. Spikelets laxly arranged, radially spreading, usually 1- or 2-flowered. Glumes not spinulose

on keel. Fl. and fr. Jun–Jul.

Valleys; 1900–2700 m. NW Yunnan [S India, Indonesia, Papua New Guinea, Philippines].

Kyllinga brevifolia f. *pumila* (J. V. Suringar) Tang & F. T. Wang (Fl. Reipubl. Popularis Sin. 11: 188. 1961; *Cyperus brevifolius* f. *pumila* J. V. Suringar, Geslacht Cyperus Mal. Archipel. 48. 1898) is similar to *K. brevifolia* var. *stellulata*, but the two taxa have not been provisionally combined here because the type of f. *pumila* has not been seen.

6. *Kyllinga nemoralis* (J. R. Forster & G. Forster) Dandy ex Hutchinson & Dalziel, Fl. W. Trop. Afr. 2: 487. 1936.

单穗水蜈蚣 dan sui shui wu gong

Thryocephalon nemorale J. R. Forster & G. Forster, Char. Gen. Pl. 65. 1775.

Perennials. Rhizomes long creeping. Culms distant or laxly tufted, 10–40 cm tall, slender, compressed triquetrous, base not swollen. Leaves usually shorter than culm; sheath brown or purplish brown maculate, short, basalmost bladeless; leaf blade 2.5–4.5 mm wide, flat, flaccid, margin laxly dentate. Involucrel bracts 3 or 4, leaflike, much longer than inflorescence. Spike 1(–3), ovoid to globose, 5–9 × 5–7 mm, with numerous spikelets. Spikelets subobovoid to narrowly ovoid-oblong, 2.5–3.5 × ca. 1.5 mm, compressed, 1-flowered. Glumes pale to straw-colored and rusty brown maculate, boat-shaped, 2.5–3.5 mm, keel wings narrow at basal part and ± broad from middle to apex, veins 3 or 4 on each side of keel, margin spinulose, apex slightly recurved mucronate. Stamens 3. Style long; stigmas 2. Nutlet brown, oblong to obovoid-oblong, ca. 1/2 as long as subtending glume, compressed plano-convex, densely puncticulate, apex shortly mucronate. Fl. and fr. May–Aug. $2n = 18$.

Under shrubs or forests, meadows, swamps in valleys, mountain slopes, wet places along trails, field margins, river margins, ditch margins; 100–1400 m. Guangdong, Guangxi, Hainan, Hunan, Taiwan, Yunnan [Bhutan, Cambodia, India, Indonesia, Japan, Kashmir, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; tropical Africa, NE Australia, Indian Ocean islands, Madagascar, Pacific islands].

Kyllinga nemoralis is naturalized in tropical America.

7. *Kyllinga squamulata* Vahl, Enum. Pl. 2: 381. 1805.

冠鳞水蜈蚣 guan lin shui wu gong

Cyperus metzii (Hochstetter ex Steudel) Mattfeld & Kükenthal; *Kyllinga metzii* Hochstetter ex Steudel; *K. squamulosa* Kunth.

Annuals. Roots fibrous. Culms densely tufted, 2–20 cm tall, slender, compressed triquetrous, smooth, base not swollen. Leaves equaling or slightly shorter than culm; sheath brownish purple, basal 1 or 2 bladeless; leaf blade 2–3 mm wide, flaccid. Involucrel bracts 3 or 4, leaflike, much longer than inflorescence, spreading to downward reflexed, base usually broadening. Spike 1(–3), subglobose, 6–9 mm in diam., with many spikelets. Spikelets densely congested, broadly ovoid, 2.5–3 × 1.5–2 mm, compressed, 1-flowered. Glumes pale to straw-colored and sometimes rusty brown maculate, boat-shaped, 2.5–3 mm, keel green, winged, with 6–10 slightly broad teeth

Fl. China 23: 246–249. 2010.

shaped like a cockscomb on apical ca. $\frac{2}{3}$ of margin, and 1–3 spinelike trichomes at apex of teeth, apex with a strict mucro. Stamens 1 or 2; anthers oblong. Style of medium length; stigmas 2. Nutlet at first yellow but dark brown when mature, ellipsoid, ca. $\frac{2}{3}$ as long as subtending glume, compressed, with dense punctate processes. Fl. and fr. Aug–Oct. $2n = 14$.

Wet grasslands, forests in valleys; 2300–3000 m. SW Sichuan, Yunnan [Bhutan, India, Nepal, Pakistan, Vietnam; tropical Africa, NE Australia, Madagascar].

Kyllinga squamulata is naturalized in SE North America and the Caribbean.

