AN ENUMERATION OF THE FUMARIA'S FOUND IN THE NETHERLANDS

by

W. H. WACHTER

(Rotterdam)

(with 1 plate)

(Issued on 16. X. 1946).

As my friend Dr J. Th. Henrard, when young, paid much attention to the adventitious species of *Fumaria*, I will give here an enumeration of the species found in our country. This genus has been somewhat neglected with us, mainly owing to the fact that the descriptions in our flora's are not exact, so that the determination was not always easy; the less so as the species are variable in several characters.

As I have not much space at my disposal, I will refrain from giving detailed descriptions, but the essential characters I will lay down into the key, so that a correct determination is possible. Minute descriptions are to be found in the splendid works of Mr H. W. Pugsley, which have been a great help to me.

It is recommendable to study the *Fumaria's* on living specimens, as many of the characters are very difficult to be seen when the plants have been dried. Mr Pugsley gives some useful remarks (lit. 4, p. 3—4): "It is of the first importance throughout the genus that normal flowers, fully coloured and with the corolla-wings developed, should be obtained. It is a remarkable characteristic of the Fumitories — especially the Latisectae — that when they grow under unnatural or starved conditions the corolla fails to develop and tends to revert to a small primordial form, whitish in colour, except for the green keels of the two outer petals, and with the wings of these two petals obsolete..... It is also desirable, when mounting specimens to collect those fruits which inevitably become detached within a cardboard frame enclosed in a small envelope. If the fruits are not collected they will certainly break away from the pedicels by degrees and disappear, and if they are simply placed in an envelope with no protection, they are often crushed in the herbarium in the course of a few years by the weight of the superincumbent sheets".

Such cleistogamous flowers have also been found in our country, and the number of crushed fruits in our herbaria is rather large.

The herbaria, from which I saw examples, are abbreviated in the following way.

Rijksherbarium, Leiden	L
Koninklijke Nederlandsche Botanische Vereeniging	NBV
Botanisch Laboratorium, Amsterdam	Amd
Botanisch Laboratorium, Utrecht	U
N. P. W. Balke, Rotterdam	Ba
Joh. Jansen, Malden	Ja
Prof. Dr S. E. de Jongh, Leiden	Jo
J. H. Kern, Gorinchem	K & R
Dr Ir A. W. Kloos, Dordrecht	Kl
Th. Reichgelt, Nijmegen	K & R
Ir J. L. van Soest, 's-Gravenhage	So
F. A. C. de Wever (in Nat. Hist. Mus., Maastricht)	Maastr.

Key to the species.

(All our species have the tip of the inner petals and the wings of the upper one blackish-red).

1a Leaf-segments broadly oval to oblong. Normal flowers large, 10—14 mm long (sometimes cleistogamous and much smaller). Wings of the upper petal reflexed upwards. Lower petal never spathulate. Fruit smooth or rugulose when dry 2

1b Leaf-segments from oblong to mostly lanceolate to linear. Normal flowers less than 10 mm long. Wings of the upper petal less reflexed upwards. Lower petal spathulate. Fruit mostly more or less rugose when dry 3

2a Racemes rather dense, 12—20-flowered. Pedicels strongly arcuate-recurved in flower and fruit (except in starved or shade-grown plants). Flowers 10—12 (—14) mm long, yellowish-white, sometimes flushed with pink. Sepals large, 4—6 mm long and 2½—3 mm broad, normally broadly-oval, whitish in colour, more or less toothed about the base. Fruit about 2 mm long and broad, subrotund to subquadrate, smooth when dry . . . . . **1. F. capreolata**

2b Racemes rather lax, usually with 6—12 flowers. Fruiting pedicels normally straight and erect-spreading. Flowers 10—12 mm long, rose-pink. Sepals large, 4—5 mm long and 2½—3 mm broad, ovate, irregularly dentate towards the base, rosy or whitish in colour. Lower petal often deflexed and free. Fruit about 2½ mm long and 2 mm broad, obovate, finely rugulose to smooth when dry . . . . . **2. F. Boraei**

3a Bracts longer than the fruiting pedicels. Sepals large, at least one-third as long as the corolla (without the spur) or longer and rather broad. Fruit nearly smooth to rugose when dry 4

3b Bracts usually shorter than the fruiting pedicels. Sepals one-third as long as the corolla without the spur (*F. officinalis*) or much shorter and fairly narrow. Fruit rugose or rugulose when dry 5

4a Pedicels arcuate-recurved in flower and fruit. Racemes about 8—12-flowered, rather lax. Flowers small, 4½—6 mm long, rose-pink. Sepals broadly-ovate, 3 mm long and 1½ mm broad, denticulate, white. Fruit very small, 1¾ mm long and 1½ mm broad, subglobose, rugulose when dry . . **3. F. Kralikii**

4b Fruiting pedicels straight and erect-spreading. Racemes very dense at first, but lax in fruit, 20—25-flowered. Flowers 6—7 mm long, rose-pink. Sepals 2½—3½ mm long and 2—3 mm broad, nearly orbicular, whitish or rosy, broader than the corolla-tube. Fruit 2—2½ mm long and broad, subglobose, rugose when dry . . . . . **4. F. micrantha**

5a Sepals very small, ½—1½ mm long. Leaf-segments linear. Fruit rounded or subacute 6

5b Sepals 2—3½ mm long and 1—1½ mm broad. Leaf-segments broader than linear, though not always. Racemes with more than 20 flowers. Fruit about 2 mm long and 2½—3 mm broad, broadest above the middle, truncate to nearly obreniform . . . . . **5. F. officinalis**

Var. t e n u i f l o r a has a slender habit. Leaf-segments sometimes linear. Racemes with 10—20 flowers. Flowers 6 mm long. Sepals 2 mm long and 1 mm broad. Fruit 2—2½ mm long and broad, broadest about the middle, somewhat apiculate.

6a Fruit rounded-obtuse above. Leaf-segments flat. Flowers deep rose or pink. Bracts shorter than the fruiting pedicels 7
6b Fruit subacute. Leaf-segments normally channeled. Racemes dense in flower, with 12—20 flowers, but lax in fruit. Bracts about as long as the fruiting pedicels. Flowers 5—6 mm long, white in colour. Sepals about 1 mm long and 0.7 mm broad. Fruit 2 mm long and broad, granular-rugose when dry **6. F. parviflora**

7a Racemes rather lax, with 6—12 flowers. Bracts three-fourths as long as the fruiting pedicels. Flowers 5—6 mm long, pink. Sepals ½—1 mm long and 0.3—0.5 mm broad. Wings of the upper petal spreading. Fruit 2 mm long and broad, granular-rugose when dry . . . . . **7. F. Vaillantii**
7b Racemes rather dense, with 12—20 flowers. Bracts half as long as the fruiting pedicels. Flowers 5—6 mm long, deep rose in colour. Sepals about 1 mm long and ½—¾ mm broad. Wings of the upper petal reflexed upwards. Fruit 2 mm long and broad, granular-rugose when dry, with a short persistent apiculus . . . . . **8. F. Schleicheri**

1. Fumaria capreolata L., Spec. Plant. ed. 1 (1753), p. 701.

A rare adventitious species in our country, but easy to distinguish when fully developed. I could only examine dried specimens and found the fruit often subquadrate. All our specimens belong to the type: *F. pallidiflora* Jordan in Schultz, Archives (1854), p. 305. The var. *speciosa* (Jordan pro spec.) Hammar, Monogr. (1857), p. 25 has not yet been found with us. It must have the pedicels recurved as in the typical *capreolata*, though a little slenderer and more flexuous, but the flowers are more coloured, from white to pink or crimson. The racemes are somewhat laxer and the sepals relatively shorter and broader. It should not be confused with *F. Boraei*.

Doorn, *Oudemans*, 1869, 1870 (L, NBV, Amd, U); id., *Miss E. van Aken*, 1906 (NBV); Apeldoorn, *Kok Ankersmit*, 1875, 1876, 1879 (L, NBV, Amd); Leiden, *Struyckenkamp*, 1892, cleistogamous (L); Deventer?, *H. W. Peteri*, 1899, cleistogamous, racemes 4—5-flowered, perhaps a shadegrown plant (Amd); Hoorn, *A. Richel*, 1920 (L, Kl); Babberich, *Joh. Jansen, v. Giersbergen & pater Donatus*, 1932 (Kl); ibid., *Joh. Jansen & Reichgelt*, 1942 (K & R).

2. Fumaria Boraei Jordan, Cat. du Jard. Bot. Grenoble (1849).

Here it is for the first time that the name *Boraei* is mentioned in our Dutch literature, though the plant is not rare in our country. It is, however, always an adventitious plant here. The old florists used the Monograph of Hammar, in which the plant bears the name: *F. media* Lois. *α typica*. No wonder that some of the old specimens were called *F. media*. Afterwards Rouy & Foucaud mentioned a *F. officinalis* var. *media* Coutinho, and so "*F. media*" appeared in our Dutch Flora's under *F. officinalis* and became undeterminable. In later years many examples were gathered under the name of *F. muralis* Sonder. Mr Pugsley identified the plant in question as *F. muralis* subsp. *Boraei*; he has seen a great many specimens both of *F. muralis* and of *F. Boraei*, so he can better judge this matter than I; but as the true *F. muralis* has not yet been found with us, it seems better to me to use the name *F. Boraei*. In herb. L sheet 908. 164—1809 lies a fine specimen from Jordan himself: "Herbier Henri van Heurck à Anvers. Fumaria Boraei Jordan! Cultivé à Lyon. Echantillon authentique communiqué par M. Alexis Jordan". The true *F. muralis* is at once distinguishable by its smaller fruits: not yet 2 mm long and somewhat less in breadth, smooth, almost polished. The flowers too are a little smaller and the habit is very slender.

The salient features of *F. Boraei* are the long, lax racemes with 6—12 flowers (shadegrown plants have racemes with 4—6 cleistogamous flowers), the rugulose, subglobose fruits, the large corolla and the irregularly dentate, subacute sepals.

Amsterdam, *Rombouts*, 1839 (NBV); id. *G. H. H. Zandvoort*, 1909 (L); id. *S. E. de Jongh*, 1916 (Kl); Chartroyse nr Utrecht, *Bondam*, 1859 (NBV); this specimen is very poor; the remnants of the fruits seem too large and too rugulose for *F. muralis*; Delden, *Suringar*, 1870 (NBV); Deventer, *Kobus*, 1877 (L, NBV); ibid., *Kok Ankersmit*, 1879 (L, NBV); this is the plant, that *Vuyck* could not place; see Prod. Fl. Bat. ed. 2 p. 90 sub *F. muralis*; Dieren, *Ensink*, 1885 (Amd); ibid., *Posthumus*, 1906 (L); Ruurlo, *Ensink*, 1887, 1888 (Amd); Vorden, *Groll*, 1888 (NBV); Hilversum, *Suringar, Vuyck, Struyckenkamp*, 1891, 1892 (L, NBV); Hengelo, *Suringar* c.s., 1895 (L, NBV); Bloemendaal, *P. N. van Kampen*, 1897 (L); Oisterwijk, *van Vloten* (NBV); Gendringen, *Miss Rust*, 1899 (NBV); Scheveningen, *F. K. van Iterson*, 1900 (NBV); ibid., *van Soest*, 1933 (So); Doorn, *S. Boot* (NBV); Enschede, *Blijdenstein*, 1904 (NBV); Apeldoorn, *Miss J. Ram & Miss Zernike*, 1907 (NBV); Arnhem, *Henrard*, 1908 (L); ibid., *Kern & Reichgelt*, 1924 (K & R); Winterswijk, *des Tombe, Lotsy & Goddijn*, 1909 (L); Zeist?, *J. D. Dorgelo*, 1911, cleistogamous (L); Gorinchem, *Henrard*, 1914 (L); Wijlré?, *de Wever*, 1915 (L, Maastr.); Heerlen, *de Wever*, 1916—1927 (L, Maastr.); Soest, *van Steenis*, Sept. 1920, cleistogamous and very poor (NBV, U, So); Bilthoven, *de Leeuw*, 1926 (So); Voorstonden (Vel.), *Jansen & Wachter*, 1926 (L); de Bilt?, *van Ooststroom*, 1929, very young (L); Berg en Dal, *Kern & Reichgelt*, 1931 (K & R); Wolfheze, *van Soest*, 1931 (So); Vogelenzang, *Roorda van Eysinga* (Kl); Mill, *Joh. Jansen*, 1934 (NBV); 1938, 1943 (Ja); Rotterdam, *Jansen & Wachter*, 1935, 1946 (L); id. *Balke*, 1939 (Ba); Tilburg, *Kloos & pater Ludovicus*, 1938 (Kl); id. *de Jongh*, 1942 (So); Middelaar, *Joh. Jansen*, 1939 (Ja); Vierlingsbeek, *Joh. Jansen*, 1943 (Ja).

The specimens from Hengelo, 1895, and Rotterdam, *Balke*, 1939 seem to me var. *ambigua* Pugsley, Journ. of Bot. XL (1902), p. 180 after the description: leaf-segments narrower, lanceolate; flowers smaller, sepals narrower, more acuminate; fruit nearly 2½ mm long and almost as broad, nearly rather square than obovate, hardly narrowed below.

The examples from Wijlré are dubious: they have more rugulose fruits than usual, almost rugose; the pedicels from which the flowers and fruits fell, are arcuate-recurved as in *F. capreolata*, but those that bear flowers and fruits are straight and patent; the flowers seem to be cleistogamous; the racemes 8—12-flowered, lax.

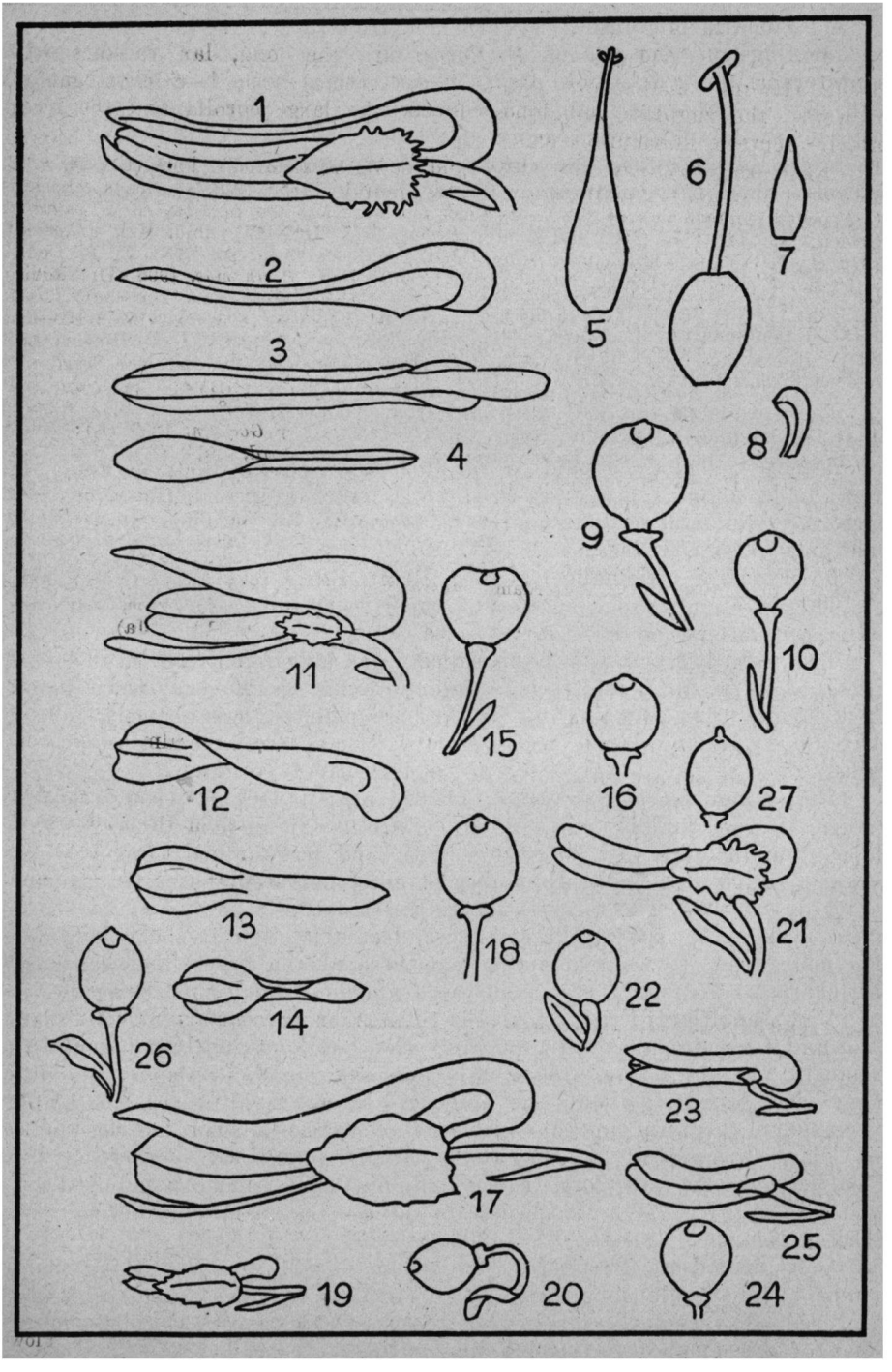
3. **Fumaria Kralikii** Jordan, Cat. du Jardin Bot. Dijon (1848), p. 19.

This very rare adventitious species was once found in the Netherlands, but in so large a number that Oudemans could distribute them in his "Herbarium van Nederlandsche Planten" sub nr 925 as *Fumaria officinalis β minor* Koch: "Op zanderig bouwland tusschen (on sandy fields between) Zeyst en Driebergen, leg. *Van den Brink*, Juni 1871".

The pedicels are recurved, so that in Prod. Fl. Bat. ed. 2, p. 90 this plant is mentioned sub *F. capreolata*. Because in 1914 I was in doubt whether or not the determination was right, I sent my specimen to Prof. Thellung, who identified it as *F. Kralikii* (L, NBV, U, Amd).

F. Boraei. 1. Flower. 2. Upper petal from side. 3. Upper petal from above. 4. Lower petal, inner side. 5. Stamens. 6. Pistil. 7. Bract. 8. Nectarium. 9. Fruit. Var. *ambigua*. 10. Fruit — *F. officinalis*. 11. Flower. 12. Upper petal from side. 13. Upper petal from above. 14. Lower petal, inner side. 15. Fruit. Var. *tenuiflora*. 16. Fruit. *F. capreolata*. 17. Flower. 18. Fruit — *F. Kralikii*. 19. Flower. 20. Fruit — *F. micrantha*. 21. Flower. 22. Fruit — *F. Vaillantii*. 23. Flower. 24. Fruit — *F. parviflora*. 25. Flower. 26. Fruit — *F. Schleicheri*. 27. Fruit.

All figures 5 ×. Fig. 1—9, 11—15 after living specimens.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

4. Fumaria micrantha Lag., Elench. Hort. Matr. (1915), p. 21.

Mr Pugsley clearly shows (lit. 4, p. 55), that the name *F. micrantha* is preferable to *F. densiflora* D.C. It is a rather rare adventitious species with us. It has sometimes been confused with *F. officinalis*, but it is easy to distinguish, when fully developed, by its fruits. The sepals are broad, broader than the corolla, and the bracts are longer than the pedicels. The leaf-segments are usually narrow, much narrower than those of *F. officinalis*.

Utrecht, *C. A. Bergsma* (NBV); Nieuwe Neuzenpolder, *Walraven* (NBV); In 't Overmaasche bij Fyenoord, *Witte*, 1856 (L); St. Kruis?, *A. Walraven*, 1861 (NBV); Bolsward, *J. M. de Boer*, 1867, 1869, 1870, 1874 (L, NBV, U, Amd); Apeldoorn?, *Kok Ankersmit*, 1877 (NBV); Leeuwarden?, *H. Albarda* (NBV); 's-Hertogenbosch, *H. W. Heinsius*, 1897 (NBV); IJsselstein, *des Tombe*, 1893 (L); Overschie?, *F. D. J. Risch* (NBV); Gorinchem, *Henrard*, 1914 (L); Rotterdam, *J. H. Kern*, 1936 (K & R, Ba, Kl); Wassenaar, *Lam, Bakker & Holthuis* (L).

The specimens, marked with an ?, are very young, but have broad sepals and long bracts.

Attention should be paid to var. *littoralis* (Dum.) Rouy & Fouc. It seems to be a plant of the sea-coast. It is much branched, the sepals are narrower than the corolla-tube; the leaf-segments are broader; the flowers pale and in shorter racemes.

5. Fumaria officinalis L., Spec. Plant. Ed. 1 (1753), p. 700.

The only indigenous species of the Netherlands, and very variable in nearly all characters.

The specific type has been called var. *vulgaris* Koch, Syn. ed. 2 (1845) App. p. 1017. Its forma *scandens* Rchb. has a very robust habit, thick stems, often climbing by its cirrhose petioles, less glaucous foliage than the type, and larger leaf-segments. Soms extreme forms might be called so.

Var. **minor** Koch, Syn. ed. 2 (1845) App. p. 1018 "herba intensius glauca, flores dimidio minores. F. officinalis tenuifolia Fries". This description includes var. *tenuiflora* Fries, and therefore Mr Pugsley proposes to call it var. *minor* Haussknecht, as Haussknecht has given a much better description. The racemes are rather lax, 10—20-flowered; the sepals about 2 mm long; the corolla smaller and paler; the fruit 2 mm long and 2½ mm broad, retuse and similar to those of the type. Especially the last character distinguishes it from var. *tenuiflora*, which much resembles it.

Var. **tenuiflora** Fries, Nov. Fl. Suec., has the sepals about 2 mm long and 1 mm broad; the fruits are 2—2½ mm long and broad, rounded-truncate, but not retuse, and usually possess a small, persistent apiculus. They are broadest about the middle. Haussknecht gives an ample discussion of this form, and called it var. *Wirtgeni* Koch, whereas Fries named his plant successively *F. tenuiflora*, *F. officinalis* var. *tenuifolia* and *F. officinalis* var. *tenuiflora*. In my opinion the last name is valid. Those who prefer to call it a subspecies should use the name subsp. *tenuiflora* (Fries) Neuman, Sveriges Fl. (1901), p. 477.

Var. **densiflora** Parlatore, Mon. Fum. (1844), p. 53. Habit more compact; foliage glaucous; petioles not cirrhose; racemes dense and many-flowered; flowers dark. I believe it to be a form from S. Europe, though some of our examples resemble it a little.

Haussknecht distinguishes further several "forms", both of *F. officinalis* and of var. *Wirtgeni*; but they are not worth mentioning, as they are not permanent and seem to depend on the environment.

Of var. *tenuiflora* I examined the following specimens:

Rheederoort aan de Steeg, leg. ?, 1835 (NBV); Harderwijk, *Bondam*, 1885 (NBV); Beusichem, leg. *H. S.* (NBV); Oosterhout, *C. Brakman*, 1899 (L); Gorinchem, *Henrard*, 1911 (L); Heerlen?, *de Wever* (Maastr.); Rotterdam, *Balke & Kern*, 1939 (Ba, K & R); Tilburg?, *de Jongh & Kloos*, 1942 (Jo, Kl).

The specimens from Heerlen and Tilburg have no characteristic fruits and it is possible that they belong to var. *minor* Koch.

6. **Fumaria parviflora** Lamarck, Encycl. Méth. II (1788), p. 567.

The main features of this species are the subacute fruits, the long bracts, the almost white flowers and the channeled leaf-segments.

Apeldoorn, *Kok Ankersmit* (NBV); ibid., *Miss J. Bam & Miss L. Zernike*, 1907 (NBV); Wormerveer, *Kloos*, 1929 (Kl); Rotterdam, *Balke*, 1939 (Ba, K & R).

7. **Fumaria Vaillantii** Lois. in Desv., Journ. Bot. II (1809), p. 358.

The differences between *F. officinalis, F. Wirtgeni, F. Vaillantii* and *F. Schleicheri* are pointed out by Haussknecht p. 411—412.

Amsterdam, *G. H. H. Zandvoort*, 1910 (L); Rotterdam, *Balke*, 1934, 1939, 1940 (Ba).

8. **Fumaria Schleicheri** Soyer-Willemet, Observ. Pl. France (1828), p. 17.

Nijmegen, *Th. Reichgelt*, 1931 (K & R).

Principal references.

1. HAMMAR, O., Monographia Generis Fumariarum (1857), Upsala — Ex actis reg. Soc. sc. Ups. Ser. III, Vol. II, pt. 1.
2. HAUSSKNECHT, C., Beitrag zur Kenntnis der Arten von Fumaria, Sect. Sphaerocapnos — Flora LVI (1873), p. 401.
3. PUGSLEY, H. W., The British Capreolate Fumitories — Journ. of Bot. XL (1902), p. 129.
4. PUGSLEY. H. W., The Genus Fumaria in Britain — Journ. of Bot. L (1912) Suppl.
5. PUGSLEY. H. W., A Revision of the Genera Fumaria and Rupicapnos — Journ. of the Linnean Soc., Botany XLIV (1917—1920), p. 233.