

**(3) *Launaea arborescens***

*Launaea arborescens* (Batt.) Murb. in Acta Univ. Lund., ser. 2, 19(1): 65. 1923 ≡ *Zollikoferia arborescens* Batt. in Bull. Soc. Bot. France 35: 391. 1888. – Holotype: Algeria, ad basim monti Mzi, prope Founassa et Djenien-bou-Resq, 6.1888, *Battandier & Trabut* (MPU!).

= *Prenanthes spinosa* T. E. Bowdich, Exc. Madeira: 245. 1825, nom. illeg. [non Forssk., Fl. Aegypt.-Arab.: 144. 1775]. – Holotype: Cape Verde Islands, Boa Vista, 1823, *Bowdich* (destroyed).

= *Sonchus freynianus* Huter & al. in Atti Imp. Regia Accad. Rovereto, ser. 2, 9: 146. 1892 ≡ *Launaea freyniana* (Huter & al.) Pau in Font i Quer, Iter Maroc. 1927: no. 729. 1928. – Type: Spain, Reg. Granat., Barranco del Caballar supra urb. Almeria, 5./6.1890, *Porta & Rigo 48* (BM!, BR!, G!, K!, P!, W!).

= *Zollikoferia arborescens* var. *cerastina* Chabert in Bull. Soc. Bot. France 44: 363. 1897. – Holotype: Algeria, Tiout, 28.4.1896, *Chabert* (FI!).

= *Launaea arborescens* f. *maritima* Maire in Jahandiez & Maire, Cat. Pl. Maroc 3: 845. 1934. – Holotype: Morocco, Agadir - n. Ighir, in rupibus maritimis, 3.4.1926, *Maire* (MPU!).

= *Launaea melanostigma* Pett. in Commentat. Biol. 22(9): 60. 1960. – Holotype: Cape Verde Islands, Brava, Achada [“Ashada”] Favatal, 3.3.1954, *Lindberg* (H [photo!]; isotype: LD!).

**Ic.:** Figs 4b, 15b. – Mattick 1935: fig. 40b sub *Zollikoferia spinosa* (habit); Guinea 1949: fig. 112 (habit); Ozenda 1958 [ed. 2, 1977]: p. 461, fig. 175 ≡ Barry & Celles 1992: p. 64, fig. 6 (habit, achene); Quézel & Santa 1963: fig. 3101 (achene, branch); Henriques & al. 1986: p. 159, fig. 3 (synflorescence); Kunkel & Kunkel 1987 [ed. 2, 1991]: p. 135, fig. 100 (synflorescence); Sagredo 1987: p. 497 (synflorescence); Brochmann & Rustan 1988: fig. 3-4 (details of holotype of *L. melanostigma*); Kilian 1988: fig. 2 (habit), fig. 3 (synflorescence), fig. 4 (achenes), fig.

5 (leaves), fig. 6 (involucre); Mateu & Güemez 1995: fig. 1(1), 2(5) (achenes); Lüpnitz 1995: fig. 49 (habit). – Further references are quoted by Kilian (1988: 122).

### Description (v. v.)

*Dense, intricate, spinescent*, ± irregularly hemispherical shrub, c. 50-100 (-150) cm high, almost leafless, with a deep-reaching strong taproot and strong lateral roots; roots shoot bearing. *Branches* terete, divaricately and intricately branched with subulate spinescent terminal segments; young branches lignified and glaucous, with ± succulent cortex becoming greyish-brown with age. Latex whitish and of unpleasant smell. *Leaves* rosulate to crowded at the base of the innovations, usually somewhat succulent, glaucous-green, narrowly spatulate to ± linear in outline, acute, (0.8)2-5(8.5) long, either 0.1-0.5 cm wide and entire to scarcely sinuate-dentate, or pinnatifid with few linear to narrowly triangular segments and then up to 1.5-2(4) cm wide, soon deciduous, higher up the shoots reduced to inconspicuous, ovate-acute bracts. All innovations terminated by a divaricately branched, spinescent *synflorescence* with branchings in their majority enclosing an angle of 80-100°; capitula always situated terminal and single on the subulate, 0.5-2(3) cm long *peduncles*, which after shedding of the capitula persist as spines. *Capitula* with 7-19 flowers. *Receptacle* at fruiting time 1.5-2.5 mm in diameter. *Involucre* (7.5)8.5-12(15) mm long, towards fruiting time cylindrical to conical, at time of fruit dispersal involucre bracts star-wise outspread and their midrib swollen and hardened in lower half; outer involucre bracts 4-7, ± imbricate, with narrowly scarious margin, the outermost broadly ovate(-acute), 1-2 mm long and ± equally wide, the following bracts gradually longer and more lanceolate, the innermost lanceolate, 1/2-3/4 as long as the inner involucre bracts; inner involucre bracts, particularly in mainland populations, variable in number, 5-6(8), linear-lanceolate and of ± equal length, 7-12 × 1.5-3.5 mm. *Flowers* with a bright yellow ligule of 5-8 × 2.1-2.8 mm and a tube 4.4-7.2 mm long; anther tube without appendages 2.6-3.8 mm long, basal and apical appendages 0.4-0.6 mm long. *Achenes* (2.5)3-4(4.8) × 0.7-1.3 mm, prismatic, all with 5 main ribs accompanied by 2 secondary ribs, with ± distinct, transverse, roundish, ± tuberculate wrinkles, often somewhat pulverulent-papillose; inner slender cuneate, (pale) brown; marginal somewhat curved and slightly compressed, distinctly thicker and cuneate, (dark) brown. *Pappus* 5-8 mm long, subhomomorphic, of numerous setaceous rays gradually somewhat decreasing in diameter from centre to periphery.

**Chromosome number:** Several counts of  $2n = 14$  have been reported in literature for *Launaea arborescens* (see Kilian & al. 1995: 274f). Two deviating counts of  $2n = 16$  from Spain (see Kilian & al. 1995: 275) need confirmation.

### Distribution and ecology

*Launaea arborescens* is widespread in continental NW Africa, with a southwesternmost extension to Cap Timiris, Mauritania, and a southeasternmost extension to the Plateau du Tademaït, Algeria; it is furthermore common on the mid-Atlantic archipelagos and in the semidesert of SE Spain (Fig. 46; literature records for

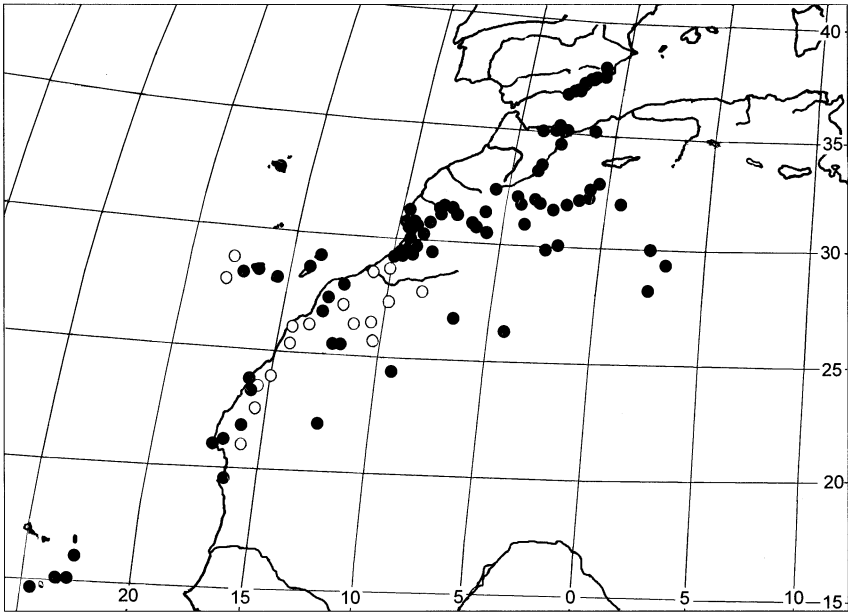


Fig. 46. Distribution of *Launaea arborescens* (empty circles: literature records; see text).

the W Sahara from Guinea 1948, 1949; for references to further, mostly regional distribution maps see Kilian 1988: 126). Its southwesternmost locality on the mainland has usually been given as Ras Nouadhibou (Cap Blanc) (see, e.g., Monod 1928: 40; Frankenberg & Klaus 1980: map 370; Kilian 1988: 126f), the more southern report by Bonnet (1909: 16) from Lemaounek, i.e. El Maounek or El Mounek, at Cap Timiris, however, is verified by the corresponding collection *Chudeau 54* (P!).

As already observed by Freitag (1971) in SE Spain, *L. arborescens* has some potential as a ruderal species in arid areas. This is moreover confirmed by the fact that the species obviously is a very recent introduction on Madeira, where it was first recorded in 1979 (Hansen 1987: 8, see also Press & Short 1994: 374). In the Cape Verde Islands the species is, at least on the island of Boa Vista, possibly indigenous. It has been collected on this island since 1823 (Kilian 1988), but was not recorded before the 1950s from the islands of Maio, Santiago and Brava, indicating a recent introduction from Boa Vista onto these islands. In the Canary Islands, where the species may well be indigenous on at least the eastern islands, it is reported from all islands meanwhile (Hansen & Sunding 1993).

*L. arborescens* is a xerophyte chiefly confined to semidesert vegetation types. An annual mean precipitation above 400 mm and a minimum temperature below 0 °C delimit its distribution in SE Spain, whereas the optimum precipitation lies below 300 mm (Freitag 1971: 215). This largely holds true also for NW Africa as its absence from the more humid areas, e.g. in NW Morocco, indicates. Physiological field studies by Stocker (1974) in the N Sahara near Beni Oumif, Algeria,

showed that the plants face considerable drought stress at an annual mean precipitation of c. 80 mm, as became evident from the reduced daily period of time in which they gained a positive photosynthesis balance.

Parts of the distribution area of *L. arborescens* in NW Africa, nevertheless, receive an annual mean precipitation of c. 40 mm and less. Of these, the coastal areas of the W Sahara, where the species is common and abundant (Guinea 1948, 1949), are climatically influenced by the Atlantic Ocean and thus characterized by a relatively high atmospheric humidity combined with less extreme temperatures, factors that both diminish evaporation and allow the growth of a semidesert vegetation. Inland populations of *L. arborescens*, on the other hand, are most frequently confined to wadi beds and certain habitats in mountainous areas, where the deep-rooting plants (>1.70 m depth, Freitag 1971: 295) can take advantage of the water capacity in deeper strata.

A hitherto neglected character of this species, which may explain its local abundance, is that plants, once established on a site, propagate considerably by root-born shoots from lateral roots.

Flowering and fruiting time follow the rain season and last as long as the growth of innovations is fed by the ground water; this may continue, under favourable circumstances, all year round.

Specimens seen (further collections cited by Kilian 1988: 126f):

SPAIN: GRANADA: La Mamola, 13.4.1968, *Merxmüller & Lippert* 23381 (M); 5 km E La Rabita, 20 m, 6.6.1973, *Podlech & Lippert* 25132 (M). – ALMERÍA: Gador, 23.6.1908, *St.-Lager* (BM, W); *ibid.*, 26.9.1950, *Roivainen* (BM); nr. Gador, 4.5.1951, *A.H.G. Alston* 10891 (BM); La Roqueta, 26.4.1883, *Nilsson* 361 (BM, C, UPS, WU); Almería, 17.5.1887, *Rouy* (LY); *ibid.*, 6.12.1851, *J. Lange* 285 (C); *ibid.*, 8.3.1931, *Jerónimo* 8153 (BM, G, MA, W); *ibid.*, 12.5.1889, *Rouy* (LY); *ibid.*, 2.4.1876, *Winkler* (K); c. 3 km from Almería airport, 12.4.1969, *P.E. Gibbs & al.* 831.69 (E); bei El Aquian, 21.8.1966, *Merxmüller & Grau* 21830 (M); Barranco del Caballar, 20.4.1928, *Ellman & Sandwith* 866 (G, K); entre Cabo de Gata y Almería, 11.3.1921, *Gros* 464 (MA); Tabernas, 4.1960 *J. Borja* (MA); *ibid.*, 3.2.1979, *A. Barra & al.* (MA); *ibid.*, 4.3.1989, *Nieto Feliner & Izuzquiza* 2620GN (MA); a 2,5 km antes del cruce a Tabernas, 250 m, 12.11.1981, *Losa, Socorro & Hurtado* (MA); just S of Tabernas, 23.4.1961, *C.A. Stace* 196 (BM); inter Riojo et Tabernas, Rambla de Tabernas, 9.4.1979, *A.M. Hernández Cardona* (MA); Mazaruleque, 17.3.1985, *Luceñi & al.* (MA); Ermita de Pedro Garcia, 22.4.1981, *Cátedra* (GZU); Sierra Alhamilla, 19.5.1928, *Cuatrecasas* (MA); *ibid.*, 9.3.1982, *Fernández Diez* (MA); *ibid.*, 2.4.1953, *Merxmüller & Wiedmann* 318/53 (M); nr. Venta de Retamar on the road to Níjar, 19.5.1928, *Lacaíta* 208/28 (BM); Las Negras a l'Est de Almería, 36°53'N, 2°01'W, 200 m, 15.5.1980, *Dechamps & Doutrélepont* 2383 (BR); Mojácar, 1.6.1974, *Segura Zubizarreta* (MA); *ibid.*, 3 km S of town, 12.4.1982, *M.F. & S.G. Gardner* 1577 (BM); de Mojácar a Carboneras, 200 m, *G. López* 1969GF (MA); Turre, base de Sierra Cabrera, 2.3.1968, *Fernández Casas* 408 (MA); entre Santa Bárbara y Vera, 300 m, 3.3.1989, *Nieto Feliner & Izuzquiza* 2610GN (MA); Mündungsgebiet des Rio Almazora bei Palomares und Villaricos, E Vera, 20.4.1973, *Merxmüller & Gleißner* 29212 (M); entre Cuevas y Huercal, 9.5.1933, *H. del Villar* (MAF); inter Huercal Overa & Vera, 19.4.1925, *Lacaíta* 36/25 (BM); Schlucht bei Huercal Overa, 2.4.1953, *coll. ignotus* 275 (M). – MURCIA: Puerto Lumbreras, 4.1961, *Delyosalle* (BR); *ibid.*, 6.7.1980, *Segura Zubizarreta* 19547 (M); entre Puerto Lumbreras y Aguilas, 24.9.1986, *Castroviejo Luceño & Pedrol*

9889 (MA); 1/2 wegs zw. Puerto Lumbreras u. Aguilas, 450 m, 26.4.1965, *Greuter 6949* (M, W, herb. Greuter); Aguilas, 29.1.1929, *Lofthouse* (BM); *ibid.*, 6.8.1980, *Segura Zubizarreta 19545* (MA); *ibid.*, 22.3.1964, *Casaseca & al.* (MA); entre Mazarron et Aguilas, 37°30'N, 1°30'E, 100 m, 15.5.1980, *Dechamps & Doutrelepon 2355* (BM, BR); entre El Cantar et Humbrias, 250 m, 11.5.1982, *Charpin & Defferard 16628* (G, MA); Cartagena, *Pau* (G); *ibid.*, 3.1905, *Jiménez* (BC, M); *ibid.*, 26.4.1926, *Ellman & Sandwith 388* (K); Calizar, Sierra de Pelayo, 4.1951, *Erteve* (MA); Montes La Zerroya, 6.3.1905, *Jiménez* (BM); Porman nr. Cartagena, 12.5.1928, *Lacaita 119/28* (BM); Sierra de Cartagena, cerca de Portman, 3.4.1981, *Regueiro 16/81* (MA). – VALENTIA: Orihuela, 14.4.1971, *O. de Bolòs* (G).

MADEIRA: Ponta São Lourenço, rocks of the Baía de Abra, 8.1979, *P. Rocha da Silva* (C).

CANARY ISLANDS: S. loc., 1894, *Coutts Trotter* (E); s. loc., 4/5.1887, *G.F. Scott Elliot* (E); s. loc., 1837, *Despréaux 209* (G). – GOMERA: San Sebastian, 26.4.1935, *Cuatrecasas & al. 422* (MAF); at Pta. de S. Cristobal E of S. Sebastian, 30 m, 24.5.1957, *K. Larsen* (C); Vellehermoso, 8.1964, *Winterhalder, Bramwell & Gaitskell EWK 107* (LIV); above and S of Hermigua, 2000', 30.8.1957, *O.J. Gillie* (E); coastal region in Barranco Vallegranrey, 9.1965, *Bramwell & J.M. Watson* (LIV). – TENERIFE: S. loc., *Broussonet* (LE); Punto de Teno, 3.1880, *Hillebrand* (Z); Montaña de Taco zwischen Los Silos und Buenavista, 9.4.1968, *Ehrendorfer & al. 4* (W); Puerto de Santiago, 6.1.1970, *E. & G. Wängsjö 3498* (LD); Chio, 12.3.1971, *Bresinsky 43* (M); mellan Arona och Adeje, 25.4.1909, *H. & E. Dahlstedt* (UPS); Adeje - La Caleta, 14.1.1972, *Kaae* (C); Playa de las Americas, 3.-4.1.1972, *Kaae* (C); Sta. Cruz, 19.8.1902, *M. Vahl* (C); P. Orotava, La Debasa, 3.1858, *R.T. Lowe 123bis* (K); Puerto Orotava, 1.8.1896, *A. Tullgren* (UPS); Orotava and Santa Cruz, 7.+12.5.1891, *J.F. Hamilton* (E); Santa Ursula, 14.3.1933, *E. Asplund 306* (C, K); San Isidro, 250 m, 16.5.1977, *Gilli* (W); El Medano, 1.5.1977, *Jarvis 510* (BM); *ibid.*, 25.10.1965, *Kaae* (C); *ibid.*, 13.10.1965, *Kaae* (C); *ibid.*, *Wildpret & Santos* (MAF); *ibid.*, 7.1968, *Urschler* (M); *ibid.*, 23.3.1978, *Möschl & Pittoni* (GZU); *ibid.*, 25.5.1977, *Gilli* (W); Punta de Cueva Nueva, nr. Poris Abona, 27.1.1973, *Aldridge 499* (BM); Las Caletillas, 50 m, 6.4.1977, *Jarvis & Murphy 98* (BM); Las Galletas, 10 m, *C. Vanden Berghen* (BR); prope Guimar, 3.1909, *O. Burckhard 300* (M, Z); Candelaria, 18.1.1898, *E. Hintz* (Z); San Andrés, 29.3.1972, *C. Vanden Berghen* (BR); *ibid.*, 100-150 m, 10.1.1968, *R. Santesson 19561* (UPS); *ibid.*, 14.2.1921, *F. Børgesen 455* (C); San Lorenzo, c. 800 m, 1.6.1963, *Landbohøjsk. Bot. Afd.* (C); road to Puertocito de Iguete, 100 m, 30.1.1973, *Aldridge 644* (BM); above Almaciga, 800-900 m, 28.1.1973, *Aldridge 572* (BM); near Taganana, 20 m, 6.4.1977, *Jarvis & Murphy 132* (BM); 1.5 km N Las Mercedes, 900 m, 13.4.1968, *Ehrendorfer & al. 9* (W). – GRAN CANARIA: S. loc., 16.1.1923, *Koopmans* (U); Agaete, 30.7.1960, *R.J. Andrews R21* (COI); *ibid.*, 6.2.1970, *A. Røstad* (LD); *ibid.*, 21.4.1973, *Aldridge 1569* (BM); Valle de Agaete, Los Nievas, 150 m, 31.7.1960, *R.J. Andrews R21* (K); Arucas, 350 m, 29.6.1963, *G. Wängsjö 205* (LD); Montane de Arucas, 500 m, 1.1.1974, *J. Lewalle 7363* (BR); Isleta bei Las Palmas, 29.3.1908, *Rikli & Schröter* (Z); SW Isleta, 60 m, 26.3.1976, *L. & V. Dalgaard 7008* (C; 2n = 14); Westseite der Isleta, 23.3.-8.4.1927, *E. & Fr.v. Wettstein* (M); barranco en el Istmo de Guanarteme, 17.4.1935, *Cuatrecasas & al. 57* (MAF); Puerto de la Luz, 21.8.1902, *M. Vahl* (C); Las Palmas, 13.3.1884, *Christ* (Z); *ibid.*, 19.4.1927, *Zerny* (W, WU); *ibid.*, 2.4.1897, *O. Gelert* (C); *ibid.*, 27.12.1964, *Kaae* (C); *ibid.*, 27.12.1964, *A. Hansen* (C); *ibid.*, 9.4.1901, *Bornmüller 2353* (W); *ibid.*, 50 m, 1.2.1967, *Kunkel 10065* (M); *ibid.*, crater above town, 610 m, 24.9.1957, *F.N. Hepper 905* (K); *ibid.*, 8.3.1921, *F. Børgesen 645* (C); Las Palmas, vega di St. Catalina, 75 m, 14.1.1927, *M. Fleischer & E. Fleischer-Haughton 111* (U); Tafira Alta, 500 m, 28.3.1964, *Markgraf* (B); at Melauara near Telde, 17.5.1957, *K. Larsen* (C); nr. Ingenio, 24.3.1978, *O. Hedberg 6517* (UPS); La Angostiva, 2.7.1966, *Myndel* (C); Punta Biwaja, 25 m, 5.3.1967, *Kunkel 10512* (G); S. Felipe, 29.6.1963, *G. Wängsjö 212* (LD); Barranco las Vacas, 280 m, 23.1.1967, *Kunkel 9892* (M); 6 km W von Agüimes, 565 m, 29.4.1976, *R. & M. Dittrich 2056* (G). – LOBOS: 21.12.1967,

*Kunkel 11771* (G). – LANZAROTE: S. loc., 3.1980, *T.W. Böcker* (C); s.loc., 300 m, 4.1978, *J. Léonard 7042* (BR, C); Arrieta, 3.8.1960, *Gartand D19* (K); prope oppidum Haria, 300 m, 4.1924, *O. Burchard 293* (E, G, Z); Arecife, Wüste südlich der Stadt, 5.4.1964, *Markgraf* (B); Arrecife, 1.1.1972, *E. & G. Wängsjö 4539* (LD); P. Arecife, 15.1.1858, *Lowe 13* (LE); Barranco Maramajo, 300 m, 7.2.1973, *Aldridge 769* (BM); Timanfaya, 140m, 4.2.1975, *Kunkel 17519* (G); Uga, 14.8.1964, *G. Wängsjö 883* (LD); Uga, an der Straße nach Yaiza, c. 250 m, 3.4.1979, *Feuerer* (M); Rubicon, El Papagayo beach, 5.2.1973, *Aldridge 742* (BM); Punta de Papagaya, 28°50'N, 13°47'W, 19.5.1980, *Prud'homme v. Reine PH 59, 60* (L). – GRACIOSA: 7.5.1970, *Kunkel 13391* (G); 1963, *H.M. Hurst 94* (LIV). – FUERTEVENTURA: Puerto de Cabras, 22.2.1905, *Pitard 231* (LY); in de nabüheid van Gran Tarajal, 1.10.1959, *Minnaert* (U); Jandia, 5 m, 7.3.1969, *Kunkel 12590* (G).

CAPE VERDE ISLANDS: BOA VISTA: S. loc., *Brunner s.n.* (G, L, LE); S coast, 15°59'N, 22°49'W, 12.6.1982, *Prud'homme van Reine RMNH Ph53* (L). – SANTIAGO: Path along sea side of Mte. Graciosa towards Pta. Preta, 19.12.1993, *Kilian 2795 & Leyens* (B). – BRAVA: SW coast, Puerta Ferreira, c. 100 m, 14°49'N, 24°44'W, 8.6.1982, *Prud'homme van Reine Ph32* (L); just before Vila N. Cintra, 650-670 m, 2.1994, *Leyens CV-94-32* (herb. Lobin).

MOROCCO: Djebel Hadid près de Mogador, 5.1867, *Balansa* (G); Cap Ghir, Tamri, 50 m, 5.4.1973, *Lewalle 6899* (BR); M. Haha, grèves de l'Acif-n-Aït-Amer près Tamri, 30.3.1922, *Maire* (MPU); Tamri to Cap Ghir, 2-3 m, 19.3.1969, *P. & J. Davis 48449* (BM, E); ad Herculis Promotorium (Ghir), 2.4.1926, *Maire* (MPU); Straße Essaouira - Agadir, c. 7 km N von Smimou, 9.5.1994, *Kilian 3667* (B, herb. Kilian); 25 km N Agadir, 31.3.1974, *Miller, Russel & Sutton 403* (BM); Chiachoua - Agadir, 900 m, 30°40'N, 9°15'W, 23.5.1980, *Charpin & al. MAR95* (G); 33 km NW Agadir an der Straße nach Essaouira, 40 m, 8.4.1986, *Podlech 40195* (G); Immouzer valley, N of Agadir, near village Oulma, 28.3.1972, *Bramwell, Richardson & B.G. Murray 303* (E, K); Imouzzer des Ida Ou Tanan, 1000 m, 22.6.1978, *Lewalle 8896* (BR); près de Dames, region d'Agadir, 29.7.1938, *Faure* (MPU); Agadir-n-Ighir, 3.4.1926, *Maire* (MPU); Agadir, 2.1934, *A.W. Trethewy 79* (K); *ibid.*, 8.6.1925, *D. Fairchild 104* (A); *ibid.*, 27.12.1968, *E. & G. Wängsjö 3033* (LD); *ibid.*, 15.1.1970, *Kaae* (C); Sous, Oued Massa, 22.4.1931, *Maire* (MPU); Tamarar (Agadir), 23.2.1980, *Lewalle 9184* (BR); Taroudant, *H. Lynes 32* (BM); *ibid.*, S side of Sous river, 200-250 m, 3.4.1972, *Davis 54010* (BM, E); 5,1 km W Tiznit, 180 m, 29°55'N, 9°50'W, 18.5.1993, *Vogt 11895 & Oberprieler* (B); 40 km S of Tiznit, 5 km E of Bou-Izakarn, 500 m, 18.3.1969, *M.R.K. Lambert 159* (BM); Straße Tiznit - Mirhleft, c. 10 km von Tiznit (2 km nach Oued Adoudou), 28.4.1994, *Kilian 3433* (B, herb. Kilian); above Sidi Mousa (nr. Tiznit), 100 m, 19.3.1972, *Davis 53555* (BM, E); reg. de Goulimine, 23.-28.8.1936, *Langerou* (MPU); Tizi - Mighert pass (Tiznit to Goulimine), 700 m, 22.3.1969, *P. & J. Davis 48576* (BM, E); Tiznit - Bou Izakarn, 25.12.1983, *Lewalle 10841* (BR); districts de Lazeroualt et Issighiwar jusqu'à Si Ahmed ou Mousa, 1876, *Mardochée* (MPU); environs de Marrakech, Guéliz, 27.3.1921, *Murbeck* (LD); near the barrage Amismis - Marrakech rd. 21./22.4.1936, *Simpson 36379* (BM); near Ogheim (Marrakesch to Qarzazate), 4000', 4.2.1960, *Whiting & Richmond 3/60* (K); S of Titi n'Test, 5.000', 11.9.1964, *R.M. & A.M. Harley 472* (BM, OXF); Tizzi n Test, Sous-Tal, 2000 m, 12.8.1957, *Rauh 177* (M); Goundafa, Nfis, 1100 m, 16.4.1925, *Maire* (FI, MPU); Demnat, c. 900 m, 21.5.1921, *Murbeck* (LD); Arbalah, 29.5.1889, *Ibrahim* (LE); Sfika nr. Al Hoceima, 20', 6.7.1965, *I.B. Heath 318* (BM); 5 km S Al Hoceima, 100 m, 7.4.1967, *Merxmüller & Oberwinkler 22119* (M); Rif, vallée de l'Oued Kert, 29.11.1929, *Mauricio* (MPU); Beni-Said, route de Dar-Kebdani, au Pont du Kert, 13.5.1934, *Sennen & Mauricio 9448* (BM, G, MA, MPU, W); Melilla, au Kert, 8.1929, *Mauricio* (BM); Rif oriental, Zauriat-Narrich (Benibufurur), 19.9.1920, *Vicioso 1267c* (MA); below Talamagait (between Midar & Al Hoceima), 300-400 m, 15.4.1971.

*Davis 51268* (BM, E); Peninsula of Melilla, between Sammar and Aazanén, 10-20 m, 35°15'N, 3°09'W, 5.5.1993, *Vogt 10919 & Oberprieler* (B); Melilla, Islas Chafarinas, 23.6.1988, *J.E. Blanco 13EBC* (MA); 3 km NW Zaio, 120 m, 34°58'N, 2°46'W, 12.4.1987, *Oberprieler & al. 2008* (herb. Oberprieler); *ibid.*, *Lippert 21761* (M); c. 45 km from Nador, 140 m, 35°04'N, 2°39'W, 21.6.1987, *Jury & Rejdali & Watson 8477* (BM); Taourirt, 20.2.1916, *Ducellier* (LD); *ibid.*, 380 m, 10.5.1989, *J. Lewalle 12882* (B); au S de Taourirt, 20.3.1923, *Wilczek & Dutoit* (G); Oued Moulouya, 15 km S Outat-Oulad-el-Haj, 830 m, 33°15'N, 3°47'W, 11.5.1993, *Vogt 11684 & Oberprieler* (B); [Moulouya valley], Ain Fritissa, 27.5.1929, *Jahandiez 307* (G); Tata, 700 m, 27.12.1986, *Lewalle 11574* (BR); Vallée du Draa, bei Tamnougalt, 28.3.1989, *Poelt* (GZU); Agdz (Oued Dra), c. 3000', *Pennycook P.48* (BM); Oued Dades, 11 km N Boumaine-du-Dades, 1570 m, 31°25'N, 6°01'W, 18.4.1986, *Podlech 41116* (G); Gorges du Ziz un peu en aval du Tunnel du Légionnaire, 1280 m, 13.4.1984, *Lambinon & Lewalle 84/M/189* (M); vicinity of Ksar es Souk, 18.8.1969, *M.A. Sanders 2* (BM); bei der Oase Erfoud, 12.4.1979, *Möschl & Pittoni* (GZU); Ksar es Souk - Tafilabet, 23.3.1978, *F. Damblon 78/44* (MA); Hammada du Guir, 15 km N of Taouz, 2000', 30.7.1966, *T.K. Thorp 244* (BM); près Figuig, 18.4.1936, *O. Paulsen* (C); *ibid.*, 18.4.1936, *A. Uggla* (S); *ibid.*, 1921, *F. Strohl-Moser* (Z); Azda, 900 m, 27.12.1971, *Davis 53468* (BM, E); Benituzin, vers "los Salados", 12.7.1930, *Sennen 7628* (BM, G); Djebel el Maiz, vid Oued Saafaaf, 18.4.1936, *E. Wall* (S); Bir Abdalla des Aït Attah (cercle d'Agilal), 900 m, 24.3.1923, *Jahandiez 40* (BM); Zaouia Sidi Ouaggag, 50 m, (Sahara marocaine), 2.1932, *Gattefossé* (MPU); versus Tiganimin (Bocoya), 100 m, 7.5.1927, *Font Quer 729* (BM, FI, MPU).

WESTERN SAHARA: Trayecto de C[abo] Juby al Aiun, 4.12.1943, *E. Guinea* (MA); Layoun, 100 m, 6.9.1990, *J. Lewalle 13142* (B); Zemmour, Timdopuzine, frontiere de Rio del Oro à l'ouest de Bir Oum Ghrein, 8.11.1936, *Mission Acridien 1487* (MPU); El Glat, 10.12.1943, *I. Matéu* (K, MA); Matala, adm. Sotof, 19.3.1911, *Chudeau* (P); Oued Togba, 17.6.1938, *Mission Acridien 2426* (MPU); environs de Metloui, 9.5.1942, *E. Morales-Agacino & C. Rungs 281* (MA).

MAURITANIA: Bir Moghreïn, 4.1935, *Theurkauff* (MPU); Guelta de Zemmur, entre Bir Oum Greïn et Agmar, 3.14.1934, *Luthereau* (MPU); Qued el Ma, 6.2.1937, *A. Chevalier* (P); région Nord et N-Ouest de l'Adrar, 1911/12, *G. Schmitt* (P); El Mounek, 1.3.1908, *Chudeau 54* (P); El Beïna, 13.3.1910, *M. Charles 25549* (P).

ALGERIA: S. loc. ["Sud-Oranais"], *Battandier 22* (JE); Nemours, 15.4.1925, *Faure* (M); entre Aouinet Legraa [= Aouhinet Bel Egra et Igilma, 3.1928, *Estival* (MPU); Kahal Morrat, [c. 26°N, 4°W], 25.2.1935, *Rolland 46bis* (MPU); entre Beni-Abbes et Tabelbala, 1922, *Tripeau* (MPU); Colomb Béchar, versus montes Dj. Bechar, c. 750 m, 22.4.1928, *Andreánszky* (W); Beni Abbes, W Steilabfall des Saoura Tales, 450 m, 30°07'N, 2°10'W, 3.4.1980, *Podlech 33760* (G, M); Beni Ounif, 5. 1922, *d'Alleizette* (LD); *ibid.*, 4.1906, *W. Herter 1298z143* (G); *ibid.*, 800 m, 15.4.1992, *Maire 2652* (BR, FI, G, MPU, Z); *ibid.*, 1000 m, 23.4.1938, *Faure* (LE, U); Beni-Ounif - Figuig, 800-900 m, 3.4.1910, *Schibler* (Z); Tadmait prope Aïn-el-Hadjadj, 600 m, 14.4.1922, *Maire* (G, MPU); entre Ouarga [= Ourgla] et Mac Mahon [= El Homr], dans le reg. A. *Chevalier 42167* (P); Sud Oranais, gorges de L'Oued Mekten, 2.7.1913, *Maire* (MPU).