



Native vegetation of freshwater rivers & creeks in south Western Australia



**WATER AND RIVERS
COMMISSION**



**Department of Conservation
and Land Management**

FRESHWATER
1997

USING THIS BOOKLET

The Water and Rivers Commission has published two booklets entitled *Vegetation of freshwater rivers and creeks in south Western Australia* and *Vegetation of estuaries and saline waterways in south Western Australia* to encourage protection and restoration of the streamline vegetation which is vital to maintaining the ecology and water quality of our creeks, rivers and estuaries. It is hoped that these booklets will be useful for the easy identification of common plants found along the various types of waterways by community rivercare and landcare groups, and other people interested in local flora. If you are interested in joining volunteer rivercare groups, you can contact your local council or the Water and Rivers Commission.

This booklet describes a number of plants which are common to freshwater conditions, including water flowing or held in streams, rivers and other wetlands. These descriptions are designed to be general and should not be used for detailed scientific work. The terminology has been simplified as far as possible and a glossary of terms is provided at the back. On the back inside cover there is a transect showing where the various plants may be found and a page index for each plant. For further information about these plants a reference list is provided.

People using this resource must keep in mind that many species are quite similar and some features are common to all plants in a particular genus.

ACKNOWLEDGMENTS

This work was prepared for the Water and Rivers Commission by Lisa Chalmers (Policy and Planning) and Judy Wheeler (Conservation and Land Management).

Special thanks to Margaret Wilson for her excellent illustrations which will make for easy identification. Special thanks to Nicole Siemon (Swan River Trust) who instigated the project and provided much input. Thanks to Luke Pen (Water and Rivers Commission) who provided comment and the initial transect drawings. Gratitude is expressed to Karen Majer and Jeff Kite (Water and Rivers Commission) for their comments. Also thanks to Neville Marchant and staff at the Western Australian Herbarium who provided valuable assistance. Thanks to Kathy Meney (Regeneration Technology Pty Ltd) and Pat Hatfield (Leschenault Inlet Management Authority) for some of the propagation information. Thanks to Paul Wilson for help in collecting fresh plant specimens for drawing.

ISBN 0 7309 7246 1

Printed on recycled paper

VALUES OF FRINGING VEGETATION

Fringing vegetation plays an important role in the maintenance of a biologically balanced and healthy waterway. It provides a wide range of functions which are essential for supporting plant and animal life and for maintaining the quality of the environment. These functions include: sediment, nutrient and pollutant filtering, stabilising banks, and, most importantly, provision of food for the whole waterway.

Balanced and healthy waterways are usually characterised by their fringing vegetation. The water in which the plants grow may be fresh, brackish or saline and the particular species determined by the tolerance of the plant to water quality. Sedges, shrubs and trees not only provide a pleasing appearance to a waterway, they are an incredibly rich shelter and breeding habitat for a wide range of organisms.

FRESHWATER WATERWAYS THE WETLANDS OF THE SOUTH-WEST

The Swan Coastal Plain has a line of lakes and damplands which run north-south roughly parallel with the coastline. They are related to the ancient dune ridges and interdunal depressions which make up the coastal plain. In these depressions, the water table intersects the ground surface, either permanently or seasonally, forming wetlands. In some areas, surface drainage contributes to these wetlands. Many small streams flow off the Darling Scarp via the deep, narrow and steep valleys. The streams either link up to the main rivers, or flow into the permeable soils and enter the groundwater system. Similarly, between Bunbury and Esperance, streams run off the higher ground towards the coast. Many of these southern rivers in the wetter part of the south-west are fresh with only a small section of the river receiving irregular tidal influences (and consequently saline intrusion) when sand barriers break periodically. Areas which receive salt water periodically will have plants which are included in the *Native vegetation of estuaries and saline waterways* booklet.

There may be considerable variation in the distribution and composition of plants within a single wetland or waterway area, due to soil type, the water depth, timing and duration of flooding and the length of the dry or exposed period. Many different types of wetland may be found in close proximity, forming not just different ecosystems, but distinctive landscapes. Many of the natural drainage lines receive water only seasonally and, for the most part of the year, have no water in their channels. Plants which can tolerate these extreme conditions will be different to those found near freshwater streams which have permanent water.

Agonis flexuosa
Peppermint
 (Myrtaceae)

LEAVES

The leaves occur alternately along the stem which zigzags and changes direction at each leaf node. They are narrow and willow-like with a pointed tip, 45-120 mm long and 3.5-12 mm wide, with a prominent midrib. The leaves have a strong scent of peppermint when crushed.

FLOWERS

The white flowers are arranged in tight spherical clusters along the stem, and are about 10 mm across. They have 5 rounded petals which are 3-6 mm long and have 20-25 tiny stamens.

FRUITS

The grey woody fruits are cup-shaped, 2.5 - 5 mm in diameter and clustered into spherical woody heads which are 7-10 mm across. At maturity the fruits release the tiny seeds through three valves.

FLOWERING TIME

Flowers in spring and early summer.

GROWTH FORM AND HABIT

Peppermint is a thick-trunked tree with rough grey fissured bark. It often has weeping branches and grows to a height of 10 m. It frequently occurs in coastal areas, sometimes fringing watercourses. It is distributed between Mandurah and Bremer Bay with isolated populations further north including Perth.

PROPAGATION

Peppermint can be propagated by seed sown in autumn or spring. The capsules mature from late summer to autumn. Collect seed using a paper bag tied over the immature woody capsules, as the seeds are shed soon after the flowers die. It can be direct seeded or planted as a seedling and can be grown from cuttings using striking hormone.



TREES

Agonis juniperina
Wattie
(Myrtaceae)

LEAVES

The small green leaves are 4-23 mm long and 0.3-2 mm wide and arranged alternately or in alternate clusters along the stem.

FLOWERS

The flowers are arranged in tight spherical clusters along the stem. The white flowers are about 5 mm across, have 5 rounded petals 1.5-3 mm long and have 10 tiny stamens.

FRUITS

The grey woody fruits are cup-shaped, 2-3 mm in diameter and clustered into woody heads which are 7-10 mm across.

FLOWERING TIME

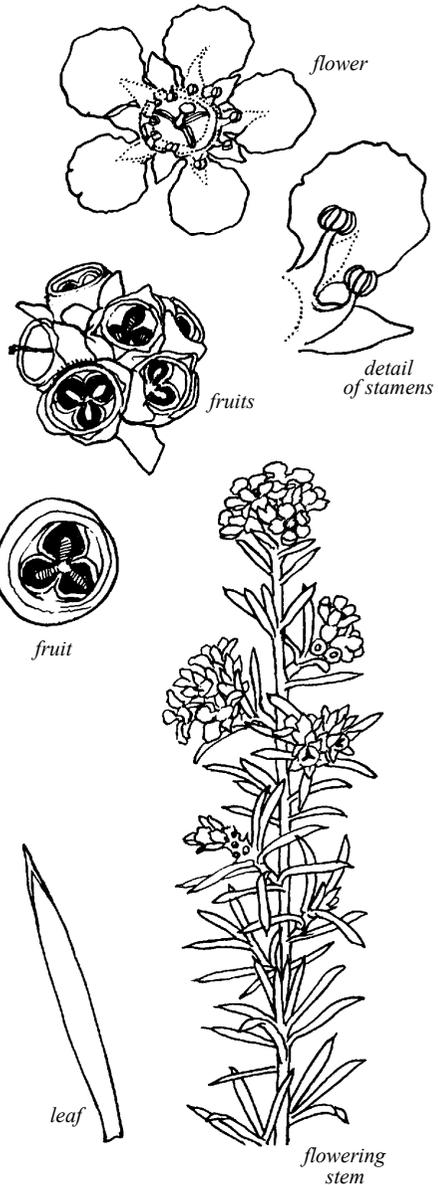
Flowers much of the year.

GROWTH FORM AND HABITAT

Wattie is a tall tree up to 27 m high, sometimes forming dense thickets. The wattie inhabits creeks, lakes and swamps from Augusta and Manjimup to east of Albany, also recorded from between Williams and Kojonup.

PROPAGATION

Wattie can be propagated by seed or by cuttings.



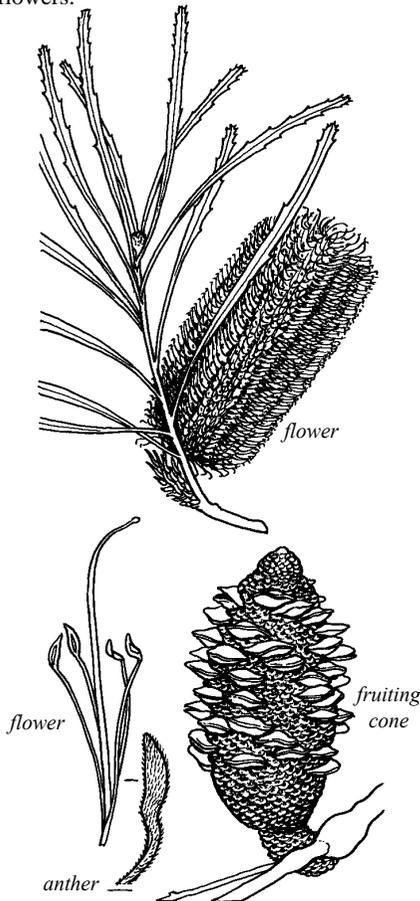
Banksia littoralis
Swamp banksia
(Proteaceae)

LEAVES

The narrow, strap-like leaves are 100-230 mm long and 4-10 mm wide. The upper surface of the leaf is dark green while the lower surface is felted white to cream with minute hairs. The margins are serrated particularly towards the leaf tip.

FLOWERS

The inflorescence is an erect, cylindrical flower cone which is up to 200 mm long and 60-70 mm wide. The flower cone is made up of hundreds of individual yellow flowers.



FRUITS

The large fruiting cones remain on the tree for many years. The small woody fruits have two woody valves which protrude from the packing tissues of the cone. The fruits eventually open and release two winged seeds.

FLOWERING TIME

Flowers from late summer to mid winter.

GROWTH FORM AND HABITAT

Swamp banksia grows up to 12 m high, with an irregular, gnarled, thick trunk and a slightly drooping canopy. The bark is dull grey, rough and crumbly. It is fire tolerant, new shoots arising from the stem after fire, and is one of the few Proteaceae species associated with winter-wet depressions. It frequently occurs in swampy areas but is not tolerant of inundation and prefers areas subject to only short winter waterlogging or very shallow groundwater table. Populations extend from Jurien to Bremer Bay usually in near-coastal areas.

PROPAGATION

Swamp banksia can be grown readily from seed in autumn and late winter.

Collect

the woody cones after flowers have withered ensuring that there is no sign of insect attack. Place the cones in an open fire so that they catch alight all over but don't leave for too long. Alternatively place in an oven at 120 degrees Celsius for half an hour.

The seeds can be prized out with tweezers. It can be direct seeded or grown to a seedling. Do not use fertiliser with a high phosphate content. Young plants may need watering in summer and need plenty of mulch around the young trees.

TREES

Banksia seminuda Riverbanksia (Proteaceae)

LEAVES

The narrow strap-like leaves are 70-120 mm long and 8-18 mm wide. The upper surface of the leaf is dark green while the lower surface is felted white to cream with minute hairs. The margins are serrated particularly towards the leaf tip.

FLOWERS

The inflorescence is an erect, cylindrical flower cone which is up to 200 mm long and 60-70 mm wide. The flower cone is made up of hundreds of individual yellow to brownish yellow flowers.

FRUITS

The large cylindrical fruiting cones remain on the tree for many years. The dead flowers soon fall to reveal numerous sharp, thin, protruding fruits. At first the valves of the fruit are furry, however, they soon age to a smooth dark grey. The fruits eventually open and release two winged seeds

FLOWERING TIME

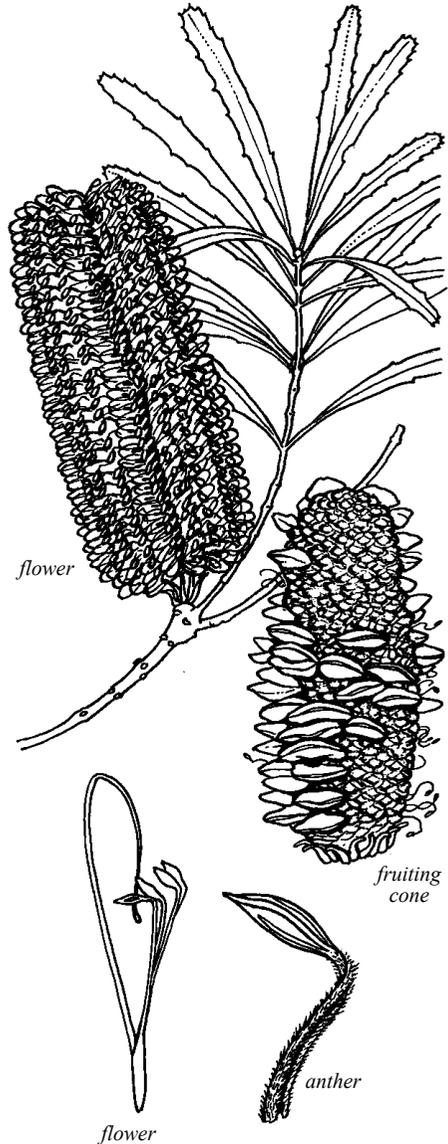
Flowers late summer to winter.

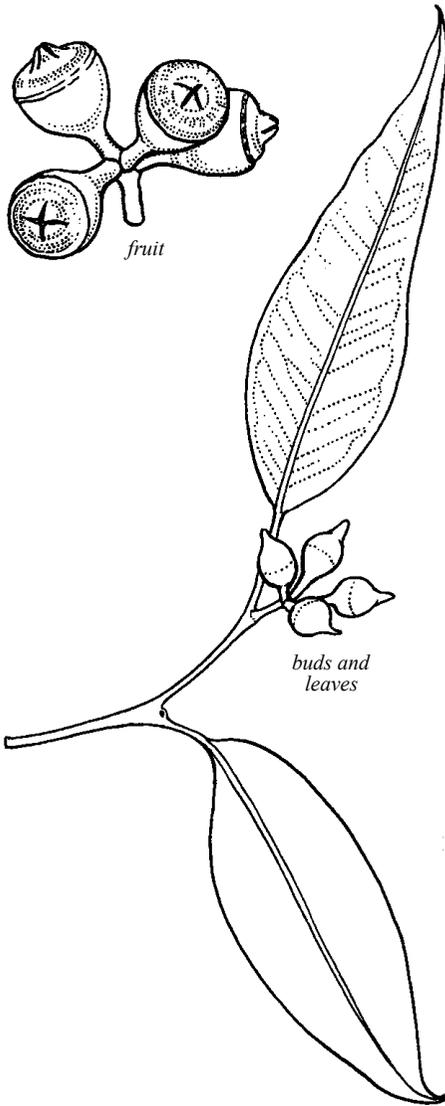
GROWTH FORM AND HABITAT

River banksia is an erect and handsome tree up to 20 m high, with fresh green luxuriant leaves and rough grey bark. It is fire sensitive. River banksia occurs often in richer and heavier soils of river banks and seasonally wet depressions. It is found from Dwellingup to Denmark.

PROPAGATION

River banksia grows well in a cool temperate climate with assured moisture supply and where the soil is slightly acid or neutral. It can be propagated from seed.





Eucalyptus rudis
Flooded gum
 (Myrtaceae)

LEAVES

The attractive mature leaves are dull, grey-green or bluish green, alternately arranged and up to 140 mm long and 30 mm wide.

FLOWERS

The inflorescence is an erect cluster of 4 to 10 flowers. The small buds are 8-12 mm long with conical caps which, when shed, reveal white to cream flowers.

FRUITS

The small fruits are brown, hemispherical to broadly bell-shaped, 4-6 mm long and 6-15 mm wide. Each fruit has a very broad rim with 4 to 6 broad projecting valves.

FLOWERING TIME

Flowers autumn to spring.

GROWTH FORM AND HABITAT

Flooded gum is an attractive tree which grows up to 25 m high, with a spread of 4 m and a somewhat rounded crown. The trunk has persistent rough and flaky dark grey bark while the upper branches have a smooth cream and pale grey bark. Flooded gum is a common species fringing winter-wet depressions, lakes and watercourses throughout the Swan Coastal Plain. It is able to tolerate prolonged periods of flooding and is usually found in waterlogged areas. Distribution extends from north of Geraldton to the south coast.

PROPAGATION

Flooded gum can be grown from seed planted in spring. It is suitable for direct seeding. Collect the mature woody fruits for seed.

TREES

Melaleuca preissiana

Modong

(Myrtaceae)

LEAVES

The dark green leaves are arranged alternately along the stem. They are flat but slightly thickened, 9-14 mm long and 1-2 mm wide.

FLOWERS

The inflorescence is an interrupted spike made up of several loose clusters of flowers interspaced with leaves. Each cluster consists of 1-3 flowers which are creamy white to pale yellow and have numerous stamens giving the inflorescence a leafy bottlebrush-like appearance.

FRUITS

The small woody fruits are cup-shaped and 3-4 mm across.

FLOWERING TIME

Flowers late spring and summer.

GROWTH FORM AND HABITAT

Modong is a medium-sized tree up to 10 m high with white papery bark and dense foliage. It can be found in waterlogged soils fringing rivers and swamps. It is less tolerant of prolonged inundation than swamp paperbark. Distribution extends from Eneabba to east of Albany with scattered occurrences inland.

PROPAGATION

Modong can be grown from seed and is suitable for direct seeding. The seed should be collected around late spring to early summer when the fruit are woody and mature.



Melaleuca raphiophylla
Swamp paperbark
 (Myrtaceae)

LEAVES

The green to greyish green and spreading leaves are arranged alternately along the stem. They are needle-like and circular in cross section. The narrow leaves are 10-40 mm long and only 0.5-1 mm wide with a pointed tip.

FLOWERS

The flowers occur in dense, cream, elongated clusters (spikes), usually towards the end of the stem. The flowers have prominent stamens which give the spike a bottlebrush-like appearance. Often new leaves are already forming at the end of the stem when the flowers open.

FRUITS

The woody fruits occur in clusters along the stem. Each is almost spherical and 5-6 mm in diameter.

FLOWERING TIME

Flowers from spring to summer.

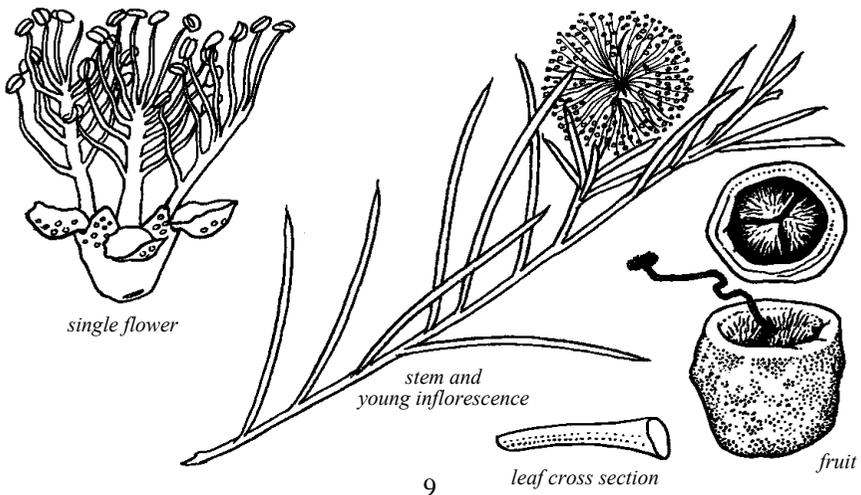
GROWTH FORM AND HABITAT

Swamp paperbark is a small to medium tree to 10 m high with greyish white papery bark. It grows near watercourses and wetlands at the drier end of the littoral zone.

Swamp paperbark is able to tolerate periodic inundation for several months of the year, but prefers waterlogged sites. It can be found near both fresh and saline water, but is less adapted to saline conditions than saltwater paperbark. Distributed around the coast from Kalbarri to Fitzgerald River National Park and also inland to York.

PROPAGATION

Swamp paperbark can be grown from cuttings or by seed planted in autumn and spring. It can be direct seeded. It has been suggested that the seed can be thrown onto the water and that this will place the seeds at the right height along the banks for successful germination.



SHRUBS

Acacia saligna Coojong (Mimosaceae)

LEAVES

The leaf-like phyllodes (structures which function as leaves) are green to bluish green, narrow and somewhat curved. They are pendulous, 70-250 mm long, 4-30 mm wide, and have a conspicuous midrib.

FLOWERS

The inflorescence is a spray of spherical flower clusters. Each fluffy cluster is 7-10 mm in diameter and consists of 25-55 tiny yellow to orange flowers.

FRUITS

The fruits are flat brown pods which are slightly constricted between the seeds. They are 80-120 mm long, 3-6 mm wide and contain several black seeds 5-6 mm long.

FLOWERING TIME

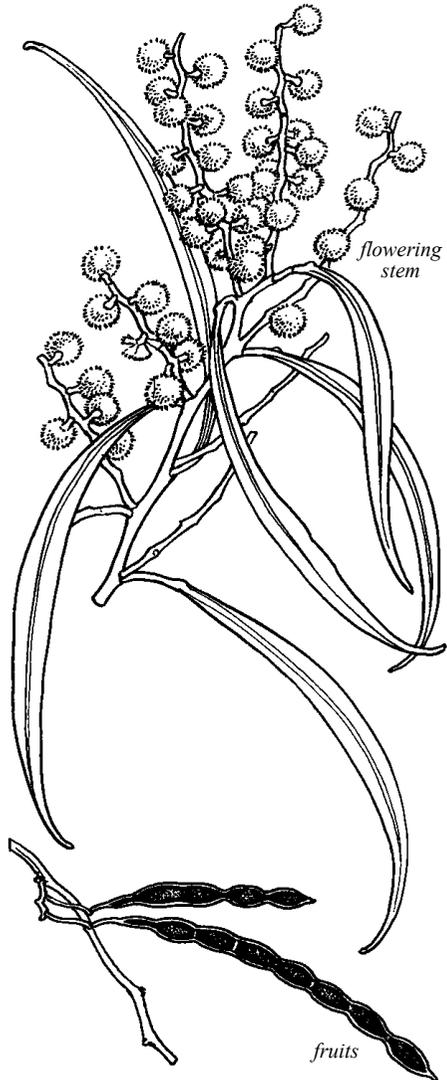
Flowers in late winter to spring.

GROWTH FORM AND HABITAT

Coojong or orange wattle has smooth dark grey bark, and is a dense, spreading tree or shrub up to 6 m high with a broad rounded canopy. Often the branches have a graceful weeping habit. It is an extremely vigorous plant and is a coloniser of disturbed areas. Coojong is subject to infection by gall rust fungus and weevils which cause large galls on the stems. It occurs in a variety of habitats, often fringing watercourses and is distributed throughout the south-west of the State from the Murchison River to Israelite Bay. It has been introduced to many areas of southern Australia as well as Africa and Asia.

PROPAGATION

Coojong can be propagated by scarified seed and is suitable for direct seeding. The seeds should be collected from early to mid summer.



Agonis linearifolia
Swamp peppermint
 (Myrtaceae)

LEAVES

The spreading green leaves are alternately arranged along the stem. They are very narrow and taper towards the base, are up to 7-45 mm long and 0.5-5 mm wide.

FLOWERS

The flowers are arranged in tight spherical clusters along the stem. The white flowers are 3.5-7 mm across. They have 5 rounded petals which are 1.5-3 mm long and have 10 tiny stamens.

FRUITS

The grey woody fruits are cup-shaped, 2-3 mm in diameter and clustered into woody heads which are 6-12 mm across.

FLOWERING TIME

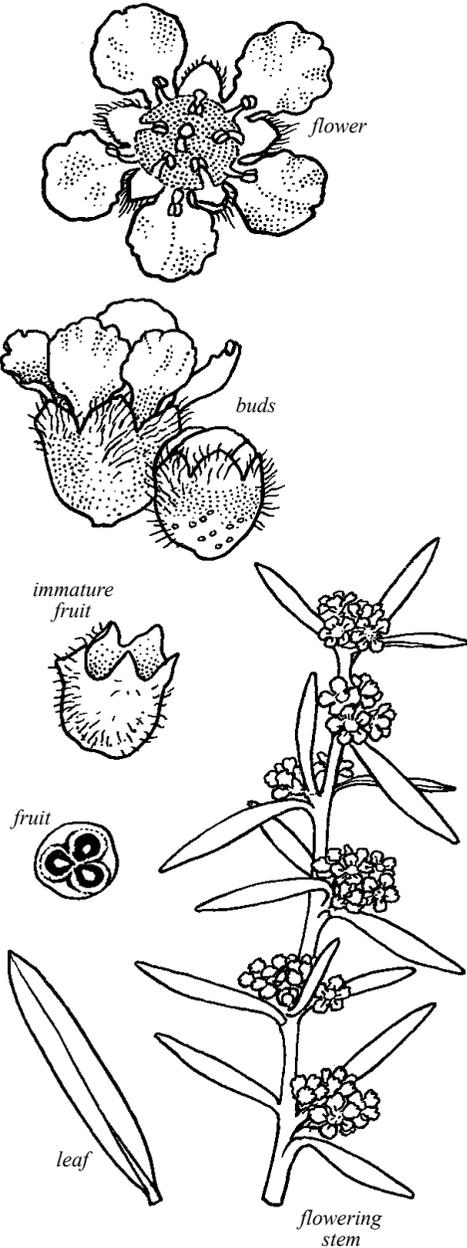
Flowers most of the year.

GROWTH FORM AND HABITAT

Swamp peppermint is a shrub which grows to a height of 5 m with a spread of about 3 m. It is found fringing swamps and watercourses, from Muchea to the south coast and east to Cape Arid National Park.

PROPAGATION

Propagation is by seed or cuttings. It is suitable for direct seeding.



SHRUBS

Astartea fascicularis
Astartea
(Myrtaceae)

LEAVES

The leaves are in tight opposite clusters of 3-7 leaves per cluster. They appear linear but are actually triangular in cross section, 5-14 mm long and 0.5-1 mm wide. The leaves are aromatic when crushed.

FLOWERS

The white or slightly pink flowers are on slender stalks and occur in groups of 2-4 along the upper stems.

The flowers are about 6 mm across, have circular petals 2-3 mm long and several tiny stamens.

FRUITS

The woody fruits are 2-3 mm across and open by three valves to release the tiny angular seeds.

FLOWERING TIME

Spring and summer.

GROWTH FORM AND HABITAT

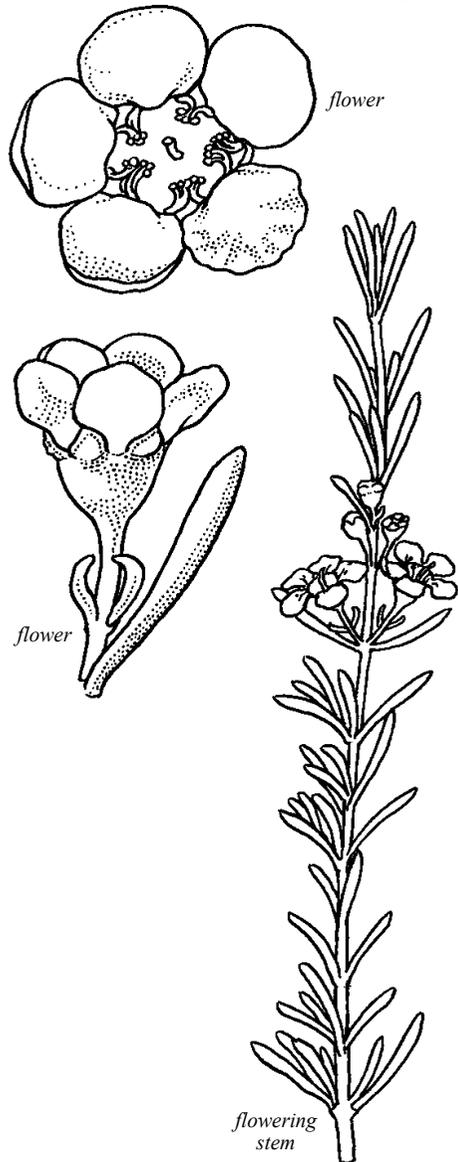
Astartea is an erect, open shrub usually 1-2 m high with a spread of 1.5 m. The slender stem has somewhat weeping branches. It is found on damp, sandy, alkaline soils near watercourses, swamps or seasonally wet depressions in south Western Australia from Moore River to Bremer Bay and also east of Esperance.

PROPAGATION

Astartea can be grown by cuttings taken in autumn or by seed.

It is suitable for direct seeding.

Seed can be collected from mature capsules in winter and early spring.



Callistachys lanceolata
Wonnich
(Papilionaceae)

LEAVES

The green leaves are arranged in whorls, usually with 3 leaves per whorl. They are leathery, 40-170 mm long and 4-30 mm wide. The leaves are pointed but variable in shape.

FLOWERS

The pea-shaped flowers are arranged in slender sprays at the ends of the branches. The outer floral whorl is clothed with dark hairs. The petals are yellow to orange, with the erect standard petal 10-15 mm long.

FRUITS

The fruits are silky hairy pods, 10-15 mm long and 5-7 mm wide, only opening in the upper third. They contain up to 12 small brown seeds each around 2 mm long.

FLOWERING TIME

Wonnich flowers in spring and early summer.

GROWTH FORM AND HABITAT

Wonnich is an erect shrub or small open tree which grows up to 8 m high. It is found fringing watercourses and inlets or in winter-wet depressions from Perth to the south coast and east to Cape Arid.

PROPAGATION

Wonnich can be grown from seed.



SHRUBS

Grevillea diversifolia
Variable-leaved grevillea
(Proteaceae)

LEAVES

The silver-grey leaves are very variable in shape, from narrow to broad and either entire or dissected into 2 or 3 lobes.

They are 25-85 mm long and 1-11 mm wide, with slightly to distinctly recurved margins. The leaves and/or their lobes are tapered to a harsh point.

FLOWERS

The pale yellow flowers are 4-5 mm long and arranged in clusters about 20 mm across. They have dark reddish protruding styles.

FRUITS

The leathery fruits are 10-13 mm long and somewhat warty.

FLOWERING TIME

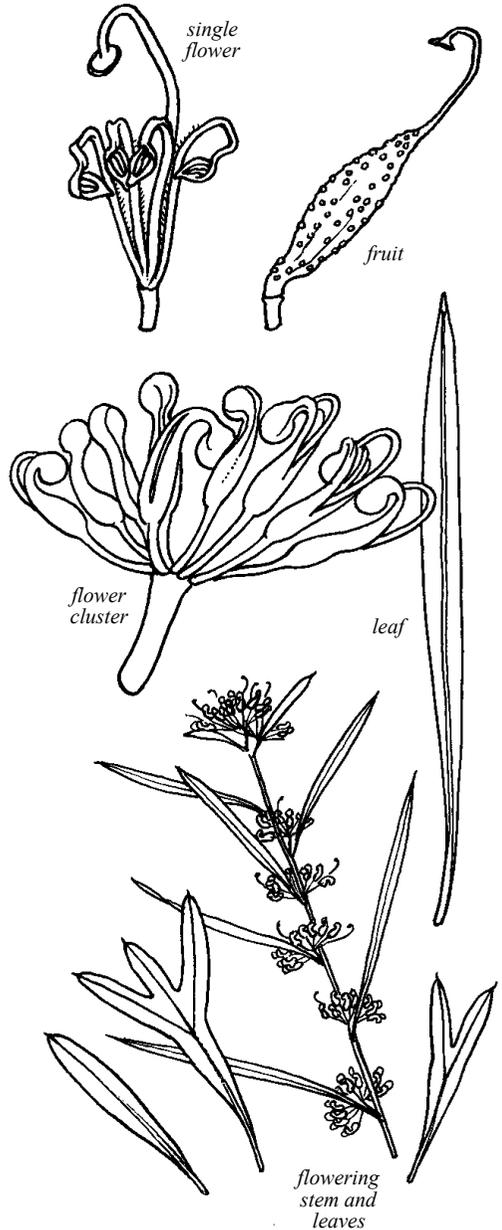
Flowers winter and spring.

HABITAT AND GROWTH FORM

Variable-leaved grevillea is a spreading shrub around 2-6 m. It occurs in damp depressions and riverine locations from Mundaring to the south coast and east to Albany.

PROPAGATION

Variable-leaved grevillea will grow from semi-hardwood cuttings.



Melaleuca lateritia
Robin redbreast bush
 (Myrtaceae)

LEAVES

The dark green leaves are alternate, flat but fine, 12-20 mm long and 1-2 mm wide.

FLOWERS

The scarlet to crimson red flowers are in dense bottlebrush-like spikes 35-85 mm long. The individual flowers have tiny petals and numerous conspicuous stamens arranged into 5 bundles.

FRUITS

The woody fruits are cup-shaped capsules 7-8 mm across, densely packed into a cylindrical spike.

FLOWERING TIME

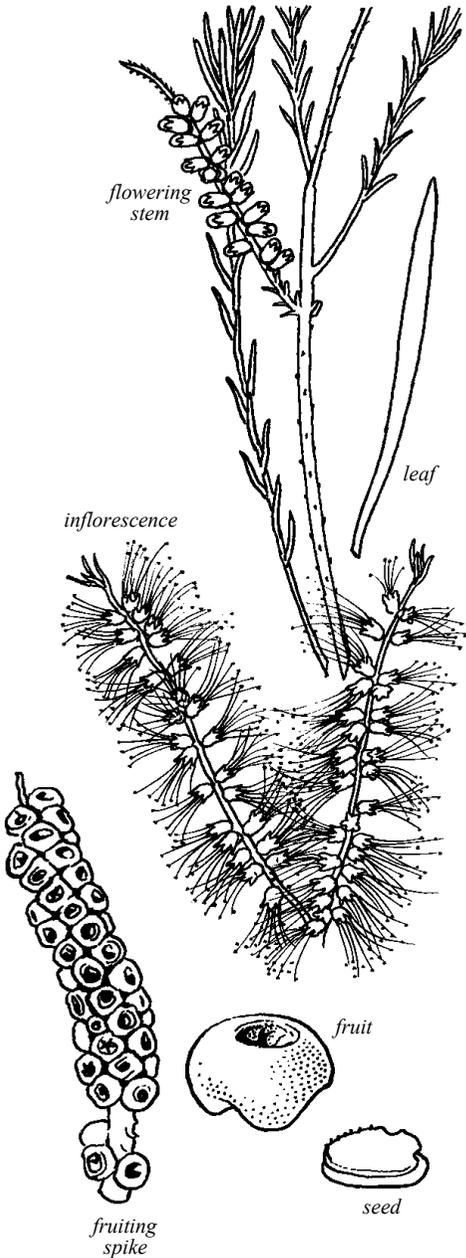
Spring to autumn.

HABITAT AND GROWTH FORM

Robin redbreast bush is a shrub to 2.5 m high with a spread of 1 m. It has coarse fibrous bark. It occurs fringing watercourses and in seasonally wet depressions. Robin redbreast bush extends from Eneabba to Albany.

PROPAGATION

Robin redbreast bush can be propagated by seed or by semi-hardwood cuttings. It is suitable for direct seeding. Seed should be collected from fruit with closed valves.



SHRUBS

Oxylobium lineare
Narrow-leaved oxylobium
(Papilionaceae)

LEAVES

The leathery leaves are irregularly scattered or alternately arranged along the stem. They are 50-160 mm long and 2.5-10 mm wide.

FLOWERS

The pea-shaped flowers are arranged in slender sprays at the ends of the branches. The outer floral whorl is clothed with dark hairs. The petals are red or yellow or a combination of both red and yellow, with the erect standard petal 10-12 mm long.

FRUITS

The fruits are silky hairy oval-shaped pods which are 7-9 mm long and 3.5-5 mm wide.

FLOWERING TIME

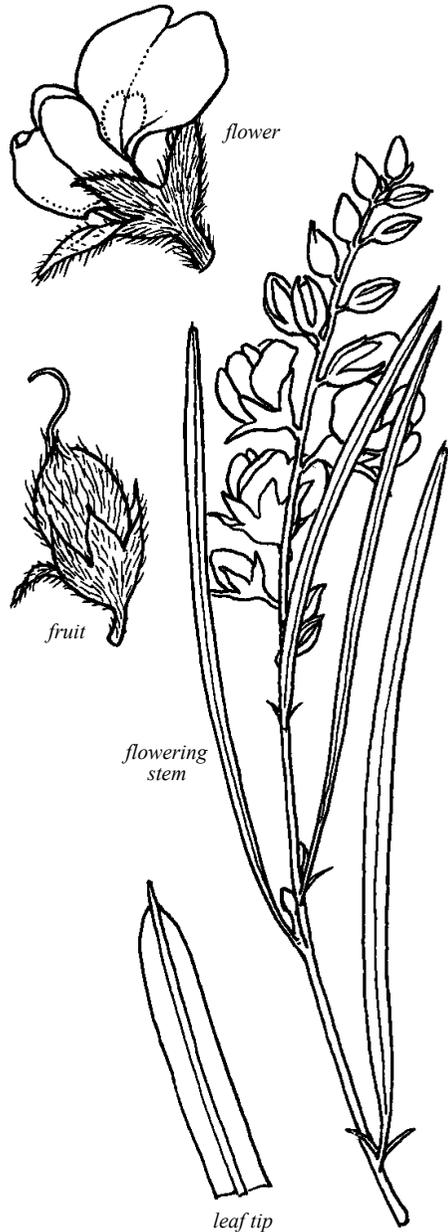
Flowers from spring to mid summer.

GROWTH FORM AND HABITAT

Narrow-leaved oxylobium is a slender erect shrub to 3 m high, sometimes with somewhat pendulous branches. It grows fringing watercourses and winter-wet swamps from Perth to Augusta, with isolated populations recorded from Mount Lesueur and Kalbarri.

PROPAGATION

Narrow-leaved oxylobium can be propagated from seed.



Paraserianthes lophantha
Albizia
(Mimosaceae)

LEAVES

The greatly divided feathery leaves are about 200 mm long and are made up of 8-10 opposite pairs of axes, each of which is in turn divided into 20-40 pairs of small leaflets. The individual leaflets are oblong, 5-10 mm long and 1.5-3 mm wide.

FLOWERS

The cream to greenish yellow flowers are arranged in dense cylindrical spikes 30-60 mm long, usually with 2 or 3 spikes together. The individual flowers have only fairly small petals but numerous conspicuous stamens 10-20 mm long.

FRUITS

The dark brown to black pods are flat, up to 120 mm long and 25 mm wide. The pod contains several black spherical seeds.

FLOWERING TIME

Flowers winter and early spring.

GROWTH FORM AND HABITAT

Albizia is a small tree up to 10 m high with long upcurved side branches. It occurs fringing watercourses and swamps from Geraldton to east of Esperance.

PROPAGATION

Albizia can be grown from seed.

The pods should be collected in early to mid summer.



SHRUBS

Viminaria juncea
Swishbush
(Papilionaceae)

LEAVES

The phyllodes are slender branchlet-like structures which function as leaves. They are needle-like, circular in cross section and up to 30 mm long.

FLOWERS

The pea-shaped flowers are in long terminal sprays. They are yellow and orange to red-brown with petals 7-10 mm long.

FRUITS

The fruit is a brown or black pod, 4-6 mm long and 2.5-3.5 mm wide. It contains a single light brown seed 3.5 mm long.

FLOWERING TIME

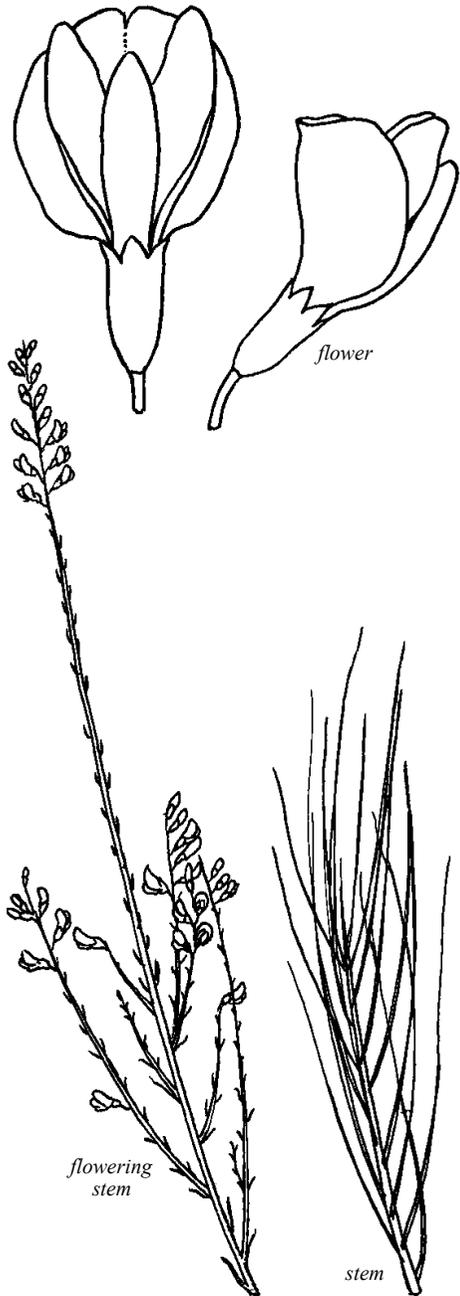
Flowers spring to summer.

GROWTH FORM AND HABITAT

Swishbush is a shrub to 5 m high with a spread of 2 m, often with pendulous branches. It occurs in a variety of habitats but often in winter-wet depressions or near lakes. It extends from Kalbarri to the south coast and east to near Esperance. It also occurs in all mainland Australian States except the Northern Territory.

PROPAGATION

Swishbush can be propagated by seed. Pick seed early to mid summer.



Baumea arthrophylla
Sparse twigrush
 (Cyperaceae)

LEAVES

The slender stem is cylindrical, hollow and 1-4 mm wide. The leaves are similar in form to the stems, divided by partitions into hollow sections and with the articulate leaf blade circular in cross section and longer than the sheath.

FLOWERS

The spike-like inflorescence is 100-150 mm in length and is made up of numerous spikelets which are each 3-4 mm long. Each spikelet contains one or more small flowers, each flower with a small bract but lacking floral segments.

FRUITS

The fruits are small, shiny, reddish nuts up to 2.5 mm long.

FLOWERING TIME

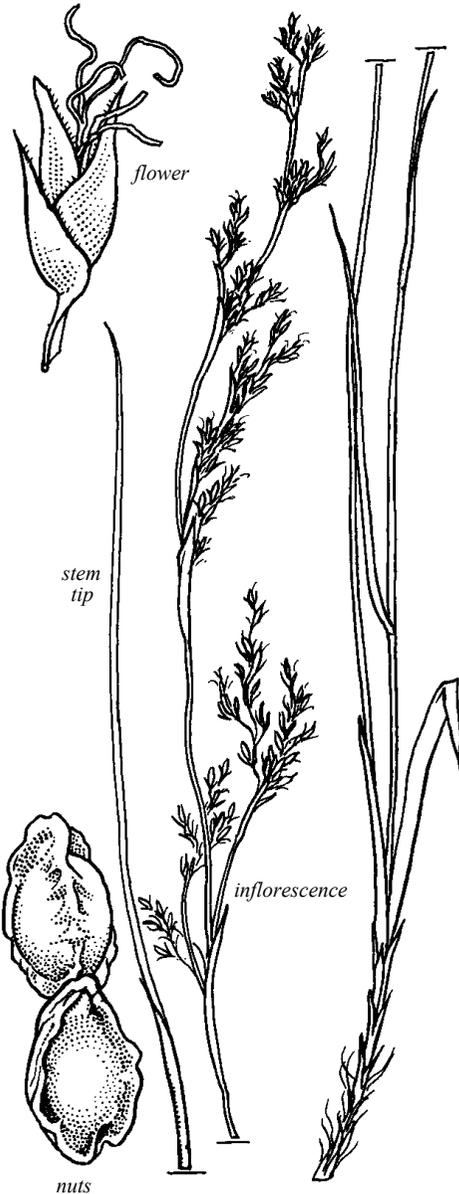
Flowers in spring.

GROWTH FORM AND HABITAT

Sparse twigrush is a sparsely spreading sedge up to 1 m tall. It occurs in seasonally wet depressions and around permanent lakes. Sparse twigrush can tolerate partially submerged conditions. It can be found from Perth to Augusta. Also occurs in all Australian States except the Northern Territory, and in New Zealand, New Caledonia, New Hebrides and New Guinea.

PROPAGATION

Sparse twigrush can be grown by seed or rhizome division.



SEDGES & RUSHES

Baumea articulata Jointed twigrush (Cyperaceae)

LEAVES

Stems are cylindrical, hollow, and 4-13 mm in diameter. The leaves are similar in form to the stems, divided by partitions into hollow sections and with the articulate leaf blade circular in cross section and longer than the sheath.

FLOWERS

The greyish brown spike-like inflorescence is 150-450 mm long, with numerous spikelets 3-5 mm long. Each spikelet contains 2-5 small flowers, each flower with a small bract but lacking floral segments.

FRUITS

The fruit are small pale nuts.

FLOWERING TIME

Flowers in spring and early summer.

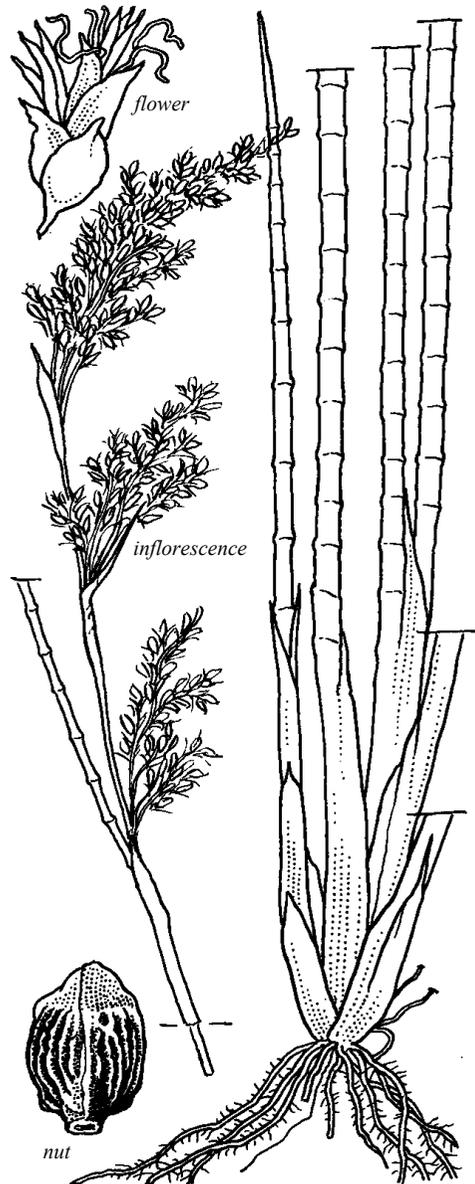
GROWTH FORM AND HABITAT

Jointed twigrush is a sedge to 2.5 m tall with a spreading habit. It often forms extensive colonies along lake margins and can tolerate deep inundation (>1 m) for prolonged periods and generally has a wide tolerance range. Jointed twigrush occurs in both fresh and brackish water. It is widespread along the margins of lakes and watercourses from just north of Perth to Hopetoun. It has also been recorded from the Kimberley, in all Australian States except the Northern Territory, and from New Zealand, New Guinea, New Caledonia and Vanuatu.

PROPAGATION

Jointed twigrush can be grown by seed or division. Seeds can be propagated by in-vitro culture, however, it is readily established through rhizome plantation. Using 0.2 m of rhizome with a good root mass and a culm of healthy leaves, it can be planted at about 1 m spacing and 0.25 m depth. Do not trim leaves.

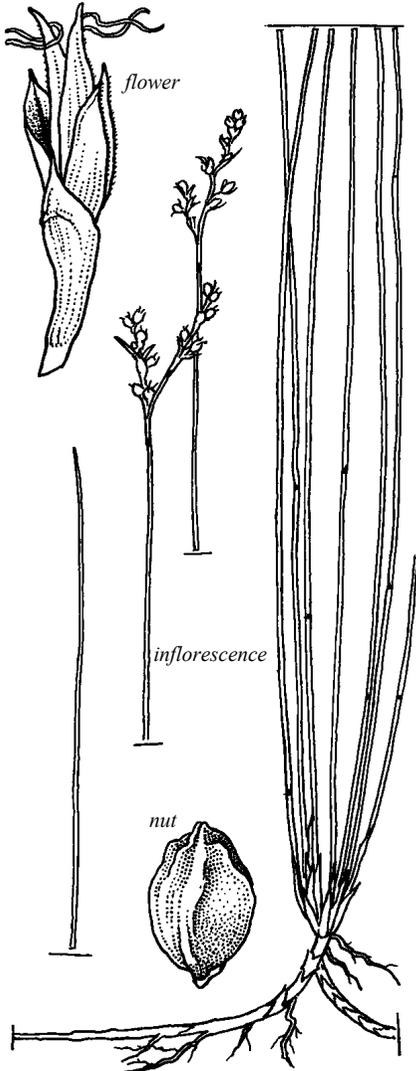
The best results are obtained in winter.



Baumea juncea
Bare twigrush
 (Cyperaceae)

LEAVES

Bare twigrush has smooth, cylindrical. blue-green stems which are 1-3 mm in diameter. The leaves are very small and are reduced to a sheath enclosing the stem with only a flat or folded blade 2-10 mm long.



FLOWERS

The spike-like inflorescence is 10-60 mm long with small brown spikelets 3-5 mm long, each containing one or more small flowers. Each flower has a small bract but lacks floral segments.

FRUITS

The fruits are tiny 3-ribbed nuts, one maturing in each spikelet.

FLOWERING TIME

Flowers spring and summer.

GROWTH FORM AND HABITAT

A widespread sedge 0.5-1.2 m tall with creeping underground stems, often forming extensive colonies along watercourses, estuaries and swamps throughout the south-west of the State. Bare twigrush may be found in seasonally waterlogged to partially inundated areas which have fresh to brackish or seasonally saline water. It prefers a fairly constant water level but will tolerate seasonal fluctuations up to half a metre. Bare twigrush is distributed along the coast from Dongara to the Recherche Archipelago, but also occurs in South Australia, Queensland, New South Wales, Tasmania, New Zealand and New Caledonia.

PROPAGATION

Bare twigrush can be propagated from seed using in-vitro culture of seed embryos. It is readily established through rhizome transplantation. Sections of rhizome approximately 100 mm long with a good root mass and healthy leaves can be planted half a metre apart. Plant rhizomes in winter and spring at a depth of 100-250 mm in sandy sediments. Do not trim leaves.

SEDGES & RUSHES

Baumea riparia River twigrush (Cyperaceae)

LEAVES

The bright green stems are flattened, 4-10 mm broad and with fine longitudinal lines. The basal leaves are similar in form to the stems with the flattened leaf blade longer than the sheath.

FLOWERS

The inflorescence is loose, spike-like and 200-350 mm long with dense clusters of spikelets. The spikelets are 5-7 mm long. Each spikelet contains one or more small flowers, each flower with a small bract but lacking floral segments.

FRUITS

The nut is whitish and approximately 2 mm long.

FLOWERING TIME

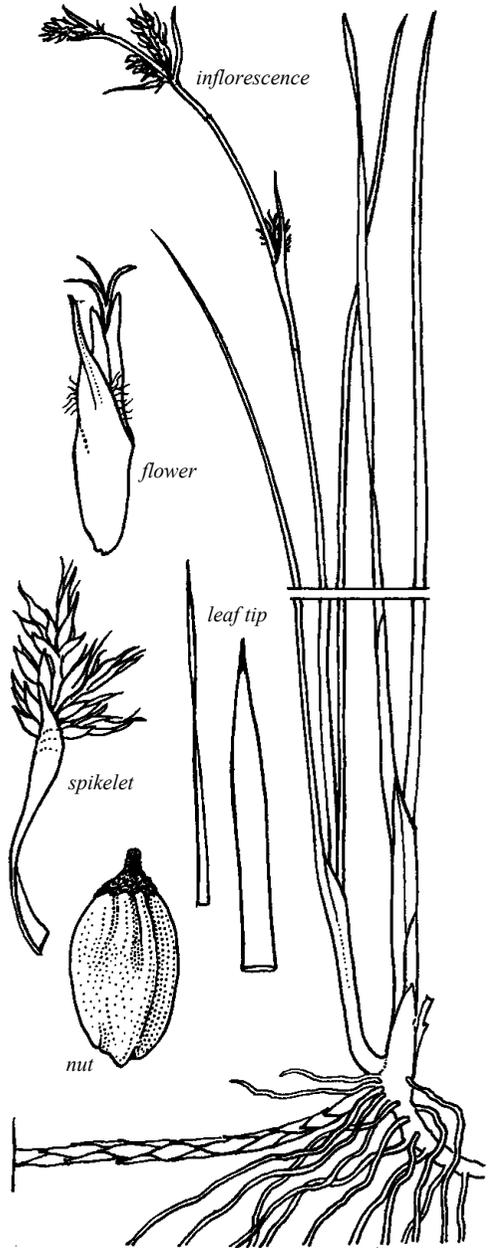
Flowers in spring.

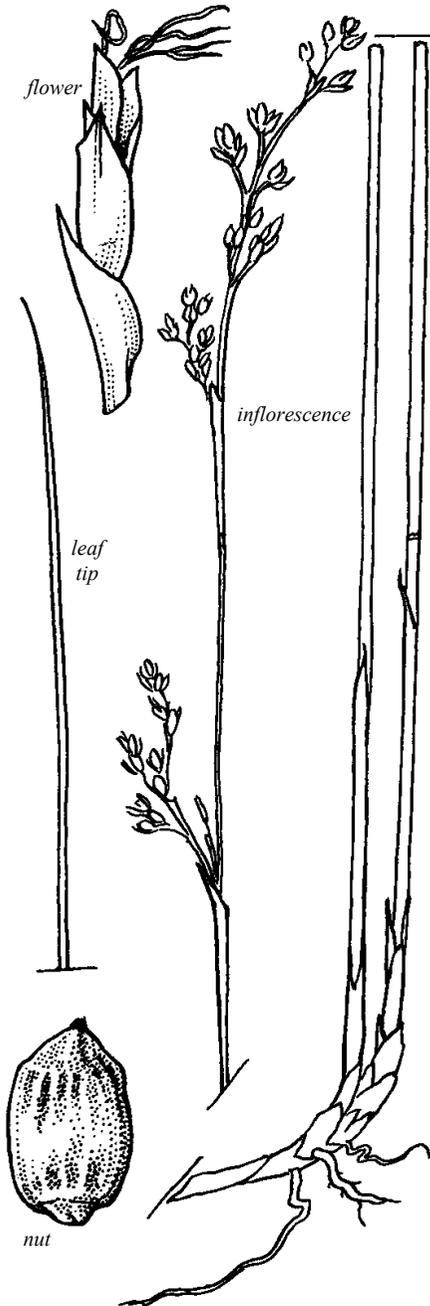
GROWTH FORM AND HABITAT

River twigrush is a sedge up to 1.5 m high. It occurs in seasonally waterlogged soils or shallow permanent water along watercourses and swamps from Bullsbrook to Albany.

PROPAGATION

River twigrush can be propagated by rhizome division.





Baumea vaginalis
Sheath twigrush
(Cyperaceae)

LEAVES

Stems are circular in cross section and 2-6 mm in diameter with rather inconspicuous longitudinal ribs when dried. The leaves are very small and overlapping near the base of the stem and have a short folded blade much shorter than the leaf sheath.

FLOWERS

The spike-like inflorescence is 50-300 mm long, with spikelets 7-9 mm long. Each spikelet contains a single small flower with a small bract but lacking floral segments.

FRUITS

The nut is approximately 2 mm long.

FLOWERING TIME

Flowers in spring.

GROWTH FORM AND HABITAT

Sheath twigrush grows up to 2.5 m in large clumps. It occurs in fresh to semi-saline waters at sites which are seasonally wet to permanently inundated, such as freshwater rivers, lakes and swamp margins. It is distributed from Perth to just east of Albany.

PROPAGATION

Sheath twigrush can be propagated by rhizome division or tissue culture. The seeds can be collected in summer.

SEDGES & RUSHES

Bolboschoenus caldwellii

Marsh club-rush

(Cyperaceae)

LEAVES

Marsh club-rush has stems which arise singly from the rhizome and are bright green. They are triangular in cross section, with grass-like alternate leaves along the stem. The leaves are up to 850 mm long and 3-12 mm wide, with a prominent midrib and distinct longitudinal veins.

FLOWERS

The inflorescence is a cluster of spikelets at the tip of the stem along with several leaf-like bracts. The golden brown spikelets are 12-20 mm long, each containing several small flowers. Each flower has a bract and the floral segments are reduced to 3-6 tiny bristles.

FRUITS

The fruits are flattened to almost triangular in shape, brown when ripe, and around 3 mm long. There may be up to 250 seeds per inflorescence.

FLOWERING TIME

Flowers in spring.

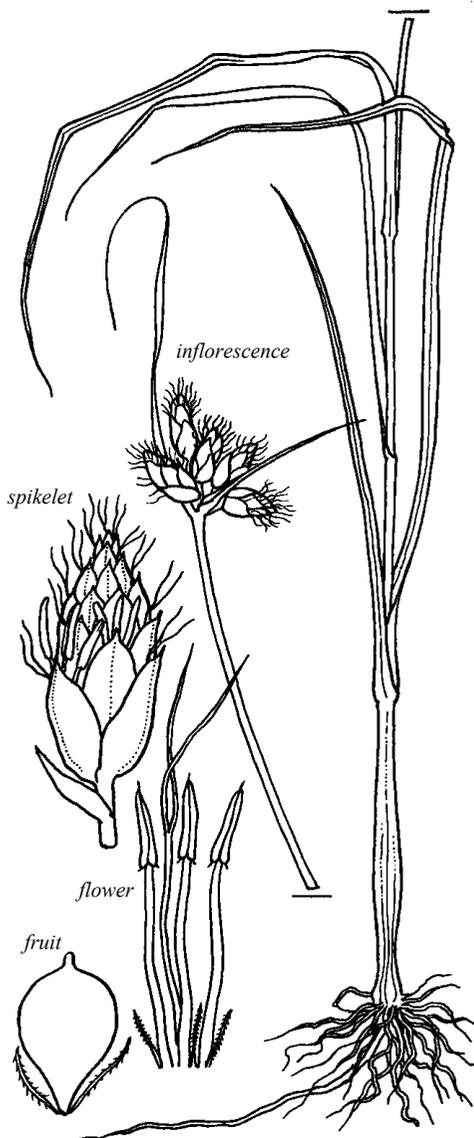
GROWTH FORM AND HABITAT

Marsh club-rush is a grass-like tufted plant which forms large colonies and reaches a height of 1.2 m. It grows in seasonally damp to seasonally inundated sites.

Marsh club-rush can tolerate a wide range of seasonal water fluctuations as it dies back to underground parts in summer and autumn and resprouts after winter flooding. It is distributed from north of Perth to the south coast and extends east to Fitzgerald River National Park.

PROPAGATION

The seed germinates readily if germinated immediately after collection. In-vitro culture can also produce seedlings, however direct seeding is more successful. Rhizome transplantation is not recommended as it is difficult and the results are variable.



Carex appressa
Tall sedge
 (Cyperaceae)

LEAVES

The stems are triangular in cross section, erect and rough to touch at the tips.
 The leaves are flat and 3-6 mm wide with rough margins.

FLOWERS

The inflorescence is a cluster of one to several greenish brownish spikelets 5-7 mm long, with mixed male and female flowers. Each small flower has a bract but lacks floral segments.

FRUITS

The fruit is 2.5-3.5 mm long and contains a small nut.

FLOWERING TIME

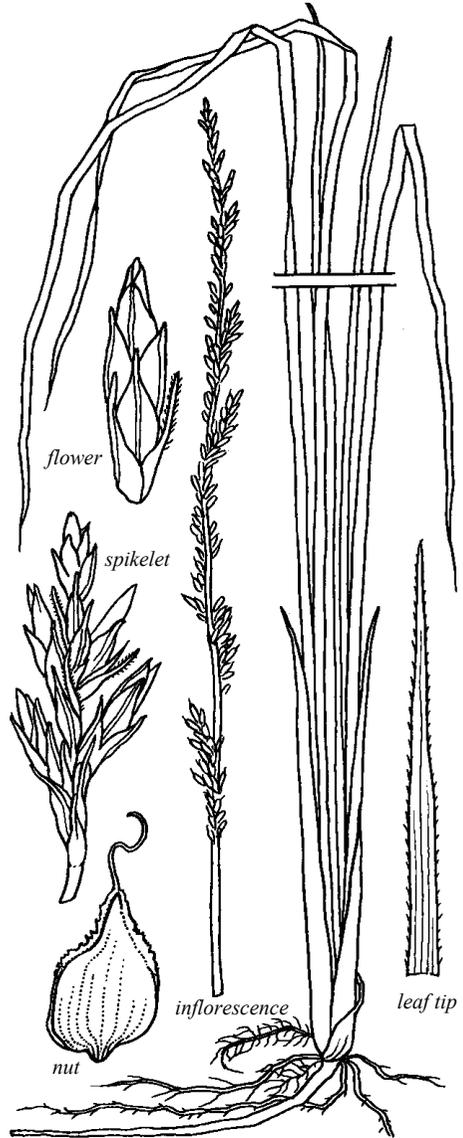
Flowers in spring.

GROWTH FORM AND HABITAT

Tall sedge is a tufted plant, often forming large clumps and reaching a height up to 2 m with a spread of 0.5 m. It can grow in fresh to brackish conditions and will occur in seasonally inundated or shallow permanent water. Tall sedge is distributed from Gingin to Albany. It is also recorded from all Australian States except the Northern Territory, and in New Zealand, New Guinea and New Caledonia.

PROPAGATION

Tall sedge can be propagated by rhizomes in early spring. The seed is relatively easy to germinate.



SEDGES & RUSHES

Carex fascicularis

Tassel sedge (Cyperaceae)

LEAVES

The stems are triangular in cross section. The leaves are flat, 5-9 mm wide, with rough margins.

FLOWERS

The inflorescence is a cluster of 3-6 pendulous greenish spikelets 20-60 mm long, with a single terminal male flower and many female flowers below. Each small flower has an awned bract but lacks floral segments.

FRUITS

The fruit is 4-7 mm long and contains a single nut.

FLOWERING TIME

Flowers in spring.

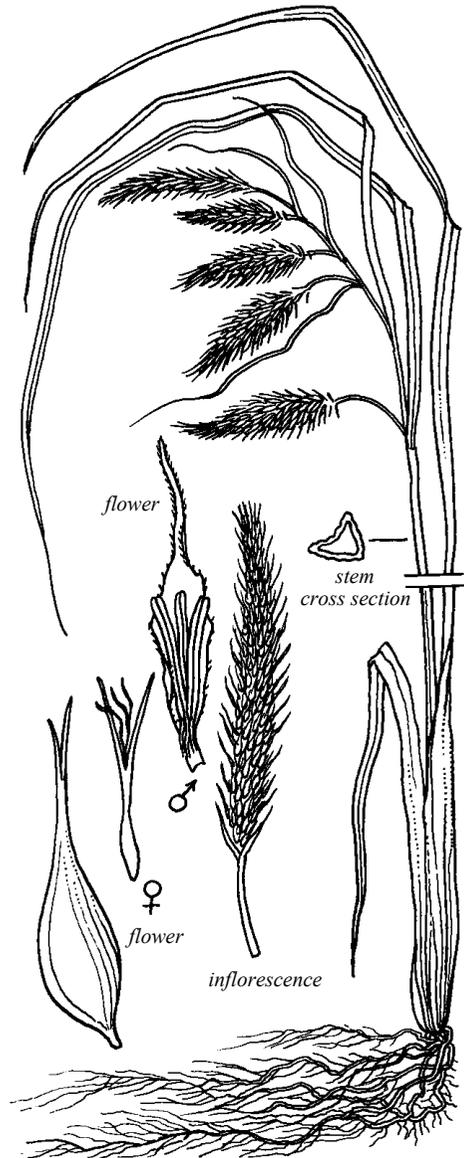
GROWTH FORM AND HABITAT

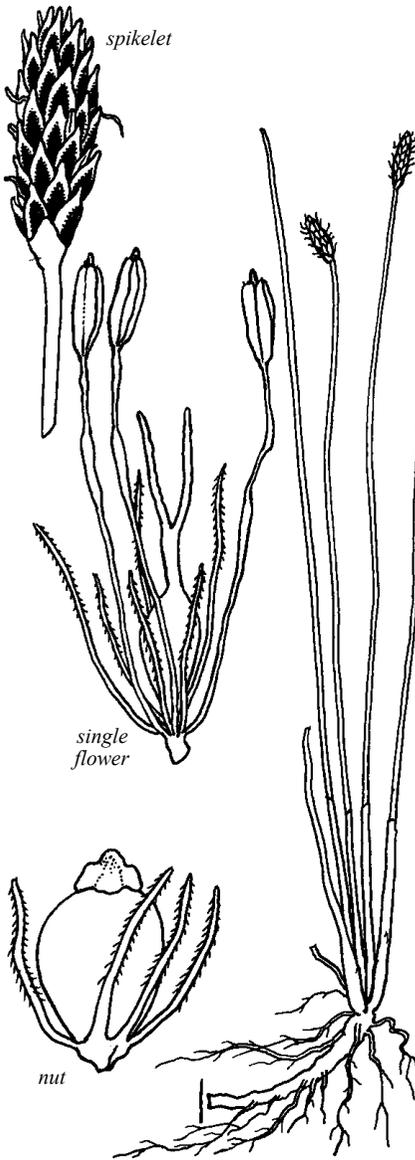
Tassel sedge is a semi-erect plant to 1.5 m high with a spread of 1 m. It occurs in freshwater to brackish conditions along seasonally waterlogged or partially inundated watercourses and lake margins from Wanneroo to Pemberton.

It also occurs in all Australian States except the Northern Territory, and in New Zealand and New Guinea.

PROPAGATION

Tassel sedge can be propagated by rhizome division.





Eleocharis acuta
Common spikerush
 (Cyperaceae)

LEAVES

The stem is circular in cross section and 1-3 mm wide. The leaves are reduced to one or more small purplish sheaths at the base of the stem, the uppermost with a small needle-like blade up to 2 mm long.

FLOWERS

The inflorescence is a single terminal brown spikelet 10-30 mm long. The spikelet contains several small flowers, each with 6-9 slender or bristle-like floral segments.

FRUITS

The fruit is a brown smooth nut 1.5-2 mm long.

FLOWERING TIME

Flowers in spring and early summer.

GROWTH FORM AND HABITAT

Common spikerush is a creeping sedge to 0.7 m high, with tufts arising along a slender rhizome. It forms a dense mass in seasonally waterlogged depressions, often partly submerged, also fringing freshwater lakes and watercourses. Common spikerush occurs from Mingenew to Cape Arid, also in all Australian States and New Zealand and New Guinea.

PROPAGATION

Common spikerush can be propagated by division. In-vitro culture is a good technique for this species. Establishing rhizome transplantation is difficult and it is best to plant large clumps for increased stability.

SEDGES & RUSHES

Isolepis nodosa Knotted club rush (Cyperaceae)

LEAVES

The stems are rigid, cylindrical to slightly compressed and 1-2.5 mm wide.

The leaves are reduced to brown or reddish papery sheaths at the base of the shoots.

FLOWERS

The inflorescence is a dense head 5-25 mm in diameter, consisting of numerous brown spikelets. Each spikelet is 3-8 mm long and contains several flowers which are surrounded by small brown bracts but lack floral segments.

FRUITS

The nut is smooth, triangular and around 1 mm long.

FLOWERING TIME

Flowers from spring to later summer.

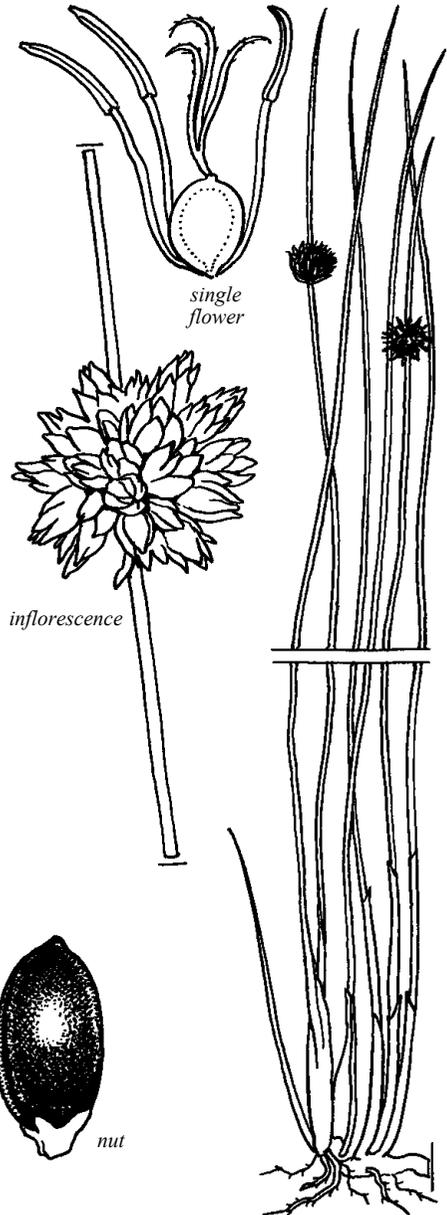
GROWTH FORM AND HABITAT

Knotted club rush is a tufted plant to 1 m and has radiating rhizomes.

It is widespread in sand of coastal dunes, winter-wet depressions and fringing rivers and lake margins. It occurs around the coast from Geraldton to east of Esperance, also in all States except the Northern Territory and in most temperate regions of the southern hemisphere.

PROPAGATION

Knotted club rush is suitable for direct seeding. The seed matures in late summer to early autumn. When mature the seed can be stripped from the stems easily.



Juncus kraussii

**Sea rush
(Juncaceae)**

LEAVES

The stems are circular in cross section and 2-4 mm broad, and have a continuous pith. The leaves are few and basal, and are similar to the stems but with a short sharp apex.

FLOWERS

The inflorescence is 35-125 mm long and has numerous head-like clusters of flowers. Each cluster has 3-15 dark red-brown flowers, each flower with 6 floral segments.

FRUITS

The fruits are dark brown capsules which split to release tiny seeds which are usually winged.

FLOWERING TIME

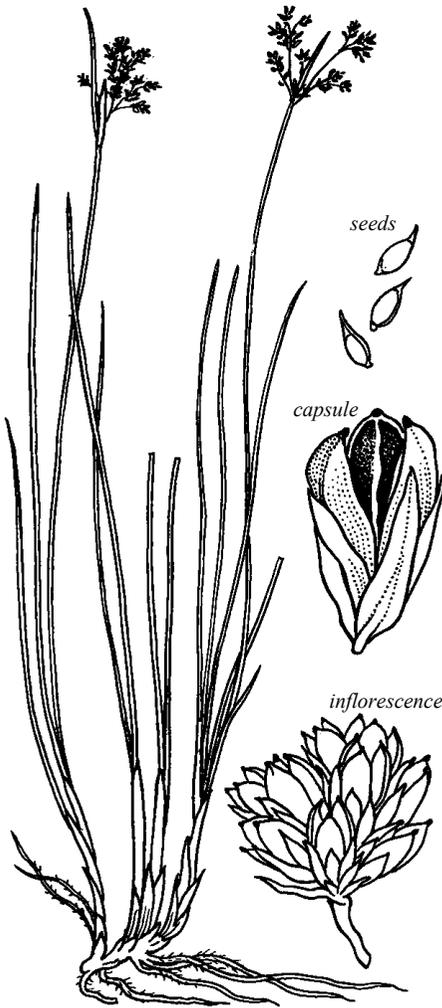
Flowers late spring to early summer.

GROWTH FORM AND HABITAT

Sea rush is a tussock-forming plant 0.8-1.5 m high with dark green stems. It forms attractive compact clumps usually covering extensive areas. The stems arise singly along the rhizome. Sea rush is one of the most widespread wetland sedges, growing in saline and brackish habitats fringing watercourses and lakes, also on sea shores. It occurs from north of Geraldton to Cape Arid, but has also been recorded from the Pilbara. Found in all Australian States, also New Zealand and South Africa.

PROPAGATION

Sea rush can be propagated by using rhizome transplantation or direct seeding. Transplantation of healthy clumps has been quite successful when the leaves have been cut about 10 cm above the base to reduce moisture loss. The best time to transplant is during its dormant period around May to June before the maximum growth period from July to October.



SEDGES & RUSHES

Juncus pallidus

Pale rush

(Juncaceae)

LEAVES

The stems are circular in cross section, 2-7 mm broad and have a continuous pith. The leaves are reduced to basal sheaths up to 230 mm long, sometimes with a short pointed blade.

FLOWERS

The inflorescence is up to 150 mm long and is of numerous straw-coloured flowers. The small flowers have 6 narrow floral segments.

FRUITS

The fruit is a pale brown capsule which contains numerous tiny brown seeds. There may be around 13,000 seeds per inflorescence.

FLOWERING TIME

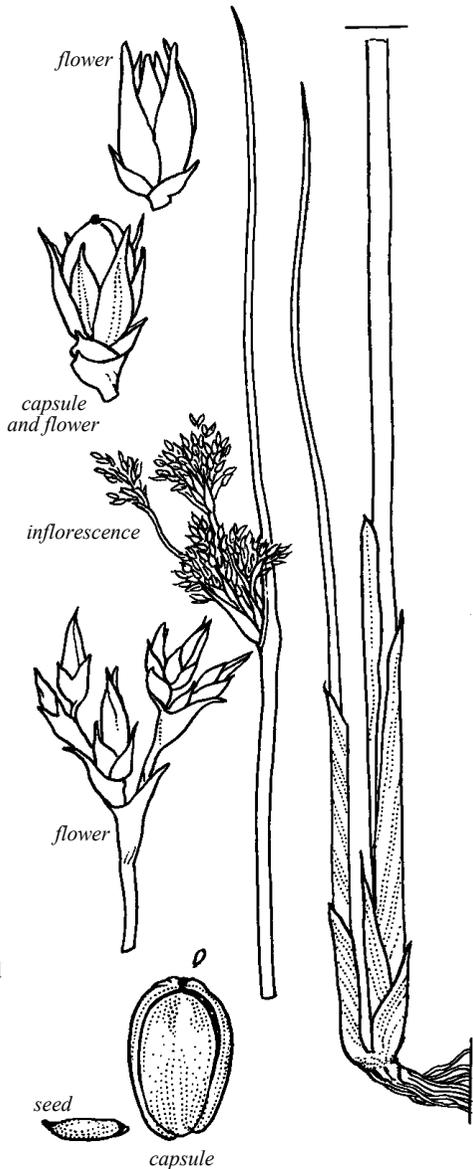
Flowers in spring.

GROWTH FORM AND HABITAT

Pale rush is a tall tufted plant up to 2 m. It is found in wet or seasonally damp soils surrounding lakes and fresh to brackish watercourses from Dandaragan to east of Ravensthorpe. It also occurs in all Australian States except the Northern Territory, also in New Zealand.

PROPAGATION

The seed is primarily available around February, shows excellent germination and longevity and will germinate any time of the year. Do not cover seeds with soil as they require light for germination. This species does not transplant well in any substrate. Clumps of plants are best planted in summer at a depth of 100 mm.



Juncus pauciflorus
Loose flower rush
(Juncaceae)

LEAVES

The stems are circular in cross section, up to 2 mm in diameter and have a continuous pith. The leaves are reduced to basal sheaths up to 170 mm long.

FLOWERS

The inflorescence is up to 100 mm long and is of numerous greenish brown flowers. The small flowers have 6 narrow floral segments.

FRUITS

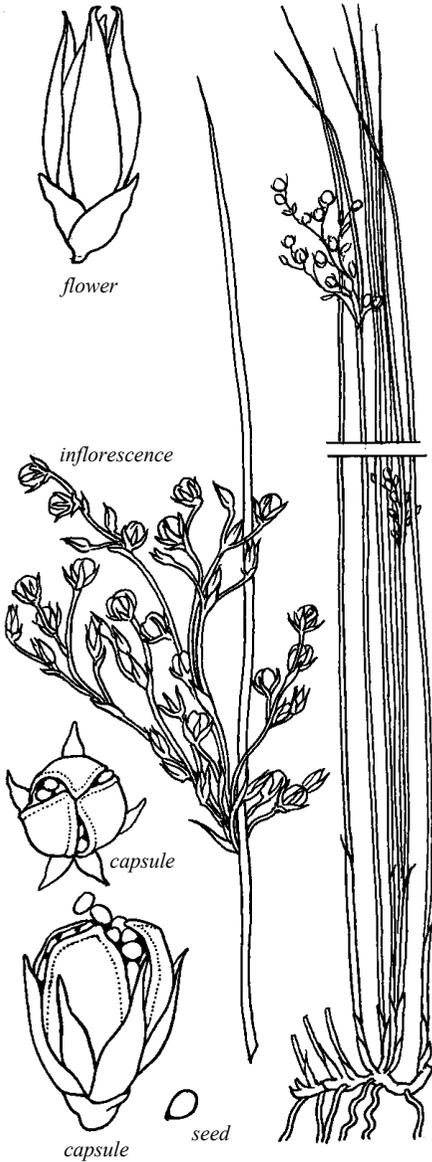
The fruit is a brown capsule which contains numerous tiny seeds.

GROWTH FORM AND HABITAT

Loose flower rush is a tufted plant with slender stems up to 1 m high and a loose inflorescence. It occurs in permanently damp or seasonally wet soil fringing fresh watercourses from Augusta to east of Esperance. It also occurs in all southern Australian States and in New Zealand.

PROPAGATION

Loose flower rush can be propagated by seed and is suitable for direct seeding. The seed can be collected in early summer.



SEDGES & RUSHES

Juncus subsecundus Fingerrush (Juncaceae)

LEAVES

The stems are circular in cross section, up to 2 mm in diameter with a discontinuous pith. The leaves are reduced to basal sheaths 10-110 mm long, but often with a needle-like tip.

FLOWERS

The inflorescence is 15-75 mm long, and consists of numerous straw-coloured flowers. The small flowers have 6 narrow floral segments.

FRUITS

The fruit is a pale brown capsule which contains numerous seeds.

FLOWERING TIME

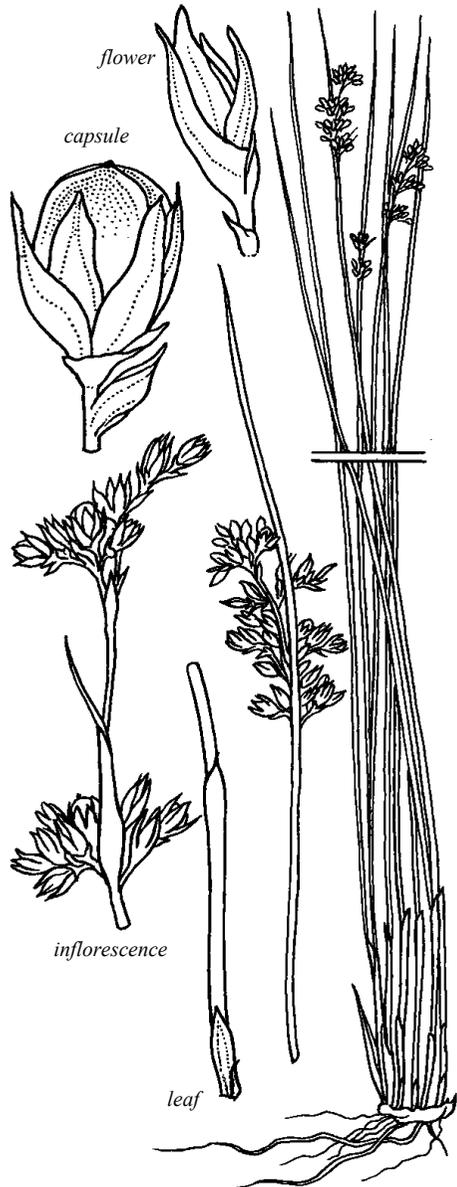
Flowers in spring.

GROWTH FORM AND HABITAT

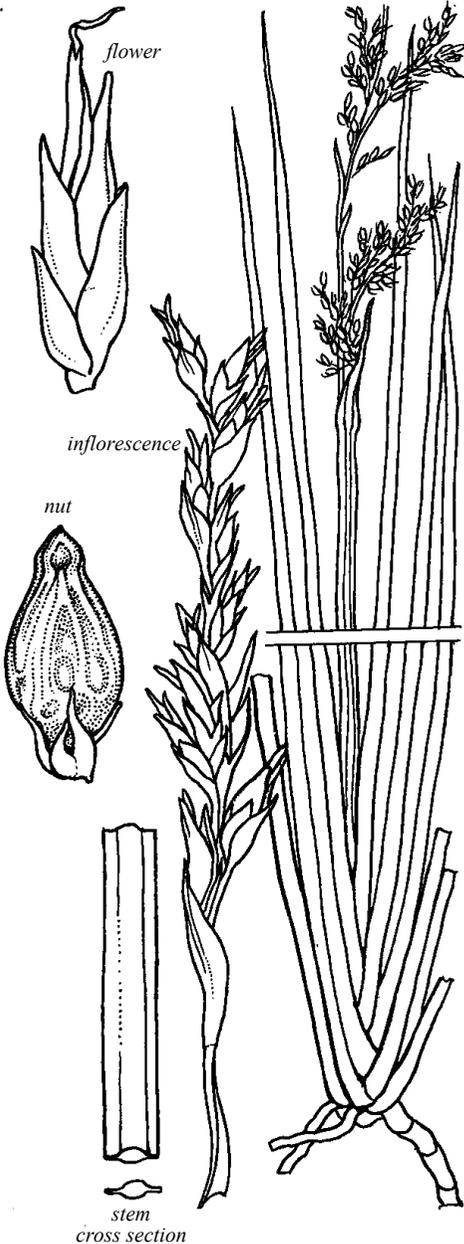
Finger rush is a tufted sedge up to 1 m high. It grows in moist or seasonally wet soils from Wongan Hills to Fitzgerald River National Park. It also occurs in all southern Australian States.

PROPAGATION

Finger rush is suitable for direct seeding from seeds collected in early summer.



Lepidosperma effusum
Spreading sword-sedge
 (Cyperaceae)



LEAVES

The stems are 5-10 mm wide and compressed often with a dark reddish line along each margin. The leaves are similar to the stems but are more compressed and have an elliptical cross section.

FLOWERS

The large inflorescence is loose and branched, 0.25-1 m long with many spikelets. The spikelets are 4-6 mm long, each of which has 2 or 3 small flowers. Each flower has a bract and 6 small floral segments.

FRUITS

The fruit is a brown nut about 2 mm long.

FLOWERING TIME

Flowers in spring.

GROWTH FORM AND HABITAT

Spreading sword-sedge is a tall tufted plant to 2-3 m high and 1 m wide. It grows in sand or clay usually along seasonally moist or wet watercourses from Wanneroo to the south coast just east of Albany.

PROPAGATION

There has been some success with tissue culture from seeds collected in spring and early summer.

SEDGES & RUSHES

Lepidosperma gladiatum Coastal sword-sedge (Cyperaceae)

LEAVES

The stems are 13-22 mm wide, are convex in the centre but have flattened margins. The dark green leaves are similar to the stems but somewhat flatter. They are up to 1.5 metres long and 25 mm wide.

FLOWERS

The inflorescence is branched, 40-180 mm long with many spikelets. The spikelets are 7-9 mm long, each with 1 or 2 small flowers. Each flower has a bract and 6 small floral segments.

FRUITS

The fruit is a pale to dark brown nut about 3 mm long. There are only 1 or 2 nuts per spikelet.

FLOWERING TIME

Flowers in late spring and early summer.

GROWTH FORM AND HABITAT

Coastal sword-sedge forms broad clumps and reaches up to 1.5 m in height. It is perennial and is found in seasonally moist or wet sands as well as dry dunes.

Widespread on coastal dunes and sandy lake margins from Leeman to Cape Arid.

PROPAGATION

Coastal sword-sedge can be transplanted and grown from seed.



Lepidosperma longitudinale
Pithy sword-sedge
 (Cyperaceae)

LEAVES

The stems are 4-7 mm in wide and are convex on both surfaces. The leaves are shorter and flatter than the stems, usually reddish or yellowish at the base and with an acute darkened tip.

FLOWERS

The inflorescence is fairly narrow but branched, 90-300 mm long with many spikelets. The spikelets are 5-7 mm long, each with 2 or 3 small flowers. Each flower has a bract and 6 small floral segments.

FRUITS

The fruit is a brown nut 3-4 mm long.

FLOWERING TIME

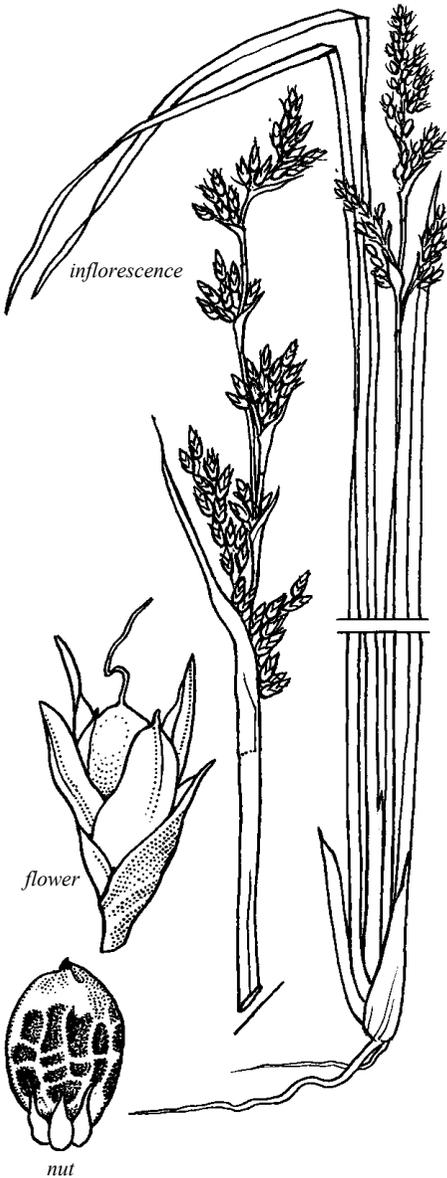
Flowers in winter.

GROWTH FORM AND HABITAT

Pithy sword-sedge is a creeping sedge up to 2 m high. This species forms large colonies in sand and peaty sands in winter-wet depressions and along watercourses from Watheroo to the south coast. It occurs in all Australian States except the Northern Territory.

PROPAGATION

Seed propagation is difficult. Pithy sword-sedge is readily established through rhizome transplantation of sections of rhizome 10 mm long with a good root mass intact and a culm of healthy leaves. They can be planted at 0.5 m spacing and to a depth of 30 cm in winter or spring with as much soil around the rhizome as possible.



SEDGES & RUSHES

Lepidosperma tetraquetrum Angle sword-sedge (Cyperaceae)

LEAVES

The stems are stout, 4-6 mm wide and square or rectangular in cross section. The leaves are similar to the stems but with a compressed apex.

FLOWERS

The inflorescence is loose and branched, 100-400 mm long with many spikelets. The spikelets are 6-8 mm long and mostly have 2 flowers. Each flower has a bract and 6 small floral segments.

FRUITS

The fruit is a nut 3-3.5 mm long, the lower part usually dark brown and the upper part whitish.

FLOWERING TIME

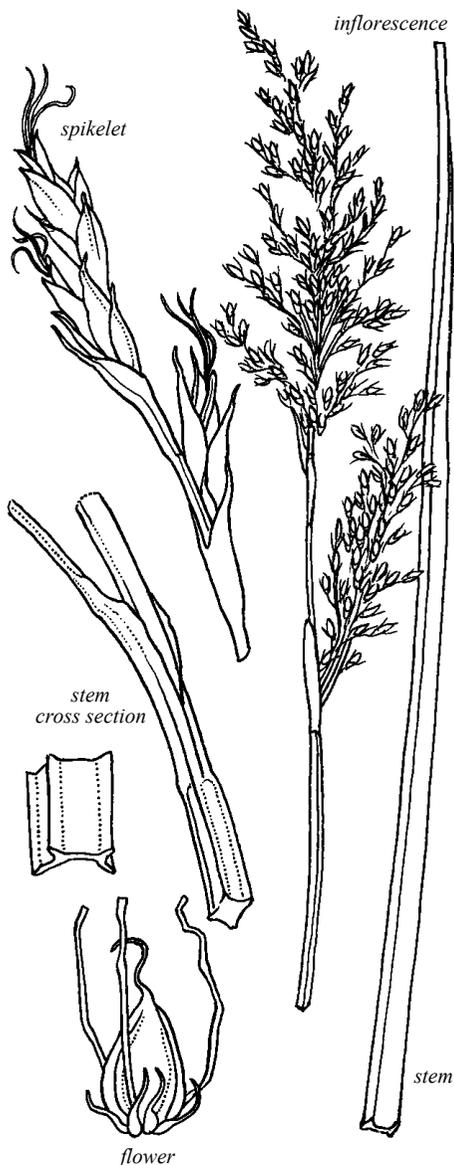
Flowers from mid winter to summer.

GROWTH FORM AND HABITAT

Angle sword-sedge grows to 3 m forming large clumps or colonies. It occurs in seasonally moist or wet sands along watercourses and winter-wet depressions from Perth to Albany.

PROPAGATION

Angle sword-sedge can be propagated by tissue culture. Seeds mature in spring and early summer.



Leptocarpus aristatus
Bearded twine-rush
(Restionaceae)

LEAVES

The stems are up to 1 mm wide.
 The scale-like leaves are 7-11 mm long.

FLOWERS

The male inflorescence is branched with clusters of pendulous spikelets each 5-11 mm long. The female inflorescence is of a single or sometimes 2 or 3 spikelets, each 7-15 mm long.
 Each spikelet contains several flowers which each have 6 floral segments.

FRUITS

The fruit is a small nut.

FLOWERING TIME

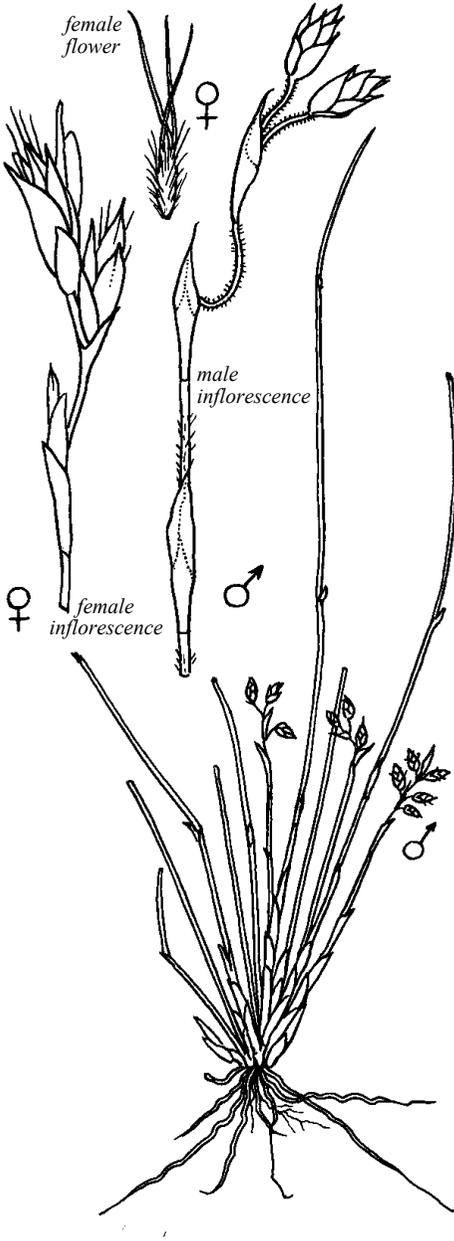
Flowers in winter and spring.

GROWTH FORM AND HABITAT

Bearded twine-rush is a densely tufted perennial sedge up to 0.8 m high with separate male and female plants. It is found in seasonally wet depressions in sand or clay from Jurien to Bremer Bay.

PROPAGATION

Bearded twine-rush can be propagated by tissue culture.



SEDGES & RUSHES

Schoenoplectus validus

Lake club-rush

(Cyperaceae)

LEAVES

The stems are circular in cross section, 3-10 mm broad and with longitudinal grooves. The leaves are reduced to a sheath with an oblique tip, the blade being absent.

FLOWERS

The inflorescence is a cluster of numerous spikelets. The brown spikelets are 5-14 mm long and 4-5 mm wide. Each spikelet has many small flowers and each flower has a bract and 5 or 6 bristle-like floral segments.

FRUITS

The fruit is a smooth, brown, slightly compressed nut. The nuts are approximately 2 mm long. There are around 600 nuts per inflorescence.

FLOWERING TIME

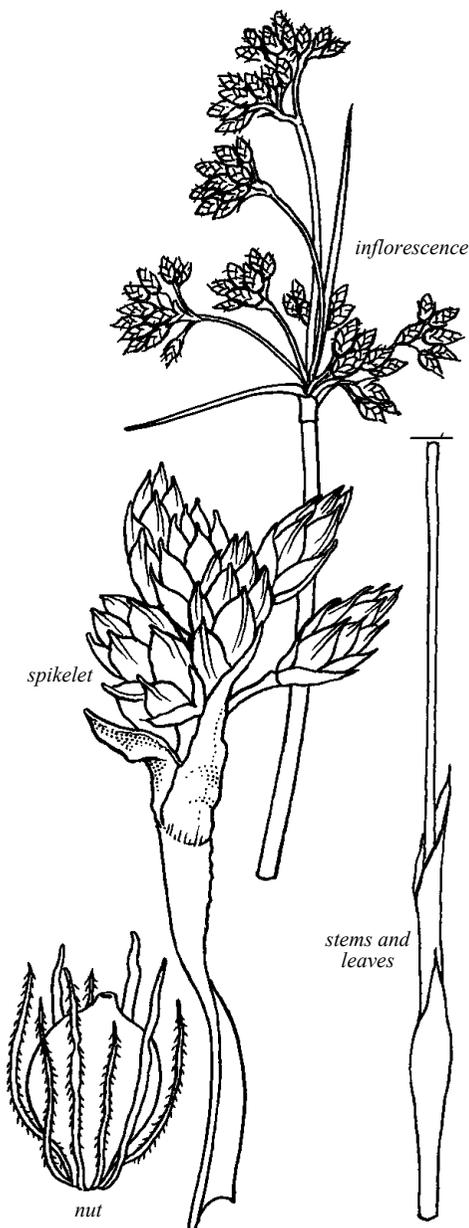
Flowers in late spring to summer.

GROWTH FORM AND HABITAT

Lake club-rush is an erect sedge reaching up to 3 m high. It forms clumps and sometimes extensive colonies. Lake club-rush grows in fresh, brackish or semi-saline water. It is widespread in the south-west in winter-wet depressions and around the margins of lakes and rivers. Occurs on the coastal plain from Yancheop to the Blackwood River. It also occurs in all other Australian States except the Northern Territory, and in other countries bordering the Pacific Ocean

PROPAGATION

Seed germination does occur in this species however few seeds germinate. In-vitro culture may be used to produce seedlings. Planting rhizomes, with a minimum length of 4 to 5 aerial stems, should be done in winter and the leaves should be cut to prevent desiccation.



Schoenus subfascicularis
a Bog-rush
 (Cyperaceae)

LEAVES

The stems are circular in cross section to slightly compressed, 0.5-2 mm wide and grooved. The leaves are reduced to reddish brown sheaths at the base of the stem—each 20-65 mm long with a tiny point-like blade.

FLOWERS

The branched inflorescence is 15-90 mm long and has a few to numerous spikelets. The spikelets are brown, 6 -11 mm long and each with several flowers.

FRUITS

The fruit is a 3-ribbed nut.

FLOWERING TIME

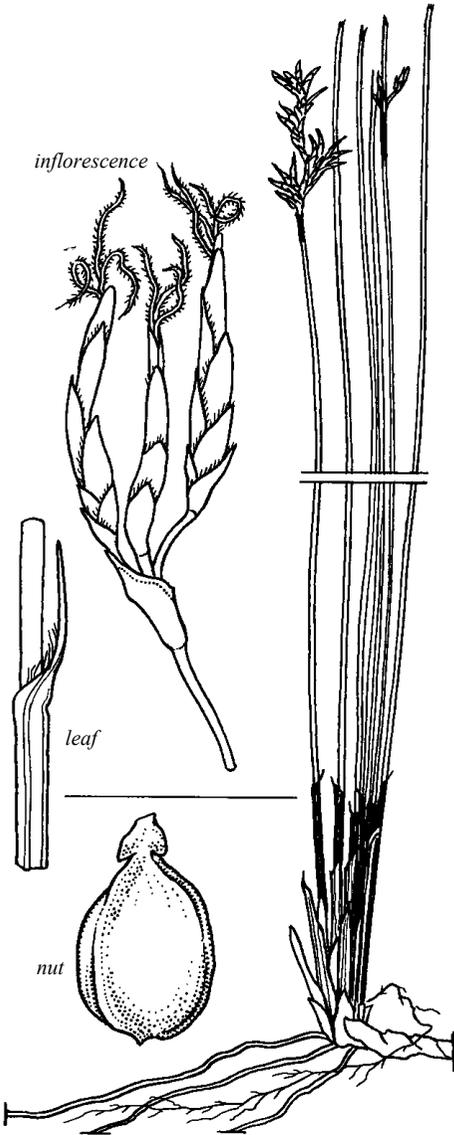
Flowers winter to early summer.

GROWTH FORM AND HABITAT

This is a perennial rush, up to 1 m high. It occurs in the seasonally wet depressions, fringing swamps and estuaries from Eneabba to the south coast and east to Cape Arid.

PROPAGATION

This rush produces very little viable seed. The plant can be propagated by rhizome division.



SEDGES & RUSHES

Typha domingensis Native cumbungi (Typhaceae)

LEAVES

The stems are cylindrical and 2.5-5 mm wide. The leaves have a sheath around the stem and a well-developed flat blade 2 m long and 5-20 mm wide. The blade is often rather spongy.

FLOWERS

The flowering spike is up to 2 m tall, the brown cylindrical inflorescence is up to 0.75 m long. The inflorescence has a lower female portion and an upper male portion, the two separated by a gap of 20-50 mm. The mature female portion is usually cinnamon brown, 120-400 mm long and 8-15 mm wide. The male portion is 150-300 mm long and 8-15 mm wide.

FRUITS

The small fruit is wind-dispersed. One spike may produce up to 400,000 seeds.

FLOWERING TIME

Flowers for much of the year but particularly in summer.

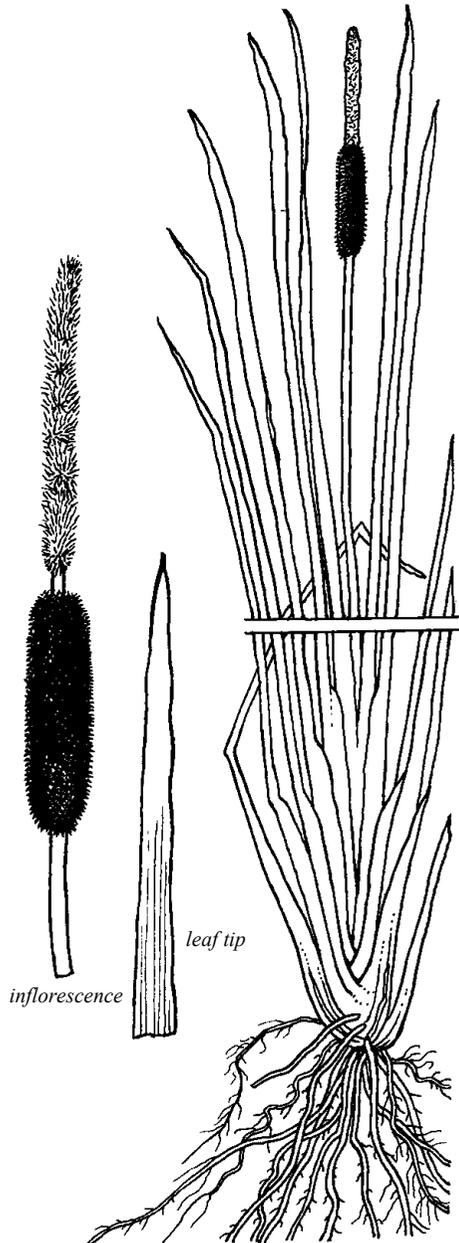
GROWTH FORM AND HABITAT

Native cumbungi is a tall bulrush to 3 m with extensive branched rhizomes. It is very similar to the introduced species *Typha orientalis* but is a smaller paler green to blue-green plant with unlobed leaf sheaths and narrower female inflorescences. Often intermingles with *Typha orientalis*.

Grows in fresh or brackish water in permanent or winter-wet depressions in scattered locations from the Kimberley to the south coast. It occurs in all states and is also widespread in tropical and warm-temperate areas of the world.

PROPAGATION

Native cumbungi is best planted from seeds in summer. Rhizome transplantation is poor.



*Centella cordifolia***Centella**

(Apiaceae)

LEAVES

The leaves are kidney-shaped to almost circular, 9-45 mm long and 15-95 mm wide. They have a distinctly notched broad base and a shallowly indented margin.

FLOWERS

The pink or white flowers arise in clusters of 3 or 4 flowers on a common stalk. The petals are only 1 mm long.

FRUITS

The broad fruit is 3 mm long, 4 mm wide and prominently ribbed.

FLOWERING TIME

Flowers for much of the year.

GROWTH FORM AND HABITAT

Centella is a creeping perennial herb which roots at the nodes. It occurs in winter-wet depressions from Gingin to Bremer Bay.

PROPAGATION

Centella can be propagated by vegetative division.

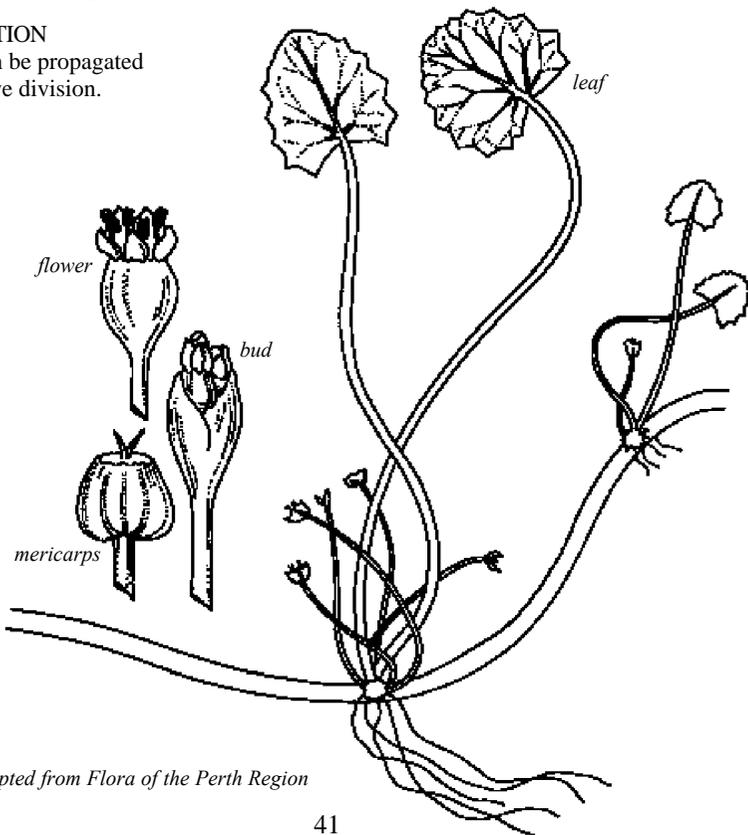


Diagram adapted from *Flora of the Perth Region*

GRASSES

Hemarthria uncinata

Matgrass

(Poaceae)

LEAVES

The leaf blades are flat or folded, 50-150 mm long and 1.5-5 mm wide. There is a rim of short hairs at the junction of the leaf sheath and blade.

FLOWERS

The inflorescence is narrow and spike-like with the individual spikelets embedded in hollows in the inflorescence axis. The spikelets are 5-10 mm long, each with 2 florets, only one of which is fertile.

FLOWERING TIME

Flowers summer to early autumn.

GROWTH FORM AND HABITAT

Matgrass is a rhizome forming grass and may grow to 1 m high. It occurs in damp areas near swamps, estuaries and watercourses from Northampton to east of Esperance. It also occurs in all Australian States except the Northern Territory.

PROPAGATION

Matgrass can be propagated by seed or by vegetative division.



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GLOSSARY

- Articulate.....Jointed.
- Biennial.....Completing the life span and then dying in more than one but not more than two years.
- Blade.....The actual “leaf” which arises above the leaf stalk or leaf sheath.
- Brackish water.....Water with a range of over 3 and up to 10 parts per thousand (ppt) Total Dissolved Salts (TDS) all year, except for after seasonal rains when salinity can fall below 3 ppt TDS.
- Bract.....A small leaf-like structure in the inflorescence.
- Capsule.....Dry fruit splitting open to release seeds at maturity.
- Direct seeding.....Seeds sown in large quantities at the chosen site so that they germinate and grow without cultivation.
- Freshwater.....Water with less than 3 parts per thousand (ppt) Total Dissolved Salts (TDS) all year.
- Inflorescence.....The flowering part of the plant.
- In-vitro.....In an artificial environment.
- Node.....A point where leaves are attached.
- Nut.....The dry and hard fruit which does not split open to release seed at maturity.
- Perennial.....With a life span extending over more than two growing seasons.
- Petal.....One of the segments of the usually coloured floral whorl.
- Phyllode.....An expanded leaf stalk which is leaf-like in the case of a reduced or absent leaf.
- Rhizome.....An underground stem running parallel to the soil surface and bearing leaves and roots.
- Saline water.....Water with a range of over 10 and up to 50 parts per thousand (ppt) Total Dissolved Salts (TDS) all year, except for after seasonal rains when salinity can fall below 10 ppt TDS.
- Salinity.....The measure of the total soluble (or dissolved) salts, i.e. mineral constituents in water.
- Scarification.....Treating seeds with hard coats with boiling water or scratching the surface to allow germination.
- Seed.....The reproductive body formed from a fertilised cell with a surrounding seed coat.
- Sheath.....A structure which clasps the stem.
- Spike.....An unbranched inflorescence of unstalked flowers or spikelets.
- Spikelets.....The grass flower heads composed of two bracts and one to several flowers. Also spike-like inflorescence of sedges.
- Stamen.....One of the male organs of the flower, consisting typically of a stalk (filament) and a pollen-bearing portion (anther).
- Style.....The elongated tip of the female organ of the flower.
- Valve.....The specialised opening of a fruit or nut.

NOTE: Water salinity in this booklet is defined according to Halse et al (1993) who classify salinity according to biological parameters. The amount of total dissolved salts in water classified fresh for drinking and other health standards will be much less than 3 ppt TDS.

Typical fringing vegetation of freshwater rivers and creeks of the lower south-west of Western Australia

