

The Adventive Flora of the Chatham Islands

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Summary

ALL previously published work on the adventive flora of the Chatham Islands has been reviewed, and a tabulation showing the evolution of the adventive flora is included.

One hundred and fifty-three species and five varieties are now listed, compared with 28 species in the last formal listing by Kirk in 1873.

Four species indigenous to New Zealand proper are cited as adventive in the Chatham Islands.

THE Chatham Islands were discovered in 1791 and their botanical history commenced with Dieffenbach's visit in 1840. This collection, which is treated in Hooker's *Flora Novae-Zelandiae* (1852-55) contained no adventive plants.

Formal history of the adventive flora commenced with the incidental publication by F. Mueller of a small number of species in 1864, based on collections and notes by H. H. Travers, in 1863.

It is reported (Cockayne, 1902: 254) that the invading Maoris in 1835 introduced potatoes, taro, and kumaras, and that gardens and orchards were established by the German missionaries after their arrival in 1843. He notes also (p. 255) that ". . . with the fruit-trees came over a grass, Mr. Shand informs me. This I have not seen, but it was probably one of the first introduced plants to spread spontaneously on the island." Livestock were first introduced in 1841, but it was not until 1866 that the present type of sheep stations came into being, when the sheep numbers were about two thousand, although cattle were stated to be wild in the "early sixties".

That opportunity for the establishment and spread of adventive plants had long been present is evident, for Cockayne (1902: 255) writes, ". . . herbivorous animals have roamed almost at their own sweet will ever since the first introduction, and where, moreover, much of the vegetation has been burnt again and again, hardly any of the plant covering can still be in its virgin condition".

Kirk (1873: 320-21) on the other hand instances the great distance of the islands from the mainland of New Zealand, the limited intercourse with other areas, and the short period over which cultivation was carried on as limiting the scope for introduction and his consequent small list of adventive species (28 species), and notes only *Rumex acetosella* L. as generally distributed throughout. Dealing with the same point almost thirty years later, Cockayne (1902: 306-7) writes, "All the same, speaking generally, I do not think introduced plants have taken possession of the soil to anything like the same extent as in both Islands of New Zealand," and mentions *Rubus fruticosus* as apparently the only species which is a menace to

any large proportion of indigenous plants, and *Poa pratensis* as spread considerably in many places. He adds to the factors mentioned by Kirk those of virtual absence of roads and the large numbers of sheep grazing such land as these species could best establish themselves on.

The present day position (Madden, 1955: 343, 347) is that cropping and the arable area have declined compared with earlier years, and there is a large area of pasture, often of poor quality—"Forests have been cleared and in their place pastures composed largely of exotic species dominate the landscape."

To the present, there has been only one formal listing of the adventive species, that by Kirk (1873: 320-22) in which 28 species are noted, but a number of other species have been recorded incidentally in papers dealing with the indigenous flora and vegetation. Cheeseman in the two editions of his "*Manual of the New Zealand Flora*" (1906, 1925) increases the total number of species but the lists were not claimed to be exhaustive, while Cockayne (1928: 354) raises the total to 128 species based on a list supplied by E. N. Northcroft [E. F. Northcroft?]. This list was not published, neither have we had opportunity to peruse it.

During a visit to the Islands by one of us (E.A.M.) in 1952, several species not previously known to occur there were found and collected, and subsequent visits increased the number. In the majority of instances, the records of species are supported by voucher specimens deposited in the herbarium of the Botany Division, D.S.I.R., Christchurch, otherwise the record is based on the observation of one of us (E. A. M.). The other author (A. J. H.) is responsible for the identification of the voucher specimens and the search of previous lists and records.

The tabulation which follows is intended to give a picture of the growth of the adventive flora of the Chatham Islands based on previously published records and recently collected material or recent observations.

It should be noted that in the "List of Species" tabulation columns 14, 15, 16, 17 and 19 (Madden, 1952, 1953, 1954, 1955 and 1957), a species is marked only for the time of its being first observed or collected and is not indicated for subsequent years. It can be reasonably accepted that it was still present at the later dates given. It will be appreciated that the date of formal recording of a species commonly has no real relation with the actual date of introduction, since a plant may have been introduced, established, and spread for many years before collection and formal recording, but it is nevertheless a criterion, however unsatisfactory, for measuring the build-up of the adventive flora.

This list contains 153 species and five varieties. Mention must be made of a small group of species which occur in the tabulation—*Fuchsia excorticata*, *Leptospermum scoparium*, *Poa caespitosa* and *Typha* sp. These species are not, according to us, indigenous in the Chatham Islands, having been deliberately introduced from New Zealand, and are therefore, by our definition, adventive species (see footnotes to tabulation).

LIST OF SPECIES.

	Mueller, 1864	H. H. Travers, 1867	H. H. Travers, 1869	W. T. L. Travers, 1872	Mueller, 1873	Kirk, 1873	Buchanan, 1875	Kirk, 1899	Cockayne, 1902	Cheeseman, 1906	Cheeseman, 1925	Gilpin, 1942	Richards, 1952	Madden, 1952	Madden, 1953	Madden, 1954	Madden, 1955	Madden, 1955	Madden, 1957
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<i>Achillea millefolium</i> L.																			
<i>Agropyron repens</i> (L.) Beauv.																	x		
<i>A. repens</i> (L.) Beauv. var. <i>aristatum</i> Baumg.																		x	
<i>Agrostis alba</i> L. p. p. (?)																			
<i>A. stolonifera</i> L. p. p.																			
<i>A. tenuis</i> Sibth.																			
<i>Aira caryophyllæa</i> L.																			
<i>A. præcox</i> L.																			
<i>Alopecurus geniculatus</i> L.																			
<i>A. pratensis</i> L.																			
<i>Ammophila arenaria</i> (L.) Link.																			
<i>Anagallis arvensis</i> L.																			
<i>Anthoxanthum odoratum</i> L.																			
* <i>Arctium</i> sp.																			
<i>Arrhenatherum elatius</i> (L.) J. & C. Presl var. <i>bulbosum</i> (Willd.) Spen.	?	?	?																
<i>Atriplex patula</i> L.																			
<i>Bellis perennis</i> L.	x	x	x																
<i>Borago officinalis</i> L.																			
<i>Brassica</i> sp.																			
<i>B. nigra</i> (L.) Koch.																			
<i>B. oleracea</i> L.																			
<i>Briza maxima</i> L.																			
<i>B. minor</i> L.																			
<i>Bromus catharticus</i> Vahl.																			
<i>B. gussonei</i> Parl.																			
<i>B. mollis</i> L.																			
<i>B. sterilis</i> L.																			
<i>Cakile edentula</i> (Bigel.) Hook.																			

* Mueller (1864: 4) notes, ". . . the Burr, . . ." and Travers (1869: 127) states ". . . the English burr, (which grows with the utmost rankness in the bush on Pitt's Island, often to the height of three feet and upwards), . . ."

	Mueller, 1864	H. H. Travers, 1867	H. H. Travers, 1869	W. T. L. Travers, 1872	Mueller, 1873	Kirk, 1873	Buchanan, 1875	Kirk, 1899	Cockayne, 1902	Cheeseman, 1906	Cheeseman, 1925	Gilpin, 1942	Richards, 1952	Madden, 1952	Madden, 1953	Madden, 1954	Madden, 1955	Madden, 1955	Madden, 1957
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<i>Calystegia sepium</i> (L.) Roem. et Sch.																			
<i>Capsella bursa-pastoris</i> (L.) Med.						x		x		x						x			
<i>Carduus tenuiflorus</i> Curt.																			
<i>Carpobrotus</i> (<i>Mesembryanthemum</i>). <i>edulis</i> (L.) Bol.																x			
<i>Cerastium glomeratum</i> Thuill.																			
<i>C. vulgatum</i> L.	x					x				x	x								
<i>Chenopodium</i> sp.					x														
<i>C. album</i> L.																			
<i>C. murale</i> L.																x			
<i>Cirsium arvense</i> (L.) Scop.																			
<i>C. vulgare</i> (Savi) Ten.																	x		
<i>Conium maculatum</i> L.																			
<i>Coronopus didymus</i> (L.) Sm.																			
<i>Cotula australis</i> (Sieb.) Hook. f.													x						
<i>Crepis capillaris</i> (L.) Wallr.																			
<i>Cynara scolymus</i> L.								x											
<i>Cynosurus cristatus</i> L.																			
<i>Dactylis glomerata</i> L.							x												
<i>Digitaria sanguinalis</i> (L.) Scop.										x	x			x					
<i>Echinochloa crus-galli</i> (L.) Beauv.																	x		
<i>Elymus arenarius</i> L.									x										
<i>Erigeron canadensis</i> L.																			
<i>E. floribundus</i> (H.B.K.) Sch.—Bip										x	x								
<i>Erodium cicutarium</i> (L.) L'Herit.								x											
<i>E. moschatum</i> (L.) L'Herit.																			
<i>Euphorbia peplus</i> L.											x								
<i>Festuca arundinacea</i> Schreb.																			
<i>F. rubra</i> L.																			
<i>F. rubra</i> L. var. <i>commutata</i>																			
§ <i>Fragaria vesca</i> L. (?)	x	x	x																
† <i>Fuchsia excorticata</i> (Forst.) Linn. f.																			x

§ Recorded by Mueller (1864: 4) and subsequently by others, as “. . . the Wild Strawberry.”

† Now spreading within the small area of Maipito Flats. near Waitangi. Deliberately planted below the house many years ago by a nostalgic housewife.

	Mueller, 1864	H. H. Travers, 1867	H. H. Travers, 1869	W. T. L. Travers, 1872	Mueller, 1873	Kirk, 1873	Buchanan, 1875	Kirk, 1899	Cockayne, 1902	Cheeseman, 1906	Cheeseman, 1925	Gilpin, 1942	Richards, 1952	Madden, 1952	Madden, 1953	Madden, 1954	Madden, 1955	Madden, 1955	Madden, 1957
<i>Fumaria muralis</i> Sond.																			
<i>F. officinalis</i> L.						x													
<i>Galium aparine</i> L.																			
<i>Geranium dissectum</i> L.																			
<i>G. molle</i> L.																			
<i>Glaucium flavum</i> Crantz																			
<i>Glyceria fluitans</i> (L.) R. Br.																			
<i>Gnaphalium japonicum</i> Thunb.																			
<i>Gnaphalium luteo-album</i> L.																			
<i>Holcus lanatus</i> L.	x																		
<i>Hordeum murinum</i> L.																			
<i>Hypericum androsaemum</i> L.																			
<i>Hypochoeris</i> sp.					x														
<i>H. radicata</i> L.																			
<i>Juncus articulatus</i> L.																			
<i>J. bufonius</i> L.																			
<i>Lagurus ovatus</i> L.																			
<i>Lavatera arborea</i> L.																			
† <i>Leptospermum scoparium</i> Forst.																			
<i>Lotium multiflorum</i> Lam.																			
<i>Leycesteria formosa</i> Wallr.																			
<i>L. perenne</i> L.																			
<i>Lotus uliginosus</i> Schkuhr.																			
<i>Malva</i> sp.																			
<i>M. sylvestris</i> L. (?)																			
<i>Marrubium vulgare</i> L.																			
<i>Matricaria matricarioides</i> (Less.) Port.																			
<i>Medicago arabica</i> (L.) All.																			
<i>M. hispida</i> Gaertn.																			
<i>M. lupulina</i> L.																			
<i>M. sativa</i> L.																			

† Originally recorded by Kirk (1899: 157) on the authority of Cox. Available local evidence indicates this species as deliberately introduced, and now spreading on the Maipito Flats. Cockayne (1902: 316) notes the species as having a very limited distribution, but does not specify the site of occurrence.

	Mueller, 1864	H. H. Travers, 1867	H. H. Travers, 1869	W. T. L. Travers, 1872	Mueller, 1873	Kirk, 1873	Buchanan, 1875	Kirk, 1899	Cockayne, 1902	Cheeseman, 1906	Cheeseman, 1925	Gilpin, 1942	Richardt, 1952	Madden, 1952	Madden, 1953	Madden, 1954	Madden, 1955	Madden, 1955	Madden, 1957
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<i>Melilotus indicus</i> (L.) All.								x		x	x								x
<i>Mimulus moschatus</i> Lindl.																			
<i>Myosotis caespitosa</i> K. F. Schultz																			
<i>Nasturtium microphyllum</i> (Boenn.) Rchb.																			
<i>N. officinale</i> R. Br. (<i>sensu lato</i>)									x										
<i>Oxalis rubra</i> St. Hil. (?)																			
<i>Panicum miliaceum</i> L.																			
<i>Parentucellia viscosa</i> (L.) Caruel																			
<i>Paspalum dilatatum</i> Poir																			
<i>Phalaris canariensis</i> L.						x													
<i>P. minor</i> Retz																			
<i>Phleum pratense</i> L.						x													
<i>Plantago lanceolata</i> L.						x				x	x								
<i>P. major</i> L.						x				x	x								
<i>P. media</i> L.									x										
<i>Poa annua</i> L.						x													
¶ <i>P. caespitosa</i> Forst.																			
<i>P. pratensis</i> L.									x	x	x								
<i>P. pratensis</i> L. var. <i>subcaerulea</i> Sm.						x													
<i>P. trivialis</i> L.																			
<i>Polygonum aviculare</i> L.	?					x													
<i>Prunella vulgaris</i> L.						x				x	x								x
<i>Ranunculus</i> sp.																			
<i>Ranunculus repens</i> L.						x													
<i>Rubus fruticosus</i> agg.									x										
<i>Rumex</i> sp.					x														
<i>R. acetosella</i> L.						x				x	x								
<i>R. crispus</i> L.										x	x								
<i>R. obtusifolius</i> L.						x				x	x								
<i>R. pulcher</i> L.										x	x								
<i>R. sanguineus</i> L.										x	x								
<i>Sagina apetala</i> L.																			
<i>S. procumbens</i> L.																			

¶ Seen on Pitt Island but not on Chatham Island. Deliberately sown many years ago on Bluff Station and spreading widely.

	Mueller, 1864	H. H. Travers, 1867	H. H. Travers, 1869	W T. L. Travers, 1872	Mueller, 1873	Kirk, 1873	Buchanan, 1875	Kirk, 1899	Cockayne, 1902	Cheeseman, 1906	Cheeseman, 1925	Gilpin, 1942	Richards, 1952	Madden, 1952	Madden, 1953	Madden, 1954	Madden, 1955	Madden, 1955	Madden, 1957
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
<i>Senecio jacobaea</i> L.																			x
<i>S. sylvaticus</i> L.																			x
<i>Setaria viridis</i> (L.) Beauv.						x											x		
<i>Sherardia arvensis</i> L.																			
<i>Silene anglica</i> L.										x		x				x			
<i>S. anglica</i> L. var. <i>quinquevulnera</i> (L.) Mert. et Koch.						x													
<i>Silybum marianum</i> (L.) Gaertn.																		x	
<i>Sisymbrium officinale</i> (L.) Scop.																			
<i>Solanum</i> sp.																			
<i>S. nigrum</i> L.	x	x	x			x				x	x		x			x			
<i>Sonchus asper</i> (L.) Hill										x	x					x			
<i>S. oleraceus</i> L.	?					x				x	x					x			
<i>Stellaria graminea</i> L.																x			
<i>S. media</i> L.						x				x	x					x			
§ <i>Taraxacum officinale</i> Weber																			x
<i>Torilis nodosa</i> (L.) Gaertn.																			x
<i>Trifolium</i> sp.									x										
<i>T. arvense</i> L.																			
<i>T. campestre</i> Schreb.										x	x						x		
<i>T. dubium</i> Sibth.						x				x	x					x		x	
<i>T. fragiferum</i> L.																x		x	
<i>T. glomeratum</i> L.															x	x		x	
<i>T. hybridum</i> L.														x	x			x	
<i>T. pratense</i> L.										x	x					x		x	
<i>T. repens</i> L.										x	x					x		x	
<i>T. subterraneum</i> L.			x	x												x		x	
<i>Trigonella ornithopodioides</i> (L.) DC.														x					x
<i>Typha muelleri</i> Rohrb.																			
<i>Ulex europaeus</i> L.											x								x
<i>Urtica urens</i> L.																			
<i>Verbascum thapsus</i> L.																x		x	
<i>Vicia angustifolia</i> (L.) Reichard																x		x	
<i>V. hirsuta</i> (L.) S. F Gray																x		x	
<i>V. sativa</i> L.																x		x	
<i>Vulpia dertonensis</i> (All.) Volk.										x	x			x		x		x	

§ First recorded by Mueller (1864: 30), but stated by Hooker (1867: 735) to be the indigenous species, *T. magellanicum* Comm

ADDENDUM

In early 1958, the following additional species were collected by one of us (E. A. M.) on the Chatham Islands:

Holcus mollis L.

Juncus pallidus R.Br.

This species has not been previously recorded in any of the published lists of species indigenous in the Chatham Islands, and we think it may have been accidentally introduced there as an impurity in grass seed from New Zealand. It is suggested that the following note by Chudleigh may refer to this species, since it is certain that *Typha*, the only plant which might be given the vernacular name "bulrush" is, and always has been restricted to a single, small site. Chudleigh (Richards, E.C., Editor), *Diary of E. R. Chudleigh, 1862-1921, Chatham Islands*, Christchurch, 1950, writes (p. 419): "24th [December, 1903]. Cut bulrushes. The bulrush is about 7ft high and $\frac{3}{4}$ in thick at base, has a feather-like tuft of seed, rich green stalk, white pith inside used as a wick for candles by some people. It looks as if it is out [ought] to be of use but I only know it as a pest." He states further (p. 426, "26th [December, 1904]. Tried the effect of arsenical poison on a terrible bulrush that is spreading like wildfire, acres per annum. You may cut it down and burn it when dry. It thrives on both."

Lepidium virginicum L.

LITERATURE AND COLLECTIONS CITED

1. MUELLER, F., 1864. *The Vegetation of the Chatham Islands*. Melbourne.
2. TRAVERS, H. H., 1867. Notes on the Chatham Islands (lat. 44° 30', long. 175° W.). In letter to his father, W. T. L. Travers, Esq., F.L.S., *Proc. Linn. Soc., Lond.*, ix: 135-44.
3. ——— 1875, 1869. On the Chatham Islands. *Trans. N.Z. Inst.*, i (ed. 2): 119-27.
4. TRAVERS, W. T. L., 1872. Notes on the Chatham Islands, extracted from letters from Mr. H. H. Travers. *Trans. N.Z. Inst.*, 4: 63-6.
5. MUELLER, F. VON, 1873. Preliminary Notes on Mr. H. H. Travers' Recent Collections of Plants from the Chatham Islands. *Trans. N.Z. Inst.*, 5: 309-10.
6. KIRK, T., 1873. On the Naturalized Plants of the Chatham Islands. *Trans. N.Z. Inst.*, 5: 320-22.
7. BUCHANAN, J., 1875. On the Flowering Plants and Ferns of the Chatham Islands. *Trans. N.Z. Inst.*, 7: 333-41.
8. KIRK, T., 1899. *The Students' Flora of New Zealand and the Outlying Islands*. Wellington.
9. COCKAYNE, L., 1902. A Short Account of the Plant Covering of Chatham Islands. *Trans. N.Z. Inst.*, 34: 243-324.
10. CHEESEMAN, T. F., 1906. *Manual of the New Zealand Flora*. Wellington.
11. ——— 1925. *Manual of the New Zealand Flora*. Wellington.
12. GILPIN, R., 1942. Collection of Plants from Chatham Islands.
13. RICHARDS, E. C., 1952. *The Chatham Islands. Their Plants, Birds and People*. Christchurch.
14. MADDEN, E. A., 1952. Collection of Plants from Chatham Islands.
15. ——— 1953. Collection of Plants from Chatham Islands.
16. ——— 1954. Collection of Plants from Chatham Islands.
17. ——— 1955. Collection of Plants from Chatham Islands.
18. ——— 1955. Farming and Rural Life on the Chatham Islands. *N.Z. Journ. of Agric.*, vol. 90., pp. 338-54.
19. ——— 1957. Collection of Plants from the Chatham Islands.

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