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RESEARCH ARTICLE

New combinations in *Pentapogon* for Aotearoa / New Zealand taxa earlier placed in *Deyeuxia* (*Poaceae*)

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Abstract. New combinations in *Pentapogon* R.Br. (*Poaceae*) are provided for three endemic Aotearoa / New Zealand species earlier placed in *Deyeuxia* Clarion ex P.Beauv.: *Pentapogon aucklandicus* (Hook.f.) de Lange & L.M.H.Schmid, comb. nov. (*Deyeuxia aucklandica* (Hook.f.) Zotov), *P. lacustris* (Edgar & Connor) de Lange & L.M.H. Schmid, comb. nov. (*D. lacustris* Edgar & Connor), and *P. youngii* (Hook.f.) de Lange & L.M.H.Schmid, comb. nov. (*D. youngii* (Hook.f.) Buchanan). These three species were omitted from a recent treatment of *Pentapogon* proposed by Peterson et al. (2022) in which other Australasian *Deyeuxia*, *D. avenoides* (Hook.f.) Buchanan, *D. densa* Benth., *D. frigida* F.Muell. ex Benth., *D. gunniana* (Nees) Benth., *D. quadriseta* (Labill.) Benth., *D. scaberula* Vickery, and *D. valida* (Vickery) Weiller, were transferred to *Pentapogon*.

Keywords: *Deyeuxia*, *Echinopogoninae*, *Pentapogon*, *Pentapogon aucklandicus*, *Pentapogon lacustris*, *Pentapogon youngii*, *Poaceae*, Aotearoa / New Zealand, new combinations

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Introduction

There is a long history of treating *Deyeuxia* Clarion ex P.Beauv. within *Calamagrostis* Adans. (Tzvelev, 1976; Clayton, Renvoize, 1986; Soreng, Greene, 2003), or separating the two genera (Watson, Dallwitz, 1992; Edgar, 1995; Lu, Phillips, 2006; Lu et al., 2006; Kellogg, 2015). Molecular DNA data have helped to resolve this taxonomic tangle such that Soreng et al. (2015, 2017), Saarela et al. (2017), Peterson et al. (2022), treated *Deyeuxia* s. str. in synonymy within *Calamagrostis* (subtribe *Agrostidinae*). Although the type and most Northern Hemisphere taxa of *Deyeuxia* are now treated in *Calamagrostis* s. str., *Calamagrostis* s. l. has proven to be polyphyletic. Peterson et al. (2019) transferred most of Latin American species (earlier often treated in *Deyeuxia* or *Calamagrostis*) mostly to *Cinnagrostis* Griseb. (subtribe *Aveninae*), while some were retained in *Calamagrostis* or transferred to other genera, and a few remained unplaced there. Yet the classification of Australasian species has received little attention. The treatment by Saarela et al. (2017) revived the following names for indigenous Aotearoa / New Zealand *Deyeuxia*; *Calamagrostis avenoides* (Hook.f.) Cockayne (for *Deyeuxia avenoides* (Hook.f.) Buchanan), *C. quadriseta* (Labill.) Spreng. (for *D. quadriseta* (Labill.) Benth.), *C. youngii* (Hook.f.) Buchanan (for *Deyeuxia youngii* (Hook.f.) Buchanan). However, combinations in *Calamagrostis* were not provided for *Deyeuxia aucklandica* (Hook.f.) Zotov and *D. lacustris* Edgar & Connor.

With respect to *Deyeuxia avenoides*, Murray et al. (2005) observed that accessions of this Aotearoa / New

Table 1. **Summary of accepted names in *Pentapogon* for Australasian species earlier placed in *Dichelachne* and *Deyeuxia***

Names in Australasian *Dichelachne* and *Deyeuxia*	Combinations in *Pentapogon*
***Deyeuxia* Clarion ex P.Beauv.**	
Deyeuxia aucklandica (Hook.f.) Zotov	*Pentapogon aucklandicus* (Hook.f.) de Lange & L.M.H.Schmid
Deyeuxia avenoides (Hook.f.) Buchanan	*Pentapogon avenoides* (Hook.f.) P.M.Peterson, Romasch. & Soreng
Deyeuxia brassii (Hitchcock) Jansen	*Pentapogon brassii* (Hitchcock) P.M.Peterson, Romasch. & Soreng
Deyeuxia densa Benth.	*Pentapogon densus* (Benth.) P.M.Peterson, Romasch. & Soreng
Deyeuxia frigida F.Muell. ex Benth.	*Pentapogon frigidus* (F.Muell. ex Benth.) P.M.Peterson, Romasch. & Soreng
Deyeuxia gunniana (Nees) Benth.	*Pentapogon gunnianus* (Nees) P.M.Peterson, Romasch. & Soreng
Deyeuxia lacustris Edgar & Connor	*Pentapogon lacustris* (Edgar & Connor) de Lange & L .M.H. Schmid
Deyeuxia quadriseta (Labill.) Benth.	*Pentapogon quadrisetus* (Labill.) P.M.Peterson, Romasch. & Soreng
Deyeuxia scaberula Vickery	*Pentapogon scaberulus* (Vickery) P.M.Peterson, Romasch. & Soreng
Deyeuxia sclerophylla Stapf.	*Pentapogon sclerophyllus* (Stapf.) P.M.Peterson, Romasch. & Soreng
Deyeuxia suizanensis (Hayata) Owhi	*Pentapogon suizanesis* (Hayata) P.M.Peterson, Romasch. & Soreng
Deyeuxia valida (Vickery) Weiller	*Pentapogon validus* (Vickery) P.M.Peterson, Romasch. & Soreng
Deyeuxia youngii (Hook.f.) Buchanan	*Pentapogon youngii* (Hook.f.) de Lange & L.M.H.Schmid
***Dichelachne* Endl.**	
Dichelachne crinita (L. f.) Hook. f.	*Pentapogon crinitus* (L.f.) P.M.Peterson, Romasch. & Soreng
Dichelachne hirtella N.G.Walsh	*Pentapogon hirtellus* (N.G.Walsh) P.M.Peterson, Romasch. & Soreng
Dichelachne inaequiglumis (Hack. ex Cheeseman) Edgar & Connor	*Pentapogon inaequiglumis* (Hack. ex Cheeseman) P.M.Peterson, Romasch. & Soreng
Dichelachne lautumia Edgar & Connor	*Pentapogon lautumia* (Edgar & Connor) P.M.Peterson, Romasch. & Soreng
Dichelachne micrantha (Cav.) Domin	*Pentapogon micranthus* (Cav.) P.M.Peterson, Romasch. & Soreng
Dichelachne parva B.K.Simon	*Pentapogon parvus* (B.K.Simon) P.M.Peterson, Romasch. & Soreng
Dichelachne rara (R.Br.) Vickery	*Pentapogon rarus* (R.Br.) P.M.Peterson, Romasch. & Soreng
Dichelachne robusta B.K.Simon	*Pentapogon robustus* (B.K.Simon) P.M.Peterson, Romasch. & Soreng
Dichelachne sieberiana Trin. & Rupr.	*Pentapogon sieberianus* (Trin. & Rupr.) P.M.Peterson, Romasch. & Soreng

Zealand endemic had $2n = 70$ chromosomes and a DNA C-Value (2C) comparable to Aotearoa / New Zealand species of *Dichelachne* Endl. This observation prompted the late Aotearoa / New Zealand agrostologist Dr Henry Connor (see de Lange, 2016) to speculate (H.E. Connor *in litt*.) that *Deyeuxia avenoides* might be better placed in *Dichelachne* – a genus of nine currently recognized species (Peterson et al., 2022). This concept was not singular, Edgar and Connor (1999) had similar problems with an uncommon, threatened grass species of the northeastern portion of Te Wai Pounamu / South Island, Aotearoa / New Zealand, that had been known widely by the informal names *Deyeuxia* "Flaxbourne" and *D.* "Waima" (discussed in Cameron et al., 1995; Edgar, 1995; Edgar, Connor, 1999), and which they realised was also placed better in *Dichelachne*; a grass they named *Dichelachne lautumia* Edgar & Connor. Peterson et al. (2022) expanded the investigation of Saarela et al. (2017), concluding that *Dichelachne* and species of *Deyeuxia* from Australasia placed in *Calamagrostis* are better placed within an expanded *Pentapogon* (subtribe *Echinopogoninae*). In that paper combinations for *Dichelachne* in *Pentapogon* were made. However, the authors noted that they were unable to include a full sampling of those Australasian "*Calamagrostis*" previously included in *Deyeuxia* or which had been retained in *Deyeuxia* pending further study. As such combinations in *Pentapogon* were only made for species of *Dichelachne* and two of the five Aotearoa / New Zealand "*Deyeuxia*" (Table 1) and several other sampled Australasian species.

This left three endemic Aotearoa / New Zealand species of *Deyeuxia* (*Deyeuxia aucklandica*, *D. lacustris*, and *D. youngii*) without available combinations in *Calamagrostis* or *Pentapogon*. Discussions on the matter with one of the authors of Peterson et al. (2022), Robert Soreng (pers. comm., 22 February 2022), elicited the response that transferral of these three species to *Pentapogon* was justified considering their morphological similarity to other taxa of that genus, and available DNA, chromosome and C-Value (2C) evidence (Murray et al., 2005), and so this nomenclatural action is taken here.

New combinations

Pentapogon aucklandicus (Hook.f.) de Lange & L.M.H.Schmid, comb. nov.

Basionym: *Agrostis aucklandica* Hook.f., Bot. Antarct. Voy. 1 (Fl. Antarct.): 96 (1845) ≡ *Deyeuxia aucklandica* (Hook.f.) Zotov, Rec. Domin. Mus. (Wellington) 5: 139 (1965).

Pentapogon lacustris (Edgar & Connor) de Lange & L.M.H.Schmid, comb. nov.

Basionym: *Deyeuxia lacustris* Edgar & Connor, New Zealand J. Bot. 37(1): 68 (1999).

Pentapogon youngii (Hook.f.) de Lange & L.M.H.Schmid, comb. nov.

Basionym: *Agrostis youngii* Hook.f., Handb. N. Zeal. Fl.: 330 (1864) ≡ *Deyeuxia youngii* (Hook.f.) Buchanan, Man. Grass. N. Zeal. (Addenda & Corrigenda, unnumbered page) (1880).

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A note added in proof (by Peter J. de Lange): This paper was written and submitted on the eve of the Russian invasion of Ukraine (24 February 2022). At the time we had no idea that this invasion would happen. It now has. Therefore, Luzie and I would like to acknowledge in print the strength of science communication during these difficult times, and especially the willingness and dedication of the editorial team of the *Ukrainian Botanical Journal* to work under such trying circumstances. We know of no other way to express our feelings over this unjustified war other than to continue to support this journal, its editorial team, and the Ukrainian people as they strive to weather the horrors to which that nation has been subjected. Kia kaha Ukraine! Arohanui.

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Реферат. Нові комбінації у роді *Pentapogon* R.Br. (*Poaceae*) запропоновані для трьох ендемічних для Нової Зеландії видів, які раніше включали до *Deyeuxia* Clarion ex P.Beauv.: *Pentapogon aucklandicus* (Hook.f.) de Lange & L.M.H.Schmid, comb. nov. (*Deyeuxia aucklandica* (Hook.f.) Zotov), *P. lacustris* (Edgar & Connor) de Lange & L .M.H. Schmid, comb. nov. (*D. lacustris* Edgar & Connor) та *P. youngii* (Hook.f.) de Lange & L.M.H.Schmid, comb. nov. (*D. youngii* (Hook.f.) Buchanan). Ці три види не були розглянуті у новій таксономічній ревізії роду *Pentapogon* (Peterson et al., 2022), у якій до *Pentapogon* були переведені інші австралазійські види *Deyeuxia*: *D. avenoides* (Hook.f.) Buchanan, *D. densa* Benth., *D. frigida* F.Muell. ex Benth., *D. gunniana* (Nees) Benth., *D. quadriseta* (Labill.) Benth., *D. scaberula* Vickery та *D. valida* (Vickery) Weiller.

Ключові слова: *Deyeuxia*, *Echinopogoninae*, *Pentapogon*, *Pentapogon aucklandicus*, *Pentapogon lacustris*, *Pentapogon youngii*, *Poaceae*, Нова Зеландія, нові комбінації