

AL FAATEH UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF BOTANY

FLORA OF LIBYA

89

1st December, 1982

Editors:

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EUPHORBIACEAE

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EUPHORBIACEAE

S.M.H. JAFRI & A. EL-GADI

Herbs, shrubs or trees, monoecious or dioecious. Leaves mostly alternate and simple. Flowers very small, regular, unisexual, variously disposed but usually in cymes, generally 5-merous with small perianth or reduced to stamen (male) and gynoecium (female) as in cyathium. Male flowers with 1-10 (-15) stamens, and often with a pistillode; female flowers with superior, 3-locular ovary with axile placentation; ovules collateral, pendulous with ventral raphe and usually carunculate micropyle. Fruit usually breaking into three, 1-seeded cocci that dehisce ventrally; seeds copiously albuminous.

A large family of c. 300 genera and nearly 7000 ssp., mainly tropical; represented by 5 genera and 32 species in Libya. It is of considerable economic importance because of its rubber and oil yielding plants; many are cultivated as ornamental plants and some are of medicinal value also.

- | | | |
|----|--|-----------------------|
| 1. | +Inflorescence a cyathium, usually arranged umbellately | 5. Euphorbia |
| | -Inflorescence not as above; male and female flowers separated, generally with perianth | 2 |
| 2. | +Leaves palmately lobed; inflorescence a terminal panicle with male (below) and female (above) flowers | 4. Ricinus |
| | -Leaves and inflorescence not so | 3 |
| 3. | +Hairs stellate | 2. Chrozophora |
| | -Hairs simple or glandular, if present | 4 |

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4. +Leaves opposite; male flowers usually on long axillary spikes 3. **Mercurialis**
-Leaves alternate; all flowers solitary or males in small fascicles in leaf axils 1. **Andrachne**

1. **ANDRACHNE**

L., Sp. Pl. 1014. 1753; Gen. Pl. ed. 5:444. 1754.

Monoecious herbs or shrubs with ascending or prostrate branches. Leaves mostly sub-orbicular, alternate, stipulate. Female flowers solitary, axillary; males usually clustered. Sepals 5-6; petals 5-6, small or absent. Staminate flowers with 5-6 stamens, somewhat connate at base; rudimentary ovary usually present. Pistillate flowers with 3-celled ovary with 2 ovules in each cell; styles 3, bifid, free or shortly connate. Fruit a 3-locular capsule with 2 seeds in each locule; seeds curved, estrophiolate.

c. 20 species, mostly in the Mediterranean region, eastwards to N. India, and S. America; only 1 species is recorded from Libya.

Andrachne telephioides L., Sp. Pl. 1014. 1753; Durand & Barratte, Fl. Lib. Prod. 216. 1910; Pamp., Prod. Fl. Cir. 304, 1931; Keith, Prelim. Check List Lib. Fl. 232. 1965; Zohary, Fl. Palest. 2:265. fig. 382. 1972. (Fig. 1)

A. nummularifolia Stapf in Denkschr. Akad. Wiss. Wien. Math.-Nat. Kl. 51:314. 1886; *A. virescens* Stapf, l.c.

Perennial herb with prostrate or ascending branches, 10-40 cm long. Leaves alternate, entire, obovate to broadly elliptical, 3-5 x 4-9 mm, shortly petiolate; stipules membranous, silvery-white with reddish base. Male flowers solitary or clustered; petals yellowish to slightly greenish outside, membranous, 1.5-2 mm long; stamens shorter than petals, filaments connate at lower $\frac{1}{3}$; anthers yellow; pedicels 1-1.5 mm long. Female flowers solitary with short pedicels, c. 5 mm; sepals 5, obovate to obcordate with short acuminate tips, greenish in colour with white membranous margin. Ovary globular turbinate with 3 cells; styles 3, deeply bifid, c. 0.5-1 mm long. Fruit a globular 3-carpellate capsule with usually 6 seeds, 2 in each chamber.

Syntypes: 'Habitat in Italia, Graecia, Media'.

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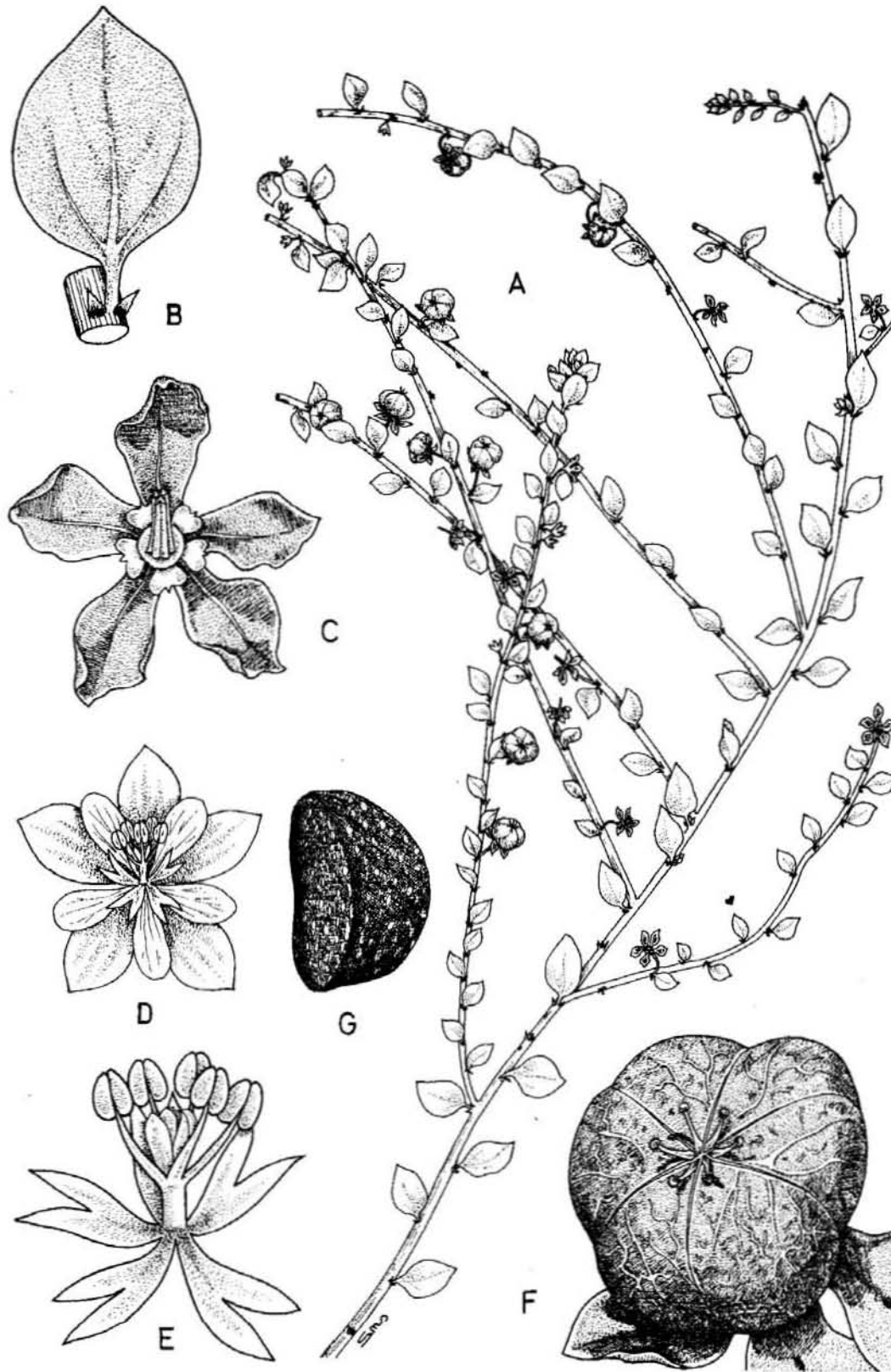


Fig. 1 **Andrachne telephioides**: A, habit x 1; B, portion of stem with a leaf x 5; C, female flower x 8; D, male flower x 10; E, the same with staminal column x 30; F, capsule x 10; G, seed x 15.

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A-3 3 km before Misrata, 7.1.1977, *M.A. Siddiqi & F.B. Ratib* 59 (ULT); **B-2** Wadi Malah, c. 3 km from Nalut, protected gorge, growing in crevice of a vertical rock, 18.4.1975, *S.I. Ali* 2372; (ULT); **C-4** El-Soda mountain, 2.10.1972, *M. Godeh* s.n. (ULT); Gara al-Tiparni, c. 23 km from Weshka, gravel, c. 10 cm long, 26.3.1975, *S.I. Ali* 2358, 2294, 2285 (ULT); 98 km to Hun, along the main highway from Sebha, Wadi Soda, along the main dried water stream, sandy soil with loamy top at some places, prostrate, 31.3.1973, *S.I. Ali* 1458 (ULT).

It has also been reported from Wadi Derna (A-7) by Durand & Barratte (l.c.).

Distribution: Mediterranean region, eastwards to Iran, Afghanistan & Pakistan.

Fl. Jan.-June

2. CHROZOPHORA

A. Juss., *Euphorb.* 27. 1824 (*nom. cons.*)

Tournefortia Scop., *Introd.* 243. 1777.

Monoecious, annual herbs or undershrubs, covered with stellate hairs. Leaves alternate, exstipulate, entire to sinuate-toothed. Inflorescence a spike-like raceme; male flowers crowded above, females below, solitary. Sepals 5; petals 5, absent in female flowers. Stamens 5-15, in males. Ovary 3-carpellate with 3 ovules in each locule and 3, bifurcate styles. Fruit a tomentose or scaly capsule; seeds estrophiolate.

c. 12 species, distributed over the Mediterranean region, tropical Africa and W. Asia to India; represented by 2 species in Libya.

+Plants whitish, densely tomentose; leaves truncate to subcordate at base; stamens 4-5 (-7)

2. ***C. obliqua***

-Plants greenish, less tomentose; leaves cuneate at base; stamens (9-) 10-11 (-12)

1. ***C. tinctoria***

1. ***Chrozophora tinctoria*** (L.) Juss., *Tent. Euph.* 28, 1824; Durand & Barratte, l.c. 217; Pamp., *Pl. Trip.* 180. 1914; *Prod. Fl. Cir.* 204. 1931; Keith, l.c. 360.

Croton tinctorius L., *Sp. Pl.* 1004. 1753.

Annual herb, rather thinly stellate-tomentose, greenish or grey-green, up to 50 cm. Leaves ovate to rhombic, entire or sinuate-dentate, subobtusate, cuneate at base;

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petioles as long as to twice as long as lamina. Male flowers usually with 9-11 stamens. Capsules mucronate, covered with peltate hairs; seeds c. 4 mm, rough or scabrous-tubercled.

Type: Described from Montpellier.

Reported from Tripoli (Ain Zara and Sorman) by Pampanini, (l.c.), from Wadi Derna by Durand & Barratte (l.c.) etc.

Distribution: Mediterranean region, eastward to Pakistan.

Fl. May-Nov. Vern. Effana

2. **Chrozophora obliqua** (Vahl) A. Juss. ex Sprengel, Syst. Veg. 3:850. 1826; Rech. f., Fl. Iran. 6:7. 1964; Tutin in Tutin et al., Fl. Europ. 2:211. 1968. (Fig. 2)

Croton obliquus Vahl, Symb. Bot. 1:78. 1790; *C. verbascifolius* Willd., Sp. Pl. 4:539. 1805; *C. villosus* Sibth. et Sm., Fl. Graec. tab. 951. 1840; *C. oblongifolius* Del., Fl. Aegypt. 283. 1813; *Chrozophora verbascifolia* (Willd.) A. Juss. Tent. Euph. 28, 1824; Durand & Barratte, Fl. Lib. Prod. 217. 1910; Pamp., Pl. Trip. 180. 1914; Corti, Fl. Veg. Fez. 179. 1942; Keith, l.c. 360; *C. tinctoria* var. *verbascifolia* (Mill.) Mull. Arg. in DC. Prodr. 15:2, 748. 1866; *C. oblongifolia* (Del.) Juss. ex Spreng., Syst. Veg. 3:850. 1826 (non *Croton oblongifolius* Roxb.).

Herbs to undershrubs, 10-80 cm high, densely stellate-tomentose, whitish in colour. Leaves petiolate, ovate-oblong, truncate to subcordate at base with entire to sinuately-toothed margin and obtuse to subacute tips; induments stellate, usually crowded on the upperside; petioles 1-8 cm long. Male flower numerous; sepals 5, linear, outside hairy and inside smooth, c. 3.5 x 0.5 mm; petals membranous, ± lanceolate, ciliate at margins with yellow tips, c. 2-3 x 1 mm; stamens usually 4-5, c. 1/3 as long as petals, anthers yellow, c. 1 mm long; filaments entire, as long as anthers. Female flowers pedicellate; pedicels c. 5-10 mm long deflexed; tepals linear 2-4 mm long with stellate induments on the outside and smooth inside; ovary tuberculate, entirely covered with silvery peltate scales; styles 3-bifid, c. 1.5 mm long. Capsules short, mucronate, 3(-5) mm across; seeds rough, c. 4 mm, scabrous-tubercled.

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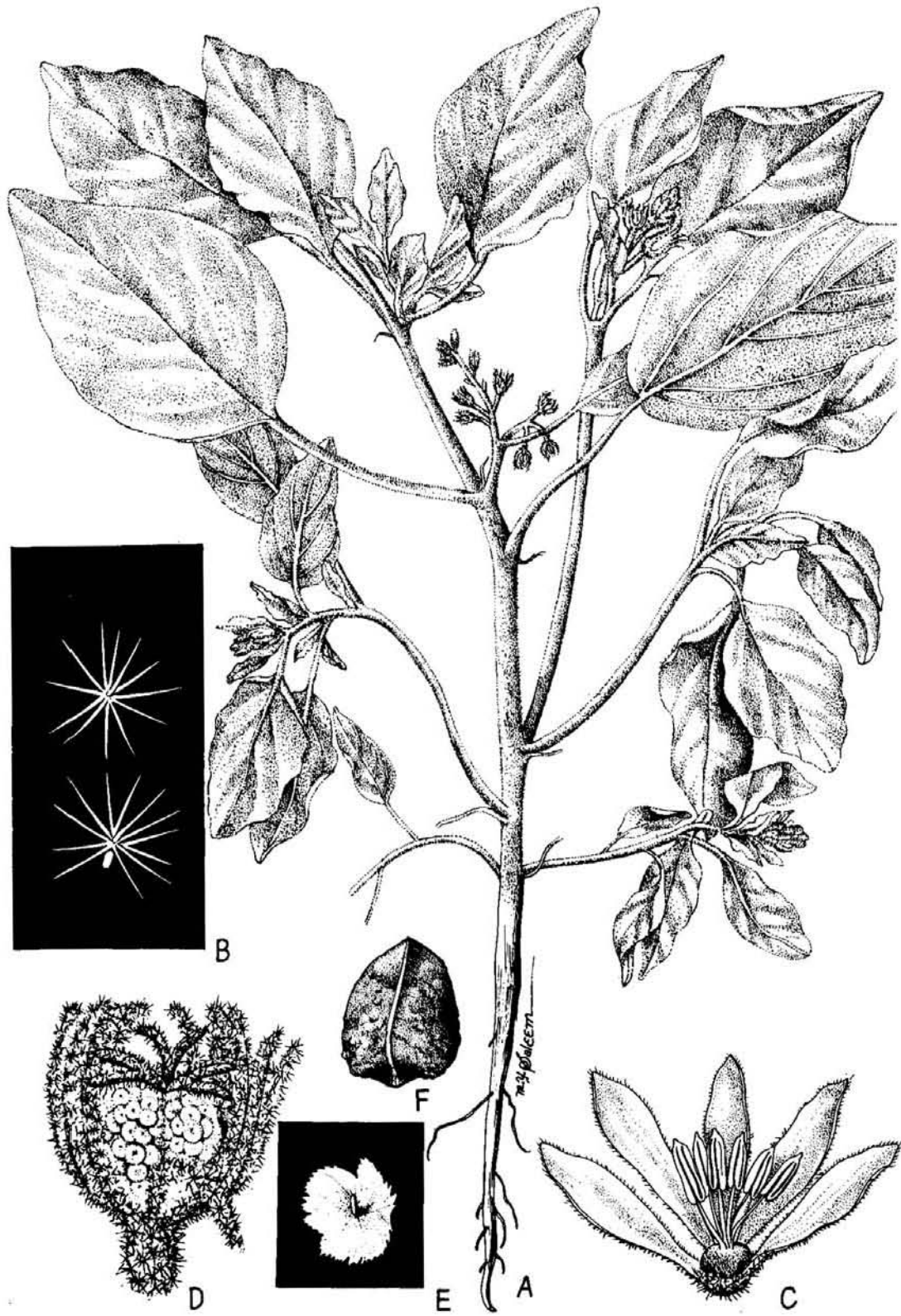


Fig. 2 ***Chrozophora obliqua***: A, habit x $\frac{1}{2}$; B, hairs x 20; C, male flower x 6; D, female flower (fruiting stage) x 6; E, scale from capsule x 30; F, seed x 5.

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Type: Described from Egypt.

A-3 Jahawat area (Msallata-Khomas) road, summer plant in loamy soil, leaves and branches pubescent, flowers yellow, 3.8.1977, *A. El-Gadi* 287 (ULT); Wadi Elmge-neen c. 35 km S.E. of Tripoli on way to Tarhuna, 19.5.1978, *S.M. Mustafa* 62 (ULT); id. *Faten Ahmed* 32 (ULT); id., *A. El-Gadi* 2172; Saline area c. 15 km W. of Khoms, soil loamy, very common, fl. yellow, 24.5.1979, *A. El-Gadi* 2872 (ULT); **E-1** 10 km before Ghat, flowers red, not opened, common in the valley, perennial, c. ½ m tall, 24.2.1976, *S.M.H. Jafri* 6347 (ULT).

Distribution: Mediterranean region, eastwards to Iraq, Iran and Pakistan.

A variable species of wide occurrence in Libya, especially in the coastal areas, extending southwest to the region of Gat.

Fl. May-Oct. *Vern.* Effana, Gasbet et-hmam

C. hierosolymitana Spreng. (l.c. 850), sometimes considered as a variety of this species, having distribution in W. Asia to Pakistan, is reported from Egypt by Rechinger, f. (l.c. 6) and may occur in our area also. However, Tackholm (St. Fl. Egypt ed. 2:316. 1974) considered this as conspecific with *C. verbascifolia* (Willd.) Juss. She considered *C. obliqua* as shrubby and *C. verbascifolia* as annual herb, the former with sparse scales (tubercles) on mature fruits and the latter densely so. Zohary (Fl. Palest. 2:268, fig. 387. 1972) considered *C. oblongifolia* (Del.) Juss. ex Spreng. (l.c. 850) as a separate species, perennial with woody base, 5-9 lateral veins on leaf blade and larger seeds, up to 5 mm (not 3 mm as in *C. obliqua*). Further studies are needed with more material from our area on this complex.

3. MERCURIALIS

L., Sp. Pl. 1035. 1753; Gen. Pl. ed. 5:457. 1954.

Herbs, usually dioecious, glabrous to tomentose. Leaves opposite, short-stipulate. Flowers small, with 3-lobed calyces, green in colour; male flowers usually in clusters on long axillary spikes; stamens 8-15; female flowers solitary or few, axillary; styles 2. Fruit a 2-celled capsule with one seed in each locule.

c. 8 species in temperate regions of Eurasia, N. Africa to N. Siam; represented by one species in Libya.

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Mercurialis annua L., Sp. Pl. 1035, 1753; Durand & Barratte, Fl. Lib. Prod. 217. 1910; Pamp., Prod. Fl. Cir. 305. 1931; Keith, Prelim. Check List Lib. Fl. 665. 1965. (Fig. 3).

M. annua var. *ambigua* (L.) Duby, Bot. Gall. 1:417. 1828; Pamp., Pl. Trip. 184. 1914; Keith, l.c.; *M. ambigua* L., Sp. Pl. ed. 2:1465. 1762.

Annual, dioecious, rarely monoecious herb, 10-60 cm high, glabrous to sparsely hairy; stem slender usually branching at base. Leaves ovate to elliptic-lanceolate, crenate-serrate, 1-5 x 0.5-1.5 cm; petiole 2-10 mm long. Male flowers in lax spikes. Sepals 3, greenish in colour, \pm ovate, c. 1 x 2 mm. Stamens c. 15 per flower; filaments entire, reddish, c. 0.5-1 mm long. Female flowers with bicarpellate, hispid ovary, c. 1 x 2 mm; styles 0.5-1 mm long. Fruit a capsule, 2-3 mm in diameter; seeds 2, subglobose, rugulose, c. 1.5 x 2 mm. Sterile flowers with 1-2 staminodes and rudimentary ovary sometimes also present. $2n=16, 48, 64, 80, 96, 112$.

Type: 'In Europae temperatae umbrosis'.

A-7 Shahat city, Terrarosa soil, 5.5.1978, *I.F. Sanousi* 15 (ULT); id. *N.M. Faris* 14 (ULT); Wadi Kouf, 8.5.1978, *A. El-Gadi & S.M.H. Jafri* 1814 (ULT); Ras El Hilal, leaf margin serrate, stem erect, branching, 6.5.1978, *Khawla H.M.* (ULT); Wadi Derna, 20.1.1967, *L. Boulos* 1319; id. 6.5.1978, *A. El-Gadi, Jafri & others* 1518 (ULT); **B-2** Ain Zarga (Jadu), an annual herb, branching, male female flowers, stamens many yellow, fruits with spiny outgrowths, under shade near water stream, 20.1.1978, *S.A. Alavi* 1492; near Ragrag Tejween, 11.5.1970, *M. Khalifa* s.n. (ULT).

Distribution: Mediterranean region, Central Europe.

It has been indicated that diploids are nearly always dioecious and polyploids are characterized by being usually monoecious (wide Tutin et al, Fl. Europ. 2:212. 1968). Work on the cytotypes of this taxon is needed from our area.

4. RICINUS

L., Sp. Pl. 1007. 1753; Gen. Pl. ed. 5. 437. 1754.

Shrub or large, monoecious herb with alternate palmately lobed leaves. Inflorescence terminal panicles with female flowers above and males below; perianth mem-

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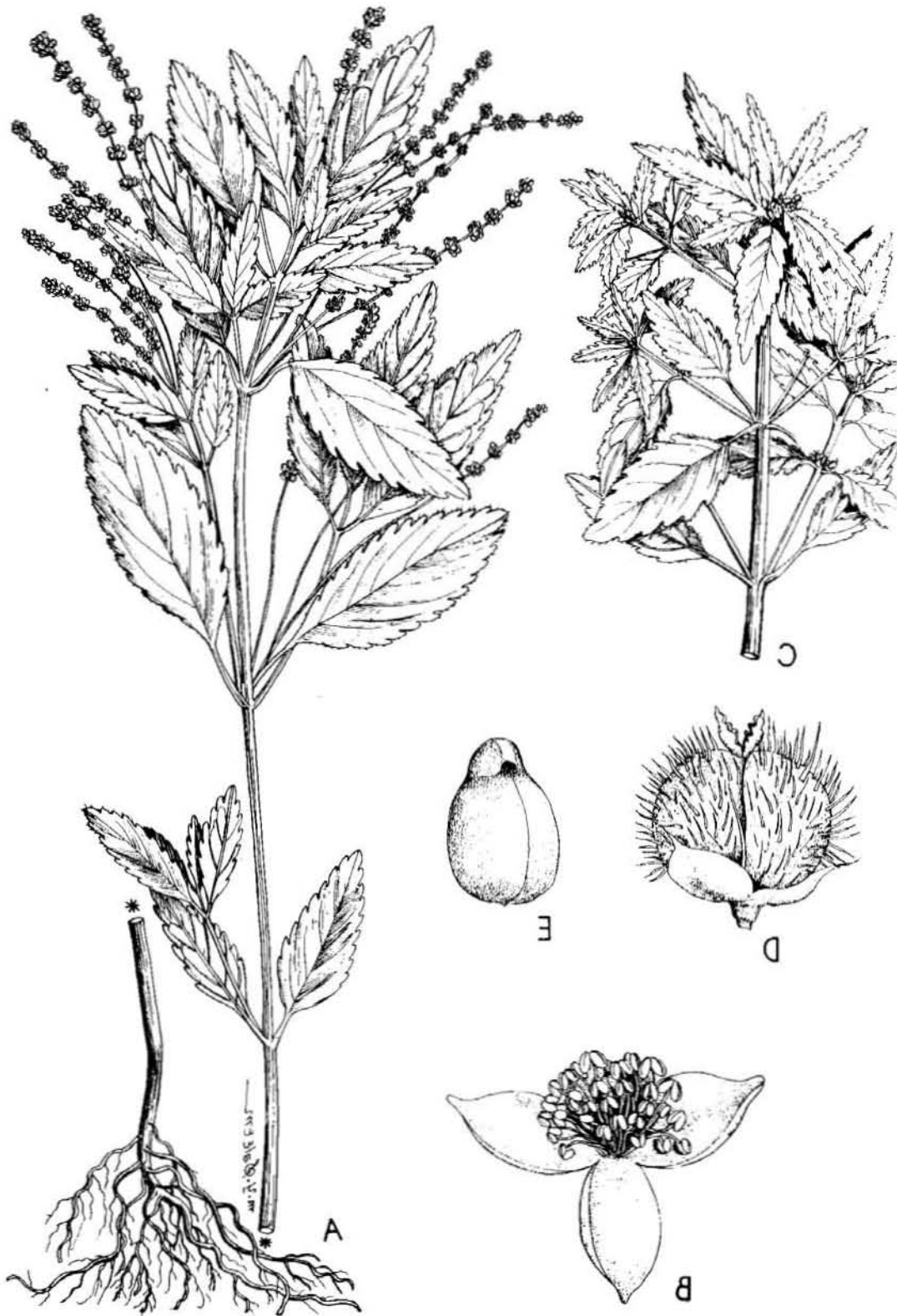


Fig. 3 *Mercurialis annua*: A, male plant x 1/2; B, male flower x 8; C, female plant x 1/2; D, capsule x 8; E, seed x 10.

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branous. Male flowers with many stamens; filaments connate and repeatedly branched. Female flowers with caducous perianth, 3-locular ovary, with 1 ovule in each locule. Fruit a capsule with 3, carunculate seeds.

A monotypic genus in tropical Africa and Asia.

Ricinus communis L., Sp. Pl. 1430. 1753; Rohlfs, Kufra 449. 1881; Durand & Barratte, Fl. Lib. Prod. 217. 1910; Pamp., Pl. Trip. 185. 1914; Prodr. Fl. Cir. 305. 1931; Keith, Prelim. Check List Lib. Fl. 836. 1965. (Fig. 4)

Large shrubby herb, 1-6 m high. Leaves palmately 5-11-lobed; lobes lanceolate dentate, unequal, dark green, shiny with reddish nerves; petioles cylindrical, 10-40 cm long, reddish to greenish. Inflorescence axillary and terminal. Male flowers pedicellate; pedicels 3-10 mm long; calyx 6-lobed, segments triangular-lanceolate, 0.5-1.2 cm long; stamens numerous; filaments c. 1.5 cm long, repeatedly branched; anthers yellow. Female flowers with calyx 3-parted, 5-7 mm long; ovary globular usually with soft projections; styles 3 bifid, 3-5 mm long, forming starshaped structure. Capsules 1-3 x 1.6-4.5 cm usually with conical projections, 0.5-1 cm long; seeds 3, carunculate with smooth, hard, ornamented testa, 1-2 cm long.

Syntypes: 'Habitat in India utraque, Africa, Europa australi'.

A-2 Sabratha, 65 km west of Tripoli, tree, 2 m high, 10.5.1978, *Laila M. Elnageh* (ULT); Ganzour (Janzour) 15 km (W) from Tripoli, tree with large leaves, 12.5.1978, *Sabah Omar* (ULT); **A-3** Tripoli, University of Al-Faateh Campus, 15.5.1978, *Nadia Shetewi* 27 (ULT); *id.* 10.5.1978, *Hameda Kazam* s.n. (ULT); Garabouly, coastal area, soil sandy, 20.1.1978, *A. El-Gadi* 641 (ULT); El-Magharba, flowers yellow, 25.5.1978, *El-Hadi & M. El Mighirbi* 50 (ULT); **A-7** Shahat, perennial, erect, simple and palmately lobed leaf, 28.2.1973, *A.S. Sharif* 23 (ULT); Derna beach, tree, 4 m, white flowers, sandy soil, 1.3.1973, *A. El-Tiafe* 92 (ULT).

Distribution: Most Tropical and subtropical countries, adventive in temperate and subtemperate regions.

The plant is probably a native of Africa, introduced and naturalized in Libya for oil from seeds, dune fixation and as an ornamental.

The plant has long been in cultivation in the Mediterranean region.

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Fig. 4 **Ricinus communis**: A, flowering shoot with female flowers above and male flowers below $\times \frac{1}{2}$; B₁, male flower $\times 3$; B₂, a branched stamen $\times 5$; C, female flower $\times 3$; D, capsule $\times 1$; E, seed $\times 2$.

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Oil obtained from Castor seeds is usually used medicinally and in industry as lubricant.

Fl. Most of the year *Vern.* Kharwa

5. EUPHORBIA

L., Sp. Pl. 450. 1753; Gen. Pl. ed. 5:208. 1754;

Tithymalus Scop., Fl. Carn. ed. 2, 1:332. 1772; *Chamaesyce* S.F. Gray, Nat. Arr. Brit. Pl. 2:260, 1821; Webster & Burch in Woodson et al, Fl. Panama 6 (Euphorb.):338. 1968; *Poinsettia* Grah. in Edin. N. Philos. J. 20:412. 1836; Webster & Burch, l.c. 335.

Monoecious herbs or shrubs rarely attaining the size of a tree, with milky latex, easily recognized by its cyathia, often arranged umbellately on axillary branches, subtended by leafy structures, the ray-leaves (those subtending the primary branches) and raylet-leaves (those subtending the ultimate branches). Leaves opposite and stipulate (subgen. *Chamaesyce*) or the cauline alternate and exstipulate, rarely opposite or whorled. Each cyathium consisting of several male flowers (each represented by single stamen) and one female flower (represented by a 3-carpellary pistil, usually exerted on a stalk), surrounded by a \pm deeply lobed involucre, with usually 4-5 glands at the top; glands with or without appendages. Stamen jointed to the pedicel. Ovary 3-locular, with 3, usually free styles; ovules solitary in each loculus; seeds usually carunculate.

c. 2000 species, cosmopolitan but chiefly in subtropical and warm temp. regions; represented by 27 species in Libya.

Cyathial glands and seed ornamentation have proved useful taxonomic characters and should be studied carefully.

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| 1. | +Leaves opposite, stipulate, asymmetrical at base. (Plants small, prostrate) | 2 |
| | -Leaves alternate, exstipulate, usually symmetrical at base. (Plants usually erect or ascending) | 5 |
| 2. | +Perennial. Leaves entire (usually velutinous; capsules 1 (-1.5) mm) | 1. E. granulata |
| | -Annual. Leaves usually \pm denticulate at least | |

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| | above (if entire then capsules larger) | 3 |
| 3. | +Ripe seeds smooth, c. 3 mm long, rounded in t.s. | 4. E. peplis |
| | –Ripe seeds rugulose, less than 2 mm, 4-angled in t.s. | 4 |
| 4. | +Cyathia solitary axillary; capsules patent-hairy (to glabrous) | 2. E. chamaesyce |
| | –Cyathia in clusters of 2 or 3; capsules appressed-hairy | 3. E. forskalii |
| 5. | +Cyathial gland mostly 1, stipitate | 27. E. heterophylla |
| | –Cyathial glands 4-5, sessile | 6 |
| 6. | +Capsules tuberculate | 7 |
| | –Capsules not tuberculate | 10 |
| 7. | +Small, perennial (up to 20 cm) with tuberous, napiform rootstock, 5 x 2.5 cm | 10. E. pseudo-apios |
| | –Shrubs (more than 30 cm); rootstock not as above | 8 |
| 8. | +Rays of umbel and dead twigs persistent. (Small shrubs, with smaller crowded leaves) | 9. E. spinosa |
| | –Rays of umbel and dead twigs not persistent (usually tall shrubs with larger, lax leaves) | 9 |
| 9. | +Capsules with short, cylindrical tubercles. Leaves larger, on greenish branches | 7. E. squamigera |
| | –Capsules with low, broad tubercles. Leaves medium, on whitish-brownish woody branches | 8. E. bivonae |
| 10. | +Perennial herbs or shrubs | 11 |
| | –Annual herbs | 19 |
| 11. | +Tall perennial or shrub, leafy above or on young branches | 12 |
| | –Perennial herbs, uniformly leafy | 13 |

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| 12. | +Seemingly dichotomously branched; leaves glabrous
-Sometimes verticillately branched above; leaves minutely pubescent | 5. E. dendroides

26. E. characias |
| 13. | +Plants densely and imbricately leafy
-Plants usually laxly and alternately leafy | 14
15 |
| 14. | +Leaves glabrous-glaucous, somewhat fleshy, all erect or ascending, often compactly appressed to the stems and ± yellowish (when dried). (maritime sands)
-Leaves minutely papillose-glaucous, lower deflexed. (cultivated) | 21. E. paralias

23. E. pithyusa* |
| 15. | +Caruncle of seed about as large as the seed; (capsule apparently somewhat constricted above the middle)
-Caruncle of seed not so prominent; capsules not so constricted | 16

17 |
| 16. | +Caruncle lobes few and prominent, thickish
-Caruncle lobes several, neither as prominent nor thickish | 11. E. retusa

12. E. calyptrata |
| 17. | +Seeds smooth or shallowly punctate; capsules 3-6 mm
-Seeds (with a conspicuous caruncle), irregularly denticulate or ridged in several rows; capsules 2.5 mm. (leaves distant, usually small, linear-subulate and deflexed) | 18

16. E. guyoniana |
| 18. | +Leaves usually with fine patent, conspicuous teeth; glands of cyathium truncate or obscurely crescentic
-Leaves minutely to obscurely serrulate, very variable; glands of cyathium with 2 long, slender horns each | 6. E. serrata

25. E. terracina |

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| 19. | +Capsules with 2 dorsal ridges or undulated wings on each valve | 20 |
| | –Capsules not so | 21 |
| 20. | +Capsules with 2 dorsal ridges on each valve; seeds sulcate ventrally (sometimes pitted also) and pitted dorsally | 22. E. peplus |
| | –Capsules with 2 undulated wings on each valve; seeds alveolate-reticulate | 13. E. pterococca |
| 21. | +Leaves toothed, at least near apex or base | 22 |
| | –Leaves entire | 23 |
| 22. | +Leaf conspicuously dentate-pectinate; seed 2-5 mm long, reticulate-wrinkled | 15. E. oxyodonta |
| | –Leaf finely serrulate, usually in the upper half; seeds 1.5-2 mm, regularly alveolate (or reticulately rugose) | 14. E. helioscopia |
| 23. | +Seeds tuberculate or rugulose | 25 |
| | –Seeds pitted or sulcate | 26 |
| 24. | +Capsules 2.5-2.8 mm; seeds usually grey to brown | 17. E. dracunculoides |
| | –Capsules 1.5-2 mm; seeds grey or whitish | 25 |
| 25. | +Plants up to 10 cm tall; leaves obovate-spathulate, usually up to 10 mm long; glands rather concave, with 2 very short or obsolete horns | 18. E. parvula |
| | –Plants 10-30 (-40) cm; leaves linear to oblong-cuneate, up to 25 x 2 mm; glands usually 2-horned | 19. E. exigua |
| 26. | +Seeds transversely sulcate | 21. E. falcata |
| | –Seeds longitudinally sulcate | 20. E. sulcata |
| 1. | Euphorbia granulata Forsk. Fl. Aegypt-Arab. 94. 1775; Durand & Barratte, Fl. Lib. Prodr. 214. 1910; Corti, Fl. & Veg. Fez. 175. 1942 (p.p.); Ozenda, | |

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Fl. Sah. 332. fig. 112. 1958; Keith, Prelim. Check List Lib. Fl. 487. 1965.
(Fig. 5, A-E)

E. forskalii var. *glabrata* J. Gay in Webb & Berth., Phyt. Canar. 3:243. 1842;
E. granulata var. *glabrata* (J. Gay) Boiss. in DC., Prodr. 15(2):34. 1862; *E.*
kralikii Batt. & Trab., Fl. Alg. 1:791. 1888.

A small, hispidly villous (rarely glabrous), prostrate, perennating herb, often much branched from the base, with brittle (especially when dry), up to 20 cm long, somewhat yellowish branches. Leaves opposite, obliquely oblong-ovate to subrounded, obtuse, entire or almost so, less than 1 cm long; stipules c. 1 mm, whitish. Cyathia very small, axillary and usually on short, leafy branches; borders of cyathia membranous, with pinkish or carmine coloured bases. Capsules c. 1 (-1.5) mm across; cocci rounded at the back and hirsute with patent hairs, sometimes glabrous; seeds rugulose. $2n=40$

Type: Lohaja, Hadiee, *Forsk.*

A-1 7 km from Nalut on way to Tripoli, 19.7.1977, *S.A. Faruqi* (ULT); **C-4** c. 80 km from Hun towards Sabha, sandy roadside, prostrate, 1.4.1973, *S.I. Ali* 1513 (ULT); **D-3** Al-Abiad, near water course of a cult. field, prostrate, 20.3.1973, *S.I. Ali* 1329, 1330, 1334, 1351 and 1353 (ULT); **E-1** Sardeles-Ghat, 25.2.1934, *R. Corti* 715 (FI); U. Tanezzuft, 11.3.1934, *R. Corti* 716 (FI); Ghat, Elbarcat, 2.3.1934, *R. Corti* 721 (FI); **E-8** Gebel Uweinat, 7.11.1968, *L. Boulos* 3319, 3334 and 3399 (ULT); Karkur, Gebel Arcno, c. 40 km, N.W. of Uweinat mountain, soil gravelly, 26.1.1979, *A. El-Gadi & Siddiqi* 2300 (ULT).

Distribution: N. Africa, Arabia, eastwards to India.

A desert species of warmer parts and seems to be more common in the southern desert areas of Libya. Glabrous forms (including glabrous fruits) are sometimes called var. *glabrata*, which appear to integrate in *E. chamaesyce*.

Fl. All the year Vern. Libbana, Moulbina, Tellak, Um El leben.

- Euphorbia chamaesyce** L., Sp. Pl. 455. 1753; Durand & Barratte, l.c. 213; Pamp., Prodr. Fl. Cir. 306. 1931; Corti, l.c. 176; Keith, l.c. 485; Smith & Tutin in Tutin et al, Fl. Europ. 2:216. 1968; Fiori & Paeolatti, Fl. Ital. Ill.

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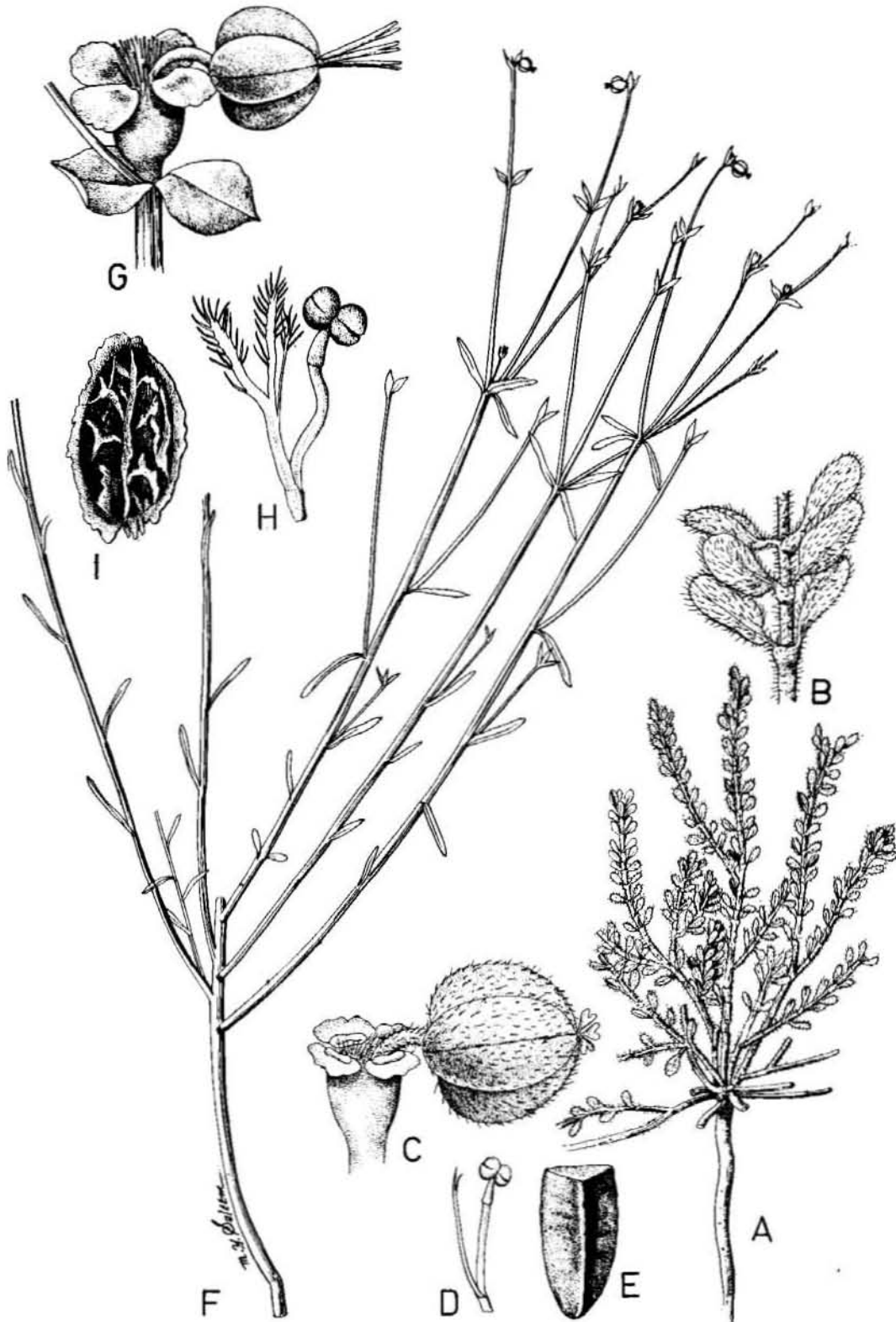


Fig. 5 ***Euphorbia granulata***: A, habit x 1½; B, a portion of stem with leaves x 3; C, cyathium with capsule x 15; D, a stamen (male flower) x 10; E, seed x 20. ***E. guyoniana***: F, habit x ½; G, cyathium with capsule and subtending bracteoles x 5; H, a stamen (male flower) x 10; I, seed x 8.

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314, fig. 2555. 1933; Zohary, l.c. 273, fig. 392. (Fig. 6, A-E)

E. canescens L., Sp. Pl. ed. 2:653. 1762; *Chamaesyce vulgaris* Prokh., Tr. Kuib. Bot. Sada 1:8. 1941; *C. chamaesyce* (L.) Hurus. in J. Fac. Sc. Univ. Tokyo. 6:283. 1954.-*nom. illeg.*

Very similar to the preceding species, but annual, 20-50 cm long, with obscurely serrulate asymmetrical leaves, 3-7 mm long; cyathia usually solitary axillary, c. 1 mm; glands suborbicular with small, whitish appendages; capsules slightly larger, c. 2 x 2 mm, smooth, subglabrous to densely villous with spreading hairs; seeds c. 1.2 mm, transversely rugulose or irregularly tuberculate-rugulose, ovoid quadrangular, greyish.

Type: 'Habitat in Europa australis (Spain, *Loffing*), Herb. Linn. 630/15 (LINN).

A-6 Dariana c. 40 km from Benghazi, c. ½ km from the sea, near cult, field, sandy soil, 16.6.1972, *S.I. Ali* 478 (ULT); **A-7** c. 5 km from Susa, on way from Shahat, 20.6.1972, *S.I. Ali* 782 (ULT); **B-4** El-Washka, 26.10.1972, *M. Godeh* (ULT); Gara el Tifarni, c. 23 km from Washka, prostrate, 26.3.1975, *S.I. Ali* 2384 (ULT).

Distribution: Europe, N. Africa, to W. Asia.

The species is more common in the coastal and the Gebel Akhdar area in Libya.

3. ***Europhorbia forskalii*** Gay in Webb & Berth., Phyt. Canar. 3(2):240. 240. 1844; Tack., St. Fl. Egypt ed. 2:326. 1974; Corti, l.c. 175 (in Syn. of *E. granulata*); Zohary, l.c., 2:274, fig. 393. (Fig. 6, F-1).

E. aegyptiaca Boiss., Cent. Euph. 13. 1860; Cufod., Enum. Pl. Aethiop. 442. 1965; *Anisophyllum aegyptiacum* (Boiss.) Schweinf. & Asch. in Schweinf. Beit. Fl. Aethiop. 34. 1867.

Prostrate, annual herb, often reddish-green and puberulous to subvillous. Very similar to the preceding species but capsules adpressedly hairy. Leaves opposite, oblong-rounded, ± denticulate, somewhat oblique at base, very shortly petioled and stipulate.

Type: Described from the Canaries.

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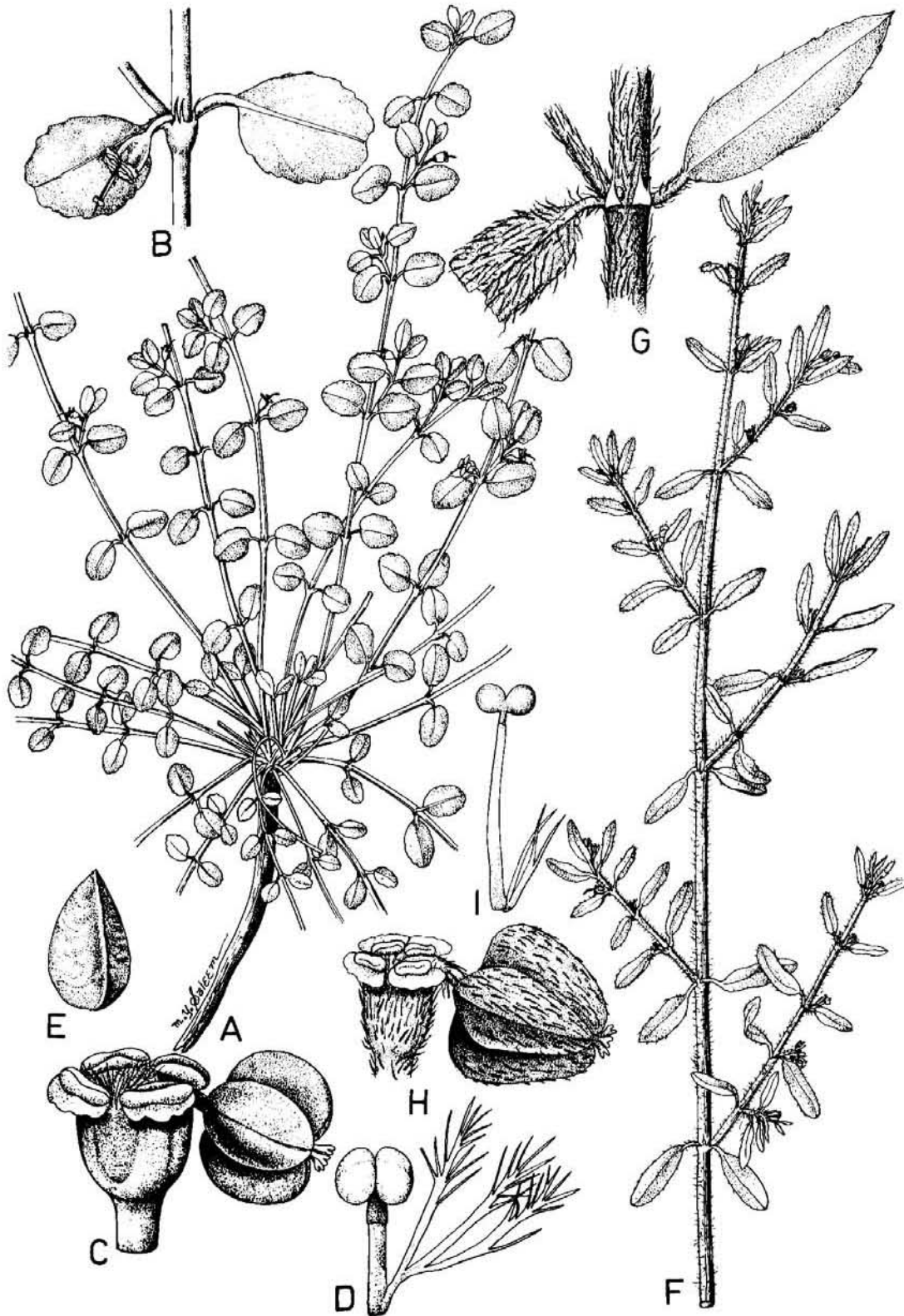


Fig. 6 ***Euphorbia chamaesyce***: A, habit x 2; B, a portion of stem with leaves and a cyathium x 5; C, cyathium with capsule x 15; D, stamen (male flower) x 20; E, seed x 20. ***E. forskalii***: F, a flowering branch x 2; G, a portion of stem with leaves x 8; H, cyathium with capsule x 15; I, stamen (male flower) x 20.

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A-3 Tripoli, Sidi El-Masri, Faculty of Science, 22.4.1967, *L. Boulos* 1742 (ULT); Oil Company School lawn, 3.1.1977, *S.A. Faruqi* s.n. (ULT).

Distribution: Trop. Africa (Aethiopia, Sudan, Nubia) Egypt, Libya, Arabia, Palestine, Syria.

4. ***Euphorbia peplis*** L., Sp. Pl. 455. 1753; Durand & Barratte, l.c. 213; Pamp., l.c. 306; Keith, l.c. 488; Smith & Tutin, l.c. 216; Fiori & Paoletti, l.c. fig. 2557; Zohary, l.c. 272, fig. 390.

Chamaesyce peplis (L.) Prokh., Consp. Syst. *Tithym.* As. Med. 15. 1933.

A procumbent, glabrous annual herb, somewhat fleshy, usually with 4 branches from the base, up to 30 (-40) cm long. Leaves somewhat curved, oblong, 5-10 (-15) x 2.5-5 (-10) mm, obtuse or emarginate, entire or almost so, oblique at the base; petiole 2-3 mm long; stipules c. 1.5 mm, subulate; cyathia axillary, solitary; glands semicircular, reddish-brown, with small, paler appendages. Capsules (3-) 3.5-4 (-4.5) x 4-5 mm, nearly smooth, purplish; seeds 3 mm, ovoid-pyriform, smooth, pale grey, occasionally brown-mottled.

Type: 'Habitat in Narbonae, Hispaniae maritimis', Herb. Linn. 630/18 (LINN).

A-3 Wadi Raml-Khoms Rd., bank of spring, soil sandy, 24.10.1957, *B.C. Park* 33 (K); **A-6** Benghazi, *V. Zanon* 150 (FI); W. Agail, S. of Greifa, 4.8.1959, *D.A. Ogden* s.n. (K).

Distribution: Europe, Canaries, N. Africa, eastwards to W. Asia.

5. ***Euphorbia dendroides*** L., Sp. Pl. 462. 1753; Durand & Barratte, l.c. 214; Pamp., l.c. 308; Keith, l.c. 486; Smith & Tutin et al, l.c. 216; Tack., l.c. 327; Fiori & Paoletti, l.c. fig. 2585; Zohary, l.c. 276, fig. 399. (Fig. 7)

Erect, apparently dichotomously branched shrub, up to 2 m high, naked below, leafy on the young branches, glabrous. Leaves alternate, oblanceolate to linear-lanceolate, 25-65 x 3-8 mm, entire obscurely to shortly mucronulate, with a single mid-vein, exstipulate, present on current years branches. Ray-leaves shorter and broader, like the cauline leaves, umbellate rays (3-) 5-8 (-10), dichotomous; raylet-leaves broadly rhombic or suborbicular, c. 10 (-12) mm, yellowish. Cyathia c. 5 mm

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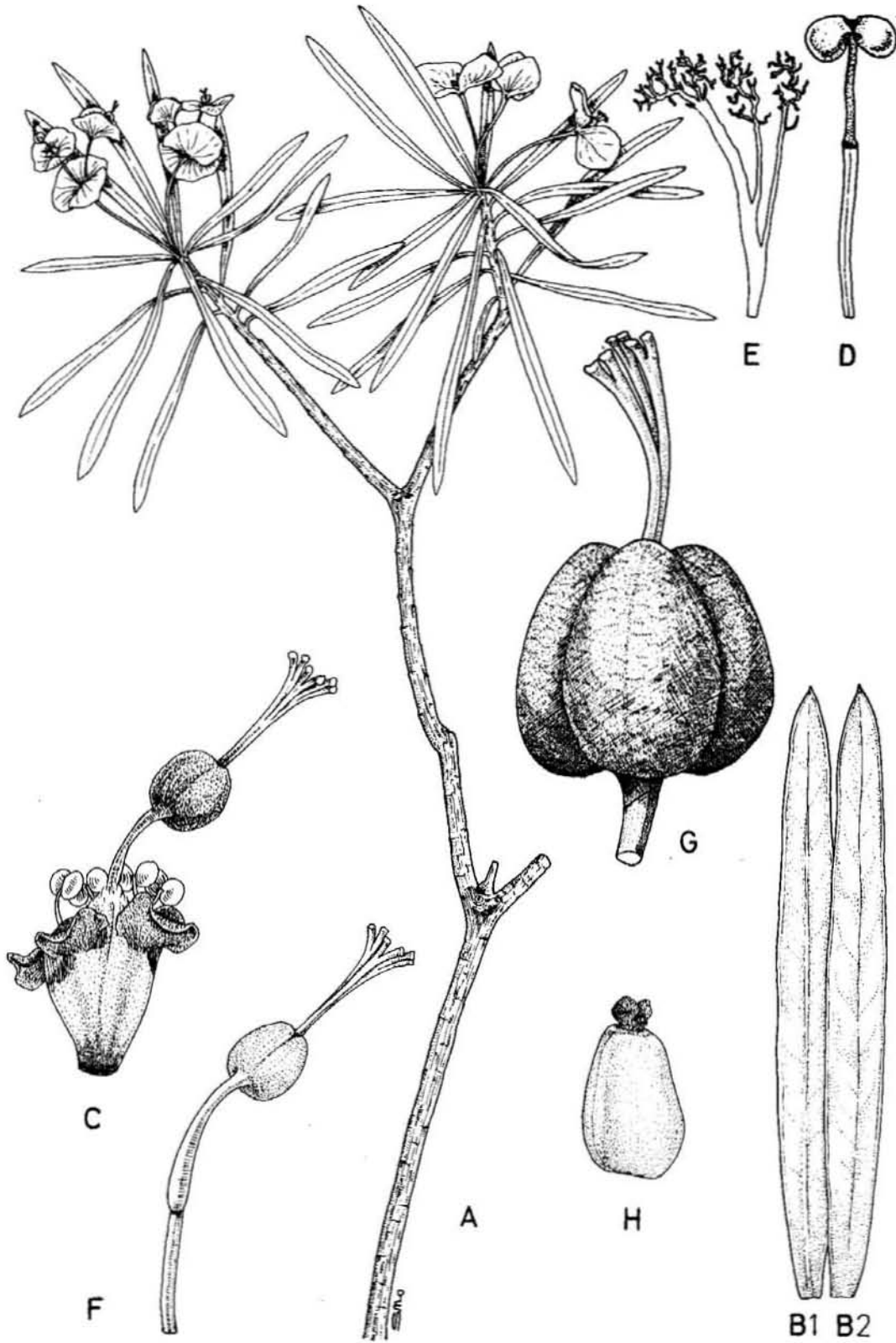


Fig. 7 *Euphorbia dendroides*: A, habit x 1/2; B₁, leaf (lower view) x 2; B₂, the same (upper view) x 2; C, cyathium x 5; D, stamen (male flower) x 10; E, scale from cyathium x 10; F, capsule (female flower) x 5; G, capsule x 8; H, seed x 8.

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across above; glands suborbicular, irregularly lobed. Capsules 5-6 mm, the valves laterally compressed, smooth or nearly so, shortly hairy; seeds 3 mm, laterally compressed, grey, smooth. $2n=18$

Type: 'Habitat in Italia, Creta, Insulis Staechadum', Herb. Linn 630/89 (LINN).

A-7 Wadi Derna, on dry slopes, between the town and waterfall, 20.1.1967, *L. Boulos* 1259 (ULT); Shahat-Museum, May, 1978, *Najata M. Faris* 40 (ULT); **A-8** c. 30 km before Tamimi, on way back from Tobruk, stony and rocky mound, shrub c. 1 m tall, common, 25.10.1975, *S.M.H. Jafri* 6097 (ULT).

Distribution: Mediterranean region.

A plant of rocky places, confined to the Gebel Akhdar area in Libya, mostly along the coast.

Fl. Jan.-May.

6. ***Euphorbia serrata*** L., Sp. Pl. 459. 1753; Jehan. & Maire, Cat. Pl. Maroc. 462. 1932; Keith, l.c. 489; Smith & Tutin in Tutin et al, l.c. 216; Fiori & Paoletti, l.c. fig. 2598. (Fig. 8)

Erect perennial herb, up to 50 cm tall, glabrous, glaucous or almost so, woody at base with slender stock. Cauline leaves linear oblong to ovate-lanceolate or oblong, smaller below, becoming longer above, up to 30 x 15 mm, sessile, acute or obtuse, with fine patent, conspicuous teeth; lower often narrowed at base, upper broadly ovate at base. Ray-leaves lanceolate-acuminate to suborbicular, \pm amplexicaul; raylet-leaves ovate to suborbicular or subreniform, mostly opposite, serrate like the cauline leaves, yellowish. Rays 3-5, dichotomously branched once or twice. Glands apparently transversely ovate, truncate or obscurely crescentic. Capsules 5-6 mm, smooth, glabrous with indurated pericarp; seeds c. 3 mm, smooth or shallowly punctate, grey.

Type: 'Habitat in Narbona, Hispania' Herb. Linn. 630/50 (LINN).

A-2: 5 km after Asaba, near cult. field, 9.4.1974, *S.I. Ali* 1754 (ULT); Maugh el Bahar, 2 km before Kaleba, cult. field, sandy soil 8.4.1974, *S.I. Ali* 1677 and 1695 (ULT); Al-Awenia, c. 7 km from Rumia, near barley field, 11.4.1974, *S.I. Ali* 1997 (ULT); Jado, rocky mountains, 6.6.1974, *B. Faris* 415 (ULT); Garian, 2.5.1913,

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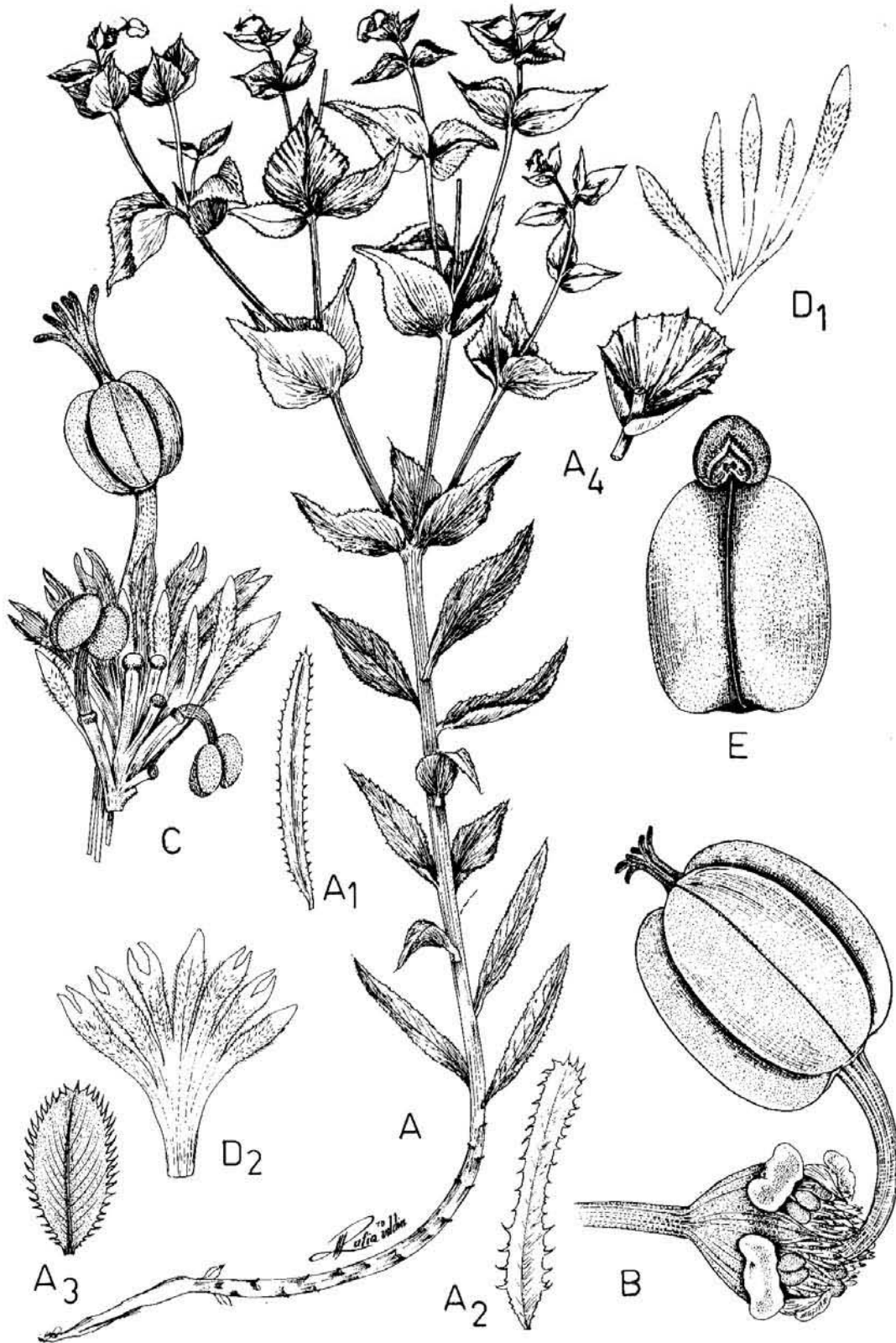


Fig. 8 ***Euphorbia serrata***: A, habit x ½; A1-A3, cauline leaves variation x 1; A4, bracteole x ½; B, cyathium with capsule x 5; C, stamens (male flowers) and gynoecium (female flower) from a cyathium x 10; D1-D2, scales from cyathium x 10; E, seed x 10.

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Pampanini 4269 (FI); *id.* sandy ground, 1.4.1949, *G.F. Johnson* 22 (BM); c. ½ km from Kaleba, 5.5.1972, *S.I. Ali* 336 (ULT); Garian massif, bracts bright yellow-green, 24.4.1939, *N.Y. Sandwith* 2764 (K); Garian, 26.7.1962, *Keith* 1016 (K); Ain Rumya, 10.4.1975, *A. Gommudi* 349 (ULT); Mangh el Bahr, 9.4.1974, *M. Godeh* 88 (ULT); Garian, 13.4.1973, *S.A. Faruqi* (ULT); 39 km from Jado to Jefren, 650 m, barley fields, on sandy soil, perennial, 18.3.1970, *P.H. Davis* 49716 (ULT); El-Asaba, 34 km from Garian, 5 km after Asaba, erect, 9.4.1974, *A.M.A. Razig* 234 (ULT); Kaleba, 10.4.1975, *Fauzia* 374 and 387 (ULT); A-3 Sharshara-Tarhuna, 20.3.1974, *G.H. Faris* 206 (ULT).

Distribution: Mediterranean region, extending to W. France and Canaries.

A species of pasture lands and cultivated areas. The last cited specimen from Tarhuna appears intermediate between this species and *E. retusa* Forsk. The 2 species seem to be closely related in their some exerted stamens also, and need further studies.

7. ***Euphorbia squamigera*** Lois., Fl. Gall. 729. 1807; Smith & Tutin in Tutin et al, l.c. 220; Jehand. & Maire, Cat. Pl. Maroc. 2:464. 1932.

E. rupicola Boiss., Elench. 81. 1838; Keith, l.c. 489; *E. squamigera* var. *rupicola* (Boiss.) Maire in Jehand. & Maire, l.c.

Shrub, up to 2.5 m tall, green, branched, naked below, densely leafy above. Cauline leaves alternate, linear-lanceolate to narrowly elliptical, (20-) 25-50 mm long, mucronate, glabrous or pubescent beneath, entire or obscurely serrulate. Ray-leaves elliptic-ovate; raylet-leaves usually rhombic or orbicular-ovate, obtuse, mucronate, yellowish at flowering time. Rays 5. Capsules .5 mm in diam., covered with short, cylindrical tubercles; seeds c. 3 mm, smooth, brown.

Type: Described from France.

A-7 Wadi El Kuf, 'on the strada Litoreana' glands ecornute, bracts free, capsules tuberculate, 13.4.1939, *N.Y. Sandwith* 2611 and *N.D. Simpson* 39565 (BM).

Distribution: Portugal, S. & E. Spain, N. Africa (Morocco, Algeria, Tunisia, Libya).

A rock species, seems to integrate in the following species, especially our specimen cited above, in having pruinose condition, as in the specimens cited below,

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but leaves and capsules somewhat larger. We need further studies with more material to confirm if true form of this species occur here.

8. ***Euphorbia bivonae*** Steud., Nom. Bot. ed. 2(1):610. 1840; Durand & Barratte, l.c. 214; Pamp., l.c. 307 (p.p.); Keith, l.c. 484 (p.p.); Smith & Tutin in Tutin et al, l.c. 220; Fiori & Paoletti, l.c. fig. 2561. (Fig. 9)

E. spinosa auct. non L. (1753):Viv., Fl. Lib. Spec. 26. 1824; *E. hierosolymitana* Boiss. ex Boiss., Diagn. Ser. I (12):110. 1853; Zoh., l.c. 277, fig. 402; *E. thamnoides* Boiss., Cent. Euphorb. 33. 1860; Khan in Notes Royal Bot. Gard. Edin. 25(2):92. 1964; *E. bivonae* var. *thamnoides* Hadidi; Tack., St. Fl. Egypt ed. 2:330. 1974; *E. thamnoides* var. *hierosolymitana* (Boiss.) Boiss. in DC., Prodr. 15(2):131. 1862; *E. bivonae* var. *papillaris* Boiss. ap. DC., Prodr. 15:131. 1862; Durand & Barratte, l.c. 214; Pamp., l.c. 307.

Similar to the preceding species, but very variable in habit, more woody and much branched with cauline leaves somewhat smaller, very variable, not or obscurely mucronate, ray-leaves ovate to elliptic, raylet-leaves obovate, not mucronate, capsules smaller with low, broad tubercles and seeds dark-brown, shiny.

Syntypes: N. Africa, Sicily.

A-2 Ain Zarga, near Jado, 600-700 m, among rocks, 1-2 ft. shrub, 17.3.1970, *P.H. Davis* 49686 (ULT); Ain Zarga, bush c. 1 m tall, with milky latex, root tuberous and tap, 20.1.1978, *Alavi & Ratib* 1486 (ULT); **A-7** Slanta, semiprostrate, 2.3.1973, *S.I. Ali & S.A. Faruqi* 1216 (ULT); Wadi Derna, on the dry slopes of the wadi side, 20.1.1967, *L. Boulos* 1289; Wadi El-Hassien, along the coastal road, Ras El Hilal-Shahat, 24.1.1967, *L. Boulos* 1417 (ULT); Wadi El Haula, 8 km from Cyrene on the Apollina road, 5.4.1939, *N.D. Simpson* 39363 (BM); Wadi Wardama, between Beda littoria and Cyrene, on limestone rocks, large shrub, almost a small tree, 6.4.1939, *N.Y. Sandwith* 2430 (K); **B-1** Alghazaya (towards Wazzin), off the road, a perennial undershrub, 25.1.1977, *Siddiqi & Ratib* 257 (ULT); S.E. Barce, amongst rocks of escarpment, common, 22.2.1958, *K. Guichard* CYR/28/58 (BM).

Distribution: Sicily, Malta and N. Africa (coastal areas).

Another calcareous rock species, said to grow nearby the sea or coastal areas. There seems some integration of forms between this species and *E. spinosa* also; the

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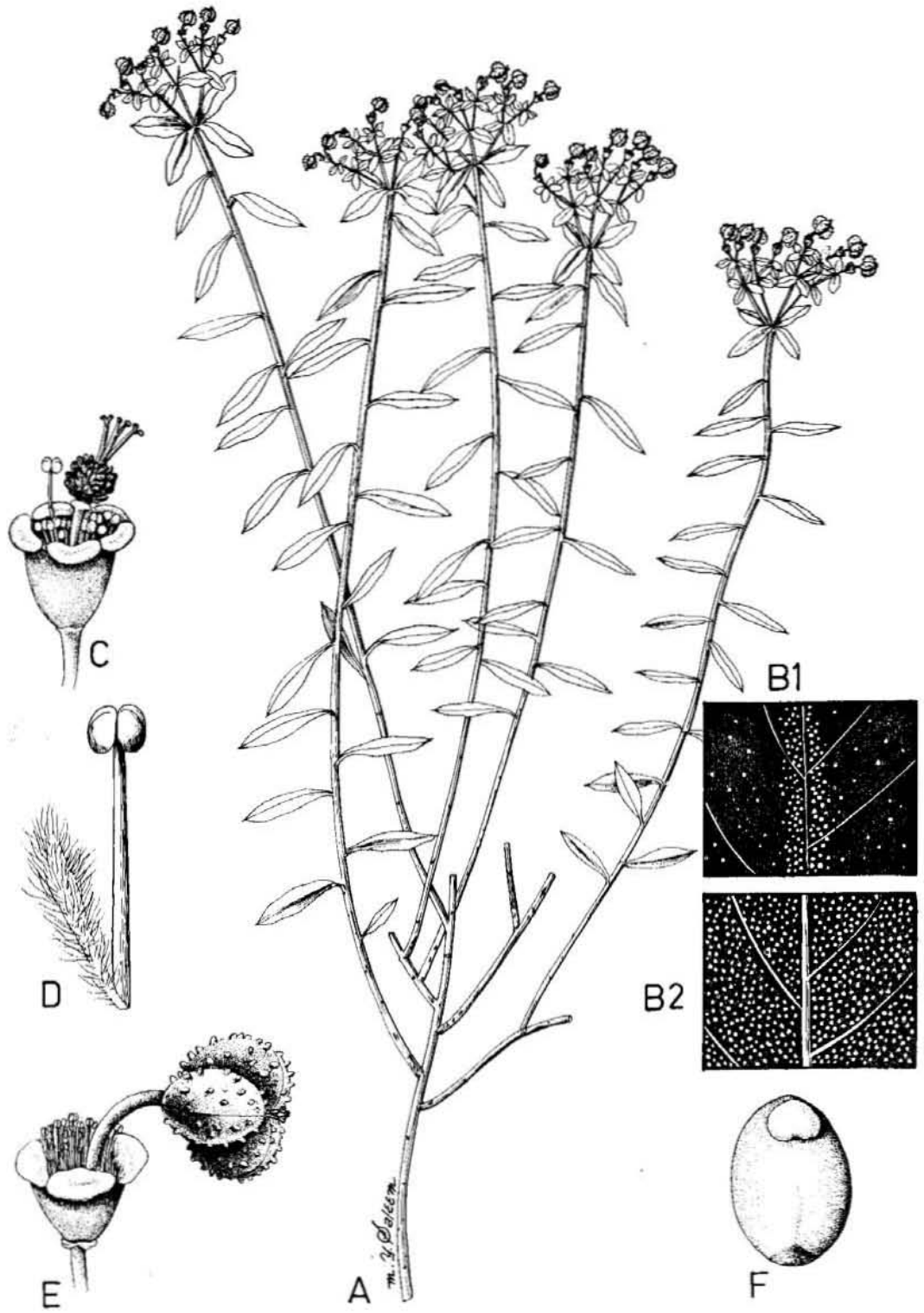


Fig. 9 **Euphorbia bivonae**: A, habit x 1/2; B1-B2, upper and lower surface of a leaf respectively, showing mealy conditions x 20; C, cyathium x 5; D, stamen (male flower) x 10; E, cyathium with capsule x 5; F, seed x 8.

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last cited specimen above, (Guichard CYR/28/58), is very small leaved resembling closely to the latter species.

Some specimens cited above may belong to *E. hierosolymitana* Boiss. (*E. thamnoides* Boiss.), an E. Mediterranean species, which is sometimes considered a variety (or subspecies) of this species.

E. hierosolymitana is said to have thick fusiform root, smaller, short petioled leaves and capsules c. 4 mm, ± globular covered with conical and cylindrical warts.

The whole complex (*E. spinosa*-*E. bivonae*-*E. squamigera* etc.) need further studies from our area.

Invariably all the specimens cited here from Libya have variable mealy conditions on the leaves.

9. ***Euphorbia spinosa* L.**, Sp. Pl. 457. 1753; Smith & Tutin et al., l.c. 220.

E. melitensis Parl., Fl. Ital. 4:478. 1869; *E. bivonae* var. *melitensis* (Parl.) Fiori ex Fiori & Paoletti, Fl. An. Ital. 2:277. 1901; Pamp., l.c. 308; Keith, l.c. 485.

Small shrubs, up to 30 cm high, freely branched, with dead branches and umbel-rays ± persistent but not pungent. Leaves 5-15 (-20) mm long, lanceolate or linear-lanceolate, entire. Ray-leaves obovate, about as long as rays, yellowish. Rays 1-5, very short, each usually with one cyathium. Capsules 3-4 mm, usually with long (rarely short) tubercles; seeds 2-3 mm, smooth, brown. $2n=14$

Type: 'Habitat in Creta' Herb. Linn. 360/35 (LINN).

A-7 between Derna and El-Mechili, 19.4.1934, *Pampanini & P. Sermolli* N. 4633 (K).

Also reported from Benghazi etc. by Pampanini (l.c.) and Kussabat by Keith (l.c.).

Distribution: Mediterranean region of Europe, Libya.

E. erinacea Boiss., occurring in Egypt, with intricate spinescent branches and capsules villous between short cylindrical warts, may also be found here.

10. ***Euphorbia pseudo-apios* Maire & Weill.** in Bull. Soc. Hist. Nat. Afr. Nord. 30:302. 1939.

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Short perennial herb, up to 10 (-20) cm; rootstock usually single, tuberous, napiform to subrounded, c. 5 x 2.5 cm, woody, giving out several simple branches; branch leafy, herbaceous, terete, glabrous. Leaves alternate, obovate, cuneate below, with usually rounded apices, obsolete mucronate, glabrous, entire or almost so. Umbels rays 3-5 in terminal ones with usually a few lateral ones also present; ray leaves like the cauline leaves, raylet-leaves smaller, yellowish-green. Cyathium obconical-campanulate, lobes ovate, obtuse, glabrous outside, villose inside; glands transversely oblong or oblong-linear. Capsules subglobose, verrucose with hemispherical or semi-ovoid verruce; seeds smooth, with a subreniform caruncle.

Syntypes: Cyrenaique: fissures des lapiaz calcaires du plateau au dessus de Cyrene, 600-650 m (n° 1379); maquis entre Gaigab et Faidia, 700 m (n° 1380), *Maire & Weiller*

Distribution: Endemic to Libya (Gebel Akhdar area).

11. ***Euphorbia retusa*** Forsk., Fl. Aegypt-Arab. 93. 1775; (non *E. exigua* var. *retusa* L., Sp. Pl. 456. 1753; nec *E. retusa* Cav., Icon. 1:21. tab. 34, fig. 3. 1791); Tack., l.c. 330, fig. 108; Zohary, l.c. 276, fig. 400. (Fig. 10, A-D).

E. kahirensis Rauschel, Nom. Bot. ed. 3:140. 1797; Post, Fl. Syr. Pal. & Sin. ed. 2, 2:495. 1933; Keith, l.c. 488; *E. cornuta* Pers., Syn. 2:17. 1806; Durand & Barratte, l.c. 214; Pamp., Pl. Trip. 181. 1913; Corti, l.c. 177; Keith, l.c. 486; Jehand. & Maire, l.c. 462; Ozenda, l.c. 334, fig. 114.

A perennating herb, up to 40 cm tall, glabrous, glaucescent, often much branched from the base, with somewhat fistular stems and thick fleshy tap root. Cauline leaves subfleshy, ovate-oblong, variable, smaller; margin entire or obscurely serrulate, sessile. Ray or raylet leaves 2-3, broadened and cordate at base, caudate-acuminate, pectinate-serrate, often recurved at tip, usually much larger and broader than the cauline leaves. Cyathium glands transversely ovate, with 2-4, short horns at edge or palmately 6-10-cleft. Capsules 5-6 mm, ovate, oblongish, somewhat constricted above the middle, rounded, glabrous, smooth; seeds 2-2.5 mm, with 4 prominent, and some shorter lobes on large, submembranous caruncle.

Type: *Forskål*

A-1 Wadi Al-Aital, sandy and stony ground, 29.3.1976, *S.M.H. Jafri* 6565 (ULT); *id.*

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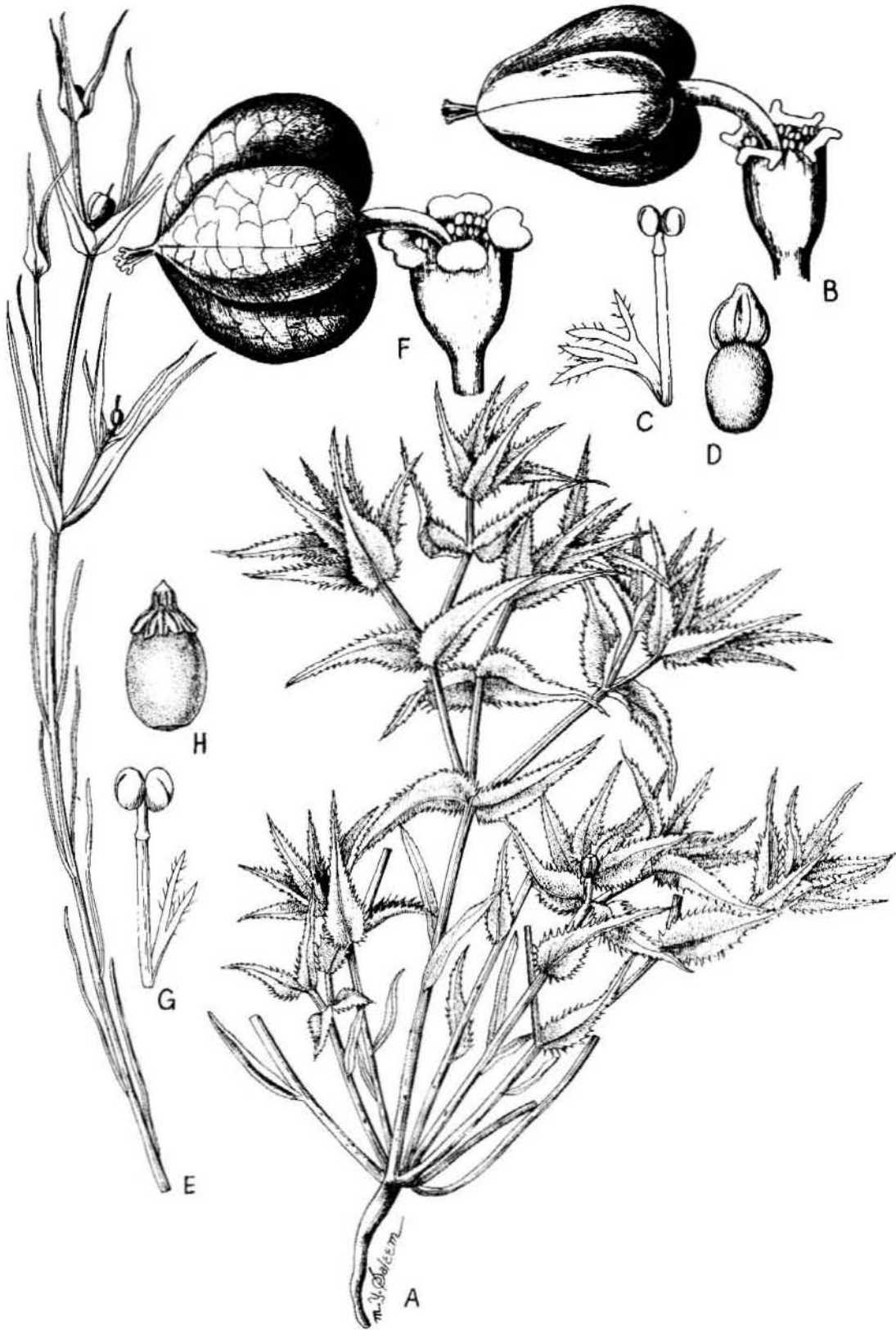


Fig. 10 ***Euphorbia retusa***: A, habit x $\frac{1}{2}$; B, cyathium with capsule x 5; C, stamen (male flower) x 10; D, seed x 4. ***E. calyptrata***: E, branch x $\frac{1}{2}$; F, cyathium with capsule x 5; G, stamen (male flower) x 10; H, seed x 4.

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10.4.1975, *Fauzia* 350 and 359 (ULT); Rhnem-Yefren, 15.3.1970, *P.H. Davis* 49526 (ULT); 108 km S.E. of Giado, barley field, 15.3.1970, *P.H. Davis* 49589 (ULT); **A-2** Kabau, at bifurcation of road, 29.3.1976, *S.M.H. Jafri* 6582 (ULT); **B-1** Ain Migzim, 10 km from main road and turning off main road from Ghadames, bushes 40-100 cm; 26.2.1975, *S.I. Ali* 2153 (ULT); 184 km from Nalut towards Ghadames, 28.2.1975, *S.I. Ali* 2131 (ULT); **B-4** 7 km to Bougrain on way to Al-Buayrat, 15.1.1967, *L. Boulos* 1069; 52 km from Bougrain, on way to Hun, roadside, stony ground, common, with milky latex, 17.2.1978, *Alavi, Ratib & Ramdan* 1734 (ULT); Wadi Sofegin, 2.5.1978, *El-Gadi & Jafri* 1244 (ULT); **C-4** 30 km from Hun, towards Tripoli, sandy roadside, 2.4.1973, *S.I. Ali* 1559 (ULT); c. 50 km from Hun towards Bugrain, sandy ground, very common, roadside, 27.2.1976, *S.M.H. Jafri* 6391 (ULT); **C-5** c. 12 km from Faghe on way to Zalla, c. 30 cm, root fleshy, stony ground, 19.2.1978, *S. Alavi, F.B. Ratib & Ramadan* 1830 (ULT).

Distribution: N. Africa (Morocco to Egypt, southern desert areas mostly), Arabia petraea, Syria, Palestine, Sinai.

A desert species, very common from S. Bougrain to Ghat in Libya, resembling closely to cyathial characters in *E. serrata* but leaves and rays elongated.

Fl. Feb.-May *Vern* Lebbana, Tanakkat (Taur.).

12. ***Euphorbia calyptrata*** Coss. et Dr. ex Coss., *Voy. Bot. Alg. in Ann. Sc. Nat. Ser. 4*, 4:286. 1855; Ozenda, *Fl. Sahara* 334, fig. 114. 1958. (Fig. 10, E-H)

E. calyptrata var. *involucrata* Coss. in *Bull. Soc. Bot. Fr.* 47: 252. 1900; Corti, l.c. 176; Keith, l.c. 485.

Similar to the preceding species but cauline leaves and involucre leaves very narrow and longer, entire above; caruncle membranous or almost so with several thinner ridges (lobes).

Type: S. Algeria, 3.6.1858, *E. Cosson* (K).

C-4 c. 98 km from Hun, along the main highway from Sebha, wadi Soda, along the main dried water course, sandy soil with loamy top at some places, 1.4.1973, *S.I. Ali* 1475 & 1483 (ULT); **E-1** Ghat, Al Barkat, cult. fields, weed, common, 24.2.1976, *S.M.H. Jafri* 6327 (ULT).

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Distribution: Algeria and Libya.

A desert species, taller and with many narrow cauline leaves; var. *involutrata* Coss. seems intermediate between this species and the preceding one.

13. ***Euphorbia pterococca*** Brot., Fl. Lusit. 2:312. 1804; Keith, l.c. 480; Smith & Tutin in Tutin et al., l.c. 221; Fiori & Paoletti, l.c. fig. 2574.

Erect, annual herb, up to 30 cm tall, often with axillary rays below the terminal one (or branching above). Leaves exstipulate, alternate, oblong-obovate or spatulate, obtuse, serrulate, the lower shortly petiolate. Ray leaves like the cauline; raylet leaves rhombic-ovate. Rays 5 (rarely more), trichotomous then dichotomous, slender, 10-20 mm long. Glands transversely ovate, without petaloid appendages. Capsules c. 1.5 mm, smooth, with 2 undulated wings on each valve; seeds c. 1.3 mm, alveolate-reticulate, dark brown.

Type: Described from Portugal.

A-7 In macchia in the hills, between Barce and Tolmetta, 14.4.1939, *N.Y. Sandwith* 2628 (K); id., *N.D. Simpson* 39601 (BM).

Distribution: Mediterranean region.

Some forms may be confused with *E. pepplus*, but glands without filiform appendages, plants branched above only, and seeds alveolate-reticulate distinguishes this species.

14. ***Euphorbia helioscopia*** L., Sp. Pl. 459. 1753; Durand & Barratte, l.c. 214; Pamp., l.c. 306; Keith, l.c. 488; Zohary, l.c. 278, fig. 404 (Fig. 11)

E. helioscopioides Loscos & Pard., Ser. Inconf. Arag 93. 1863.

Erect or suberect, glabrescent annual herb, with usually fistulose, inside somewhat spongy stem, up to 50 cm tall. Leaves usually obovate-spathulate, up to 5 x 2.5 cm (in our material), minutely serrate in the upper half; ray- and raylet-leaves like the cauline but smaller. Rays usually 5, trichotomous then dichotomous. Glands transversely ovate, without horns. Capsules 2.5-3.5 mm; seeds c. 2 mm, reticulately rugose with a transversely ovate or semiorbicular caruncle. $2n=42$.

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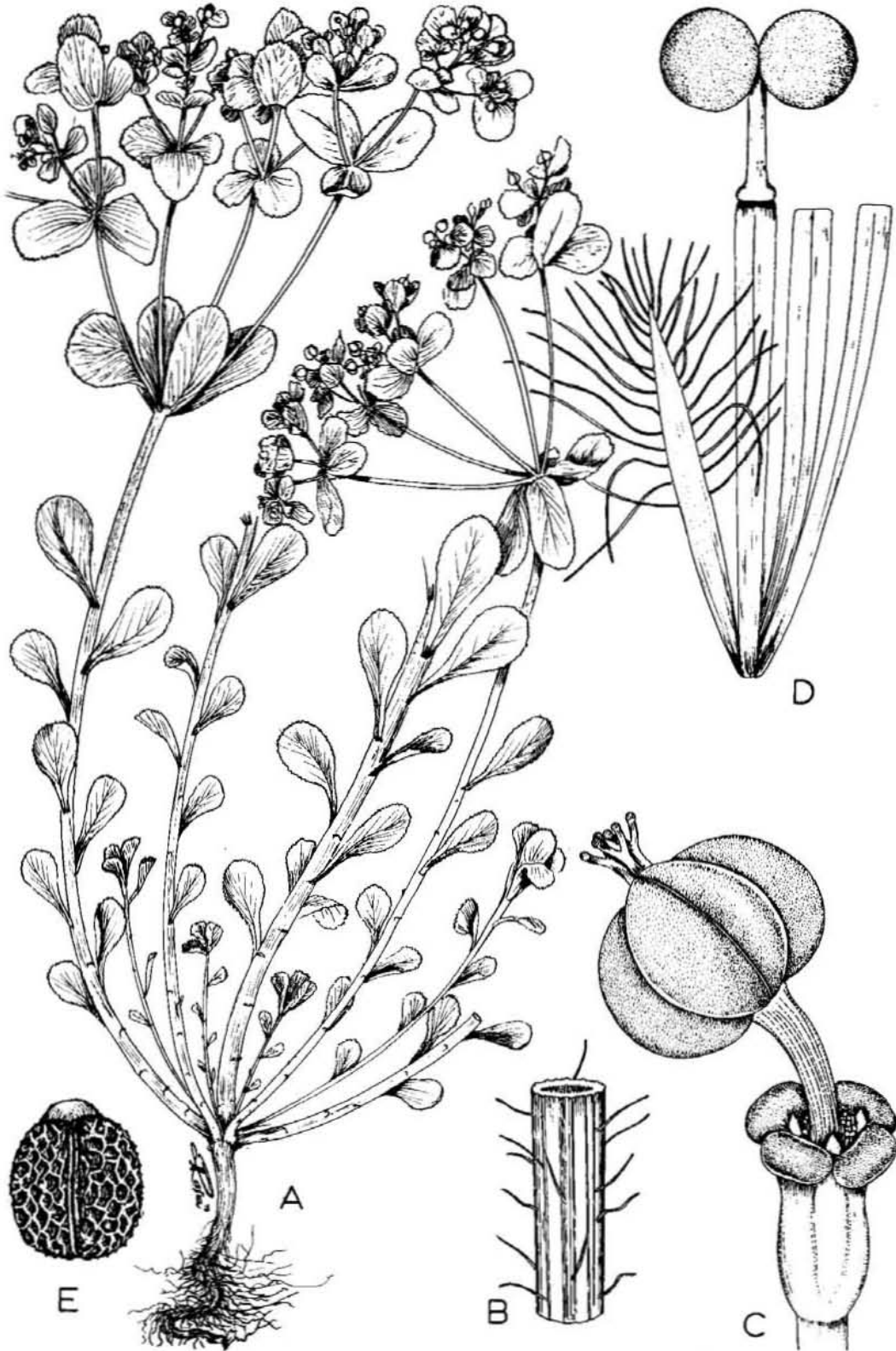


Fig. 11 *Euphorbia helioscopia*: A, habit x 1/2; B, portion of stem x 5; C, cyathium with capsule x 10; D, stamen (male flower) x 25; E, seed x 10.

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Type: "Habitat in Europae cultis" Herb. Linn. 630/49 (LINN).

A-2 Mang el Bahar, 8.1.1974, *A.M.A. Razig* 121 (ULT); Al-Awenia, c. 7 km from Rumia, near barley fields, erect, 11.4.1974, *S.I. Ali* 2047 (ULT); **A-3** 12 km from Benghashir, erect, 25.3.1976, *Amina A.* 12 (ULT); Misrata, 15.1.1967, *L. Boulos* 1053 (ULT); 15 km after Gasr Ben Gashir, 25.3.1976, *Fathi B.R.* 8 (ULT); Sharshara, 17.3.1978, *Ramadan* 35 (ULT); **A-7** Susa, Gebel Akhdar, 24.1.1967, *L. Boulos* 1444 (ULT); near Labrag, 11.3.1968, *L. Boulos* 2183 (ULT); Baida, 25.1.1967, *L. Boulos* 1487 (ULT); Wadi Derna, 21.1.1967, *L. Boulos* 1247 (ULT); Shahat, 24.1.1967, *L. Boulos* 1453 (ULT); id., 28.2.1973, *A. El-Tiaf* 23 (ULT); id., *A.S. Sharif* 19 (ULT); id., *S.I. Ali* 971 and 995 (ULT); Shahat ruins, 4.5.1978, *El-Gadi & Jafri* 1426 (ULT); Al-Gariba, herb with milky latex, 21.2.1978, *Alavi, Fathi & Ramadan* 1923 (ULT); **A-8** Al-Tamimi, 13.3.1968, *L. Boulos* 2279 (ULT).

Distribution: Europe, N. Africa to Asia, introduced in N. America.

A widely distributed species in the cooler climates, very variable in size of leaves and hollowness of stem. *E. helioscopioides* Loscos, is only a dwarf form of this species.

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15. ***Euphorbia oxyodonta*** Boiss. & Hausskn. in DC., Prodr. 15, 2:1267. 1862; Tack., St. Fl. Egypt ed. 2:330. 1974; Zohary, l.c. 279, fig. 406.

E. sintenisii Boiss. ex Freyn. in Bull. Herb. Boiss. 6:986. 1898; Keith, l.c. 490.

Annual herb, erect to procumbent, 20-40 cm tall, pilose-hispid usually on stems. Leaves obovate to lanceolate, obtuse or acute, serrate or dentate. Rays 3-4 (-5), short, forked twice or thrice. Ray-leaves ovate; raylet leaves ovate-rhombic, acute, serrate. Cyathium with triangular lobes. Capsules glabrous, globose-depressed, deeply 3-sulcate; cocci rounded at back; seeds 2-3.3 x 1.5-2.5 mm, brown, laxly reticulate; caruncle small, vertical, retuse.

Type: 'In fissuris rupium et calcareis Djebel Muhassan et Turmanin prope Aleppum, *Haussknecht*'.

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A-7 Cirenaica, near El Minier, 11.4.1939, *N.D. Simpson* 39524 (BM); El Minia west of Derna, glands entire, orange, bracts free, capsules smooth or very slightly tubercle, plants sparsely pilose, seeds brown to black, 11.4.1939, *N.Y. Sandwith* 2569 & *N.D. Simpson* 39524 (BM).

Distribution: E. Mediterranean region, N. Africa to Iraq.

Like *E. helioscopia* but leaves somewhat broadly dentate, caruncle small, vertical. Probably confined to calcareous rock in the Gebel Akhdar area in Libya.

E. sintenesii resembles this species in leaf and seed characters but said to differ in habit; it is taller and erect, but seeds smaller (c. 2.2 x 1.5 mm). Tack. (l.c.) considered *E. sintenisii* conspecific with this species. However, specimens are needed for comparative studies.

Fl. March-May

16. ***Euphorbia guyoniana*** Boiss. et Reut., Pugillus 109. 1852; Durand & Barratte, l.c. 214; Jehand. & Maire, Cat. Pl. Maroc. 2:465. 1932; Ozenda, l.c. 334, fig. 113; Keith, l.c. 488. (Fig. 5, F-I)

Perennating herb, up to 60 (-100) cm tall, ascending to erect. Leaves distant, alternate, linear-subulate, usually c. 5-10 (-15) mm long, deflexed. Ray and raylet-leaves ovate-rhombic, acutish, usually 2-3. Rays terminal and axillary, 2-4, elongated, ending in single cyathium on each branch. Glands on cyathium transversely oblong, lobes triangular, ciliate. Capsules 2.5 mm, sphaeroid, slightly keeled; seeds c. 2 mm, ovate, with many somewhat longitudinal rows; irregularly denticulate or tuberculate, without a conspicuous caruncle.

Type: 'Hab. in regionibus interioribus Africae boreali deserto finitimis circa Bikara, ubi detexit cl. et amicissimus Dr. Guyon'.

A-3 Oasi de Tripoli, *G. Lopez* 18 (FI); Abu Salim, near Tripoli, on stable sand near Eucalyptus experimental plots, plants to 2 ft, 25.2.1955, *K.M. Guichard* KG/LIB/596 (BM).

Distribution: Algeria, Tunisia & Libya.

A desert species or growing in sandy habitats.

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17. **Euphorbia dracunculoides** Lam., Encyc. 2:428. 1788; Corti, l.c. 178; Keith, l.c. 486; Smith & Tutin in Tutin et al., l.c. 222; Tack., l.c. 332; Ozenda, Fl. Sah. 334, fig. 114 (as *E. inconspicua*); Jafri, Fl. Karachi 199, fig. 196. 1966. (Fig. 12)

E. glebulosa Coss. & Dur. in Bull. Soc. Bot. Fr. 4:493. 1857; Keith, l.c. 487 (as *E. globulosa*); *E. inconspicua* Ball in J. Bot. 13:205. 1875; *E. dracunculoides* ssp. *inconspicua* (Ball) Maire, Cat. Pl. Morac. 2:406. 1932; Quezel & Santa, Nouv. Fl. Alg. 2:604. 1963; Keith, l.c.; *E. flamandi* Batt. in Bull. Soc. Bot. Fr. 45:253. 1900; Quezel & Santa, l.c.; *E. dracunculoides* ssp. *flamandi* (Batt.) Maire, l.c.; Quezel & Santa, l.c.; Ozenda, l.c.; *E. dracunculoides* ssp. *volutiana* Maire, l.c.; Quezel & Santa, l.c.; Keith, l.c. 487; *E. dracunculoides* ssp. *glebulosa* (Coss. & Dur.) Maire, l.c.; Quezel & Santa, l.c.

Erect annual herb, up to 40 cm tall, glabrous, often much branched from the base. Leaves linear-spathulate or lanceolate, (5-) 15-50 x (2-) 3-5 mm, cauline alternate; ray and raylet leaves smaller than the cauline leaves, variable in shape. Rays 2-3, up to 4 times as long as the subtending leaf, dichotomous. Glands usually 2-horned. Capsules 2.5 x 2.8 mm, shallowly sulcate, glabrous, smooth, not keeled; seeds (1-) 1.5-2 mm, ovoid, grey to dark-brown, finely tubercled.

Type: 'Isle de France' *Commerson* (P).

A-7 c. 20 km from Labrag (c. 35 km from Lamluda), stony roadside, 19.6.1972, *S.I. Ali* 710 (ULT); **B-2** c. 24 km from Mesda towards Garian, *S.I. Ali* 1980 (ULT); Mezda road, 67 km after Garian, 10.11.1974, *A.M.A. Razig* 310 (ULT); **B-4** c. 17 km from Weshka, sandy soil, erect, c. 25 cm, 23.3.1975, *S.I. Ali* 2311 (ULT); **E-1** U. Tanezzuft, 9.3.1934, *R. Corti* 724 (FI).

Distribution: Tropics and subtropics of the Old World, extending to S. Europe.

A very polymorphic species and seems to be rare and confined to the southern desert areas of Libya. Further work is needed with adequate material, from here to ascertain infraspecific or specific taxa to be segregated. It is represented by (i) ssp. *inconspicua* (Batt) Maire, which is a small annual, not exceeding more than 10 cm in height; (2) ssp. *flamandi* (Batt.) Maire, a subshrubby plant with linear leaves and rays;

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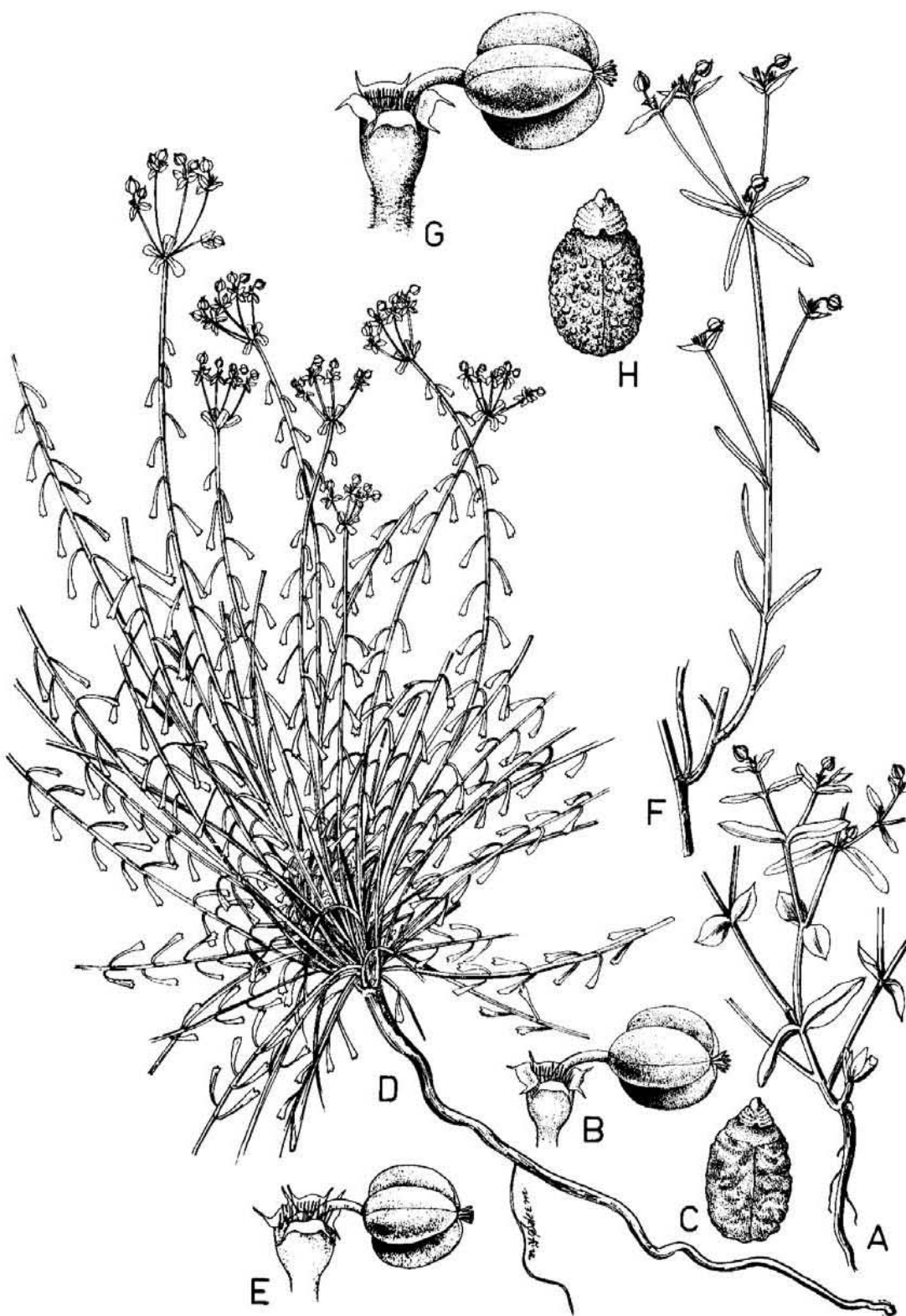


Fig. 12 *Euphorbia dracunculoides* ssp. *inconspicua*: A, habit x 1; B, cyathium with capsule x 10; C, seed x 15. ssp. *glebulosa*: D, habit x 1/2; E, cyathium with capsule x 5. ssp. *flamandi*: F, habit x 1/2; G, cyathium with capsule x 5; H, seed x 8.

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and (3) ssp. *glebulosa* (Coss. & Dur.) Maire, with broader ray- and raylet leaves. The typical form of this species probably do not occur in our area.

18. ***Euphorbia parvula*** Delile, Fl. Egypt. 235, t. 30. fig. 4. 1813; Durand & Barratte, l.c. 215; Keith, l.c. 488; Tack., l.c. 322. (Fig. 13, E-G)

Very small, annual herb, up to 10 cm tall; similar to *E. exigua* L., but leaves obovate-spathulate, usually up to 10 mm long, entire, rays 2-3, twice forked, seeds ovoid, 1-1.2 mm, ovoid, white, finely tubercled. Raylet leaves oblong-lanceolate, acute. Cyathium lobes oblong, ciliate; glands rather concave, transversely ovate, with 2, short or obsolete horns; capsules oblate-spheroid, 1.5 mm broad, rounded at back, caruncle absent.

Type: Described from Egypt.

A-3 Tarhuna, Ras Ghenai, 25.3.1913, *Pampanini* 1500 (FI); **A-6** S.E. Benghazi, 20.3.1933, *Pampanini* 4690 (FI); B. el Gicch tra Agedabia e Saumnu, 10.4.1934, *Pampanini & Sermolli* 4692 (FI); **A-7** El-Karsa, coastal road to Derna-Ras El-Hilal, 11.3.1968, *L. Boulos* 2131 (ULT); c. 16 km from Labrag (c. 30 km from Lamluda), c. 10 cm, stony roadside, 13.6.1972, *S.I. Ali* 717 (ULT).

Distribution: Egypt & Libya.

Many previous reports may be a misidentification of *E. exigua*, whose smaller forms may be mistaken for this species. Cyathial glands with obsolete or very short horns distinguishes this species from the following one.

19. ***Euphorbia exigua*** L., Sp. Pl. 456. 1753; Post, l.c. 500; Keith, l.c. 487; Smith & Tutin in Tutin et al., l.c. 222; Fiori & Paoletti, l.c. 2578; Zohary, l.c. 282, fig. 413. (Fig. 13, A-D)

E. exigua var. *retusa* L., Sp. Pl. 456. 1753.

Annual herb, up to 30 (-40) cm tall, often much branched from the base. Leaves 3-25 x 1-2 mm, linear to oblong-cuneate, entire, with acute, truncate to retuse apices, very variable. Ray-leaves usually like the upper cauline leaves or a little broader below; raylet-leaves obliquely triangulate-ovate-lanceolate, usually entire. Rays 3-5, up to 7 times forked. Glands of the cyathia with 2 horns, rarely the horns much

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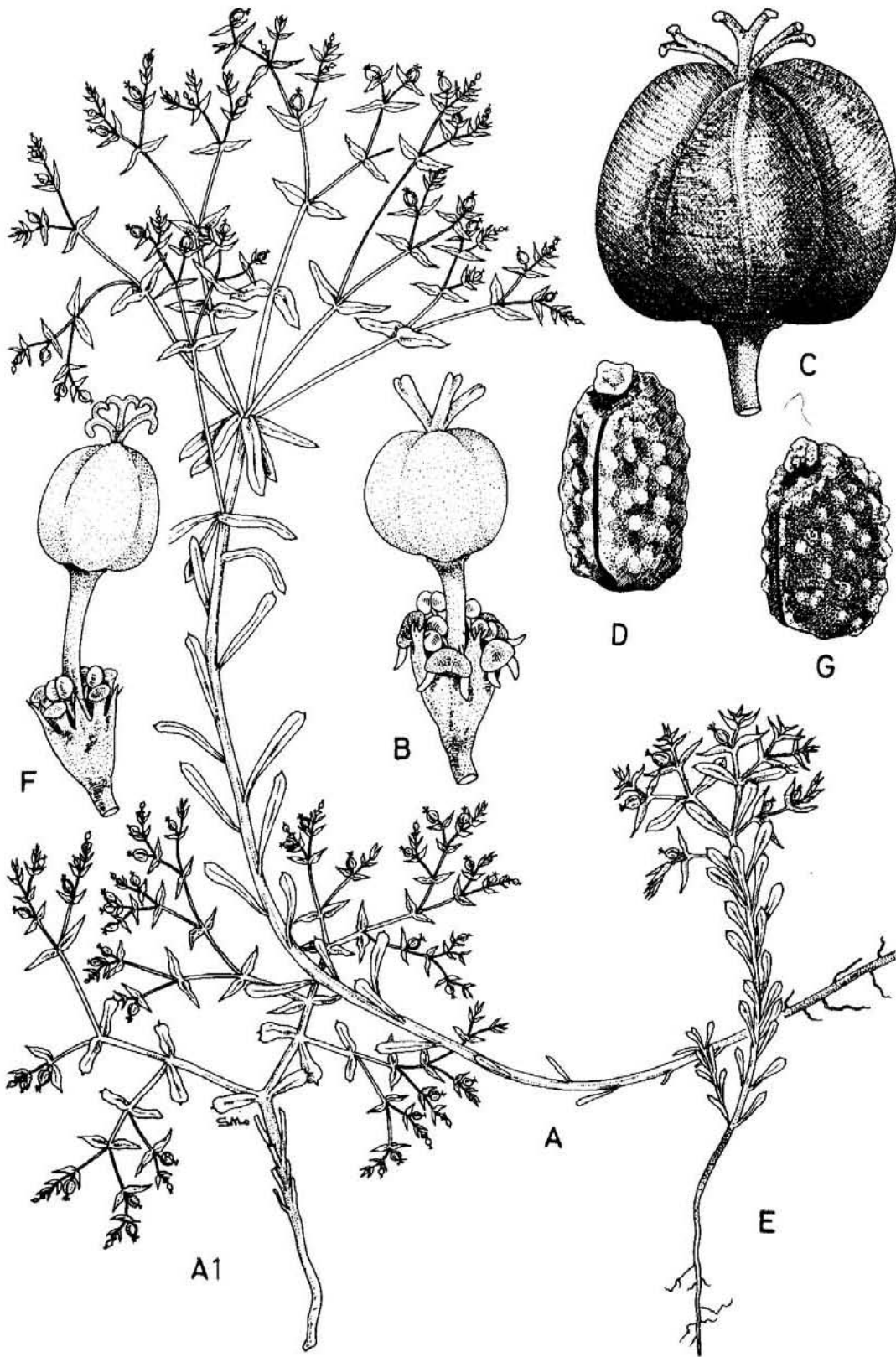


Fig. 13 ***Euphorbia exigua***: A-A₁, habit variations x 1; B, cyathium with capsule and appendaged glands x 15; C, capsule x 20; D, seed x 20. ***E. parvula***: E, habit x 1; F, cyathium with capsule and unappendaged glands x 10; G, seed x 20.

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reduced. Capsule 1.5-2 x 1.6 mm, shallowly sulcate, smooth but often \pm granulate on the keels; seeds 1.2 mm, ovoid-quadrangular, vermiculate-rugose or tubercled, grey. $2n=24$

Type: 'Habitat in Lusatia, Gallia, Helvetia, Hispania inter segetes' Herb. Linn. 630/27 (LINN).

A-3 Labda, 30.3.1975, *Zenab A.* 212 (ULT); id., *S.I. Ali* 2579 (ULT); Mesellata, Gussabat, 10.4.1913, *Pampanini* 2646 (FI); id., *El-Gadi* 918 & 933; **A-7** Gebel Akhdar, Gasr Libya, clay loam soil, annual, 5.5.1970, *A. Ghafoor* 381 (ULT); Shahat, descent to Ras Hilal road & down the road, 20.4.1978, *Ramadan, Fathi & Siddiqi* 870 (ULT).

Distribution: Europe, N. Africa, Canaries & W. Asia.

A very variable species in size of plant, cauline leaves size and apex, and our plants have retuse apices in cauline leaves but vary in length. This seems to be common in Gebel Akhdar area.

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20. ***Euphorbia sulcata*** De Lens ex Lois., *Fl. Gall. ex.* 2, 1:339. 1828; Pamp., l.c. 310; Jehandez & Maire, *Cat. Pl. Maroc*; Keith, l.c. 490; Smith & Tutin in Tutin et al., l.c. 222; Fiori & Paoletti, l.c. fig. 2577.

E. retusa Cav., *Icon.* 1:21. tab. 34, fig. 1. 1791.

Very similar to the preceding species but seed with longitudinal darkish furrows only, capsules deeply sulcate.

Type: Described from Portugal.

A-2 Garian, 26.4.1913, *Pampanini* 3829 (FI); **A-3** Tarhuna, 18.3.1913, *Pampanini* 866 (FI); Mesellata, 11.4.1913, *Pampanini* 2818 (FI); **A-8** Marmarica, Tobruk. 1918, *F. Cassinera* (FI).

Distribution: S.W. Europe & N. Africa

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Apparently like *E. parvula* but seeds distinctive.

21. ***Euphorbia falcata*** L., Sp. Pl. 456. 1753; Durand & Barratte, l.c. 215; Pamp., l.c. 309; Keith, l.c. 487; Smith & Tutin in Tutin et al., l.c. 222; Fiori & Paoletti, l.c. fig. 2576; Zohary, l.c. 282, fig. 414. (Fig. 14, E-H)

E. acuminata Lam., Encyc. 2:426. 1788; *E. rubra* Cav., Icon. 1:21, tab. 34, fig. 2. 1791 (non Pallas); *E. falcata* var. *acuminata* (Lam.) S. Amand, Fl. Agen. 189, 1821; Pamp., l.c. 310; var. *rubra* (Cav.) Boiss., Fl. Or. 4:111. 1879; Pamp., l.c.; *Tithymalus falcatus* (L.) Klotzsch & Garcke ex Garcke, Fl. Nord. & Mittl-Deutschl ed. 4:292. 1858.

Annual herb, sometimes becoming entirely reddish, up to 30 (-40) cm, simple or branched from the base with several axillary rays above. Cauline leaves alternate, linear-oblong to obovate-spathulate, mucronate, 5-30 x 3-5 mm, entire. Ray-leaves like the cauline; raylet leaves up to 20 x 10 mm, asymmetrically suborbicular or elliptic-ovate, acuminate to aristate, subentire. Rays 4-5, up to 5 times dichotomous. Glands on cyathia broad, with 2 horns. Capsules 1.5-2 x 1-2.5 mm, shallowly sulcate, smooth; seeds 1-1.2 mm, flattened-ovoid-quadrangular, pale grey or brown, transversely sulcate. $2n=16, 36$.

Type: 'Habitat in Europa australis'. Herb. Linn. 630/25-26 (LINN).

A-1 Wadi Al-Aital, 10.4.1975, A. Gammudi 372 (ULT); **A-2** 5 km after Asaba, near cult. field, 9.4.1974, S.I. Ali 1757 & 1788 (ULT); Kaleba, 10.4.1975, Fauzia 374 (ULT); El-Auinia, 11.4.1974, M. Godeh (partly) (ULT); Al-Awenia, 11.4.1974, S.I. Ali 2044 & 2055 (ULT); **A-3** Area of Wadi El-Mjeneen, Dam, mountainous area, top soil sandy with gravels, 7.4.1978, A. El-Gadi 1000 (ULT); **A-7** 12 km E. El-Merj, Gebel Akhdar, 10.3.1968, L. Boulos 2061 (ULT); Ras El-Hilal, near coastal road, 6.5.1978, El-Gadi & Jafri 1659 (ULT); Wadi El-Mahboul, 21.4.1978, Ramadan, Fathi & Siddiqi 957 (ULT); id., 1.3.1973, A.S. Sharif 86 (ULT); Ras el-Hilal, 6.5.1978, Abohelfia Ali 62 (ULT); Wadi Derna, 14.3.1968, L. Boulos 2379 (ULT); Plateau, 2 km W. Wadi Mahboul, Susa coastal road, 11.3.1968, L. Boulos 2169 (ULT); Up stream of Wadi El-Kouf, 12.3.1968, L. Boulos 2210 (ULT); **A-8** Omm Rezum, S.E. Derna, 13.3.1968, L. Boulos 2350 (ULT); Mersa, c. 5 km from Baida, 18.6.1972, S.I. Ali 596 (ULT); c. 1 km from Taknes, roadside, S.I. Ali 560 (ULT); c. 20 km from Labrag, stony roadside, S.I. Ali 702 (ULT).

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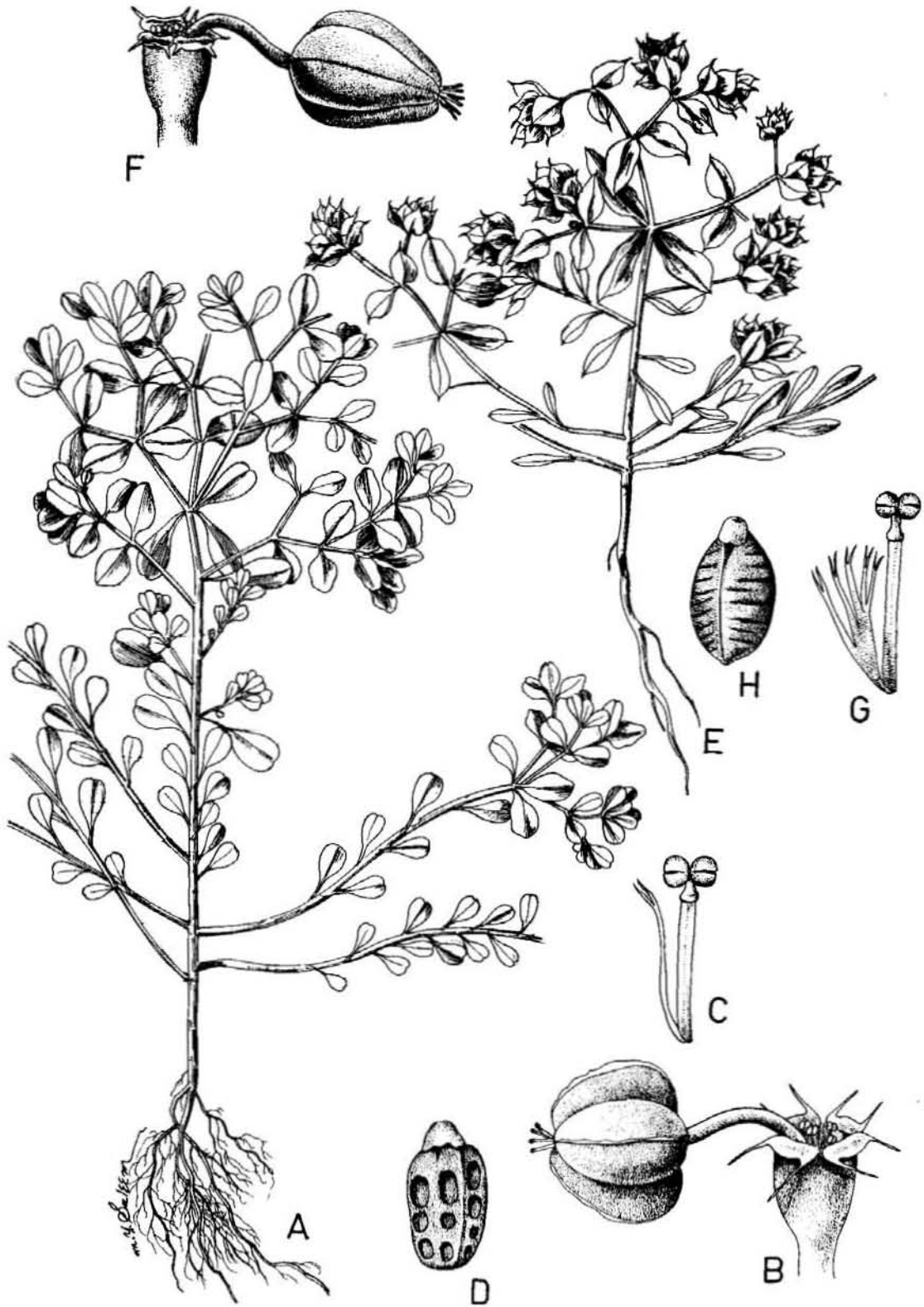


Fig. 14 **Euphorbia peplus**: A, habit x ½; B, cyathium with capsule x 10; C, stamen (male flower) x 20; D, seed x 10. **E. falcata**: E, habit x ½; F, cyathium with capsule x 10; G, stamen (male flower) x 20; H, seed x 10.

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Distribution: Europe, N. Africa eastwards to Pakistan & India.

A variable species in stature, otherwise fairly constant in characters; easily recognized by its transversely sulcate seeds, and broader, congested raylet leaves. It seems more common in the Gebel Akhdar area in Libya, but has also been reported from Tripoli, Benghazi etc. by Durand & Barratte (l.c.).

Fl. Feb.-May

22. **Euphorbia peplus** L., Sp. Pl. 456. 1753; Durand & Barratte, l.c. 215; Pamp., l.c. 309; Keith, l.c. 489; Smith & Tutin in Tutin et al., l.c. 222; Fiori & Paoletti, l.c. fig. 2575; Zohary, l.c. 283, fig. 416. (Fig. 14, A-D)

E. peplodes Gouan, Fl. Monsp. 174. 1755; Smith & Tutin in Tutin et al., l.c.; *E. peplus* var. *peplodes* (Gouan) Visiani, Fl. Dalm. 3: 174. 1825; Durand & Barratte, l.c.; Pamp., l.c.; Keith, l.c.; var. *minor* Viv., Fl. Lib. Spec. 26. 1824; *Tithymalus peplus* (L.) Gaertn., Fruct. 115. 1790; *E. peplus* ssp. *peplodes* (Gouan) Rouy, Fl. Fr. 12: 175. 1910.

Annual herb, up to 30 (-40) cm tall, erect to ascending, glabrous, sparsely branched from the base; axillary rays none or 1-3 only, cauline leaves alternate, obovate, suborbicular to ovate, entire, 5-25 x 3-15 mm, with petioles up to 8 mm, lower often deflexed. Ray-leaves like the cauline but with shorter petiole; raylet-leaves smaller, subobliquely ovate. Rays 3, up to 5 times forked. Glands of cyathia with 2, filiform horns. Capsules (1.5-) 2 mm in diam., shallowly sulcate, smooth with 2 dorsal ridges on each valve; seeds 1-1.4 mm, ovoid-hexagonal, sulcate ventrally and pitted dorsally (or sometimes ventrally also), pale grey, darker in the depressions. $2n=16$

Type: 'Habitat in Europae cultis oleraceis'. Herb. Linn. 630/24 (LINN).

A-2 Rumia, 15 km from Yefren, 9.4.1974, *S.I. Ali* 1839 (ULT); **A-3** Tripoli, Sidi el-Masri, Faculty of Science, 22.4.1967, *L. Boulos* 1758 (ULT); 8 km from Tripoli University, 13.1.1976, *Fathi B.R.* 88 (ULT); University Campus, erect weak plant, pale green, 11.4.1978, *Ramadan* 166 (ULT); Labda, 29.3.1975, *Fauzia* 198 (ULT); **A-6** Benghazi, University Campus, small, branched & erect herb, with milky latex, common, 21.2.1978, *Alavi, Fathi & Ramadan* 1941 (ULT); Al Bakur, Tocra, 10.3.1968, *L. Boulos* 2090 (ULT); **A-7** Wadi Derna, 20.1.1967, *L. Boulos* 1301 and

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1306 (ULT); Shahat area, 6.5.1978, *Howeaidy* 52 (ULT); id., 5.5.1978, *Salawi* 43 (ULT); 15 km S.W. Massah, 17.1.1967, *L. Boulos* 1128 (ULT); Derna, 18.1.1967, *L. Boulos* 1147; Wadi Al-Ramlah, 5 km N. Al-Makili, 22.1.1967, *L. Boulos* 1360 (ULT); Al-Ghareeba, common, 5.5.1978, *A. Ghafoor* 349 (ULT); 5 km W. of Baida (El-Merj-Beida), 300-350 m, limestone macchie, annual, 25.3.1970, *P.H. Davis* 49969 (ULT); Wadi Derna, shingle of wadi bed, annual, 31.3.1970, *P.H. Davis* 50352 (ULT).

Distribution: Europe, N. Africa (Morocco to Egypt), eastwards to Iran.

A variable species in size of the plants, capsules and seeds, but it is very difficult to separate out infra-specific categories due to integrading forms. *E. peploides* is a poorly developed, small plant with smaller capsules and seeds, growing in dry places. It is difficult to maintain even its varietal rank.

Fl. Jan.-May

23. ***Euphorbia pithyusa** L., Sp. Pl. 458. 1753; Durand & Barratte, l.c. 216; Keith, l.c. 489; Smith & Tutin in Tutin et al., l.c. 225; Fiori & Paoletti, l.c. fig. 2587.

A perennial, suffruticose herb, up to 50 cm tall, minutely papillose, glaucous, much branched at the base, densely leafy with the deflexed lower leaves; axillary rays 0-20 (-30), occasionally forming a whorl. Leaves 5-25 (-45) x 1-10 (-12) mm, linear-lanceolate to ovate-lanceolate, sharply serrulate and irregularly serrulate near the apex. Ray-leaves ovate, obtuse, mucronate, entire or irregularly serrulate; raylet-leaves transversely ovate to suborbicular. Rays 5-8, up to 4 times forked, occasionally proliferating. Glands variable in shape, often crescentic. Capsules 2.3-3 (-3.2) x 2.5-3.5 mm, shallowly sulcate, granulate on the keels; seeds 1.5-2 mm, ovoid, rugulose, tuberculate or almost smooth, dark grey and whitish. $2n=36$.

Type: "Habitat in arenosis Belgii, Hispaniae Italiae", Herb. Linn. 630/41 (LINN).

Distribution: W. Mediterranean region & S. Europe.

Reported from Tripoli by Durand & Barratte (l.c.) but they doubted its being wild in the area; probably introduced only by chance. However, occurrence of this species needs confirmation from the area. It is sometimes cultivated as an ornamental.

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It differs from the following species by its narrower, lanceolate, serrulate, more pointed leaves, smaller capsules and smaller, rugulose-pustulose seeds.

24. **Euphorbia paralias** L., Sp. Pl. 458. 1753; Durand & Barratte, l.c. 216; Pamp., l.c. 311; Keith, l.c. 488; Smith & Tutin in Tutin et al., l.c. 225; Fiori & Paoletti, l.c. fig. 2588; Zohary, l.c. 286, fig. 422. (Fig. 15)

Perennial, caespitose herb, woody at base, erect to ascending, up to 60 cm tall, glabrous, glaucous, somewhat fleshy, branched from the base. Leaves variable, 3-30 x 2-15 mm; lowest ones obovate-oblong, smaller; middle ones elliptic-oblong; upper ones ovate or ovate oblong; all entire, adaxially concave, imbricate. Ray-leaves like the upper cauline leaves, raylet-leaves suborbicular-rhombic to reniform, strongly concave on the adaxial side. Rays 3-6, up to 3 times forked. Glands emarginate or crescentic. Capsules 3-5 x 4.5-6 mm, deeply sulcate, granulate on the keels; seeds 2.5-3.5 mm, broadly ovoid, smooth, pale grey. $2n=16$.

Type: "Habitat in Europae arena maritima". Herb. Linn. 630/44 and 45 (LINN).

A-2 c. 50 km from Tripoli, before Sabrata, sandy saline field, not common, ascending, perennial, 14.11.1975, *S.M.H. Jafri* 6206 (ULT); Talil, sands near the sea, very common, 12.6.1976, *S.M.H. Jafri* 6691 (ULT); **A-3** 10-20 km E. Tripoli, along the coastal road to Khoms, on sand dunes near the sea shore, 22.11.1966, *L. Boulos* 1010 (ULT); Labda, abundant, 30.3.1975, *Zenab A.* 192 & 213 (ULT); 5 km after El-Khoms, 1.5.1974, *M.A. Razig* 465 (ULT); Ain Kaam area, 8.4.1978, *O. Shetwi* 57 (ULT); Wadi Kaam, 14.4.1978, *A. El-Gadi & J. Abdulla* 8 (ULT); Sorman, seacoast, *A. El-Gadi* 262 (ULT); Leptis, 120 km from Tripoli, 1.5.1974, *M. Godeh* 334 (ULT); **B-4** Wadi Jarf project 20 km before Sirte on way to Benghazi, common in sand, 16.4.1978, *Ramadan, Fathi & Siddiqi* 269 (ULT).

Distribution: Coastal areas of Europe & N. Africa.

A species, growing in sand along the coastal area of Libya, easily recognized by its small densely compact appressed leaves.

Fl. Jan.-April *Vern.* Lebbana, Lenghes

25. **Euphorbia terracina** L., Sp. Pl. ed. 2:654. 1762; Durand & Barratte, l.c. 215; Pamp., l.c. 310; Corti, l.c. 179; Keith, l.c. 490; Smith & Tutin in Tutin et al.,

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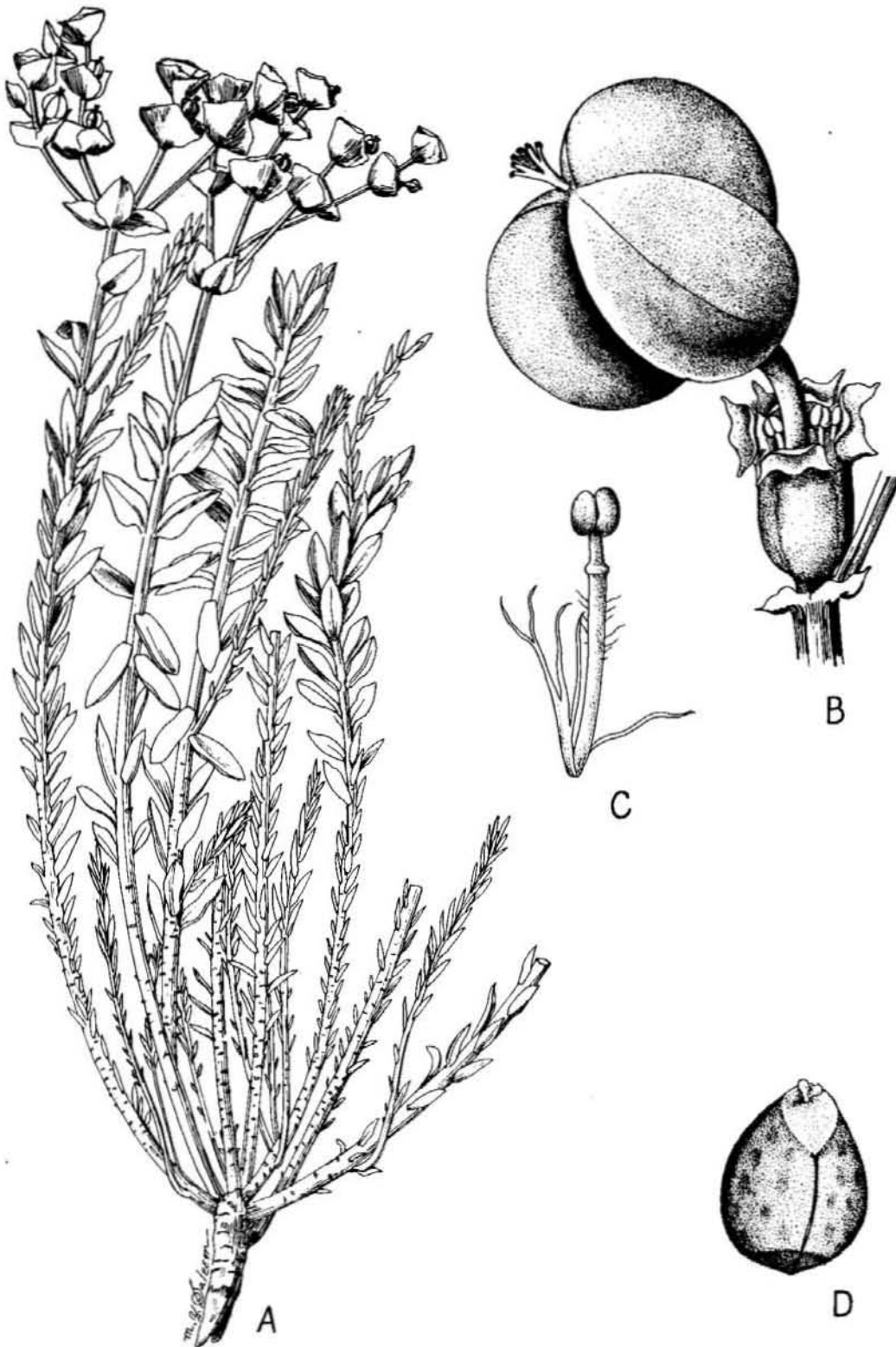


Fig. 15 *Euphorbia paralias*: A, habit x ½; B, cyathium with capsule x 5; C, stamen (male flower) x 10; D, seed x 10.

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l.c. 226; Fiori & Paoletti, l.c. fig. 2583; Zohary, l.c. 285, fig. 420. (Fig. 16)

E. trapezoidalis Viv., Fl. Lib. Spec. 25, tab. 4, fig. 1824; *E. seticornis* Viv., l.c.; *E. megalatlantica* auct. non Ball. (1876); Keith, l.c. 488.

Perennial herb or small shrublet, glabrous, up to 70 cm long, erect to suberect, simple or branched from the base. Leaves alternate, (10-) 15-40 (-50) x (2-) 4-7 (-10) mm, linear-lanceolate to elliptic-oblong, minutely to obscurely serrulate, very variable. Axillary rays 0-5. Ray-leaves resembling the upper cauline leaves; raylet leaves deltate-rhombic, sometimes slightly asymmetrical, occasionally coarsely serrulate. Rays 4-5, up to 5 times forked. Glands with 2 long, slender horns. Capsules 3-5 x 4-5 mm, deeply sulcate, smooth; seeds 2-2.5 mm, ovoid, smooth, pale-grey or whitish.

Type: Described from Spain, Herb. Linn. 630/33 (LINN).

A-2 c. ½ km before Kabao, roadside valley, 5.5.1972, *S.I. Ali* 367 (ULT); Garian, 28.4.1978, *Salwa H.H.* (ULT); **A-3** 12 km West Tripoli, near the sea, 24.3.1967, *Boulos, Tawil & Bouni* 1595 (ULT); Tripoli, University Campus, Science Faculty, sandy reddish soil, common, 15.2.1976, *S.M.H. Jafri* 6274, 6296 and 6298 (ULT); Faculty of Agriculture farm, c. 20 cm tall, 10.4.1978, *Ramadan L.* 115 (ULT); Barley field, Faculty of Science, Tripoli, sandy soil, 18.4.1967, *L. Boulos* 1703 (ULT); 14 km from Tripoli, near Ganzoor, soil sandy, 10.5.1978, *Sabah Omar* (ULT); Tripoli, Agr. field, 14.6.1978, *A.D. Ahmad* (ULT); Sharshara, 17.3.1978, *Ramadan* 30 (ULT); id., 19.5.1978, *J. Abdul Al* 42 (ULT); Leptis Magna (Lebda), near the theatre, 26.4.1967, *L. Boulos* 1838 (ULT); Msallata, 19.5.1978, *Fauzi, A.O.* (ULT); Misurata, 15.1.1967, *L. Boulos* 1062 (ULT); Ain Zara, flowers yellowish-green, 16.12.1977, *A. El-Gadi* 529 (ULT); Misurata, 12.5.1978, *Sumaya S.S.* (ULT); id., 10.5.1978, *Naima A.* 60 (ULT); Gasr Khair, E. of Tripoli, on way to khoms, waste field, soil stony & clayey, 2.5.1978, *El-Gadi & Jafri* 1193 (ULT); **B-4** Sirte, with white latex, 16.4.1978, *Ramadan, Fathi & Siddiqi* 306 (ULT).

Distribution: Europe, Mediterranean region, Canaries, Syria.

A very variable species in leaf and size of plant. Further work is needed in the area, where it grows widely around Tripoli in the coastal areas, mostly in sandy soil.

E. megalatlantica doubtfully reported by Keith (l.c.) from Libya, based on a sterile specimen (seen at Kew) is most probably *E. terracina*, which is very common in

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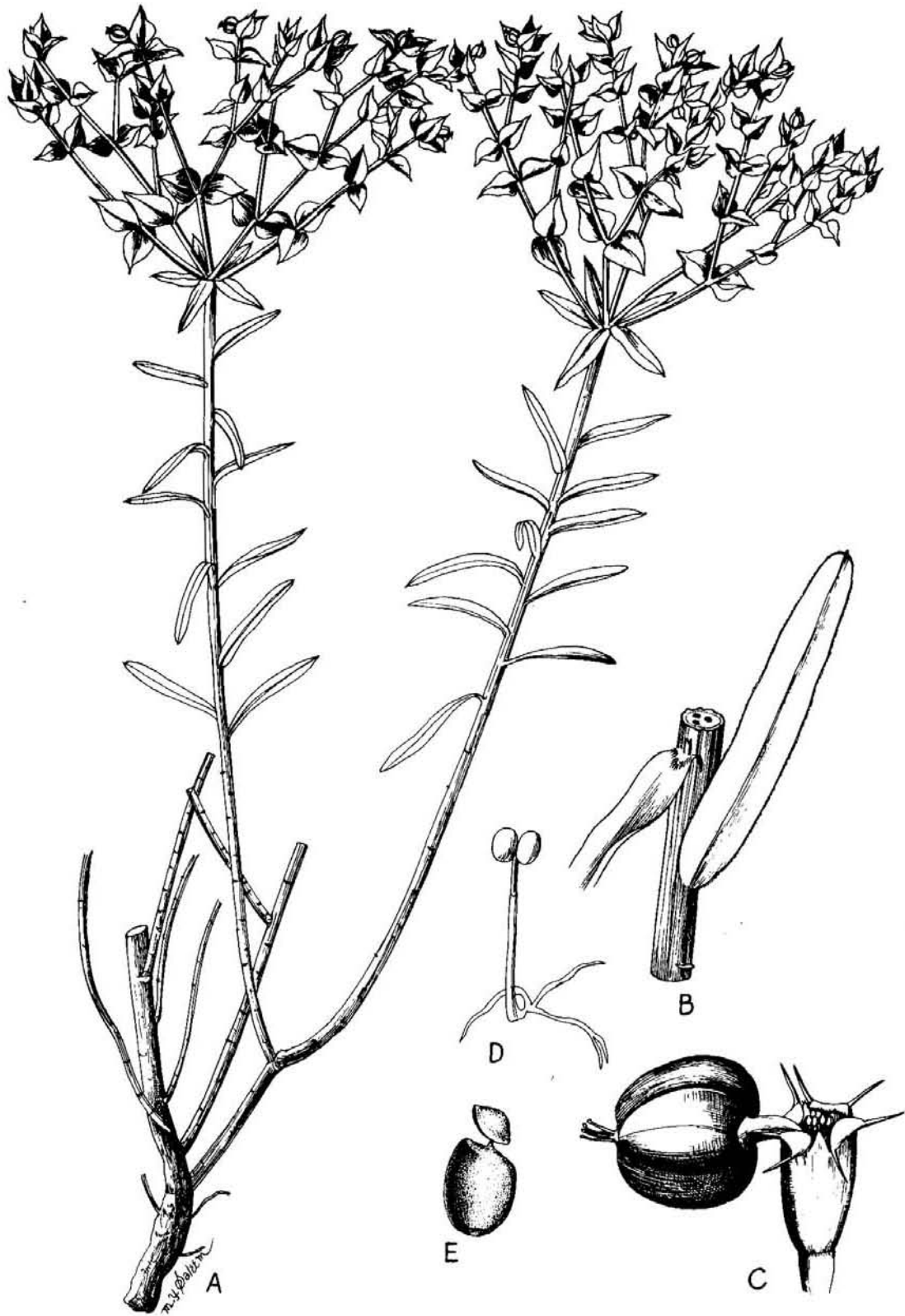


Fig. 16 *Euphorbia terracina*: A, habit x $\frac{1}{2}$; B, portion of stem with leaves x 2; C, cyathium with capsule x 6; D, stamen (male flower) x 10; E, seed x 6.

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Libya. ***E. megalatlantica*** Ball. is very similar in habit to this species but capsules tuberculate.

Fl. Jan.-May *Vern.* Lebbana

26. ***Euphorbia characias*** L., Sp. Pl. 463. 1753; Durand & Barratte, l.c. 216; Pamp., l.c. 311; Keith, l.c. 486; Smith & Tutin in Tutin et al., l.c. 226; Fiori & Paoletti, l.c. fig. 2600. (Fig. 17)

A tall, perennial herb or small shrub, woody below, up to 1 m (-2 m) high, leafy above, densely tomentose, rarely glabrescent, glaucous, caespitose. Leaves linear to oblanceolate or obovate, entire, (15-) 30-90 (-130) x 4-10 (-17) mm, those of previous year larger. Axillary rays many. Ray-leaves like the upper cauline; raylet-leaves suborbicular-deltate, usually connate in pairs at the base. Rays usually 10-20, generally twice forked, up to 4 times dichotomous. Glands variable, generally emarginate with short or long horns. Capsules 4-7 x 5-6 mm, deeply sulcate, smooth, densely villous; seeds 2.5-3.5 (-3.8) mm, ovoid, silver-grey.

Type: "Habitat in Gallia, Hispania, Italia".

A-7 4 km E. Al-Merj, along the southern road, 23.1.1967, *L. Boulos* 1399 (ULT); 15 km S. W. Massah, Gebel Akhdar, 17.1.1967, *L. Boulos* 1129 (ULT); 55 km from Baida on way to Tobruk, c. 1 m tall, seemingly verticillately branched with swollen tops of the branches, 24.10.1975, *S.M.H. Jafri* 6029 (ULT); Shahat motel, 5.5.1978, *Iman F.S.* 37 (ULT); Wadi Kouf, 8.5.1978, *El-Gadi & Jafri* 1858 (ULT); 22 km E. of Labrag on way to Derna, with dark purple or violet involucre glands, 5.5.1978, *El-Gadi, Jafri & Siddiqi* 1511 (ULT); Ain Mara, 5.5.1978, *A. El-Gadi & S.M.H. Jafri* 1547 & 1559 (ULT); Shahat, erect, bracts reddish on the outside, 28.2.1973, *S.I. Ali & S.A. Faruqi* 1020 (ULT).

Distribution: Mediterranean region.

Easily recognized by its tomentose leaves from *E. dendroides* with which it superficially resembles. Also confined to the Gebel Akhdar area in Libya.

Fl. Jan.-March *Vern.* Halebleb

27. ***Euphorbia heterophylla*** L., Sp. Pl. 453. 1753; J. Berhaut, Fl. Illustr. Senegal, 3: 453 : (with fig.). 1975.

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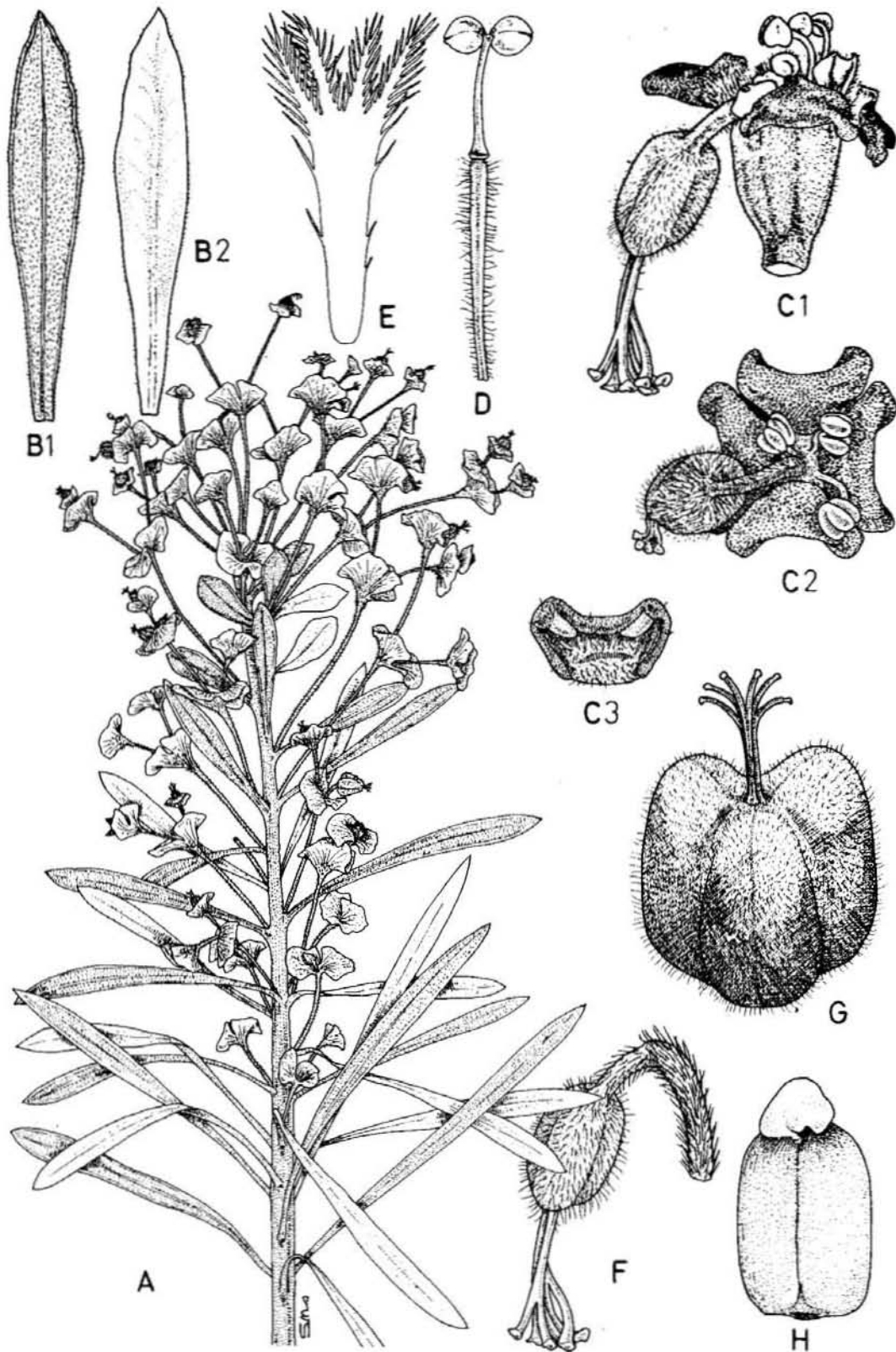


Fig. 17 **Euphorbia charasis**: A, habit x 1/2; B1-B2, leaf (dorsal and ventral surfaces respectively) x 1 1/2; C1, cyathium x 5; C2, the same (apical view) x 5; C3, involucre gland (lower view) x 5; D, stamen (male flower) x 20; E, scale from cyathium x 10; F, young capsule x 5; G, capsule x 5; H, seed x 8.

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E. geniculata Ortega, Nov. Pl. Hort. Matr. Dec. 18.1797; Tack., St. Fl. Egypt. ed. 2: 326. 1974; Zohary, l.c. 287, fig. 423; *Poinsettia heterophylla* (L.) Kl. & Gke. in Monat-Akad. Berlin 253. 1859.

An erect annual herb, up to 1 m tall, glabrous or subglabrous; stem leaves alternate, opposite to subopposite or alternate above, 5-15 x 3-5 cm, all of one shape (ovate to elliptic) or the upper ones fiddle-shaped and often with reddish bases, crenulate to subentire, shortly petiolate. Cyathia in dense corymbose terminal cymes, c. 3.5 mm broad at flowering time, invol. gland mostly 1, exceptionally 2-3, stalked. Capsules c. 4 (-5) mm in diam., smooth, glabrous. $2n=28$.

Type: "Habitat in America Calidiore".

A-3 Tripoli, 28.4.1978, *Azza Shedid* 8 (ULT).

Distribution: A native of Tropical America, which has widely established itself as a weed in tropical and subtropical regions of Afro-Asian countries.

E. geniculata is said to have no fiddle-shaped leaves, which may be an intra-specific variation only.

Fl. Apr.-May

E. pulcherrima Willd. [= *Poinsettia pulcherrima* (Willd.) Grah.], a shrub, up to 3 m tall, also native of Mexico, very similar to the above species but with a large yellow gland on cyathium, is often cultivated as an ornamental; the involucral leaves sometimes become entirely red-coloured. This is often called Mexican fire plant.

Acknowledgements: We are grateful to the authorities of FI, K and BM, for herbarium and library facilities.

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