

9. 1. *J. acutus* L., Sp. Pl. 325 (1753) – Fig. 2.

≡ *Juncastrum acutum* (L.) Fourr. in Ann. Soc. Linn. Lyon ser. 2, 17: 171 (1869).

≡ *J. acutus* L. var. *conglobata* Trautv. in Trudy Imp. S.-Peterburgsk. Bot. Sada 5: 480 (1878).

≡ *J. acutus* L. var. *conglomeratus* Buchenau in Bot. Jahrb. Syst. 12: 250 (1890).

Typus: Lectotype (selected here): LINN 449: 1, left hand specimen (!).

Perennial, densely caespitose by intravaginal shoot formation. Rhizome extremely abbreviated, inconspicuous. Young plants often with some vegetative shoots. Leaves terete, pungent. Auricles lacking. Inflorescence of various form, composed of many, few-flowered, often confluent heads. Inner tepals with prominent, scarious, auricle-like apical parts, thus notched.

Total distribution: Fig. 3.

9. 1a. *J. acutus* subsp. *acutus*

= *J. spinosus* Forssk., Fl. Aegypt.-Arab. 75, xxiv, lxxv (1775) – Typus: Lectotype (selected here): Hb. Forsskål no. 29, Cent. III, no. 38 (C!).

= *J. multibracteatus* Tineo in Gussone, Fl. Sic. Prodr. Suppl. 105 (1832) ≡ *J. acutus* L. var. *effusus* Buchenau in Bot. Jahrb. Syst. 12: 250 (1890) – Typus: In humentibus Castronuovo, Todaro 556 (BM!, FI!, K!, W!).

[= *J. macrocarpus* Nees in Linnaea 20: 243 (1847) nom. nud.].

= *J. karelini* Steud., Syn. Pl. Glumac. 297 (1855) – Typus: Lectotype (selected here): Astrabad, Karelin (LE!).

= *J. acutus* L. var. *longibracteatus* Buchenau in Boissier, Fl. Orient. 5: 354 (1882) – Typus: Tell Afar inter Sindschar et Mosul, 1867, Haussknecht 978 (G-BB!).

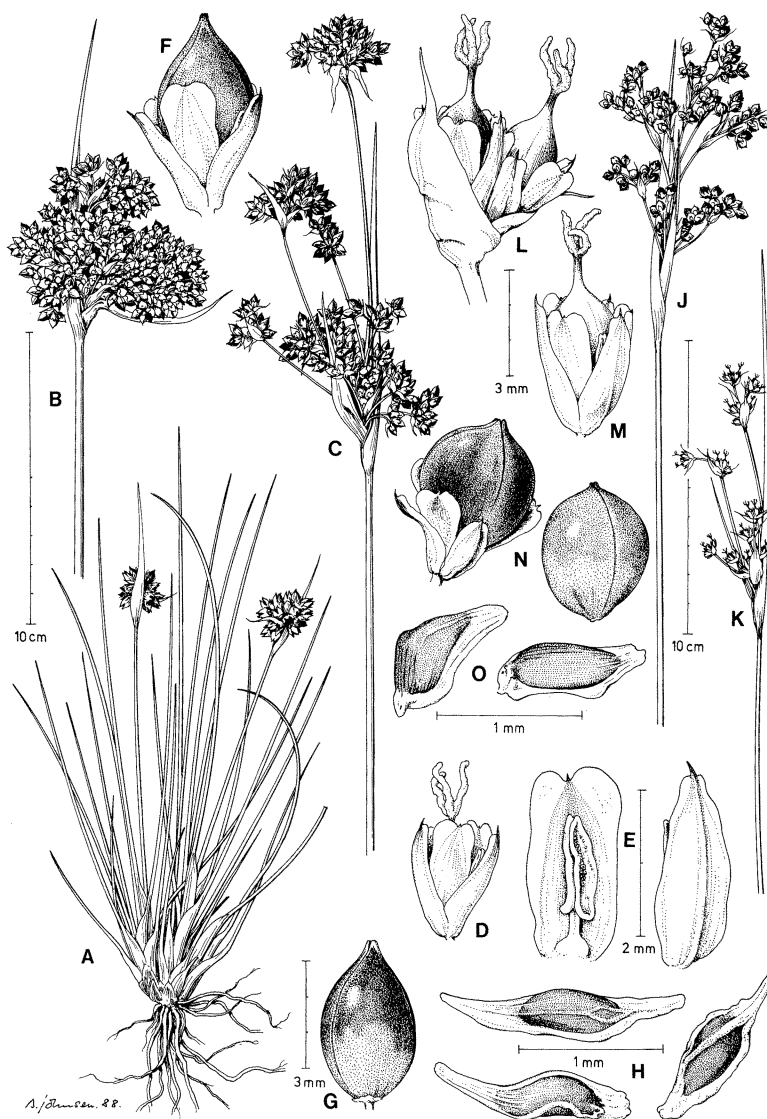


Fig. 2. *J. acutus*. A–H: subsp. *acutus*. – A: Habit of young plant with depauperate inflorescence. – B, C: Inflorescences. – D: Flower. – E: Inner and outer tepals with stamens. – F: Flower with ripe fruit. – G: Ripe capsule. – H: Seeds. – I–O: subsp. *leopoldii*. – J, K: Inflorescences. – L: Head in late flower. – M: Flower with young fruit. – N: Flower with ripe fruit and capsule. – O: Seeds.

Material: A: Egypt, El Dikheila, 24. 8. 1952, *El Hadidi* (LD). – B: Greece, Peleponnesos, Loutra Kiafa, *Snogerup* 1473 (LD). – C, F, G, H: Greece, Kerkyra, *Snogerup* 23608 (LD). – D, E: France, Bouches-du-Rhone, N Les Stes Maries, *Snogerup* cult. no. 360 (LD). – J, N, O: Gran Canaria, *Wängsjö* 231 (LD). – K, L, M: USA, California, Los Angeles Co., *Snogerup* cult. no. 3850 (LD).

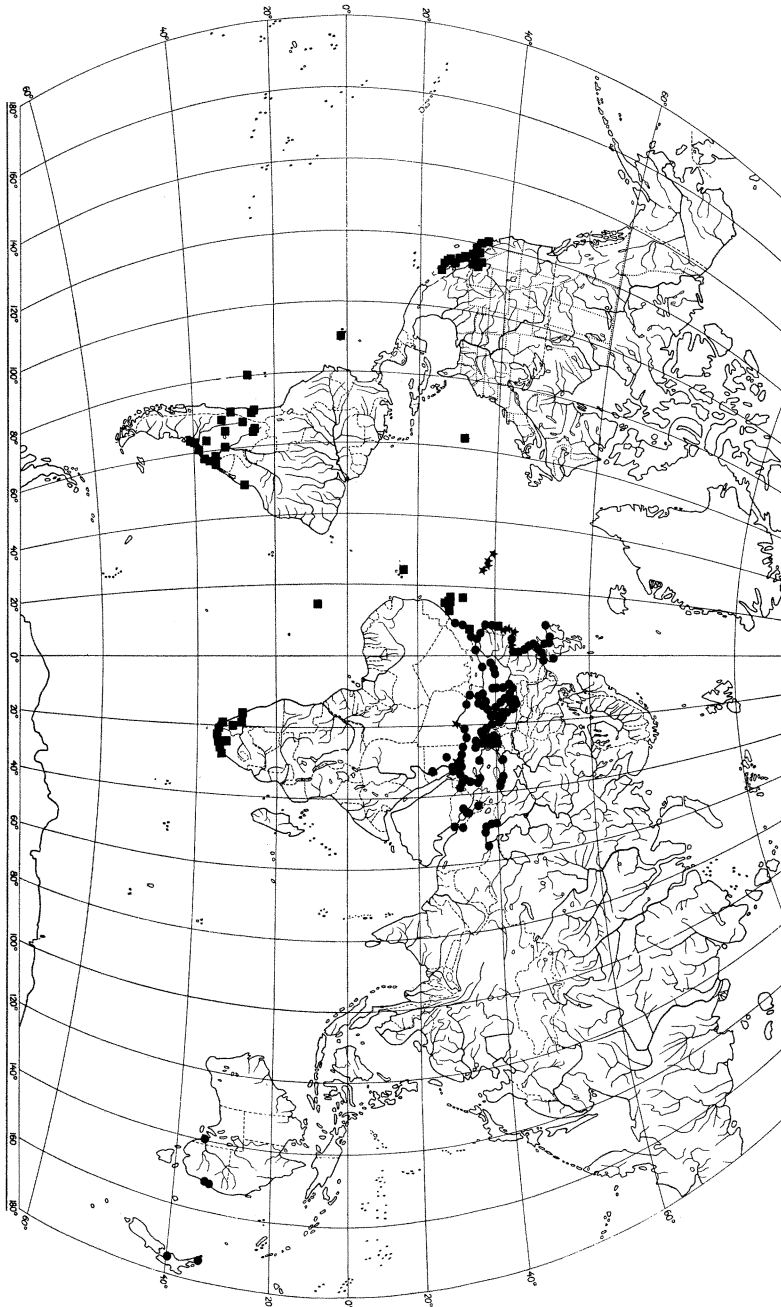


Fig 3. *J. acutus*, total distribution according to revised material. – Dots: subsp. *acutus*. – Squares: subsp. *leopoldii*. – Stars: intermediates.

Culms 50–150 cm, rigid, 2–4(–6) mm thick, with a few small basal sheaths and 1–5 basal leaves. Leaves (10–)30–80(–120) cm long or sometimes the first very short, 1.5–4 mm thick. Inflorescence 5–15 × 3–7 cm, usually dense, almost sphaerical, rarely lax, elongated or wide, many-flowered, with (10–)50–100(–200) heads. Lowest two bracts leaf-like, pungent, the first (4–)7–25(–40) cm long, including the (2–)3–5(–10) cm long sheath, forming an apparent prolongation of the culm, the second 2–5(–8) cm, including the 1–4 cm long sheath, erectopatent; upper bracts gradually smaller, with a broad, sheath-like, amplexicaul base, cuspidate but not pungent, those of the heads non-herbaceous, amplexicaul, ovate, pointed, usually light brown. Heads (1–)2–3(–4)-flowered; uppermost part of pedicel thick. Tepals (2.8–)3.5–4(–4.5) mm, usually equal, oblong, usually light brown to straw-coloured with darker, brown to chestnut-coloured margins of the herbaceous part, with broad hyaline margins, outer tepals slightly cymbiform, basally ± keeled, obtuse, with an up to 0.3 mm long mucro, when young with small scarious wings apically, inner with broad hyaline auricles and thus notched. Stamens 6, equalling tepals or slightly shorter, anthers 1.5–1.8(–2.0) mm, 2.5–4 times as long as filaments, usually red when young. Style 0.5–0.8 mm, stigmas 1.5–2 mm, light to dark purplish brown. Capsule 4–6 mm, much exceeding tepals, spheroidal to ovoidal with a conical top, mucro very short, glossy, straw-coloured to dark brown, triseptate, normally containing 80–120 seeds. Seeds 0.8–1.1 mm, including the seed-coat 1.8–2.5 mm, ellipsoidal to narrowly ovoidal, c. 25-striate, light brown with two darker tips; seed-coat forming two equal or subequal appendages.

Chromosome number: $2n = 48$, chromosomes very small.

Distribution: W Europe, the Mediterranean, through Jordan and Iraq to the Persian Gulf, coasts of the Black Sea and the S Caspian area. Introduced and apparently established in Australia and New Zealand. Fig. 4 shows the main distribution area.

Ecology: *J. acutus* subsp. *acutus* occurs mainly in sand fields, sand dunes and salt marshes. Occasionally it also grows in river-beds, in fresh-water marshes and near wells. It is mostly found from sea level to about 10 m, but occasionally up to 900 m altitude.

9. 1b. *J. acutus* subsp. *leopoldii* (Parl.) Snogerup in Bot. Not. 130: 187 (1978).

≡ *J. leopoldii* Parl. in Giorn. Bot. Ital. 2: 324 (1846) ≡ *J. acutus* var. *leopoldii* (Parl.) Buchenau in Abh. Naturwiss. Vereine Bremen 4: 421 (1875) – Typus: Lectotype (selected here): South Africa, Sommerset, Stellenbosch, *Ecklon & Zeyher 4308* (FI!, iso- S!, W!).

= *J. acutus* L. var. *sphaerocarpus* Engelm. in Wheeler, Rep. U.S. Geogr. Surv. 100th Merid., Bot. 6: 376 (1878) ≡ *J. robustus* S. Watson in Proc. Amer. Acad. Arts 14: 302 (1879) – Typus: California, S. Barbara (not traced; material from type locality seen).

Culms (50–)80–150(–200) cm, rigid, usually 1.5–2.5 mm thick, sometimes up to 6 mm, with some small and 1–2 larger basal sheaths and 3–4(–5) basal leaves. Leaf sheaths wide and often up to 25 cm long. Leaves 40–100 cm long, 1.5–3 mm thick. Inflorescence 5–30(–40) cm long, 2–6(–8) cm broad, lax or rarely congested, with (10–)35–100(–250) heads, heads often densely aggregated into ± large groups. Lowest two bracts leaf-like, pungent, the first 3–20(–35) cm, including the 3–6(–10) cm long sheath, often shorter than inflorescence, forming an apparent prolongation of the culm, the second 2–7(–10) cm, including the 2–3(–5) cm



Fig. 4. *J. acutus*, distribution in Europe, N Africa and SW Asia according to revised material. – Dots: subsp. *acutus*. – Squares: typical subsp. *leopoldii*. – Stars: intermediates.

long sheath; upper bracts gradually smaller, usually only the lowest with conspicuous laminae, but in Californian material sometimes even the upper with small pungent laminae, those of the heads usually shorter than flowers, rarely in Californian material some exceeding with large tips, non-herbaceous, amplexicaul, ovate, usually mucronate, dark brown to straw-coloured. Heads (1–)2–4-flowered; uppermost part of pedicels thickened, more than in subsp. *acutus*, especially in fruit stage, and outer tepals inserted slightly below the rest. Tepals 2.2–3.7 mm, equal or inner higher (because of higher insertion), oblong with broad hyaline margins, non-scarious parts light to dark brown, usually with a darker marginal zone, outer tepals cymbiform with small auricle-like expansions apically and usually with mucro up to 0.5 mm long, inserted lower than the inner and $\pm$ keeled basally, inner tepals with broad hyaline auricles apically and thus notched. Stamens 6, slightly shorter than tepals, anthers 1.4–1.8 mm, (2–)2.5–4 times as long as filaments, usually red when young, rarely yellow. Style 0.6–1.3 mm, stigmas 1.5–2.5 mm, reddish. Capsule (3–)3.5–5 mm, much exceeding tepals, obovoidal, apically usually blunt, with an 0.2–0.6 mm long mucro, rarely with a small conical projection, usually chestnut-coloured to dark or rarely light brown, basally lighter, trilocular or when ripe trisepate, normally containing 95–120 seeds. Seeds 0.7–0.8(–0.9) mm, including the seed-coat 1.1–1.4 mm long, ellipsoidal to obliquely ovoidal, 20–25-striate; seed-coat forming two equal or subequal appendages.

Chromosome number: $2n = 48$, chromosomes very small.

Distribution: The total distribution is shown in Fig. 3, the distribution in N America in more detail in Fig. 22. Typical plants of this subspecies are found in the Atlantic Islands, W Africa, S Africa, Argentina, Chile, Uruguay, S Brazil, W coast of Mexico, California, Nevada, and Bermuda. The mapped occurrence on the Galapagos Islands was probably based on mislabelled material.

The few and mainly intermediate populations in SW Europe might be the results of recent introductions; those in Egypt were found mainly in some places most untouched by human influence, thus it can be assumed that they are probably relicts of a formerly more continuous distribution of *Juncas acutus* subsp. *leopoldii* in Africa.

Important specimens examined from N Africa and Europe:

M o r o c c o : Pr. opp. Tanger, 15. 7. 1926, *Lindberg 1532* (H).

L i b y a : Cyrenaica, 40 km E of El Agheila, 19. 8. 1957, *Guichard Cyr. 57/36* (BM).

E g y p t : Wadi Natroun, lake Beda, 7. 5. 1968, *El Hadidi* (CAI, LD); *ibid.*, lake Goabar, 11. 10. 1942, *Täckholm et al.* (CAI); *ibid.*, lake Umm Risha, 24. 12. 1944, *Davis 8094* (K); Cairo-Alex. desert road, 25. 1. 1978, *Abdel Wahab* (CAI); Ain Murun, kl. Oase, 26. 4. 1876, *Ascherson 513* (CAI, G-BOIS, K, M, W, WU).

P o r t u g a l : Buarcos, 1877, *?Neotetz 548* (G, K); shore of Oporto, 1. 7. 1887, *Murray* (BM); Praia de Vieira, 10. 1881, *Barros Gomez 180 Fl. Lus. Soc. Brot.* (BM); in arenosis ad lacun Albufeira, 8. 5. 1844, *Willkomm Pl. hisp. exs. 7a* (BM); Estremadura, Sacavém, marg. Rio Trancão, 27. 10. 1943, *Foules & Rainha 15381* (S).

S p a i n : Guipuzcoa, S. Sebastian, 6. 1895, *Gandoger 290* (E); Almeria, edge of lagoon on the Llanos de Almeria, 6. 5. 1960, *Glanville 315* (BM); Prov. de Almeria, Roquetas de Mar, Punta del Sabinal, 21. 7. 1950, *Roivainen* (H, S); Girona, N of Ampurias, 26. 6. 1969, *Verdcourt 4700* (K); Andalusia, Fuengirola, near sea level, 10. 12. 1967, *Kraft* (LD); Fuengirola, Rio de las Pasadas, 18. 7. 1952, *Erlandsson* (S); Arenas Gordas, 21. 4. 1910, *Raunkier*

691 (C); Santander, 10. 10. 1852, *Lange* (C); La Coruna, 2. 10. 1852, *Lange* (C, GB); Galecia, prov. Pontevedra, isthmus El Grove, 9. 7. 1930, *Buch* (H).

Ecology: Seashores, especially in sand dunes and sand fields, salt marshes. Saline places inland, river-beds and other permanently or seasonally wet spots with fresh water, in the Atlantic Islands often on volcanic materials. From sea level to at least 1400 m in S Africa, to 1000 m in W North America, to 200 m in the Azores, to 510 m in the Canary Islands.

J. acutus* × *heldreichianus

Usually a moderate-sized plant. Inflorescence slightly elongate, capsules often light coloured with a long conical tip, looking unfilled. Seed set irregular, from 0% up to at least 30% in the best developed capsules. Pollen almost 100% staining.

Specimens examined:

Greece: Euboea, N of Akr. Mantili near the shore, 21. 6. 1958, *Runemark & Snogerup 11655C* (LD); Naxos, sand dunes S of the town of Naxos, 25. 5. 1958, *Snogerup cult. nos. 1676, 1707, 1728* (LD); pr. Korinthum in aren. marit., 26. 4. 1885, *Hausknecht* (W).

J. acutus* × *littoralis

Usually a tall plant forming large tussocks. Inflorescence and flowers like those of *J. littoralis*. Capsules differently developed, the large ones with conical top. Seed set irregular, from 0% to c. 50% in the best developed capsules. Pollen almost 100% staining.

Specimens examined:

Italy: Toscana, palude di Arno vecchio, 10. 9. 1916, *Savelli 239* (FI).

Greece: Nom. Kavala, in maritime sand 4 km SSW of Pontolivadon, c. 15 km E of Kavala, 0–2 m, 1. 7. 1971, *Snogerup 530* (LD); Euboea, Chalkis in planitie litorea, 6. 9. 1966, *Rechinger 37917* (W); Naxos, sand dunes S of the town of Naxos, 29. 5. 1958, *Snogerup cult. no. 1684* (LD).

Israel: Philistean Plain, S of Ascalon, 11. 7. 1979, *Berliner* (HUI); Acre Plain, Qishon river, 12. 4. 1925, *Smoly* (HUI, S, W); Negev, S of Gaza, banks of Nahal Gaza, 28. 3. 1942, *Zohary* (HUI, S).