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## THE AUSTRALIAN SPECIES OF *AMPHIBROMUS* (POACEAE)

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### ABSTRACT

Jacobs, S. W. L. & Lapinpuuro, L. (Royal Botanic Gardens, Sydney, Australia 2000) 1986. *The Australian species of Amphibromus (Poaceae)*. *Telopea* 2(6): 715–729 — Ten species of *Amphibromus* are recognized for Australia. *A. archeri*, *A. recurvatus*, *A. neesii* and *A. whitei* are maintained, although *A. neesii* has been misapplied in the past. *A. nervosus* is re-instated. *A. gracilis* is a synonym of a prior name, *A. fluitans*, from New Zealand. *A. vickeryae*, *A. sinuatus*, *A. pithogastrus* and *A. macrorhinus* are described as new species.

### INTRODUCTION

Swallen (*Amer. J. Bot.* 18: 411–415, 1931) revised the genus *Amphibromus*, describing as new *A. quadridentulus* from South America and *A. recurvatus* from Tasmania. He also synonymized *A. archeri* under *A. neesii* on the basis that they both apparently had the same Type, Gunn 995. Gunn's numbers are the equivalent of species numbers not collection numbers, so the Type of *A. archeri* is only one of the specimens of Gunn 995. *A. archeri* is quite distinct from *A. neesii*. Swallen also applied *A. neesii* very broadly, including material we here place into three species. He did not borrow any specimens from Australian herbaria and missed some taxa that were represented by only a few specimens.

#### Characters used to delimit the taxa

**Lemma apex.** The apex is usually four-lobed (or -toothed) with the two outer lobes often less developed than the inner two. *A. fluitans* and *A. sinuatus* have membranous lobes with the lemma nerves not extending right to the margin; *A. archeri* and *A. vickeryae* have the lemma nerves excurrent as short awns on the lobes.

**Awn.** The awns in most species are straight when young, becoming twisted and geniculate at maturity or on drying. The awns of *A. fluitans* and *A. sinuatus* are barely twisted and remain more or less straight on maturity and drying.

The point of insertion of the awn is a useful diagnostic characteristic. In *A. neesii* the awn arises 25–35% of the lemma length from the tip and in *A. macrorhinus* 50–60% of the lemma length from the tip.

**Lemma surface.** The surface of the lemma varies from almost glabrous to quite scabrous. This character has been used in the past to help distinguish subspecific taxa but, in general, is too variable to be of much value. Some species tend to be more scabrous than others but most species have examples of both extremes.

The margins of the epidermal cells of the lemma show useful differences. The basic pattern, found in the two South American species and in most of the

Australian species, is an evenly undulate margin (Fig. 1a). *A. sinuatus* has an irregularly sinuate outline (Fig. 1b) and *A. fluitans* (Fig. 1c, 1d) quite an intricate raised pattern that does not appear to be necessarily confined to the margins of the epidermal cells. The lemma surface patterns indicate that the South American species of *Amphibromus* are closely related to most of the Australian species. *A. fluitans* in New Zealand would seem to have been a more recent introduction from Australia. *A. fluitans* has probably developed through *A. sinuatus* (or something similar to it) from the group of other species. Like many such trends, however, the sequence could be read in the reverse direction, although the geographical pattern of the species makes this appear unlikely.

### AMPHIBROMUS Nees

London J. Bot. 2: 420 (1843); Steud., Syn. Pl. Glum. 1: 328 (1854); J. D. Hooker, Fl. Tasm. 2: 121 (1858); Swallen, Amer. J. Bot. 18: 411 (1931).

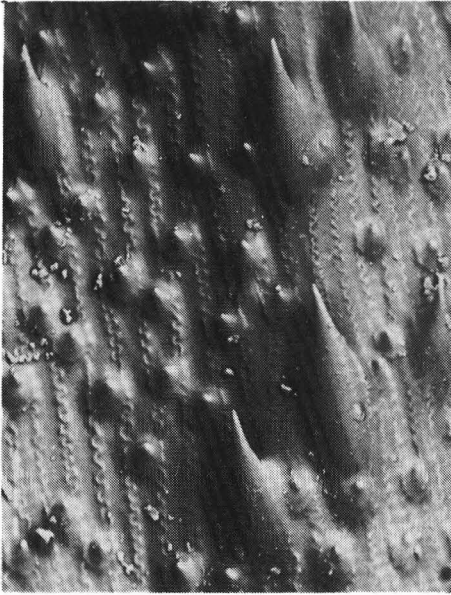
Slender, caespitose perennials to 1.5 m tall sometimes with geniculate stems. Leaf blades linear, narrow, flat or inrolled; ligule membranous, elongated, entire but becoming lacerated with age. Inflorescence a narrow, loose, elongated panicle, main axis terete and glabrous below, becoming angled and scabrous towards the apex, branches erect, slender, often flexuose. Spikelets pedicellate, solitary, rachilla disarticulating above the glumes and between the lemmas and usually continued with malformed spikelets above, but often concealed by the uppermost floret; florets 3–10, bisexual (or the uppermost male), 7–20 mm long (excluding awns). Glumes obtuse or acute,  $\pm$  keeled; the lower (1–)3(–5)-nerved with the midrib prominent; the upper longer and broader, 3–7-nerved, the midrib and sometimes 2 laterals considerably more prominent than the other nerves. Lemmas longer than the glumes, firm, 2–4-toothed or -lobed with the lobes aristate to obtuse, 5–7-nerved, with an awn arising from about the middle to just below the apex, the awn  $\pm$  twisted,  $\pm$  geniculate,  $\pm$  recurved; callus prominent, hairy. Palea bilobed, 2-keeled. Lodicules 2, membranous, spatulate to narrow-triangular, sometimes with a lateral lobe. Embryo c. 10–35% the length of the caryopsis. Hilum 20–50% the length of the caryopsis.

Cleistogamy is fairly common, at least in Australian species of *Amphibromus*. Cleistogamous florets may be intermixed with chasmogamous florets in the same spikelet or cleistogamous spikelets may remain in reduced inflorescences enclosed in the leaf sheaths. Cleistogamous florets have all three stamens and styles fully retained in the floret as well as a mature or nearly mature caryopsis. Cleistogamous florets usually have shorter stamens than the chasmogamous florets on the same plant.

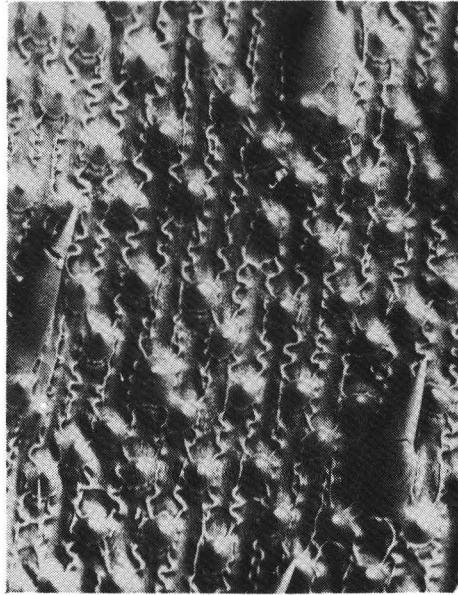
A genus of 12 species: two endemic to South America, one from both New Zealand and Australia, and the remainder endemic in Australia.

The species are mainly aquatic or semi-aquatic. *A. sinuatus* and *A. fluitans* are virtually aquatic, often with only the inflorescences above the water. *A. nervosus* and *A. macrorhinus* are common on the black soil floodplains of southern inland creeks and rivers. Although periodically inundated, these two species complete most of their growth cycle out of water. The habits and habitats of the remaining species are more or less intermediate between these two extremes.

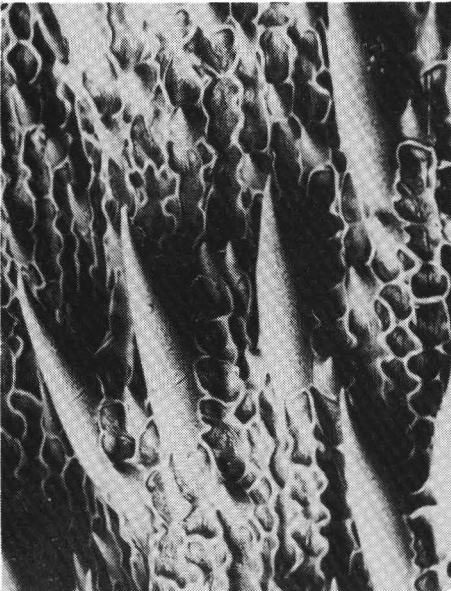
Type species: *Amphibromus neesii* Steud.



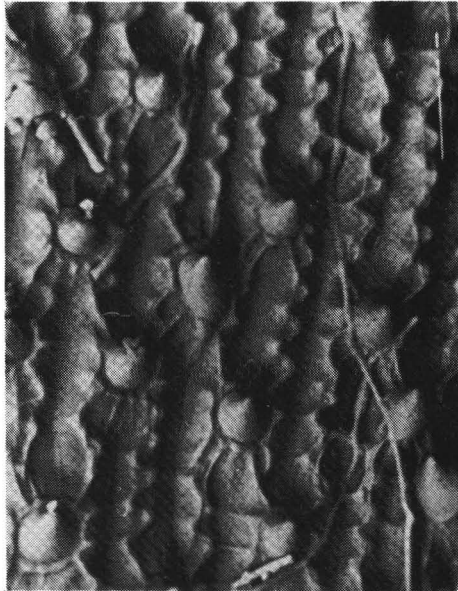
A



B



C



D

Fig. 1. Lemma epidermis of *Amphibromus* species: (a) *A. nervosus*, upper scale bar = 10  $\mu$ m (c. 385x); (b) *A. sinuatus*, upper scale bar = 10  $\mu$ m (c. 385x); (c) *A. fluitans* from Australia, lower scale bar = 10  $\mu$ m (c. 420x); (d) *A. fluitans* from New Zealand, lower scale bar = 10  $\mu$ m (c. 910x).

## KEY TO SPECIES

1. Lemma apex toothed, with nerves of teeth extending into bristles ..... 2
- 1\*. Lemma apex toothed, but nerves not extended into bristles ..... 3
2. Lemma (excluding awn and bristles)  $\geq 6$  mm long; inner teeth and bristles  $> 2$  mm long; Vic., Tas., S.A. .... **A. archeri** 8
- 2\*. Lemma (excluding awn and bristles)  $\leq 5.5$  mm long; inner teeth and bristles  $< 2$  mm long; W.A. .... **A. vickeryae** 7
3. Plants rooting at nodes; lemmas with straight awns ..... 4
- 3\*. Plants usually caespitose, or if rooting at nodes, awns bent and often twisted ..... 5
4. Lemma  $< 6$  mm long; spikelets 9–15 mm long; florets 6–10 ..... **A. fluitans** 10
- 4\*. Lemma  $> 6$  mm long; spikelets 12–21 mm long; florets 5–7 ..... **A. sinuatus** 9
5. Lemma  $\leq 5$  mm long, spikelet  $\leq 10$  mm long ..... 6
- 5\*. Lemma  $\geq 5$  mm long, spikelets  $\geq 10$  mm long ..... 7
6. Lower glume  $< 2.5$  mm long, upper glume  $< 3.5$  mm long; Qld. .... **A. whitei** 4
- 6\*. Lower glume  $> 3$  mm long, upper glume  $> 3.5$  mm long; Vic., S.A., Tas. .... **A. recurvatus** 2
7. Lemma densely hispid, with 4 teeth of more or less equal length; awn scarcely twisted ..... **A. recurvatus** 2
- 7\*. Lemma scabrous or papillose, not hispid; teeth 2–4, if 4 the outer generally shorter or poorly developed; awn twisted ..... 8
8. Ligule  $\leq 5$  mm ..... **A. pithogastrus** 6
- 8\*. Ligule  $> 6$  mm long ..... 9
9. Awn arising towards apex, 25–35% of the lemma length from tip; apex appearing constricted ..... **A. neesii** 1
- 9\*. Awn arising dorsally, 40% or more of the lemma length from tip; apex not appearing constricted ..... 10
10. Lemma with drawn-out, chartaceous apex, back of lemma very roughly papillose, awn arising 50–60% of the lemma length from apex ..... **A. macrorhinus** 5
- 10\*. Lemma apex evenly tapering from body of lemma, back of lemma smooth to scabrous, awn arising 40–55% of the lemma length from apex ..... **A. nervosus** 3

### 1. *Amphibromus neesii* Steud., Syn. Pl. Glum., 1: 328 (1854)

LECTOTYPIFICATION: In the protologue, Steudel cites 'Gunn nr. 995. Ins. Van Diemen'. Gunn numbers correspond to species numbers rather than to true collecting numbers. At Kew there are two sheets bearing specimens of Gunn 995. One of these contains three elements. The central element (= Archer 28) is selected as the lectotype of *A. archeri* (J. D. Hook.) P. F. Morris (q. v.). The remaining elements belong to *A. neesii*, a name that has been widely misapplied to collections of *A. nervosus*. The second sheet of Gunn 995 contains two elements. The left one matches the two outer specimens of the first sheet, is clearly a Gunn specimen, and has the locality given as 'Van Diemen's Land'. It matches the description, and the label information is closest to that of the original citation; it is therefore here designated as the Lectotype of *A. neesii* Steud. The right-hand specimen labelled 'Tasmania, C. Stuart' is a specimen of *A. macrorhinus*.

SYNONYMS: Note, the synonyms usually quoted under *A. neesii* (viz. *Avena nervosa* R. Br. and most of its derivatives) belong under *A. nervosus*.

Caespitose perennial to 1.5 m tall, occasionally rhizomatous. Culms erect, terete to flattened, 1–2.5 mm wide, lightly to moderately ribbed, glabrous. Nodes 2–4, glabrous, exerted, up to 95% of the width of the culm. Basal sheath glabrous (sometimes slightly scabrous), lightly ribbed, 5–10 mm wide. Upper sheath glabrous (to scabrous), ribbed, 4–6.5 mm wide. Ligule membranous, long-acute to acute, (4.5–)6.5–8 mm long. Blade linear, inrolled to flat, to 37 cm long, 2–4 mm wide, glabrous to scabrous, ribbed on the lower surface; upper surface deeply ribbed, with short stiff hairs on the ribs. Panicle erect, sparse, to 37 cm long, with 1–3 branches per node, the branches to 14 cm long; pedicels to 2 cm long. Spikelets 8–14(–17) mm long with 2–5(–6) bisexual cleistogamous and/or chasmogamous florets. Glumes 2, unequal, green (often purple in the

centre) with hyaline margins; lower glume acute, broad-lanceolate to lanceolate, 3–5-nerved, more or less glabrous, 3.8–6.3 mm long, 1.2–2.1 mm wide; upper glume acute, broad-lanceolate to lanceolate, 5–7-nerved, glabrous, (4.6–)6.4–7.5 mm long, 1.7–3.0 mm wide. Lemma papillose to scabrous with very short stiff hairs along the centre, 5.9–8.4 mm long, apex appearing constricted, 2(–4)-toothed, teeth 0.26–0.36 mm long. Awn arising 25–35% of the lemma length from the tip, bent, twisted, scabrous or hispid, pale to dark purple-brown, 13.8–25.5 mm long, 0.23–0.41 mm wide at the base; column (2.5–)4.8–6.5(–8) mm long, bristle 9–17.5 mm long. Palea acute, 2-nerved, papillose, glabrous, keels ciliate, 78–92% of the length of the lemma. Lodicules 2, acute, membranous, glabrous, 1.3–2.35 mm long. Anthers of chasmogamous florets 1.3–2.3 mm long. Caryopsis yellow-brown, 2–3 mm long, glabrous; embryo 10–20% of the length of the caryopsis; hilum orange to red-brown, 35–45% of the caryopsis.

**DISTRIBUTION:** Southern New South Wales, Victoria and Tasmania. Floodplains and banks of inland rivers.

**SPECIMENS EXAMINED:** NEW SOUTH WALES: **Southern Tablelands:** Tumbarumba, *McBarron 4303*, 27.12.1949 (NSW). **South Western Slopes:** Glenfalloch nr. Billabong, *Black 1225.000(17)*, 7.12.1936 (MEL); Tarrabandra, 6 miles [10 km] SE. of Gundagai, *McBarron 5282a* p.p., 8.11.1950 (NSW).

**VICTORIA:** **Region D:** 3–4 miles [5–6 km] SW. of Edenhope, *Swindley 1193*, 30.11.1962 (MEL). **Region E:** Lower Glenelg National Park, *Beaglehole 42563*, 29.12.1964 (MEL); Hawkesdale, *Williamson 2343*, –11.1904 (MEL); 21 km NE. of Portland, 38° 15'S 141° 48'E, *Crisp 6879*, 17.11.1980 (MEL); Port Fairy, *Whan NSW 150493*, – (NSW); Portland, *Williamson NSW 150492*, –11.1901 (NSW), *Beaglehole 598*, –12.1945 (MEL), *42479*, –11.1947 (MEL, AD). **Region K:** Port Campbell National Park, *Beaglehole 21481 & Finck*, 29.10.1966. **Region M:** Ravenswood, –, 27.11.– (MEL 100588), *Bissell*, – (MEL 100585). **Region R:** ± 7½ miles [12 km] N. of Beechworth, *Beaglehole 43808 & Cameron*, 8.12.1973 (MEL). **Region S:** Mansfield, *Black 1225.000 (21)*, 27.11.1940 (MEL), *1225.000 (18)*, *1225.000 (19)*, 17.11.1940 (MEL); *Black*, 19.11.1940 (MEL 100580). **Region Z:** 6 miles [10 km] E. of Orbost, *Beaglehole 31277A*, 26.10.1969 (MEL, BRI).

**TASMANIA:** Barnbougle, near Bridport, *Carpenter MP23*, 8.1.1979 (Tas. Ag. Dept. Herb.); Trial Harbour, *Morris 81179*, 2.12.1981 (Tas. Ag. Dept. Herb.); Apsley Marshes, *Morris 8238*, 31.1.1982 (Tas. Ag. Dept. Herb.).

## 2. *Amphibromus recurvatus* Swallen, Amer. J. Bot. 18: 415 (1931); Morris, Victorian Naturalist 51: 147 (1934).

**HOLOTYPE:** as cited '... Broad River Valley National Park, Tasmania, in February, 1929, by R. A. Black (no. 1225)' (US 1447361!).

There appear to be two duplicates of this collection in MEL, one in NSW and a fragment of the Holotype in MEL. There is a note written by R. A. Black attached to one of the MEL duplicates (MEL 100632) — 'This portfolio, with others, was sent to Prof. A. S. Hitchcock of the Smithsonian Institution, Washington, D.C., U.S.A. who passed it on to Mr Jason Swallen who gave me, wrongly, credit for having collected this new sp.'. This specimen is labelled as collected by L. Rodway in Feb. 1919, and has an R. A. Black Herbarium no. of 1225.002 (1) (the number 1225 being Black's genus number for *Amphibromus*). MEL 100633 and the specimen in NSW bear similar label information to MEL 100632. MEL 100526, a fragment of the Holotype, has the collector as 'L. Rodway per R. A. Black (Black 1225)' and the date as 'ii.1929'.

There are two errors in the original citation of the Type, (i) crediting the collection to Black instead of Rodway and, (ii) the year of collection as 1929 instead of 1919.

Caespitose perennial to 1.5 m tall. Culms erect, terete to flattened, 1–1.5 mm wide, ribbed, glabrous, sometimes sparsely scabrous. Nodes 3–5, glabrous, exerted, 60–95% of the width of the culm. Basal sheath glabrous to with scattered minute hairs, lightly ribbed, 3–7 mm wide. Upper sheath glabrous to slightly scabrous, ribbed, (3–)4–7 mm wide. Ligule membranous, long-

acute, 7–11 mm long. Blade linear, flat to loosely rolled, to 30 cm long, 2–3 mm wide, more or less glabrous, lightly to moderately ribbed on lower surface, scabrous and deeply ribbed on upper surface. Panicle erect, frequently purple-tinged, contracted, to 20 cm long, with 2 or 3 branches per node, the branches to 6 cm long; spikelets on hispid pedicels to 1 cm long; main axis scabrous and terete below, becoming hispid and angular towards the apex; branches angled and hispid. Spikelets 7–11 mm long with 4–6 bisexual florets (only chasmogamous florets found). Glumes 2, subequal, green, frequently tinged with purple, tips and margins hyaline; lower glume acute to acuminate, 1–3-nerved, glabrous except for sparsely scabrous midrib, 3.3–5.5 mm long, 1.3–2.0 mm wide; upper glume acute, elliptical, 3–5-nerved, more or less glabrous, 4.0–5.4 mm long, 1.5–2.0 mm wide. Lemma densely hispid, 4.0–5.2 mm long, 5–7-nerved; apex 4-toothed, teeth more or less equal or outer teeth slightly shorter, 0.43–1.0 mm long, purple veins extending to the teeth. Awn arising 35–45(–50)% of the lemma length from the tip, bent, scarcely twisted, hispid, 9–18 mm long, 0.15–0.28 mm wide at the base, pale brown to purple-brown; column 3.3–5.5 mm long; bristle 5–13 mm long. Palea acute, 2-nerved, papillose, top half glabrous to more often sparsely hispid, 70–95% of the length of the lemma, keels ciliate. Lodicules 2, acute, membranous 0.8–1.3 mm long, glabrous or with few short hairs at apex. Anthers 1.2–2.0 mm long. Caryopsis yellow-brown, 1.8–2.3 mm long, glabrous; embryo 10–30% of the length of the caryopsis; hilum linear, red-brown, 20–35% of the length of the caryopsis.

**DISTRIBUTION:** Wetter areas of southern Victoria, Tasmania and south-eastern South Australia.

**SPECIMENS EXAMINED:** VICTORIA: **Region D:** 13¼ miles [22 km] NW. of Dergholm, *Beaglehole* 37997, 1.12.1971 (MEL, BRI); 9 miles [14 km] NNW. of Dergholm, *Beaglehole* 37988, 29.11.1971 (MEL); 4 miles [6 km] ENE. of Dergholm, *Beaglehole* 38013, 7.12.1971 (MEL); Grampians, *Beaglehole* 30299, 18.1.1969 (MEL, NSW). **Region E:** 21 km NE. of Portland, 38° 15'S 141° 48'E, *Crisp* 6880, 17.12.1980 (MEL); Kentbruck area, *Beaglehole* 5896, 18.12.1963 (MEL, AD, NSW); *Beaglehole* 43342, c. 1950 (MEL); Portland, *Beaglehole* 42478, –.11.1947 (MEL, AD), 571, –.3.1946, s.n., spring 1947 (MEL 100635). **Region H:** East Wingan Track, *Beaglehole* 32726, 23.12.1969 (MEL). **Region K:** 1¼ km SSE. of Colac, *Beaglehole* 44282, 15.3.1974 (MEL); 16 km WSW. of Timboon, *Beaglehole* 61842, 29.11.1978 (MEL). **Region N:** Prestons River, *Mueller*, 5.12.1877 (MEL 100630). **Region P:** French Island, *Beaglehole* 38284, 6.5.1972 (MEL). **Region T:** 17.5 km NE. of Yarram, *Beaglehole* 62525, 14.12.1978 (MEL). **Region W:** Orbost, *Grove* 1200, –.2.1905 (NSW).

TASMANIA: nr. point of Rocky Cape, *Willis*, 4.1.1967 (MEL 100639); Derwent Bridge, *Blake* 18353, 19.1.1949 (BRI); Lake St Clair, *Willis*, 6.1.1977 (MEL 521281); Broad River Valley, *Rodway*, (R. A. Black 1225.002(1)) –.2.1919 (NSW, MEL 100526, 100632, 100633); Lake Seal, *Carolin* 1590, 27.1.1960 (NSW); S. Bruny, *Black* 320, 30.12.1921 (MEL, AD).

SOUTH AUSTRALIA: **South-eastern:** c. 2.5 km NW. of Wandilo Railway Station, *Wilson* 695, 10.12.1966 (AD); Dismal Swamp, *Tate*, 22.11.1882 (AD 97506374); 3 miles [5 km] W. of Lake Leake, *Beaglehole* 6572 & *Kraehenbuehl*; between Mt McIntyre and Mt Burr, *Tate*, –.1882 (MEL 100634, AD 97506374); Marshs Swamp, between Glencoe and Mt Burr, *Wilson* 816, 6.1.1968 (AD).

### 3. *Amphibromus nervosus* (J. D. Hook.) Druce, Rep. Bot. Exch. Club Brit. Isles 1916: 604 (1917)

**BASEONYM:** *Danthonia nervosa* J. D. Hook., Fl. Tasm. 2: 121, pl. 163A (1858). Hooker based his combination on the illegitimate *Avena nervosa* R. Br. and cited two Gunn specimens (995 and 1493) as well; Gunn 995 is true *A. neesii* and Gunn 1493 is *A. macrorrhinus*.

Druce based his combination on the illegitimate name *Avena nervosa* R. Br. (1810) but, as he also refers to *Danthonia nervosa* J. D. Hook. (1858) it can be argued (N. Taylor pers. comm.) that this is a case of bibliographic error (Art. 33. ICBN) and that the combination *Amphibromus nervosus* (J. D. Hook.) Druce is valid. Druce included *Amphibromus neesii* Steud. in his synonymy and so *A. nervosus* Druce (Art. 72 ICBN) would be regarded as a superfluous name unless interpreted as being based on the legitimate name *Danthonia nervosa* J. D. Hook. *D. nervosa* was also based on the illegitimate name *Avena nervosa* R. Br. and so the type of *Amphibromus nervosus* (J. D. Hook.) Druce is the same as the type of *Avena nervosa* R. Br.



LECTOTYPE (here designated): R. Brown, Iter Austral. 1802-5 (BM! 2 sheets). The sheet numbered 6222 with the original plant labels is the better specimen and is designated the Lectotype.

SYNONYMS: *Avena nervosa* R. Br., Prodr. 1:178 (1810), *nom illeg.*, non Lamk. 1791.

We have labelled many specimens of this species with the manuscript name *Amphibromus morrisii*. These determinations should be altered to *A. nervosus* (J. D. Hook.) Druce.

Caespitose perennial (occasionally rooting at the nodes), to 1.25 m tall. Culms erect, flattened to terete, 1-3 mm wide, lightly ribbed, glabrous to slightly scabrous. Nodes 2-5, glabrous, exserted, 65-80% of the width of the culm. Basal sheath glabrous, lightly ribbed, 3-9(-13) mm wide. Upper sheath glabrous to slightly scabrous, ribbed, 1.5-5.5 mm wide. Ligule membranous, acute, 10-20 mm long. Blade linear, flat to inrolled, to 30 cm long, 1.5-3.5 mm wide; upper surface scabrous, deeply ribbed; lower surface glabrous to scabrous, moderately ribbed. Panicle erect, contracted, incompletely exserted, to 40 cm long with 2-4 branches per node, the branches to 15 cm long; pedicels scabrous, to 2 cm long. Spikelets 10-16 mm long, with 4-6 bisexual cleistogamous and/or chasmogamous florets. Glumes 2, unequal to subequal, pale, glabrous, acute; lower glume broad-lanceolate, 1-3(-5)-nerved, (2.6-)3.4-5.0(-5.5) mm long, 0.9-1.7 mm wide; upper glume broad-lanceolate, 3-5-nerved, (3.1-)4.5-6.2(-6.7) mm long, (1.0-)1.5-2.3 mm wide. Lemma scabrous, 5.0-7.2 mm long, (5-)7-nerved; apex 2-toothed, usually with 2 smaller lateral teeth or notches, sometimes 4-toothed. Inner teeth (0.25-)0.3-0.65(-1.05) mm long. Awn arising 40-55(-60)% of the lemma length from the lemma tip, bent, twisted, scabrous, 12.0-22.0 mm long, 0.15-0.28 mm wide at base, pale, rarely to dark purple-brown; column 4.0-8.5 mm long, bristle 7.0-15 mm long. Palea acute, 2-nerved, glabrous, smooth to papillose, keels ciliate, 75-95% the length of the lemma. Lodicules 2, acute to obtuse, membranous, glabrous, 0.95-1.3 mm long. Anthers of chasmogamous florets linear, 2.2-3.0 mm long; anthers of cleistogamous florets 0.28-1.4 mm long. Caryopsis yellow-brown, 1.36-2.15 mm long, glabrous; embryo 16-30(-40)% the length of the caryopsis; hilum linear, reddish brown, 25-50% the length of the caryopsis.

This is the most common species on the mainland and is the species previously identified with *A. neesii*. *A. nervosus* can be distinguished from *A. neesii* by its awn, which arises from lower on the back of the lemma, the usually more scabrous lemma and the broader lemma apex.

DISTRIBUTION: Widespread on the floodplains and banks of inland rivers of southern mainland Australia.

SELECTED SPECIMENS: NEW SOUTH WALES: **Central Coast:** Richmond, *Carne* NSW 108963, 6.11.1910 (NSW), *Greenwood* 420, -8.1910 (NSW); Doonside, *Coveny* 948, 9.2.1969 (NSW); Homebush Bay, *Vickery* NSW 108965, 29.9.1965 (NSW); Flemington, *McBarron* 17968, 27.9.1969 (NSW); Cabramatta, *Woolfs*, -1870 (MEL 100595); Glenfield, *McBarron* 11498, 6.11.1965, 11667, 17.12.1965, *NSW* 108861, -10.1964 (NSW); Narellan, *McBarron* 14517, 22.10.1967 (NSW); Camden, *Vickery* NSW 17957, 29.10.1934 (NSW); Campbelltown, *McBarron* 18326, 1.11.1969 (NSW); 'apud Portum Jackson', *Brown* 149, - (BM, photo NSW). **Northern Tablelands:** Glen Innes, *Vickery* 90, 30.12.1934 (NSW); *Breakwell* NSW 108924, -11.1914 (NSW); South Guyra, *McKie* 630, - (BRI); Booroolong, *Lapinpuro* 71 & *Atherton*, -1.1983 (NSW). **Central Tablelands:** Fish River, c. 15 km SW. of Oberon, *Lapinpuro* 67 & *Jacobs*, 30.11.1982 (NSW). **Southern Tablelands:** Gunning to Goulburn, *Mair* NSW 108867, 26.11.1950 (NSW); Canberra, *Vickery* NSW 17946, 15.11.1931 (NSW); Black Mountain, *Gauba* CBG 003934, 19.11.1952 (NSW); Lyneham, *Pullen & Gray* 4313, 25.11.1968 (NSW, AD); Tharwa, *Blake* 7535, 2.2.1935 (BRI); Talbingo, *Newman* 64, 17.11.1952 (NSW); Tumberumba, *McBarron* 4302, 27.12.1949 (NSW); 10 km S. of Tumberumba, *Lloyd* NSW 108864, 26.11.1980 (NSW); Cooma to Nimmitabel, *Maiden* NSW 108923, -12.1896 (NSW). **North Western Slopes:** Terry Hie Hic, *McBarron* 15822, 20.9.1968 (NSW); Narrabri, *Breakwell* NSW 108919, -10.1912 (NSW); Coonabarabran, *Failes* NSW 108918, -11.1901 (NSW). **Central Western Slopes:** Gilgandra district, *Taylor* NSW 108913, -10.1956 (NSW); Dubbo-Nyngan, *Blakely* 55, -10.1912 (NSW); Tullamore, *Hill* NSW 108914, 22.10.1963 (NSW); Harvey Ranges, Peak Hill,

*Boorman NSW 108916*, -11.1905 (NSW); Dilga, Cumnock, *Donnelly 16*, -12.1909 (NSW); Lachlan River, *Mueller*, -9.1878 (MEL 100627); Grenfell, *Sangster 2*, 25.10.1939 (NSW); Temora, *Dwyer 946*, -11.1916 (NSW, BRI 176749); Narrandera, per Goldsbrough & Mort *NSW 108910*, 30.11.1917 (NSW); Tarrabanda, 6 miles [10 km] SE. of Gundagai, *McBarron 5282*, 8.11.1950 (NSW); The Rock, *Paterson 6*, -10.1916 (NSW); Urangeline, *Newman NSW 108863*, 21.11.1955 (NSW); Henty, *McBarron 4245*, 9.12.1949 (NSW); 3 miles [5 km] S. of Henty, *Flynn NSW 108912*, 2.11.1970 (NSW); Little Billabong, *McBarron 889*, -12.1946 (NSW); Culcairn, *Forsyth NSW 108909*, -10.1900 (NSW); Holbrook, *McBarron 729*, 15.3.1947 (NSW, BRD); Culcairn to Germanton, *Forsyth NSW 108911*, -11.1900 (NSW); Albury, *McBarron 4628*, 30.4.1950, 21408, 1.1.1976 (NSW). **North Western Plains:** Moree to Bullarah, *Waterhouse 82*, 3.11.1956 (NSW); 25 km NW. of Nyngan, *Hone NSW 108871*, -9.1978 (NSW); Nyngan district, *Forbes NSW 108868*, - (NSW); Miandetta, *Thompson 1433*, 8.4.1976 (NSW); Mullengudgery, *Henderson NSW 108870*, 15.9.1950 (NSW); c. 40 miles [64 km] SW. of Cobar, Ivanhoe road, *Henderson NSW 108877*, 11.9.1950, *NSW 108878*, 18.9.1950 (NSW); Nevertire, *Helms NSW 108874*, -11.1892 (NSW). **South Western Plains:** Ivanhoe, *Bennett 28*, - (NSW, MEL 100570); Merrimajeel Creek (Murrumbidgeel Creek) 10 miles [16 km] from Booligal, Ivanhoe road, 33°29'S 144°54'E, *De Nardi 1010*, 15.10.1972 (NSW); Merriwagga-Gunbar road, *Green 61*, 21.9.1973 (NSW); Hay district, *Knowles NSW 108875*, 2.8.1949 (NSW); Hay, *McBarron 20949*, 24.9.1973 (NSW); Mirroo Creek, 34°28'S 145°55'E, *Jacobs 4495*, 12.12.1982 (NSW); 'Torrey Plains', W. of Maude, c. 34°31'S 144°04'E, *Jacobs 433*, 15.10.1972 (NSW); 35 km W. of Hay, Balranald road, *Jacobs 3460*, 21.11.1978 (NSW); Yanco, *McIntyre NSW 117389*, 5.1.1983 (NSW), *Breakwell NSW 108872*, -11.1913 (NSW); c. 13 km SE. of Yanco, Narrandera road, *Jacobs 4494*, 11.12.1982 (NSW); 'Zara', *Officer 217*, -12.1904 (NSW); environs of Jerilderie, *McBarron 20982*, 26.9.1973 (NSW); Finley, *Lacy NSW 108862*, 31.10.1979 (NSW); Berrigan district, *Crawford NSW 108922*, 15.12.1948 (NSW); Tulla, Barham district, *Henderson 96*, -9-11.1945, *Henderson NSW 108869*, 5.10.1945 (NSW); 5 miles [8 km] E. of Tocumwal, *Vickery NSW 108873*, 10.10.1949 (NSW). **South Far Western Plains:** Popiltah, *Stanley 2182*, -9.1979 (NSW); near Anabranch, Wentworth-Broken Hill road, *Henderson 486*, *NSW 137490*, 22.9.1950 (NSW).

VICTORIA: **Region A:** Hattah Lakes, *Beaughole 42480*, -10.1948 (MEL), *Anderson*, 15.8.1969 (MEL 100559). **Region B:** Wyperfeld National Park, *Beaughole 9735 & Landy*, 5.11.1960 (MEL), *Beaughole 29329 & Finch*, 13.10.1968 (MEL, NSW), *Beaughole 28500*, 18.9.1968 (MEL, AD). **Region C:** Dimboola Reservoir, *Beaughole 42481*, -10.1948 (MEL); Mitre Rock, N. of Mt Arapiles, *Beaughole 29879*, 28.11.1968 (MEL, AD). **Region D:** Grampians, *Sullivan 64*, -1893 (MEL); E. of Lake Mundi, *Swindley 1099*, 29.11.1962 (MEL); Brin Brin, Coleraine, *Phillips & Goode NSW 108866*, 11.11.1958 (NSW); Mt Napier, *Macpherson 87*, -1898 (MEL). **Region E:** Portland, -11.1887 (MEL 100586). **Region F:** Lake Powell, ± 16 km SE. of Robinvale, *Beaughole 56094*, 3.5.1977 (MEL). **Region H:** near Wycheproof, *Watts 589*, -10.1917 (NSW). **Region J:** Carisbrook, *Black 1225.000 (13)*, 18.11.1931 (MEL); Fiery Creek, *Mueller NSW 108865*, -1.1899 (NSW); Creswick, *Willis*, 4.12.1942 (MEL 100558). **Region K:** Colac district, *Lake*, 11.12.1978 (MEL 100640). **Region M:** 2 miles [3.5 km] NW. of Murchison, Rushworth road, *Muir 4643*, 7.11.1967 (MEL). **Region N:** Kilmore, *Meebold 21581*, -11.1936 (NSW); 'Alma Vale', Beveridge, *Black 1225.000 (4)*, 22.11.1935 (MEL); Werribee, 37°55'S 144°40'E, *St John*, 28.11.1900 (MEL 100568); Bamba Park, Mt Cotterell, 20 miles [32 km] SW. of Melbourne, *Melville 2054 & Todd*, 16.11.1952 (MEL). **Region R:** Boxwood, *Black 1225.001(2)*, 14.10.1935 (MEL); Greta, *Black 1225.000 (15)*, 20.12.1934 (MEL). **Region W:** ± ½ mile [1 km] NW. of Junction of Benambra-Snowy River road at Wulgulmerang, *Beaughole 33359*, *Rogers & Finch*, 7.11.1970 (MEL, NSW); Gippsland, *Campbell*, - (BRI 176754). **Region Z:** Cann River, *Wakefield 3304*, -1946 (MEL).

SOUTH AUSTRALIA: **Flinders Ranges:** Wilpena Pound, *Tate*, - (AD 97506373). **Murray:** above Overland Corner, *Tate*, -1.1884 (AD 97506366); W. of Braendlers main scrub, 35°10'S 139°05'E, *Spooner 7422*, 22.11.1980 (AD); Scorpion Springs Conservation Park, S. of Pinnaroo, *Symon 8768*, 24.10.1973 (NSW); Bucklands Park, *Brooks 3*, -11.1927 (MEL); Charleston scrub, Mt Lofty Range, *Spooner 2646*, 19.11.1972 (AD); Ascot, Adelaide, *Harris 76*, 25.10.1959 (AD); Mt Barker, *Cleland*, 23.11.1946 (AD 97219120); Reedbeds [Fulham, c. 8 km W. of Adelaide], *Tate*, 23.11.1879 (AD 97506375). **Kangaroo Island:** Vivonne Bay, *Black*, - (AD 97516124). **South-eastern:** Comaun, c. 20 km E. of Penola, *Hunt 1653*, 10.11.1963 (AD); c. 2.5 km N. of Wandilo Railway Station, *Wilson 670*, 5.11.1966 (AD).

WESTERN AUSTRALIA: **Irwin:** 30 miles [48 km] E. of Geraldton, *Long 87*, 19.9.1960 (PERTH). **Avon:** Ninghan, *Gardner 12052*, 18.8.1953 (PERTH); 6 miles [10 km] E. Ballidu, *Royce 1202*, 10.10.1946 (PERTH); Trayning, *Bull*, -11.1965 (PERTH); Baandee, *Kay*, -10.1966 (PERTH); Waeel, W. of Cunderdin, *Gardner 6512*, 22.10.1943 (PERTH); N. of Muntadgin, *Bailey 248*, -9.1947 (PERTH); near Highbury, *Gardner 6551*, 26.10.1943 (PERTH). **Eyre:** Cape Le Grand National Park, 33°57'S 122°13'E, *Cranfield*, 19.11.1979 (PERTH); Thomas River, Cape Arid National Park, E. of Esperance, *Royce 9985*, 2.12.1971 (PERTH). **Roe:** 5 miles [8 km] NE. of Hyden, *Royce 7839*, 27.7.1963 (PERTH); Popanyinning, *Sedgwick*, -1924 (PERTH); Kulin, *King*, 15.10.1930 (PERTH); Pallarup Rocks, SE. of Lake King, *George 1544*, 13.10.1960 (PERTH); Cowalleup Rocks, *Newbey 4586*, 11.11.1974 (PERTH). **Darling:** Northam district, *Bailey 6/39*, -9.1945 (PERTH); Busselton, *Royce 5173*, 3.11.1955 (PERTH); Bridgetown, *Walter*, -6.1923 (PERTH); Tweed River, *Oldfield 667*, (MEL 100590, 100592); N. of Stirling Range, *Mueller*, -10.1867 (MEL 100597, 100598); Stirling Range, *Mueller*, -10.1867 (MEL 100596).



#### 4. *Amphibromus whitei* C. E. Hubbard, Kew Bull. 1941: 30 (1941).

HOLOTYPE: QUEENSLAND: **Maranoa District:** Roma, on edge of large fresh-water swamp, *White* 9580, 25.10.1933 (K! isotype BRI).

Caespitose perennial, to about 40 cm tall. Culms erect, more or less terete, 1.0–1.5 mm wide, lightly ribbed, glabrous. Nodes 2 or 3, glabrous, exserted, 65–80% of the width of the culm. Basal sheath glabrous, ribbed, 3–4.5 mm wide. Upper sheath glabrous, moderately ribbed, 1.5–2.0 mm wide. Ligule membranous, long-acute, 7–11 mm long. Blade linear, flat to inrolled, to 13 cm long, 1–1.5 mm wide; upper surface deeply ribbed, scabrous; lower surface moderately ribbed, slightly scabrous. Panicle contracted, incompletely exserted, to 12 cm long, with 3–4 branches per node, the branches to 6 cm long; pedicels to 1 cm long. Spikelets 7–10 mm long, with 4 or 5 bisexual florets (only cleistogamous florets seen). Glumes 2, lanceolate, glabrous, unequal, hyaline; lower glume 1-nerved, c. 2 mm long, < 1 mm wide; upper glume 3-nerved, c. 3 mm long, c. 1 mm wide. Lemma scabrous, c. 4 mm long, 7-nerved; apex 2–4-toothed, the lateral teeth shorter or poorly developed; inner teeth 0.2–0.4 mm long. Awn arising 45–46% of the lemma length from the lemma tip, bent, twisted, pale, scabrous, 11–14 mm long, 0.15 mm wide at the base; column 4.5–5 mm long; bristle 6.5–9 mm long. Palea acute, 2-nerved, more or less smooth, glabrous, 75–80% of the lemma length, keels ciliate. Lodicules 2, acute, membranous, glabrous, 0.4 mm long. Anthers of cleistogamous florets 0.23–0.26 mm long. Caryopsis pale yellow-brown, 0.8–1.2 mm long, glabrous; embryo 20% of the length of the caryopsis; hilum linear, reddish brown, 38% of the length of the caryopsis.

DISTRIBUTION: *A. whitei* is only known from the Type collection. It is very similar to *A. nervosus* but is distinguished by the shorter glumes and lemmas and the more scabrid lemma surface. The locality is well isolated, c. 500 km from the nearest locality of any other *Amphibromus* specimen, and further field studies are desirable to ascertain whether there are other populations of this taxon.

QUEENSLAND: **Maranoa:** Roma, *White* 9580, 25.10.1933 (K, BRI).

#### 5. *Amphibromus macrorhinus* S. W. L. Jacobs & L. Lapinpuro, sp. nov.

Differt a *A. neesii* lemmatibus plerumque scabrioribus, arista dorsali, apice lemmatis productiore magis chartaceoque.

HOLOTYPE: VICTORIA: On the Wangaratta road, 6 miles [10 km] from Whitfield, *T. B. Muir* 1682, 1.11.1960. Small tussocks, beside road in open position in flat farmland (NSW). Isotypes in MEL (100562) and AD (96734057).

Caespitose perennial to 1 m tall. Culms erect, terete to slightly flattened, 1–2.5 mm wide, ribbed, glabrous to slightly scabrous. Nodes 2–4, glabrous, exserted, 60–85% of the width of the culm. Basal sheath glabrous to slightly scabrous, lightly ribbed, 2.5–6 mm wide. Upper sheath glabrous to slightly scabrous, ribbed, 2–5.5 mm wide. Ligule membranous, long-acute, 6–17 mm long. Blade linear, flat to inrolled, to 25 cm long, 1.5–4 mm wide, glabrous to scabrous; lower surface ribbed, upper surface deeply ribbed with short stiff hairs on the ribs. Panicle erect, contracted to open, to 40 cm long, with 1–3 branches per node, the branches to 8 cm long; pedicels to 2 cm long. Spikelets 10–17 mm long, with 4 or 5 bisexual, cleistogamous and/or chasmogamous florets. Glumes 2, unequal to subequal, pale green with hyaline margins. Lower glume acute to acuminate, narrow lanceolate, 3–4-nerved, glabrous, 3.9–6.3 mm long, 1.3–1.6 mm wide; upper glume acute, lanceolate, 5-nerved, more or less glabrous, sometimes with some papillae especially along the veins, 4.2–7.0 mm long,

1.5–2.6 mm wide. Lemma very roughly papillose, the papillae concentrated on the lower half, less dense and concentrated along the nerves towards the apex, 5.3–7.9 mm long, 7-nerved; apex 4-toothed, the inner teeth 0.5–1.15 mm long, the outer teeth shorter, the nerves usually stopping short of the tooth apex. Awn arising 50–60% of the lemma length from the lemma tip, bent, slightly to moderately twisted, scabrous, 10–19 mm long, 0.18–0.28 mm wide at the base, pale green to darker brown; column 3.5–6.8 mm long; bristle 6.5–13.5 mm long. Palea acute, 2-nerved, slightly papillose on the back, glabrous, 65–95% of the length of the lemma, keels ciliate. Lodicules 2, acute, membranous, glabrous, 1.0–2.2 mm long. Anthers of chasmogamous florets linear, 2.7–3.0 mm long, of cleistogamous florets 0.5–0.8 mm long. Caryopsis yellow-brown, glabrous, 1.5–1.95 mm long; embryo 15–20% of the length of the caryopsis; hilum linear, red-brown, 30–40% of the length of the caryopsis.

*A. macrorhinus* is similar to *A. nervosus* but can be distinguished by the awn, which is inserted lower down, and the more drawn-out and chartaceous lemma apex.

The specific epithet is derived from the Greek for 'long-nosed' referring to the drawn-out chartaceous lemma apex.

**DISTRIBUTION:** Floodplains and banks of inland and coastal rivers of southern Australia, including Tasmania.

**SELECTED SPECIMENS:** NEW SOUTH WALES: **South Western Slopes:** 'Glenfalloch', Billabong, *Black 1225.003 (1)*, 7.12.1936 (MEL); Wallandool near Urangeline, *McBarron 5139*, 18.10.1950 (NSW); Holbrook, *McBarron 1264*, 14.12.1947 (NSW); Bulgandry, *McBarron 5100*, 16.10.1950 (NSW); 'Kywanna', Albury, *Black 1225.000 (16)*, 30.10.1937 (MEL); Murray River near Albury, *Wilson 28*, --, 1890 (MEL). **South Western Plains:** Yanco, *Ridley 17*, --, 8.1910 (NSW); *Breakwell NSW 117388*, --, 11.1913 (NSW); 34 miles [58 km] N. of Deniliquin, *Mulham 5535*, --, 9.1967 (NSW); Edwards River [Kyalite River], *Mueller*, --, 10.1875 (MEL 100591); Barham, *Vickery NSW 117390*, 12.10.1949 (NSW).

**VICTORIA:** **Region C:** Wimmera, *Guerin*, --, 1893 (MEL 100575); Mt Arapiles, *Beaglehole 16582*, 31.10.1964 (MEL); 25 miles [40 km] S. of Horsham, *Muir 1486*, 22.10.1960 (MEL). **Region H:** Mt Wycheproof, *Watts NSW 117387*, --, 10.1916 (NSW); Minyip, *Eckert 1*, 12.5.1899 (MEL 100572). **Region J:** Stawell, *Beaglehole 22006*, 17.11.1966 (MEL); near Lake Fyans, 11 miles [18 km] SW. of Stawell, *Muir 2687*, 3.11.1962 (MEL); Ararat, *Beaglehole 21712*, 16.11.1966 (MEL). **Region M:** Miepoll, *Black 1225.000 (11)*, 22.11.1934 (MEL); *Black 1225.003 (1)*, 15.11.1939 (MEL 100552, 100553). **Region R:** ± 6 miles [10 km] N. of Beechworth, *Beaglehole 43565*, 22.11.1973 (MEL); Eldorado, *Black 1225.001 (3)*, 10.11.1934 (MEL); Londrigan, *Black 1225.000 (5)*, *1225.000 (6)*, 9.11.1934 (MEL); Glenrowan West, *Black 1225.000 (14)*, 13.10.1935 (MEL); Benalla, *Black 1225.000 (1)*, 24.10.1932, *1225.000 (9)*, 13.11.1934 (MEL); Baddaginnie, *Black 1225.000 (3)*, 8.11.1935 (MEL); Wangaratta road, 6 miles [10 km] from Whitfield, *Muir 1682*, 1.11.1960 (NSW, MEL, AD). **Region S:** on the Mansfield road, 4 miles [6 km] from Jamieson, *Muir 1663*, 31.10.1960 (MEL). **Region Z:** Cann River, *Wakefield 2493*, --, 1946 (MEL).

**TASMANIA:** Formosa, *Gunn 1493*, --, 12.1845 (NSW); Folly Lagoon, Ross, *Curtis*, 26.11.1974 (Tas. Dept. Ag. Herb., NSW).

**SOUTH AUSTRALIA:** **Eyre Peninsula:** c. 3 km S. of Edillilie, *Alcock 2812*, 22.10.1969 (AD). **Yorke Peninsula:** Yorke Peninsula, *Tepper*, -- (MEL 100629). **Southern Lofty:** Millbrook Reserve, c. 20 km NE. of Adelaide, *Cleland*, 30.10.1963 (AD 96529012); Encounter Bay, *Cleland*, 3.11.1923 (AD 96809182). **South-eastern:** 12 miles [19 km] N. of Bordertown, *Beaglehole 42524 & Kraehenbuehl*, 6.11.1964 (AD); c. 20 km E. of Penola (37°16'S 140°57'E), *Alcock 37* (AD).

**WESTERN AUSTRALIA:** West Australia, *Drummond 978*, -- (MEL 100593, 100594).

## 6. *Amphibromus pithogastrus* S. W. L. Jacobs & L. Lapinpuro, sp. nov.

*A. neesii* affinis, sed nervis fuscatis et lobis longioribus apicis lemmatis, lemmate tumidiore, differt.

**HOLOTYPE:** Norway, via Oberon, *J. Vickery NSW 149945*, 26.1.1953. Moist situation, near swamp (NSW).

Caespitose perennial to 1 m tall, occasionally with corm-like swellings on lower nodes. Culms erect, terete to flattened, 1–2 mm wide, ribbed, glabrous. Nodes 2 or 3, glabrous, exserted, up to 80% of the width of the culm. Basal sheaths glabrous, ribbed, 3–6 mm wide. Upper sheath glabrous, ribbed, 3–6 mm wide. Ligule membranous, acute, 2–5 mm long. Blade linear, flat to inrolled, to 20 cm long, 1.5–5 mm wide, glabrous and lightly ribbed on the lower surface, glabrous to minutely scabrous and deeply ribbed on the upper surface. Panicle erect, contracted, to 25 cm long, with 2 branches per node, the branches to 8 cm long; spikelets on hispid pedicels less than 3 cm long. Spikelets 8–15 mm long with 2–6 bisexual florets (only cleistogamous florets found). Glumes 2, unequal, green with broad straw-coloured margins; lower glume acute, 3–5-nerved, more or less glabrous, 3.6–5.3 mm long, 1.4–2.3 mm wide; upper glume acute, elliptical, 5–7-nerved, more or less glabrous, 4.7–7.3 mm long, 2.2–3.6 mm wide. Lemma papillose, 5.6–7.5 mm long, 7-nerved, swollen; apex 4-toothed with 4 nerves extending to the membranous margins, the nerves dark-coloured near the apex; the 2 central teeth 0.3–0.65 mm long, the lateral teeth shorter and less clearly formed. Awn arising 25–35(–45)% of the lemma length from the lemma tip, bent and twisted, pale to darker along the bristle, 9–16 mm long, 0.15–0.26 mm wide at the base; column 3–5 mm long; bristle 6–11 mm long. Palea acute, 2-nerved, glabrous, 55–70% of the length of the lemma, keels ciliate. Lodicules 2, membranous, glabrous, 1.3–1.75 mm long, with a lateral notch. Anthers 0.6–1.5 mm long. Caryopsis 1.6–2.1 mm long, yellow-brown, glabrous; embryo 25–30% of the length of the caryopsis; hilum linear, dark red-brown, 40–50% of the length of the caryopsis.

Similar to *A. neesii* but differing in the dark-coloured nerves and longer lobes at the lemma apex, and the more swollen lemma.

The specific epithet is derived from the Greek for 'pot-bellied', in reference to the swollen lemma.

DISTRIBUTION: Seasonally swampy areas of New South Wales Tablelands and eastern Victoria.

SPECIMENS EXAMINED: NEW SOUTH WALES: **Northern Tablelands:** Armidale district, *Ingram NSW 149947*, –12.1938 (NSW); Moona Plains, *Crawford 276*, –12.1884 (MEL); Walcha district, *Crawford NSW 149946*, –6.1900 (NSW). **Central Tablelands:** Norway, *Vickery NSW 149945*, 26.1.1953 (NSW). **Southern Tablelands:** 'Gundowinga', Crookwell, –, – (NSW 117395). **South West Slopes:** Gundagai, *Palmer 27*, –11.1908 (NSW).

VICTORIA: **Region S:** Mansfield, *Black 1225.000 (20)*, 19.11.1940 (MEL).

## 7. *Amphibromus vickeryae* S. W. L. Jacobs & L. Lapinpuro, sp. nov.

Differt a *A. neesii* habitu robustiore, lemmatibus majoris, seta brevi in quoque lobo lemmatis quadrilobis terminanti.

HOLOTYPE: Western Australia: Darling: Beechboro, 3 miles [5 km] N. of Guildford, *Fitzgerald NSW 117393*. –12.1901 (NSW).

Caespitose perennial to 1 m tall. Culms erect, terete to flattened, 1–3 mm wide, moderately ribbed, glabrous. Nodes 4 or 5, glabrous, exserted; lower nodes swollen, to 20% wider than the culm; upper nodes sunken, to 85% the width of the culm. Basal sheath glabrous to very slightly scabrous, lightly ribbed, 7–11 mm wide. Upper sheath glabrous, moderately ribbed, 4.5–5.5 mm wide. Ligule membranous, acute to long-acute, glabrous, 9–12 mm long. Blade linear, flattened, to 35 cm long, 3–4 mm wide; lower surface glabrous, moderately ribbed; upper surface deeply ribbed, scabrous with prickles along the ribs. Panicle erect, contracted, exserted, to 15 cm long with 2 or 3 branches per node,

the branches to 5 cm long, becoming flexuose, pedicels to 1 cm long. Spikelets 8–11 mm long with 3 or 4 florets (only chasmogamous florets found). Glumes 2, unequal to subequal, acute, glabrous, pale with darker brown to purple midrib; lower glume lanceolate, 3-nerved, 3.2–3.4 mm long, 0.9–1.2 mm wide; upper glume broad-lanceolate, 5-nerved 3.6–4.0 mm long, 1.4–1.6 mm wide. Lemma densely papillose with prickle-hairs along nerves, otherwise glabrous, 5.0–5.5 mm long, 7-nerved; apex 4-toothed, the nerves of the teeth often dark in colour, extending into short bristles; the inner teeth including bristles 0.7–1.4 mm long, the outer teeth usually shorter. Awn arising 45–50% of the lemma length from the lemma tip, bent, twisted, scabrous, 10–12 mm long, 0.15–0.18 mm wide at the base, dark to pale; column 4–5 mm long; bristle 6–7.5 mm long. Palea acute, 2-nerved, glabrous, papillose, c. 80% of the length of the lemma, keels ciliate. Lodicules 2, membranous, glabrous, 0.98–1.12 mm long. Anthers of chasmogamous florets linear, 1.74 mm long. Caryopsis red-brown, 1.9 mm long; embryo c. 35% of the length of the caryopsis; hilum linear, dark brown, 30–35% of the length of the caryopsis.

Differs from *A. nervosus* in the more robust habit, the larger lemmas, the short bristle produced at the end of each of the four lemma lobes, and the more uniformly, finely hispid lemma back. These differences are particularly marked with respect to Western Australian specimens of *A. nervosus*. The lemma size of some specimens of *A. nervosus* from the eastern States approaches that of *A. vickeryae*, but the other differences hold.

This species epithet honours the late Dr Joyce Vickery, former botanist at the N.S.W. National Herbarium and acknowledged expert on Australian grasses.

DISTRIBUTION: Wet areas of coastal districts in the Darling region of Western Australia. Apparently rare (? extinct).

SPECIMENS EXAMINED: WESTERN AUSTRALIA: **Darling:** Beechboro, 3 miles [5 km] N. of Guildford, *Fitzgerald* NSW 117393, NSW 117394, –12.1901 (NSW).

## 8. *Amphibromus archeri* (J. D. Hook.) P. F. Morris, Victorian Naturalist 51: 146, pl. 26, 2–3 (1934).

BASIONYM: *Danthonia archeri* J. D. Hook., Fl. Tasm. 2: 122, pl. CLXIII. 1 (1858).

LECTOTYPE: Tasmania: Cheshunt, *Archer* 28 (K!, duplicate NSW). The Kew specimen bears three inflorescences and the base of a single plant plus some fragments in an attached packet. The base, central culm (without florets) and one lemma in the packet represent what has been known as *A. archeri*. These portions are here designated as the Lectotype. The two outer culms are of *A. neesii* and are part of *Gunn* 995, 1837, from Tasmania. The drawings on the specimen sheet have clearly been altered to produce a 'hybrid' drawing for plate CLXIII to accommodate the variation in lobe lengths of the different lemmas.

*A. archeri* var. *papillosus nomen nudum* P. F. Morris, Victorian Naturalist 51: 147 (1934). *A. archeri* varies in the degree of development of the papillae on the lemma surface. There does not appear to be any logical discontinuity in the variation of the development of the papillae. We consider that there is insufficient justification for recognizing subspecific taxa in *A. archeri*.

Caespitose perennial to 1.2 m tall, occasionally with corm-like swellings on the lower nodes. Culms erect,  $\pm$  terete, 1–3 mm wide, lightly to moderately ribbed, glabrous to scabrous. Nodes 2–4, glabrous, exserted, 70–95% of the width of the culm. Basal sheath glabrous, lightly ribbed, 4.0–7.5 mm wide. Upper sheath glabrous to scabrous, moderately ribbed, 3–6 mm wide. Ligule membranous, acute to long-acute, 4.5–12.5 mm long. Blade linear, flat to inrolled, to 32 cm long, 2.5–4 mm wide; lower surface glabrous to scabrous, moderately ribbed; upper surface deeply ribbed with short stiff hairs on the ribs.

Panicle erect, tardily exerted, spreading to contracted, to 35 cm long, with 2 or 3 branches per node, the branches to 15 cm long; pedicels to 2.5 cm long. Spikelets 12–18 mm long, with 3–7 bisexual, cleistogamous and/or chasmogamous florets. Glumes 2, unequal, glabrous, green with hyaline margins and often purple markings. Lower glume acute to acuminate, lanceolate, 3–5-nerved, 5.1–6.8 mm long, 1.5–2.2 mm wide; upper glume acute, elliptical-lanceolate, 5–7-nerved, 6.4–9.2 mm long, 2.0–3.2 mm wide, sometimes the central nerve excurrent. Lemma 6.0–7.8 mm long, more or less smooth to densely papillose or with tubercle-based prickle-hairs, 7-nerved; apex 4-toothed, the nerves of the teeth extending into the hispid bristles, often dark in colour; the inner teeth including bristles 2.7–3.8 mm long, the outer tooth-bristles usually shorter, or sometimes the outer bristles not developed. (The bristles may be occasionally fused, but separate easily.)AWN arising 30–45% of the lemma length from the lemma tip, bent, slightly to moderately twisted, scabrous, 14.5–17.5 mm long, 0.18–0.25 mm wide at the base, pale green to dark purple-brown; column 5.0–7.5 mm long; bristle 9–12 mm long. Palea acute, 2-nerved, glabrous, smooth to finely papillose on the back, 65–75% of the length of the lemma, keels ciliate. Lodicules 2, membranous, glabrous, 1.4–1.9 mm long. Anthers of chasmogamous florets linear, 2.3–3.4 mm long; of cleistogamous florets 0.5–0.65 mm long. Caryopsis yellow-brown, glabrous, 1.7–2.2 mm long; embryo 20–30% of the length of the caryopsis; hilum linear, red-brown, 30–35% of the length of the caryopsis.

DISTRIBUTION: Damp areas of southern Victoria, southern South Australia and Tasmania.

SPECIMENS EXAMINED: VICTORIA: **Region D:** S. of Glenislie Station, *Beaglehole* 29947, 6.12.1968 (MEL, BRI); E. of Dundas Range, *Beaglehole* 29932, 5.12.1968 (MEL); 22 km WSW. of Casterton, 37°39'S 141°11'E, *Corrick* 659, 18.11.1981 (NSW). **Region E:** S. of Greenwald, *Beaglehole* 6607, 1.1.1965 (MEL); Portland, *Beaglehole* 5035, -.11.1947 (MEL, BRI, AD); *Williamson NSW* 109174, -.12.1902 (NSW). **Region J:** Ararat, *Beaglehole* 21711, 16.11.1966 (MEL). **Region M:** Campaspe River, -, -.10.1875 (MEL 100567). **Region N:** Kilmore Junction, -, 10.11.1906 (MEL 100536). **Region P:** Beaconsfield, *P.R.H.S. & J.*, 6.12.1906 (MEL 100554); Cranbourne, *Willis*, 29.1.1971 (MEL 100533); 10 km NNW. of Anglesea, *Beaglehole* 63343, 17.1.1979 (MEL). **Region T:** Hazelwood, *Auchterlonie*, 1.12.1965 (MEL 100532); Leongatha South, *Bissett*, -.12.1962 (MEL 100531); 11 km SSW. of Yarram, *Beaglehole* 62402, 9.12.1978 (MEL, NSW). **Region Z:** 2.5 miles [4 km] W. of Genoa, *Beaglehole* 32795, 25.12.1969 (MEL, NSW); 4 miles [6 km] NE. of Genoa, *Beaglehole* 32834, 26.12.1969 (MEL); E. Wingan Road, *Beaglehole* 32715, 23.11.1969 (MEL); Mallacoota, *Beaglehole* 32883, 27.12.1969 (MEL), *Beaglehole* 32892 & *Finck*, 28.12.1969 (MEL).

TASMANIA: Rushy Lagoon, Gladstone, *Morris*, -.11.1975 (Tas. Dept. Ag. Herb.); Cheshunt, *Archer* 28, - (K, NSW); Derwent Bridge, *Vickery NSW* 109171, 19.1.1949 (NSW); South Port, *JH*, -.12.1855 (MEL 100547).

SOUTH AUSTRALIA: **Southern Lofty:** Adelaide Plains, *Cleland*, 7.11.1926 (AD 97219157); Charleston Conservation Park, 34°55'S 138°58'E, *Spooner* 6283, 1.1.1979 (AD); Belair, *Tate*, 24.11.1883 (AD 97506368); *Ising*, 26.11.1932 (AD 97701171); Mt Lofty Range National Park, *Cleland*, 26.11.1932 (AD 97219158), 14.11.1942 (AD 96809120), 9.10.1943 (AD 97219116), 13.10.1956 (AD 95711010); Mt Lofty Range, *Menzel*, -.11.1896 (BRI 176753); Aldgate, *Menzel*, -.12.1896 (AD 97506367); Blackwood, *Ising*, 31.10.1931 (AD 97415237); Meadows, *Donald*, 25.11.1936 (MEL 100548); Nixon Skinner Reserve, *Cleland*, 14.11.1964 (AD 966061130); Victor Harbor, *Cleland*, 30.12.1940 (AD 97219130); Jagers to Waitpinga, *Cleland*, 13.1.1936 (AD 97219102); Waitpinga, *Cleland*, 6.1.1940 (AD 97219156). **South-eastern:** 3 miles [c. 5 km] W. of Lake Leake, *Beaglehole* 6575 & *Kraehenbuehl*, 9.1.1965 (AD); between Glencoe and Mt Burr, *Wilson* 949, 23.11.1968 (AD).

## 9. *Amphibromus sinuatus* S. W. L. Jacobs & L. Lapinpuro, sp. nov.

*A. fluitanti* affinis sed lemmate longiore, parietibus cellularum epidermalis lemmatis sinuatis differt.

HOLOTYPE: Northern end of Llangothlin Lagoon, approx. 4.5 km E. of highway, 30°02'S 151°46'E. *Lapinpuro* 17, *Jacobs & Wilson*, 26.11.1982 (NSW).

A stoloniferous perennial to about 70 cm tall. Culms decumbent, terete to flattened, 0.8–2.0 mm wide, lightly ribbed, glabrous. Nodes 1–4, glabrous, exserted; the lower nodes sometimes swollen, up to 30% wider than the culm; the upper nodes 60–90% the width of the culm. Basal sheath glabrous, lightly ribbed, 3.5–6 mm wide. Upper sheath glabrous to scabrous, lightly to moderately ribbed 3–4 mm wide. Ligule membranous, acute to acuminate, 5–11 mm long. Blade linear, flat, to 17 cm long, 1–4 mm wide, scabrous; upper surface deeply ribbed, lower surface moderately to deeply ribbed. Panicle erect, becoming flexuose, incompletely exserted, to 21 cm long, with 2 or 3 branches per node, the branches to 11 cm long; pedicels to 2 cm long. Spikelets 12–19 mm long with 5 or 6 bisexual cleistogamous or chasmogamous florets. Glumes 2, unequal, pale, with darker nerves, glabrous; lower glume acute to acuminate, narrow-lanceolate to triangular, 1–3-nerved, (3.0–)3.7–4.5 mm long, 1.0–1.2 mm wide; upper glume acute, lanceolate to broad-lanceolate, 3–5-nerved, (3.9–)4.3–5.8 mm long, (1.2–)1.7–2.4 mm wide. Lemma scabrous with prickle-hairs especially along the nerves and towards upper half, 7-nerved, 6.2–8.2 mm long; apex 4-toothed with the outer teeth smaller and lower; inner teeth 0.5–1 mm long. Awn arising 35–50% of the lemma length from the lemma tip, straight, scarcely twisted, scabrous, 14–26 mm long, pale. Palea acute, 2-nerved, more or less smooth, glabrous, 75–95% of the lemma length, keels ciliate. Lodicules 2, acute, membranous, glabrous, 1.0–1.6 mm long. Anthers of chasmogamous flowers linear, 2.3–3.3 mm long; of cleistogamous flowers 0.5–0.7 mm long. Caryopsis yellow-brown, glabrous, 2.3–2.7 mm long; embryo 25–35% of the length of the caryopsis; hilum linear, darker yellow-brown to red-brown, 30–40% of the length of the caryopsis.

The specific epithet describes the sinuate margins of the epidermal cells of the lemma.

**DISTRIBUTION:** Eastern New South Wales and Victoria, in cold areas with permanent swamps; aquatic. Now apparently uncommon as the few habitats that are apparently suitable are grazed by stock.

**SPECIMENS EXAMINED:** NEW SOUTH WALES: **Nothern Tablelands:** northern end of Llangothlin Lagoon, c. 4.5 km E. of highway, 30°02'S 151°46'E, *Lapinpuro 17, Jacobs & Wilson*, 26.11.1982 (NSW); Walcha district, *Crawford NSW 117397*, -. (NSW).

**VICTORIA: Region D:** Kaladbro Swamp, 37°40'S 140°59'E, *Corrick 625*, 25.11.1980 (NSW); WSW of Casterton and S. of Lake Mundi, *Corrick 664*, 20.11.1981 (NSW). **Region V:** Emu Flat, East Gippsland, *Beaglehole 35929*, 9.1.1971 (MEL). **Region Z:** Bendock–Lower Bendock road, *Beaglehole 34888*, 25.11.1970 (MEL, BRI).

## 10. *Amphibromus fluitans* Kirk, Trans. & Proc. New Zealand Inst. 16: 374 (1884)

**HOLOTYPE:** [New Zealand] 'Hab. North Island: in shallow waters, margins of Waihi Lake and Creek' (CHR? dupl. K, US).

**SYNONYM:** *Amphibromus gracilis* P. F. Morris, Victorian Naturalist 51: 145 (1934). **LECTOTYPE** (here designated): near Melbourne (towards Yarra at Kew), *Dakin s.n.*, 6.2.1934 (MEL 100528). There are four specimens at MEL that appear to be all part of the Type collection (MEL 100527, 100528, 100529, 100530). MEL 100527 does not have the locality information on the label ('near Melbourne (towards Yarra at Kew)') and seems to have been the specimen forwarded to Hubbard for comment (Morris, 1934). MEL 100528 has the original label, is a good specimen, and fits the original description. MEL 100529 and 100530 have labels photocopied from MEL 100528. We here designate MEL 100528 as the Lectotype of *Amphibromus gracilis* P. F. Morris. There is a duplicate in BRI (008006) of this collection.

A stoloniferous ( $\pm$  rhizomatous) perennial to c. 75 cm tall. Culms decumbent, more or less terete, 0.5–1.5 mm wide, ribbed, glabrous to scabrous. Nodes 3–5, glabrous, exserted, 60–85% the width of the culm. Basal sheath



slightly scabrous, ribbed, 2–6 mm wide. Upper sheath scabrous, deeply ribbed, 2–4.5 mm wide. Ligule membranous, acute to long-acute, 6.5–12 mm long. Blade linear, flat to inrolled, to 25 cm long, 2–4.5 mm wide, scabrous, upper surface deeply ribbed, lower surface moderately ribbed. Panicle erect, contracted, incompletely exerted, to 35 cm long, with 2 or 3 branches per node, the branches to 8.5 cm long; pedicels scabrous to hispid, to 2 cm long. Spikelets 9–15 mm long, with (5–)6–10(–12) bisexual, cleistogamous or chasmogamous florets. Glumes 2, unequal, with broad membranous margins, glabrous; lower glume narrow-lanceolate, 1–3-nerved, 2.7–3.7 mm long, 0.7–1.4 mm wide; upper glume broad-lanceolate, 3–5-nerved, 3.4–4.5 mm long, 1.1–1.7 mm wide. Lemma scabrous to hispid, 3.7–5.0 mm long, (5–)7-nerved; apex 2-toothed, teeth 0.3–0.6 mm long. Awn arising 40–55(–60)% of the lemma length from the tip (adhering from the first 1 mm), straight, not twisted (or scarcely so), scabrous, 11–17 mm long, pale-coloured. Palea acute, 2-nerved, smooth, glabrous, 30–75% of the length of the lemma, keels ciliate. Lodicules 2, acute, membranous, glabrous, 0.9–1.23 mm long. Anthers of chasmogamous florets linear, 1.48–1.70 mm long; of cleistogamous florets 0.5 mm long. Caryopsis yellow-brown, 1.3–1.7 mm long, glabrous; embryo 10–20% of the length of the caryopsis; hilum linear, reddish-brown, 25–30% of the length of the caryopsis.

**DISTRIBUTION:** Southern New South Wales, Victoria and Tasmania, mostly in permanent swamps. Now apparently uncommon as many suitable habitats are grazed by stock.

**SPECIMENS EXAMINED:** NEW SOUTH WALES: **South Western Slopes:** Ettamogah, *McBarron* 2955, 9.1.1947 (NSW); Howlong road, Albury, *McBarron* 1670, 14.4.1948 (NSW); Albury, *McBarron* 4351, 13.1.1950, 4372, 15.12.1949 (NSW).

**VICTORIA:** **Region D:** near the Grampians, *Sullivan*, --.1893 (MEL 100555); Casterton, *Graham*, 20.1.1965 (MEL 100556). **Region N:** near Melbourne (towards Yarra at Kew), *Dakin*, 6.2.1934 (MEL 100527, 100528, 100529, 100530, BRI 008006). **Region R:** near Bright, *Cleland NSW* 150490, --.1.1913 (NSW). **Region T:** 4 km W. of Gelliondale, *Beaulehole* 62417, 10.12.1978 (MEL). **Region U:** Walwa, *McBarron* 1257, 5.12.1947 (NSW). **Region V:** 11 km S. of Spring Creek bridge on Tallangatta to Yabba road, *Scarlett* 81–38, 22.1.1981 (NSW, BRI).

**TASMANIA:** near Horton Hill, *Morris* 79108, 14.2.1979 (HO).

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