THE GENUS FARSETIA IN PAKISTAN, INDIA AND AFGHANISTAN

S. M. H. JAFRI

The genus *Farsetia* Turra (Cruciferae) consists of about 10 species distributed in North and Central Africa, Orient, Pakistan and India, but the status of some of the described species has remained undecided or confusing. They have often been the subject of interesting discussions among taxonomists (Burtt, 1948; Burtt & Lewis, 1949; Rechinger, 1951). The species in Pakistan, India and Afghanistan present their share of problems, and have not recently been studied in detail. Accumulation in the British herbaria of enough herbarium specimens of *Farsetia* from the present area has encouraged me to attempt a clarification of this taxonomic problem.

Hooker & Thomson (1861) recognized four species of *Farsetia* from this area, out of which two, *F. Jacquemontii* and *F. Edgeworthii*, were newly described. Hooker & T. Anderson (1872) reduced the number of species to three by sinking *F. Edgeworthii* Hook. fil. & Thom. in their concept of "*F. aegyptiaca*" Turra*. Boissier (1867) recorded *F. Jacquemontii* from Baluchistan, *F. aegyptia* var. *gracilior* Boiss. from Afghanistan, and *F. linearis* Decaisne from Afghanistan and Baluchistan. Blatter and Hallburgh described a new species, *F. macrantha*, from the Rajputana desert in 1919.

There can be no doubt that *F. Hamiltonii* Royle is a distinct species from the others mentioned above. *F. linearis* Decne. has rightly been excluded from Afghanistan and Baluchistan (whence it was recorded by Boissier, 1867) by Burtt (1948).

All the specimens of *Farsetia*, except those of *F. Hamiltonii* Royle, accumulated at Kew and Edinburgh from the present area were studied in detail.

Before these studies are discussed the validity of the name *Farsetia Jacquemontii* requires mention. When describing this new species, Hooker & Thomson doubtfully quoted *Arabis heliophila* DC. as its synonym. On the other hand, Hooker & T. Anderson (1872) excluded *Arabis heliophila* DC. remarking, "it is impossible to determine from Burman's figure whether this is the *A. heliophila* DC." Earlier Boissier (1867) had included both *Arabis heliophila* DC. and *Heliophila incana* Burman (on which De Candolle based his *Arabis heliophila*) as synonyms of *F. Jacquemontii*. I have seen Burman's figure and description of his *Heliophila incana*, and De Candolle's good description of *Arabis heliophila*, and have come to the conclusion that they are nothing but *F. Jacquemontii*. Bunge (in Cosson's Fl. Atl. 1884) described a new species, *Farsetia heliophila* with which *A. heliophila* DC. is no doubt conspecific, but he did not quote *A. heliophila* DC. as its synonym. I find that all the above mentioned epithets are names for a single species, as will be evident also from the

* The correct spelling of this name is *F. aegyptia* Turra—see Burtt & Lewis in Kew Bull. 1949, 290. It is used throughout the rest of this paper.

following studies. The correct name for this species would have been a new combination, based on *Heliophila incana* Burm., had not the presence of *F. incana* (L.) R.Br. (which is *Alyssum incanum* L.=*Berteroa incana* (L.) DC.) invalidated this combination; thus *F. Jacquemontii* Hook f. & Thoms. provides the oldest available epithet and becomes the valid name.

The following statistical studies are based on flower and fruit characters. Examining specimens of true *Farsetia aegyptia* Turra from outside the present area, one can distinguish the Indian material by the shape of the calyx, and size and width of the seed and wing: in the latter the calyx is oblong, the seed smaller (about 3 mm. diam.) including a narrow wing (about 0·6–0·9 mm. broad), while in the former the calyx is oblong-subovate, broadest at the base, the seed larger (about 4 mm. in diam.), including broader wing (about 2 mm. broad). Moreover, the calyx, seed and wing measurements of the Indian plants closely resemble those of *F. Jacquemontii.*

Table 1 shows the measurements of the 61 specimens available and formerly included under *Farsetia Jacquemontii* and the other names mentioned above. I could not see any specimen of *F. macrantha* Blatt. & Hallb., but from the measurements given in the specific description it fits easily within the limits of the same group.

The seven columns in the table show: 1, Length of petal. 2, Mean length of petal. 3, Length of siliqua. 4, Breadth of siliqua. 5, Length/Breadth ratio of siliqua. 6, Seriation of seeds in fruit. 7, Width of membranous wing of seeds.

As size of siliquae and length of petals are the primary characters on which the various units were distinguished by their authors, the measurements given in the table should justify using these characters for separating taxa from the above mentioned group.

Figure 1 is a histogram showing the frequency distribution of the length of petals of the 53 specimens with flowers. The form obtained is somewhat skewed but shows that the length of the petals varies continuously from

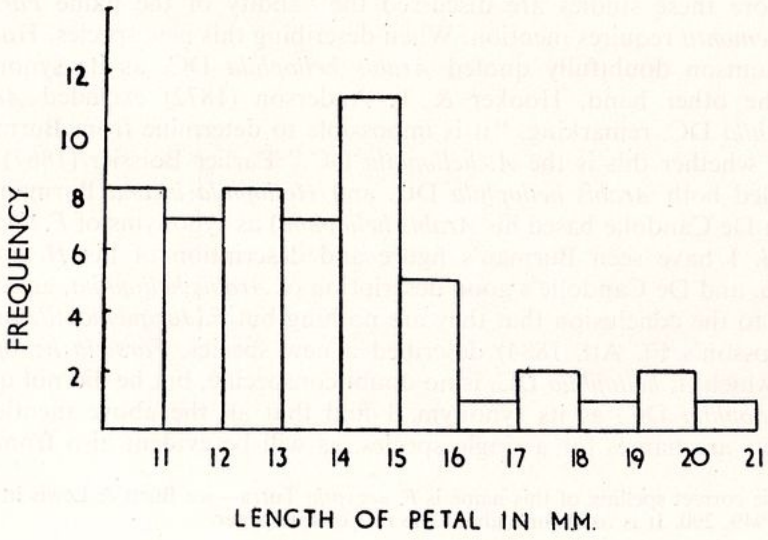

FIG. 1. Frequency distribution of petal length.

10–21 mm. (calculated mean=13·9 mm.), with most of the specimens (83%) having petals 10–15 mm. Any separation of taxa on the length of the petals (flower size) would, therefore, be valueless.

Figure 2 is a histogram showing the frequency distribution of length/breadth ratio of siliquae of 41 specimens with mature fruits. The form obtained shows a definite break and suggests that two taxa are involved, one with 17% of the specimens having short and broad fruits with l/b ratio 3–4 (calculated mean=3·65), and the other with 83% of the specimens having long and narrow fruits with l/b ratio of 6·7–15 (calculated mean=10·15).

Looking into the regional distribution of these two groups in the present area, I find that the bigger group with 83% specimens has a wide range of distribution almost throughout the present area; this represents typical *Farsetia Jacquemontii* Hook. fil. & Thom., including as synonyms *Heliophila incana* Burm., *Arabis heliophila* DC., *Farsetia heliophila* Bunge and *F. macrantha* Blatt. & Hallb. The smaller group with 17% of the

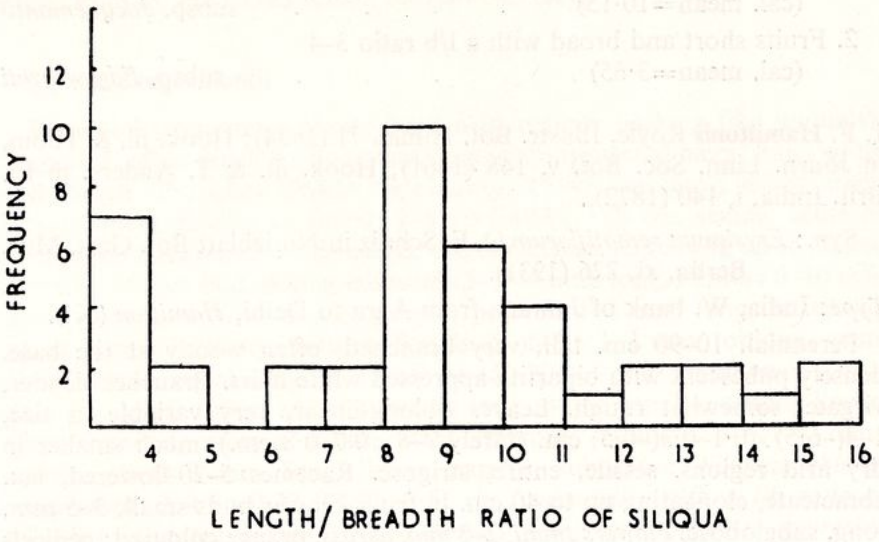

FIG. 2. Frequency distribution of length/breadth ratio of siliquae.

specimens is confined to Salt Range, N. W. F. Prov. (West Pakistan) and adjacent parts of Afghanistan, and includes specimens referred to *F. aegyptia* by Hooker & Thomson, *F. Edgeworthii* Hook. fil. & Thom. and *F. aegyptia* var. *gracilior* Boiss. As the specimens of this latter group closely resemble *F. Jacquemontii* in habit, calyx shape, seed size and width of the wing, I prefer to recognize it as *F. Jacquemontii* subsp. *Edgeworthii* (Hook. fil. & Thom.) Jafri, with a localised distribution. The two taxa show some overlap in petal length but not in fruit shape (l/b ratio).

Thus, the present area has only two species of *Farsetia*, *F. Hamiltonii* and *F. Jacquemontii*, the latter with a subspecies, *Edgeworthii*, in addition to the typical race.

It is interesting to note that O. E. Schulz was misled by a young specimen of *F. Hamiltonii* Royle from Kharghoda (*Saxton* 496: K!), a dry hot place, and described it as a new species of *Erysimum*, *E. remotiflorum* O. E. Schulz. *Erysimum* is a genus of cooler climates in our area, occurring

mostly in the Himalaya and at high altitudes in Baluchistan and Afghanistan, while *Farsetia* is common in warmer parts. So far as the bipartite appressed hairs are concerned, *Farsetia* and *Erysimum* are alike and could be mistaken for one another in the absence of flowers and fruits. Although the specimen of Schulz's new species does not bear fruits, it can be recognized as a *Farsetia* by its other characters: racemes lax (with small flowers), inner sepals not saccate, petals narrow and slightly longer than the sepals, and stigma somewhat conical, short, bilobed with lobes slightly decurrent.

Key to the species

1. Flowers small, about 3 mm. across; petals short, slightly exceeding the sepals . . . . . 1. *F. Hamiltonii*
1. Flowers mediocre or large, 6–10 (or more) mm. across; petals long, much exceeding the sepals . . . . 2. *F. Jacquemontii*
   2. Fruits long and narrow with a l/b ratio 6·7–15 (cal. mean=10·15) . . . . . subsp. *Jacquemontii*
   2. Fruits short and broad with a l/b ratio 3–4 (cal. mean=3·65) . . . . . subsp. *Edgeworthii*

1. **F. Hamiltonii** Royle, Illustr. Bot. Himal. 71 (1834); Hook. fil. & Thom. in Journ. Linn. Soc. Bot. v, 148 (1861); Hook. fil. & T. Anders. in Fl. Brit. India, i, 140 (1872)..

Syn.: *Erysimum remotiflorum* O. E. Schulz in Notizblatt Bot. Gart. Mus. Berlin, xi, 226 (1931).

Type: India, W. bank of Jamuna from Agra to Delhi, *Hamilton* (K!).

Perennial, 10–90 cm. tall, very branched, often woody at the base, densely pubescent with bipartite-appressed white hairs. Branches slender, virgate, somewhat rough. Leaves oblong-linear, very variable in size, 1–4(–6·5)×0·1–0·3(–0·5) cm. (rarely 7–8×0·7–0·8 cm.), much smaller in dry arid regions, sessile, entire, strigose. Racemes 5–20-flowered, lax, ebracteate, elongating up to 40 cm. in fruit. Flower buds small, 3–5 mm. long, subglobose. *Flowers small, 2–3 mm. across*, orange coloured; pedicels 1–2 mm. long, increasing up to 4 mm. in fruits, filiform, ascending. Sepals 3·5–4×0·8–1 mm., oblong, subobtuse, equal, strigose, lateral two not saccate. *Petals* 4·5–5×0·8–1·2 mm., *slightly longer than the sepals*, oblong, cuneate, apex rounded. Stamens about 3:4 mm.; anthers about 1 mm. long, obtuse. Siliquae 1–2×0·25–0·4 cm., oblong, compressed, ± rounded towards both ends, covered with bipartite-appressed hairs; valves 1-veined, subtorulose; style 1–1·5 mm. long, very thin or filiform, with minute, subconical, bilobed stigma; seeds uniseriate, about 3 mm. in diam. (including about 1 mm. broad membranous wing), orbicular; septum membranous, with a ± distinct mid-vein.

WEST PAKISTAN. Multan, *Ritchie* (E!); *Cunningham* (E!); (without locality), *J. L. Stewart* (E!, K!); Sibi, 90 m., *Lace* 3426 (E!, K!); Quetta, *Lace* 3400 (E!).

INDIA. Banks of Jamuna, *Hamilton* 1482 (E!); Hissar, *Drummond* 20358 (E!). Gurgaon, *Drummond* 20375 (E!); Sirsa, *Drummond* 20360 (E!); Kharghoda, by a cultivated field, only seen in one locality, *Saxton* 496 (K!).

I do not find any *F. Hamiltonii* from Afghanistan. There is every possibility of its occurring in the southern parts of W. Pakistan, but till now no one has recorded it except Woodrow from 'Sind' (Cooke, Fl. Bombay Pres. i, 31:1903) whose specimens I could not find in the British herbaria.

2. **F. Jacquemontii** Hook. fil. & Thom. in Journ. Linn. Soc. Bot. v, 148 (1861); Boiss., Fl. Or. i, 158 (1867); Hook. fil. & T. And., Fl. Brit. India, i, 140 (1872).

Syn.: *Heliophila incana* Burm. fil., Fl. Ind., 140, t.46 (1768).
Arabis heliophila DC., Syst. ii, 237 (1821) et Prodr. i, 147 (1824).
Farsetia heliophila Bunge in Cosson, Compend. Fl. Atlant. ii, 227 (1884); Bornmüller in Beih. Bot. Centr. lix, 289 (1939); Rech. fil. in Phyton, iii, 52 (1951).
F. macrantha Blatter & Hallb. in Journ. Bombay Nat. Hist. Soc. xxvi, 220 (1918).

Type: Punjab, Pind Dad Khan, *Jacquemont* (K!).

Subsp. **Jacquemontii**

Perennial (sometimes plants from arid regions looking like annuals), branched, often much so, hoary with bipartite-appressed hairs; hairs white and rough. Branches slender, spreading, 15–45 cm. long, often erect, Leaves linear-oblong, or linear, 1–6×0·1–0·7 (–1·2) cm. sessile, acute or subobtuse. Racemes 5–15-flowered, lax, ebracteate, increasing up to 20 cm. in fruit. Flower bud oblong-ellipsoid (5–)7–9 mm. long. *Flowers* 6–10 *mm. across*, orange-yellow or pale purple; pedicels 1–2 mm. long, increasing up to 5 mm. in fruits, filiform. Sepals (5–)6–9×1–2 mm., oblong, acute or subobtuse, equal, strigose. *Petals* 10–15(–20)×1·5–2·5 mm. *much longer than the sepals* (often about twice as long as the sepals), oblong-linear, apex rounded, margin entire, often crimped. Stamens 5–6:7–8 mm., anthers about 3 mm. long, linear, narrow, subobtuse. *Siliquae oblong, compressed*, 2–4·8×0·27–0·44 (–0·5) *cm., subsessile, with a l/b ratio of* 6·7–15 (*calculated mean*=10·15), *densely hairy with bipartite appressed hairs*; valves submembranous, with a distinct mid-vein; *style short, about* 0·5 *mm. long, slightly thickened*, with a conical, bilobed stigma; seeds 1–2-*seriate* ± orbicular, 2·5–3 mm. in diam. including 0·6–0·9 mm. broad, membranous, white wing; septum with distinct mid-vein and reticulate venation.

Very variable in leaf size, flower size and fruit size. Occurs widely throughout W. Pakistan, W. and N.W. India, East Afghanistan and Iran. The Griffith and Stocks specimens referred to *F. linearis* by Boissier belong here. See Table 1 for the specimens from the present area. Those marked with an asterisk belong to the other sub-species.

Subsp. **Edgeworthii** (Hook. fil. & Thom.) Jafri, **comb. et stat. nov.**

Syn.: *F. Edgeworthii* Hook. fil. & Thom. in Journ. Linn. Soc. Bot, v, 147 (1861).
F. aegyptia var. *gracilior* Boiss., Fl. Or. i, 159 (1867).

Type: Punjab (W. Pakistan), Salt Range, *Edgeworth* 1012 (K!).

Perennial, woody at the base; branches flexuous, slender, erect, covered with bipartite appressed white hairs. Leaves linear as in the type race. Racemes 5–10-flowered, lax, increasing up to 10 cm. in fruit. Flowers often large, usually larger than the type race. Petals usually 14–20 mm. long. *Siliquae short and broad, usually* 18–21 × 5–6·8 *mm., with a l/b ratio of* 3–4 (*calculated mean*=3·65), oblong, compressed; *seeds* ± *biseriate*, about 3 mm. in diam. including 0·7–0·9 mm. broad wings.

The material referred to *F. aegyptia* Turra in the Flora of British India belongs here. For specimens from the present area see the Table (only those specimens which are marked with an asterisk).

In the accomplishment of the present work I am highly indebted to Dr. P. H. Davis and Mr. B. L. Burtt. My thanks are also due to the authorities at Kew, British Museum and Edinburgh for facilities in consulting these herbaria.

References

BOISSIER, E., 1867. Flora Orientalis, i.

BUNGE, A., 1884. In Cosson, Compendium Florae Atlanticae, ii.

BURTT, B. L., 1948. On Farsetia Hamiltonii Royle. *Kew Bulletin*, 1948, 495.

—— & LEWIS, P., 1949. On the Flora of Kuweit. *Kew Bulletin*, 1949, 290.

HOOKER, J. D., & ANDERSON, T., 1872. Cruciferae in J. D. Hooker, Flora of British India, i.

—— & THOMSON, T., 1861. Praecursores ad floram indicam. *Journ. Linn. Soc. Bot.* v, 147.

RECHINGER, K. H., 1951. Cruciferae iranicae novae vel minus cognitae. *Phyton*, iii, 52.

TABLE I

MEASUREMENTS OF PETALS, SILIQUAE AND SEEDS IN FARSETIA JACQUEMONTII

(Note: 1=Uniseriate; S=Sub-biseriate; 2=Biseriate)

Specimen	Petal length in mm.	Mean petal length in mm.	Length of siliquae in mm.	Breadth of siliquae in mm.	Length/ breadth ratio of siliquae	Seriation of seeds	Width of seed wing] in mm.
(*Kew Herbarium*!)							
West Pakistan (mostly):							
Punjab							
1. Pind Dad Khan, *Jacquemont*	11–12	11·5	32	3·5	9·1	S	0·75
2. Ludhiana, *Thomson*	11–12	11·5	31	2·9	10·7	S–1	0·75
3. Ferozepore, *Thomson*	10	10	—	—	—	—	—
4. Multan, *Edgeworth*	14	14	—	—	—	—	—
5. *Drummond* 20374	—	—	23	3·3	6·9	S	0·5
6. *Drummond* 14T	14	14	—	—	—	—	—
7. *J. L. Stewart*	14	14	31	3·5	8·9	S	0·6
8. Jhelum, *Aitchison*	11	11	24	3·5	7	S	0·7
9. Multan, *Inayat*	—	—	35	3	11·7	S	0·6
10. *Drummond* 20381	14	14	—	—	—	—	—
11. *Drummond* 20364	13	13	—	—	—	—	—
12. *Drummond* 20361	14	14	28	3·5	8	S	0·7
13. *Drummond* 20362	11	11	24	3·3	7·3	S	0·7
14. Ludhiana, *Thomson*	13–14	13·5	30	3·8	8	S–2	0·75
15. *Drummond* 20380	13–14	13·5	—	—	—	—	—
16. *Drummond* 20378	13	13	—	—	—	—	—
17. *Drummond* 20379	14–17	15·5	25	3	8·3	S	0·7
18. *Drummond* 20376	14–17	15·5	32	3·3	10	S	0·7
19. *Salt range, *Edgeworth* 112	17–19	18	19	5·9	3·2	2	0·75
20. *Salt range, *Edgeworth* 140	18–20	19	20·5	6·8	3	2	0·7
21. **Edgeworth* 1012	17–18	17·5	21	6·5	3·2	2	0·8
22. *Drummond* 20365	10	10	—	—	—	—	—
23. *Drummond* 20366	10–12	11	—	—	—	—	—
24. *Drummond* 20367	10–11	10·5	—	—	—	—	—
25. *Griffith* 1498	10–11	10·5	20	3	6·7	S	0·8
N.W.F. Prov.							
26. Peshawar, *H. Deane*	13–14	13·5	—	—	—	—	—
27. *Khyber, *Qazilbash* 2466	15	15	18	6	3	2	0·9
Sind							
28. *Dalzell*	14–15	14·5	—	—	—	—	—
29. *Dalzell*	9–13	11	35	4	9	S	0·7
30. *Dalzell*	—	—	43	4·4	10	S–2	0·8
Baluchistan							
31. *Stocks* 432	10–11	10·5	38	4·3	8·8	S–2	0·9
32. Persian Baluchistan *Rechinger* 3913	14–	14	48	3·5	14	S–2	0·8
	10–11	10·5	36	4·3	8	S–2	0·9
Afghanistan							
33. **Griffith* 1497	14	14	20	5	4	2	0·7
34. **Griffith* 1495	12	12	20	5	4	2–S	0·9
35. **Johnston* 131	13–17	15	—	—	—	—	—
Persia							
36. *Bunge*	10–14	12	36·5	2·7	13·4	1–S?	0·6
	11–13	12	—	—	—	—	—
37. *Bornmüller* 89	12	12	45	3	15	S	0·6

TABLE I—*continued*

Specimen	Petal length in mm.	Mean petal length in mm.	Length of siliquae in mm.	Breadth of siliquae in mm.	Length/ breadth ratio of siliquae	Seriation of seeds	Width of seed wing in mm.
(*Edinburgh Herbarium*!)							
Punjab							
38. *Drummond* 30362	12	12	25	3	8·3	S	0·7
39. *Drummond* 20378	12	12	25	3	8·3	S–1	0·7
40. *Drummond* 20365	10	10	—	—	—	—	—
41. *Drummond* 20361	14	14	24	3	8	S	0·7
42. *Drummond* 20364	14–15	14·5	45	3	15	1–S	0·7
43. *Drummond* 20374	—	—	24	3	8	1–S	0·7
44. *Thomson*	12–13	12·5	27	3	9	1–S	0·7
45. Multan, *Edgeworth* 29	13–14	13·5	50	4	12·5	S	0·85
46. Montgomery, *Lace*	12–13	12·5	40	3	13·3	1–S	0·7
	15–16	15·5	36	3	12	1–S	0·7
47. Baghanwalla, *Fleming*	—	—	28	3	9·3	S	0·75
48. *J. L. Stewart*	—	—	28	3	9·3	S	0·75
49. Lahore, *S. Das* 12	13	13	28	2·8	10	1–S	0·7
50. *Anderson* 63	—	—	27	3	9	1–S	0·7
51. Ferozepore, *Madden*	14–15	14·5	—	—	—	—	—
52. **J. L. Stewart*	—	—	18	5	3·6	2	0·85
N.W.F. Prov.							
53. Landikotal, *Lowndes* L691	17–18	17·5	—	—	—	—	—
54. *Landikotal, *Lowndes* L691	15–17	16	19	5	3·8	2	0·8
Baluchistan							
55. *Lace* 3504	10	10	—	—	—	—	—
Afghanistan							
56. **Johnston* 131	18–21	19·5	18	5	3·6	2	0·8
57. **Johnston* 109	18–22	20	—	—	—	—	—
Persia							
58. *Bornmüller* 89	10–12	11	—	—	—	—	—