308. Juncus subsecundus N.A.Wakef., *Vict. Nat.* 73: 211 (1957)

T: Australia, E Victoria, Princess Highway W of Providence Ponds, 22 Jan 1957, *N.A.Wakefield 4873*; holo: MEL.

Illustrations: E.Edgar, *New Zealand J. Bot*. 2: 190, fig. 14 (1964); K.L.Wilson, *in* G.J.Harden (ed.), *Fl. New South Wales* 4: 282 (1993).

Perennials, 30–90 cm tall; rhizome short-creeping, short-noded; stems densely tufted. Stem leafless, terete, 0.5–1.5 (–2.2) mm diam., hard, grey-green; ridges 10–20 (–40), distinct, prominent; dorsal cells ±not enlarged; subepidermal sclerenchyma strands present; pith very finely irregularly interrupted, of astericiform cells. Cataphylls 2–3, ±tight, abaxially stramineous-brown distally, dark yellow-brown, slightly glossy at base, adaxially silvery-stramineous and glossy. Lower bract 5–20 cm long, exceeding inflorescence; sheath narrow. Inflorescence 1–7 (–13) cm long, diffuse; flowers numerous, solitary or loosely to densely clustered. Bracteoles ovate, to c. 1 mm long, scarious. Tepals ±equal, stramineous-brown, occasionally red-tinged, with broad membranous margins; outer tepals 2–4 mm long, sometimes slightly longer, acute to acuminate; inner tepals acute to subacute and mucronate. Stamens 3–6; anthers 0.7–0.9 mm long; filaments 0.5–0.8 mm long; style c. 0.1 mm long; stigmas to c. 0.5 mm long. Capsule triseptate, ovoid to ellipsoid, 2.2–2.8 mm long, exceeding or shorter than perianth, obtuse, rarely to subacute, not or shortly mucronate, golden-brown or dark golden-brown to red-brown at apex. Seeds ±broadly ovoid, c. 0.3–0.35 × c. 0.2 mm, apiculate, c. 14–18-striate, densely reticulate, pale brown; appendages absent. Fig. 143.

Endemic to Australia, widespread there except for the northernmost part; perhaps introduced in New Zealand. Temporarily introduced in England. 10: gbr. 50: NSW, QLD, SOA, TAS, VIC, WAU. 51: nzn. Various habitats, mostly on heavy soils in dryish places. Map 534.

50. NEW SOUTH WALES: Central Tablelands, WSW of Kiama, The Barren Grounds, 11 Feb 1959, *E.F.Constable* (NSW, PRA); Northwestern Plains, near Yancannia Station, *W.E.Mulham W961* (NSW, PRA); W of Yetman, 9 Nov 1954, *L.A.S.Johnson & E.F.Constable* (NSW, PRA); Central Western Slopes, Gungal to Mt Dangar, Woronda Rivulet, 10 Apr 1953, *L.A.S.Johnson* (NSW, PRA). VICTORIA: Riverina, 3 km E of Chiltern, *E.J.McBarron 6070* (NSW, PRA).

The residual original syntype of *Juncus radula* var. *laevior* Buchenau, *Bot. Jahrb. Syst*. 12: 241 (1890), see also *J. radula* (i.e., Swan River, *J.Drummond 3a, 321*; syn: BM, K, MEL, NSW), belongs to *J. subsecundus*.

309. Juncus vaginatus R.Br., *Prodr*. 1: 258 (1810)

T: [Australia] J [= Port Jackson], *R.Brown [Bennett 5789]*; holo: BM.

Juncus tenax Solander, *in* J.G.A.Forster, *Fl. Insul. Austral. Prodr*. 90 (1786), *nom. inval.*

Illustration: K.L.Wilson, *in* G.J.Harden (ed.), *Fl. New South Wales* 4: 283 (1993).

Perennials, 40–140 cm tall; rhizome stout, creeping, covered with castaneous to dark scales; stems in dense rows. Stem leafless, terete, 1.5–4.5 mm diam., ±soft, yellow-green; ridges prominent, 30–65; dorsal cells not enlarged; pith continuous, of perfectly astericiform cells. Cataphylls few, c. 2–4, distally ±lax, abaxially pale stramineous to pale yellow-brown distally, dull deep yellow-brown to brown and ±dull at base, adaxially silvery stramineous. Lower bract erect, 11–40 cm long, exceeding inflorescence; sheath not inflated, only slightly dilated. Inflorescence 7–17 cm long, diffuse; flowers numerous, of 5–15 dense glomerules densely clustered in 1–5 groups on thick peduncles (to 1 mm in diam.). Outer tepals 2.5–3.2 mm long, lanceolate, acute to acuminate, with ±narrow membranous margins, longer than or equalling inner ones; inner tepals broader, ±broadly acute, with broad membranous margins, all stramineous-brown, often tinged red-brown. Stamens 6; anthers 0.7–0.9 mm long; filaments c. 0.6 mm long; style c. 0.1 mm long; stigmas to 0.5 mm long. Capsule slightly triseptate (unilocular), oblong-ovoid, 2.8–3.3 mm long, obtuse to subacute, shorter than to slightly exceeding perianth, not or shortly mucronate, golden brown. Seeds pale brown, narrowly ovoid, c. 0.5 × 0.2–0.25 mm, apiculate, longitudinally c. 16–22-striate, densely transversely reticulate; appendages absent. Fig. 144.

Australia. In the older Australian literature this name was misapplied to a number of other species, subsequently described by L.A.S.Johnson as distinct. Temporarily introduced in England. 10: gbr. 50: NSW, QLD, VIC, TAS. Damp to wet situations. Map 535.

50. NEW SOUTH WALES: S Tablelands, Lake Burley Griffin, Canberra, Jun 1965, *L.Wescombe* (NSW, PRA); N Tablelands, Ironbark Ck, 22 km from Bundarra on Bundarra Rd, *J.Armstrong 696 & A.N.Rodd* (NSW, PRA).

310. Juncus usitatus L.A.S.Johnson, *Contr. New South Wales Natl Herb*. 3: 241 (1963)

T: New South Wales, Cheltenham, 23 Nov 1952, *L.A.S.Johnson s.n.*; holo: NSW20734; iso: CHR129318.

Illustrations: E.Edgar, *New Zealand J. Bot*. 2: 187, fig. 9 (1964); K.L.Wilson, *in* G.J.Harden (ed.), *Fl. New South Wales* 4: 279 (1993).

Perennials, 50–140 (–180) cm tall, densely caespitose; rhizome 2–3 mm diam., very short-noded. Stem leafless, terete, 0.5–2 (–2.3) mm diam., ±soft, mid-green; ridges 20–40, conspicuous; subepidermal sclerenchyma strands present, some connected to small vascular bundles; epidermis cells almost uniform; pith interrupted or occasionally continuous, of somewhat irregularly astericiform cells. Cataphylls 3–4, short, ±lax to ±tight; upper cataphylls to (4–7) –10 cm long, abaxially stramineous-brown to golden brown and dull distally, red-brown and ±glossy at base, adaxially silvery to golden brown. Inflorescence pseudolateral, 2–7 cm long, diffuse; flowers numerous, solitary, arranged in rows along slender branches. Lower bract 10–28 cm long, exceeding inflorescence, with narrow sheath. Tepals subequal, ±not appressed to capsule, ±erecto-patent, stramineous-brown; outer tepals 1.3–2 (–2.2) mm long, longer than or equalling inner ones, acute, with prominent central band and broad membranous margins; inner tepals ±obtuse to subacute, distally with very broad membranous margins. Stamens 3 (–6); anthers 0.5–0.7 mm long, about as long as 0.4–0.6 mm filaments; style c. 0.1 mm long; stigmas c. 0.5 mm long. Capsule triseptate, broadly ellipsoid to subglobose, 1.5–2 mm long, exceeding or rarely equalling perianth, slightly trigonous, obtuse, not or shortly mucronate, usually golden brown. Seeds 0.45–0.5 × c. 0.2 mm, ellipsoid, c. 12–14-striate, reticulate, yellowish brown with dark tips; appendages absent. Fig. 141.

Australia, except for northern part, New Zealand (Kermadec and North Islands), New Caledonia. Temporarily introduced in England. 10: gbr. 50: NSW, QLD, SA, VIC, WAU. 51: KER, NZN. 60: NWC. Stream banks and other moist places, often near the coast. Map 536.

50. QUEENSLAND: Maryborough, 10 Dec 1937, *H.Flecker* (LD). NEW SOUTH WALES: Central Coast, Warnervale, *K.L.Wilson 9588 & G.Sainty* (NSW, PRA); North Coast, 98 km NW of Grafton, 13 Dec 1966, *M.D.Tindale* (NSW, PRA); Central Tablelands, Bowenfels, Farmers Ck, *R.G.Coveny 6158, D.H.Benson, L.A.S.Johnson & K.L.Wilson* (NSW, PRA). **51.** KERMADEC IS.: Denham Bay, 20 Dec 1966, *W.R.Sykes* (CHR). **60.** NEW CALEDONIA: Melaleuca, Haute Mayavetch, 500 m, *M.Schmid 182* (P); Paita, 200 m, 28 Sep 1902, *R.Schlechter [It. Neo-Caledon.] 14824* (PR).

Presumed Hybrids

Hybridization is common in this section, even between not very closely related species. Further investigations are much needed. In particular, hybrids among Australian species are believed to be relatively common. The list below probably does not include all cases.

Juncus alexandri subsp. *alexandri* × *Juncus laeviusculus* subsp. *laeviusculus*

Reported by L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 38 (1991), distribution map included] without indication of the degree of sterility.

50. New South Wales: Southern Tablelands, Yarrangobilly Caves to Snowy Mountains Hwy (western access), 30 Mar 1964, *L.A.S.Johnson* (NSW).

Juncus alexandri subsp. *melanobasis* × *Juncus laeviusculus* subsp. *laeviusculus*

Reported by L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 38 (1991), distribution map included] without indication of the degree of sterility.

50. New South Wales: Northern Tablelands, Gibraltar Range on new highway, *M.Gray 3211* (NSW); Gloucester Tops, 22 May 1962, *O.D.Evans & J.P.Burgess* (NSW).

Juncus alexandri subsp. *melanobasis* × *Juncus continuus*

Reported by L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 38 (1991)] from New South Wales, without indicating degree of sterility. Plants identified by L.A.S.Johnson as this hybrid are at least partially fertile and have an intermediate appearance.

50. NEW SOUTH WALES: Central Tablelands, Mt. Vincent, 5 Aug 1961, *B.G.Briggs* (NSW). VICTORIA: Mitchell R. between The Amphitheatre and the mouth of Cobbannah Ck, *A.C.Beauglehole 41741* (NSW).

Juncus arcticus subsp. *arcticus* × *Juncus filiformis*

Juncus ×*montellii* Vierh., *in* I.Dörfler, *Herb. Norm*. 4781 (1907). T: Lapponia Fennica [Finland, Lapponia enontekiensis] Polojoensun, 68°20′N, Aug 1905, *J.Montell [I.Dörfler, Herb. Norm.] 4781*; syn: H, LD, etc.

Illustration: Ö.Nilsson & S.Snogerup, *Bot. Not*. 124: 316, fig. 59 (1971).

Long-lived perennial, vegetatively propagating by its branching rhizome. Stem usually 30–60 cm tall, slender as in large *Juncus filiformis*. Lower bract 1/4–1/2 as long as stem. Stem and bract smooth as in *Juncus arcticus*. Anthers empty or almost so and usually not opening. Capsule growing to almost full size but with concave sides. Seeds all degenerating at different stages. Fig. 147.

Often formed where the parents meet, forming local clones and in some cases found without one or both parents. 10: FIN, NOR, SWE. 11: SWI. 70: GNL.

10. NORWAY: Sör-Tröndelag, Kongsvoll, 950 m, 1 Nov 1927, *O.R.Holmberg* (LD). SWEDEN: Dalarne, Särna parish, 300 m NW Rörmyrvallen, 3 Aug 1989, *Edelsjö* (LD); Lule Lappmark, Jokkmokk, Vaisa, Rautåive, 28 Jul 1947, *G.Björkman* (LD).

Juncus aridicola × *Juncus subglaucus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 280 (1993)]. It is fertile, probably not rare.

50. NEW SOUTH WALES: 1 km W of Caroona, NW of Quirindi, *L.A.S.Johnson 8186 & B.G.Briggs* (NSW).

Juncus astreptus × *Juncus bassianus*

L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 42 (1991), distribution map included] reported extensive hybridisation in this combination, with whole populations intermediate. The degree of sterility in these plants was not reported.

50. TASMANIA: Central Highlands, St Valentines Peak, near Guildford Junction–Hampshire Road, 26 Jan 1962, *Philips* (HO, NSW); E of Lake Solitude, west of Lake St Clair, Mar. 1973, *B.G.Briggs 4715* (NSW); Interlaken Rd., Bothwell, 9 Apr 1976, *D.I.Morris & W.M.Curtis* (NSW); Ben Lomond: N slope of Mt Barrow, 4 Jan 1965, *L.A.S.Johnson* (NSW); Ben Lomond National Park, 10 Feb 1979, *M.Noble 28331* (HO).

Juncus bassianus × *Juncus procerus*

Published by L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 43 (1991), distribution map included] as *J. astreptus* × *J. procerus*, and reported as occurring extensively in Tasmania, including whole hybrid populations. The degree of sterility for these plants was not commented on.

50. TASMANIA: Furneaux, Lackrana, Flinders Island, 9 Dec 1975, *D.I.Morris* (HO); West Coast, 24 km from Strahan on road to Queenstown, *A.E.Orchard 5383* (HO, NSW); Central Highlands, Arthur Lakes, *H.Eichler 16946* (NSW); 7 km W of Lake Echo Dam on Bronte Rd., *K.L.Wilson 6300* (HO, NSW); Ben Lomond N slope, *M.Noble 28781* (HO); East Coast, Fern Tree to Kingston, 3 Jan 1965, *L.A.S.Johnson* (NSW); South East, Castle Forbes Bay, 22 May 1978, *W.M.Curtis & B.Allen* (HO, NSW).

Juncus balticus × *Juncus breweri*

Probable hybrids were reported by H.L.Lint (unpubl.) from California, Oregon and Washington. The status of the plants and the degree of sterility of the putative hybrids remains to be studied.

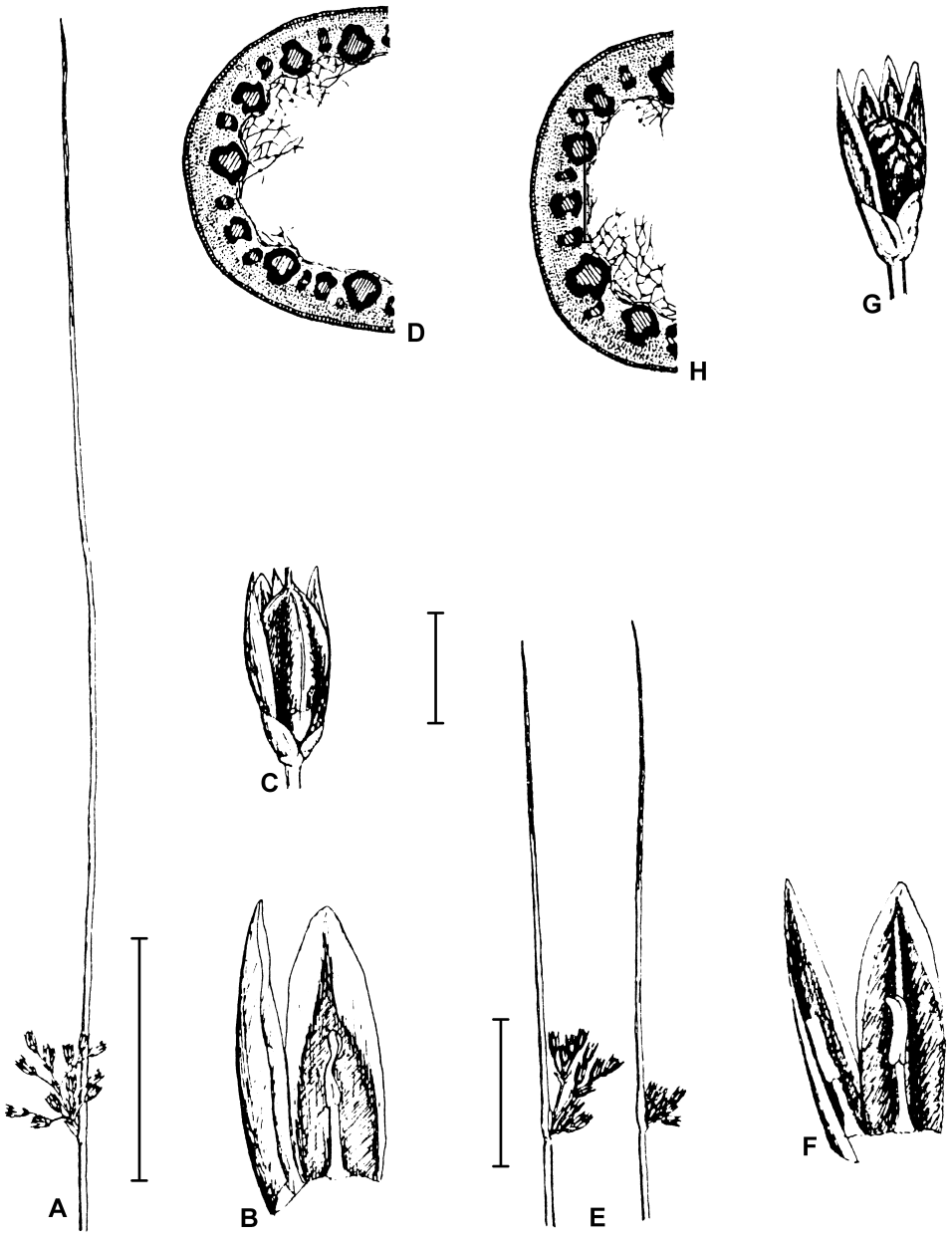


Figure 147. *Juncus balticus* subsp. *balticus* × *Juncus filiformis*. **A**, inflorescence; **B**, tepals; **C**, flower; **D**, stem T.S. *Juncus arcticus* subsp. *arcticus* × *Juncus filiformis*. **E**, inflorescence; **F**, tepals; **G**, flower with capsule; **H**, stem T.S. Scale bars: **A**, **E** = 2 cm; **B**, **F** = 1.5 mm; **C**, **G** = 2 mm; **D**, **H** = 0.6 mm. Drawn by Ö.Nilsson. Reproduced with permission from Ö.Nilsson & S.Snogerup, Bot. Not. 124: 315 & 316, fig. 58 & 59 (1971). © Lund Botanical Society.

Juncus balticus × *Juncus lesueurii*

Reported from California by H.L.Lint (unpubl.). The putative hybrids occur among parental plants in the vicinity of San Francisco; they require further study to prove their hybrid status.

Juncus balticus subsp. *balticus* × *Juncus effusus* subsp. *effusus*

Juncus ×*obotritorum* Rothm., *Wiss. Zeitschr. Univ. Greifswald* 14: 79 (1965). T: [Germany, Mecklenburg] inter Wustrow et Dierhagen prope Ribnitz Megalopolitanae, 16 Sep 1961, *W.Rothmaler & U.Schneider*; holo: *n.v.* [not given in the protologue; probably JE or GFW].

[*Juncus scalovicus auct. non* Asch. & Graebn., *Ber. Deutsch. Bot. Ges*. 11: 524 (1893): P.Ascherson & P.Graebner, *Syn. Mitteleur. Fl.* 2(2): 45 (1904). See *Juncus balticus* × *J. filiformis*].

The hybrid is low, has thin stems and looks in habit most like a non-caespitose *Juncus inflexus*. The stem anatomy is intermediate between that of the parents. It is completely seed sterile but the pollen stains perfectly. It has apparently spread vegetatively for at least 9 km in the sole British locality.

A very rare hybrid, certainly known only from one small area near Airsdale in S. Lancashire in England and from the type locality of *Juncus* ×*obotritorum* in northernmost Germany.

Juncus balticus subsp. *balticus* × *Juncus filiformis*

Juncus ×*inundatus* Drejer, *Bot. Tidsskr*. 2: 181 (1838), *n.v.*; *Juncus balticus* var. *inundatus* (Drejer) Fr., *Summa Veg. Scand*. 1: 65 (1846), *n.v.*; *Juncus arcticus* var. *inundatus* (Drejer) Trautv., *Trudu Imp. S.-Peterburgsk. Bot. Sada* 5 (1) 118 (1877); *Juncus balticus* subsp. *inundatus* (Drejer) Nyman, *Consp. Fl. Eur*. 747 (1882). T: *n.v.*

Juncus scalovicus Asch. & Graebn., *Ber. Deutsch. Bot. Ges*. 11: 524 (1893). T: [Russia, Kaliningrad region, the former East Prussia] Ostpreussen, *Puszinen bei Tilsit*; syn: *n.v.*

Illustration: Ö.Nilsson & S.Snogerup, *Bot. Not*. 124: 315, fig. 58 (1971).

Long-lived perennial, vegetatively propagating by branching rhizome. Stem usually 60–100 cm tall, taller but often weaker than in either of the parents. Stem and bract smooth as in *Juncus balticus*. Anthers poorly developed but pollen often at least 50 % stainable. Capsules developed to full size but irregular in form and with 0–5 variously formed seeds. Propagation by seed or backcross not proved. Fig. 147.

In many cases formed where the parents meet, forming sometimes very large stands and often found in the absence of one or both parents. 10: DEN, FIN, NOR, SWE. 11: GER, 14: BLT, RUW.

10. DENMARK: Jylland: Slettestrand, 6 Aug 1937, *Kinnander* (LD); Västjylland, Sodbjerg Fyr, 15 Jul 1971, *Rickman* (LD). FINLAND: Ostrobottnia media, Pedersöre parish, Ådön Is., *C.W.Fontell [Pl. Finl. Exs.] 147* (H, LD etc.); Oulun Pohjanmaa, Hailuoto Is., 3 km S of Marjaniemi, *S.Snogerup 12531* (LD). NORWAY: Tromsö, 24 Jul 1927, *N.O.V.Sylvén* (LD); Nordland, Vesterålen, Hadselöy, Ångstad, *H.Smith 4543* (LD). SWEDEN: Norrbotten, Nederkalix parish, Storön, *S.Grapengiesser [Pl. Suec. Exs.] 461* (LD, S etc.); Skåne, Arlöv, 1200 m NE of Burlöv Centrum, *S.Snogerup 9555* (LD).

Juncus balticus subsp. *balticus* × *Juncus inflexus* subsp. *inflexus*

This hybrid is taller than any of the parents, with thick stems, and propagates extensively by a long-noded creeping rhizome. It has apparently spread 20 km from a single place of hybridization. No seed set has been observed, but the pollen stains perfectly.

So far only known from one single coastal area at Airsdale in S. Lancashire.

Juncus balticus subsp. *mexicanus* × *Juncus textilis*

Tall and stout plant. Subepidermal sclerenchyma strands lacking. There are no observations on the degree of sterility, but it has been noted that no hybrid swarms occur.

Reported and mapped from several places in San Diego and Ventura counties by Lint (unpubl.).

Juncus bassianus × *Juncus gregiflorus*

Reported by L.A.S.Johnson [in M.R.Banks *& al*., *Asp. Tasman. Bot. Trib. W. Curtis* 41 (1991)]. Fertility of the plants is largely suppressed.

50. TASMANIA: Harz Mountains, near hut at the top of road, 43°13′ S 146°46′ E, 28 Feb 1986, *K.D.Hill 1553, L.A.S.Johnson & D.Blaxell* (NSW).

Juncus conglomeratus × *Juncus effusus* subsp. *effusus*

Juncus ×*haussknechtii* P.Fourn., *Quatre Fl. France* 521 (1928), *nom. illeg*., *non* Ruhmer (1881); *Juncus* ×*kern-reichgeltii* Jansen & Wacht. ex Reichg., *Fl. Neerl*. 1: 201 (1964). T: not indicated [both names doubtfully valid because of the absence of a clear description in the protologue of Fournier's name].

Juncus brueggeri Domin, *Preslia* 13–15: 23 (1936). [Probably validated through a reference to C.G.Brügger, *Jahresber. Naturforsch. Ges. Graubünden* 23–24: 119 (1863). Further direct or indirect references include H.C.Haussknecht, *Mit. Geogr. Ges. Thüring*. 2: 217 (1884) and F.G.P.Buchenau, *in* H.G.A.Engler, *Pflanzenr*. (iv.36) 25: 137 (1906) and perhaps other works of Buchenau. So far, the validating description has not been traced in the works referred to.]

Illustration: Ö.Nilsson & S.Snogerup, *Bot. Not*. 124: 185, fig. 54 (1971).

Forming large and long-lived tussocks similar to the parents. Stem with 25–35 ridges as those of *Juncus conglomeratus* in structure but not as prominent. Inflorescence dense but less compact than in *Juncus conglomeratus*. Anthers variously developed, pollen staining well. Capsules well developed, probably sometimes with ±reduced seed set. The frequency and properties of this hybrid need further investigation. Fig. 148.

Juncus conglomeratus × *Juncus inflexus* subsp. *inflexus*

Juncus ruhmeri Asch. & Graebn., *Syn. Mitteleur. Fl*. 2(2): 451 (1904). T: Brandenburg, Friedeberg, zwischen Wildenow und dem Busch, *G.F.Ruhmer*; syn: *n.v.*

A still imperfectly known hybrid, reported from several places in Europe.

11. AUSTRIA: Südkärnten, Bleiburg, 16 Aug 1965, *H.Melzer* (W).

Juncus effusus subsp. *effusus* × *Juncus inflexus* subsp. *inflexus*

Juncus ×*diffusus* Hoppe, *Flora* 1(2): 186 (1819), *pro sp*.; *Juncus glaucus* subsp. *diffusus* (Hoppe) Bonnier & Layens, *Fl. France* 319 (1894). T: [Germany] Regensburg, in der Gegend von Stauf, *D.H.Hoppe [Herb. Viv. Pl. Gramin.] 155*; syn: BRNM, LI.

Illustration: Ö.Nilsson & S.Snogerup, *Bot. Not*. 124: 184, fig. 53 (1971).

Like *Juncus inflexus* in habit but usually taller, light green. Ridges on stem 25–49, like those of *Juncus inflexus* but irregularly placed. Flowering prolonged until late autumn; anthers usually poorly developed but pollen 60–85% stainable. Capsules often degenerating but some well developed, no viable seeds formed. Repeatedly formed where the parents meet, forming large and long-lived tussocks but rhizome short and no effective vegetative propagation reported. Known from S Scandinavia and C Europe and from Algeria. Fig. 148.

10. DENMARK: Bornholm, Ormebaekken, 5 Jul 1894, *L.M.Neuman* (LD). SWEDEN: Skåne, Benestad, 12 Sep 1911, *O.R.Holmberg* (LD).

Juncus effusus subsp. *solutus* × *Juncus pylaei*

Striations of stem conspicuous but low and irregularly placed.

72. CANADA: Ontario, Chalk R., 1946, *I.Hustich* (H, det. L.Hämet-Ahti).

Juncus filicaulis × *Juncus subsecundus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 282 (1993)] From NSW without further information.

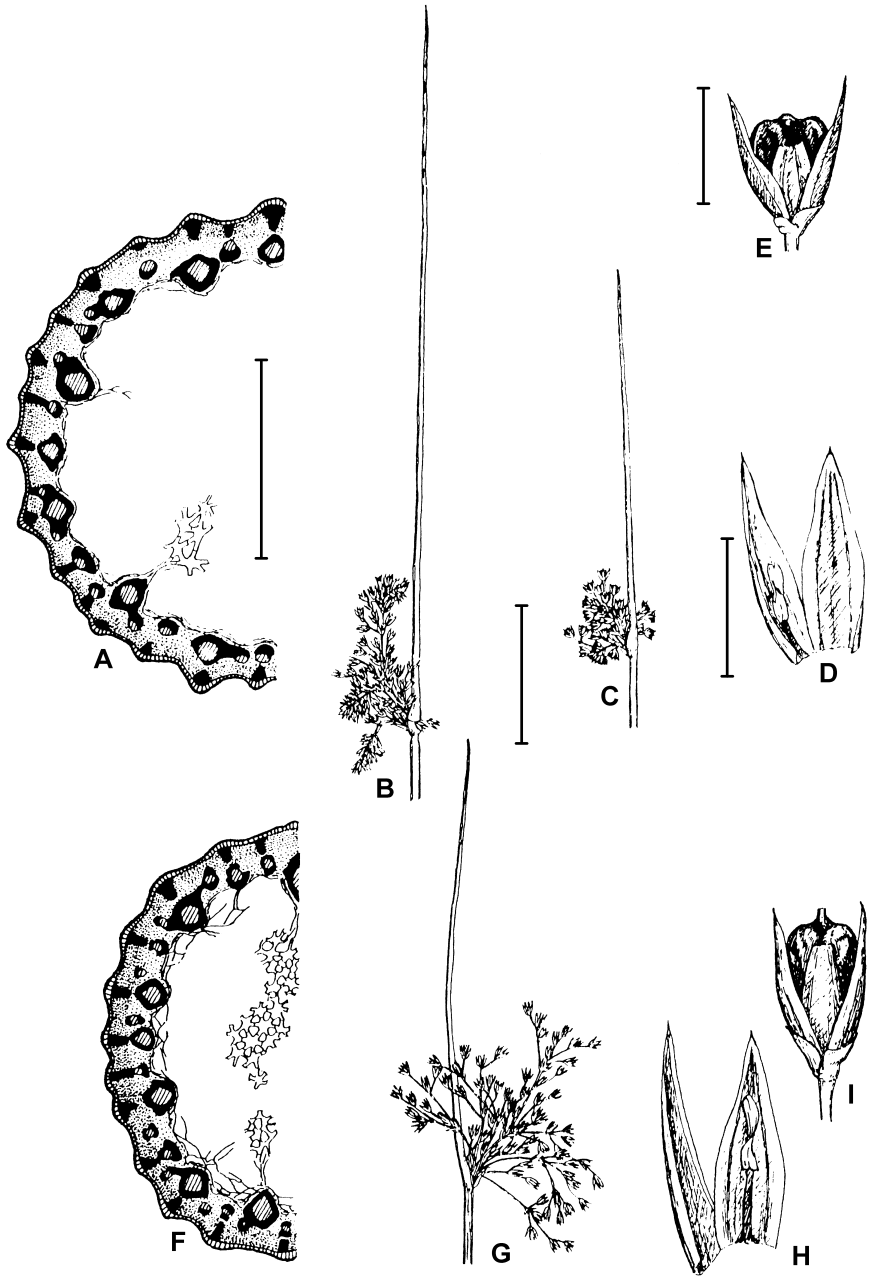


Figure 148. *Juncus conglomeratus* × *Juncus effusus* subsp. *effusus*. **A**, stem T.S.; **B**, **C**, inflorescence; **D**, tepals and stamen; **E**, flower with capsule. *Juncus effusus* subsp. *effusus* × *Juncus inflexus* subsp. *inflexus*. **F**, stem T.S.; **G**, inflorescence; **H**, tepals with stamen; **I**, flower with capsule. Scale bars: **A**, **F** = 0.8 mm; **B**, **C**, **G** = 3.4 cm; **D** = 2 mm; **E** = 2.3 mm. Drawn by Ö.Nilsson. Reproduced with permission from Ö.Nilsson & S.Snogerup, *Bot. Not*. 124: 184 & 185, fig. 53 & 54 (1971). © Lund Botanical Society.

Juncus flavidus × *Juncus radula*

Juncus correctus Steud., *Syn. Pl. Glumac*. 2: 296 (1855). T: Western Australia, *J.Drummond 319*; lecto: P, *designated here* by K.L.Wilson; iso: BM, photo NSW, MEL.

Densely caespitose, c. 70 cm tall. Inflorescence many-flowered. Pollen well staining but not readily separating.

50. NEW SOUTH WALES: Parkes, 17 Sep 1936, *J.Mauritzon* (LD, det. L.A.S.Johnson).

Juncus inflexus subsp. *inflexus* × *Juncus pallidus*

Reported from stands of casual *Juncus pallidus* in Bedfordshire, England, but extinct according to C.A.Stace, *Hybrid. Fl. Brit. Isl*. 463 (1975). No note on degree of sterility.

Juncus mollis × *Juncus polyanthemus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 279 (1993)] as occasionally occurring in New South Wales.

50. NEW SOUTH WALES: Martinsville, *L.A.S.Johnson* (NSW 69035).

Juncus mollis × *Juncus usitatus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 279 (1993)] as occasionally occurring in New South Wales.

50. NEW SOUTH WALES: Devlins Ck, Beecroft, *L.A.S.Johnson 7909* (NSW).

Juncus polyanthemus × *Juncus usitatus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 279 (1993)] as occasionally occurring in New South Wales. It is probably relatively common between parents, and fertile.

50. NEW SOUTH WALES: North Coast, Gloucester, *R.G.Coveny* 16727 (NSW).

Juncus remotiflorus × *Juncus subsecundus*

Reported by K.L.Wilson [in G.J.Harden (ed.), *Fl. New South Wales* 4: 282 (1993)] as occasionally occurring in New South Wales. It seems to be relatively common and fertile.

50. NEW SOUTH WALES: 13 km ESE of Michelago, Tinderry Mtns, *R.G.Coveny 6337 & P.D.Hind* (NSW).

Excluded Hybrid

A hybrid between *Juncus effusus* and *Juncus pallidus* was reported from a stand of casual *Juncus pallidus* in Bedfordshire, England, but its identity was questioned already by C.A.Stace, *Hybridization Fl. Brit. Isl*. 464 (1975).

Doubtful Names

Juncus dulongjiongensis Novikov, *Bjull. Moskovsk. Obšč. Prir., Odt. Biol*. 103(4): 69 (1998).

T: China, Yunnan, Dulongjiong. 22 Nov 1990, *[Anonymous] 753*; holo: KUN312519.

A species from the vicinity of *Juncus setchuensis* but differing in the shape of capsule, blackish brown cataphylls and interrupted pith. Further study is necessary; until now only a single specimen has been observed.

Juncus communis γ. [unranked] *robustus* E.Mey., *Linnaea* 10: 243 (1853).

T: [Australia] Lofty Range, *F.Mueller*; syn: *n.v.*; Fiedler's Section, Novobr. [New England], *Behr*; syn: *n.v.*; Van Diemensland [Tasmania], *C.Stuart*; syn: *n.v.*

Juncus lesueurii var. *stenocaulon* Buchenau, *in* H.G.A.Engler, *Pflanzenr*. (iv.36) 25: 148 (1906)

T: not indicated [not located in herb. Buchenau in W nor in the other herbarium collections consulted].

Accepted in M.Barros, *Darwiniana* 10(3): 395 (1953), but interpretation unclear. It may belong to *J. lesueurii*.

Juncus flexilis Turcz., *in* S.S.Stscheglejew, *Ukaz. Otkryt*. 8 (1): 412 (date not identified), *n.v.*

Juncus palustris Gromov, *Tr. Obshch. Nauk Khark. Univ*. 1: 144 (date not identified), *n.v.*

Juncus communis var. *japonicus* Miq., *Prolus. Fl. Jap*. [*Ann. Mus. Bot. Lugduno Batavi* 3: 164 (1867)].

T: Japan, *Buerger*; syn: L, *n.v.*; in Archipelago Coreano, *R.Oldham 895*; syn: L, *n.v.*

Juncus polyanthemus var. *major* J.M.Black, *Fl. South Australia*, 2nd edn, 1: 183 (1948), *nom. inval.*

SECTION 10. FORSKALINA

Juncus sect. **Forskalina** Kuntze, *in* T.E. von Post & O.Kuntze, *Lex. Gen. Phaner*. 303 (1903)

Juncus subg. *Subulati* Buchenau, *Bot. Jahrb. Syst*. 1: 118 (1880); *Juncus* sect. *Subulati* (Buchenau) Rouy, *Fl. France* 13: 245 (1912), *nom. illeg*.; *Juncus* subg. *Forskalina* (Kuntze) V.I.Krecz. & Gontsch., *in* V.L.Komarov, *Fl. SSSR* 3: 557 (1935), *nom. illeg*. T: *Juncus subulatus* Forssk.

Tall, rigid perennials; rhizome thick, creeping. Stem leafy; cauline leaves terete, non-septate, acute; pith of astericiform cells; vascular bundles confined to the surrounding parenchyma. Stomata sunken. Lower bract not an apparent prolongation of stem. Inflorescence terminal, cymose, supradecomposite. Flowers borne singly; floral bracteoles present. Stamens 6. Seeds faintly reticulate; appendages ±not developed.

A single species distributed in the whole Mediterranean from Spain and Morocco to Palestine and Syria, the Black Sea region, Iraq, Iran and Middle Asia. Locally important as forage.

311. Juncus subulatus Forssk., *Fl. Aegypt.-Arab*. 75 (1775)

T: [Egypt] Alexandriae, Apr 1762, *Forsskål 30 (237)*; holo: C-FORSK.

Juncus multiflorus Desf., *Fl. Atlant*. 1: 313 (1798), *nom. illeg*., *non* Retz. (1795); *Tenageia multiflora* (Forssk.) Fourr., *Ann. Soc. Linn. Lyon*, sér. 2, 17: 172 (1869). T: [N Africa] '... in paludibus'; [illegible], *R.Desfontaines 739*; holo: P-DESF.

Juncus siculus Tineo, *in* G.Gussone, *Fl. Sicul. Syn*. 2(2): 888 (1844); *Juncus subulatus* subsp. *siculus* (Tineo) Richt., *Pl. Eur*. 1: 176 (1890); *Juncus multiflorus* var. *siculus* (Tineo) Lojac., *Fl. Sicula* 3: 156 (1909). T: [Sicily] Trapani, *V.Tineo*; syn: PAL, *n.v.*

Juncus salinus Durieu, *in* J.B.G.M.Bory de Saint-Vincent & M.C.Durieu, *Expl. Sci. Alg. Fl*. 1: tab. 43 (1849); *Juncus multiflorus* subvar. *salinus* (Durieu) Coss. & Durieu, *in* J.B.G.M.Bory de Saint-Vincent & M.C.Durieu, *Expl. Sci. Algér*. 2: 263 (1868); *Juncus subulatus* f. *salinus* (Durieu) Maire, *Fl. Afr. Nord* 4: 284 (1957). T: [Algeria] ad lacum Miserghin prope Oran, *M.C.Durieu*; syn: *n.v.*; icon *in* J.B.G.M.Bory de Saint-Vincent & M.C.Durieu, *Expl. Sci. Alg. Fl*. 1: tab. 43 (1849); syn.

Illustrations: M.C.Durieu, *in*J.B.G.M.Bory de Saint-Vincent & M.C.Durieu, *Expl. Sci. Alg. Fl*. 1: tab. 43 (1849); F.G.P.Buchenau, *in* H.G.A.Engler, *Pflanzenr*. (iv.36) 25: 102, fig. 58 (1906); A.J.Willis & E.W.Davies, *Watsonia* 4: 214, fig. 1 (1960); S.Pignatti, *Fl. Ital*. 3: 432 (1982).

Map: A.J.Willis & E.W.Davies, *Watsonia* 4: 214, fig. 2 (1960).

Perennials, c. 30–120 cm tall, robust; rhizome to 6 mm diam., creeping; internodes c. 1–5 cm long. Cataphylls 2–3, ±brown; blade absent or short filiform. Cauline leaves 2–4, ±terete, to c. 60 cm long, sometimes exceeding inflorescence; auricles present; sheaths ±dilated; pith of astericiform cells; apex acuminate. Lower bract c. 2–5 (–10) cm long, shorter than inflorescence, acuminate. Bracteoles stramineous-membranous, ovate, acuminate, to c. 2 mm

long. Inflorescence supradecomposite, of several anthelas, multiflorous, c. (3–) 7–20 (–40) cm long, to 5–8 cm diam. Tepals subequal, with outer often slightly longer, 2.4–3.5 mm long, usually pale brown to stramineous-brown, ovate-lanceolate, apiculate to acute; margins broad, membranous; inner tepals subobtuse, mucronate. Stamens 6, c. 1/2 as long as perianth; anthers 0.9–1.3 mm long; filaments c. 0.3–0.4 mm long; style to 1 mm long; stigmas c. 1 mm long. Capsule ovoid-trigonous, 2.5–3.0 mm long, ±equalling perianth, obtuse to subobtuse, dark castaneous-brown; mucro short. Seeds obliquely ovoid, c. 0.5–0.7 × 0.30–0.35 mm, ±brown to pale brown, slightly reticulate; apices prominent, appendix-like, less than 0.1 mm long. 2n = 42, *fide* S.Snogerup, *Bot. Not*. 116: 146–147 (1963).

Coastal areas of W and S Europe, most of North Africa, including parts of Sahara, the E Black Sea and Caspian regions, the Near East, W Middle Asia. 10: grb. 12: BAL, COR, FRA, POR, SAR, SPA. 13: ALB, GRC, ITA, KRI, SIC, YUC. 20: ALG, EGY, LBY, MOR, TUN. 32: TKM, TZK, UZB. 33: TCS. 34: CYP, EAI, IRN, IRQ, LBS, PAL, TUR. Salt marshes, coastal and inland saline sites, shores of saline lakes, often together with species of the section *Juncus*. Map 537.

10. GREAT BRITAIN: England, N Somerset, Berrow, *N.Y.Sandwith 5444* (L). **12.** BALEARES: Menorca, between Cavallaria and Mercendal, 15 Jul 1885, *P.Porta & G.Rigo* (K, LD, PR). CORSE: Bonifacio, *J.L.Kralik [Pl. Cors.] 815* (K, P). FRANCE: Var, La Garde, 20 Jun 1900, *A.Albert & Cerbiére [Soc. Etude Fl. Fr.-Helv.] 1128* (P). SPAIN: Cádiz, Medina Sidonia, *N.Y.Sandwith 6221* (K). **13.** GREECE: Serrai, Struma R., *K.H.Rechinger 9232* (K). KRITI: Ag. Nikolaos, *H.Runemark & S.Snogerup 17499* (LD). **20.** ALGERIA: Sidi-Yahia, Oued Rhir, *L.Chevallier [Pl. Sahar. Alger.] 640* (P). EGYPT: Bahariya Oasis, Al-Harra, *Abd El Ghani 1835* (K). **32.** TADZHIKISTAN: Akyurabad, Vaksh R., *A.I.Vvedenskiy 202a* (TAK). TURKMENISTAN: Kisil-Arvat, *Povarnitsina 550* (TAK). UZBEKISTAN: Sherabad, between Khtai & Bish-Khotan, *M.G.Popov [Herb. Fl. As. Med.] 329* (K). **33.** SOUTH CAUCASUS: Azerbaijan, Gandza, 27 Jun 1928, *L.Prilipko* (BAK). **34.** CYPRUS: Famagusta, 9 Jul 1939, *H.Lindberg* (K, S). ISRAEL: Haifa, *F.S.Meyers & J.E.Dinsmore 3423* (L).

Doubtful names

(whole genus, section not identified)

Juncus bracteosus Kit. ex Kanitz, *Linnaea* 32: 332 (1863).

T: [Hungary] E rivo Solymosiensi, *Kitaibel*; syn: BP, *n.v.*

In the Kitaibel collection of herbarium BP, there is a specimen of *Juncus articulatus* considered as a possible type of *J. bracteosus* by S.Jávorka, *Ann. Mus. Nat. Hung*. 26: 197–198 (1929). The specimen is labeled 'E rivo in Somos Matrae' but does not correspond to the description given by Kanitz.

Juncus phyllophorus Lojac., *Fl. Sicula* 3: 165, plate xi, fig. 3 (1909).

T: [Sicily] ad Alcamo, [*collector not given*]; holo: PAL, *n.v.*

Juncus philippii Lojac., *Fl. Sicula* 3: 167, pl. xi, fig. 5 (1909).

T: [Sicily] in Sicilia, *R.A.Philippi*; holo: n.v

Juncus laterifolius Anonymous, *Escritos Dámaso Antonio Larrañaga* 2: 138 (1923).

T: not indicated.

Juncus terminifolius Anonymous, *Escritos Dámaso Antonio Larrañaga* 2: 138 (1923).

T: not indicated.

Juncus aristatus Anonymous, *Escritos Dámaso Antonio Larrañaga* 2: 138 (1923), *nom. illeg.*

T: not indicated.

Juncus liukiuwi Sieb., *Verh. Batav. Genootsch. Kunst. Wetensch*. 12: 11 (1830), *nom. inval.*

Excluded Names

Juncus zeilanicus Houtt., *Nat. Hist*. 2 (13), Aanwyz Plaat. [2]: tab. 93, fig. 1 (1782)

T: icon in E. van F.Houttuyn, *Nat. Hist*. 2 (13): tab. 93, fig. 1 (1782); syn.

As stated by E.D.Merrill, *J. Arnold Arb*. 19: 322 (1938), both the description and the figure belong to *Scleria zeylanica* Poir. of the Cyperaceae.

Juncus rubens Lam., *Encycl*. 3: 266 (1789)

T: [Uruguay] Monte-Video, *P.Commerson*; holo: P, not found.

The description hardly refers to a species of *Juncus* and the description of flowers was not provided.

Juncus parviflorus Poir., *Encycl*., Suppl. 3: 160 (1813), *nom. illeg*., *non* Ehrh. (1791).

T: Porto-Ricco, *Ledru*; holo: P, *n.v.*

The description shows that the name does not refer to any species of the Juncaceae. The type specimen was seen in Paris by F.G.P.Buchenau [in I.Urban, *Symb. Antill*. 1: 498 (1900)]. It represents *Rhynchospora micrantha* Vahl.

Juncus loureiroanus Schult. & Schult.f., *Syst. Veg*. 7(1): 238 (1829).

T: [a new name for *J. bulbosus sensu* Loureiro, *Fl. Cochinch*. 265 (1790)] not indicated [original material of Loureiro was searched for authentic material, but type not found].

According to A.Camus [in F.Gagnepain, *Fl. Gén. Indo-Chine* 941 (1937)], the name refers to *Eleusine indica* (L.) Gaertn.

Juncus dioicus Steud., *Syn. Pl. Glumac*. 2: 309 (1855).

T: Australia, Port George; holo: P [three sheets].

The name does not belong to the Juncaceae; it represents a synonym of *Anarthria gracilis* R.Br. of the Restionaceae.

Voladeria carchiensis Benoist, *Bull. Soc. Bot. France* 84: 637 (1937).

T: Ecuador, Carchi, Páramo del Angel, 3500 m, *M.R.Benoist 4629*; holo: P, *n.v.*

H.Balslev visited the type region, and the only plant corresponding to the original description of M.R.Benoist is *Oreobolus* of the Cyperaceae.

APPENDIX I

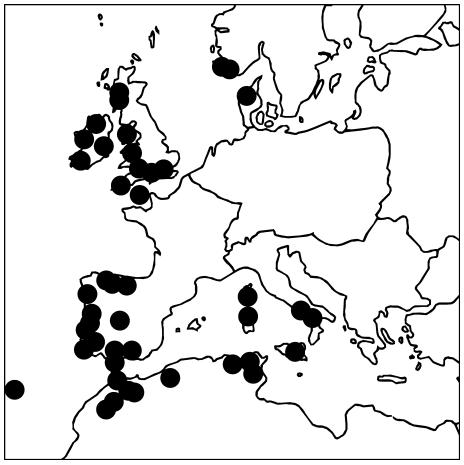
List of taxa with lectotypes and neotypes designated in the present volume (by J.Kirschner, if not otherwise stated in the text).

Juncus ambiguus Guss.	12
Juncus australis Hook.f.	118
Juncus balticus subsp. *pacificus* Engelm.	76
Juncus bufonius var. *amuricus* Maxim.	7
Juncus bufonius var. *fasciculatus* Koch	15
Juncus castaneus Clairv.	81
Juncus correctus Steud.	144
Juncus dichotomus Elliott	32
Juncus effusus subsp. *hesperius* Piper	95
Juncus fauriei Lév. & Vaniot	77
Juncus filicaulis Buchenau	122
Juncus filiformis var. *aphyllus* E.Mey.	107
Juncus glaucus Ehrh. ex P.Gaertn., B.Mey. & Scherb.	104
Juncus gunnii Hook.f.	125
Juncus lesueurii Bol.	76
Juncus lesueurii var. *elatus* S.Watson	101
Juncus lesueurii var. *tracyi* Jeps.	75
Juncus patens E.Mey.	83
Juncus plebeius R.Br.	9
Juncus polyanthemus Buchenau	130
Juncus radula var. *laevior* Buchenau	133
Juncus sprengelii Willd.	40
Juncus subg. *Agathryon* Raf.	1
Juncus tenuis var. *uniflorus* Farw.	38
Juncus trifidus L.	43
Juncus vaseyi Engelm.	27
Juncus warakensis Nábělek	105

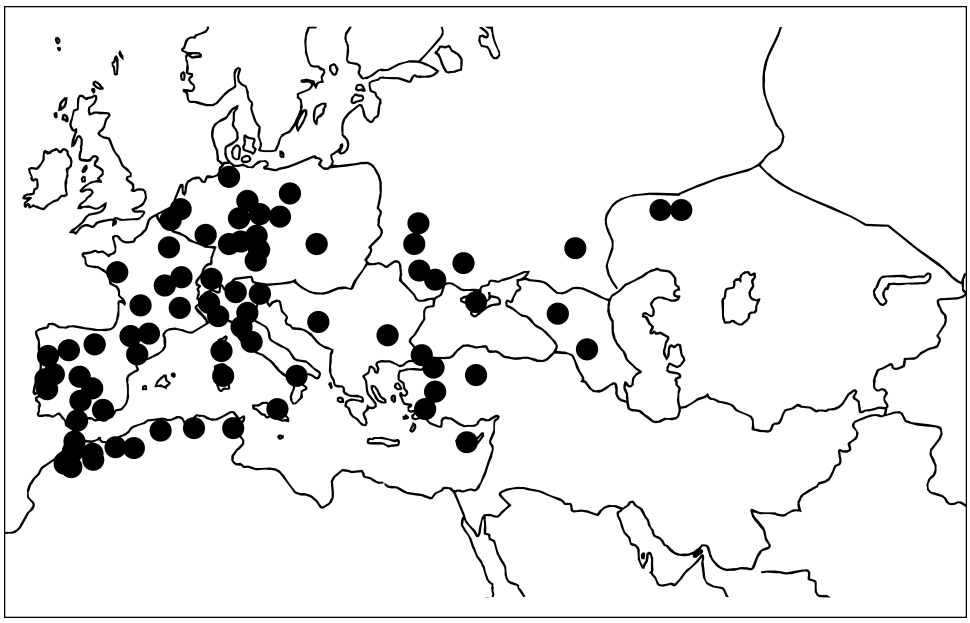
MAPS

Number in brackets refers to the page on which the taxon is described.

405. Juncus rechingeri (3)

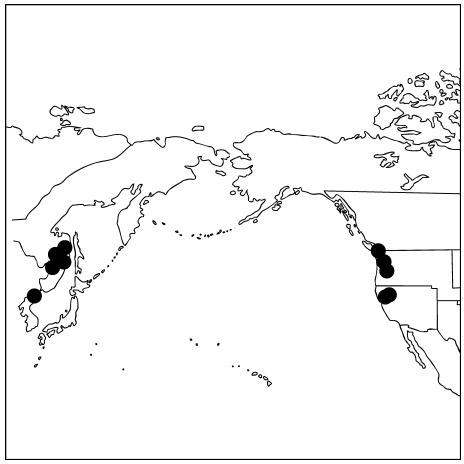


406. Juncus foliosus (4)

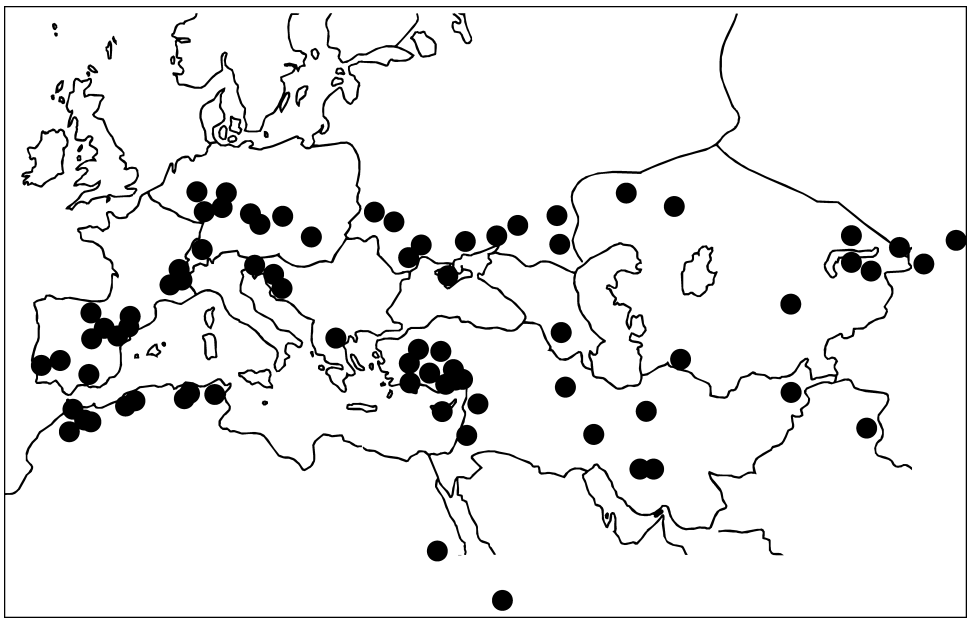


407. Juncus tenageia subsp. tenageia (5)

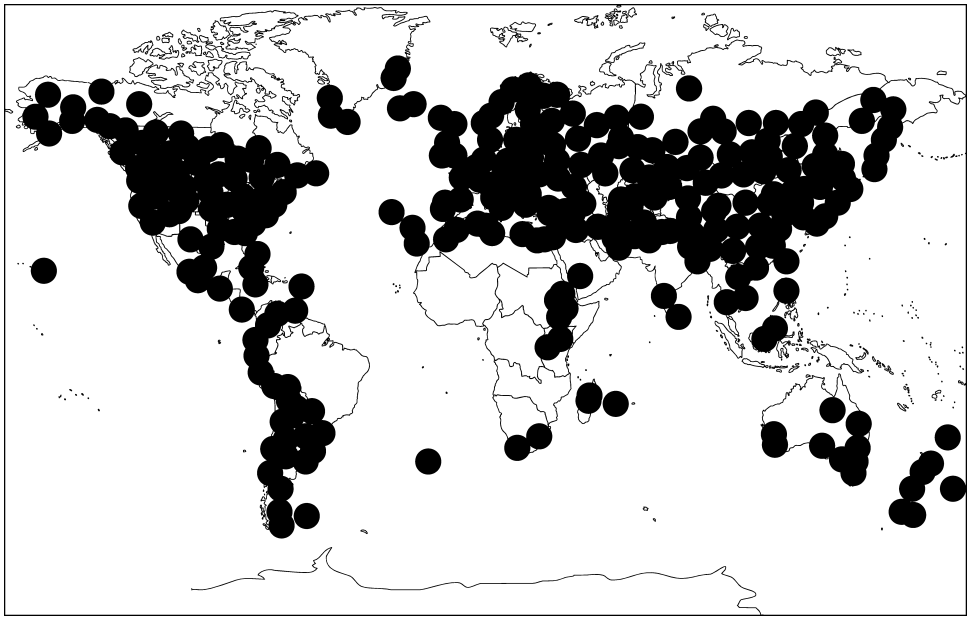
408. Juncus tenageia subsp. perpusillus (5)



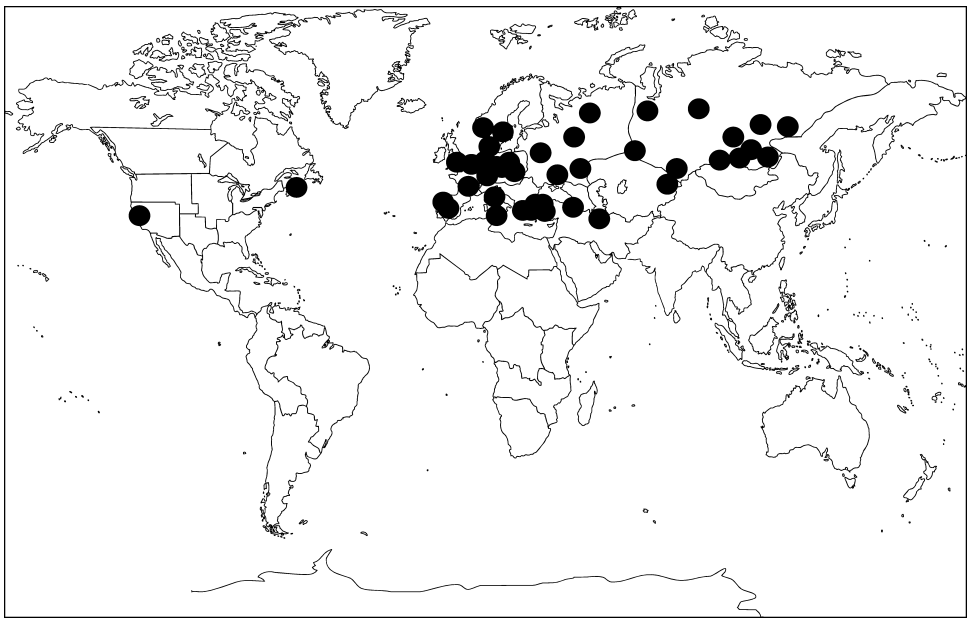
409. Juncus amuricus (7)



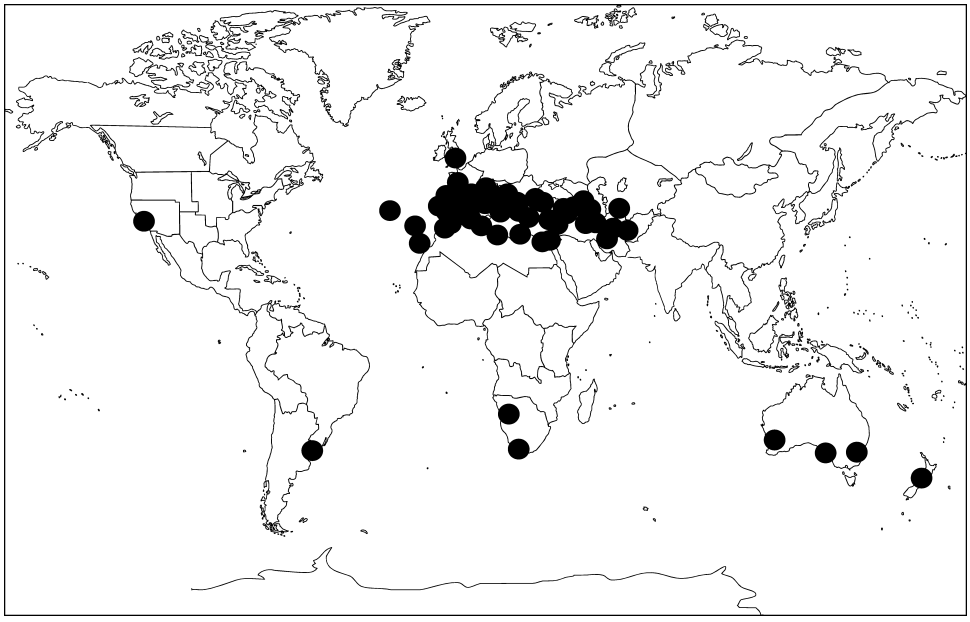
410. Juncus sphaerocarpus (7)



411. Juncus bufonius (9)

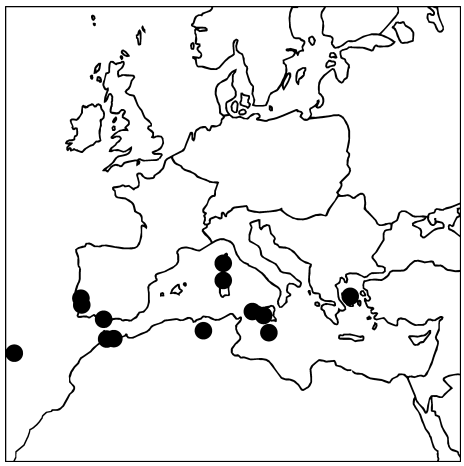


412. Juncus minutulus (10)

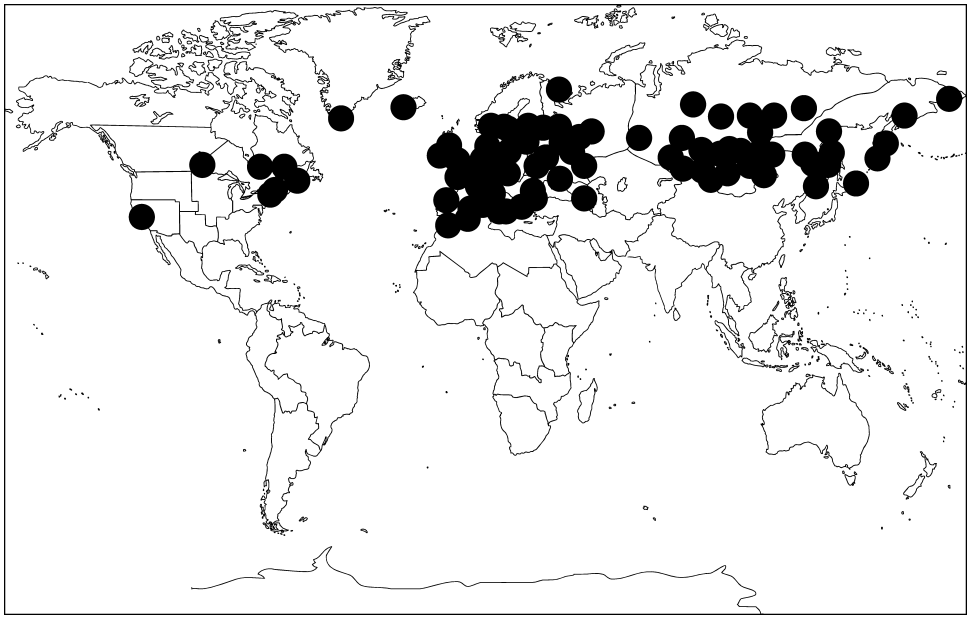


413. Juncus hybridus (12)

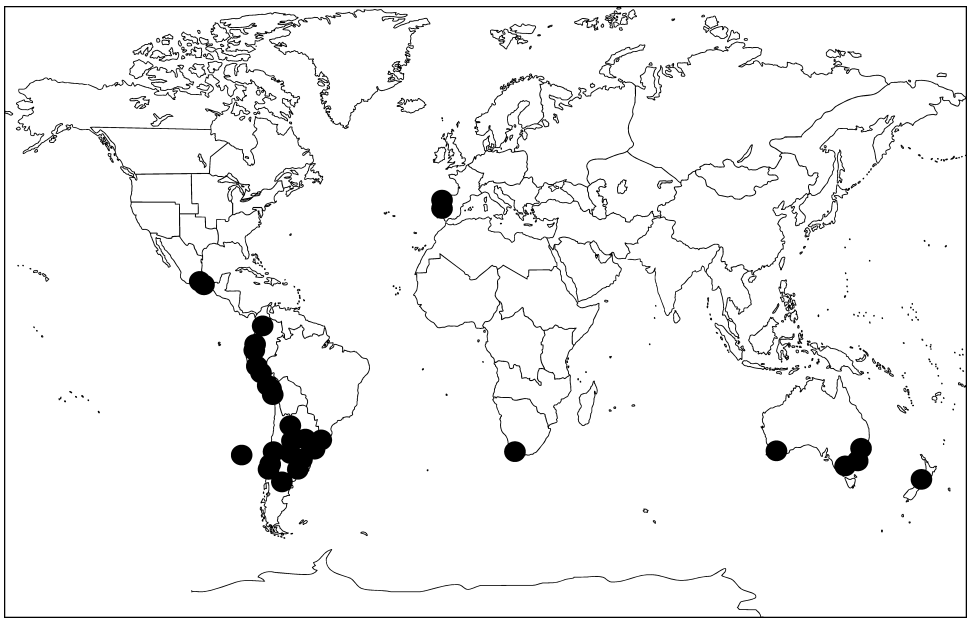
414. Juncus turkestanicus (13)



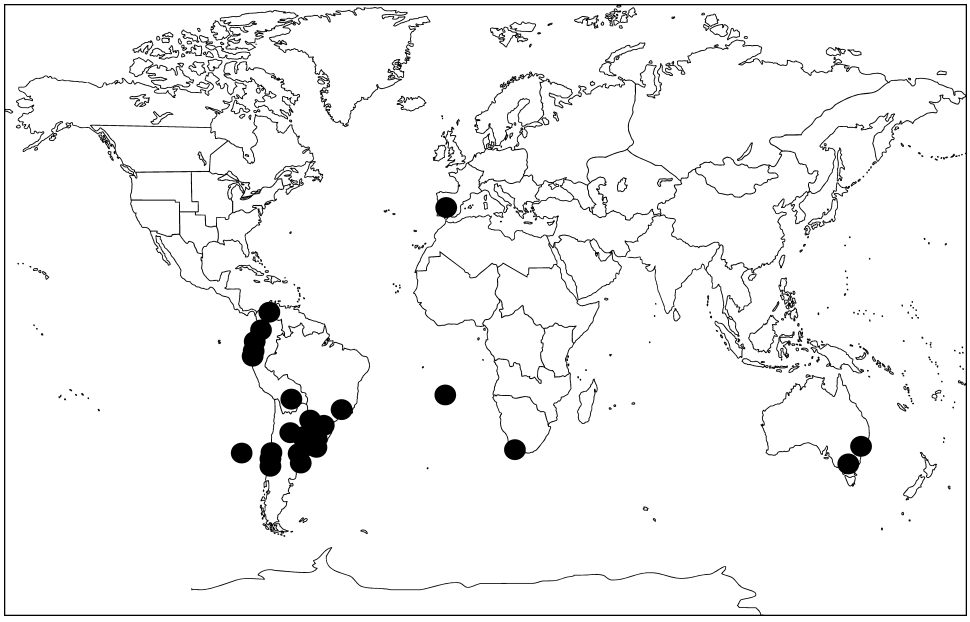
415. Juncus sorrentinii (14)



416. Juncus ranarius (14)



417. Juncus imbricatus (20)

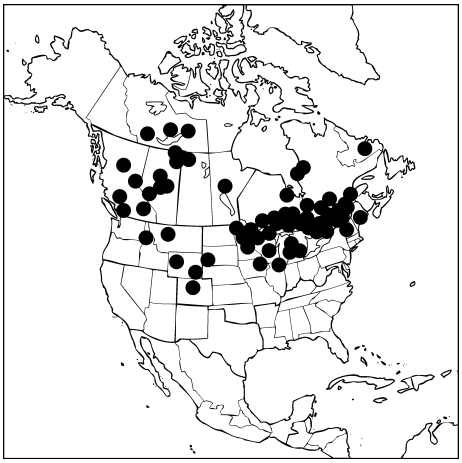


418. Juncus capillaceus (21)

419. Juncus cordobensis (24)

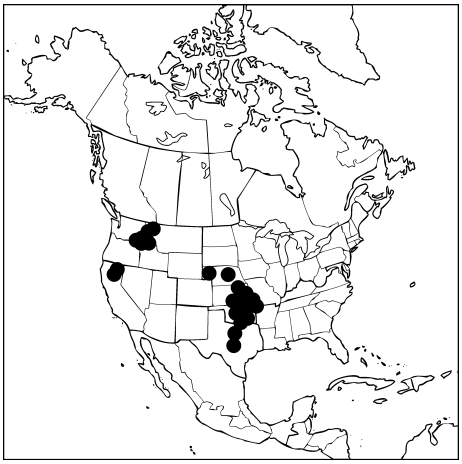
420. Juncus venturianus (25)

421. Juncus coriaceus (25)

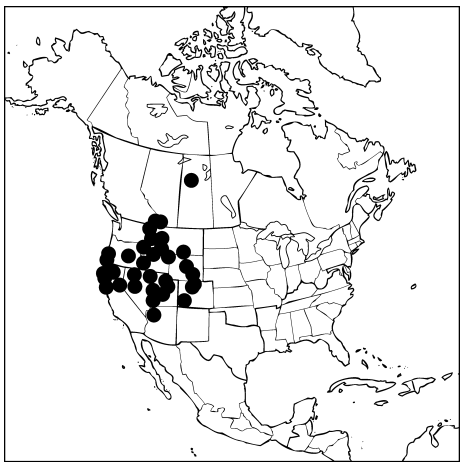


422. Juncus vaseyi (27)

423. Juncus greenei (27)



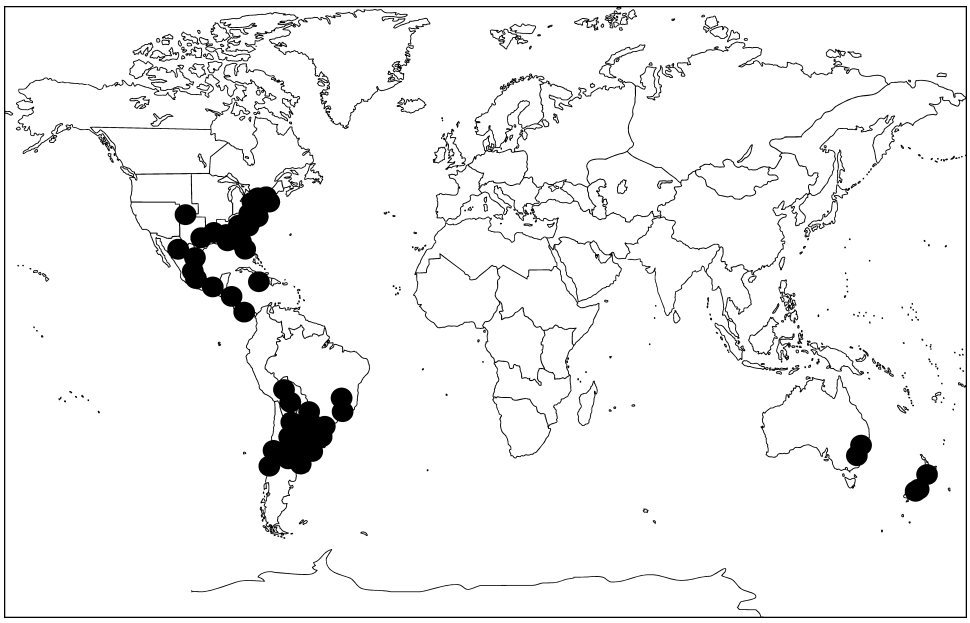
424. Juncus brachyphyllus (29)



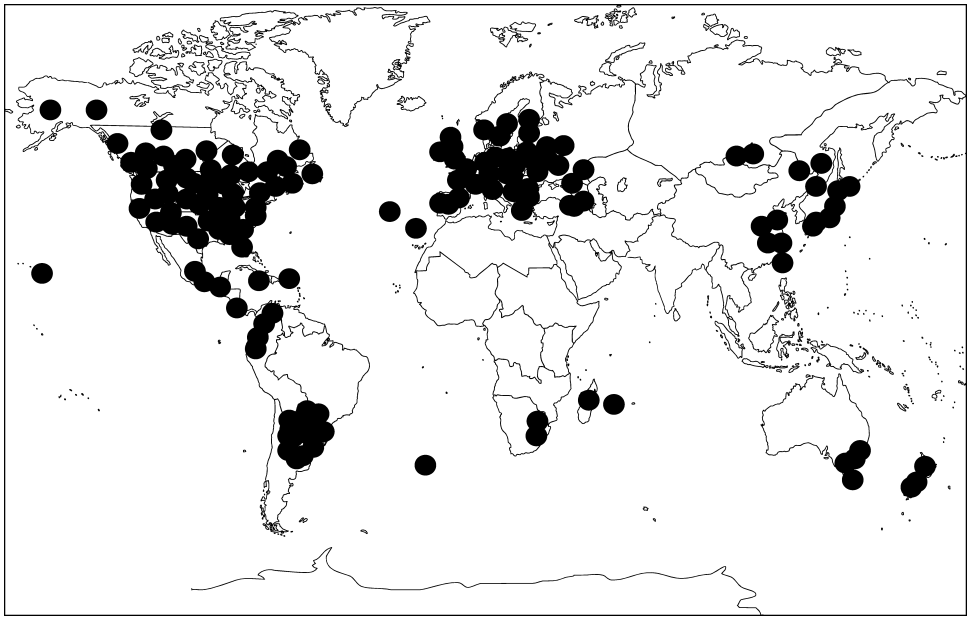
425. Juncus confusus (29)

426. Juncus georgianus (31)

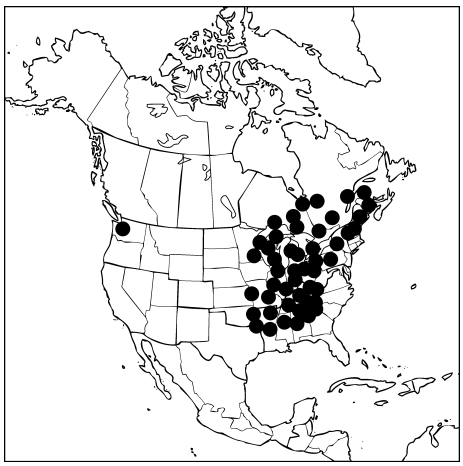
427. Juncus secundus (31)



428. Juncus dichotomus (32)

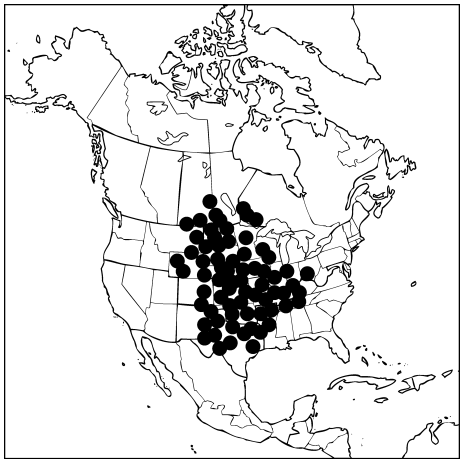


429. Juncus tenuis (33)

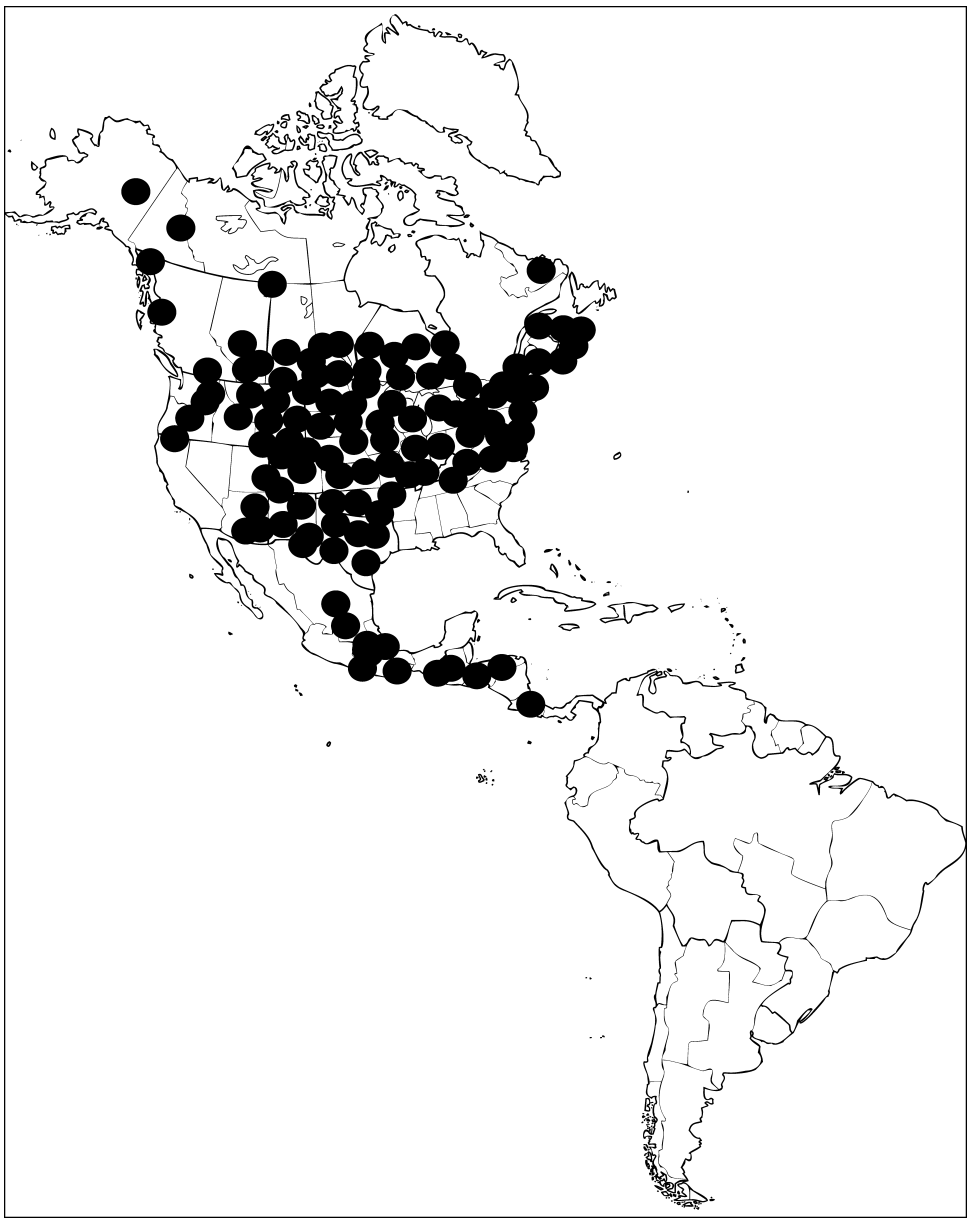


430. Juncus anthelatus (35)

431. Juncus occidentalis (36)



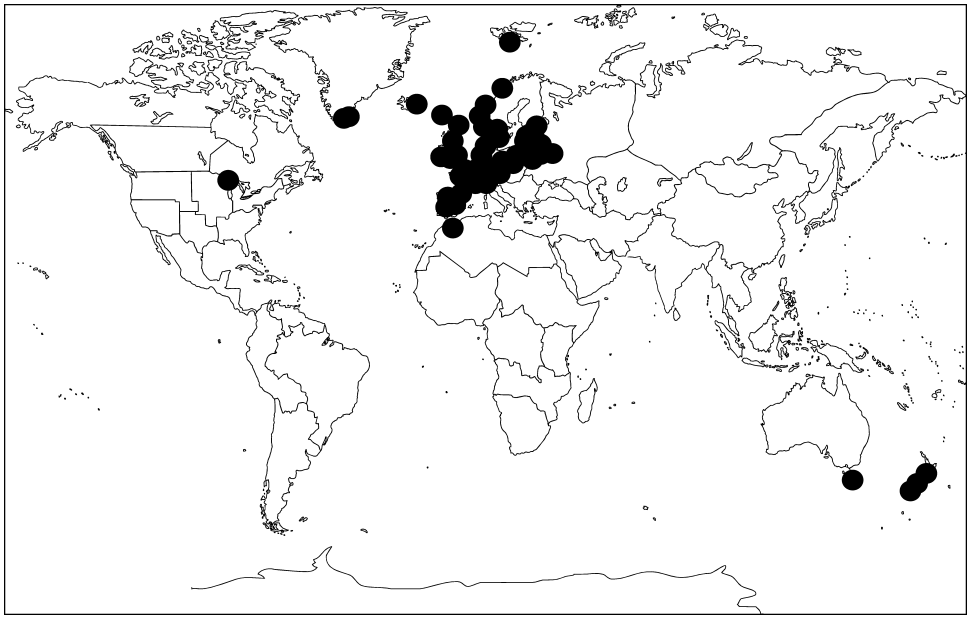
432. Juncus interior (36)



433. Juncus dudleyi (38)

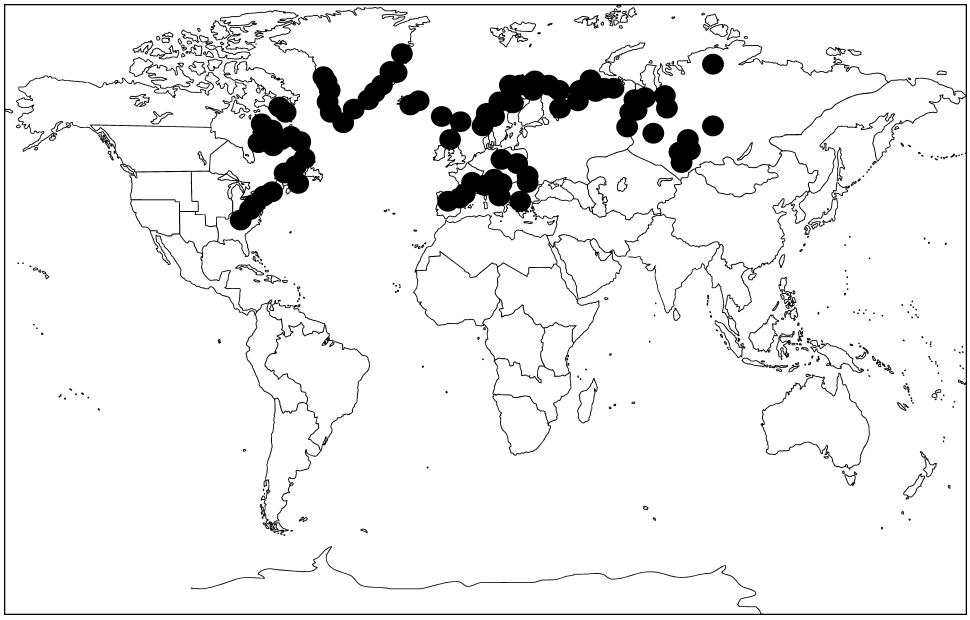
434. Juncus revolutus (39)

435. Juncus homalocaulis (40)

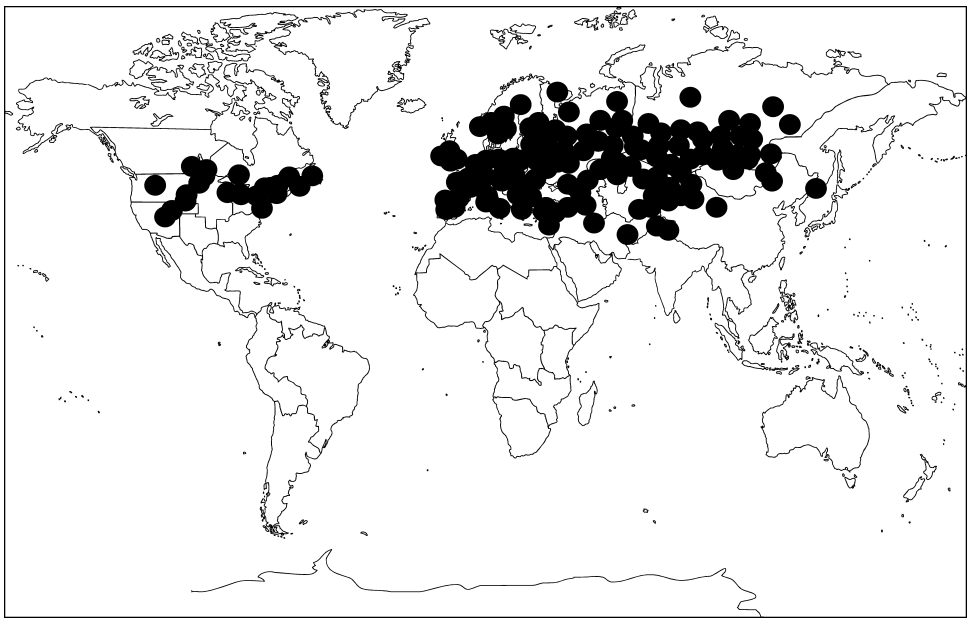


436. Juncus squarrosus (40)

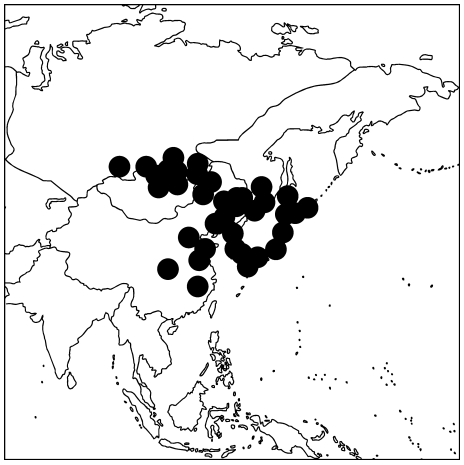
437. Juncus monanthos (41)



438. Juncus trifidus (43)

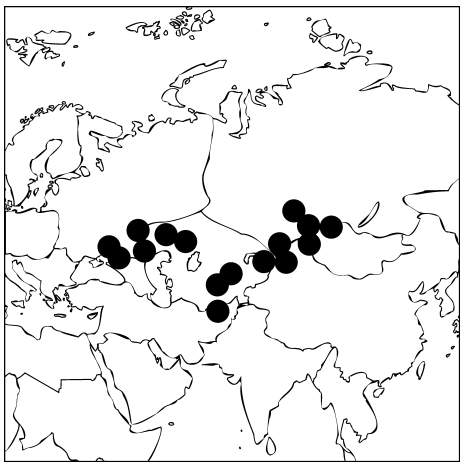


439. Juncus compressus (44)

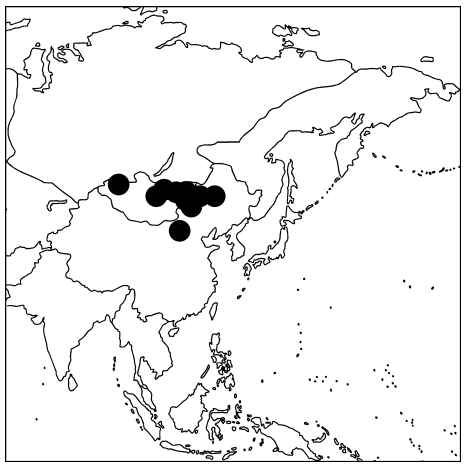


440. Juncus gracillimus (46)

441. Juncus salsuginosus (47)



442. Juncus soranthus (48)



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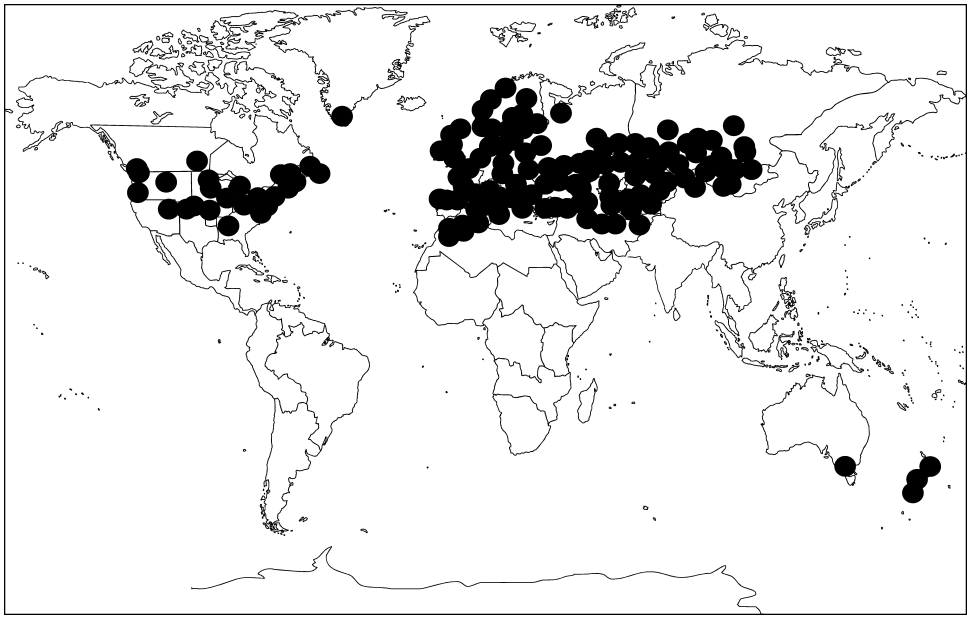
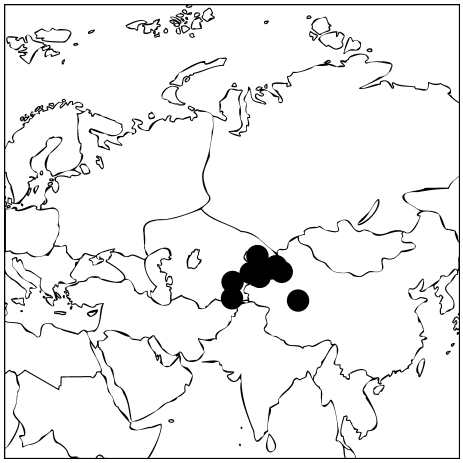


444. Juncus gerardii subsp. gerardii (49)

445. Juncus gerardii subsp. atrofuscus (52)

446. Juncus gerardii subsp. montanus (52)



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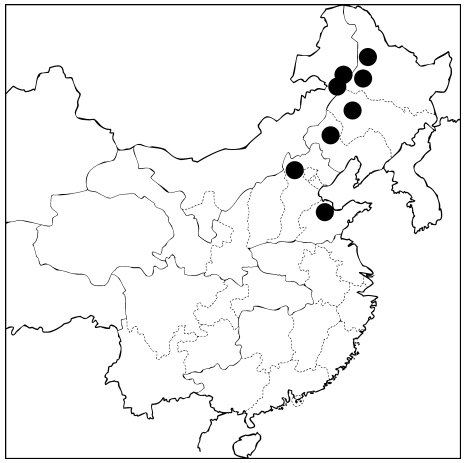

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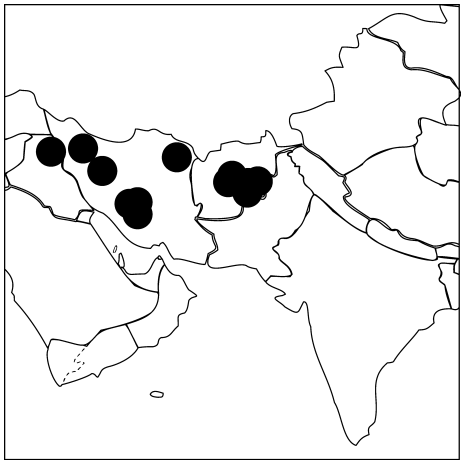

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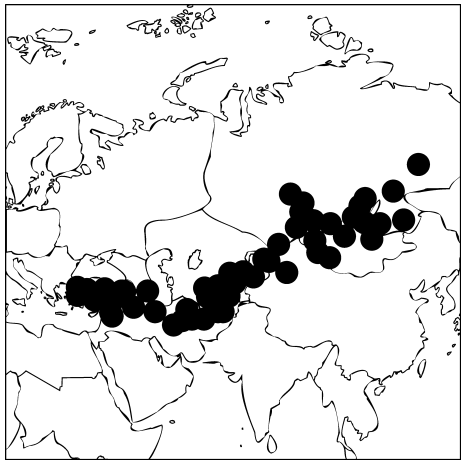

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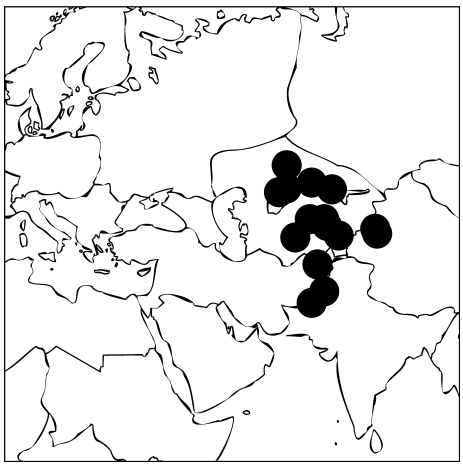

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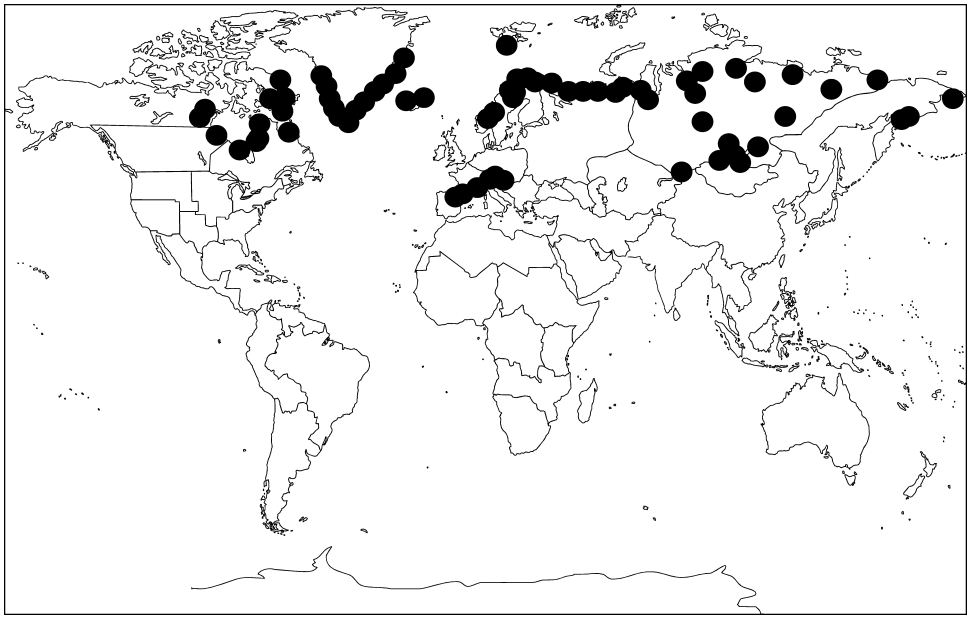

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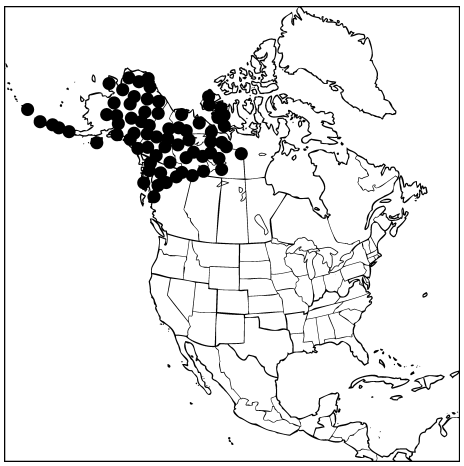

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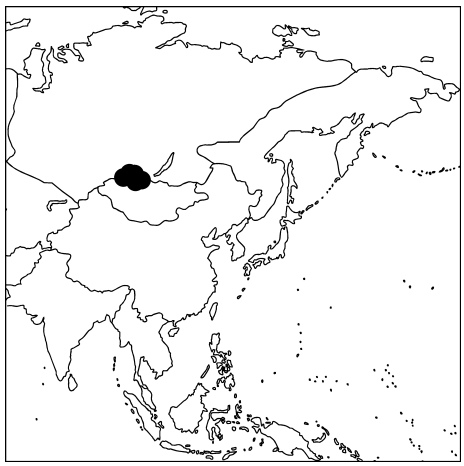

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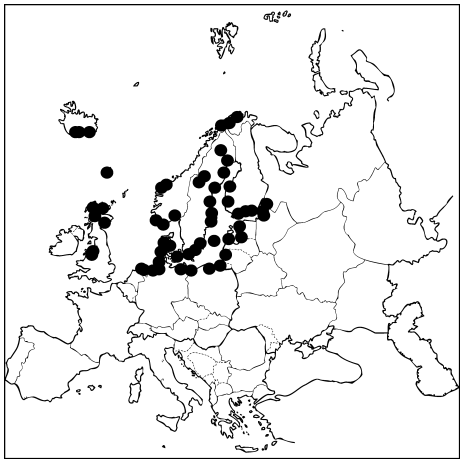

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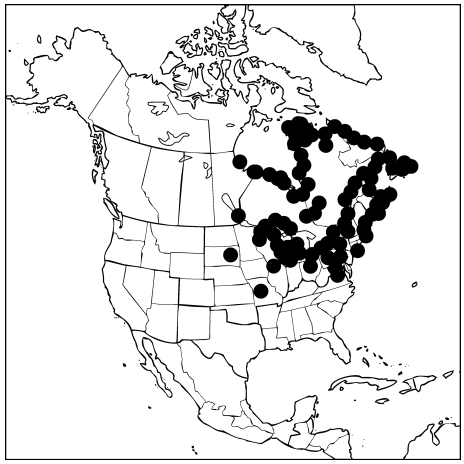
456. Juncus balticus subsp. pyrenaeus (70)

457. Juncus balticus subsp. cantabricus (70)



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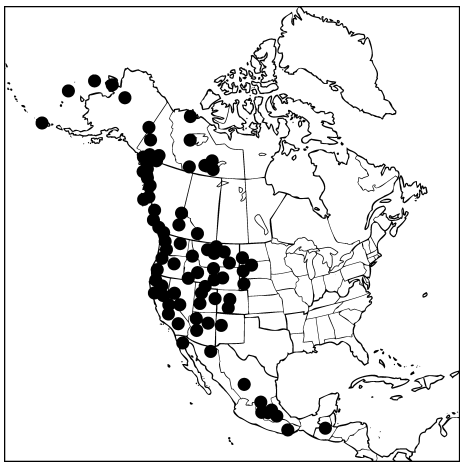
459. Juncus balticus subsp. mexicanus (72)



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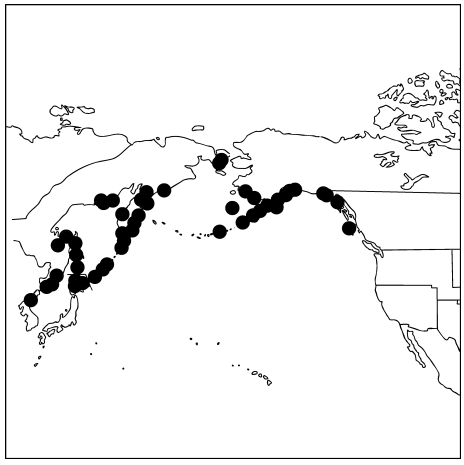
461. Juncus balticus subsp. andicola (74)

462. Juncus breweri 75)



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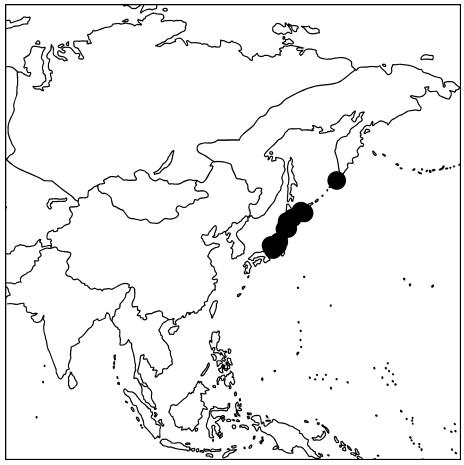
464. Juncus lesueurii (76)



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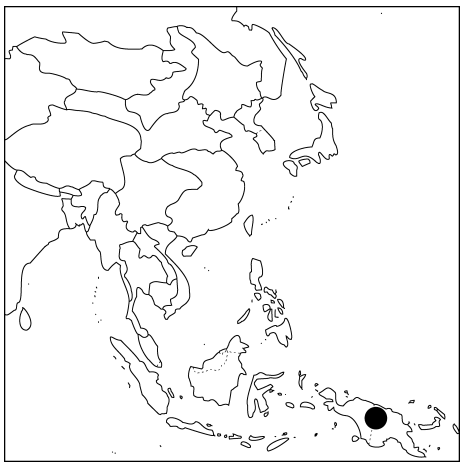

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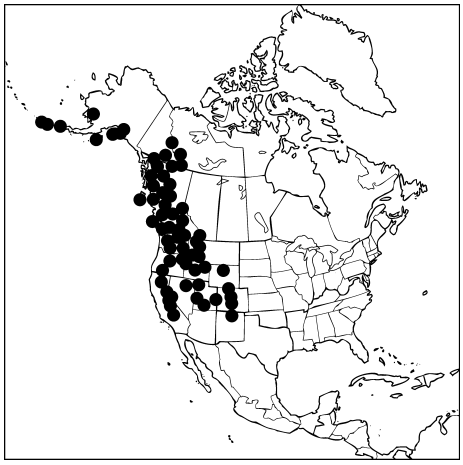

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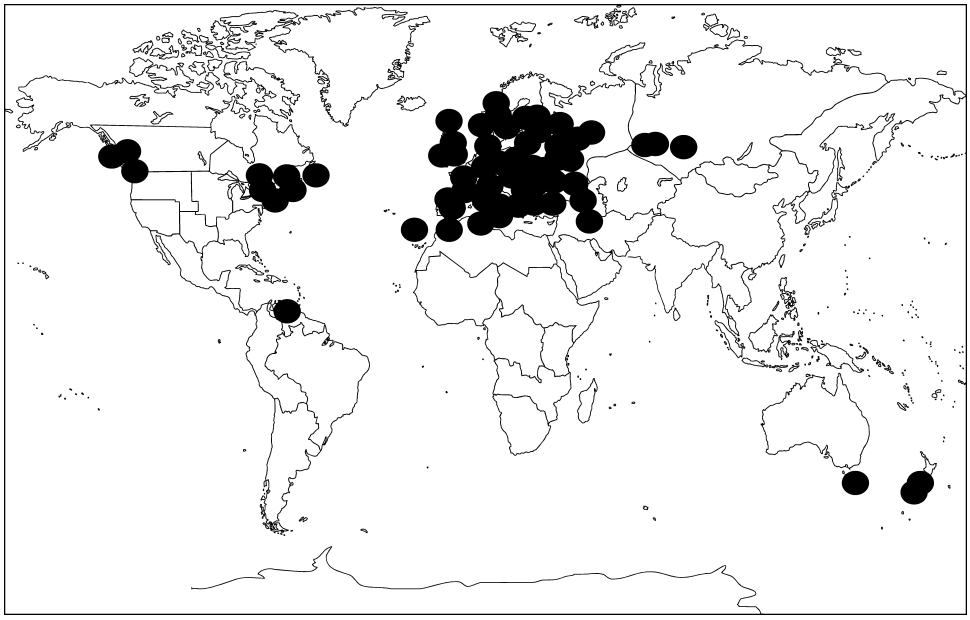

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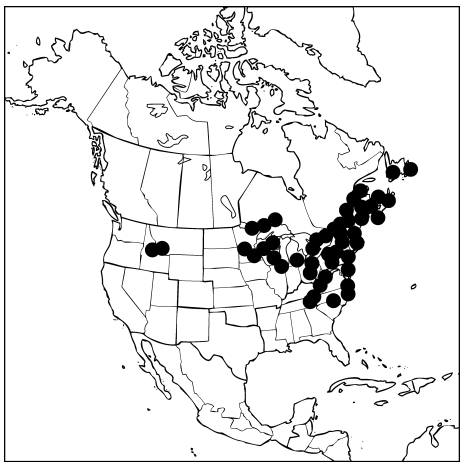

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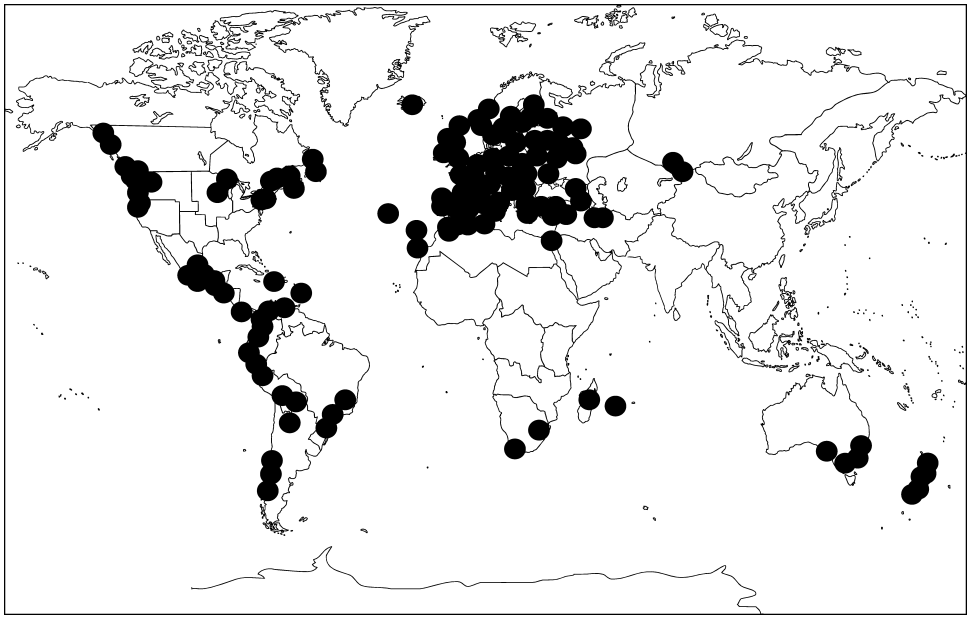

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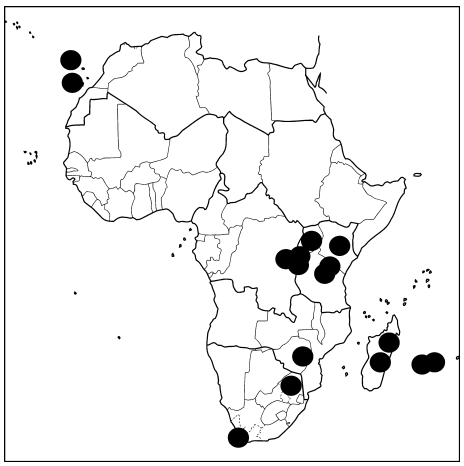

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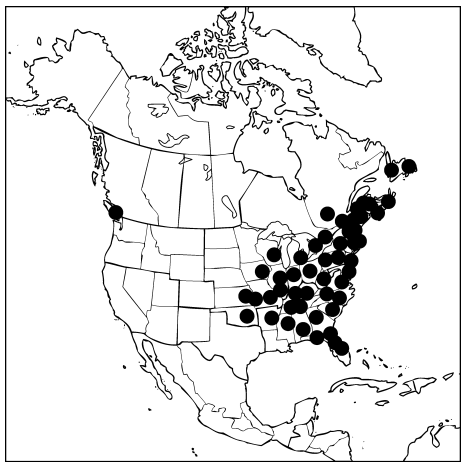

477. Juncus effusus subsp. solutus (92)

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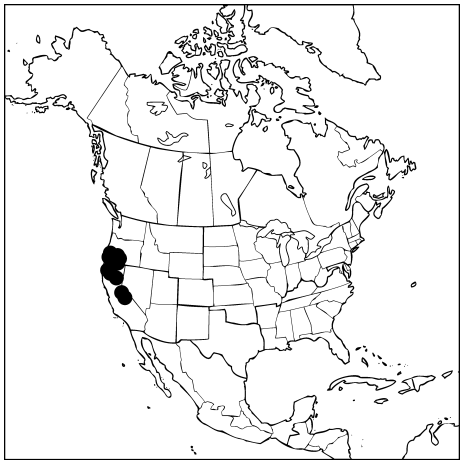

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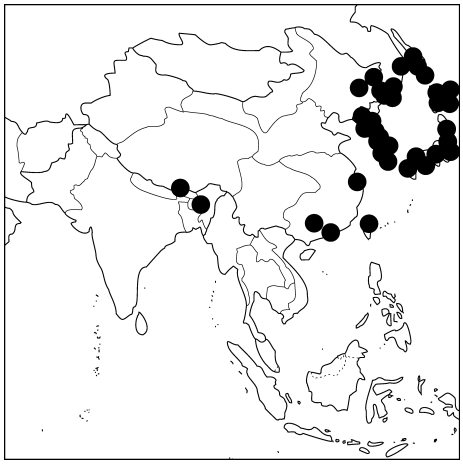

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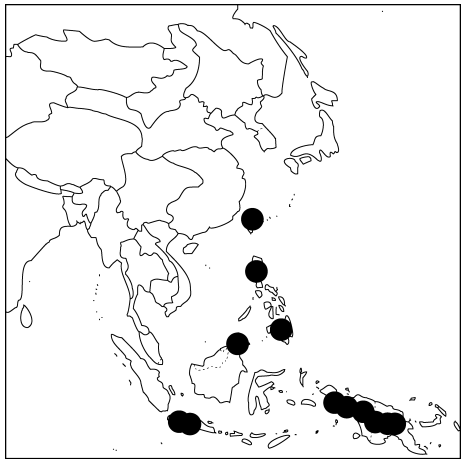

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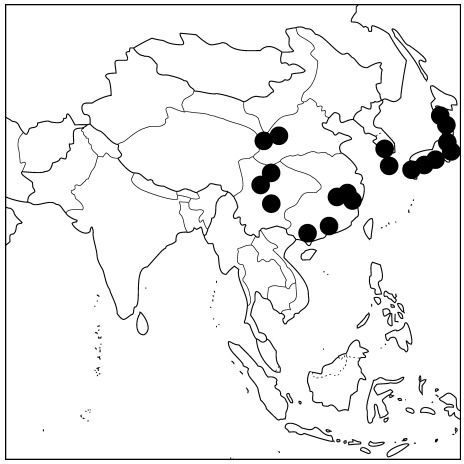
486. Juncus decipiens subsp. sundaicus (98)



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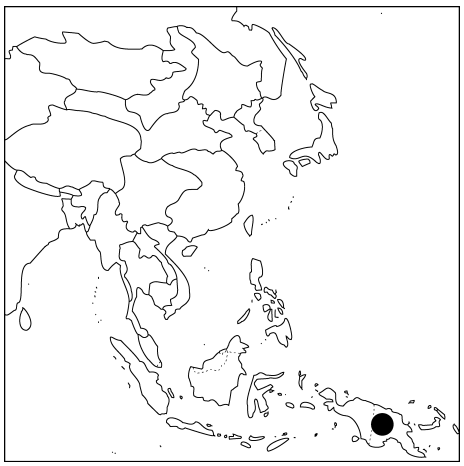

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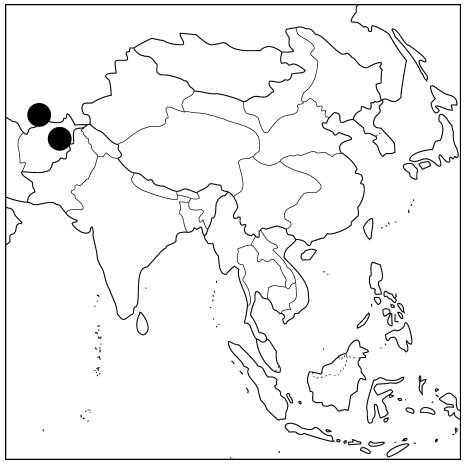

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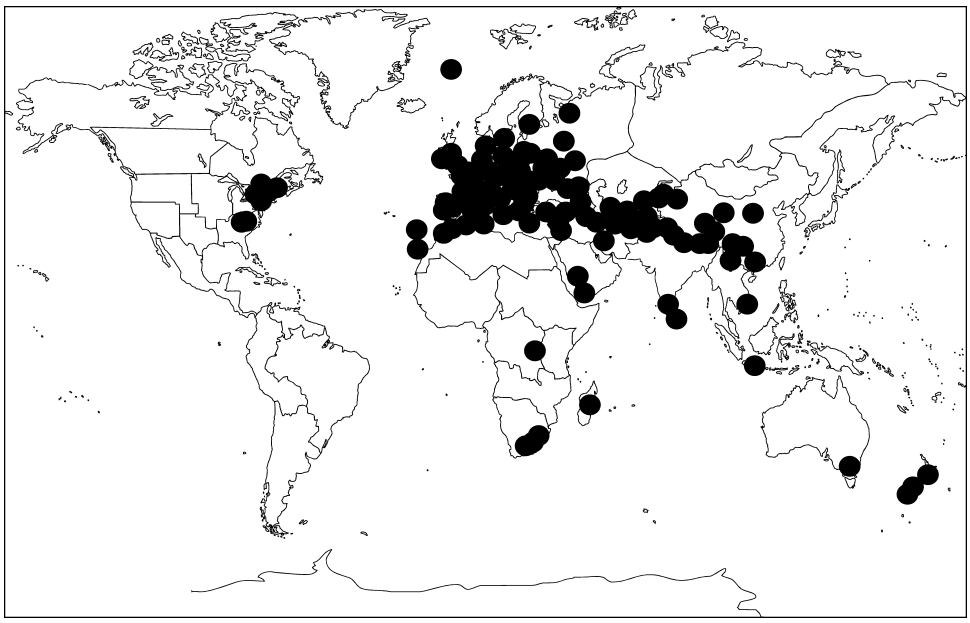

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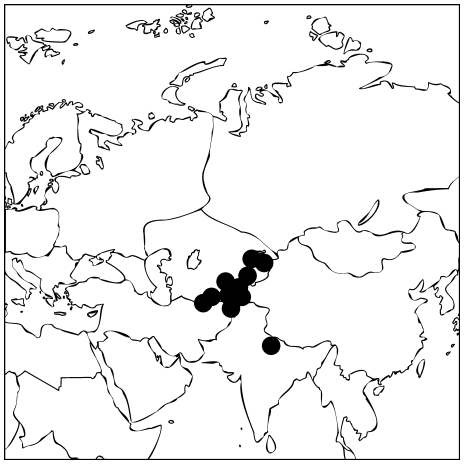

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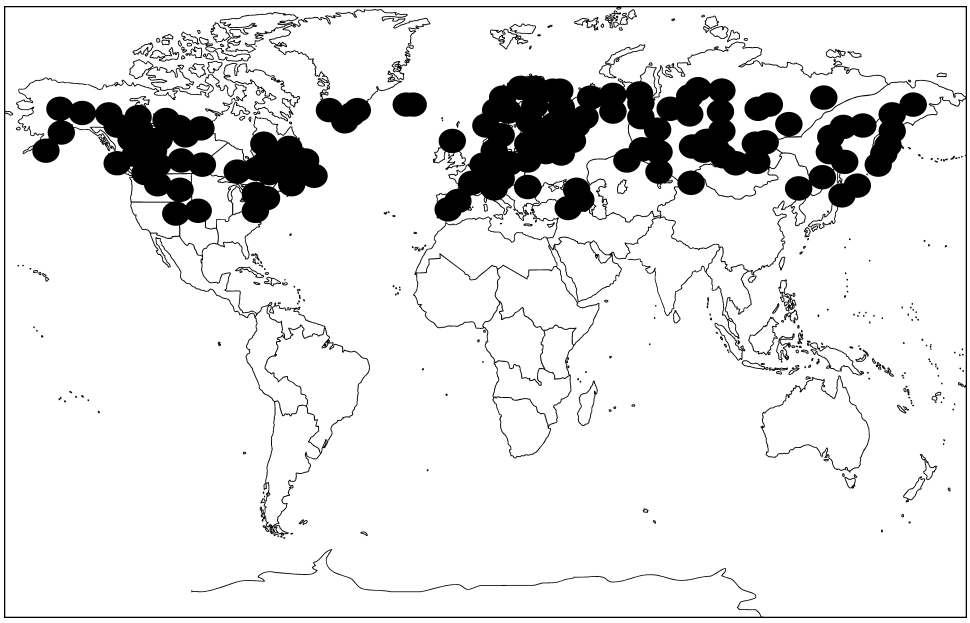

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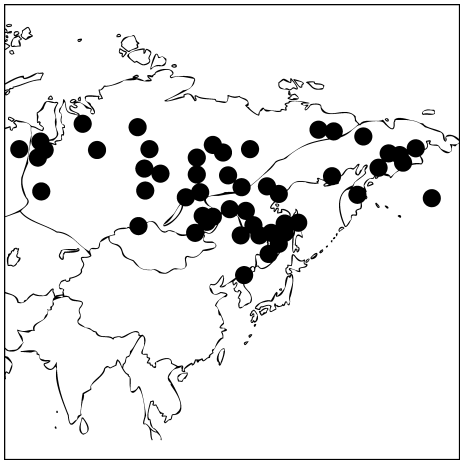

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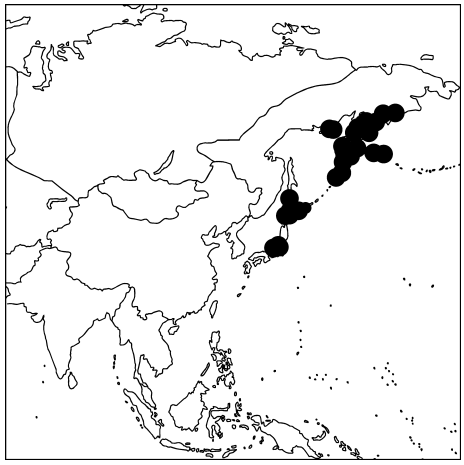

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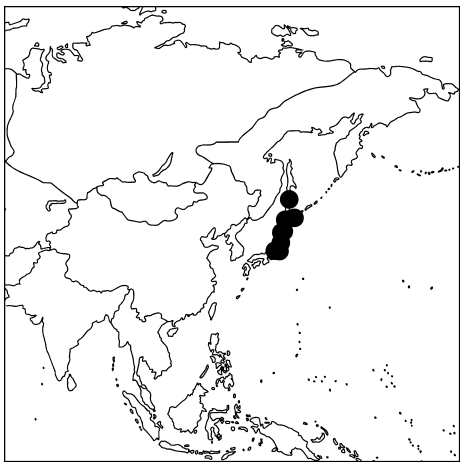

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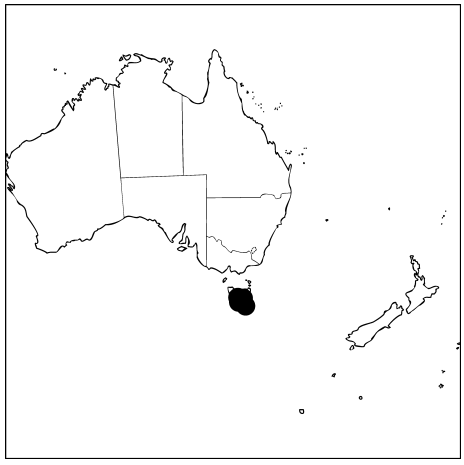

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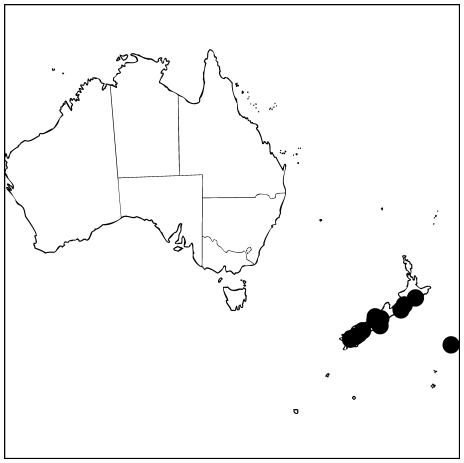

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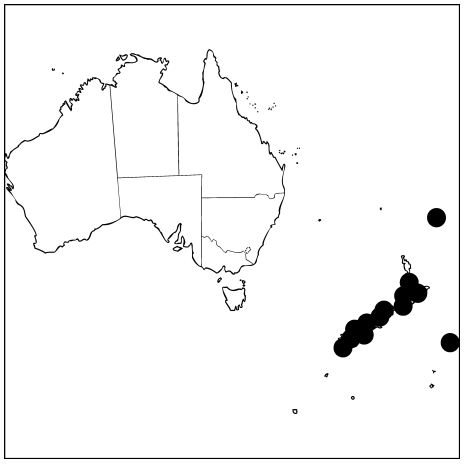

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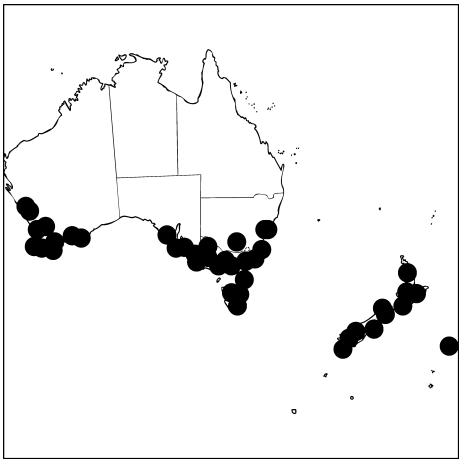

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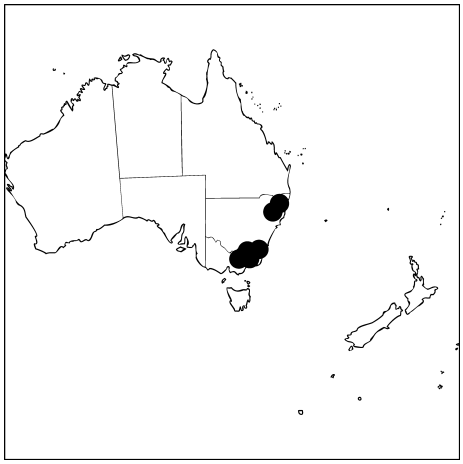

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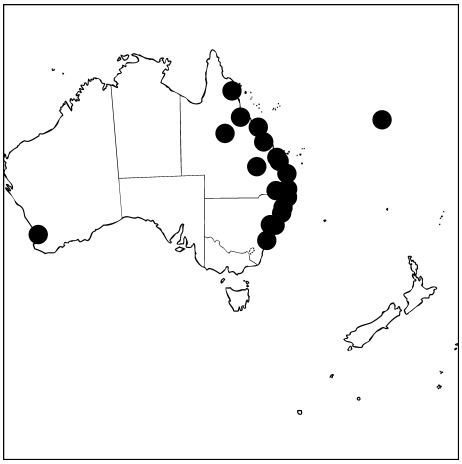

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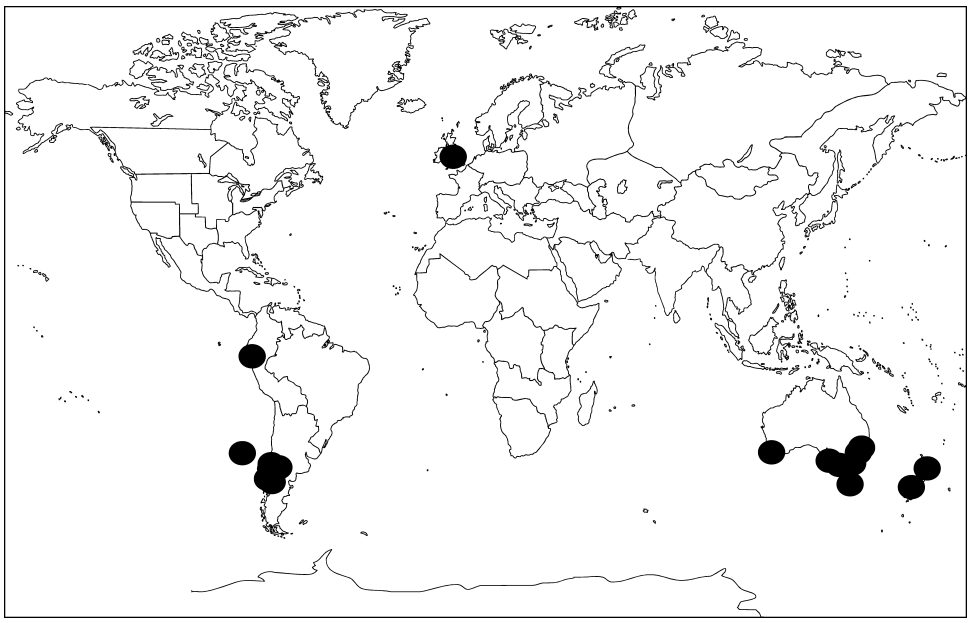

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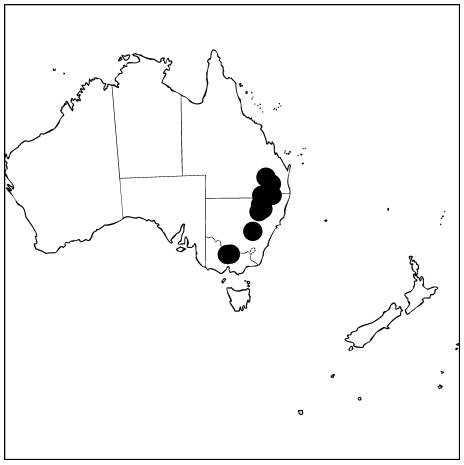

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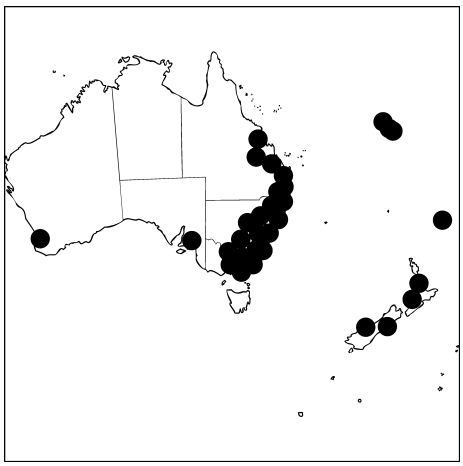

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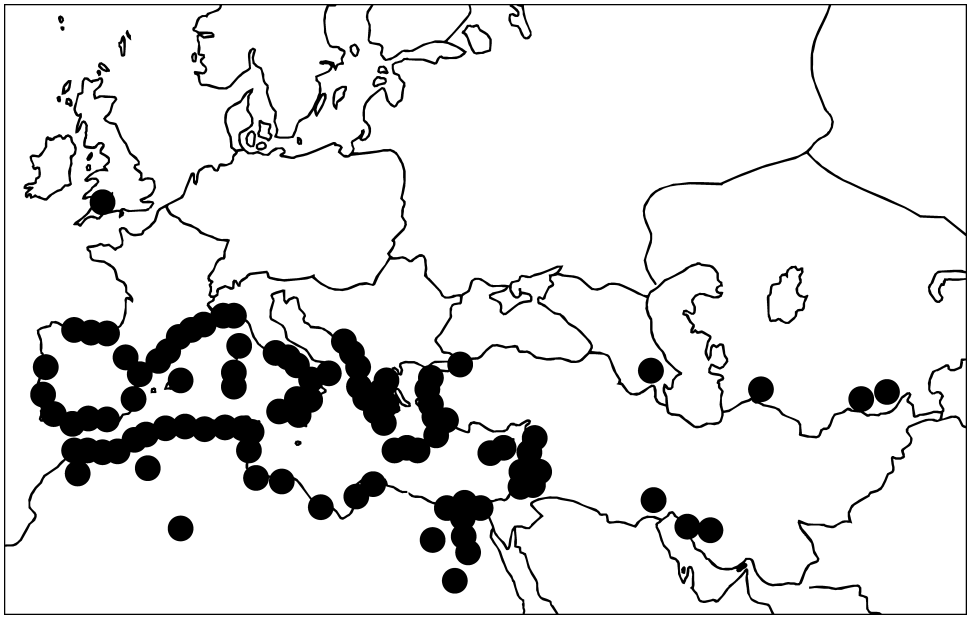

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