



## The Genus *Scirpus* L. in Maharashtra

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## The Genus *Scirpus* L. in Maharashtra

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### Abstract

The genus *Scirpus* L. (Cyperaceae) is surveyed for Maharashtra, India. Seventeen species of the genus are reported from the state.

### INTRODUCTION

The genus *Scirpus* L., in broad sense appears to be a heterogeneous assemblage of ill-defined species. It includes all the scirpoid species left out from inclusion in other genera (Clarke, 1893). The characteristic features of the genus are spirally arranged glumes and style which is continuous with the ovary. These features, however, are not diagnostic or exclusive for the genus but are shared by other genera as well. Spirally disposed glumes for instance are also characteristic for *Bulbostylis*, *Fimbristylis*, *Eleocharis*, *Fuirena*, *Eriophorum* and *Lipocarpa*. It is, therefore, necessary to employ other features such as involucre bracts, position of inflorescence on the culms, presence or absence of hypogynous structures, habit of the plant etc., in the circumscription of different species. But even these features are intermixed and cannot be employed in combination. Thus it can be said that there is no satisfactory set of characters that can be employed for characterisation of any one species. It is the overall assessment of certain prominent features and field experience that help in distinguishing different species of the genus. The importance and variability of certain features are detailed below.

### Hypogynous Structures

These features occur in the form of bristles or scales in different species. Most of the morphologists hold that these are geneologically related to the reduced perianth, (Blasser, 1940, 1941) or flower as a whole and hence could have some phylogenetic or evolutionary significance. These structures, however, are totally lacking in certain species such as *Scirpus articulatus*, *S. kernii*, *S. kyllingioides*, *S. lateriflorus*, *S. jacobii* and *S. squarrosus*. They appear as scales in species like *S. brachycerus*, *S. littoralis* etc. and as bristles in other species like *S. affinis*, *S. juncoides*, *S. maritimus* and *S. mucronatus*.

Interestingly enough, the hypogynous structures have been weighed variously by different taxonomists. They have some role in the distinction of infrageneric categories when employed in combination with other morphological features, such as the position of inflorescence on the culms, structure of spikelets, bracts, glumes and nuts.

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### Significance of Leaves

Leaves in general may have some taxonomic significance in the genus though they appear to have insignificant role in the life history of some of the species. In most of the species they are totally lacking, while in a few instances they appear as ribbon-shaped submerged structures in the juvenile stage only. The mature plant in flowering and fruiting stage seldom noted to bear any leaves. The presence of leaves in the juvenile stage may be interpreted as the phylogenetically residual features in the evolution of these species. The biological activities of leaves are obviously shifted to green culms.

### Ecology and Phenology

Most of the species prefer wet localities such as road-side ditches, pools, lakeshores, streams and riverbanks, wet rice fields etc. and flourish during late rainy season (September) to early autumn (November). A few species can tolerate semi-moist localities and can thrive up to midsummer (May). This feature can be employed in distinguishing the two major groups among *Scirpus*.

### Anatomical Evidence

Metcalf and Gregory (1971) in his comprehensive account of the anatomy of Cyperaceae emphasizes taxonomic significance of structural variation in central ground tissues of culm of various species. The bundle sheaths also show remarkable variation. This feature helps in distinguishing two groups of species, one with 2-layered sheaths, and the other with 3-layered sheaths

### Embryological Evidence

Embryological features are also variable within the genus and atleast six distinct genera can be recognised on the basis of these features, (Van der Veken, 1965). Embryological studies in *Scirpus mucronatus* (Khanna, 1965) and *S. maritimus* (Jaquet, 1966) are also interesting.

### Economic Importance

The genus is of little economic importance. The rhizomes and culms of *Scirpus articulatus*, *S. gossus*, *S. kysoor* are used in Ayurvedic medicines. *S. brachycerus* is supposed to be poisonous to cattles (Caius, 1992). *S. kysoor* is cultivated for its edible tubers in Konkan region of the state. The stiff culms of *S. maritimus* mixed with those of *Cyprus brachycerus* and *C. pangorei* are used in making mats and baskets.

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### Generic and Infrageneric Delimitation

Morphological circumscription of the genus in a broad sense is rather difficult. As stated earlier, there is not a single set of characters, which is constant for all the included species. Similarly, the genus is heterogeneous from anatomical as well as embryological point of view. Further all these features are variable even within the smaller groups of species. Thus, there is no correlation of characters and this has posed the existing problems in the taxonomy of the genus. Obviously, there are varied opinions regarding the delimitation of the genus as well as its subgenera and sections. Some cyperologists treat the genus in a broad sense with different species groups under sections, others split the genus into several distinct genera. Clarke (1893), Chermeson (1937), Kern (1974) and Rao and Verma (1982) are in favour of taking the genus in a broad sense including various small sections with more or less closely related species. This course has been followed in the present paper as it appears more convenient and less problematic.

Palla (1888-89) employing chiefly anatomical features, recognised various genera of smaller size such as *Blysmus*, *Bulboschoenus*, *Isolepis*, *Schoenoplectus* etc. as distinct from *Scirpus*. Subsequently, a few other smaller genera like *Rikliella*, *Kyllingiella* and *Actinoscirpus* have been recognised by different workers on similar principles. Some of the recent cyperologists including Hooper (1976), Koyama (1985), Goetghebeur and Simpson (1991) have accepted these narrow generic limits. The narrow generic limit of *Rikliella* was also followed by the present author in the recent publication (1998).

The genus *Rikliella* erected by J. Raynal has been merged into the genus *Lipocarpha* R.Br. by Goetghebeur and Van den Borre (1989). The new concept of the genus is based on the interpretation of reduction in the inflorescence and the floral structures. This contention gets support from the common possession of the features of achene surface pattern (SEM studies by Pandey *et al.*, 1995) and secondary metabolites (Ragan, 1994) in the species of both viz. *Lipocarpha* and *Rikliella*.

Although the broad generic limits as taken by Clarke (1893), Kern (1974) and others are not wholly satisfactory, they are definitely more convenient for recognising various species groups on morphological grounds. Anatomical, embryological and other features may be of some use in the natural classification of the genus but cannot be employed by field taxonomists. Further, even within the narrow limits of various genera the included species do not appear interrelated. *Scirpus grossus* and *S. kysoor*, for instance are lodged between *Schoenoplectus* and *Actinoscirpus*, *S. maritimus* between *Bulboschoenus* and *Schoenoplectus*. The position of these and other species under these genera appears to be doubtful. The other genera like *Rikliella*, *Kyllingiella* etc. also recognised on the basis of leaf anatomy and interpretation of floral reduction are not morphologically distinct from *Scirpus* (*sensu lato*).

It may be concluded here that neither the broad generic limit nor the narrow circumscription of smaller genera are entirely satisfactory. The genus is urgently in need of intensive investigation.

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## Key to the Sections

1. Involucral bracts 2-5, foliaceous, dorsiventral ..... 2
1. Involucral bracts stem like, solitary looking like the continuation of stem, the others if present glume-like or setaceous ..... Sect. **Schoenoplectus**  
(sps. 2, 3, 5, 6, 10, 11, 14, 15 & 16)
2. Rhizome when present creeping with tuberiferous stolons; hypogynous bristles present; nuts over 1 mm long ..... 4
2. Rhizome when present vertical, neither stoloniferous nor tuberiferous; hypogynous bristles totally absent; nuts 0.5-1mm long ..... 3
3. Spikelets 1-3, not arranged in globose heads, squarrose by the recurved mucros of glumes. Plants very slender with almost filiform stems and setiform leaves .....  
..... Sect. **Micranthi**  
(sps. 7, 17)
3. Spikelets numerous, arranged in single, terminal globose head never squarrose. Plants less slender with stems and leaves not filiform and setiform ..... Sect. **Micheliani**  
(sps. 8, 13)
4. Stems 3-winged, nodeless; leaves basal; inflorescence anthelate, decomound .....  
..... Sect. **Actinoscirpus**  
(sps. 4, 9)
4. Stems acutely trigonous, noded; leaves cauline; inflorescence simple or of clustered spikelets ..... Sect. **Maritimi**  
(sps. 1, 12)

## Key to the species

1. Leaves well-developed; involucral bracts 2-5, foilaceous, dorsiventrally flat ..... 2
1. Leaves reduced to sheaths, rarely shortly laminate (except in *S. lateriflorus* sometimes the stems are leafy); involucral bracts seeminly stem-like, solitary, looking like the continuation of stems, the others when present, glume-like or setaceous ..... 9
2. Rhizome when present vertical; tubers or stolon never present; nuts under 0.4 mm wide and under 1mm long; bristles absent ..... 3
2. Rhizome creeping with tuberiferous stolons; nuts over 0.5mm wide and more than 1mm long; bristles present ..... 6
3. Spikelets numerous, not squarrose, always arranged in single, terminal compact globose heads; stems rather thick, 0.5-1.5mm wide; leaves flat 0.5-3 mm wide ..... 4
3. Spikelets 1-3, solitary, squarrose from the recurved mucros of the glumes, never arranged in heads as above; stems filiform and the leaves setiform ..... 5
4. Habit *Kyllinga*-like; rhizome vertical; leaves always shorter than the stems; heads white, 3-4 mm wide; glumes muticous; nuts pale or white .....8. **S. kyllingioides**

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4. Habit not *Kyllinga*-like; tufted annuals; leaves often longer than the stems; heads greenish to stramineous; 8-10 mm wide; glumes distinctly mucronate; nuts orange-yellow ..... 13. **S. michelianus**
5. Spikelets more often pseudolateral; lowest involucrel bract erect as if the continuation of stem; styles 3-fid; nuts trigonous ..... 17. **S. squarrosus**
5. Spikelets terminal; lowest involucrel bract spreading or deflexed; styles 2-fid; nuts biconvex ..... 7. **S. kernii**
6. Stems triquetrous or almost 3-winged, 2-3 cm wide, nodeless; leaves basal; inflorescence anthelate, decomposed; spikelets ovoid, 2-4 mm long; glumes 2.5-3 mm long, entire at apex ..... 7
6. Stems almost acutely trigonous, 2-4 mm wide, noded; leaves cauline; inflorescence simple or of clustered spikelets; spikelets terete, cylindrical or broadly ellipsoid, subturgid, 1-3 cm long; glumes 5.5-9 mm long, lacinate at apex ..... 8
7. Hypogynous bristles retrorsely barbellate ..... 4. **S. grossus**
7. Hypogynous bristles plumose with many soft or silky hairs, (never retrorsely barbellate) ..... 9. **S. kysoor**
8. Involucrel bracts with broad, hyaline wing on margins near the base; inflorescence often terminal; spikelets broadly ellipsoid, flat or subturgid, stramineous; glumes 7-9 x 3-4 mm, nuts reticulate; style mostly 2-fid ..... 1. **S. affinis**
8. Involucrel bracts without or rarely with a narrow hyaline wing on margins at base; inflorescence often pseudolateral; spikelets terete, cylindrical, ultimately blackened; glumes 5.5-6 x 2.5-3 mm; nuts smooth; styles mostly 3-fid ..... 12. **S. maritimus**
9. Hypogynous bristles absent ..... 10
9. Hypogynous bristles or scales present ..... 14
10. Stems hollow, compressed (when dry), often septate; spikelets 3.5-6 mm wide; glumes 3-4 mm long ..... 11
10. Stems solid, terete or angular, not septate; spikelets 1.5-2.5 mm wide; glumes 2-2.2 mm long ..... 13
11. Cluster of spikelets above the middle; stem-like bracts as long as or shorter than the stems; spikelets bright orange-yellow; glumes very loosely imbricated ..... 16. **S. roylei**
11. Clusters of the spikelets near the base of the stems and hence the stem-like involucrel bracts much longer than the stems; spikelets stramineous to brown; glumes tightly imbricate ..... 12
12. Stems 6-10 mm wide; glumes *ca.* 4 mm long; nuts triquetrous, 1.8-2 mm long with faintly horizontally wavy ridges, smooth and ribless on angles ..... 2. **S. articulatus**

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12. Stems 1.5-2.5(3) mm wide; glumes *ca.* 3 mm long; nuts trigonous, 1-1.2 mm long with strong horizontally wavy ridges and strong rib on angles ..... 5. **S. jacobii**
13. Stem with a basal female flower; spikelets arranged little below the apex of stems, partly peduncled and with short rays; nuts trigonous with strong wavy ridges, almost muricate on angles; styles 3-fid ..... 10. **S. lateriflorus**
13. Stem without a basal female flower; spikelets arranged near the base of the stems, all sessile; rays absent; nuts biconvex, smooth; styles 2-fid ..... 15. **S. naikianus**
14. Inflorescence with 1-4 (rarely upto 10) spikelets; bristles retrorsely barbellate ..... 15
14. Inflorescence with many spikelets; hypogynous scales plumose or ciliate, never barbellate ..... 16
15. Stems strongly 3-gonous; styles 3-fid ..... 14. **S. mucronatus**
15. Stems many angled; styles mostly 2-fid ..... 6. **S. juncooides**
16. Spikelets all sessile, often clustered in globose heads; hypogynous scales like the small, narrow glumes, ciliate on margins; nuts planoconvex; styles 3-fid ... 3. **S. brachycerus**
16. Spikelets all peduncled, solitary, hypogynous; scales densely plumose from the moniliform hairs; nuts biconvex; styles 2-fid ..... 11. **S. littoralis** subsp. **subulatus**

1. **Scirpus affinis** Roth in R. & S. Syst. 2: 140. 1817; Sharma *et al.*, Fl. Maharashtra (Monocots), 367.1998; W.Khan in Naik, Fl. Marathwada 2:965.1998. *S. maritimus* L. var. *affinis* (Roth) Clarke in Hook. f., Fl. Brit. India 6: 659.1893. Cooke, Fl. Pres. Bombay 2: 893. 1908. *Bulboschoenus maritimus* (L.) Palla subsp. *affinis* (Roth) Koyama, Brittonia 31: 284. 1979.

Dwarf perennial, 5-40 cm tall; spikelets stramineous.

*Fls. & Frts:* January-May.

*Specimens examined:* Beed Dt., Majalgaon, W. Khan 4150.

*Notes:* Sometimes treated as the variety of *S. maritimus* L. (Clarke, Cooke l.c., Kern, 1974), but there are more differences between the two than similarities as shown in the key. Phenologically also it is isolated. The two taxa are common in this state. Further studies based on features other than the intermixed digynous and trigynous florets in plants of Maharashtra state suggest that the polymorphism in *S. maritimus* should not be racially united with specifically distinct *S. affinis* Roth. Since spikelets with digynous florets mixed with trigynous ones (or vice versa) are not rare in Cyperaceae.

The Asiatic *S. affinis* and European *S. maritimus* - complex are urgently in need of a revision.

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2. *Scirpus articulatus* L., Sp. Pl. 47. 1753; Clarke in Hook. f., Fl. Brit. India 6: 656. 1893; Cooke, Fl. Pres. Bombay 2: 891.1908; Kern in Steenis, Fl. Malesiana ser. 1.7(3): 513. 1974; W. Khan in Naik, Fl. Marathwada 2: 966.1998. *Schoenoplectus articulatus* (L.) Palla, Bot. Jahrb. Syst. 10: 229.1889; Sharma *et al.*, Fl. Maharashtra 357. 1996.

Densely tufted perennial with fistular leafles stems; spikelets greenish tinged with brown.

*Fls. & Frts:* November-February.

*Specimens examined:* Nanded Dt., Bhokar town, W. Khan 223, 553.

The plant is used as purgative. The stems are used for making mats.

3. *Scirpus brachycerus* Hochst. ex A. Rich., Tent. Fl. Abyss. 2: 496. 1851; Verma et Chandra, Cypr. M.P. Records BSI. 212: 264.1981. *S. corymbosus* Heyne ex Roth., Nov. Pl. Sp., 1821; Clarke in Hook. f., Fl. Brit. India 6: 657. 1893; Cooke, Fl. Pres. Bombay 2: 892. 1908; W. Khan in Naik, Fl. Marathwada 2: 967. 1998. *auct. non.* Linn. 1753. *nec.* Forsk. 1775. *Isolepis corymbosus* Roth. ex R. & S. Syst. Veg. 2:110. 1817. *Schoenoplectus corymbosus* (Roth ex R. & S.) J. Raynal in J.B. Lebrum *et al.*, Cat. Niger. Pl. 343. 1976. Sharma *et al.*, Fl. Maharashtra 359. 1996.

Robust perennial with terete stems; spikelets pseudolateral pendulous.

*Fls. & Frts:* November-February.

*Specimens examined:* Aurangabad Dt., Delhi gate, Naik 265, W. Khan 2278.

*Notes:* All our specimens have non septate stems and the flowers with hypogynous scales. These features have not been mentioned in earlier Indian Floras. The plants are said to be poisonous to the cattles.

4. *Scirpus grossus* L. f., Suppl. 104. 1781; Clarke in Hook. f., Fl. Brit. India 6: 659. 1893; Cooke, Fl. Pres. Bombay 2: 893. 1908; Kern in Steenis, Fl. Malesiana ser. 1. 7(3): 498.1974. *Schoenoplectus grossus* (L.f.) Palla in Allg. Bot. Z. Syst. 17. Bibl. 3. 1911. Sharma *et al.*, Fl. Maharashtra 359. 1996; *Actinoscirpus grossus* (L.f.) Goetgh. & Simpson in Kew Bull. 46: 171. 1991.

Stems narrowly 3-winged, upto 2 m tall; leaves and bracts over 2 cm broad.

*Fls. & Frts:* October-January.



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*Specimens examined:* Science college garden, Pune, *Garde 594*, Bassein (Thana Dt.) *Rayan 1853* (BSI).

*Notes:* The roots are said to be sweetish, cooling, laxative, tonic of the liver, good against infection and poison, diuretic, useful in burning sensation, vomiting, fever and gonorrhoea. The properties are said to be same as those of *Cyperus esculentus*.

5. **Scirpus jacobii** Fischer, Kew Bull. 1931: 103. 1931 *et in* Gamble, Fl. Pres. Madras 3: 1156. (1957. BSI repr.). *Schoenoplectus jacobii* (Fischer) Lye in Bot. Notis. 124: 290. 1971. *Schoenoplectus senegalensis* (Hochst. ex Steud.) Palla, Bot. Jahrb. 10: 229. 1888. Sharma *et al.*, Fl. Maharashtra 366. 1996; *Isolepis senegalensis* Hochst. ex Steud., Syn. Pl. Glum. 2: 96. 1855; *Scirpus senegalensis* (Hochst. ex Steud.) W. Khan in Naik, Fl. Marathwada 2: 971. 1998 *non* Lamk., 1791.

Densely tufted annual with flat, septate stems; spikelets greenish brown.

*Fls. & Frts:* September-December.

*Specimens examined:* Nanded Dt., Degloor, Mirzapur, *Madhukar Reddy 6146*.

Resembles smaller forms of *S. articulatus*, but differs in the nature of glumes and nuts.

6. **Scirpus juncooides** Roxb., [Hort. Beng. 81.1814. *nom. nud.*] Fl. Ind. 1: 218. 1820; Kern in Steenis, Fl. Malesiana ser. 1. 7(3): 512. 1974; W. Khan in Naik, Fl. Marathwada 2: 967. 1998. *S. erectus auct. plur. non* Poir. 1804; Clarke in Hook. f., Fl. Brit. India 6: 656. 1893. *Schoenoplectus juncooides* (Roxb.) Palla, Bot. Jahrb. Syst. 10: 229. 1889; Sharma *et al.*, Fl. Maharashtra 361. 1996.

Tufted annual with pseudolateral capitate inflorescence.

*Fls. & Frts:* October-December.

*Specimens examined:* Nanded Dt., Degloor, Mirzapur, *Madhukar Reddy 6798*.

7. **Scirpus kernii** Raymond, Nat. Canad. 86. 230. 1959; J. Raynal, Adansonia, ser. 2. 13: 155. 1973; Sharma *et al.*, Fl. Maharashtra 356. 1996; W. Khan in Naik Fl. Marathwada 2: 963. 1998. *Lipocarpa kernii* (Raymond) Goetghebeur, Wageningen Agri. Univ. papers, 89-1: 42. 1989.

Small annual with filiform stems, leaves and bracts; spikelets brown tinged with green.

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*Fls. & Frts:* August-October.

*Specimens examined:* Nanded Dt., Mahedeoghat (Bhokar), W. Khan 280.

8. *Scirpus kyllingioides* (A. Rich.) Boeck. in *Linnaea* 36: 733. 1870; Clarke in Hook. f., *Fl. Brit. India* 6: 662. 1893; Cooke, *Fl. Pres. Bombay* 2: 968. 1998. *Isolepis kyllingioides* A. Rich, *Tent. Fl. Abyss.* 2: 502. 1851. *Kyllingiella microcephala* (Steud.) R. Haines & Lye in *Bot. Notis.* 131: 176. 1978; Sharma *et al.*, *Fl. Maharashtra*, 331. 1996. *Kyllinga microcephala* Steud. in *Fl.* 25: 597. 1842.

Habitually much similar to the species of *Kyllinga*, with its white globose, terminal heads and basal leaves, but it is distinguished by the spiral phyllotaxy of glumes and also by the trigonous nuts.

*Fls. & Frts:* August-October.

*Specimens examined:* Kolhapur Dt., Kolhapur University, W. Khan 4084.

9. *Scirpus kysoor* Roxb. [*Hort. Beng.* 6. 1814*nom. nud.*] *Fl. Ind.* 1: 230. 1832; Cooke, *Fl. Pres. Bombay* 2: 894. 1908. *S. grossus* L. var. *kysoor* (Roxb.) Clarke in Hook. f., *Fl. Brit. India* 6: 660. 1893. *Actinoscirpus grossus* (L.f.) Goetgh. & Simpson var. *kysoor* (Roxb.) H.J. Noltie in *Edinburgh, J. Bot.* 51(2): 173. 1994.

Very robust perennial upto 2 m tall.

*Fls. & Frts:* October-January.

*Specimens examined:* Bhandra Dt., Amgaon, W. Khan 4583. Ratnagiri Dt., Yadov *s.n.*

*Notes:* Sometimes it is considered as synonymous to *S. grossus* L. Due to the different nature of the bristles (as shown in the key) *S. kysoor* appears to be a distinct taxon though not separable specifically from the former. Beetle (*Amer. J. Bot.* 3: 661. 1946) regards it as the forma of *S. grossus*. Very recently it is treated under the newly erected genus *Actinoscirpus* as the var. of *A. grossus* by Noltie (l.c.). The specific status (*S. kysoor*) followed here is tentative till further investigation.

Cultivated in some parts of the state for its edible tubers.

10. *Scirpus lateriflorus* Gmel., *Syst. Veg.* 1: 127. 1791; Kern in Steenis, *Fl. Malesiana ser.* 1. 7 (3): 514. 1974; W. Khan in Naik, *Fl. Marathwada* 2: 968. 1998. *S. lateralis* Retz., *Obs.* 4: 12. 1786 *et ibid* 5: 16. 1789. *non* Forssk. 1775; *Isolepis uninodis* Miq., *Fl. Ind. Bat.* 3: 308. 1856. *Scirpus supinus* L. var. *uninodes* Clarke in Hook. f., *Fl. Brit. India* 6: 656. 1893; Cooke, *Fl. Pres. Bombay* 2: 892. 1908. *Schoenoplectus supinus* (L.) Palla,

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subsp. *lateriflorus*, (Gmel.) Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 158. 1985.

Tufted annual with pseudolateral inflorescence.

*Fls. & Frts:* October-February.

*Specimens examined:* Nanded Dt., Bhokar town, W. Khan 1428.

*Notes:* The species is extremely polymorphic, some forms are with more slender stems, the cylindrically accrescent few spikelets, the tightly arranged glumes and longer involucre bracts are so variable that one can easily recognise them as distinct. But these are linked with several intermediates appear to be of least taxonomic value. The Eurasian species *S. supinus* L. is sometimes united with *S. lateriflorus* but the former is distinct by its nodeless stems, the multistriate glumes and has no amphicarp.

**11. *Scirpus littoralis*** Schrad, Germ. 1: 42. t. 5. f. 7. 1806; Clarke in Hook. f., Fl. Brit. India 6: 659. 1893; Cooke, Fl. Pres. Bombay, 2: 894. 1908; W. Khan in Naik, Fl. Marathwada 2: 969. 1998. subsp. **subulatus** (Vahl) W. Khan *comb. nov.* *Scirpus subulatus* Vahl, Enum. Pl. 2: 268. 1806. *S. littoralis* Sch. var. *subulatus* (Vahl) Chiovenda Istit. Bot. Catania 1: 15. 1928. *Schoenoplectus littoralis* (Sch.) Palla subsp. *subulatus* (Vahl) Koyama in Dassan. & Fosb., Rev. Handb. Fl. Ceylon 5: 157. 1985; Sharma *et al.*, Fl. Maharashtra 363. 1996.

Medium sized perennial; stems terete throughout; spikelets brown-green to bright brown-purplish.

*Fls. & Frts:* Almost throughout the year.

*Specimens examined:* Godavari river - bed, W. Khan 1539.

*Notes:* The typical subsp. *littoralis*, which occurs in Europe and Western Asia is distinguished from ssp. *subulatus* in having sharply trigonous or almost triquetrous stems and broader plogynous scales. In most of the Indian flora the latter was known to be as *S. littoralis*.

**12. *Scirpus maritimus*** L., Sp. Pl. 51. 1753; Clarke in Hook. f., Fl. Brit. India 6: 658. 1893; Cooke, Fl. Pres. Bombay 2: 893. 1908; Kern in Steenis, Fl. Malesiana ser. 1. 7(3): 499. 1974; W. Khan in Naik, Fl. Marathwada 2: 969. 1998. *Bulboschoenus maritimus* (L.) Palla in Koch. Syn. Deutsch. Fl. ed. 3: 2532. 1904; Sharma *et al.*, Fl. Maharashtra 365. 1996.

Tall perennial. Tubers large, non aromatic, spikelets brown to blackish.

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*Fls. & Frts:* September-December.

*Specimens examined:* Nanded Dt., Kinwat, *Zate* 196; Beed Dt., Majalgaon, Patrud canal, W. Khan 4013.

*Notes:* Some of the cyperologists regard this as polymorphic species and *S. affinis* as one of its variant forms.

The roots are said to be astringent and diuretic.

- 13. *Scirpus michelianus* L.,** Sp. Pl. 76. 1753; Clarke in Hook. f., Fl. Brit. India 6: 662. 1893; Cooke, Fl. Prs. Bombay 2: 895. 1908. *Cyperus michelianus* (L.) Delile, Fl. Egypt. Illustr. 50. 1813; Sharma *et al.*, Fl. Maharashtra 367. 1996.

Dwarf tufted annual. Leaves longer than the stems; spikelets stramineous (in Herb. specimen) in terminal globose heads; glumes spiral.

*Fls. & Frts.:* ?

*Specimens examined:* *s. loc., s.n.* (BSI).

*Notes:* Apparently closely resembles the commonly occurring *Cyperus pygmaeus* Rottb. almost in all respects except in having spiral arrangement of glumes and the nature of nuts. Several authors including Boeckeler (1870) and Kükenthal (1936). considered the former conspecific with the latter. But occurrence of the above specimen indicates that Kunth (1837), Clarke (1893), and Cooke (1908) have rightly treated them into two different genera. I have included the species on the authority of Cooke (1908), who reported it from Konkan.

- 14. *Scirpus mucronatus* L.,** Sp. Pl. 50.1753; Clarke in Hook. f., Fl. Brit. India 6: 657. 1893; Kern in Steenis, Fl. Malesiana ser. 1. 7 (3): 510. 1974. *Schoenoplectus mucronatus* (L.) Palla, Verh. K. K. Zool. Bot. Ges. Wien. 38. Sitzb. 49. 1888; Sharma *et al.*, Fl. Maharashtra 365. 1996.

Tufted perennial with sessile, capitate pseudolateral inflorescence near the apex of the stems; spikelets yellowish brown.

*Fls. & Frts:* October-November.

*Specimens examined:* Science College, Pune, *Donde* 17 (BSI).

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15. *Scirpus naikianus* W. Khan, Rheedea 8(1): 71-73. 1998.

Densely tufted dwarf annual with dimorphic culms; leaves reduced to sheaths; spikelets pseudolateral.

*Fls. & Frts:* December-January.

*Specimens examined:* Nanded Dt., Amdari (Bhokar), W. Khan 2158.

*Notes:* This species belongs to the Sect. *Schoenoplectus* Rchb. It is not amply related to any of the species of this section. In some features it is similar to *S. wallichii* Nees but differs in having inflorescence always near the base of stems, the boat-shaped small (ca 2mm long) glumes, the papillose anthers and smooth nuts without bristles.

*S. naikianus* can be distinguished from the allied *S. lateriflorus* Gmel. by its basal inflorescence.

16. *Scirpus roylei*, (Nees) Parkar in Duthie, Fl. Upp. Gang. Pl. 3: 361. 1929; W. Khan in Naik, Fl. Marathwada 2: 970.1998. *Isolepis roylei* Nees in Wt. Contr. 107. 1834. *I. lupina* Nees l.c. *Scirpus quinquefarius* Buch.-Ham. ex Boeck., Linnaea 36. 701. 1869-70; Clarke in Hook. f., Fl. Brit. India 6: 657. 1893; Cooke, Fl. Pres. Bombay 2: 892. 1908. *Schoenoplectus roylei* (Nees) Ovizinn. & Zukav., Fl. Tadjikist. 2: 40. 1963; Sharma *et al.*, Fl. Maharashtra 365. 1996.

Spikelets characteristically bright orange yellow.

*Fls. & Frts:* November-January.

*Specimens examined:* Jalna Dt., Shahagad, *Pardeshi* 899.

17. *Scirpus squarrosus* L., Mant. Ait. 181. 1771; Clarke in Hook. f., Fl. Brit. India 6: 663. 1893; Kern in Steenis, Fl. Malesiana ser. 1. 7 (3): 516. 1974; Cooke, Fl. Pres. Bombay 2: 396. 1908. *Rikliella squarrosa* (L.) J. Raynal, Adansonia ser. 2.13: 154.1973; Sharma *et al.*, Fl. Maharashtra 356. 1996; W. Khan in Naik, Fl. Marathwada 2: 963. 1998. *Isolepis squarrosa* (L.) R. & S., Syst. 2: 111. 1973. *Lipocarpa squarrosa* (L.) Goetgh., Wageningen Agri. Univ. papers 89. 171. 1989.

Apparently very similar and difficult to distinguish from *S. kernii*. Both often decively grow together in the same locality, but distinct in features as shown in the key.

*Fls. & Frts:* August-October.

*Specimens examined:* Nanded Dt., Kinwat, *Naik* 893; Mirzapur, W. Khan 4033.

## The Genus *Scirpus* L. in Maharashtra

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