AL FAATEH UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF BOTANY

FLORA OF LIBYA

43

15th November, 1977

Editors:

S.M.H. JAFRI & A. EL-GAD
Al Faateh University,
Faculty of Science,
Department of Botany, Tripoli

FUMARIACEAE

by S.M.H. JAFRI

Illustrations by
Sami MAKAR
M.Y. SALEEM

Fl.Lib.43:1-16.1977

FUMARIACEAE

S.M.H. JAFRI

Herbs, usually with brittle stem and watery juice, mostly glabrous or subglabrous. Leaves usually alternate, much divided without jointed segments. Flowers in racemes or spikes, rarely 1-few-flowered, bisexual, zygomorphic, hypogynous, generally pedicellate and bracteate. Sepals 2, small, scale-like, caducous. Petals 4, in 2 dissimilar whorls; 2 outer longer, one or both spurred or saccate at the base, ± connivent; 2 inner smaller, narrower, and often coherent at tip. Stamens 2 (or 6 in 2 bundles), tripartite, the central branch bearing a dithecous anther and the lateral 2 branches bearing monothecous anthers. Ovary 1-celled with 2 parietal palcenta, each bearing 1-many anatropous ovules; style simple with obtuse or lobed stigma. Fruit a 2-valved capsule or a nutlet; seeds with minute embryo and copious endosperm.

About 14 genera and nearly 400 species, chiefly in the N. temperate zone and E. Africa; represented in Libya by 1 genus.

Sometimes treated as a subfamily of *Papaveraceae*, from which it is distinguished mainly by its zygomorphic flowers, usually with spurred corolla and dimorphous anthers in each bundle of stamens.

FUMARIA

L., Sp. Pl. 699. 1753; Gen. Pl. ed. 5: 314. 1754.

Weak annual herbs (rarely perennating), often scandent, glabrous, glaucous, with 2-4-pinnatisect leaves; ultimate segments short, narrow. Flowers small, usually on short leaf-opposed racemes, bracteate, often white or pink with deep coloured tips, shortly spurred. Petals 4, only the upper spurred with spur much shorter than the lamina, lower petal keeled, inner 2 narrower. Fruit a small, 1-seeded, ± globose nut; seed large, suborbicular.

FUMARIACEAE

About 50 species, chiefly of temperate and cooler regions of the old world; 10 species are recorded for Libya.

Plants, specially the flower colour and leaf conditions are better studied in field and hence comprehensive field notes are needed while collecting plants.

1.	+	Flowers 9 mm or more long. Leaf-lobes usually more than 2 mm broad	2
	—	Flowers less than 9 mm long. Leaf-lobes usually less than 1.5 mm broad	7
2.	+	Fruit coarsely rugose when dry, 2.5-4 × 2.3-3 mm	3
	—	Fruit smooth or obscurely rugulose when dry, c. 2 (-2.5) × 1.5-2.5 mm	6
3.	+	Fruit distinctly keeled, mucronulate	1. **F. gaillardotii**
	—	Fruit not or obscurely keeled, obtuse or emarginate	4
4.	+	Flowers white; sepals ovate or oblong-lanceolate	5
	—	Flowers pink; sepals very narrow, linear	3. **F. macrocarpa**
5.	+	Fruiting pedicels recurved; sepals broadly ovate	4. **F.flabellata**
	—	Fruiting pedicels erect or almost so; sepals oblong-lanceolate	2. **F. judaica**
6.	+	Racemes long peduncled. Flowers white; fruits ± smooth on rigidly recurved pedicels	5. **F. capreolata**
	—	Racemes oh short peduncles or subsessile. Flowers pink; fruits obuscurely rugulose on erect pedicels	6. **F. bastardii**
7.	+	Flowers pink-violet; sepals large, c. as broad and 1/3 or more as long as the corolla	8

— Flowers white or pinkish; sepals small or inconspicuous, narrower and up to 1/4 of the corolla 9

8. + Fruits truncate retuse at the apex; bracts shorter than the spreading fruiting pedicels 7. **F. officinalis**
— Fruits rounded; bracts exceeding the ascending fruiting pedicels 8. **F. densiflora**

9. + Bracts as long as or exceeding the fruiting pedicels; leaf segments channelled 9. **F. parviflora**
— Bracts shorter than the fruiting pedicels; leaf segments flat 10. **F. vaillantii**

1. **Fumaria gaillardotii** Boiss. Fl. Or. 1: 139. 1867; Cullen in Davis, Fl. Turk. 1: 243. 1965. (Fig. 1, G-L)

T. agraria auctt. non Lag.: Tack., Fl. Egypt, ed. 2: 158. 1974; Durand & Barratte, Fl. Lib. Prod. 10.1910 (partly); Pamp., Pl. Trip. 111. 1914; Prodr. Fl. Cir. 214. 1931; Keith, Prelim. Check List Lib. Fl. 508. 1965; *T. agraria* Lag. ssp. *gaillardotii* (Boiss.) Maire, Fl. Afr. Nord. 12: 71. 1965.

Annual, robust herb, usually with 2-3-pinnatisect leaves, lower long petioled; ultimate segments oblong to cuneiform, usually obtuse. Racemes lax, 10-12 (-16)-flowered, longer than the bare portion of the peduncle. Bracts 3-4 mm long, oblong, cuspidate, ± equalling the straight, ascending fruiting pedicels. Sepals 3-4 × c. 2 mm., ovate, ± incised-dentate, acute, whitish, as wide as the corolla below. Corolla 10-13 mm long, pink or pale rose; upper petal with narrower limb and larger spur. Fruit 2.5-4 × 2-4 mm, usually subglobose-quadrate, tuberculate-rugose, slightly mucronulate, keeled.

Type: in cultis ad Sidonem Syriae, *Gaillardot* (K).

Reported from Tripoli, Barka, El Merj etc. by Durand & Barratte (l.c.), Pampanini (l.c.) and Keith (l.c.)

Distribution: N. Africa, Turkey & W. Syria

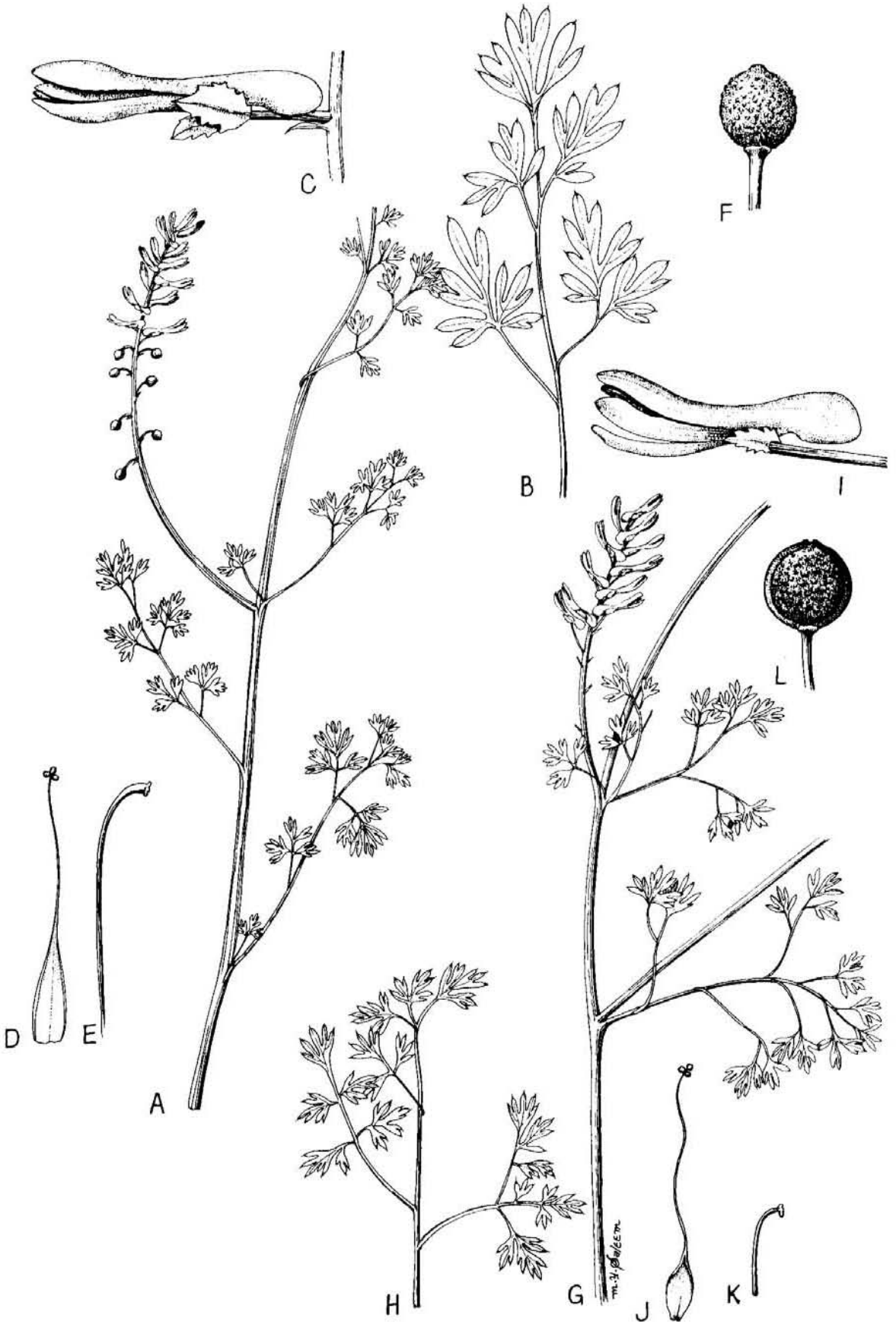


Fig. 1 **Fumaria flabellata:** A, a flowering and fruiting branch × 0.5; B, portion of a leaf × 1; C, flower × 3; D, stamen × 5; E, style and stigma × 5; F, fruit × 5. **F. gaillardotii:** G, a portion of flowering branch × 0.5; H, a portion of leaf × 1; I, flower × 3; J, stamen × 5; K, portion of style and stigma × 5; L, fruit × 5.

Sometimes (Maire, l.c.) considered a subspecies of **F. agraria** Lag. (a complex species of wide distribution). It differs from **F. agraria** Lag. by its pink corolla and subglobular-quadrate, submucronulate fruit.

2. **Fumaria judaica** Boiss., Diagn. ser. I. 8: 15. 1849; Maire, l.c. 75, fig. 17; Durand & Barratte, l.c. 10 (as a synonym of **F. agraria**). (Fig. 2, A-D).

Racemes lax, 10-20 flowered ± equalling the naked peduncle below; bracts oblong-acuminate up to 0.5 as long as the 3-4 mm long fruiting pedicels; sepals 2 (-2.5) × 1 (-1.5) mm, ± dentate; corolla 10-12 mm long, white becoming tinted with pink (inner petals apices dark-purple). Fruit c. 3 mm in diam. obscurely keeled, tuberculate-rugose, obtuse.

Type: Palestine, Mt. Carmel, *Boissier.*

A-3 Godeida, 8 km from Tripoli University, roadside weed 5.12.1975, *Fathi, B.R.* 37 (ULT); 16.2.1976, *Fathi, B.R.* 162 (ULT); **A-7** Gebel Akhdar, Al Baida, Feb. 1970, *M. Shergawi & Mustafa, B.H.* s.n. (ULT); Derna, beach, 1.3.1973, *S.I. Ali & S.A. Faruqi* 1183 (ULT).

Distribution: E. Europe, N. Africa (Libya, Egypt) Palestine, Arabia.

Short bracts, orbicular-obtuse obscurely keeled fruits distinguishes it from the previous species.

Fl. Feb.-March

3. **Fumaria macrocarpa** Parlatore, Pl. Nov. 5. 1842; Durand & Barratte, lc. 10; Pamp. Prodr. Fl. Cir. 214. 1931; Maire, l.c. 76, fig. 18; Keith, l.c. 509.(Fig. 3).

Similar to *F. judaica* but sepals linear-lanceolate, c. 1.5-3 × 0.5-0.8 mm long, pale-rose flowers and bracts as long as or longer than the fruiting pedicels, fruits (2.5-) 3 (-4) mm in diameter rugose.

Type: in insula Chios, *Aucher*

A-7 Below Cyrene (Shahat) ruins, 500-800 m, rochy limestone gully dominated by garigue, annual, flowers wihte (turned pinkish on herbarium sheet), scrambling,



Fig. 2 **Fumaria judaica:** A , habit × 0.5; B, a portion of leaf × 2; C, flower × 2; D, a portion infructescence × 3; **F. capreolata:** E, flower × 2; F, a portion of infructescence × 3.

26.3.1970, *P.H. Davis* 50077 (ULT); Baida, Feb. 1970, *M. Shergavi & Mustafa, B.H.* s.n. (ULT); Shahat, 28.2.1973, *S.I. Ali & S.A. Faruqi* 993 (ULT); Wadi Lathrun, Derna-Susa coastal road, 11.3.1968, *L. Boulos* 2159 (ULT); Al Gubba, 1.3.1973, *S.I. Ali & S.A. Faruqi* 1204 (ULT).

Distribution: E. Mediterranean element; Greece, Aegean Islands, Libya (Gebel Akhdar) Palestine & W. Syria.

A scrambling species with whitish or pinkish flowers, confined to the Baida-Derna (Gebel Akhdar) area of Libya.

Fl. Feb.-March

4. **Fumaria flabellata** Gasp. in Rendic. Accad. Sc. Nap. 1: 51. 1842; Maire, l.c. 82, fig. 21. (Fig. 1, A-F).

   F. capreolata var. *flabellata* (Gasp.) Coss., Compend. 2: 88. 1887; Pamp. Pl. Trip. 111. 1914; Prodr. Fl. Cir. 214. 1931; Keith, l.c. 509.

Similar to *F. judaica* but fruiting pedicels recurved, sepals ovate 3-5 × (1.5-) 2-2.5 mm and wings of the upper petal purple, fruits 2-2.75 × 2-2.75 mm, densely tuberculate-rugose when dry. Racemes 10-30-flowered, elongating in fruit and becoming longer.

Type: Described from S. Europe.

Reported from Bengazi and Tripoli by Maire (l.c.) and Keith (l.c.).

Distribution: S. Europe & N. Africa.

Weak, deflexed fruiting pedicels, up to c. 7 mm long with much shorter bracts easily distingishes this species. It appears that some of the forms of *F. judaica* reach very close to this species in having longer pedicels and broader sepals but pedicels not deflexed. These need further studies with more collections.

5. **Fumaria capreolata** L., Sp. Pl. 701. 1753; Durand & Barratte, l.c. 9; Pamp., Pl. Trip. 111. 1914; Prodr. Fl. Cir. 214. 1931; Maire, l.c. 77, fig. 19. (Fig. 2, E-F).

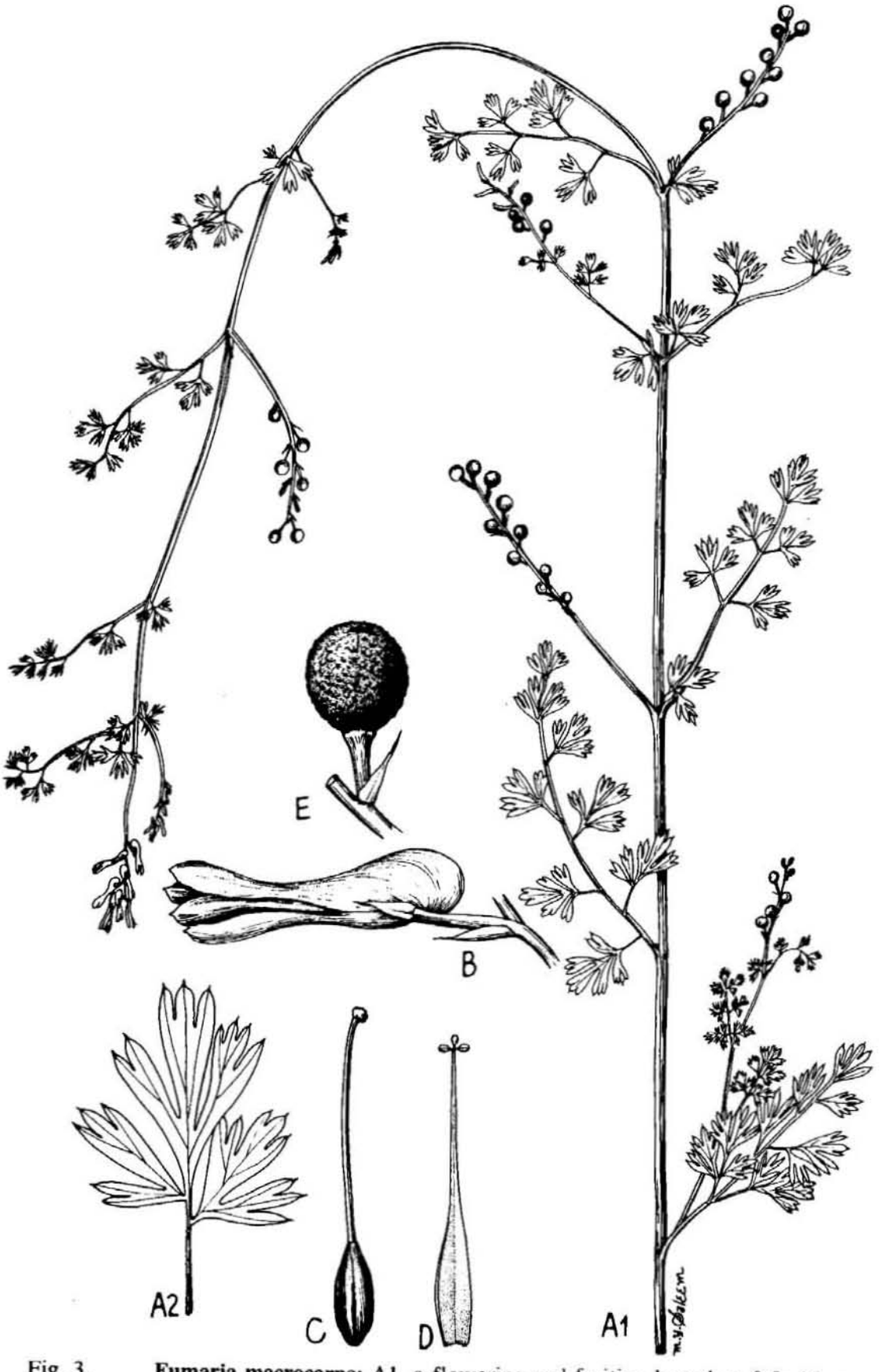


Fig. 3. **Fumaria macrocarpa:** A1, a flowering and fruiting branch × 0.5; A2, a portion of leaf × 2; B, flower × 4; C, gynoecium × 8; D, stamen × 8; E, fruit × 5.

Racemes dense, up to 20-flowered, shorter than the peduncle (bare portion below the raceme). Bracts linear-lanceolate, slightly shorter than the fruiting, often rigidly recurved pedicels. Sepals 4-6 × 2.5-3 mm, ± dentate near the base. Corolla 10-14 mm long, usually creamy white; wings of upper petal and apex of inner petals blackish-red; lower petal with very narrow, erect margins. Fruits smooth or obscurely rugulose, obscurely keeled, 2-2.3 × 1.8-2.3 mm.

Syntypes: Described from France and Britain.

Reported from Tirpoli and Wadi Derna by Durand & Barratte (l.c.) and others.

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

Differs from all previous species by its smooth or obscurely rugulose fruit when dried; pedicels rigidly recurved in fruit with slightly shorter bracts.

6. **Fumaria bastardii** Boreau in Ducharte, Rev. Bot. 2: 359. 1847; Durand & Barratte, l.c. 9 (partly); Pamp., Pl. Trip. 111. 1914; Prodr. Fl. Cir. 214. 1931; Maire, l.c. 88, fig. 25; Keith, l.c. 508.

   F. capreolata var. *bastardii* (Bor.) Coss. et Germ., Fl. Par. 98. 1861; *F. confusa* Jord., Cat. Jord. Bot. Dijon 1848, in Linnaea 23: 469. 1850.

A small, robust plant, similar to the previous species but racemes longer than the peduncle, bracts 1/2-2/3 as long as the straight erect or suberect fruiting pedicel and flowers pink-violet with apices of inner petals (and sometimes the wings of the upper petal) dark-purple. Sepals 2-3 × 1-2 mm, ± serrate; corolla 9-12 mm. Fruit 2-2.5 mm in diam. ovoid with a wide flattish base and ± obtuse apices, slightly keeled and smooth (or sub-rugulose).

Syntypes: Described from Europe (Spain, Paris, Corsica etc.).

Reported from Tripoli and Cyrenaica by Durand & Barratte (l.c.) and Maire (l.c.) etc.

Distribution: Europe, Canaries, N. Africa.

Deep pink-violet flowers in subsessile racemes and ± erect pedicels easily distinguishes it from *F. capreolata.*

7. **Fumaria officinalis** L., Sp. Pl. 700. 1753; Durand & Barratte, l.c. 8; Pamp., Pl. Trip. 112. 1914; Prodr. Fl. Cir. 213. 1931; Maire, l.c. 105, fig. 36; Keith, l.c. 509. (Fig. 4)

F. wirtgeni Koch, Syn. Fl. Germ. ed. 2: Append. 1018. 1845.

A small, robust plant with racemes longer than the naked peduncle below, many flowered. Flowers pink-violet, 7-9 mm long; bracts shorter than the fruiting pedicels; sepals lanceolate 1.5-3.5 × 1-1.5 mm, dentate. Fruits truncate and retuse at the apices (subreniform in profile), 2-3 mm, rugose when dry, obscurely keeled.

Type: Described from Europe, Herb. Linn. 881/13 (LINN).

A-2 Janduba, 25 km from Garian, 8.4.1974, *M. Godeh* 76 (ULT); Janduba, near cultivated field, flowers pink-violet with deeper tips, 17.4.1973, *S.I. Ali* 1586 (ULT); 5 km after Asaba, c. 24 km from Garian, near cult. field, 7.4.1974, *S.I. Ali* 1777 (ULT); 9.4.1974, *A.M.A. Razig* 228 (ULT); El Kaliba, rocky soil, 5.4.1974, *M. Godeh* 89 (ULT); 10.4.1975, *Zenab, A.* 352 (ULT); **A-3** Misrata, 29.3.1975, *Zenab Abu Raya* 172 (ULT).

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

Easily recognized by its pink flowers, subreniform fruits and bracts shorter than the pedicels. Differs from all other species in our area by its subreniform fruits with truncate-retuse apices.

Longer spreading pedicels than the bract in addition to fruit shape distinguishes it from *F. densiflora* DC.

Fl. Feb.-April

8. **Fumaria densiflora** DC., Cat. Hort. Monspel. 113. 1813; Durand & Barratte, l.c. 9; Pamp., Pl. Trip. 112; Prodr. Fl. Cir. 213; Maire, l.c. 101, fig. 34; Keith, l.c. 509. (Fig. 5).

F. micrantha Lag., Elench. Hort. Matrit. 21. 1816; *F. bracteosa* Pomel, Nouv. Mat. 239. 1874; Keith, l.c. 508; Tack., St. Fl. Egypt, ed. 2: 157. 1974.

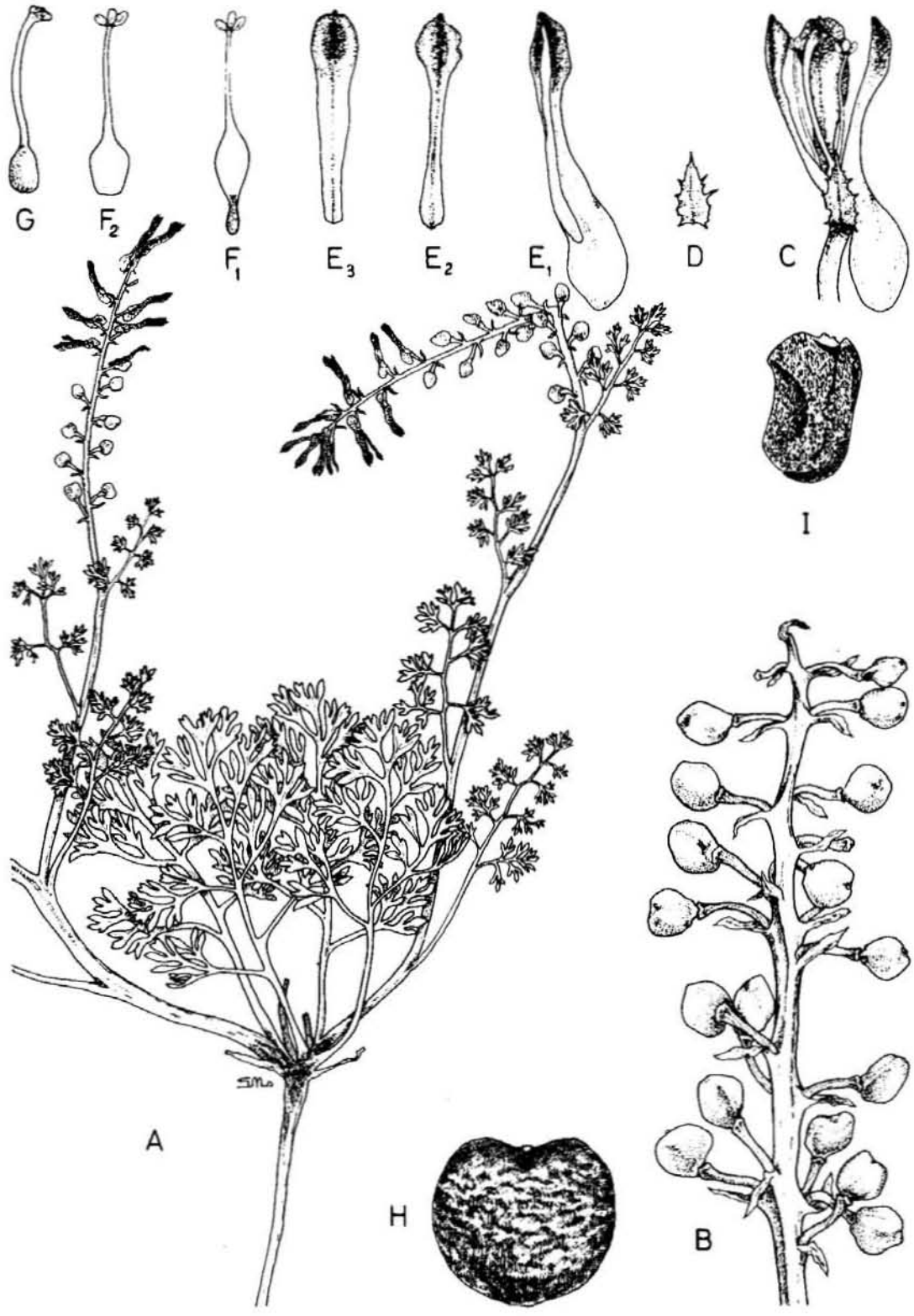


Fig. 4 **Fumaria officinalis:** A, habit × 1; B, infructescence × 3; C, flower × 5; D, sepal × 5; E1, upper petal × 5; E2, lower petal × 5; E3, inner petal × 5; F1-F2, stamens × 5; G, gynoecium × 5; H, fruit × 10; I, seed × 10.



Fig. 5 **Fumaria densiflora:** A, a flowering and fruiting branch × 1; B, infructescence × 3; C, flower × 5; D, sepal × 5; E1, upper petal × 5; E2, lower petal × 5; E3, inner petal × 5; F1-F2, stamens × 5; G, gynoecium × 5; H, fruit × 10; I, seed × 10.

Annual, ascending, glabrous, ± glaucous herb, up to 50 cm long. Leaves 2-4-pinnatisect; ultimate segments dense, linear. Racemes 20-30-flowered, much exceeding the very short or obsolete peduncle. Bracts normally exceeding the straight fruiting pedicels. Sepals (2-) 2.5-3.5 × (1-) 1.5-3 mm, subentire to laciniate, broadly ovate to suborbicular. Corolla (4-) 5-7 mm long, pink; wings of upper petal and apex of inner blackish-red; lower petal with straight margins, subspathulate. Fruit subglobose, 2-2.5 mm in diam., keeled, rugose when dried; apex rounded-obtuse.

Type: in agris circa Telonem, *Ziz* (G).

A-2 5 km after Asaba (c. 24 km from Garian), near cultivated field, flowers light violet, 7.4.1974, *S.I. Ali* 1778 (ULT); Gebel Nafousa, 23.3.1971, *L. Boulos* 4558 (ULT); **A-3** Sog El Sabat, beyond Bengashir, 25.3.1976, *A.M. Dlango* 3 (ULT); Sharshara, prostrate annual, pink flower, 25.3.1976, *A. Wahid* 41 (ULT); **A-7** Marawah, prostrate herb, violet flowers, 2.3.1973, *A. El Tiafe* 126 (ULT); **A-8** Tamimi to Om Rezem, sandy wadi (flooded last autumn), annual, flowers pink, 30.3.1970, *P.H. Davis* 50312 (ULT).

Distribution: W. & S. Europe, N. Africa, eastwards to Turkestan, S. Afr., and New Zealand.

A variable species of wide range of distribution; the small flowered (flowers c. 4 mm long) plants with very narrow capillary ultimate leaf segments, confined from N. Africa to West Asia was considered a ssp. *bracteosa* (Pomel) Murbeck by Maire (l.c. 103) and as separate species by Tackholm (l.c.). However, there seems integration of this form throughout the range of species distribution and not easily separable. Distinguished from other small flowered species of our area by its larger and broader sepals.

Fl. Feb.-April *Vern.* Sfinari el Homar

9. **Fumaria parviflora** Lam., Encycl. 2: 567. 1788; Durand & Barratte, l.c. 8; Pamp., Pl. Trip. 112. 1914; Prodr. Fl. Cir. 213. 1931; Maire, l.c. 112, fig. 40; Keith, l.c. 509. (Fig. 6, J-M)

F. caespitosa Loscos ex Willk. & Lange, Prod. Fl. Hisp. 3: 884. 1880;
F. glauca Jord., Pugill. 8. 1852.

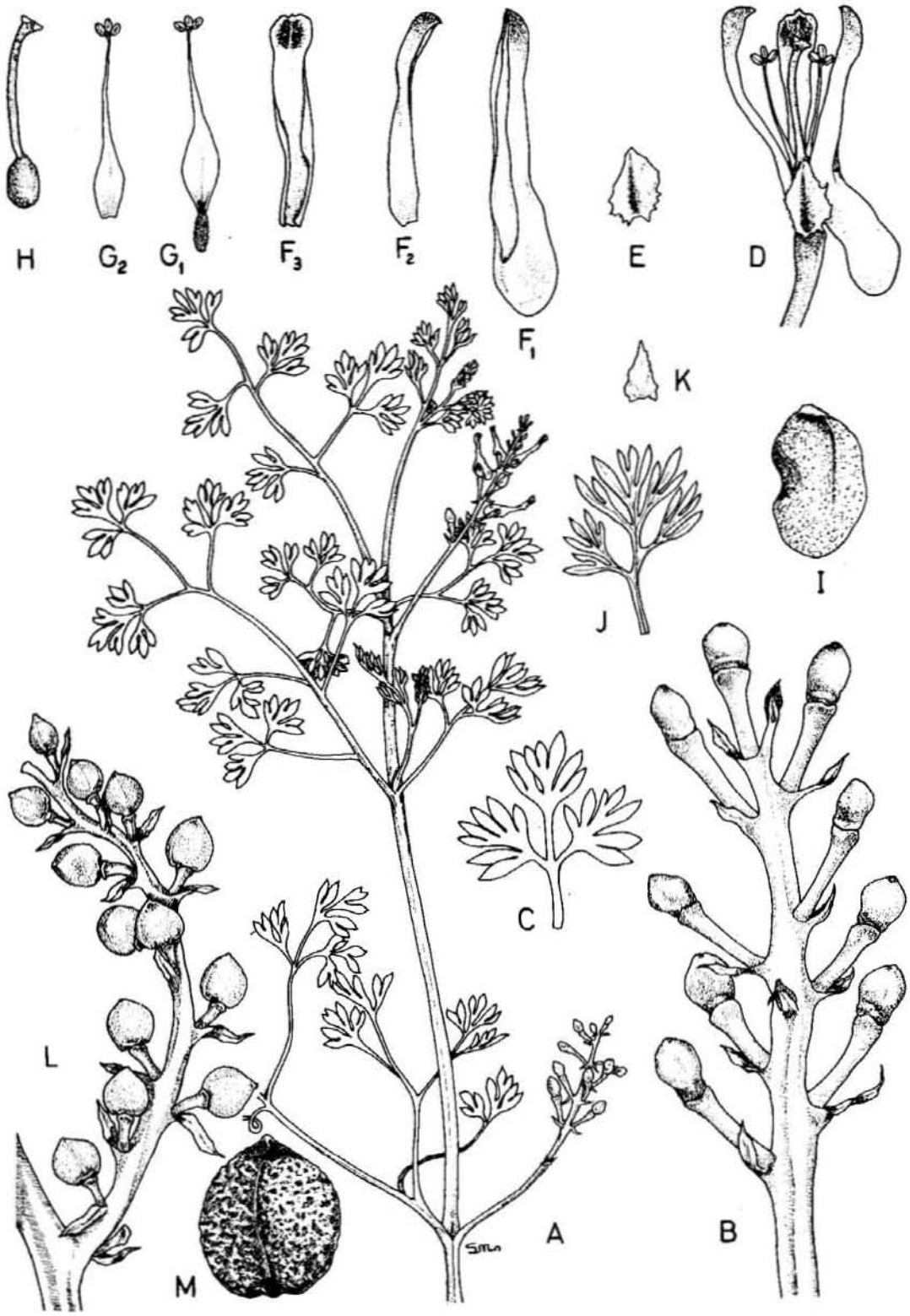


Fig. 6 **Fumaria vaillantii:** A, a portion of flowering and fruiting branch × 1; B, infructescence × 3; C, a portion of leaf × 2; D, flower × 5; E, sepal × 5; F1, upper petal × 5; F2, lower petal × 5; F3, , inner petal × 5; G1-G2, stamens × 5; H, gynoecium × 5; I, seed × 10; **F. parviflora:** J, a portion of leaf × 2; K, sepal × 10; L, infructescence × 3; M, fruit × 10.

Erect to diffuse annual herb, leaves 2-3-(-4)-pinnatisect, usally glaucous and glabrous; ultimate segments linear, channelled. Racemes up to 20-flowered, subsessile. Bracts about as long or longer than the fruiting, straight pedicels. Sepals c. 1-1.5 × 0.6-0.8 mm, ovate, dentate. Corolla 5-6 mm long, white or pinkish. Pedicels erect, ± straight, up to 2 (-2.5) mm long in fruits. Fruits c. 2 (-2.5) × 2 mm, keeled, apiculate or subacute.

Type: Described from plant cultivated at Paris.

A-2 Gebel Nafousa, 23.3.1971, *L. Boulos* 3530 (ULT); Garian, 11.4.1974, *Gassim, F.* 510 (ULT); Mangel Bahar, *A.M.A. Razig* 125 (ULT); El Kaliba, 10.4.1975, *Zenab, A.* 352 (A) (ULT); Garian, 25.3.1968, *L. Boulos* s.n. (ULT); Mangh el Bahar, 2 km before Kaleba, cult. field, sandy soil, flowers violet, tip darker, 8.4.1974, *S.I. Ali* 1701 (ULT); 5 km after Asaba, near cultivated field, 7.4.1974, *S.I. Ali* 1779 (ULT); 30 km from Giado to Jefran, 650 m, barley fields on sandy soil, flowers pale pink, 18.3.1970, *P.H. Davis* 49712 (ULT); Kaleba, c. 15 km from Garian, sandy soil, cult. field, common; corolla very light violet with dark tips, *S.I. Ali* 2715 (ULT); c. 1 km from Kabao on way to Jadu, prostrate, flowers violet tipped, *S.I. Ali* 381 (ULT); **A-3** Sharshara, 30.3.1975, *A. Gammudi* 292 (ULT); Tripoli, Sidi Misri, Faculty of Science, in barley field, 18.4.1967, *L. Boulos* 1708 (ULT); *P.H. Davis* 49450 (ULT); 8 km west Khoms, in barley fields, *L. Boulos* 1821 (ULT); Misrata, *Zenab, A.* 171, 173 & 175 (ULT); **A-7** Shahat, Gebel Akhdar, 18.6.1972, *S.I. Ali* 651 (ULT); **B-1** 36 km from Nalut on way to Tripoli, along the main road, sandy soil, flowers violet, 28.2.1975, *S.I. Ali* 2242 (ULT); University campus, straggling herb with whitish flowers, *A. Ghafoor* 305 (ULT).

Distribution: Europe, S. Russia, N. Africa and S.W. Asia.

Differs from *F. densiflora* DC, by its inconspicuous, narrow sepals on usually whitish flowers in addition to other characters.

Fl. Feb.-April

10. **Fumaria vaillantii** Lois. in Desv. J. Bot. Appl. 2: 358. 1809; (Fig. 6, A-I).

F. schrammii (Hausskn.) Velenovsky, Fl. Bulg. 22. 1891.

Similar to the previous species but leaf segments flat, racemes exceeding the

peduncle (peduncle up to 2 cm long), pedicels somewhat longer, exceeding the bracts, ascending, lower outer petal spathulate. Differs from *F. densiflora* DC. by the shorter bracts, smaller sepals and lower outer petal subspathulate or almost straight.

Type: Not designated.

A-3 Tripoli, behind university campus, flowers white, c. 6 mm long, white, 17.3.1977, *S.M.H. Jafri* 6735 (ULT).

Distribution: Europe, Temp. Asia and N. Africa.

Fl. Feb.-April

INDEX TO FUMARIACEAE

Fumaria L. 1
F. agraria auct. non Lag. 3
F. agraria Lag. 5
F. agraria ssp. *gaillardotti* (Boiss.) Maire 3
F. bastardii Bor. 9
F. bracteosa Pomel 10
F. caespitosa Los. 13
F. capreolata L. 7
F. capreolata var. *bastardii* (Bor.) Coss. et Germ. 9
F. capreolata var. *flabellata* (Gasp.) Coss. 7
F. confusa Jord. 9
F. densiflora DC. 10
F. densiflora ssp. *bracteosa* (Pomel) Murb. 13
F. flabellata Gasp. 7
F. gaillardotii Boiss. 3
F. glauca Jord. 13
F. judaica Boiss. 5
F. macrocarpa Parl. 5
F. micrantha Lag. 10
F. officinalis L. 10
F. parviflora Lam. 13
F. schrammii (Hausskn.) Velen. 15
F. vaillantii Lois. 15
F. wirtgeni Koch. 10