

- § *Phormium tenax* J.R. & G.Forst.
- * *Piptatherum miliaceum* (L.) Cosson
- # *Poa anceps* Forst.f.
- * *Poa annua* L.
- * *Poa trivialis* L.
- * *Rytidosperma racemosum* (R.Br.) Connor & Edgar
- * *Setaria gracilis* Kunth
- * *Setaria parviflora* (Poir.) Kerguelen
- * *Setaria pumila* (Poir.) Roem. & Schult.
- * *Sporobolus africanus* (Poir.) Robyns & Tournay
- * *Tradescantia fluminensis* Velloso
- * *Vulpia bromoides* (L.) S.F.Gray
- * *Vulpia myuros* var. *megalura* (Nutt.) Auquier

- New Zealand flax, harakeke
- bamboo grass, rice millet
- annual poa
- rough-stalked meadow grass
- danthonia
- knot-root bristle grass
- Malesian bristle grass
- yellow bristle grass
- ratstail, Parramatta grass
- wandering jew
- vulpia hair grass, squirrel-tail fescue
- vulpia hair grass

Yellow-wort (*Blackstonia perfoliata*) (Gentianaceae) hitchhikes south?

Ewen K Cameron

Introduction

Yellow-wort (*Blackstonia perfoliata*) (Gentianaceae) is a glaucous annual herb, erect with yellow flowers, native to Europe and the Mediterranean area. In New Zealand flowering plants range from 6-55(-63.5) cm tall with simple stems or branched above, with flowers in terminal cymes, 1-many flowered. In Europe four subspecies are recognised. The New Zealand material can be referred to the type subspecies (Webb *et al.* 1988), which is the most widespread one in Europe, although rare in the southern part of the species range (Tutin *et al.* 1972). In Britain it occurs in calcareous grassland, bare chalk and dunes, being rather common in central and southern England extending north to Northumberland and to County Sligo in Ireland (Chapham *et al.* 1987, Stace 1991). In Europe it extends north to Holland and Germany (Tutin *et al.* 1972). It appears to be expanding its range in recent years in northern England due to its inclusion in commercial wildflower mixtures on roadside verges and other landscaped sites (University of Hull 2005). It has naturalised in Australia: South Australia and Victoria (single collection) (Adams 1996, Walsh & Entwistle 1999); and in New Zealand.

History and naturalisation in New Zealand

The first wild collection of yellow-wort in New Zealand was by W.R.B. Oliver in November 1916 from manuka scrub at Parengarenga, North Cape district (herbarium voucher: AK 91492) and published by Cheeseman (1919) as *Chlora perfoliata*. Allan (1940) confirmed that yellow-wort still existed at this locality, but added no new localities (see Fig. 1 & Appendix 1 which show the second wild collection in New Zealand was in 1948). Sykes (1981) extended the distribution to "N Auckland, especially Mangonui County" and then seven years later included "south to Whangarei area ... has only recently spread southwards" (Sykes in Webb *et al.* 1988).

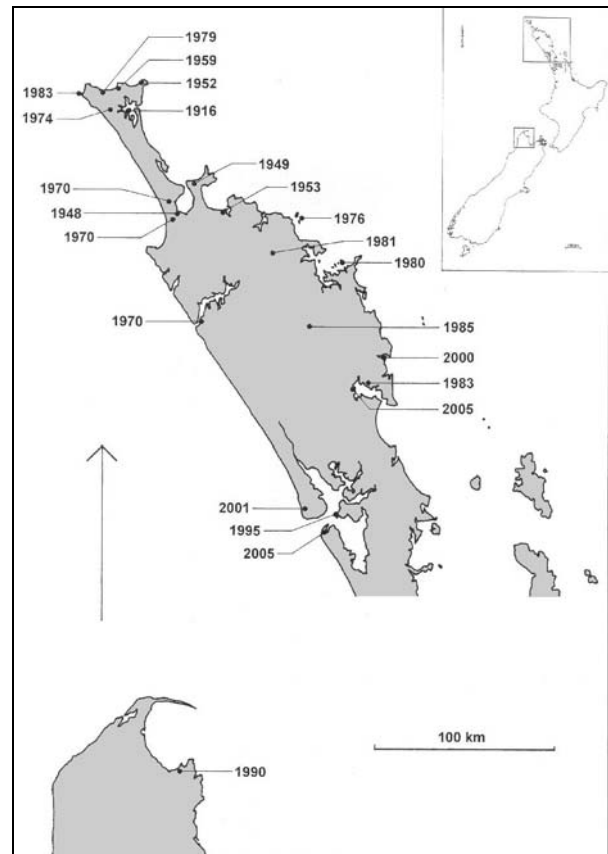


Fig. 1. Distribution map of yellow-wort in New Zealand showing the first year of collection for each general locality; based on a selection of the 58 specimens held in New Zealand herbaria.

In August 1995 when Anthony Wright and I collected yellow-wort in dune slacks at Okahukura Peninsula in the Kaipara Harbour (AK 223773) during an Auckland Bot Soc field trip I suspected that it was a new southern limit for this species in New Zealand. On checking other New Zealand herbaria records I was surprised to learn that it had been collected from the top of the South Island in January 1990 by Peter Johnson around the cement wharf at Tarkohe, east of Takaka (CHR 465133).

I thought little more about it until I was in Takaka in January 2003 on a family holiday and also saw yellow-wort (AK 283357) where it had been collected earlier by Johnson. I noticed that it was most common by the wharf area that was used by cement ships loading locally ground cement up until 1988 (John Campbell, Golden Bay resident *pers. comm.*). Was this how it managed to “leap-frog” so far south, apparently missing out the lower two-thirds of the North Island? It wasn't until January 2005 that I managed to check out my theory by visiting the cement wharf area at Portland in Whangarei Harbour to find yellow-wort thriving around the wharf area close to the works (AK 289218), especially on the calcareous-rich spilt cement. Therefore I suspect the tiny “dust” seeds of yellow-wort were transported from Whangarei to Takaka on one of the coastal cement ships.

Note - cement ships didn't convey cargo directly from Portland to Golden Bay, because both ports produced cement in the ground form. However, the same ships were used for both ports (Laura McCloud, Golden Bay Cement Co., *pers. comm.*) up until 1988. Accidental transportation of flowering plants by ships is not new to New Zealand, e.g. Kirk (1896) recorded 101 exotic species growing wild on a ballast heap from ships in Wellington Harbour, of which 20 species were new wild records for New Zealand.

In New Zealand yellow-wort grows in a wide range of habitats, the most frequent being coastal dune slacks with oioi (*Apodasmia similis*). Often its pink-flowered European cousin centaury (*Centaureum erythraea*) (Gentianaceae) is also present. Other habitats include: sand-dunes, coastal cliffs (limestone & otherwise), spilt cement, manuka shrubland, grassland and roadsides. It is most frequent by the coast, but not restricted to coastal habitats. Most specimens were collected <20m asl, but as far as I can gather, 6/58 New Zealand herbarium specimens were collected between 60-300m asl. The most inland was from a roadside at Manginangina, near Puketi Forest, west of Kerikeri (CHR 400855). The dust-like seed I suspect is transported by the wind, water and waterfowl – Peter de Lange (*pers. comm.*) confirmed that it is dispersed by wind and water.

After drafting this article I participated on the Auckland Bot Soc trip to the bombing range by Kaipara South Head in March 2005 (see Cameron 2005) where we discovered two plants of yellow-wort 640m apart in the dune slacks (AK 289602) – extending its Auckland distribution by 3' S. Based on the 58 records in New Zealand herbaria, apart from the Takaka records, this recent Kaipara South Head collection is currently the most southern New Zealand record. However, judging from yellow-wort's native distribution (to 55° N in north England), it is likely that it will at least spread throughout coastal areas of New Zealand's three main islands and that it simply established in Northland first.



Fig. 2. An attractive herbarium sheet of yellow-wort from South Head, Hokianga (AK 189985).

Competition for sebaea?

The threatened (Acutely Threatened / Nationally Critical) and related native sebaea (*Sebaea ovata*) (Gentianaceae) is morphologically similar looking to yellow-wort, it is also an annual and they both grow in coastal dune slacks. Sebaea can be distinguished by its 5-merous yellow flowers and cylindrical corolla tube (yellow-wort is 6-9-merous and flowers open fully) (Webb *et al.* 1988). Ogle (1989) records that sebaea occurred in the 19th century in scattered localities from Northland to Hawkes Bay and Canterbury. In 1987 Peter de Lange (*pers. comm.*) saw sebaea at Hokianga South Head – the last observation of it naturally in Northland. It is also native to Tasmania Victoria NSW, Queensland, S Australia & W Australia (Walsh & Entwistle 1999). Currently in New Zealand it is restricted to two localities by Wanganui (Forester & Townsend 2004). Three hundred plants of sebaea were planted at two sites in the general Pouto area (N Kaipara) and in November 2002, and the following season 380 more were planted (all sourced from Wanganui). There was some initial success, but no plants were located last summer; there is still hope some seed has survived (Lisa Forester *pers. comm.*). Therefore the only current area in New Zealand where sebaea and yellow-wort may co-exist is at Pouto. But this could change with restoration work involving

sebaea at different localities, or if yellow-wort ever reaches Wanganui.

Conclusions

Yellow-wort appears to be an attractive herb of low environmental impact, unless it is shown that it directly competes with sebaea. It is slowly spreading southwards along both coasts from the Far North where it established first and appears to have taken some 80 years to reach Auckland's west coast. It has

possibly been shipped accidentally to the top of the South Island from Whangarei in the 1970s-80s and it is expected to continue to expand its distribution over both islands. Other New Zealand ports where ground cement is offloaded from Whangarei would be worth checking for yellow-wort establishment. Recording a species establishment across New Zealand adds to the knowledge of the rate and pattern of plant dispersal which may be relevant indicating how other species with similar seed-dispersal methods may also spread.

Acknowledgements

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References

- Adams, L.G. 1996: Gentianaceae in *Flora of Australia* 28: 72-104.
- Allan, H.H. 1940: *A handbook of the naturalized flora of New Zealand*. Government Printer, Wellington.
- Cameron, E.K. 2005: Field Trip: Bombing Range, Waionui Inlet, Kaipara South Head. 19/03/05. *Auckland Botanical Society Journal* 60(1): 17-22.
- Chapham, A.R.; Tutin, T.G.; Moore, D.M. 1987: *Flora of the British Isles*. Cambridge University Press.
- Cheeseman, T.F. 1919: Contributions to a fuller knowledge of the flora of New Zealand: No. 6. *Transactions of the NZ Institute* 51: 85-92.
- Forester, L.; Townsend, A. 2004: Threatened plants of Northland Conservancy. Department of Conservation, Wellington.
- Kirk, T. 1896: On the products of a ballast heap. *Transactions of the NZ Institute* 29: 501-07.
- Ogle, C.C. 1989: *Sebaea ovata* (Gentianaceae) and its habitat near Wanganui. *Wellington Botanical Society Bulletin* 45: 92-99.
- Stace, C.A. 1991: *New Flora of the British Isles*. Cambridge University Press.
- Sykes, W.R. 1981: Checklist of dicotyledons naturalised in New Zealand. 11. *NZ Journal of Botany* 19: 319-325.
- Tutin, T.G.; Heywood, V.H.; Burges, N.A.; Valentine D.H. 1972: *Flora Europaea. Volume 3*. Cambridge University Press.
- University of Hull (retrieved May 2005): Action plan: yellow-wort. <http://www.geo.hull.ac.uk/HBAP/html/PDF/SAP25.pdf>
- Walsh, N.G.; Entwistle, T.J. (eds). 1999: *Flora of Victoria, vol. 4*. Royal Botanic Gardens Melbourne.
- Webb, C.J.; Sykes, W.R.; Garnock-Jones, P.J. 1988: *Flora of New Zealand, vol. IV. Naturalised pteridophytes, gymnosperms, dicotyledons*. Botany Division, Christchurch.

Appendix 1. The 58 yellow-wort herbarium records from New Zealand herbaria arranged north to south

- 34° 24' S, Kerr Point, N Cape, Jan 1952, *Powell*, AK 45905;
- 34° 24' S, N Cape Reserve, Oct 1995, *Wright* 12614, AK 224978;
- [34° 25' S], Waikuku Flat, Oct 1969, *Parris*, AK 127997;
- 34° 25' S, Surville Cliffs, Nov 1979, *Wright* 3280, AK 151252;
- [34° 26' S], Kapowairua, Spirits Bay, Sep 1959, *Hynes*, AK 51599;
- 34° 26' S, Tom Bowling Bay, Nov 1979, *Wright* 3278, AK 151234 & 151254 (dup WELT);
- 34° 26' S, Te Huka Stream, Tom Bowling Bay, Nov 1982, *Ogle* 902, CHR 404672;
- 34° 26' S, E Spirits Bay, Nov 1989, *Sykes* 449/89, CHR 465011;
- 34° 28' S, Pandora, Dec 1979, *Gardner* 2629, CHR 441021;
- 34° 28' S, Motuopao I, Dec 1983, *Cameron* 2480, AK 272817;
- 34° 28' S, Motuopao I, Dec 1983, *Wright* 6115, AK 164773;
- 34° 28' S, Te Werahi Beach, Dec 1984, *Cameron*, AK 274323;
- 34° 28' S, Te Werahi swamp, Dec 1985, *Braggins*, AK 283928;
- 34° 28' S, Te Werahi Beach, Mar 1987, *Broekhuizen*, NZFRI 17048;
- 34° 28' S, Te Werahi Beach, Oct 1990, *de Lange* 482, AK 202944 (dup CHR);
- [c.34° 32' S], Parengarenga, Nov 1916, *Oliver*, *Cheeseman Herb.*, AK 91492;
- 34° 32' S, Te Paki Stream, Oct 1974, *Bangerter* 5206, AK 135570;
- 34° 36' S, N of Te Kao, Dec 1989, *Wright* 9563, AK 191251;
- [34° 49' S], Pukenui, Nov 1961, *Hynes*, AK 71166;
- 34° 50' S, Karikari Peninsula, Matai Bay, Nov 1974, *Wright*, AK182194;
- [34° 51' S], Karikari Bay, Nov 1949, *Mason & Moar*, CHR 69591;
- 34° 54' S, Rangaunu Harbour, Sep 1985, *Bellingham*, AK 174983;
- [c.34° 55' S], Karikari Peninsula, Nov 1974, *Wright* 771, AK 137941;
- [c.34° 55' S], Tokerau Beach, Nov 1973, *Rawlings*, CHR 366813;
- 34° 56' S, Coal Creek, Ninety Mile Beach, Nov 1966, *Cooper*, AK 117723;
- 34° 57' S, Lake Waiparera, Nov 1970, *Esler*, AK 215769;
- [c.34° 59' S], Rangaunu Harb + Puheke Hill, Nov 1949, *Mason & Moar*, AK 35846;
- [34° 59' S], Mangonui, Cooper's Beach, Dec 1953, *Moore*, CHR 83630;
- 34° 59' S, S of Waiharara, Dec 1989, *Wright* 9589, AK 215489;
- 35° 2' S, near Awanui, Lake Ngatu, Nov 1970, *Mason & Esler* 11490, CHR 214386;
- 35° 2' S, Waipapakauri, Dec 1948, *Hutson*, CHR 71599;
- 35° 2' S, Waipapakauri, Jan 1980, *Garnock-Jones*, CHR 361555;
- 35° 2' S, Waipapakauri, Nov 1989, *Champion*, WAIK 11800;
- [c.35° 7' S], Kaitaia, Jan 1954, *Moore & Richie*, CHR 83658;
- 35° 12' S, Moturoa I, Jan 1990, *Wright* 9776, AK 193204;
- [35° 12' S], Manginangina, Dec 1981, *Sykes* 391/81, CHR 400855 (dup AK);
- 35° 13' S, Bay of Is, Urupukapuka I, Jan 1980, *Beever* 80008, AK 156963;

35° 13' S, Bay of Is, Urupukapuka I, Jan 1980, *Wright 3308*, AK 151144;
 35° 14' S, Bay of Is, Poroporo I, Jan 1980, *Wright 3340*, AK 151422;
 35° 15' S, Flagstaff Hill, Russell, Nov 1985, *Adam*, AK 278203;
 35° 15' S, Bay of Is, Motukauri, Jan 1980, *Wright 3461*, AK 151377;
 35° 17' S, Paihia, Dec 1981, *Sykes 485/81*, CHR 400858 (dups NZFRI, WELT);
 [35° 28' S], Cavalli Is, Motukawanui, Oct 1976, *Olsen*, AK 155147;
 35° 29' S, Hokianga, Maukoro Pa, Jan 1977, *Wright 1647*, AK 141232;
 35° 30' S, N Hokianga Harbour, Dec 1985, *Bellingham 465*, AK 174917;
 35° 30' S, Bay of Is, Motatau, Dec 1985, *Bellingham 469*, AK 174832;
 35° 31' S, Opononi, Oct 1970, *Hynes*, AK 127644;
 35° 32' S, Hokianga, South Head, Nov 1989, *Wright 9500*, AK 189985;
 35° 32' S, Hokianga, South Head, Nov 1989, *Sykes 434/89*, CHR 464996;
 35° 39' S, Ngunguru, Nov 2000, *Parr*, AK 282019;
 35° 39' S, Ngunguru, Jan 2005, *Cameron 12765*, AK 289217;
 35° 46' S, Whangarei, Tamaterau, Jan 1983, *Devonshire*, CHR 404712;
 35° 48' S, Whangarei Harbour, Portland, Jan 2005, *Cameron 12783*, AK 289218;
 36° 16' S, Pouto, N of Kaipara North Head, Jan 2001, *Cameron 10519*, AK 252642;
 36° 23' S, Okahukura Peninsula, Aug 1995, *Cameron 8199 & Wright*, AK 223773;
 36° 27' S, Kaipara South Head, Mar 2005, *Cameron 13048*, AK 289602;
 40° 50' S, E Takaka, Tarakohe, Jan 1990, *Johnson 881*, CHR 465133;
 40° 50' S, E Takaka, Tarakohe, Jan 2003, *Cameron 11390*, AK 283357.

***Carex maculata* – a new introduced sedge in New Zealand**

Mike Wilcox

Two introduced sedges – *Carex brownii* from Australia and *Carex hirsutella* from North America – have recently been found in the Auckland region (Wilcox 2004a, 2004b). The record of *Carex hirsutella* – from Stoney Creek Forest near Kaukapakapa – is the first and only record so far of this species in New Zealand. In November 2001 I found another apparently introduced *Carex* sedge in Stoney Creek Forest (Wilcox and Clapperton 2001), and this was given the name *Carex* “Waitoki” by McKain (2004), its identity being a mystery (AK 255406).

In February 2005, a botanical visitor from Canada, Randy Olsen, was shown specimens of *Carex* “Waitoki” in the Herbarium at the Auckland War Memorial Museum (AK) and identified it as *Carex maculata* Boot, a sedge native to eastern Australia, Papua New Guinea, and New Caledonia, where it grows in wet places within rainforest. It has also been called *Carex neurochlamys* F.Muell. (Wilson 1993, Jaffré *et al.* 2001).

Characteristics of *Carex maculata*, as described by Wilson (1993) are:

- sheath of leaves with thin portion red dotted
- inflorescence erect, narrow, spikes sessile or lowest pedicellate, upper contiguous, lower distant
- styles 3-fid
- utricles 2-3mm long, minutely papillose, strongly ribbed
- male glumes not mucronate or with mucro shorter than body of glume

Carex maculata occurs in Stoney Creek Forest at two sites. The first place I saw it was on the edge of a shaded creek in second-growth bush. It looked vegetatively like a typical Auckland native bush *Carex* such as *C. lambertiana* or *C. ochrosaccus*, but the flower heads were narrow and green. Another five plants were later found nearby on a disused, overgrown logging track under mature pines.

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References

- Jaffré, T.; Morat, P.; Veillon, J.-M.; Rigault, F.; Dagostini, G. 2001. *Composition and characterisation of the native flora of New Caledonia*. Institut de recherche pour le développement, Nouméa.
- McKain, C. 2004. *Carex in Auckland. A field guide*. Waitakere City Council.
- Wilcox, M. D. 2004a. Population of *Carex brownii* at Stanmore Bay. *Auckland Botanical Society Journal* 59(1): 62-63.
- Wilcox, M. D. 2004b. *Carex hirsutella* – a new introduced sedge in the Auckland Region. *Auckland Botanical Society Journal* 59(1):63-64.
- Wilson, K.L. 1993. Cyperaceae in Harden, G. J. (ed.) 1993. *Flora of New South Wales*. Volumes 4. New South Wales University Press.
- Wilcox, M. D.; Clapperton, L. 2001. Native flora of the bush at Stoney Creek QE II Trust Covenant, Rapsons Road, Kaukapakapa. *Auckland Botanical Society Journal* 56(2):72-73.