
Family 34. AIZOACEAE
(including Gisekiaceae, Molluginaceae and Tetragoniaceae)

A. G. MILLER

Succulent or subsucculent annual or perennial herbs or rarely subshrubs. Leaves opposite, alternate or whorled, simple, entire; stipules absent or membranous. Flowers regular, bisexual, axillary or terminal, solitary or in cymes or fascicles. Sepals 5, free or united below. Petals small or absent or replaced by petaloid staminodes. Stamens 5-many. Staminodes often present, sometimes showy and petaloid. Ovary superior or inferior, 1-5-celled; carpels 2-5, fused or rarely free; placentation axile, parietal, basal or apical; ovules 1-many per cell. Fruit a capsule opening by valves or circumscissile, sometimes indehiscent or splitting into 1-seeded mericarps.

1. Delicately branched erect or ascending annual herbs; stem-leaves linear, whorled or if absent then the leaves all in a basal rosette **5. Mollugo**
- + Prostrate or decumbent annual or perennial herbs or shrublets; stem-leaves broader, alternate, opposite or whorled, never in a basal rosette 2

AIZOACEAE

- | | | |
|-----|---|-----------------------------|
| 2. | Petals or petaloid staminodes present | 3 |
| + | Petaloid staminodes absent (sepals sometimes petaloid in <i>Aizoon</i>) | 7 |
| 3. | Plants glandular-pubescent; fruit splitting into 2 indehiscent 1-seeded mericarps | 2. Limeum |
| + | Plants glabrous or papillose; fruit a many-seeded capsule | 4 |
| 4. | Leaves alternate, elliptic to broadly obovate, flat in section | 5 |
| + | Leaves opposite, \pm narrowly oblong, terete in section, very fleshy | 6 |
| 5. | Petaloid staminodes many (petals absent), pink or magenta; stamens many; capsule not surrounded by the persistent calyx | 3. Corbichonia |
| + | Petals 5, white; stamens 5; capsule surrounded by the persistent calyx | 13. Telephium |
| 6. | Annual herbs; petaloid staminodes white; plants of saline coastal areas and salt flats | 11. Mesembryanthemum |
| + | Perennial herbs; petaloid staminodes pink; plants of rocky mountainous areas | 10. Delosperma |
| 7. | Leaves alternate | 8 |
| + | Leaves opposite | 9 |
| 8. | Fruit dry and indehiscent; ovary inferior; prostrate, diffusely branched herb | 12. Tetragonia |
| + | Fruit a many-seeded capsule dehiscent by 5 valves; ovary superior; prostrate or ascending herbs, not diffusely branched | 9. Aizoon |
| 9. | Carpels free; fruit a cluster of 5 achenes; plant marked throughout with numerous linear raphides | 1. Gisekia |
| + | Carpels united; fruit a capsule; plant without linear raphides | 10 |
| 10. | Plants softly tomentose; sepals free | 4. Glinus |
| + | Plants glabrous or papillose; sepals united into a tube below | 11 |
| 11. | Capsule dehiscent by 5 valves | 9. Aizoon |
| + | Capsule circumscissile or dehiscent by a 2-valved lid | 12 |
| 12. | Style 1 | 7. Trianthemum |
| + | Styles 2–5 | 13 |
| 13. | Flowers clustered; fruit a 4-seeded capsule dehiscent by means of a 2-valved lid, the valves usually separating | 8. Zaleya |
| + | Flowers solitary; fruit a several-seeded (usually more than 4) capsule dehiscent by a circumscissile lid | 6. Sesuvium |

1. GISEKIA L.

Annual herbs, marked throughout with numerous linear raphides. Leaves opposite, sub-succulent; stipules absent. Flowers in axillary, sessile or pedunculate fascicles. Sepals 5, free. Petaloid staminodes absent. Stamens 5–20. Ovary superior, of 5 free carpels, the carpels 1-ovuled. Fruit a cluster of 5 achenes.

1. G. pharnaceoides L., Mant. pl. 2: 562 (1771). Syn.: *Pharnaceum occultum* (Forsskal, 1775 p.58). Illustr.: Fl. Trop. E. Afr.: 4 (1961); Collenette (1985 p.37); Western (1989 p.35).

Glabrous herb; stems prostrate, up to 30cm. Leaves subsessile, linear-oblong or narrowly oblanceolate to elliptic, 5–30(–40) × 1–8(–12)mm, obtuse or acute. Flowers greenish or reddish, in congested fascicles; fascicles sessile or on up to 15(–50)mm peduncles; pedicels 2–10mm. Sepals ovate, c.2mm. Stamens 5. Achenes c.1.25mm long, papillose. **Map 183, Fig. 29.**

Sandy and stony areas, stabilized dunes and on granite; cultivated and waste ground, and roadsides; 15–1050m.

Saudi Arabia, Yemen (N & S), Socotra, Oman, UAE. Africa, Palestine, Iran, Pakistan, India, Sri Lanka and the Mascarenes.

2. LIMEUM L.

Herbs or shrublets, frequently glandular-hairy. Leaves opposite or alternate; stipules absent. Flowers solitary or in axillary cymes. Sepals 5, free, with broad membranous margins. Stamens c.7; staminodes c.5, membranous, petaloid, clawed, toothed at the tip. Ovary superior, 2-celled; styles 2. Fruit splitting into two 1-seeded mericarps.

Friedrich, H.C. (1956). Revision der Gattung Limeum L. *Mitt. Bot. Staatssamml. München* 2: 133–166.

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|---|-----------------------|
| 1. Mericarps reticulately rugose, greyish brown | 1. L. arabicum |
| + Mericarps smooth, brown | 2. L. obovatum |

1. L. arabicum Friedrich, op. cit.: 156 (1956). Illustr.: Collenette (1985 p.37); Western (1989 p.34). Type.: Yemen (S), *Popov et al.* 4195 (BM, K).

Intricately branched shrublet or perennial herb, glandular-hairy throughout; stems up to 80cm. Leaves sub-opposite, elliptic or ovate to sub-orbicular, 2–10 × 2–8mm, obtuse or apiculate. Flowers solitary or paired. Sepals broadly ovate, 4–5 × 1.5–3.5mm. Stamines oblong, 3–4.5 × 1.5–2.2mm. Fruit recurved; mericarps reniform, 2.5–3.5mm long, reticulately rugose, greyish brown. **Map 184, Fig. 29.**

Sand-dunes and sandy areas in wadis etc.; 50–850m.

Saudi Arabia, Yemen (S), Oman, UAE. Endemic.

2. L. obovatum Vicary in J. Asiat. Soc. Bengal 16: 1163 (1847). Syn.: *L. humile* sensu Mandaville (1990) non Forsskal (1775) [= *Andrachne telephioides* sensu Vahl]; *L.*

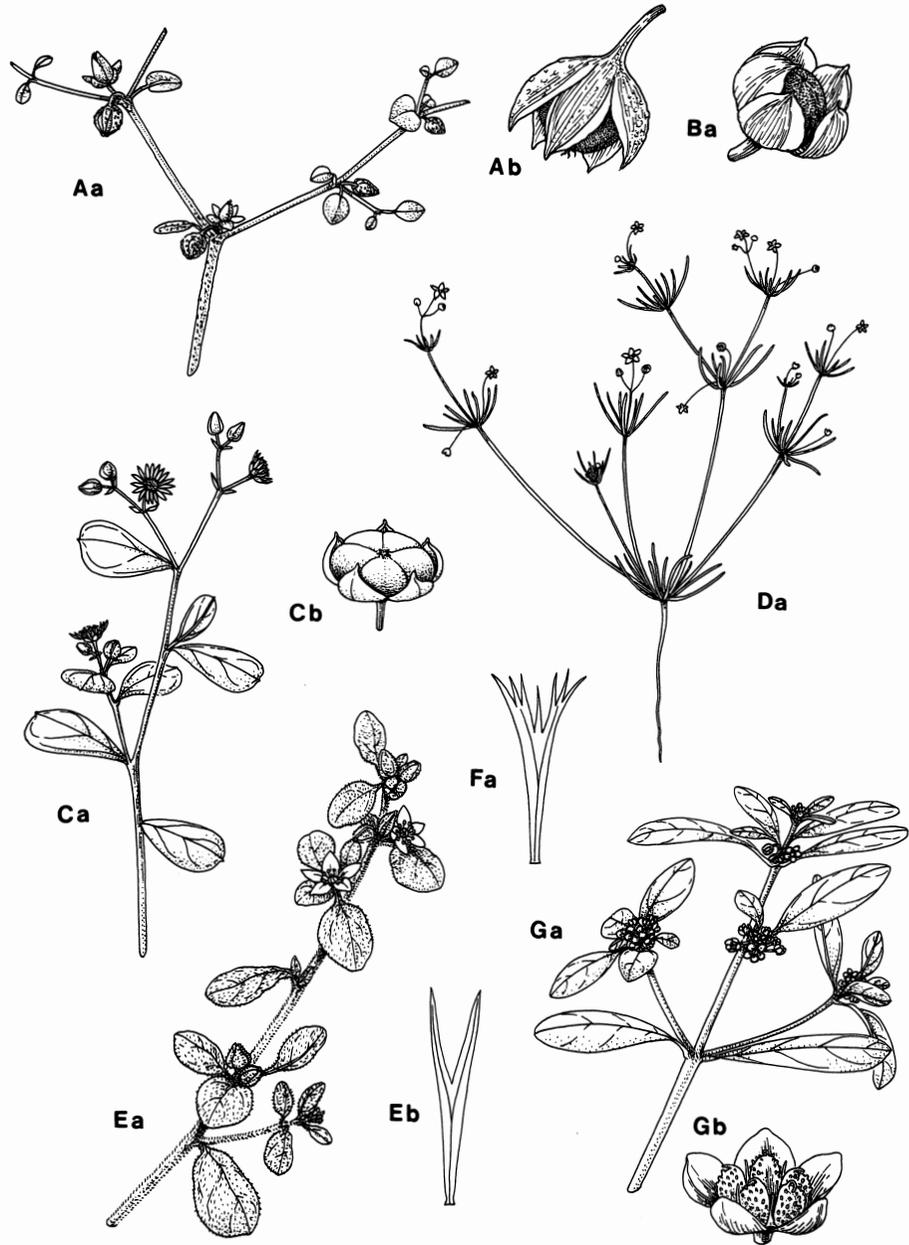


Fig. 29. Aizoaceae. A, *Limeum arabicum*: Aa, flowering shoot ($\times 0.6$); Ab, fruit ($\times 6$). B, *L. obovatum*: Ba, fruit ($\times 6$). C, *Corbichonia decumbens*: Ca, flowering shoot ($\times 0.6$); Cb, fruit ($\times 3$). D, *Mollugo cerviana*: Da, habit ($\times 0.6$). E, *Glinus lotoides*: Ea, flowering shoot ($\times 0.6$); Eb, staminode ($\times 7$). F, G, *Gisekia pharnaceoides*: Fa, staminode ($\times 7$). G, *Gisekia pharnaceoides*: Ga, habit ($\times 0.6$); Gb, fruit ($\times 7$).

indicum Stocks ex T. Anderson (1860 p.30). Illustr.: Fl. Pakistan 41: 9 (1973) as *L. indicum*; Collenette (1985 p.38).

Similar to *L. arabicum* but usually a prostrate herb, sometimes woody below; sepals 3–4.5mm; staminodes c.2 × 1–1.4mm; mericarps smooth, brown. **Map 185, Fig. 29.**

Sandy and gravelly plains, flood plains and wadi-beds; 0–850m.

Saudi Arabia, Yemen (N & S), Oman, UAE, SW Africa, Sudan, Ethiopia and Pakistan.

3. CORBICHONIA Scop.

Annual or perennial herbs. Leaves alternate, petiolate; stipules absent. Flowers in terminal or leaf-opposed cymes. Sepals 5, free. Petals absent. Staminodes petaloid, free, many. Stamens many, in 2 rows. Ovary superior, 5-locular; ovules many; styles 5, free. Fruit a many-seeded, 5-valved capsule.

1. *C. decumbens* (Forsskal) Exell in J. Bot. 73: 80 (1935). Syn.: *Orygia decumbens* Forsskal (1775 p.103). Illustr.: Fl. Trop. E. Afr.: 10 (1961); Collenette (1985 p.37). Type: Yemen (N), *Forsskal* (BM, C).

Annual or perennial herb, glabrous; stems prostrate or decumbent, up to 30cm, often pink-tinged. Leaves glaucous, subsucculent, elliptic to broadly obovate, 8–30 (–50) × 4–30mm, apiculate, cuneate below; petiole 1–4mm. Cymes 5–10-flowered, the flowers opening late afternoon. Sepals green with a white membranous margin, ovate, c.4mm. Staminodes pink or magenta, many, delicate, soon perishing, becoming longer than sepals. Fruit globose, 4–5mm diam. **Map 186, Fig. 29.**

Stony and rocky areas, amongst limestone boulders, plains and wadi-beds; 0–1220m.

Saudi Arabia, Yemen (N & S), Socotra, Oman. Widespread in drier parts of tropical Africa, Iran, Pakistan and India.

4. GLINUS L.

Annual herbs. Leaves opposite or verticillate; stipules absent. Flowers in axillary fascicles. Sepals 5, free. Petals absent. Staminodes present. Stamens 11–30. Ovary superior, (3–)5-locular; ovules many; styles (3–)5, free. Fruit a (3–)5-valved many-seeded capsule.

- 1. Staminodes white, linear
- + Staminodes yellow, multifid

- 1. *G. lotoides***
- 2. *G. setiflorus***

1. *G. lotoides* L., Sp. pl.: 463 (1753). Syn.: *Mollugo glinus* A. Rich. (1847 p.48); *Mollugo hirta* Thunb., Prodr. fl. cap.: 24 (1794). Illustr.: Fl. Trop. E. Afr.: 14 (1961); Collenette (1985 p.37).

Annual herb, softly stellate-tomentose throughout; stems prostrate or decumbent, up to 50cm. Leaves elliptic or broadly obovate to suborbicular, 5–30 × 3–20mm,

obtuse or rounded, the margins entire or obscurely undulate, cuneate below; petioles 3–12mm. Fascicles 2–10-flowered, the flowers opening in the afternoon; pedicels 1–6mm. Sepals greenish white, ovate, 4–8mm. Stamines white, c.15, linear, deeply bifid at the apex. Capsule oblong-ovoid, c.5 × 3mm. **Map 187, Fig. 29.**

Irrigated and cultivated areas, in silty depressions and on rocky slopes; 0–400m.

Saudi Arabia, Yemen (N & S), Socotra, Oman. Widespread in the tropics and subtropics.

2. *G. setiflorus* Forsskal (1775 p.95). Type: Yemen (N), *Forsskal* (C).

Similar to *G. lotoides* but the stamines yellow, multifid. **Map 188, Fig. 29.**

Yemen (N). Kenya, Tanzania, Ethiopia and Somalia.

In Arabia a rare plant collected only once by Forsskal in the 18th century.

5. MOLLUGO L.

Glabrous annual herbs. Leaves opposite or verticillate, sometimes with a basal rosette; stipules small or absent. Flowers in clusters or cymes. Sepals 5, free. Petaloid stamines absent. Stamens 3–5. Ovary superior, 3–5-locular; ovules many; stigmas 3. Fruit a capsule opening by 3 valves.

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| 1. | Both cauline and a basal rosette of leaves present; cauline leaves linear; basal leaves up to 10 × 3mm, soon withering | 1. <i>M. cerviana</i> |
| + | Leaves all in a basal rosette; cauline leaves absent; basal leaves up to 30(–60) × 10(–15)mm, persistent | 2. <i>M. nudicaulis</i> |

1. *M. cerviana* (L.) Ser. in DC., Prodr. 1: 392 (1824). Syn.: *Pharnaceum umbellatum* Forsskal (1775 p.58). Illustr.: Fl. Pakistan 40: 4 (1973); Fl. Trop. E. Afr.: 14 (1961); Collenette (1985 p.38).

Delicately branched annual herb; stems ascending, up to 12cm. Leaves sessile, glaucous; basal leaves forming a rosette, linear to spatulate, up to 10 × 3mm, soon withering; cauline leaves linear, up to 15mm. Flowers axillary or terminal, in sessile or pedunculate 1–4-flowered fascicles; pedicels 2–10(–15)mm. Sepals greenish with white margins, 1–3mm, obtuse, persistent. Stamens 5. Capsule subglobose, 1.5–2mm. **Map 189, Fig. 29.**

Sandy and stony places by roadsides, in wadi-beds etc. and as a weed of cultivation; 30–1500m.

Saudi Arabia, Yemen (N & S). Widespread in the tropics and subtropics of the Old World.

2. *M. nudicaulis* Lam., Encycl. 4: 221 (1797). Illustr.: Fl. Pakistan 40: 2 (1973).

Annual herb; stems erect or ascending, up to 25cm. Leaves all in a basal rosette, obovate to oblanceolate, up to 40(–60) × 10(–15)mm, rounded, attenuate below.

Flowers in dichasial cymes forming a leafless panicle; pedicels 2–15mm. Sepals white, 2–3mm, obtuse, persistent. Stamens 3–5. Capsule subglobose to oblong-ovoid, 2.5–3mm. **Map 190.**

Stony and sandy soils; 100–1300m.

Saudi Arabia, Yemen (N), Socotra. Pantropical.

6. SESUVIUM L.

Annual or perennial herbs. Leaves opposite; stipules absent. Flowers axillary, solitary or clustered. Calyx 5-lobed; lobes triangular, shortly aristate on the back below the tip. Petaloid staminodes absent. Stamens 5–many, free or fused into a ring at the base. Ovary 2–5-celled; styles 2–5. Fruit a circumscissile capsule, the lid not splitting; seeds several.

- 1. Flowers pale pink or yellow; stamens 5(–7); leaves narrowly oblong-elliptic, 5–15mm long **1. *S. sesuvioides***
- + Flowers bright pinkish-mauve; stamens many; leaves narrowly oblanceolate or spatulate, 1.5–3cm long **2. *S. verrucosum***

1. *S. sesuvioides* (Fenzl) Verdc. in Kew Bull. 12: 349 (1957). Syn.: *Trianthema polysperma* Oliver, Fl. trop. Afr. 2: 588 (1871). Illustr.: Fl. Pakistan 41: 4 (1973); Collenette (1985 p.39).

Annual or perennial herb; stems prostrate, up to 20cm, papillose. Leaves fleshy, narrowly oblong-elliptic, 5–15 × 1–5mm, acute or obtuse, shortly petiolate. Flowers pale pink or yellow, solitary or in clusters of 2–3, sessile. Calyx lobes c.4mm. Stamens 5(–7), not fused at the base. Capsule c.5mm long. **Map 191, Fig. 30.**

Salt flats and waste ground; 0–15m.

Saudi Arabia, Yemen (N). Tropical and SW Africa, Iran, Pakistan and India.

2. *S. verrucosum* Raf., New Fl. 4: 16 (1838). Illustr.: Phillips (1988 p.63).

Annual or perennial herb; stems erect or prostrate, up to 1.5m, glabrous. Leaves fleshy, narrowly oblanceolate to spatulate, 1–3 × 0.1–1cm, rounded, long-attenuate below. Flowers bright pinkish-mauve, solitary, sessile. Calyx lobes 4–6mm. Stamens many, fused into a ring at the base. Capsule c.5mm long. **Map 192.**

Weed of irrigated and waste ground, apparently naturalized on salt flats; 0–20m.

Saudi Arabia, UAE, Bahrain. A native of S America.

For a discussion of the occurrence of this species in Arabia see Kew Bull. 40: 208 (1985).

7. TRIANTHEMUM L.

Annual or perennial herbs. Leaves opposite, unequal, with membranous margins at the base, often connate in pairs; stipules absent. Flowers sessile or shortly pedicellate, axillary, solitary or in clusters. Calyx 5-lobed, with a subterminal dorsal appendage. Stamens 5–many. Petaloid staminodes absent. Ovary 1–2-celled; ovules 1–many; styles 1, free. Fruit a circumscissile capsule.

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|----|--|-----------------------------|---|
| 1. | Flowers solitary, hidden by the membranous base of the petiole; leaves usually more than 1cm long | 4. T. portulacastrum | 2 |
| + | Flowers clustered, clearly visible; leaves usually less than 1cm long | | |
| 2. | Leaves linear to narrowly obovate, ± circular in section | 3. T. triquetrum | 3 |
| + | Leaves elliptic, ovate or obovate, flat in section | | |
| 3. | Prostrate annual or perennial herbs; flowers green; leaves grey-green when fresh, ± black when dry | 1. T. crystallinum | |
| + | Bushy perennial; flowers yellow; leaves pale green when fresh, blackish green when dry | 2. T. sheilae | |

1. T. crystallinum (Forsskal) Vahl (1790 p.32). Syn.: *Papularia crystallina* Forsskal (1775 p.69). Illustr.: Collenette (1985 p.39). Type: Yemen (N), *Forsskal* (C).

Prostrate annual or perennial herb, sometimes woody below; stems white, up to 15cm, papillose. Leaves ovate to obovate, 2–5(–10) × 1–3(–7)mm, obtuse or rounded, grey-green when fresh, black with a white reticulate pattern when dry. Flowers green, clustered. Calyx lobes triangular, unequal, 1–2mm; appendage 0.5–1mm. Capsule rounded, depressed in the centre around the style. **Map 193, Fig. 30.**

Sandy and alluvial soils, coarse gravel and lava slopes; 0–1550m.

Saudi Arabia, Yemen (N & S). Ethiopia and Somalia.

2. T. sheilae A.G. Miller in Edinb. J. Bot. 51 (1): 33 (1994). Illustr.: Collenette (1985 p.39). Type: Saudi Arabia, *Collenette* 4718 (E).

Bushy annual or perennial herb; stems white, ascending, up to 20(–90)cm, papillose and somewhat glandular above. Leaves elliptic to obovate, 2–10 × 1–6mm, acute to rounded, pale green when fresh, blackish green with a white reticulate pattern when dry. Flowers yellow, clustered. Calyx lobes triangular, 1–2.5mm; appendage 0.5–1mm. Capsule rounded, depressed in the centre around the style. **Map 194.**

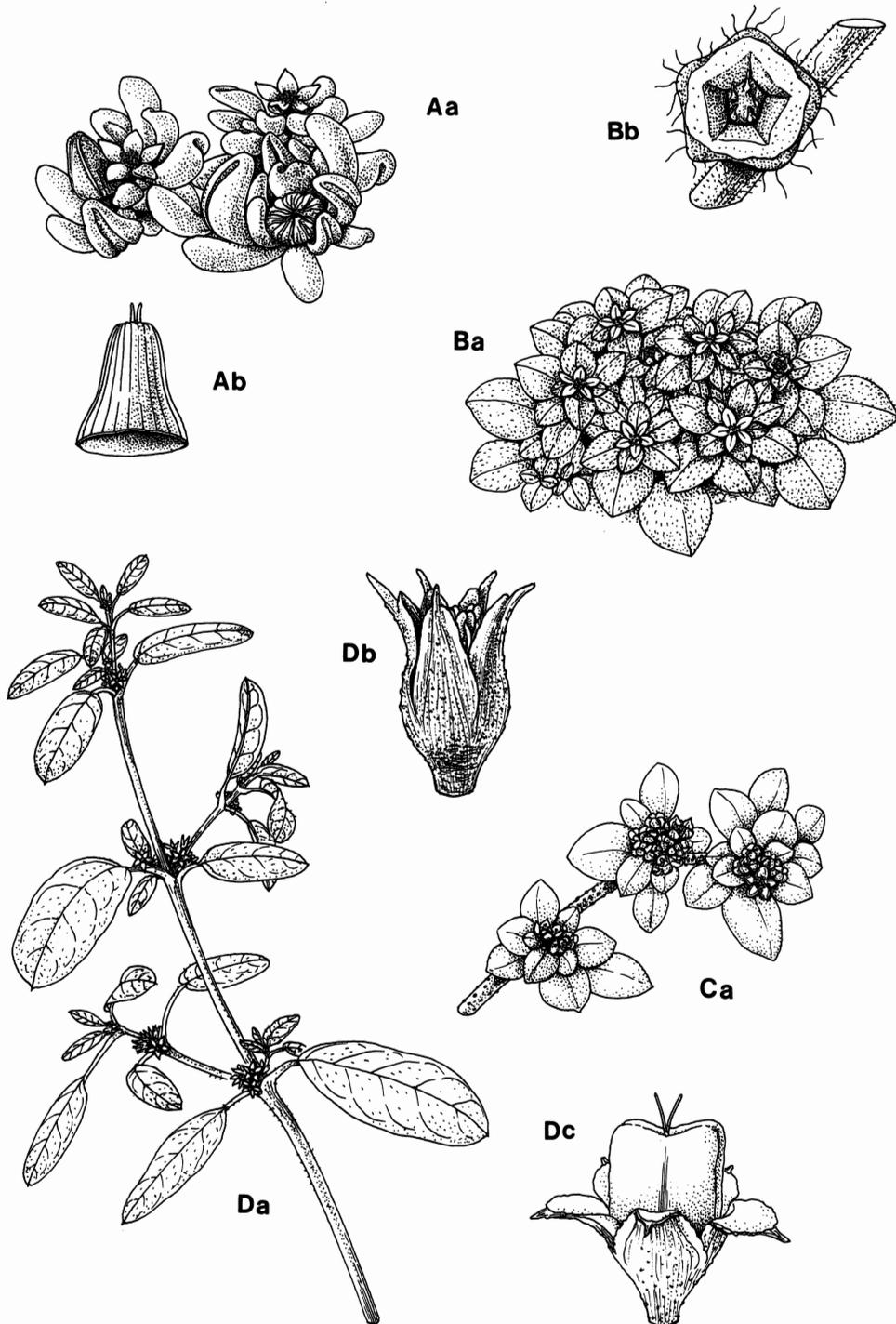


Fig. 30. Aizoaceae. A, *Sesuvium sesuvioides*: Aa, habit ($\times 0.6$); Ab, cap of fruit ($\times 6$). B, *Aizoon canariense*: Ba, habit ($\times 0.6$); Bb, fruit ($\times 4$). C, *Trianthema crystallina*: Ca, habit ($\times 0.6$). D, *Zaleya pentandra*: Da, flowering shoot ($\times 0.6$); Db, flower ($\times 7$); Dc, fruit ($\times 7$).

Open stony places, dry gravel plains, coral sand, lava blocks and near alkaline seepages; 0–1400m.

Saudi Arabia, Yemen (S). Ethiopia and Djibouti.

3. *T. triquetrum* Willd. in Ges. Naturf. Freunde Berlin Neue Schriften 4: 181 (1803). Syn.: *T. sedifolia* Vis., Pl. Aegypti 19, t.3/1 (1836). Illustr.: Collenette (1985 p.40).

Succulent annual herb; stems prostrate, up to 30cm, often reddish tinged, papillose. Leaves linear or narrowly elliptic to narrowly obovate, almost circular in section, up to 5(–10) × 0.5(–1)mm, acute, attenuate below into a short petiole. Flowers sessile, in clusters. Calyx lobes triangular, c.1mm, thickened at the tip. Capsule rounded, depressed in the centre around the style. **Map 195.**

Sandy soils, coastal sands and roadsides; 0–800(–1500)m.

Saudi Arabia, Yemen (N & S), Oman. Egypt, tropical and southern Africa, and Asia from Iran to Australia.

4. *T. portulacastrum* L., Sp. pl.: 223 (1753). Syn.: *Trianthema monogyna* L., Mant. pl.: 69 (1767). Illustr.: Fl. Pakistan 41: 4 (1973); Collenette (1985 p.39).

Annual herb; stems prostrate or ascending, up to 50cm, glabrous or sparsely pubescent. Leaves ovate or broadly obovate to ± orbicular, 5–30(–50) × 5–25 (–45)mm, rounded or apiculate, cuneate below; petiole 2–20(–25)mm. Flowers white or pink, sessile, solitary, hidden by the leaf bases. Calyx lobes narrowly ovate, c.3mm, sub-apically mucronate. Capsule 3–5-seeded, the lid flattened with a raised rim. **Map 196.**

Weed of cultivation; 0–100m.

Saudi Arabia, Yemen (N & S). Pantropical weed.

8. ZALEYA Burm. f.

Annual or perennial herbs. Leaves opposite, subsucculent; stipules absent. Flowers subsessile in congested axillary clusters. Calyx 5-lobed, the lobes with membranous margins. Stamens 5. Petaloid staminodes absent. Ovary superior, 2-celled; ovules 2 per cell; stigmas 2, free. Fruit a 4-seeded capsule, dehiscent by means of a 2-valved lid, the valves usually separating.

1. *Z. pentandra* (L.) C. Jeffrey in Kew Bull. 14: 238 (1960). Syn.: *Trianthema pentandra* L., Mant. pl.: 70 (1767); *Rocama prostrata* Forsskal (1775 pp. CVIII & 71). Illustr.: Fl. Trop. E. Afr.: 27 (1961); Fl. Pakistan 41: 4 (1973); Collenette (1985 p.40); Western (1989 p.36). Type: Yemen (N), from a specimen cultivated at Uppsala from seed sent by *Forsskal* (LINN).

Prostrate annual or perennial herb; stems up to 30cm, glabrous or minutely papillose. Leaves elliptic or oblong-elliptic to obovate, 10–30 × 3–20mm, obtuse; petiole 3–15mm, membranous-winged and sheathing at the base. Calyx lobes greenish or pinkish tinged with a white margin, oblong-ovate, c.2mm. Capsule black, rectangular, 1.5–4 × 1.5–2mm. **Map 197, Fig. 30.**

Stony and sandy places, in fields, wadis and irrigated areas, and as a weed of cultivation; 10–2000m.

Saudi Arabia, Yemen (N & S), Socotra, Oman, UAE. Tropical Africa, Palestine and Madagascar.

9. AIZOON L.

Annual or perennial herbs. Leaves alternate or opposite, succulent, sessile or petiolate; stipules absent. Flowers solitary or in groups, axillary or in stem forks. Calyx 5-lobed. Petals absent. Stamens many, in 5 bundles, inserted on the calyx tube. Ovary superior, (4–)5-locular; ovules many; styles (4–)5, free. Fruit a many-seeded capsule, dehiscing by 5 valves.

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|---|-------------------------|
| 1. Leaves orbicular to obovate, petiolate; calyx lobes 2–3.5mm long; prostrate, pilose herb | 1. A. canariense |
| + Leaves narrowly oblong to oblong-oblongate, sessile; calyx lobes 5–9mm long; erect or ascending, papillose herb | 2. A. hispanicum |

1. A. canariense L., Sp. pl.: 488 (1753). Syn.: *Glinus chrystallinus* Forsskal (1775 p.95). Illustr.: Fl. Trop. E. Afr.: 33 (1961); Collenette (1985 p.36); Mandaville (1990 pl.14); Western (1989 p.35).

Annual or perennial herb, densely to thinly pilose; stems prostrate, up to 30cm. Leaves alternate, fleshy, orbicular to obovate, 10–35 (including petiole) × 4–20mm, rounded or bluntly subacuminate, attenuate below; petioles 3–15mm. Flowers greenish or yellowish with a yellow centre, solitary in leaf axils, sessile. Calyx lobes triangular, 2–3.5 × c.2mm. Stamens 12–25. Fruit red or pink, (4–)5-angled, depressed centrally, 4–6mm diam., the valves not recurving on dehiscence. **Map 198, Fig. 30.**

Very common on sandy and gravelly ground, rocky slopes, wadis, irrigated areas and waste ground; 0–2000m.

Saudi Arabia, Yemen (N & S), Socotra, Oman, UAE, Qatar, Bahrain, Kuwait. Tropical and N Africa, Palestine, Iraq, Iran and Pakistan.

1. *M. forsskalei* Hochst. ex Boiss., Fl. orient. 2: 765 (1872). Syn.: *M. cryptanthum* Hook. f. in Hooker's Icon. pl. t.1034 (1868); *Opophytum forskahlii* (Hochst.) N.E. Br. in Gard. Chron. ser 3, 84: 253 (1828). Illustr.: Mandaville (1990 pl.16); Colletette (1985 p.38) as *Opophytum forsskahlei*.

Annual herb; stems erect or ascending, up to 25cm. Leaves fleshy, subterete, ± linear-oblong, up to 5 × 1.5cm. Staminodes white or cream, yellowish at the base, longer than the calyx. Capsule 12–15mm long. **Map 201, Fig. 31.**

Coastal sands and salt flats; 0–850m.

Saudi Arabia, Qatar, Bahrain. Libya, Egypt and Palestine.

2. *M. nodiflorum* L., Sp. pl.: 481 (1753). Syn.: *Cryophytum nodiflorum* (L.) L. Bolus in S. African Gard. 17: 327 (1927). Illustr.: Fl. Kuwait 1: pl.152 & 153; Mandaville (1990 pl.17); Colletette (1985 p.38).

Annual herb; stems decumbent or ascending, up to 20cm. Leaves fleshy, terete, linear, up to 5–15 × 1–1.5mm, ciliate at the base. Staminodes white or cream, yellowish at the base, shorter than or barely exceeding the calyx. Capsule 5–8mm long. **Map 202, Fig. 31.**

Coastal sands and salt flats; 0–850m.

Saudi Arabia, Oman, UAE, Qatar, Bahrain, Kuwait. N Africa, S Europe and SW Asia.

12. TETRAGONIA L.

Annual or perennial herbs. Leaves alternate; stipules absent. Flowers minute, paired in the leaf axils. Calyx 5-lobed, tubular below. Petaloid staminodes absent. Stamens 5 (in Arabia), alternating with the calyx lobes. Ovary inferior, 1-celled; styles 3. Fruit dry, indehiscent, 1-seeded.

1. *T. pentandra* Balf.f. (1884 p.404). Type: Yemen (Socotra), *Balfour, Cockburn & Scott 37* (K).

Glabrous annual herb; stems prostrate, up to 60cm. Leaves broadly elliptic or ovate, 1–2 × 0.5–1.5cm, obtuse, contracted abruptly below into a petiole; petiole 0.5–1cm. Calyx lobes triangular, c.0.5mm. Fruit obconical, c.1.75mm diam., 5-angled, smooth. **Map 203, Fig. 31.**

No habitat details available.

Socotra. Somalia.

In Socotra known only from a solitary collection made last century; recently also found in Somalia.

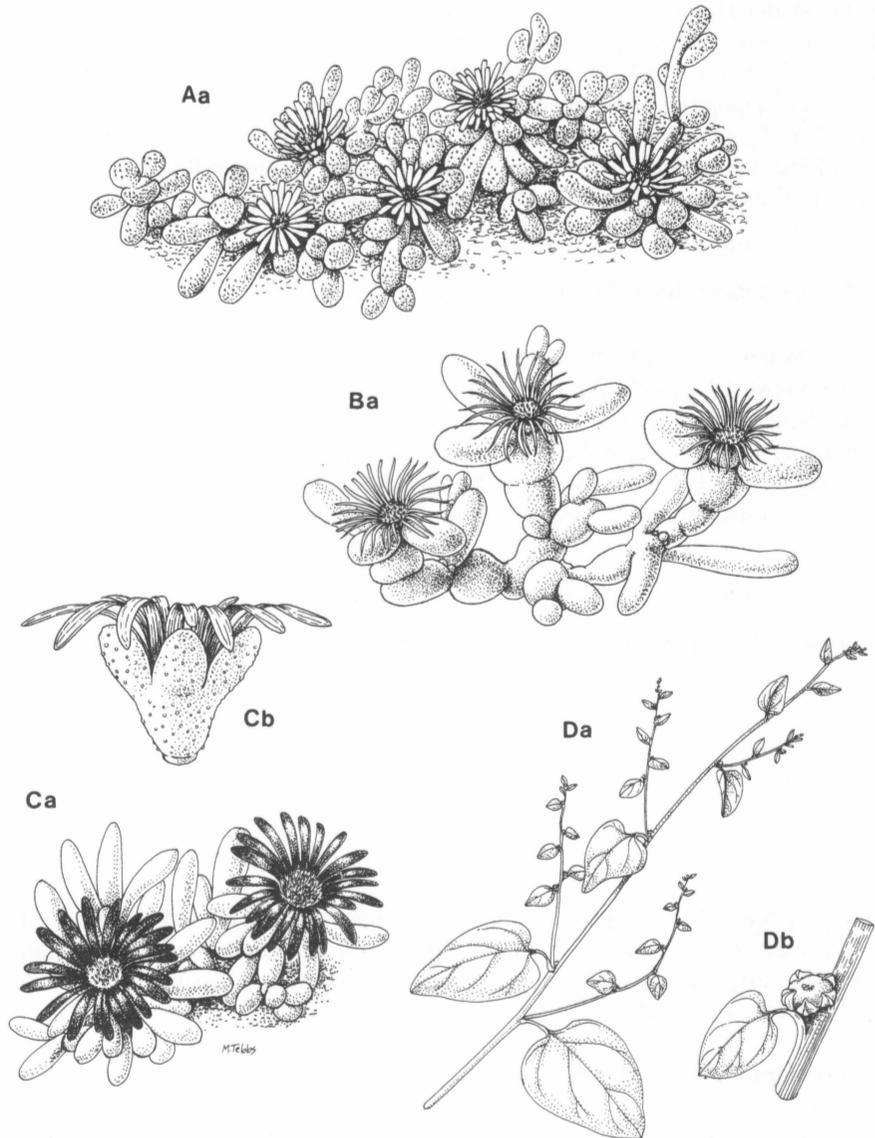


Fig. 31. Aizoaceae. A, *Mesembryanthemum nodiflorum*: Aa, habit ($\times 1.5$). B, *M. forsskalei*: Ba, habit ($\times 1.5$). C, *Delosperma harazianum*: Ca, habit ($\times 1.5$); Cb, flower ($\times 3$). D, *Tetragonia pentandra*: Da, habit ($\times 0.6$); Db, fruit ($\times 4$).

13. TELEPHIUM L.

Annual or perennial herbs. Leaves alternate; stipules small and membranous. Flowers in dense terminal cymes. Sepals 5. Petals 5, white, free, entire, inserted on a small disk. Stamens 5. Ovary superior, 1-locular or incompletely 3-4-loculed below; ovules many; styles 3, free. Fruit a many-seeded loculicidally dehiscent capsule.

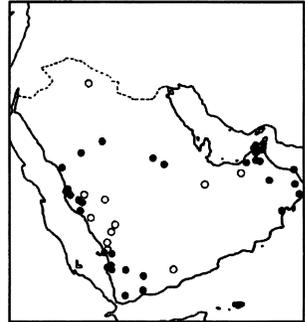
1. **T. sphaerospermum** Boiss., *Diagn. pl. orient. sér. 1, 1 (10): 12 (1849)*.

Glaucous, glabrous, annual or perennial herb; stems prostrate, 3-15cm, numerous, branched at the base but usually unbranched above. Leaves somewhat fleshy, obovate to elliptic, 5-15 × 1-5mm, acute or obtuse, attenuate below. Sepals oblong, 3-4mm, green with a white membranous margin. Petals white, as long as the sepals. Fruit trigonous-ovoid, 3-5 × 2.5-3mm, partly exserted from the persistent calyx. **Map 204.**

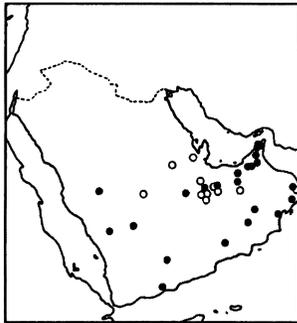
Dry rocky slopes, wadi-beds, sandy depressions and roadsides; 600-2600m.

Saudi Arabia, Yemen (N & S), Oman. N Africa.

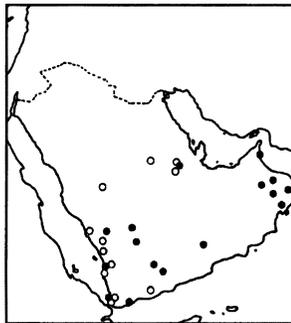
Distribution Maps



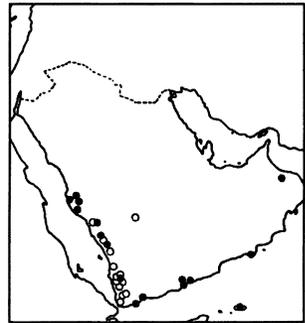
Map 183. *Gisekia pharnaceoides*



Map 184. *Limeum arabicum*

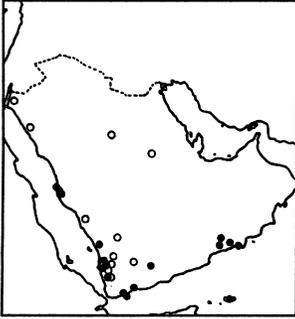


Map 185. *L. obovatum*

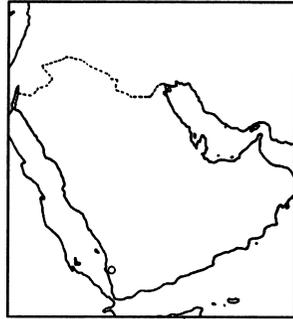


Map 186. *Corbichonia decumbens*

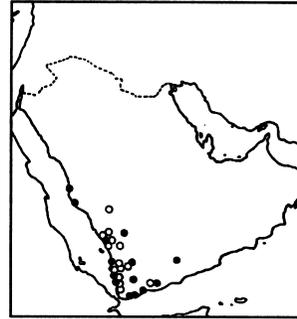
Distribution Maps



Map 187. *Glinus lotoides*



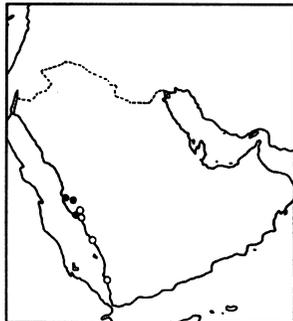
Map 188. *G. setiflorus*



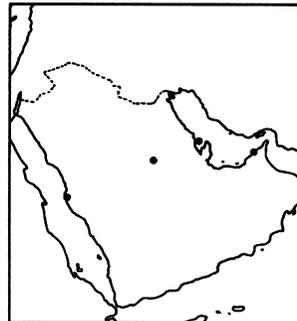
Map 189. *Mollugo cerviana*



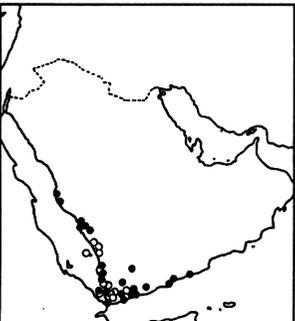
Map 190. *M. nudicaulis*



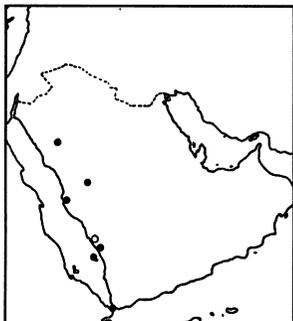
Map 191. *Sesuvium sesuvioides*



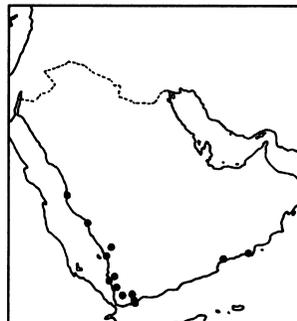
Map 192. *S. verrucosum*



Map 193. *Trianthema crystallina*

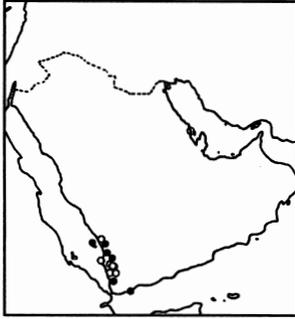


Map 194. *T. sheilae*

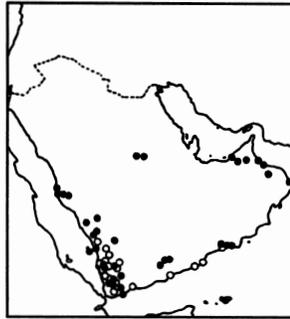


Map 195. *T. triquetra*

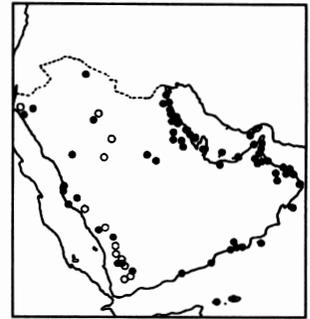
Distribution Maps



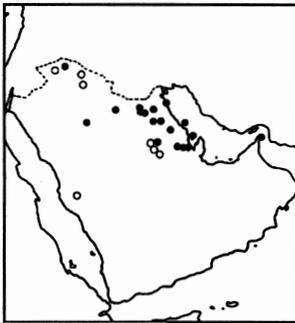
Map 196. *T. portulacastrum*



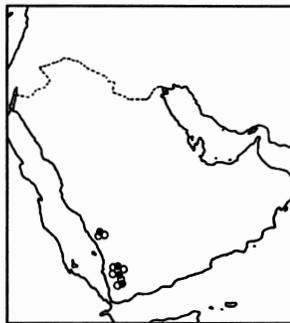
Map 197. *Zaleya pentandra*



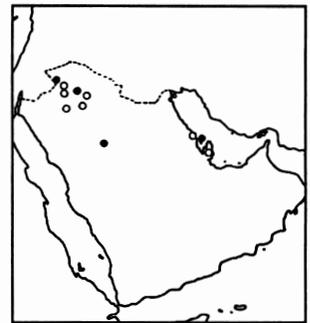
Map 198. *Aizoon canariense*



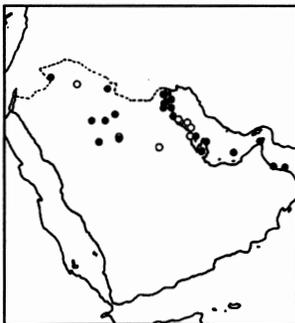
Map 199. *A. hispanicum*



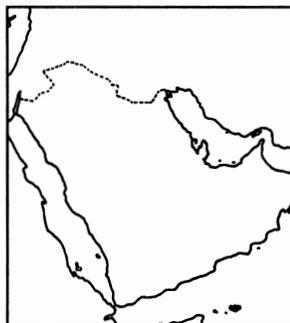
Map 200. *Delosperma harazianum*



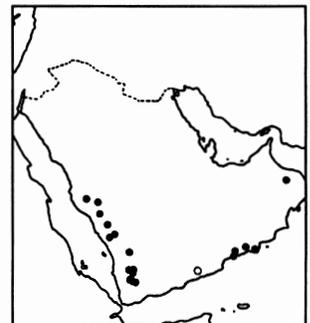
Map 201. *Mesembryanthemum forsskali*



Map 202. *M. nodiflorum*



Map 203. *Tetragonia pentandra*



Map 204. *Telephium sphaerospermum*