

A phylogeny of the genus, from which the relevance and rationale of all these characters might be assessed, is overdue. In the meantime one can enjoy speculating, perhaps under the spell of Alice

Tangerini's striking, intriguingly detailed illustrations of new species from the Marquesas Islands (Wagner & Lorence 2011).

#### References

- Gardner, R. O. 2002: Systematic notes on *Coprosma* (Rubiaceae). *New Zealand Natural Sciences* 27: 41–57.  
Oliver, W. R. B. 1935: The genus *Coprosma*. *Bernice P. Bishop Museum Bulletin* 132: 1–207.  
Wagner, W. L.; Lorence, D. H. 2011: Revision of *Coprosma* (Rubiaceae, tribe Anthospermeae) in the Marquesas Islands. *PhytoKeys* 4: 109–124.  
Whistler, W. A. 1978: Vegetation of the montane region of Savai'i, Western Samoa. *Pacific Science* 32: 79–94.

## Auckland's long-awned brome grasses (*Bromus* species, Poaceae)

Rhys Gardner

### Introduction

The grasses reviewed here are all introduced winter-annuals. Three are rather infrequent in northern New Zealand, only becoming "proper weeds" in the drier climates of Hawkes Bay, Nelson and Canterbury. The fourth species, *B. arenarius*, was first recorded in New Zealand by Allan Cunningham, and like other harmless Australians sighted early in our botanical history is often regarded, at least by collectors, as an honorary rare-plant.

Flora NZ V's key to the genus (Edgar & Connor 2000) separates out the long-awned bromes from those whose awn is less than a centimetre long. One of the latter group, *B. stamineus*, occasionally exceeds in this regard but is a rather infrequent South Island plant and a perennial one at that. Similarly, three long-awned annual species, *Bromus japonicus* var. *vestitus*, *B. madritensis* and *B. rubens*, have been picked up just a few times in NZ, from the southern North Island (Edgar & Connor 2000). This leaves four long-awned species in the Auckland region: *B. arenarius*, *B. diandrus*, *B. sterilis* and *B. tectorum* of which *B. diandrus* is by far the most common

### Overview

Brome-grasses may be recognized vegetatively by their closed leaf-sheaths (at least the first-formed ones), membranous, dentate to deeply lacerate ligules, and (for NZ representatives) a lack of auricles or hair-tufts at the sheath-blade junction. The inflorescence is a panicle, often loose but sometimes dense and fan-shaped. The spikelets are straightforward in structure, having a pair of somewhat unequal glumes and c. 4–10 florets (all awned; upper florets sometimes vestigial). The brome ovary is topped by a swollen hairy structure, a feature shared with members of two other tribes (typified respectively by *Brachypodium* and *Hordeum*). This outgrowth is well-illustrated in Flora

NZ V. It remains on top of the matured grain and might help somehow in dispersal.

The glumes and lemmas of our four species have broad translucent margins. In the *B. tectorum* lemma these fuse just above the awn base to form a shortly bifid triangular tip in which there is no trace of nervation (unlike in the other three species). The awn itself is straight to somewhat recurved and is only weakly twisted. It is flat to grooved on its adaxial side, and ridged to convex abaxially, where there are several series of antrorse scabridities, rather feeble and hair-like in *B. arenarius* and *B. tectorum* but unpleasantly harsh in the large florets of *B. diandrus*. The callus at the floret-base is an innocuous structure, being more or less shortly rounded to subacute and with only a feeble pair of lateral hair-tufts.

As noted, the four species are annuals. They can make good growth in sunny, moderately fertile, well-drained sites, but are rather few-culmed, lack stolons or rhizomes, and rarely reach 50 cm tall.

### Key

*Bromus arenarius* belongs to the type section of the genus. The others belong to sect. *Genea*, this a word for "offspring", i.e., a group of species separated from *Bromus* (Clifford & Bostock 2007).

**A.** Lower glume 3–5 nerved, upper glume 5–7 nerved; mature (i.e., "fruiting") spikelet with florets not greatly spreading, thus the spikelet becoming ovate-oblong in outline; [lowest inflorescence-branches mostly longer than spikelets (incl. awns); lower glume 0.7–1 cm long; lemma 1–1.5 cm long, loosely hairy all over; awn 1–2 cm long]

..... ***B. arenarius***

**AA.** Lower glume 1-nerved, upper glume 3-nerved; mature spikelet with florets angled out from each

other (exposing much of the rachilla), the spikelets becoming obovate in outline ..... **sect. *Genea***

**B.** Lowest inflorescence-branches mostly shorter than spikelets (incl. awns), usually bearing just 1 spikelet; lower glume 1.2–2.4 cm long; lemma 2–3.5 cm long, scabrid, usually with a few hairs near apex; awn 3–5.5 cm long ..... ***B. diandrus***

**BB.** Lowest inflorescence-branches longer than spikelets (incl. awns), and usually bearing 1–2 of these; lower glume 0.8–1.5 cm long; lemma 1.5–2.3 cm, scabridulous to almost smooth, usually without hairs near apex; awn 1.5–3.5 cm long ..... ***B. sterilis***

**BBB.** Lowest inflorescence-branches mostly much longer than spikelets, rarely bearing fewer than 4–8 of these; lower glume 0.6–1 cm; lemma 1.0–1.6 cm, us. loosely hairy all over, rarely almost glabrous; awn 1–2 cm ..... ***B. tectorum***

**The species**

1. *Bromus arenarius* Labill. sand brome (Fig. 1A) Presumably native to Australia, including Tasmania. Naturalized in the USA.

In northern NZ now mainly found on the offshore islands, where *Senecio lautus* (Asteraceae) and *Lepidium pseudotasmanicum* (Brassicaceae) are frequent associates.

– The Auckland War Memorial Museum herbarium (AK) has a dozen or so collections from the Auckland region. Only one is from the Waitakere coast (Ball, AK 265366, coll. 1886). Several got in the 1920s and '30s are from "scoria flats" at Mt Wellington. Modern records are from some of the Hauraki Gulf islands, with a single one from Rangitoto (*de Lange*, E side near slipway, one plant in pahoehoe lava, AK 225367, coll. 2003).

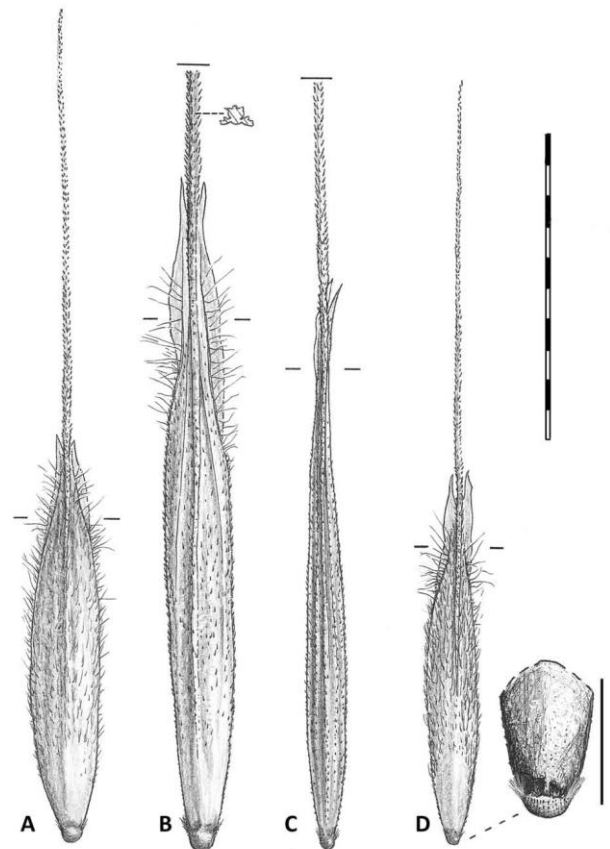
– The *B. arenarius* lemma resembles that of the usual form of *B. tectorum* in being loosely hairy all over, but unlike the latter, is never purple-coloured.

– The Flora of Australia treatment (Weiller & Henwood 2009) does not fully accept sand brome as native to that country, but suggests no alternative.

2. *Bromus diandrus* Roth ripgut brome (Fig. 1B) Native to the Mediterranean and SW Asia regions, widely naturalized in other temperate regions.

– Among the modern collections in AK are those from: Waitakere coast, on dunes stabilized by kikuyu grass; Rangitoto I., in a gull colony; Watchman I., among exotic grasses. Others are from dry waste ground or grassland or lightly shaded coastal forest where it can be locally common.

– Ripgut brome has the longest lemmas and awns of all the bromes, but depauperate examples can be confused with robust *B. sterilis*. Both species have scabrid rather than hairy lemmas, but *B. diandrus*



**Fig. 1. *Bromus* species, florets (whole or part) viewed of abaxial (dorsal) side. A: *B. arenarius*. B: *B. diandrus*, with t.s. of awn. C: *B. sterilis*. D: *B. tectorum*, with enlargement of apex. Upper scale bar = 1 cm; lower scale bar = 1 mm. Short lines on either side indicate the base of the awn, where it attaches to the body of the lemma. The awns in B and C have been cut short. Based respectively on AK 229629, 271974, 177814 and 50284. Drawn by ROG.**

also has some hairs (to 1 mm long) distally, from near the top of the lateral lemma nerves; also, these nerves are rather less prominent than in *B. sterilis*. Weiller and Henwood (2009) say that the floret callus is relatively acute in *B. diandrus*, but, given the variation in the *B. diandrus* floret world-wide, this feature is not completely reliable (Cope & Gray 2009).

– The earliest collections for Auckland, and probably for the country as a whole, are those of Kirk and Cheeseman (respectively AK 98312; AK98315–16). To learn this one has to go to the specimens themselves rather than to Flora NZ V, and even the relevant precursor checklist (Forde & Edgar 1995) just cites a "First Record" publication of 1935.

3. *Bromus sterilis* L. barren brome (Fig. 1C) Native to the Mediterranean–SW Asia region, not widely naturalized. The common name is said to refer to its deleterious effect on agricultural production.

– The only AK specimens from the Auckland region are those collected in 1985 by Alan Esler and Jack Mackinder at Cannibal Creek on the Waitakere coast, "in thin soil over rock on exposed knob" (AK 216758; see also AK 177814).

– The fertile parts of *B. sterilis* are comparatively glabrous, notably, near the lemma apex and on the stalk of the inflorescence, which is "glabrous to scabrid in *B. sterilis*, distinctly hairy in *B. diandrus*" (Cope & Gray 2009: 452). Also, despite being narrower in both relative and absolute terms, the mature lemma of *B. sterilis* is, especially on its flanks, more prominently nerved than that of *B. diandrus*.

4. *Bromus tectorum* L. downy brome (Fig. 1D)  
Native to temperate parts of Eurasia, widely naturalized in other temperate regions. The specific epithet means "of the roofs" and was given by

Linnaeus to the plant's growing on soil-covered roofs in southern Europe. The older authors also mention walls as a favoured habitat.

– According to Connor & Edgar (2000), although downy brome was recorded for Auckland by Thomas Kirk the only known collection from here appears to be one collected in 1996 ... AK 233145. (A 1959 collection from Miranda on the Firth of Thames is considered to have probably come from Tekapo; E. Edgar in sched. AK 120136).

– Cope and Gray (2009: 454) say that "at maturity, the species is instantly recognized by the small glistening spikelets often all held horizontally to one side ... in the more floriferous spikelets the rachilla above the last fertile floret is often twisted so that the awns of the sterile florets lie in several different planes". The "glistening" would come from reflection off the broad hyaline margins and apices of the glumes and lemmas.

#### References

- Clifford, H. T.; Bostock, P. D. 2007: Etymological Dictionary of Grasses. Springer, Berlin.  
Cope, T.; Gray, A. 2009: Grasses of the British Isles. BSBI, London.  
Edgar, E.E.; Connor, H.E. 2000: Flora of New Zealand. Volume V. Manaaki Whenua Press, Lincoln.  
Weiller, C. M.; Henwood, M. J. 2009: Flora of Australia 44A: 80–93. ABRIS/CSIRO Australia, Melbourne.

## *Barleria repens* Nees (Acanthaceae) on the southern Queensland coast

Ewen K. Cameron

While on holiday in southern Queensland in April 2013 we went for a swim on the coast at Agnes Water, between Gladstone and Bundaberg (lat. 24.206677° S) and noticed a low flowering shrub with pinky-orange flowers at the back of the beach (Fig. 1). It appeared to be suckering through the sand dunes on the margin of a public access walkway to the beach.



**Fig. 1. *Barleria repens* (Acanthaceae), Agnes Water. Corolla c.50 mm long, with 5 ± equal lobes. Paired outer sepals (os) c.25 mm long – larger, flatter than the leaves. Photo: EKC, 22 Apr 2013.**

The curved tubular flowers were c.50 mm long; the calyx deeply four-lobed, arranged as two outer lobes and two much smaller inner lobes; leaves opposite with impressed veins and the leaf margins rolled back (rather reminiscent of small *Coprosma repens* leaves). I photographed a piece (Fig. 1) and later tried to work it out from a useful local guide book (*Wild Plants of Greater Brisbane*, A Queensland Museum Guide, 2003) and later using the SE Queensland Flora (Stanley & Ross 1986). It appeared to be in the Acanthaceae but I failed to resolve it. Sending an image later to a couple of Australian colleagues also failed but Rhys Gardner resolved it quite quickly: "*Barleria repens*, seems right."

Checking on Australian Plant Names Index (<http://www.anbg.gov.au/apni/>) it had *Barleria repens* as: "Qld (doubtfully naturalised)". However, Australia's Virtual Herbarium (AVH) ([http://avh.ala.org.au/occurrences/search?taxa=barleria+repens#tab\\_mapView](http://avh.ala.org.au/occurrences/search?taxa=barleria+repens#tab_mapView)) had several records all on the Queensland coast from opposite the Whitsunday Islands south to the Gold Coast.