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Cyperaceae of Economic, Ethnobotanical and Horticultural Importance: A Checklist

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Cyperaceae of economic, ethnobotanical and horticultural importance: a checklist

DAVID A. SIMPSON¹ & CECILIA A. INGLIS²

Summary. A checklist of *Cyperaceae* recorded as having economic, ethnobotanical and horticultural importance is presented. Data have been obtained from the literature and herbarium material. Forty-five genera and 502 species/infraspecific taxa are included.

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INTRODUCTION

Cyperaceae are the third largest family in the Monocotyledons and comprise c. 104 genera and c. 5000 species (Goetghebuer 1998). They have a cosmopolitan distribution, with a concentration of genera in the tropics. The largest genus is *Carex*, with c. 2000 species, followed by *Cyperus* with c. 600 species; *Cyperaceae* are of economic significance worldwide. Forty-five genera and 502 species/infraspecific taxa are identified as such here. Their importance is often at a regional or local level and the family plays a vital part in many local economies. It is probably due to their localised use that they have generally been overlooked as plants of economic importance. Moreover, relevant data are scattered through the literature or on herbarium specimens. The aim of this work is twofold: a) to bring together the disparate data in the form of a checklist and b) to increase awareness of the economic value of this taxonomically difficult but highly interesting family. The checklist was compiled from a survey of relevant literature and herbarium specimens in Kew and elsewhere. They were entered on to an ALICE format database using the first and second level descriptors for economic use delimited by Cook (1995). Each entry in the checklist comprises the accepted name, basionym and important synonyms where these are considered necessary (for instance if a species is often recognised in another genus),

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general distribution, habitat and then economic/ethnobotanical importance. We have also included 'Weeds' and 'Active Compounds Present' as separate first level descriptors. In the case of the former, many *Cyperaceae* are considered to be serious weeds and their presence as such is of particular economic importance in some regions. Interestingly, many species which are considered to be weeds also have uses. Further brief information is provided under the second level descriptor, if such information is available. This includes the country from which the data were recorded, if known. Reference citations beginning with 'H' followed by a number represent a herbarium specimen. Intraspecific taxa have been recognised when there is specific reference to one in the data source. Otherwise, data have been assembled under species names. Following the main Checklist, a further list arranges taxa under first and second level descriptor headings. This will allow rapid determination of the names and number of taxa assigned to particular descriptors. As far as possible we have checked and verified the names used; we have not included records where the naming is uncertain or incorrect. We have taken a global view in this Checklist and have endeavoured to include as many taxa as possible. However, our search for records has been limited by time and no doubt we have overlooked taxa, especially from the New World where both the literature and herbarium material are less well known to us. The first author would welcome any new data or confirmation of the data given below.

THE CHECKLIST

ACTINOSCIRPUS (*Ohwi*) R. W. Haines & Lye

Actinoscirpus grossus (L. f.) Goetgh. & D. A. Simpson, Kew Bull. 46: 171 (1991).

Scirpus grossus L.f., Suppl.: 104 (1781).

India, SE Asia; swamps and cultivated areas, particularly rice fields.

MATERIALS: *Fibres*: mats, bags and baskets. Culms cut, split, dried, flattened and sun-bleached; may be dyed, Thailand, Malaysia (Kern 1974; Simpson 1992a).

MEDICINES: *Unspecified medicinal disorders*: affects both heat production and heat regulation in the body, India (Cauis & Banby 1935); *Digestive system disorders*: vomiting, diarrhoea, India (Cauis & Banby 1935; Heywood 1993); *Ill-defined symptoms*: liver tonic, India (Cauis & Banby 1935); *Infections/infestations*: useful against infection and poisons, including gonorrhoea and leprosy, India (Cauis & Banby 1935); *Nutritional disorders*: appetite stimulant; improves sense of taste, India (Cauis & Banby 1935); *Sensory system*: eye problems, India (Cauis & Banby 1935); *Skin and subcutaneous cellular tissue disorders*: useful for treatment of burning sensations, India (Cauis & Banby 1935).

ENVIRONMENTAL USES: *Soil improvers*: ploughed in as green manure, SE Asia (Burkill 1935).

Example
→

WEEDS: *Rice fields*: (Simpson & Koyama 1998).

var. *kysoor* (Roxb.) Noltie, Edinburgh J. Bot. 51 (2): 173 (1994).

Scirpus kysoor Roxb., Hort. Bengal.: 6 (1814).

Pakistan, India, Malay Peninsula; swamps, cultivated areas.

FOOD: *Tubers*: (Burkill 1935).

Carex phaeocephala Piper, Contr. U.S. Natl. Herb. 11: 172 (1906).

Canada and U.S.A.; high, rocky summits, occasionally coniferous woodland.

ANIMAL FOOD: *Unspecified part*: variable forage value for sheep, U.S.A. (Hermann 1970).

Carex phyllocephala T. Koyama, Acta Phytotax. Geobot. 16: 40 (1955).
Japan; habitat not recorded.

ENVIRONMENTAL USES: *Ornamentals*: (Grounds 1989).

Carex physodes M. Bieb., Mém. Soc. Imp. Naturalistes Moscou 2: 104, t. 7 (1809).
Temperate Asia, European part of Russia; sandy, intermittently wet areas.

ANIMAL FOOD: *Unspecified part*: forage, Russia (USDA-ARS 2000).

Carex pilulifera L. Sp. Pl. 2: 976 (1753).

Europe, N Asia; mostly dry, grassy areas, rarely in open woods.

ENVIRONMENTAL USES: *Ornamentals*: (Grounds 1989).



FIG. 2. A *Schoenus nigricans* rope, Italy (EBMC 34392); B *Lepironia articulata* mat, China (EBMC 34372); C *Carex* sp. net, Australia (EBMC 34318); D *Lepidosperma squamatum* mat, Australia (EBMC 34370); E *Schoenoplectus lateriflorus* hat, Taiwan (EBMC 34405); F *Schoenoplectus lacustris* protective sleeve cuffs, origin unknown (EBMC 34404); G *Cyperus longus* paper, Channel Is. (EBMC 34357); H *Schoenoplectus lacustris* matting, U.K. (EBMC 34396); J *Carex paniculata* broom, U.K. (EBMC 34214); K *Cyperus longus* rope, Channel Is. (EBMC 34315). All from the Economic Botany Museum collections, Kew; catalogue number in brackets.

No weed
reference

Second in a series

Cultivars of Japanese Plants at Brookside Gardens—II

Barry R. Yinger
Carl R. Hahn

Koten Engei

The Japanese employ a unique system of horticulture called *koten engei*, a term that resists easy translation but whose meaning is approximated by "cultivation of classical plants." In this traditional style of horticulture:

□ The plants grown are groups of variants of species that, in their original form, are of modest demeanor. Most of the species are native to Japan and have insignificant or scarcely showy flowers.

□ The variants are usually selections of mutated forms rather than hybrids. In most cases variations are of leaf shape and color rather than of floral characteristics.

□ The kinds and degrees of variation are carefully classified and named, and certain kinds of variation are judged more valuable than others. A weak constitution is usually a "plus."

□ The plants are always grown in pots instead of in the garden. The pots are thin, porous *raku* ware, usually with rough surfaces, shiny black glazes, and simple, fanciful decorations. Certain styles are appropriate for certain cultivar groups.

□ Cultivars are assigned names that often allude to people, places, or events in classical Chinese or Japanese history.

□ The cultivars are evaluated and ranked by societies devoted exclusively to variants of single species. The rankings are published periodically on a chart called a *meikan*, which recalls in its format the classical ranking board (*banzuke*) of sumo wrestling. The societies stage public exhibitions of the plants.

□ Interest in the various species groups of cultivars is cyclical, being accompanied by recurrent waves of financial speculation in them.

Historically, many species have been treated as subjects for *koten engei* selection in Japan. Some are not grown now, but others—such as cultivars of *Rohdea japonica*, *Asarum*, and *Selaginella tamariscina*—have enjoyed enduring, if cyclical, interest for nearly 300 years. Some of the plants that will be described in our series are, or have been, part of the cult of *koten engei* and as such have, or have had, acceptable cultivar names. The first group of cultivars treated below—selections of *Ardisia japonica*—are part of the modern and classical *koten engei* tradition.

The Series

This article is part of Brookside Gardens's ongoing effort to reduce the considerable confusion in the nomenclature of cultivated plants from Japan. Our principal sources of information in this effort are the catalogs of nurseries that deal in a wide range of cultivated plants. We have also consulted the very few classic and modern Japanese texts that list and illustrate cultivated plants. Some of the names we publish may have to be changed as we find more sources of information. This long-term, serial effort should yield a reliable catalog of valid cultivar names for a wide range of Japanese cultivated plants.

In the first installment of this series (published in *Arnoldia*, vol. 43, no. 4, pages 3–19, Fall 1983),

we described the special collections program in which the plants considered here are acquired, maintained, and evaluated at Brookside Gardens, Wheaton, Maryland, a publicly supported botanical and display garden of the Montgomery County, Maryland, park system. We also described in detail our approach to evaluating the acceptability of existing Japanese names as valid cultivar names, based on our interpretation of the rules and recommendations set forth in the *International Code of Nomenclature for Cultivated Plants*. We wish to establish and preserve in the Western literature legitimate Japanese cultivar names for the plants we are growing and to assign and register a suitable name where none exists that satisfies the *Code*. Readers interested in the details of our procedure for judging existing names should consult the previous article.

The inclusion of a plant name in this series does not imply that it is new either here or in Japan, or that we are its first or only introducer. We make no judgment about the garden value of the plants described; we hope that such information will emerge from an evaluation program now in progress under the supervision of Brookside Gardens's curator, Philip Normandy.

We will try to honor requests for more information about these cultivars and will be pleased to receive additional information as well. At present, time and money are not sufficient for the depth of research necessary to answer all questions that might be raised, but we will try to address questions as they arise. We intend to deposit specimens and documentation of published cultivars with the United States National Arboretum in Washington, D. C., as the plants continue to develop. Address correspondence to Carl R. Hahn, Maryland-National Capital Park and Planning Commission, 8787 Georgia Avenue, Silver Spring, MD 20907. **Please note that the Arnold Arboretum cannot supply these plants or information about them.**

Mr. Young June Chang, Seoul National University, Seoul, Korea; Mr. Philip Normandy, Brookside Gardens; and Mrs. Gennie Potter, Maryland-National Capital Park and Planning

Commission, gave kind and invaluable assistance in preparing the manuscript, for which we sincerely thank them.

The Cultivars



The descriptions are of mature new growth in early summer. The leaves of some cultivars are different at other seasons, particularly during the colder seasons, when pink and red tones appear.

Ardisia japonica (Thunb.) Bl. 'Amanogawa' [Milky Way galaxy] (Yinger Collection No. 805)

Leaves of many shapes and patterns, puckered and often twisted, usually somewhat elongated or bearing large lobes of irregular sizes, 4 to 9 cm by 1 to 5.5 cm, with regularly or sparsely toothed margins. Those leaves without monstrous lobes, green with white or greenish-white central markings, those with lobes, light green with a white reticulate pattern and an irregular, darker-green border 1 to 2 mm wide, the lobes white. A vigorous clone.

Illustrated on page 97 and described on page 254 of *Shumi no Koten Shokubutsu* (1975).

Ardisia japonica (Thunb.) Bl. 'Beniyuki' [red snow] (Yinger Collection No. 810)

Leaves elongated and irregular, narrowing very acutely at the base, about half of them slightly lobed, the rest prominently and almost regularly lobed (resembling the leaves of *Quercus alba*); 5 to 10 cm by 2 to 4 cm. The slightly lobed ones with very narrow, white margins 1 to 2 mm in width that seldom invade the center of the leaf, the heavily lobed ones with broad, white margins up to 1.5 cm in width. Leaf surfaces slightly puckered, with slightly undulate margins. White areas becoming red in winter. A vigorous clone.

Illustrated on page 97 and described on page 254 of *Shumi no Koten Shokubutsu* (1975).

Ardisia japonica (Thunb.) Bl. 'Chiyoda' [a place-name] (Yinger Collection No. 806)

Leaves very irregular in outline, with no teeth on their margins, blades 5 to 11 cm by 1 to 3.5 cm, all bearing thin, white margins 1 to 2 mm in width that rarely invade the centers of the blades. Most leaves almost flat, with interveinal spaces sometimes raised or puckered. A vigorous clone.

Ardisia japonica (Thunb.) Bl. 'Shirofu Chirimen' [white variegated crepe paper] (Yinger Collection No. 804)

Leaves of regular outline, elongated, with acutely pointed apexes, blades 3 to 5 by 1.5 to 2 cm; margins toothed. Some shoots and leaves all green or all white, the rest with sectoral white markings or flecks of white. A few leaves equally divided longitudinally into green and white halves. Most leaves flat and scarcely puckered, a few with undulate margins. A rather dwarf selection.

Illustrated on page 96 and described on page 293 of *Shumi no Koten Shokubutsu* (1975).

Carex phyllocephala T. Koyama 'Sparkler' [a new cultivar name assigned by Barry R. Yinger] (Yinger Collection No. 1403)

Leaves, which persist for at least two years, lime green to dark green, with 1- to 4-mm-wide white margins. One to four longitudinal streaks of white often within the green portions of the leaves. Sheaths at the bases of the leafstalks purplish. A rare and attractive variant of a rare plant.

Sold by Ishiguro Momiji En (nursery), Nagoya, Japan, as *furi tenjiku-suge* (variegated *Carex phyllocephala*).

The following two plants are selections of *Daphne odora*, a Chinese shrub long popular as a garden plant in Japan. Many cultivars have been selected for pot culture as well, especially those with leaves variegated in various patterns, fasciated shoots, or twisted leaves. The classic works *Somoku Kihin Kagami* (1827) and *Somoku Kinyoshu* (1829) list twenty-one variants. The two more-modern cultivars described below are notable for their floral display as well and seem not to be included among the cultivars listed in the classics.

Daphne odora Thunb. 'Ringmaster' [a new cultivar name assigned by Carl R. Hahn] (Yinger Collection No. 1894)

Leaves green with 2- to 4-mm-wide margins of cream or pale yellow. Flowers 2 cm across, with a tube 1 cm long, pure white, appearing relatively late.

A very beautiful selection combining white flowers with clear marginal variegation to produce plants that are unusually striking in flower.

Grown in Japan by Mr Yoshimichi Hirose, Iwakuni City, Yamaguchi, Japan. Described, but not named, on page 51 of the 1911 catalog of the Yokohama Nursery Company, Yokohama, Japan.

Daphne odora Thunb. 'Zuiko Nishiki' [fragrant brocade] (Yinger Collection No. 279, No. 1794, and No. 1920)

Leaves green, not variegated. Flowers dark pink (Rhodamine purple or Fuchsia purple in the 1938 Royal Horticultural Society's Colour Chart) or white. On young plants, flowers usually all of one color or the other, both colors appearing on the same plant as the plant matures. All the flowers of an umbel usually of one color, but some umbels having both pink and white flowers, and a few individual flowers showing sectoral (chimeral) patterns. Individual flowers large, 2 to 2.5 cm across, each with a tube 1 cm long. Corolla lobes obtuse or rounded at their tips. Flowers borne in large, rounded umbels of 15 to 25 flowers. A very beautiful plant marketed under several names, including "sakiwake" and "shibori," both of which are applied to two-colored flowers or inflorescences.

Described and illustrated on page 33 of the Fall 1980 catalog of Kairyō En (nursery). Grown by Kairyō En, Angyo, Japan, and several other major nurseries.

Distylium racemosum Sieb. & Zucc. 'Akebono' [dawn] (Yinger Collection No. 269)

Leaf blades 5 to 10 by 2 to 5 cm, mostly about 7 cm by 3 to 3.5 cm, persisting two years. One-year-old leaves creamy white, all on new shoots, some below the apexes of the shoots speckled or veined green. Two-year-old leaves dark green with no markings. Stems of new shoots creamy white or sometimes dark pink, those of older shoots green. A vigorous plant with obliquely ascending branches. A very distinctive variegated clone, one of several listed in modern and classical Japanese sources.

Described under the name 'Akebono' [dawn] on page 11 of Catalog No. 62 (Fall 1978–Spring 1979) of the Asahi Shokobutsuen (nursery), Okazaki, Aichi Prefecture, Japan.

Distylium racemosum Sieb. & Zucc. 'Guppy' [a new cultivar name assigned by Barry R. Yinger] (Yinger Collection No. 274)

Leaves green, not variegated, 3 to 5 cm by 1 to 2 cm, with short (5 to 15 mm) internodes. Typically

shorter than culms; blade V-shaped in section, recurved, 1–2.5 mm wide, midrib not distinct abaxially. Inflorescence spicate (rarely compound), brown or dark brown, densely and broadly cylindrical, 0.5–1.2 × 0.2–0.4 cm; lowest involucre bract glume-like. Terminal spikelets of inflorescence male, lower ones bisexual with 1 basal female flower and (1 or)2(or 3) distal male flowers. Glumes brown or dark brown, with pale midvein, ovate, 2.5–3 × ca. 2 mm, midvein narrow, margin very narrowly or not hyaline, apex obtuse. Prophylls pale brown at upper part, narrowly elliptic, ca. 3.3 × 0.9 mm, membranous, glabrous,

hyaline at base, obscurely 2-keeled, margins connate in lower 1/4(–1/2). Nutlets brown or pale brown, oblong-elliptic, flattened, body ca. 1.5 × 0.9 mm, stipe ca. 0.5 mm, very shortly beaked. Stigmas 2. Fl. and fr. Jul–Sep.

High alpine turf; (3100–)3800–5000 m. Xinjiang, Xizang [Afghanistan, India (Himachal Pradesh), Kashmir, ?Nepal, Pakistan, Tajikistan].

This is, perhaps, a western form of *Kobresia pusilla*, but it is also close to *K. myosuroides* subsp. *bistaminata*.

33. CAREX Linnaeus, Sp. Pl. 2: 972. 1753.

藨草属 tai cao shu

Dai Lunkai (戴伦凯), Liang Songyun (梁松筠 Liang Song-jun), Zhang Shuren (张树仁), Tang Yancheng (汤彦承 Tang Yen-cheng); Tetsuo Koyama, Gordon C. Tucker

Herbs, perennial; rhizome usually stoloniferous. Culms tufted or sparse, lateral or central, erect, trigonous, bladeless sheathed at base. Leaves basal or basal and cauline, flat, rarely involute or revolute on margins, linear or lorate, rarely lanceolate, sheathed at base. Involucre bracts leaflike, rarely scale-shaped or setaceous, sheathed or not. Flowers unisexual, 1 male flower or 1 female flower in a unisexual spikelet, female spikelet included by prophyll, prophyll wholly connate at margins into utricle, sometimes reduced spikelet axis present in utricle, with scalelike bractlet at base. Spikes 1 to numerous, usually numerous spikes arranged in spicate, racemose, or paniculate inflorescence, composed of many unisexual or bisexual spikes, bisexual spike androgynous or gynaeandrous, usually plants monoecious, rarely dioecious, pedunculate or sessile, with or without sheathlike or utriculiform cladoprophyll at base; male flower with (2 or)3 stamens, filaments distinct; female flower with 1 pistil, style slightly slender, persistent or deciduous, base usually not thickened; stigmas 2 or 3. Utricles trigonous, plano-convex or biconvex, with slightly long or short beak. Nutlets rather tightly or loosely enveloped in utricle, trigonous or plano-convex.

About 2,000 species: cosmopolitan; 527 species (260 endemic) in three subgenera and 69 sections (two endemic) in China.

- 1a. Spikes numerous, all bisexual, sessile, usually densely arranged in spicate inflorescence, cladoprophyll not present; stigmas usually 2, rarely 3 3. *C.* subg. *Vignea*
- 1b. Spikes few to numerous, unisexual or bisexual, pedunculate, rarely shortly pedunculate to subsessile, rarely single and terminal, usually loosely arranged in racemose or paniculate inflorescence, rarely in spicate inflorescence, cladoprophyll present; stigmas usually 3, rarely 2.
- 2a. Spikes bisexual and androgynous, very rarely unisexual, usually arranged in complex inflorescence, cladoprophyll utriculiform at spike base, with a female flower 1. *C.* subg. *Vigneastra*
- 2b. Spikes unisexual, or unisexual and bisexual, rarely all bisexual, spikes 1 to several borne in an involucre bract sheath, rarely arranged in complex inflorescence, cladoprophyll sheathlike, without female flower 2. *C.* subg. *Carex*

1. *Carex* subg. *Vigneastra* (Tuckerman) Kükenthal, Bot. Jahrb. Syst. 27: 516. 1899.

复序藨草亚属 fu xu tai cao ya shu

Zhang Shuren (张树仁); Tetsuo Koyama, Gordon C. Tucker

Carex sect. *Vigneastra* Tuckerman, Enum. Meth. Caric. 10. 1843; *C.* subg. *Indocarex* Baillon ex Kükenthal, nom. illeg. superfl.

Inflorescence simple or compound. Spikes few to numerous, usually bisexual and androgynous, rarely unisexual; cladoprophyll utriculiform, with or without a developed female flower.

About 100 species: tropical and subtropical Asia; 36 species (16 endemic) in ten sections (one endemic) in China.

Key to sections

- 1a. Each cladoprophyll with a developed female flower inside; inflorescence spicate; spikes numerous and densely arranged 1. *C.* sect. *Japonicae*
- 1b. Cladoprophylls without flowers or some with flowers; inflorescence paniculate or racemose, if inflorescence spicate then spikes fewer.
- 2a. Cladoprophyll below terminal spike with a developed female flower inside, others without flower; rachilla present at base of nutlet; inflorescence racemose.
- 3a. Terminal spike androgynous; utricle with smooth straight beak; nutlets with flat faces 2. *C.* sect. *Mundae*
- 3b. Terminal spike male; utricle with scabrous geniculate beak; nutlets with concave faces 3. *C.* sect. *Hangzhouensis*

- 1b. Spikes remote, not congregated at top of culm, racemosely disposed.
- 3a. Female spikes with lax utricles; utricles subrhombic, distinctly trigonous, ca. 5 mm, dark gray-green, several veined abaxially, glabrous, sometimes ciliate on margins, dark brown glandular punctate; female glumes connate at base, funnellform 370. *C. poculisquama*
- 3b. Female spikes with dense utricles; utricles ovoid or obovoid, indistinctly trigonous, 3–4 mm (ca. 4.8 mm in *C. ligulata*), brownish green, with 2 lateral veins abaxially, densely hispidulous, rarely ciliate on margins or veins; female glumes not connate at base, not funnellform.
- 4a. Culms rather slender; leaf blades less than 5 mm wide; female spikes 3–4 mm wide; utricles subdistichous, laxly disposed, ca. 3 mm, densely hispidulous 371. *C. hebecarpa*
- 4b. Culms stouter than above; leaf blades (5–)7–15 mm wide; female spikes 5–6 mm wide; utricles multiseriate, densely or rather densely disposed, 3–5 mm, densely hispidulous or only on veins and upper margins.
- 5a. Utricles 3–3.5 mm, hispidulous only on veins and upper margins 372. *C. pseudoligulata*
- 5b. Utricles 3–5 mm, densely hispidulous.
- 6a. Leaf sheaths not overlapping, sheaths rather loosely enveloping culm; female glumes ca. 3 mm; utricles obovate, 4–5 mm 373. *C. ligulata*
- 6b. Leaf sheaths overlapping, sheaths rather tightly enveloping culm; female glumes ca. 1.8 mm; utricles broadly ovate, ca. 3 mm 374. *C. maubertiana*

368. *Carex pseudophyllocephala* L. K. Dai, Acta Phytotax. Sin. 32: 187. 1994 [*"pseudo-phylocephala"*].

假头序藨草 *jia tou xu tai cao*

Rhizome short, without stolons. Culms tufted, 12–15 cm tall, slender, triquetrous, clothed with brown and shortly bladed sheaths at base. Upper leaves longer than culm, lower leaves shorter than culm, blades 2–5 mm wide, flat, scabrous on veins and margins, slightly shortly sheathed, upper and lower sheaths ± overlapping. Involucral bracts leaflike, congregated at top of culm, longer than inflorescence, scabrous on veins of adaxial surface and margins, smooth on abaxial surface, rather shortly sheathed. Spikes 4 or 5, congregated at top of culm; terminal spike male, linear, 1–1.5 cm, shortly pedunculate; lateral spikes female, narrowly oblong, 0.7–1.5 cm, several to 15-flowered, shortly pedunculate. Female glumes brown-yellow, orbicular-ovate, ca. 2 mm, membranous, 1-veined, apex acute, sometimes mucronate. Utricles yellow-green, yellow-brown in maturity, obliquely patent, longer than glume, lanceolate or broadly lanceolate, trigonous, ca. 2.5 mm, membranous, glabrous or sometimes laxly ciliate on margins near beak, abaxially distinctly 2-veined laterally, base cuneate, apex gradually narrowed to a rather short beak, orifice shortly 2-toothed. Nutlets brown-yellow, tightly enveloped, lanceolate, ca. 2 mm; style rather short, base not thickened; stigmas 3. Fl. and fr. Jun–Jul.

• Thicket on mountain slopes, damp places at forest margins. Hunan.

369. *Carex phyllocephala* T. Koyama, Acta Phytotax. Geobot. 16: 40. 1955.

密苞叶藨草 *mi bao ye tai cao*

Rhizome short and slightly thick, ligneous, without stolons. Culms 20–60 cm tall, rather stout, obtusely trigonous, clothed with reddish brown and bladeless sheaths at lower part. Leaves contiguously disposed, longer than culm, blades 8–15 mm wide, ± stiff, revolute on margins with distinctly transverse septate nodes between veins on abaxial surface, slightly long sheathed; sheaths ± overlapping, distinctly ligulate, reddish. Involucral bracts leaflike, congregated at top of culm, longer

than inflorescence, rather shortly sheathed. Spikes 6–10, congregated at top of culm; terminal spike male, linear-cylindric, 1–2.5 cm, shortly pedunculate; lateral spikes female, sometimes with few male flowers at apex, narrowly cylindric, 2–3 cm, densely many flowered, pedunculate. Female glumes green at middle, pale laterally, very shortly ferruginous striate, broadly obovate, ca. 1.8 mm, membranous, 3-veined, apex acute, mucronate. Utricles grass-green, very shortly ferruginous striate, obliquely patent, longer than glume, broadly obovate, trigonous, 2.8–3.5 mm, membranous, densely white hispidulous, distinctly 2-veined laterally, base cuneate, apex abruptly contracted into a rather short beak, orifice shortly 2-toothed. Nutlets obovate, trigonous, ca. 2 mm, sessile; style base slightly thickened; stigmas 3. Fl. and fr. Jun–Sep.

Damp places in forests, roadsides, valleys: 500–1000 m. Fujian [Japan].

370. *Carex poculisquama* Kükenthal, Repert. Spec. Nov. Regni Veg. 27: 111. 1929.

杯鳞藨草 *bei lin tai cao*

Rhizome short. Culms densely tufted, 30–50 cm tall, triquetrous, rather slender, stiff, scabrous on upper part, clothed with bladeless or shortly bladed sheaths at lower part. Upper leaves longer than culm and lower leaves shorter than culm, blades 3–4 mm wide, furrowed on midrib of adaxial surface, revolute on margins, scabrous on margins and abaxial surface, rather long sheathed. Involucral bracts leafy, nearly equaling or longer than inflorescence, rather shortly sheathed. Spikes 3 or 4, upper spikes approximate, lower spikes slightly remote; terminal spike male, linear, 1–2 cm, shortly pedunculate; lateral spikes female, narrowly cylindric, 1–3 cm, laxly 10- or more flowered, rather slenderly pedunculate. Female glumes yellowish and ferruginous punctate, broadly ovate, ca. 4 mm, membranous, 1-costate, base connate and clasping rachilla, apex acute, shortly aristate. Utricles gray-green, obliquely patent, longer than glume, rhombic-elliptic, trigonous, ca. 5 mm, papery, glabrous, thinly several veined, base gradually narrowed and stipitate, margins hispidulous, apex gradually narrowed to a slightly broad and short beak, orifice 2-toothed.

MPI Biosecurity Index Search Results

Appendix D

Genus = Carex

Scientific Name	Import Specification Seed for Sowing	Import Specification Nursery Stock
<i>Carex acicularis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex albula</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex allanii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex appressa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex astonii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex aurea</i>	Entry prohibited	Entry prohibited
<i>Carex baldensis</i>	Entry prohibited	Entry prohibited
<i>Carex berggrenii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex bichenoviana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex bifida</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex breviculmis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex brownii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex buchananii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex capillacea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex carsei</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex chathamica</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex cirrhosa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex cockayneana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex colensoi</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex comans</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex conlca</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex coriacea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex dallii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex decurtata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex demissa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex devia</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex diandra</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex dipsacea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex dissita</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex divisa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex divulsa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex dolomitica</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex druceana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex echinata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex edgariae</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex elingamita</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex enysii</i>	Basic	L2 see 155.02.06 under Hebe

<i>Carex fascicularis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex filamentosa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex firma</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex flacca</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex flagellifera</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex flaviformis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex forsteri</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex fretalis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex gaudichaudiana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex geminata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex glauca</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex goyenii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex hachijoensis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex hectorii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex hirta</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex impexa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex inopinata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex inversa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex lynx</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex kaloides</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex kermadecensis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex kirkil</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex lachenalii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex lambertiana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex leesoniana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex libera</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex litorea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex longibrachiata</i>	Entry prohibited	Entry prohibited
<i>Carex longiculmis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex longii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex lucida</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex lurida</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex maorica</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex montana</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex morrowii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex muelleri</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex muricata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex ochroaaccus</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex oshimensis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex otrubae</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex ovalis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pallescens</i>	Basic	L2 see 155.02.06 under Hebe

<i>Carex paniculata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pendula</i>	Entry prohibited	Entry prohibited
<i>Carex petrii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pleiostachys</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pseudocyperus</i>	Entry prohibited	Entry prohibited
<i>Carex pterocarpa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pumila</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex punctata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex pyrenaica</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex raoulii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex remota</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex resectans</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex riparia</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex rubicunda</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex scoparia</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex secta</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex sectoides</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex siderosticha</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex sinclairii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex solandri</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex spicata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex spirostris</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex stricta</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex subdola</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex sylvatica</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex tenuiculmis</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex ternaria</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex testacea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex trachycarpa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex traversii</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex trifida</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex unclifolia</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex ventosa</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex virgata</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex vulpinoidea</i>	Basic	L2 see 155.02.06 under Hebe
<i>Carex wakatipu</i>	Basic	L2 see 155.02.06 under Hebe

There are 115 results matching your search query.
To narrow down your search try entering more detail into the search boxes.

Hebe

Note: The entry conditions in this schedule only apply to species in the Plants Biosecurity Index listed under Import Specifications for Nursery Stock as “see 155.02.06 under *Hebe*”, and are additional to those specified in sections 1, 2 and 3 of the import health standard.

GENERAL CONDITIONS:

Approved Countries: All

Quarantine Pests: *Phellinus noxius*; *Xylella fastidiosa*

Entry Conditions: **Basic;** with variations and additional conditions as specified below:

A. For Whole Plants:

PEQ: Level 2

Minimum Period: 3 months

a. Conditions for *Xylella fastidiosa* (section 2.2.1.12)

Guidance for importers: The minimum quarantine period will be 6 months for nursery stock sourced from countries not recognised by MPI as free from *Xylella fastidiosa*

b. Conditions for *Phellinus noxius* (section 2.2.1.13)

Note: Only applies to members of the *Albizia* and *Cassia* genera AND the following species: *Agathis robusta*, *Celtis sinensis*, *Grevillea robusta*, *Hibiscus rosa-sinensis*, *Hibiscus schizopetalus*, *Hibiscus tiliaceus*, *Ilex rotunda*, *Lagerstroemia speciosa*, *Lagerstroemia subcostata*, *Ligustrum japonicum*, *Liquidambar formosana* and *Pistacia chinensis*

B. For Cuttings:

PEQ: Level 2

Minimum Period: 3 months

a. Conditions for *Xylella fastidiosa* (section 2.2.1.12)

Guidance for importers: The minimum quarantine period will be 6 months for nursery stock sourced from countries not recognised by MPI as free from *Xylella fastidiosa*

C. For Tissue Cultures:

a. Conditions for *Xylella fastidiosa* on tissue culture (see section 2.2.2.5)

Guidance for importers: There will be a minimum quarantine period of 6 months in a Level 2 PEQ greenhouse, for tissue cultures from countries not recognised by MPI as free from *Xylella fastidiosa*.

Chapter 2



The Significance of Cyperaceae as Weeds

Charles T. Bryson and Richard Carter

ABSTRACT Weedy Cyperaceae adversely affect natural plant communities and the health of humans and livestock and are major deterrents to agricultural and forest productivity. Most weeds are exogenous and have traits that give them biological and reproductive advantages over other plants. Weeds cost billions of dollars in agriculture, forestry, and urban areas and threaten diversity in natural communities worldwide. Of an estimated 8000 species of weeds worldwide, only about 200 species cause approximately 95% of the problems in production of food, feed, fiber, and livestock. About 25% of the world's weeds are monocots. Of these, sedges are among the most troublesome and difficult to control. The most important cyperaceous weeds in terms of their adverse effect on agriculture include *Cyperus rotundus* L., *C. esculentus* L., *C. difformis* L., *C. iria* L., and the *Fimbristylis miliacea* (L.) Vahl/*F. dichotoma* (L.) Vahl complex, ranking first, 16th, 32nd, 33rd, and 40th among the world's worst weeds, respectively. We provide an overview of cyperaceous weeds, including economic losses, population dynamics, control methods, identification, biology, ecology, dispersal mechanisms, spread, and discussions of major weeds of agriculture, forestry, urban areas, and natural communities.

KEY WORDS *Abildgaardia*, *Bolboschoenus*, *Bulbostylis*, *Carex*, *Cladium*, *Courtoisina*, *Cyperaceae*, *Cyperus*, *Eleocharis*, *Fimbristylis*, *Fuirena*, *Isolepis*, *Kyllinga*, *Lepidosperma*, *Lepironia*, *Lipocarpa*, *Mapania*, *Oxycaryum*, *Rhynchospora*, *Schoenoplectus*, *Scirpodendron*, *Scirpus*, *Scleria*, sedge, weed.

APPENDIX 1

Known and suspected anthropogenic dispersal in Cyperaceae.

Species ¹	Method of dispersal	Source
<i>Bolboschoenus glaucus</i> (Lam.) S. G. Sm.	planted as waterfowl food, rice agriculture	Browning et al., 1995; Smith, 2002a
<i>Bolboschoenus maritimus</i> (L.) Palla	rice agriculture	Holm et al., 1997
<i>Bolboschoenus maritimus</i> subsp. <i>paludosus</i> (A. Nelson) T. Koyama	planted as waterfowl food	Smith, 2002a
<i>Bolboschoenus robustus</i> (Pursh) Soják	ornamental	Everett, 1980–1982
<i>Bulbostylis humilis</i> (Kunth) C. B. Clarke	wool alien	Sell & Murrell, 1996
<i>Bulbostylis striatella</i> C. B. Clarke	wool alien	Sell & Murrell, 1996
<i>Carex acuta</i> L.	ornamental	Grounds, 1989; Huxley, 1992
<i>Carex acutiformis</i> Ehrh.	ornamental	Huxley, 1992
<i>Carex alba</i> Scop.	ornamental	Huxley, 1992
<i>Carex albula</i> Allan	ornamental	Greenlee & Fell, 1992; Turner & Wasson, 1998; Darke, 1999
<i>Carex appressa</i> R. Br.	erosion control, wool alien	Huxley, 1992; Sell & Murrell, 1996; Simpson & Inglis, 2001
<i>Carex arenaria</i> L.	ornamental	Huxley, 1992
<i>Carex atrata</i> L.	ornamental	Grounds, 1989; Huxley, 1992
<i>Carex austrina</i> Mack.	railroad adventive	Mühlenbach, 1983
<i>Carex baccans</i> Nees	ornamental	Bailey, 1935; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex baldensis</i> L.	ornamental	Huxley, 1992
<i>Carex baltzellii</i> Chapm. ex Dewey	ornamental	Darke, 1999
<i>Carex berggreni</i> Petrie	ornamental	Grounds, 1989; Huxley, 1992; Darke, 1999
<i>Carex brevior</i> (Dewey) Mack. ex Lunell	contaminated grass seed	Bryson et al., 1992
<i>Carex brunnea</i> Thunb.	ornamental	Grounds, 1989; Huxley, 1992
<i>Carex buchananii</i> Berggr.	ornamental	Bailey, 1935; Brooklyn Botanical Garden, 1988; Ottesen, 1989; Greenlee & Fell, 1992; Darke, 1999
<i>Carex caryophyllea</i> Latourr.	ornamental	Huxley, 1992; Darke, 1999
<i>Carex cherokeensis</i> Schwein.	hay	Bryson, pers. obs.
<i>Carex comans</i> Berggr.	ornamental	Everett, 1980–1982; Greenlee & Fell, 1992; Turner & Wasson, 1998; Darke, 1999
<i>Carex conica</i> Boott	ornamental	Bailey & Bailey, 1976; Ottesen, 1989; Greenlee & Fell, 1992; Darke, 1999
<i>Carex crawfordii</i> Fernald	railroad adventive	Mühlenbach, 1983
<i>Carex crinita</i> Lam.	ornamental	Darke, 1999
<i>Carex curvula</i> All.	ornamental	Huxley, 1992
<i>Carex devia</i> Cheeseman	wool alien	Sell & Murrell, 1996

Appendix 1. Continued.

Species ¹	Method of dispersal	Source
<i>Carex morrowii</i> Boott	ornamental	Bailey, 1935; Bailey & Bailey, 1976; Everett, 1980-1982; Grounds, 1989; Ottesen, 1989; Greenlee & Fell, 1992; Huxley, 1992; Turner & Wasson, 1998; Darke, 1999
<i>Carex muskingumensis</i> Schwein.	ornamental	Brooklyn Botanical Garden, 1988; Grounds, 1989; Ottesen, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex nebrascensis</i> Dewey	railroad adventive	Mühlenbach, 1979
<i>Carex nigra</i> (L.) Reichard	ornamental	Ottesen, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex nudata</i> W. Boott in S. Watson	ornamental	Greenlee & Fell, 1992; Turner & Wasson, 1998; Darke, 1999
<i>Carex oklahomensis</i> Mack.	hay, highway construction	Bryson et al., 1992, 1996
<i>Carex ornithopoda</i> Willd.	ornamental	Grounds, 1989; Ottesen, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex oshimensis</i> Nakai	ornamental	Grounds, 1989; Darke, 1999
<i>Carex pallescens</i> L.	ornamental	Darke, 1999
<i>Carex paniculata</i> L.	ornamental	Huxley, 1992; Heywood, 1993
<i>Carex pansa</i> L. H. Bailey	ornamental	Greenlee & Fell, 1992; Darke, 1999
<i>Carex pendula</i> Huds.	ornamental	Bailey & Bailey, 1976; Everett, 1980-1982; Grounds, 1989; Ottesen, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999; Reznicek, 2002
<i>Carex pensylvanica</i> Lam.	ornamental	Darke, 1999
<i>Carex petriei</i> Cheeseman	ornamental	Grounds, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex phyllocephala</i> T. Koyama	ornamental	Grounds, 1989; Greenlee & Fell, 1992; Darke, 1999
<i>Carex pilulifera</i> L.	ornamental	Grounds, 1989; Darke, 1999
<i>Carex plantaginea</i> Lam.	ornamental	Bailey & Bailey, 1976; Grounds, 1989; Greenlee & Fell, 1992; Huxley, 1992
<i>Carex praegracilis</i> W. Boott	highway construction and maintenance, ornamental	Reznicek et al., 1976; Bruton & Catling, 1982; Cusick, 1984; Reznicek & Catling, 1987; Darke, 1999
<i>Carex pseudocyperus</i> L.	ornamental	Brooklyn Botanical Garden, 1988; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex riparia</i> Curtis	ornamental	Bailey, 1935; Everett, 1980-1982; Grounds, 1989; Huxley, 1992; Darke, 1999
<i>Carex scaposa</i> C. B. Clarke	ornamental	Huxley, 1992
<i>Carex secta</i> Boott	wool alien	Sell & Murrell, 1996
<i>Carex siderosticta</i> Hance	ornamental	Grounds, 1989; Greenlee & Fell, 1992; Huxley, 1992; Darke, 1999
<i>Carex solandri</i> Boott	ornamental, wool alien	Sell & Murrell, 1996; Darke, 1999

Dispersal

APPENDIX 2

Cyperaceous weeds of the world with data on habit, habitat, and distribution.

no reference to
Carex phyllocephala

Species ¹	Source	Habit ²	Habitat	Distribution ³
<i>Abildgaardia ovata</i> (Burm. f.) Kral	Holm et al., 1979; Soerjani et al., 1987; Moody, 1989; Kukkonen, 2001	P	pastures, rice fields	AFR, ASI, AUS, CAR, EUR, IND, NA, PI, SA
<i>Bolboschoenus affinis</i> (Roth) Drobow	Kukkonen, 2001	P	rice fields	EUR, IND
<i>Bolboschoenus caldwellii</i> (V. J. Cook) Soják	Kern, 1974; Simpson & Inglis, 2001	P	aquatic, irrigation ditches	AUS, PI
<i>Bolboschoenus fluviatilis</i> (Torr.) Soják	Holm et al., 1979; WSSA, 1989	P	aquatic	ASI, AUS, NA
<i>Bolboschoenus maritimus</i> (L.) Palla	Kern, 1974; Reed, 1977; Kühn, 1982; Moody, 1989; Holm et al., 1997; Johnson, 1997; Kissman, 1997	P	aquatic, crops, rice fields	AFR, ASI, CAR, EUR, IND, NA, PI, SA
<i>Bolboschoenus planiculmis</i> (F. Schmidt) T. V. Egorova	Zhirong et al., 1990	P	wetlands, rice fields	ASI
<i>Bulbostylis barbata</i> (Rottb.) C. B. Clarke	Ohwi, 1965; Lin, 1968; Reed, 1977; Godfrey & Wooten, 1979; Holm et al., 1979; Kühn, 1982; Moody, 1989; Le Bourgeois & Merlier, 1995; Simpson & Inglis, 2001	A	crops, cultivated fields, fallow fields, rice fields, waste places	AFR, ASI, AUS, CAR, IND, NA, PI, SA
<i>Bulbostylis capillaris</i> (L.) C. B. Clarke	Godfrey & Wooten, 1979; Lorenzi, 1982; Moody, 1989; Kissman, 1997	A	roadsides, waste places	NA, SA
<i>Bulbostylis ciliatifolia</i> (Elliott) Fernald	Godfrey & Wooten, 1979	A	fallow fields, roadsides, waste places	CAR, NA
<i>Bulbostylis densa</i> (Wall.) Hand.-Mazz.	Ohwi, 1965; Reed, 1977; Kühn, 1982; Moody, 1989; Kukkonen, 2001; Simpson & Inglis, 2001	A	aquatic biotypes, crops, cultivated fields, rice fields, waste places	AFR, ASI, AUS, IND, PI
<i>Bulbostylis filamentosa</i> (Vahl) C. B. Clarke	Healy & Edgar, 1980	P		AFR
<i>Bulbostylis hispidula</i> (Vahl) R. W. Haines	Kühn, 1982; Le Bourgeois & Merlier, 1995; Simpson & Inglis, 2001	A	aquatic biotypes, crops, cultivated fields, grasslands	AFR
<i>Bulbostylis hispidula</i> subsp. <i>pyriformis</i> (Lye) R. W. Haines	Gordon-Gray, 1995	A	pioneers or exposed areas, weeds of cultivation	AFR
<i>Bulbostylis humilis</i> (Kunth) C. B. Clarke	Gordon-Gray, 1995	A	gardens, potted plants	AFR
<i>Bulbostylis puberula</i> (Poir.) Kunth	Holm et al., 1979; Soerjani et al., 1987; Moody, 1989		rice fields	IND
<i>Carex acuta</i> L.	Holm et al., 1979	P		EUR
<i>Carex albolutescens</i> Schwein.	WSSA, 1989	P	moist soils	NA
<i>Carex albula</i> Allan	Moore & Edgar, 1970; Simpson & Inglis, 2001	P	crops, grasslands	PI

Weed Risk Assessment system question sheet:

Answer yes (y) or no (n), or don't know (leave blank), unless otherwise indicated

Botanical name: <i>Carex phyllocephala</i> 'Spark Plug'		Outcome: Accept	
Common name: Carex 'Spark Plug'		Score: 0	
Family name: Cyperaceae		Your name: Chuck Pavlich, Director of NPD,	
Sub-Family name: Caricoidae		Terra Nova Nurseries Inc	
History/Biogeography			
A C C	1 Domestication/ cultivation	1.01 Is the species highly domesticated? If answer is 'no' go to question 2.01	No
		1.02 Has the species become naturalised where grown?	
		1.03 Does the species have weedy races?	
C C C	2 Climate and Distribution	2.01 Species suited to New Zealand climates (0-low; 1-intermediate; 2-high)	1
		2.02 Quality of climate match data (0-low; 1-intermediate; 2-high)	1
		2.03 Broad climate suitability (environmental versatility)	No
		2.04 Native or naturalised in regions with extended dry periods	No
		2.05 Does the species have a history of repeated introductions outside its natural range?	No
C E A E	3 Weed elsewhere	3.01 Naturalised beyond native range	No
		3.02 Garden/amenity/disturbance weed	No
		3.03 Weed if agricultural/horticultural/forestry	No
		3.04 Environmental weed	No
		3.05 Congeneric weed	No
Biology/Ecology			
A C C A C C E E E E E	4 Undesirable traits	4.01 Produces spines, thorns or burrs	No
		4.02 Allelopathis	No
		4.03 Parasitic	No
		4.04 Unpalatable to grazing animals	No
		4.05 Toxic to animals	No
		4.06 Host for recognized pests and pathogens	No
		4.07 Causes allergies or is otherwise toxic to humans	No
		4.08 Creates a fire hazard in natural ecosystems	No
		4.09 Is a shade tolerant plant at some stage of its life cycle	Yes
		4.10 Grows in infertile soils	No
		4.11 Climbing or smothering growth habit	No
		4.12 Forms dense thickets	No
E C E	5 Plant type	5.01 Aquatic	No
		5.02 Grass	No
		5.03 Nitrogen fixing woody plant	No
		5.04 Geophyte	No
C C C C C C	6 Reproduction	6.01 Evidence of substantial reproductive failure in native habitat	No
		6.02 Produces viable seed	No
		6.03 Hybridises naturally	No
		6.04 Self-fertilisation	No
		6.05 Requires specialist pollinators	No
		6.06 Reproduction by vegetative propagation	Yes
		6.07 Minimum generative time (years)	1yr
A C A C E E C C	7 Dispersal mechanisms	7.01 Propagules likely to be dispersed unintentionally	No
		7.02 Propagules dispersed intentionally by people	Yes
		7.03 Propagules likely to disperse as a produce contaminant	No
		7.04 Propagules adapted to wind dispersal	No
		7.05 Propagules buoyant	No
		7.06 Propagules bird dispersed	No
		7.07 Propagules dispersed by other animals (externally)	No
		7.08 Propagules dispersed by other animals (internally)	No
C A A C E	8 Persistence attributes	8.01 Prolific seed production	No
		8.02 Evidence that a persistent propagule bank is formed (>1 yr)	No
		8.03 Well controlled by herbicides	Yes
		8.04 Tolerates or benefits from mutilation, cultivation or fire	No
		8.05 Effective natural enemies present in Australia New Zealand	

Could if dug up, split and replanted

New to NZ, unlikely though

CODES: A = Agricultural, E = Environmental, C = Combined.

Total Score	0
Outcome	Accept
Agricultural Score	-5
Environmental Score	-1