New names for New Zealand weeds

P.D. Champion¹, T.K. James² and M.I. Dawson³

¹NIWA, PO Box 11-115, Hamilton 3251, New Zealand

²AgResearch, Ruakura Research Centre, P. Bag 3123, Hamilton 3240, New Zealand

³Landcare Research, PO Box 40, Lincoln 7640, New Zealand

Corresponding author: p.champion@niwa.co.nz

Abstract There have been numerous changes in botanical names of New Zealand weeds and their assignment to plant families since the publication of the relevant Flora of New Zealand volumes. This paper outlines the reasons behind the changes in nomenclature, including the recent use of DNA sequencing to classify plants by the Angiosperm Phylogeny Group (APG). Currently accepted name changes and new assignment of families for weeds in New Zealand are listed.

Keywords angiosperm phylogeny, plant names, taxonomy, weeds, ICBN, APG.

INTRODUCTION

The standard references for the introduced plants in New Zealand are three volumes of the Flora of New Zealand series. Volume 3 covered all naturalised monocotyledonous plants with the exception of grasses (Healy & Edgar 1980); Volume 4 covered naturalised pteridophytes, gymnosperms and dicotyledonous plants (Webb et al. 1988) and, most recently, in Volume 5 Edgar & Connor (2000) have covered grasses, both native and naturalised. Since these volumes were published, taxonomists, both in New Zealand and overseas, have continued to increase knowledge of the world's flora.

This paper presents the currently accepted botanical names of introduced weeds in New Zealand and also notes changes to their plant families where these differ from the Flora treatments. These new names and family arrangements are used in the most recent edition of "An Illustrated Guide to Common Weeds of New Zealand" (Popay et al. 2010). The new names are also followed in the Landcare Research Ngā

Tipu o Aotearoa – New Zealand Plants databases (Landcare Research 2010).

WHAT'S IN A NAME?

Naming and classification of plants follow the system introduced by Linnaeus (1753) and the development of the International Code of Botanical Nomenclature (ICBN), the latest version being ratified in Vienna in 2006 (ICBN 2006). The guiding principle in botanical nomenclature is priority, i.e. the earliest valid name published for a species takes priority over later names. A botanical name is fixed to a plant by a type specimen. These specimens are usually dried, pressed and the labelled plant material deposited and preserved in herbaria. Any change in taxonomy (e.g. deciding that a group of plants is different from the type specimen and warrants a new specific or subspecific rank name) must also be published and accompanied by its own type specimen. Plant names are accompanied by the name of the taxonomist who first described the

species. For example, *Lagarosiphon major* (Ridl.) Moss was first named as a variety of *Lagarosiphon muscoides* Harv. (var. *major* Ridl.) by Henry Ridley in the Journal of the Linnaean Society in 1886, then elevated to species rank by Charles Moss in the Transactions of the Royal Society of South Africa in 1928 (International Plant Names Index 2010). The earlier name (*Lagarosiphon muscoides* var. *major*) is no longer accepted as a current name and becomes a synonym of *L. major*.

WHY DO WE HAVE ALL THESE CHANGES?

Changes to botanical plant names are intended to more accurately reflect the true relationships between plant groups. Although some plant names have remained unchanged since first described by Linnaeus and his contemporaries, others have had extensive changes. The seemingly continuous changes in names are not a new phenomenon (although recent molecular-based taxonomic techniques have led to some major unexpected changes). In the late 1920s renowned New Zealand botanist Leonard Cockayne bemoaned the adherence to the ICBN, meaning that previously well-used botanical names for New Zealand natives such as flax (*Phormium Colensoi* – back then species named after botanists were afforded a capital letter), pohutukawa (*Metrosideros tomentosa*) and southern rata (*M. lucida*) were to be replaced by *P. tenax*, *M. excelsa* and *M. umbellata* respectively. Interestingly, Cockayne states in the case of flax, “to change the name for that highly-important economic plant would not be tolerated” (Cockayne 1929). However, the currently accepted names, all earlier published names of the same taxa, are now those used. Similarly insignis pine (*Pinus insignis*) is now known as radiata pine (*P. radiata*). It is rather ironic that Cockayne’s concerns over a name change were made in the paper that discussed Cockayne and H.H. Allan’s transfer of New Zealand *Veronica* to *Hebe* (Cockayne 1929). Recent molecular-based evidence suggests they should be transferred back to *Veronica*, but more of that later.

Since the publication of Floras 3 to 5 there have been several reasons for the name changes to the weeds listed below. In some cases the plants have been incorrectly assigned a species name in New Zealand and are actually a different species (a misapplication), or taxonomic revisions have recognised new species or new ranks (e.g. subspecies or variety). An example is fleabane, now known in New Zealand as *Conyza sumatrensis*, but previously called *C. albida* or *C. floribunda* (all South American species). Genus names have also been changed, e.g. water cresses (*Nasturtium* spp.) were previously included in the genus *Rorippa*.

Until relatively recently these changes have been based on plant morphology, usually reproductive morphology (e.g. floral characters) as this is generally more informative than variation in vegetative parts. Grouping of genera into higher taxonomic levels and classifications such as Family, Order and Phylum were also traditionally based on morphological characters. Then came what Glenn & Dawson (2008) term “the second Linnaean revolution”. Advances in DNA sequencing techniques have made it possible to reconstruct the evolutionary (phylogenetic) relationships of organisms and have revealed that some plants have closer affinities to other families than the ones into which they were previously assigned. The Angiosperm Phylogeny Group (APG), a group of flowering plant taxonomists, is incorporating this DNA evidence into a practical classification system following the ICBN. It is now up to the third update of the classification (APG III 2009).

Major changes affecting both New Zealand weeds and native plant groups can be found in the Scrophulariaceae (the foxglove or snapdragon family). DNA evidence suggests that species and genera formerly included in this family should now be placed in several families, with the foxgloves (*Digitalis* spp.), snapdragons (*Antirrhinum* spp.) and *Hebel*/*Veronica* now belonging in the same family as the plantains (Plantaginaceae), while others such as monkey musk (*Mimulus guttatus*) now belong

in the Phrymaceae; only a few of the original scrophs including the type genus *Scrophularia* (figwort) and the mulleins (*Verbascum* spp.) are retained. Members of the family Buddlejaceae, which includes the weedy *Buddleja* spp., have been moved into new circumscription of Scrophulariaceae. As well as rearranging family and higher taxonomic levels, APG has considered that some genera are not significantly distinct to justify their separation from other genera. *Hebe* being sunk into *Veronica* is a high profile (at least in New Zealand) example of this (Garnock-Jones et al. 2007), whereas other subgenera are elevated to genus level (e.g. ragwort has been moved from *Senecio* (*S. jacobaea*) to the genus *Jacobaea* (*J. vulgaris*)).

Not all taxonomists accept all proposed changes and the inclusion of *Hebe* within *Veronica* is not universally accepted. Another example of different usage of names is provided by comparing the recent major treatments of

the world's plants by Heywood et al. (2007) and Mabberley (2008). These authors have different classifications and names for some of the species that are weeds in New Zealand.

NAME CHANGES FOR NEW ZEALAND WEEDS

The following two tables list most of the name changes applied to New Zealand weeds – changes to genus and species names (Table 1) and changes to families (Table 2) where these differ from the Flora of New Zealand series. Where there are differences of opinion or debate, we have followed Landcare Research (2010) and the name changes used in this paper are also used in the new edition of *An illustrated guide to common weeds of New Zealand* book (Popay et al. 2010). Of course this is not a final listing of accepted name changes, as these will continue to change as taxonomic research advances.

Table 1 Botanical names for weeds where they have been changed from those in Flora of New Zealand Volumes 3 to 5 (Healy & Edgar 1980; Webb et al. 1988; Edgar & Connor 2000).

Common name	New botanical name	Old botanical name
agapanthus	<i>Agapanthus praecox</i> subsp. <i>orientalis</i>	<i>Agapanthus orientalis</i>
alpine strawberry	<i>Potentilla vesca</i>	<i>Fragaria vesca</i>
aluminium plant	<i>Lamium galeobdolon</i>	<i>Galeobdolon luteum</i>
angel's trumpet	<i>Brugmansia</i> × <i>candida</i>	<i>Brugmansia candida</i>
Asiatic and giant knotweed	<i>Fallopia</i> spp.	<i>Reynoutria</i> spp.
banana passionfruit	<i>Passiflora tripartita</i> var. <i>mollissima</i>	<i>Passiflora mollissima</i>
banana passionfruit	<i>Passiflora tripartita</i> var. <i>azuayensis</i>	<i>Passiflora mixta</i>
banana passionfruit	<i>Passiflora tarminiana</i>	<i>Passiflora mixta</i>
bomaria	<i>Bomarea multiflora</i>	<i>Bomarea caldasii</i>
bulbil watsonia	<i>Watsonia meriana</i> 'Bulbillifera'	<i>Watsonia bulbillifera</i>
Bushy asparagus	<i>Asparagus aethiopicus</i>	<i>Asparagus densiflorus</i> ¹
Californian mallow	<i>Malva assurgentiflora</i>	<i>Lavatera assurgentiflora</i>
Cape pondweed	<i>Aponogeton distachyos</i> ²	<i>Aponogeton distachyus</i>
Cape tulip	<i>Morea flaccida</i>	<i>Homeria collina</i> ¹
catsear	<i>Hypochoeris radicata</i> ²	<i>Hypochoeris radicata</i>
Cretan mallow	<i>Malva linnaei</i>	<i>Lavatera cretica</i>
elephant's ear	<i>Alocasia brisbanensis</i>	<i>Alocasia macrorrhiza</i>
fleabane	<i>Conyza sumatrensis</i>	<i>Conyza albida</i>
Field hawkweed	<i>Pilosella caespitosa</i>	<i>Hieracium caespitosum</i>
German ivy	<i>Delairea odorata</i>	<i>Senecio mikanioides</i>
Guinea grass	<i>Megathyrsus maximus</i>	<i>Panicum maximum</i>

Common name	New botanical name	Old botanical name
ice plant	<i>Carpobrotus chilensis</i>	<i>Carpobrotus aequilaterus</i>
Indian strawberry	<i>Potentilla indica</i>	<i>Duchesnea indica</i>
introduced cudweeds ³	<i>Gamochaeta</i> spp.	<i>Gnaphalium</i> spp.
king devil	<i>Pilosella piloselloides</i> subsp. <i>praealta</i>	<i>Hieracium praealtum</i>
lake club-rush and Californian bulrush	<i>Schoenoplectus</i> spp.	<i>Scirpus</i> spp.
monkey apple	<i>Syzygium smithii</i>	<i>Acmena smithii</i>
Montpellier broom	<i>Genista monspessulana</i>	<i>Teline monspessulana</i>
moth plant	<i>Araujia hortorum</i>	<i>Araujia sericifera</i> ¹
mouse-eared hawkweed	<i>Pilosella officinarum</i>	<i>Hieracium pilosella</i>
native cudweeds	<i>Euchiton</i> spp.	<i>Gnaphalium</i> spp.
nodding spurge	<i>Chamaesyce nutans</i>	<i>Euphorbia nutans</i>
nothoscordum	<i>Allium neopolitanum</i>	<i>Nothoscordum inodorum</i>
orange hawkweed	<i>Pilosella aurantiaca</i> and <i>Pilosella</i> × <i>stoloniflora</i>	<i>Hieracium aurantiacum</i> and <i>Hieracium</i> × <i>stoloniflorum</i>
oxtongue	<i>Helminthotheca echioides</i>	<i>Picris echioides</i>
potato vine	<i>Solanum laxum</i>	<i>Solanum jasminoides</i>
purple-backed pondweed	<i>Landoltia punctata</i>	<i>Spirodela punctata</i>
purua grass	<i>Bolboschoenus</i> spp.	<i>Scirpus</i> spp.
ragwort	<i>Jacobaea vulgaris</i>	<i>Senecio jacobaea</i>
rambler rose	<i>Rosa</i> × <i>wichurana</i>	<i>Rosa wichuraiana</i>
rice-paper plant	<i>Tetrapanax papyrifer</i> ²	<i>Tetrapanax papyriferus</i>
sea rush	<i>Juncus kraussii</i>	<i>Juncus maritimus</i>
small-flowered nightshade	<i>Solanum nodiflorum</i>	<i>Solanum americanum</i>
spotted spurge	<i>Chamaesyce maculata</i>	<i>Euphorbia maculata</i>
strawberry	<i>Potentilla</i> × <i>ananassa</i>	<i>Fragaria</i> × <i>ananassa</i>
strawberry dogwood	<i>Cornus capitata</i>	<i>Dendrobenthamia capitata</i>
swamp willow weed	<i>Persicaria decipiens</i>	<i>Polygonum salicifolium</i>
tall fescue	<i>Schedonorus arundinaceus</i>	<i>Festuca arundinacea</i>
tauhinu	<i>Ozothamnus leptophyllus</i>	<i>Cassinia leptophylla</i>
teasel	<i>Dipsacus fullonum</i>	<i>Dipsacus sylvestris</i>
tiger lily	<i>Lilium lancifolium</i>	<i>Lilium tigrinum</i>
tree mallow	<i>Malva dendromorpha</i>	<i>Lavatera arborea</i>
twin cress	<i>Lepidium didymum</i>	<i>Coronopus didymus</i>
velvet groundsel	<i>Roldana petasitis</i>	<i>Senecio petasitis</i>
wart cress	<i>Lepidium squamatum</i>	<i>Coronopus squamatus</i>
water cress	<i>Nasturtium officinale</i>	<i>Rorippa nasturtium-aquaticum</i>
water cress	<i>Nasturtium microphyllum</i>	<i>Rorippa microphylla</i>
wattles	<i>Acacia</i> spp.	<i>Racosperma</i> spp.
willow weed	<i>Persicaria maculosa</i>	<i>Polygonum persicaria</i>
willow weeds and water pepper	<i>Persicaria</i> spp.	<i>Polygonum</i> spp.
wiwi	<i>Juncus edgariae</i>	<i>Juncus gregiflorus</i>

¹ Misapplication in New Zealand.² Orthographic name change – change to the species spelling to follow the rules of nomenclature.³ Marsh cudweed (*Gnaphalium uliginosum*) is the only species retained in this genus in New Zealand.

Table 2 Family names for weed species where they have been changed from those in Flora of New Zealand Volumes 3 and 4 (Healy & Edgar 1980; Webb et al. 1988).

Species	New family	Old family
<i>Acer</i> spp.	Sapindaceae	Aceraceae
<i>Agapanthus praecox</i>	Agapanthaceae	Liliaceae
<i>Allium</i> spp.	Alliaceae	Liliaceae
<i>Araujia hortorum</i>	Apocynaceae	Asclepiadaceae
<i>Asparagus</i> spp.	Asparagaceae	Liliaceae
<i>Asphodelus fistulosus</i>	Asphodelaceae	Liliaceae
<i>Atriplex</i> spp.	Amaranthaceae ¹	Chenopodiaceae
<i>Buddleja</i> spp.	Scrophulariaceae	Buddlejaceae
<i>Callitriche</i> spp.	Plantaginaceae	Callitrichaceae
<i>Chenopodium</i> spp.	Amaranthaceae ¹	Chenopodiaceae
<i>Cobaea scandens</i>	Polemoniaceae	Cobaeaceae
<i>Cymbalaria muralis</i>	Plantaginaceae	Scrophulariaceae
<i>Digitalis purpurea</i>	Plantaginaceae	Scrophulariaceae
<i>Fumaria</i> spp.	Papaveraceae	Fumariaceae
<i>Hydrocleys nymphoides</i>	Limncharitaceae	Butomaceae
<i>Hydrocotyle</i> spp.	Araliaceae	Apiaceae
<i>Hypericum</i> spp.	Hypericaceae	Clusiaceae
<i>Landoltia punctata</i>	Araceae	Lemnaceae
<i>Lemna minor</i>	Araceae	Lemnaceae
<i>Linaria</i> spp.	Plantaginaceae	Scrophulariaceae
<i>Mimulus</i> spp.	Phrymaceae	Scrophulariaceae
<i>Nephrolepis cordifolia</i>	Lomariopsidaceae	Davalliaceae
<i>Paesia scaberula</i>	Dennstaedtiaceae	Pteridaceae
<i>Parentucellia viscosa</i>	Orobanchaceae	Scrophulariaceae
<i>Pteridium esculentum</i>	Dennstaedtiaceae	Pteridaceae
<i>Sambucus nigra</i>	Adoxaceae ²	Caprifoliaceae
<i>Veronica</i> spp.	Plantaginaceae	Scrophulariaceae
<i>Wolffia australiana</i>	Araceae	Lemnaceae

¹ Heywood et al. (2007) retain Chenopodiaceae.

² Heywood et al. (2007) list *Sambucus* as belonging to Sambucaceae.

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