Bolboschoenus in Auckland

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The sedge genus *Bolboschoenus* (Cyperaceae) is widely distributed in the world (Browning & Gordon-Gray 2000). Three species of *Bolboschoenus* occur in New Zealand and Australia. They were originally included in *Scirpus* (Cook 1947), but later separated out into *Bolboschoenus* (Smith 1995). The biology of related species in North America has been recently reviewed (Kantrud 1996). These are broad-leaved tall perennial sedges of brackish and freshwater stream and lake margins, usually occurring close to the sea. Characteristic vegetative features are the bright green, flat leaves, triangular stems, the network of creeping rhizomes and swollen underground woody tubers, and the die-back of the foliage in winter. Large pure clonal colonies are commonly formed. The achenes can be dispersed by water (they readily float) and by ducks. The names club-rush and Purua grass have been applied to all three species.

The three species can be found about the Auckland isthmus. Sites in the region where I have observed the species (voucher samples collected), or from which there are AK herbarium specimens are as follows:

Bolboschoenus caldwellii (Cook) Soják
"sea club-rush". Miranda, Otara Creek, Duder Regional Park (salt marsh), Onehunga Tavern salt marsh, Motions Creek (Westmere), Chelsea (AK 121477). Further afield, it occurs in Whitianga Harbour, inland at Tokaanu (L. Taupo), at Napier, at coastal sites near Foxton, and in Canterbury (Kaikoura, Amberley).

Bolboschoenus medianus (Cook) Soják
"marsh club-rush". Auckland Airport wetland, Ihumatao (Manukau Harbour), Puhinui Reserve, Waimahia Estuary (Clendon), Laingholm (AK 29695), Titirangi Beach (AK 216729), Piha North (AK 104945), Waitakere River at Bethell's Beach (AK 140951), Te Atatu coastal wetland, Whau River upper headwaters at New Lynn (AK 221635), Lawsons Creek (Moire Park, Massey), Motion's Creek (Westmere), Armitage Reserve (Point Chevalier), Shakespear Regional Park (brackish wetland), Lucas Creek (Albany), Mangemangeroa Creek (Howick), Tahuna Torea (Tamaki River), Mairangi Bay (AK 143410), Matheson's Bay (AK 128611), Islington Bay (AK 119706), Little Shoal Bay (AK 216725), Mahurangi Heads (AK 51035), Hatfield's Bay (AK 157998), Kawakawa Bay (AK 181197), Motuihe Island (AK 216721), Whakanewha Regional Park on Waiheke Island, Otakawhe Bay on Waiheke Island (AK 229256), Great Barrier Island (AK 70240), and on the Coromandel Peninsula (e.g., AK 233416).

Bolboschoenus fluviatilis (Torrey) Soják
"freshwater club-rush". Oruarangi Stream (Mangere), Shakespear Regional Park (duck pond), Unitec (artificial wetland), Henderson Creek, Onehunga freshwater springs (AK 22135), Lake Wainamu at Bethell's Beach (AK 71126), Woodside Bay on Waiheke Island (AK 175685), Algies Bay (AK 181200), and Lake Pokorua near Waiuku (AK 245634). It also occurs at Port Waikato, Meremere, and in Northland, e.g., at Te Kopuru (in drains) and Omapere.

From these records it is evident that B. medianus is the most abundant and widespread species. It occurs commonly on suitable muddy sheltered creek habitats in both the Waitemata and Manukau Harbours. The shortest species, *Bolboschoenus caldwellii*, is comparatively uncommon, occurring mainly on the eastern coast of the isthmus, strictly in salt meadows or in wetlands adjoining salt marshes. The tallest species, *B. fluviatilis* grows on the margins of sheltered bodies of freshwater, typically small lakes or ponds (but along drains, e.g., at Te Kopuru), and of the three species, is likely to be the most important food source of dabbling ducks - which probably disperse the achenes. A distinctive feature of it, at least in dried herbarium specimens, is that the lower culm and leaves are usually maculated with purplish markings - a feature also sometimes seen in *B. medianus.*

Collection records and field observations suggest that the species rarely grow together. *Bolboschoenus medianus* is typically found fringing creeks close to where they come out to the sea. Sites where two species occur together are Motions Creek, at Meola Road, Westmere, with *B. medianus* on one side of the creek, and *B. caldwellii* on the other, and Shakespear Regional Park, where *B. fluviatilis* flourishes around the duck pond and *B. medianus* in the adjacent tidal wetland.

In a study of these species, Browning, Gordon-Gray and Smith (1997) pointed out that *B. medianus* was intermediate in many of its anatomical characters between *B. caldwellii* and *B. fluviatilis*, as is evident in the following table. They indeed suggested that *B. medianus* may be of hybrid origin, either arising directly from crossing between the other two species or from ancestral parental stocks which gave rise to the now very *distinctive B. caldwellii* and *B. fluviatilis* (Browning & Gordon Gray 2000). These observations of the species in Auckland confirm the intermediacy of our most abundant species *B. medianus* in stature and several other characters, and strongly suggest that it is also intermediate in its ecology, with a preference for brackish creek banks close to the sea rather than the full saline conditions of salt marshes, or strictly freshwater sites.

The species can be identified as follows:

	B. caldwellii	*B. medianus*	*B. fluviatilis*
Nuts	exclusively two-angled (lenticular); nut in planar outline is almost circular	in the same spikelet, some lenticular, some trigonous	exclusively three-angled (trigonous); nut in planar outline narrowly elliptical.
Pericarp surface	isodiametric, 5- or 6-sided cells (honeycomb pattern)	may vary on an individual nut	small cell areas not clearly isodiametric and hexagonal
Styles	2-branched	2- and 3-branched within individual spikelets	3-branched
Stature	short (e.g., 0.4 m – 0.7 m)	intermediate (e.g., 0.9-1.2 m)	very tall (e.g., 1.5-2.0 m)
Perigonial bristles	caducous, consistently shorter than the achenes	persistent or caducous and consistently shorter than the achene	persistent and equal to the achene
Umbel	semi-sessile head, with few branches, and few spikelets	spikelets in clusters at end of long rays	spikelets in cluster at end of long (e.g. 7 cm) rays
Width of leafy bracts at base of umbel	narrow, e.g., 2.5 mm	intermediate, e.g., 5 mm	broad, e.g., 10 mm
Ecology	salt marshes	banks of streams near the sea	margins of freshwater streams and lagoons

References

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