A KEY TO THE PLANTS OF THE ESTUARIES AND BRACKISH LAGOONS OF NORTH CANTERBURY

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While keys to the majority of native angiospermous plants of New Zealand are readily available, their use is limited by two factors. Firstly, they are based mainly on characters of the reproductive organs which are absent for much of the year. Secondly, in lowland modified areas, the flora is frequently enriched with adventive species and with some exceptions (Healey, 1970) keys to these are not generally available. In addition, Moore and Adams (1963) give descriptions and illustrations of some species mentioned in this key.

The flora of the salt marshes and related communities of North Canterbury is relatively simple in terms of numbers of species. These communities contain a mixture of native and adventive species and some of the latter are common and widespread. Some plants given in the key are not strictly salt marsh plants but are frequently found in the vicinity of the high water limits of the salt marsh (e.g. Agropyron repens, Festuca arundinacea and Phormium tenax). The key is also intended to cover Lake Ellesmere which contains a number of submerged aquatics not characteristic of salt marshes as a whole. A number of salt marsh plants also occur in damp hollows (slacks) in sand dunes. Gunnera arenaria and Ranunculus acaulis, usually restricted to this habitat, are also included in the key. The key may also be used for this habitat, but care should be taken to avoid true dune plants.

The main difficulty in devising vegetative keys is that some species are not always distinguishable when sterile. The key should not be used with obviously atypical material. It may, however, be used at most times of the year. The vocabulary has been kept simple but, if necessary, reference should be made to the glossary of any flora. The key has been tried out in the field with students and hopefully this has uncovered all the original errors. It is hoped that the resulting key will prove useful to beginners, teachers and those not previously acquainted with the salt marsh flora.

The key introduces a species of rush, Juncus gerardii, not previously recorded for Canterbury. This Northern Hemisphere species has been recorded as an adventive in coastal localities throughout New Zealand (Healey, 1970, p. 154). Recently, Dr. C.J. Burrows found this plant on the north bank of Saltwater Creek about one hundred yards downstream of State Highway No. 1. The species is invariably restricted to saline habitats.

References:

Healey, A.J. 1970: Identification of Weeds and Clovers. Editorial Services Ltd., Wellington.

Moore, L.B. and Adams, N.M. 1963: Plants of the New Zealand Coast. Longman Paul Ltd., Auckland.

		Refer to:
1.	Plant shrubby, to 2 m tall. *Plagianthus divaricatus*.	
	Plant herbaceous.	2
2.	Plant a floating frond up to 3 cm across.	3
	Plant rooted or submerged.	4
3.	Plant a green, oval frond with few offshoots. *Lemna minor*.	
	Plant a reddish frond of few branches and many leaves. *Azolla rubra*.	
4.	Leaves reduced to scales or absent.	5
	Green leaves present.	16
5.	Stem jointed.	6
	Stem uninterrupted.	8
6.	Plant more than 40 cm tall. *Leptocarpus similis*.	
	Plant less than 20 cm tall.	7
7.	Blue-green or reddish, fleshy stems 3-15 cm. *Salicornia australis*.	
	Translucent green stems with brown joints, 2-8 cm *Lilaeopsis novae-zelandiae*.	
8.	Plants less than 25 cm tall.	9
	Plants mostly greater than 50 cm tall.	10
9.	Plants tufted; stems filiform, 5 cm tall. *Scirpus cernuus*.	
	Plants rhizomatous; stems thicker and taller. *Eleocharis acuta*.	
10.	Plants forming extensive patches of blue-green stems.	11
	Plants tussocky.	12
11.	Stems triangular in section. *Scirpus americanus*.	
	Stems rounded. *Scirpus lacustris*.	
12.	Inflorescence dense and globular. *Scirpus nodosus*.	
	Inflorescence branches visible.	13
13.	Fruit capsules dark brown to black. *Juncus maritimus*.	
	Fruit capsules light brown.	14
14.	Bright green stems up to 3 mm diameter.	15
	Pale green stems, 3-8 mm diameter. *Juncus pallidus*.	
15.	Some inflorescence branches drooping. *Juncus effusus*.	
	All inflorescence branches erect. *Juncus gregiflorus*.	
16.	Flaccid, weak plants, permanently or frequently submerged	17
	Rigid terrestrial plants, flooded only by high tide	22
17.	Leaves short, whorled and divided into filiform segments, *Myriophyllum* species.	
	Leaves undivided, usually long.	18

		Refer to:
18.	Translucent leaves with transverse veins. Zostera muelleri.	
	Leaves with longitudinal veins only.	19
19.	Leaves apparently whorled. Zannichellia palustris.	
	Leaves alternate.	20
20.	Leaves 2.5-3.5 cm long. Lepilaena bilocularis.	
	Leaves greater than 5 cm long.	21
21.	Leaf tip blunt. Ruppia polycarpa.	
	Leaf tip with two teeth. Ruppia megacarpa.	
22.	Grasses or grass-like plants.	23
	Plants not grass-like.	41
23.	Plant tussocky.	24
	Plant not tussocky.	29
24.	Leaves bristle-like.	25
	Leaves broader.	26
25.	Plant bright green; inflorescence compact, 3 mm. Scirpus cernuus.	
	Plant dull bluish green; inflorescence spreading. Puccinellia stricta.	
26.	Leaves 1.0-1.5 mm wide. Carex litorosa.	
	Leaves wider.	27
27.	Leaves rigid, V-shaped, exceeding 100 x 5 cm. Phormium tenax.	
	Leaves smaller, flat or curled.	28
28.	Leaf blades grading into sheath; stem 5-30 cm; inflorescence compact. Juncus caespiticus.	
	Sharp discontinuity between blade and sheath; stem 60-200 cm; inflorescence spreading. Festuca arundinacea.	
29.	Leaves erect, inflated, 1-2 m x 15 mm. Typha orientalis.	
	Leaves spreading, not inflated, smaller.	30
30.	Stems 1-4 mm, triangular in section.	31
	Stems rounded in section.	32
31.	Leaves 1-4, deeply grooved. Scirpus americanus.	
	Leaves many, double-folded or flat. Scirpus caldwellii.	
32.	Leaves solid or hollow.	33
	Leaves flat.	35
33.	Leaves all basal, inflorescence a spike. Triglochin striatum.	
	Stem leaves present, inflorescence branched.	34

		Refer to:
34.	Leaves solid, Juncus gerardii. Leaves hollow, septate internally. Juncus articulatus.	
35.	Leaves densely hairy. Holcus lanatus. Leaves hairless or nearly so.	36
36.	Plant Perennial, spreading habit. Plant annual, easily uprooted.	37 39
37.	Spreading by surface stolons. Agrostis stolonifera. Spreading by underground rhizomes.	38
38.	Colonising mud flats; leaves rigid and coarse. Spartina x townsendii. At or above high water mark; leaves not rigid. Agropyron repens.	
39.	Inflorescence a long curved spike. Parapholis incurva. Inflorescence short and erect.	40
40.	Inflorescence hard and rigid; awns straight. Hordeum marinum. Inflorescence soft; awns curved. Polypogon monspeliensis.	
41.	Leaves divided into leaflets. Leaves not so divided.	42 46
42.	Leaflets lobed. Apium filiforme. Leaflets at most finely toothed.	43
43.	Leaves with five leaflets. Lotus tenuis. Leaves with three leaflets.	44
44.	Plant erect, annual. Trifolium arvense. Plant spreading, perennial.	45
45.	Spreading stems subterranean. Ranunculus acaulis. Stems creeping on soil surface. Trifolium fragiferum.	
46.	Plant a rosette. Plantago coronopus. Plant otherwise.	47
47.	At least some leaves lobed. Leaves linear, spoon-shaped or rounded.	48 52
48.	Leaves rhomboid, hastate or triangular. Leaves lobed differently.	49 50
49.	Flower enclosed by pair of fleshy bracts; plant erect or prostrate. Atriplex hastata complex. Flower with 3-5 perianth segments; plant prostrate. Chenopodium ambiguum.	
50.	Leaf blades about as broad as long. Gunnera arenaria. Leaves much longer than broad.	51

		Refer to:
51.	Leaves with regular curved lobes. Cotula dioica. Leaves fleshy, coarsely lobed or toothed, occasionally unlobed. Cotula coronopifolia.	
52.	Leaves linear, more or less pointed. Leaves broader, rounded.	53 54
53.	Leaves 10-20 mm; stipules triangular. Spergularia marginata. Leaves 2-12 mm; stipules absent. Suaeda novae-zelandiae.	
54.	Leaves opposite. Leaves alternate.	55 56
55.	Leaves on aerial stems. Mimulus repens. Leaves borne on subterranean stems. Glossostigma elatinoides.	
56.	All stems creeping; leaves 5-25 mm or more. Selliera radicans. Erect stems usually present; leaves 2-12 mm. Samolus repens.	

SPECIES LIST

* = not indigenous to New Zealand:

SPECIES:	COMMON NAME:	FAMILY:
Agropyron repens *	Couch grass; twitch	Gramineae
Agrostis stolonifera*	Creeping bent; fiorin	Gramineae
Apium filiforme	Slender celery	Umbelliferae
Atriplex hastata (complex)	Orache	Chenopodiaceae
Azolla rubra	Water fern	Azollaceae
Carex litoralis	Sea tussock sedge	Cyperaceae
Chenopodium ambiguum	Coastal goosefoot	Chenopodiaceae
Cotula coronopifolia	Batchelor's button	Compositae
C.dioica	Pincushion	Compositae
Eleocharis acuta	Spike sedge	Cyperaceae
Festuca arundinacea	Tallfescue	Gramineae
Glossostigma elatinoides		Scrophulariaceae
Gunnera arenaria	Sand gunnera	Haloragaceae
Holcus lanatus *	Yorkshire fog	Gramineae
Hordeum marinum *	Sea barley grass	Gramineae
Juncus articulatus *	Jointed rush	Juncaceae
J.caespiticus		Juncaceae
J.effusus *	Soft rush	Juncaceae
J.gerardii *	Mud rush	Juncaceae

SPECIES:	COMMON NAME:	FAMILY:
J.gregiflorus	Common rush	Juncaceae
J.maritimus	Sea rush	Juncaceae
J.pallidus	Great rush	Juncaceae
Lemna minor	Duckweed	Lemnaceae
Lepilaena bilocularis		Zannichelliaceae
Leptocarpus similis	Oioi	Restionaceae
Lilaeopsis novae-zelandiae	Tape measure	Umbelliferae
Lotus tenuis *	Birds' foot trefoil	Leguminosae
Mimulus repens	Purple mimulus	Scrophulariaceae
Myriophyllum species	Water milfoil	Haloragaceae
Parapholis incurva *	Sickle grass	Gramineae
Phormium tenax	N.Z. flax	Agavaceae
Plagianthus divaricatus	Shore ribbonwood	Malvaceae
Plantago coronopus *	Bucks' horn plantain	Plantaginaceae
Polypogon monspeliensis *	Beard grass	Gramineae
Puccinellia stricta	Salt grass	Gramineae
Ranunculus acaulis	Sand buttercup	Ranunculaceae
Ruppia megacarpa	Horses' mane	Ruppiaceae
R.polycarpa	Horses' mane	Ruppiaceae
Salicornia australis	Glasswort	Chenopodiaceae
Samolus repens	Sea primrose	Primulaceae
Scirpus americanus	Three-square	Cyperaceae
S.caldwellii	Club sedge	Cyperaceae
S.cernuus		Cyperaceae
S.lacustris	Bulrush	Cyperaceae
S.nodosus	Knotted sedge	Cyperaceae
Selliera radicans	Remu-remu	Goodeniaceae
Spartina x townsendii *	Cord grass	Gramineae
Spergularia marginata	Sea spurrey	Caryophyllaceae
Suaeda novae-zelandiae	Sea-blite	Chenopodiaceae
Trifolium arvense *	Hares' foot clover	Leguminosae
T.fragiferum *	Strawberry clover	Leguminosae
Triglochin striatum	Arrow-grass	Juncaginaceae
Typha orientalis	Raupo	Typhaceae
Zannichellia palustris	Horned pondweed	Zannichelliaceae
Zostera muelleri	Eel-grass	Zosteraceae

Lomaria procera (Blechnum capense):

There are no limits to the variations of this protean plant, of which the New Zealand botanist should collect and preserve large suites of specimens with the stipes and rhizomes, it is indeed only by such large suites that any accurate idea can be obtained of this species of fern, and it is impossible for the student or even the botanist to recognise some of the states of this plant at sight.

Ibid.
