

Scrophulariaceae in the flora of Egypt

1. Systematic revision of the indigenous taxa

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The indigenous taxa of Scrophulariaceae represented in the flora of Egypt were systematically revised. This revealed the presence of 50 species belonging to 16 genera, 8 tribes and 3 sub-families. *Kickxia gracilis*, *K. pseudoscoparia*, *Scrophularia sinaica*, *Veronica scardica* and *V. rubrifolia* are new records to the flora of this country.

For each species, valid name, synonyms (if any), type, distribution (local and global) and selected specimens are given. A key for the genera of the family, keys for species belonging to genera with more than one species; and for the infra-specific taxa of polymorphic species are provided

Key words: Flora of Egypt, Scrophulariaceae, indigenous taxa, *Kickxia gracilis*, *K. pseudoscoparia*, *Scrophularia sinaica*, *Veronica scardica*, *V. rubrifolia*.

Introduction

Scrophulariaceae is a large family comprising about 292 genera and nearly 3000 species of cosmopolitan distribution; consisting mainly of herbs and few shrubs and lianas. The members of the family are generally recognized by their typically bilateral symmetric tubular flowers, (\pm actinomorphic in *Verbascum*) and their many-seeded capsular fruits. The family is of limited economic use, the best known applications are the drugs Digitalin and Digoxin extracted from species of *Digitalis*. Many genera are well known as garden ornamentals as species of *Antirrhinum* and *Veronica*.

Scrophulariaceae was the subject of numerous systematic treatments since Jussieu (1789). Among the most important treatments are those of Brown (1810), De Candolle (1815), Wettstein (1895), Hutchinson (1948), Melchior (1964) and Richardson (1978).

Olmstead & Reeves (1995), used the chloroplast genes *rbc L* & *ndh F*, to study the phyletic relations among Scrophulariaceae. Their results indicated that the two distinct clades (Scroph. I & Scroph. II) were composed of elements of the tradition monophyletic Scrophulariaceae Bremer *et al.* (1998), classified the Scrophulariaceae under order

Lamiales and it was claimed to be biphyletic and that each of the two subgroups is more closely related to the other families of Lamiales than they to each other.

According to Täckholm (1974), Scrophulariaceae is represented in Egypt by 18 genera and about 60 species. El Hadidi & Fayed (1994/95) recognized 17 genera comprising 60 species, while Boulos (1995) enumerated 62 species and 17 genera.

Systematic Treatment

I. Synopsis of the Egyptian taxa of Scrophulariaceae

The taxa are arranged to the generic level according to the system proposed by Wettstein (1895), with some modifications adopted by Melchior (1964). Species names preceded by two asterisks [**] are new records to the flora of Egypt.

I. Subfamily: *Verbascoideae* Melch., pro part.

I.A. Tribe: *Verbasceae* Benth.

1. *Verbascum* L.

- 1.1 *V. sinaiticum* Benth.
- 1.2 *V. sinuatum* L.
- 1.3 *V. eremobium* Meurb.
- 1.4 *V. fruticosum* Post
- 1.5 *V. letourneuxii* Asch.
- 1.6 *V. schimperianum* Boiss.

2. *Celsia* L.

- 2.1 *C. parviflora* Decne.

I.B. Tribe: *Aptosimeae* Benth.

3. *Anticharis* Endl.

- 3.1 *A. arabica* Endl.
- 3.2 *A. glandulosa* Asch.
- 3.3 *A. linearis* (Benth.)K.Hochst. ex Asch.

II. Subfamily: *Scrophularioideae* Melch., pro part

II.C. Tribe: *Gratiroleae* Benth.

4. *Lindenbergia* Lehm.

- 4.1 *L. indica* (L.) Vatke

5. *Bacopa* Aubl.

- 5.1 *B. monnieri* (L.)Pennell

6. *Peplidium* Delile

- 6.1 *P. humifusum* Delile

7. *Limosella* L.

- 7.1 *L. aquatica* L.

8. *Lindernia* All.

- 8.1 *L. parviflora* (Roxb.)Haines

II.D. Tribe: *Manuleae* Benth.

9. *Jamesbrittantia* Kuntze

- 9.1 *J. dissecta* (Delile)Kuntze

II.E. Tribe: *Antirrhineae* Chav.

10. *Anarrhinum* Desf.

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- 10.1 *A. forsskaohlii* (J.F.Gmel.)Cufod.
- 11. *Misopates* Raf.
 - 11.1 *M. orontium* (L.)Raf.
- 12. *Kickxia* Dumort.
 - 12.1 *K. elatine* (L.)Dumort.
 - 12.2 *K. floribunda* (Boiss.) Täckh. & Boulos
 - 12.3 *K. aegyptiaca* (L.)Nabelek
 - 12.4 *K. acerbiana* (Boiss.) Täckh. & Boulos
 - 12.5 *K. nubica* (Skan)Dandy
 - 12.6 *K. macilenta* (Decne)Danin
 - ** 12.7 *K. gracilis* (Benth.)D.A.Sutton
 - ** 12.8 *K. pseudoscoparia* V.W.Smith & D.A.Sutton
 - 12.9 *K. hastata* (R.Br.ex Benth.)Dandy
- 13. *Linaria* Mill.
 - 13.1 *L. haelava* (Forssk.)F.Dietr.
 - 13.2 *L. joppensis* Bornm.
 - 13.3 *L. albifrons* (Sm.)Spreng.
 - 13.4 *L. simplex* Desf.
 - 13.5 *L. tenuis* (Viv.)Spreng.
- II.F. Tribe: **Scrophularieae** Melch.
 - 14. *Scrophularia* L.
 - 14.1 *S. arguta* Sol.
 - 14.2 *S. deserti* Delile
 - **14.3 *S. sinaica* Benth.
 - 14.4 *S. canina* L.
 - 14.5 *S. hypericifolia* Wydler
 - 14.6 *S. libanotica* Boiss.
- III. Subfamily **Rhinanthoideae** Wettst.
 - III.G. Tribe: **Veroniceae** Benth.
 - 15. *Veronica* L.
 - 15.1 *V. anagalloides* Guss
 - 15.2 *V. Anagallis- aquatica* L.
 - **15.3 *V. scardica* Griseb.
 - 15.4 *V. catenata* Pennell
 - 15.5 *V. kaiseri* Täckh.
 - 15.6 *V. musa* Täckh. & Hadidi
 - 15.7 *V. persica* Poir.
 - 15.8 *V. polita* Fr.
 - 15.9. *V. campylopoda* Boiss.
 - **15.10. *V. rubrifolia* Boiss.
 - III.H. Tribe: **Buchnereae** Benth.
 - 16. *Striga* Lour.
 - 16.1 *S. hermonthica* (Delile) Benth.
 - 16.2 *S. asiatica* (L.)Kuntze

II. Key to the genera of Scrophulariaceae

1.a.	Plant glabrous	2
b.	Plant hairy	4
2.a.	Subaquatic, stemless herb.....	7. <i>Limosella</i>
b.	Terrestrial, stemmed herbs.....	3
3.a.	Calyx campanulate; corolla bi-labiate, stamens 2, dilated at base ..	6. <i>Peplidium</i>
b.	Calyx of unequal sepals; corolla campanulate; stamens 4, filiform ...	5. <i>Bacopa</i>
4.a.	Corolla rotate or tubular and dilated above	5
b.	Corolla bi-labiate	9
5.a.	Corolla rotate	6
b.	Corolla tubular and dilated above.....	8
6.a.	Plants with unbranched hairs; leaves mostly opposite; calyx and corolla 4-merous; stamens 2.	15. <i>Veronica</i>
b.	Plants with branched hairs; leaves mostly alternate; calyx and corolla 5-merous; stamens 4 or 5	7
7.a.	Leaf margin entire; stamens 4	2. <i>Celsia</i>
b.	Leaf margin crenate, sinuate, dentate to undulate; stamens 5	1. <i>Verbascum</i>
8.a.	Leaves with entire margin; flowers bracteolate; stamens 2, with half moon-shaped uni-celled anthers	3. <i>Anticharis</i>
b.	Leaves with dentate or incised margin; flowers ebracteolate; stamens 4, with reniform uni-celled anthers	9. <i>Jamesbrittania</i>
9.a.	Plant semiparasitic, with scabrous texture, turns to black when dry....	16. <i>Striga</i>
b.	Plant non parasitic, with soft hairy texture, remains green when dry	10
10.a.	Corolla spurred or gibbous at base	11
b.	Corolla neither spurred nor gibbous	14
11.a.	Corolla spurred	12
b.	Corolla gibbous	13
12.a.	Leaves sessile, linear-oblong; flowers in terminal raceme; capsule opens by apical irregular teeth	13. <i>Linaria</i>
b.	Leaves petiolate, often hastate or sagitate; flowers solitary in leaf axils; capsule often opens by 2-circular lid or with 1-3 valves	12. <i>Kickxia</i>
13.a.	Inflorescence of spike-like racemes; calyx of 5 unequal sepals; corolla with prominent sulcate palate, closing the tube- mouth; stamens 4, fertile, with divergent bi-celled anthers	11. <i>Misopates</i>
b.	Inflorescence of paniculate or thyrose-like cymes; calyx of 5 subequal sepals; corolla without palate; stamens 4, with confluent bi-celled anthers, staminode one or sometimes absent	14. <i>Scrophularia</i>
14.a.	Stamens 2, with divergent bi-celled anthers, staminodes 2, stigma bi-lamellate	8. <i>Lindernia</i>
b.	Stamens 4, with either confluent or stipitate bi-celled anthers, stigma clavate to capitate	15
15.a.	Leaves opposite, petiolate; anthers stipitate bi-celled; seed coat with hooked, thickened ridges	4. <i>Lindenbergia</i>
b.	Leaves alternate, or the lower leaves opposite, sessile; anthers confluent bi-celled; seed coat tuberculate	10. <i>Anarrhinum</i>

III. Systematic Revision

The present revision is based on collections kept in CAI, CAIM and K (abbreviations of Index Herb. ed.8,1990), as well as on fresh materials collected by the authors from localities in the Mediterranean coastal-land, Libyan, Isthmic and Arabian Deserts, Faiyum Governorate and Sinai. Phytogeographical territories for the selected specimens are those proposed by El-Hadidi (1980), Fig. (1).

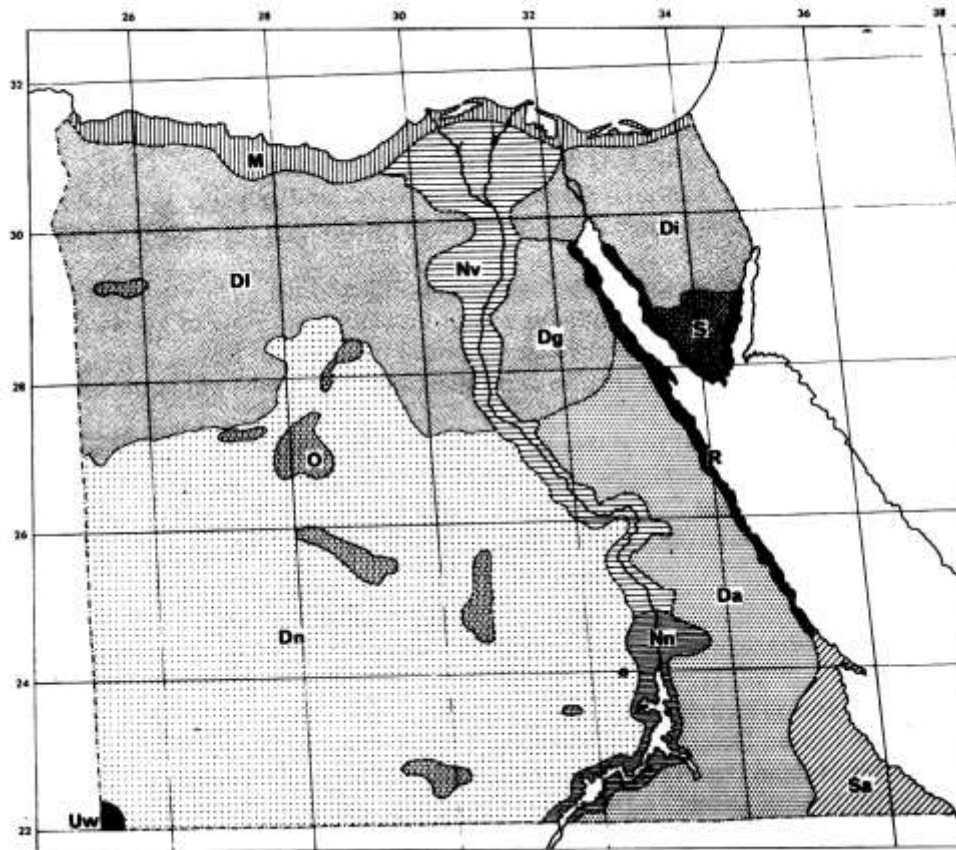


Fig. (1). Phytogeographical subdivisions of Egypt (after El Hadidi, 1980). (M) Mediterranean coastal belt, (DI) Libyan Desert, (Dn) Nubian Desert, (Di) Isthmic Desert, (Dg) Galala Desert, (Da) Arabian Desert, (Nv) Nile Valley sector of the Nile-land, (Nn) Nile nubian sector of the Nile land, (O) Oases of (DI) & (Dn), (S) Southern mountainous Sinai, (R) Red Sea coastal plains, (Sa) Gebel Elba district; (Uw) Gebel Uweinat area.

Note: According to Täckholm (1974:483-501), Scrophulariaceae is represented in Egypt by 18 genera and 59 species; among which *Sutera glanulosa* Roth (op. cit.:494) is treated here as *Jamesbrittania dissecta* (Delile) Kuntze. *Schweinfurthia aptera* Vatke was reported by Täckholm (op. cit.:499) as a very rare species in Gebel Elba district; based on collections from Gebel Asotriba (from the Gebel Elba group) which is not an Egyptian territory. This taxon is mainly known from C. and N.E. Africa (Sutton, 1988:141) and its occurrence in Egypt is doubtful. *Parentucellia viscosa* (L.) Caruel was reported by Täckholm (op. cit.:501) as a very rare weed in the Nile Delta. No material was available for this revision.

1. *Verbascum* L., Sp. Pl.ed. 1:177 (1753).

A large genus of about 360 species widely distributed in Europe, North Africa, West, Central and Temperate Asia.

Key to the species

- 1.a. Flowers ebracteolate 2
- b. Flowers bracteolate 3
- 2.a. Flowers sessile, pedicels up to 2.5 mm long,
 indumentum of yellowish-white, branched hairs 6. *V. schimperianum*
- b. Flowers pedicellate, pedicels 3-8 mm long, indumentum of
 white stellate hairs 5. *V. letourneuxii*
- 3.a. Flowers arranged in racemose inflorescence 4
- b. Flowers arranged in axillary clusters on terminal flowering branches 5
- 4.a. Pedicels 5-10 mm long, subtended by bracteoles nearly on
 the middle part of the pedicel, corolla 8 mm long 3. *V. eremobium*
- b. Pedicels 1-3 mm long, subtended by bracteoles nearly at
 the base of the pedicel, corolla 10-12 mm long 4. *V. fruticosum*
- 5.a. Upper leaves auriculate-decurrent or not; flowers arranged in
 compact axillary clusters on leafy flowering branches; cluster
 consists of 3-7 flowers at each node 1. *V. sinaiticum*
- b. Upper leaves amplexicaul-decurrent; flowers arranged in lax
 axillary clusters; cluster consists of 2-3 flowers at each node 2. *V. sinuatum*

1.1 *Verbascum sinaiticum* Benth., in DC. Prodr 10:236(1846); Boiss., Fl.Orient. 4:318(1879); Täckh.,Stud.Fl.Egypt ed. 2:486(1974); Abdallah *et al.*, Notes A.R.C. Herb.Egypt 6 : 189 (1984); El Hussein & Zareh, in Täckholmia 12:65(1989).

Type: in deserto Sinaitico et in montis Sinai Humidis, *Ehrenberg*.

V. fasciculatum Ehrenb.ex Sweet,Hort.Brit.ed.2:381 (1830).

Distribution:

Confined in Egypt to the wadi beds of Ithmic Desert and mountainous Sinai. Known from S.W.Asia, Arabian Peninsula and Tropical E. Asia.

Selected specimens:

(Di) Desert entree Suez et Giza; 9.2.1833; *Bové 77* (K)–(S) near the monastery of St. Catherine; 10.5.1965; *El Hadidi* s.n. (CAI).

1.2. *Verbascum sinuatum* L., Sp. Pl.ed. 1:178(1753); Boiss., Fl.Orient. 4:233 (1879); Täckh., Stud. Fl.Egypt ed. 2:486 (1974).

Type: Monspelii, Florentiae, specimen no. 242/7 (LINN, microfiche !)

V. undulatum M.-Bieb., Fl.Tour.Caucas. 1:161(1808), non Lam.

Distribution:

Outskirts of the Desert of Nile Delta, recorded once from Dakhla Oasis. Known from N. Africa, eastwards to S.W.Asia.

Selected specimens:

(Nv) Belbeis-Cairo road; 3.2.1880; *Schweinfurth* s.n. (CAI)–(O) Dakhla Oasis, Ezbet Fatyma; 13.4.1928; *Simpson 6026* (CAIM).

1.3. *Verbascum eremobium* Murb., Monogr. Verbascum, Lunds Univ. Arsskr. Avd.2, Bd. 29(2):458(1933).

a. var. subsinguliflorum Murb. ex Täckh. in Svensk. Bot. Tidskr. 36:249(1942); Täckh., Stud. Fl. Egypt ed. 2:486(1974); Abdallah *et al.*, Notes A. R. C. Herb. Egypt 6:188(1984).

Type: Sinai; Darb El Hagg at Sudur El Heitan; May 1939; *Drar 693* (CAIM).

Distribution:

Confined to the wadi beds of Isthmic Desert, Sinai. Known from S.W. Asia.

Selected specimens:

(Di) Wadi Ein El Gedeirate; 6.4. 1939; *Drar* s. n. (CAIM), North of Qusaima from Eoga; 26.5. 1998; *E. Shamsa* s. n. (CAI).

1.4. *Verbascum fruticosum* Post, in Bull.Herb.Boissier 1(8):403 (1893); Täckh., Stud.Fl.Egypt ed.2.:485(1974); Abdallah *et al.*, Notes A.R.C. Herb. Egypt 6:188(1984); El Husseini & Zareh in Taeckholmia 12:65(1989).

Type: Wadi en-Nar between Jerusalem and Mar saba; July 1892; *Post 237* (BEI).

V. neglectum Defler & Sickenb., Mém.Inst.Egypt. 4,2:263(1901).

Type: Sinai, Wadi El Hagg; 1892; *Deflers*.

Distribution:

Confined to N. Sinai. Known from S.W. Asia.

Selected specimens:

(M) 17 km E. of El Arish, on the road to Rafah; 18.4.1985; *Gibali* s.n. (CAI)–(Di) Ain El Gedeirate, 12.4.1929; *Shabetai* z 151 (CAIM).

1.5. *Verbascum letourneuxii* Asch., in Asch. & Schweinf., Ill. Fl. Egypte 2:114,189 (1887) “*tourneuxii*”; Täckh., Stud. Fl. Egypt ed 2:485(1974); Abdallah et al., Notes A.R.C.Herb Egypt 6:189(1984); El Hussein & Zareh in *Taeckholmia* 12:65(1989).

Type: in apricis calcareo prop Qom Rakouni et Matronka; April (1879); *Letoureux* 325 (P).

V. spinosum Delile, Descr. Egypte, Hist. Nat .55, no 237 ,(1813), non L.

Distribution:

Common along the Mediterranean coastal land, southwards in the Isthmic and Libyan Deserts. Known from Libya.

Selected specimens:

(M) The plateau of Sallum; 21.4.2973; *Amin et al.* (CAI); Matruh- Siwa road, 194 km N. Siwa oasis; 3.5.1988; *A.Fahmy* 1071 (CAI)–(Di) : Ain Gadis, N. Sinai; 14.9.1928; *Drar* s.n. (CAI & CAIM).

1.6. *Verbascum schimperianum* Boiss., Diagn. Pl. Orient. ser. 1(2) 12:11(1853); Boiss., Fl. Orient. 4:341(1879); Täckh., Stud. Fl. Egypt ed. 2:486(1974); Abdallah et al.,Notes A.R.C. Herb. Egypt 6:189(1984); El Hussein & Zareh in *Taeckholmia* 12:65(1989).

Type: In Arabia petraea; 1835: *Schimper* s.n. (G).

Distribution:

Confined to the sand plains and rocky wadi beds of the Isthmic Desert and mountainous southern Sinai. Known from S.W. Asia.

Selected specimens:

(Di) Ain El Gedeirate; 7.11.1926; *Drar* 413 (K)–(S) Wadi Isla; April 1940; *Hassib* s.n. (CAI).

2. *Celsia* L. Sp. Pl. ed. 1:621(1753).

A genus of about 60 species, distributed in the Mediterranean region, India, Ethiopia and South Africa.

- 2.1** *Celsia parviflora* Decne., in Ann. Sci. Nat. Bot. ser. 2, 2:254(1834); Fl. Orient. 4:354(1879); Täckh., Stud. Fl. Egypt ed. 2:486(1974).

Type: Desert du Sinai; 7.1832; *Bové* 70 (K).

Verbascum decaisneamum Kuntze, Revis.Gen. Pl. 2:468(1891); Feinbrun, Fl. Palaest. 3:180, tab. 299(1978); El Hussieni & Zareh in Taekholmia 12:65(1989).

Distribution:

Confined to the wadi beds of mountainous southern Sinai. Known from S.W. Asia.

Selected specimens:

(S) Desert du Sinai; 7.1832; *Bové* 70 (K) Wadi El Arbaain, St. Catherine; 18.5.1988; *Kassas* s.n. (CAI).

3. *Anticharis* Endl., Gen.Pl.9:682(1839).

A genus of about 14 species, known mainly from Tropical and South Africa; some species extending their distribution eastwards to Arabian Peninsula and western India.

Key to the species

- 1.a. Leaves sessile, linear to linear-elliptic 3. *A. linearis*
- b. Leaves petiolate or attenuated into a petiole, ovate or elliptic 2
- 2.a. Sepals oblong; corolla up to 10 mm long; capsule beaked at apex, twice as long as calyx 1. *A. arabica*
- b. Sepals oblanceolate-elliptic, corolla 13-14 mm long capsule acuminate at apex, equal or slightly longer than calyx 2. *A. glandulosa*

- 3.1. *Antichris arabica*.** Endl., in Endl. et Fenzl, Nov.Strip. Dec. 3:23(1839); Boiss., Fl. Orient.4:422(1879); Täckh., Stud.Fl.Egypt ed.2:494(1974).

Type: Arabian Felix, Unio itineraria, 1837; *Schimper* 748 (G, Syntype)

Distribution:

Confined to the rocky habitats of Gebel Elba district and southern reaches to the Arabian Desert. Known from Nubia of the Sudan Republic, Ethiopia, southern Arabia, eastwards to Afghanistan.

Selected specimens:

(Da) Little gully, Wadi El Allaqi; 27.1.1963; Täckholm *et al.* 137 (CAI)–(Sa) Wadi Aak, Elba district; 27.1.1962; Täckholm *et al.* 809 & 810 (CAI).

3.2. *Anticharis glandulosa* Asch., Monatsber. K. Akad. Wiss. Berlin 880 (1866); Boiss., Fl. Orient. 4:423(1879); Täckh., Stud. Fl. Egypt ed.2:494(1974); El Hussieni & Zareh in Taekholmia 12:65(1989).

Type: Aegyptus Superiore; *Schweinfurth* (B).

Distribution:

Recorded from the coastal mountains and plains of Gebel Elba district. Also known from Pakistan, Arabian Peninsula, the Sudan Republic and Iran.

Selected specimens:

(Da) Wadi Eneb, between Koseir and Ras Banas; 1864; *Schweinfurth* 149 (K)–(R) Gebel Samuki, Red Sea coast; 6.2.1961; *Täckholm et al.* 314 & 235 (CAI)–(Sa) Gebel Elba district, Wadi Haiteem; 27.1.1962; *Täckholm et al.* 767 (CAI).

3.3. *Anticharis linearis* (Benth.) Hochst. ex Asch., Monatsber. K. Akad. Wiss. Berlin 882(1866); Boiss., Fl. Orient. 4:423(1879); Täckh., Stud. Fl. Egypt ed. 2:494(1974); Hepper & Friis, Pl. Forssk. Fl. Aegypt.-Arab. 227(1994).

Doratanthera linearis Benth., in DC. Prodr. 10:347(1846).

Type: in Senegambia; *Leprieur*

Antirrhinum linearia sensu *Forssk.*, LXVIII no 300, non L.

Type: Cairo garden; 1762; *Forsskal* 950 (C)

Distribution:

Rare in wadi beds of Gebel Elba district and southern coastal plain of the Red Sea. Known from the Sudan Republic, Iran and Pakistan.

Selected specimens:

(R) Gebel Hamata, Red Sea coast; 7.2.1961; *Täckholm et al.* 326(CAI)–(Sa) Gebel Elba district, wadi Haiteem; 27.1.1961; *Täckholm et al.* 757 (CAI).

4. *Lindenbergia* Lehm., Sem. Hort. Bot. Hamburg. 8(1829).

A genus of about 12 species distributed in N.E. Africa, Arabian Peninsula and E. Asia.

4.1. *Lindenbergia indica* (L.) Vatke, in Oesterr. Bot. Z. 25:10(1875)

Dodartia indica L., Sp. Pl. ed. 1:633(1753)

Type: India Orientalis, specimen no. 800/3 (LINN, microfiche !)

Bovea sinaica Decne., in Ann. Sci. Nat. Bot. ser. 2, 2:253(1834).

Lindenbergia sinaica (Decne.) Benth., Scroph. Ind. 22(1835); Boiss., Fl. Orient. 4:425(1879); Täckh., Stud. Fl. Egypt ed. 2:494(1974).

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Type: Egypte; Sinai desert, vi.1832; *Bové* 64 (P, microfiche !).

Lindenbergia abyssinaica Hochst. Ex Benth., in DC.Prodr.10:377 (1846); Täckh., Stud. Fl. Egypt ed. 2:494(1974).

Lindenbergia sinaica Decne. var. *abyssinaica* (hochst. Ex Benth.). Almagia, in Ann.Ist. Roma,8(2):140(1904).

Type: Ethiopia; *Schimper* 782 (G, Lectotype; microfiche !)

Distribution:

Common in the wadis and the coastal plains of Eastern Desert, Gebel Elba district and mountainous southern Sinai. Known from the Sudan Republic, Eritrea, Ethiopia, Somalia, Saudi Arabia, Jordan, Yemen, Oman, Pakistan and India.

Selected specimens:

(Dg) Wadi Ataqa, S. of Suez; 8.3.1954; *El Hadidi* s.n. (CAI)–(S) Sinai, wadi Isla 16.4.1937; *Shabetai* z 4188 (K & CAIM); Dahab, Sharm El Shiekh; Nov. 1998; *E.Shams* s.n. (CAI)–(R) Red Sea coast, Khor Gebel El Faraiyed; 12.2.1961; *Täckholm et al.* 924 & 975 (CAI)–(Sa) Gebel Elba district, Gebel Shandodai; 10.2.1962; *Täckholm et al.* 1979 (CAI).

5. *Bacopa* Aubl. Hist.Pl.Guiane 128,t.48 (1775)

A genus of about 100 species in tropical and subtropical region.

5.1. *Bacopa monnieri* (L.) Pennell, in Proc.Acad.Nat.Sci.Philad. 98:94(1946); Täckh., Stud. Fl. Egypt ed. 2:496(1974); Hepper & Friis, Pl.Forssk.Fl.Aegypt.Arab. 227 (1994).

Type: South America, *Hallman*.

Lysimachia monnieri L., Cent.Pl. 2:9(1756).

Gratiola monnieri (L.) L., Syst.Nat.ed.10:851(1759).

Limosella calycina Forssk., Fl.Aegypt.-Arab. 112(1775).

Type: Yemem; ad Uadi Zebid., *Forsskal*

Distribution:

Weed in moist places and along canal banks of the Nile Delta and its outskirts in the Isthmic Desert. Known from the Tropics of both hemispheres.

Selected specimens:

(Nv) 20 km N. of Tanta; 21.9.1993; *El Garf* s.n. (CAI); El Gheita, Markaz Bilbeis, near the road to Ismailia; 10.9.1966; Täckholm *et al.* s.n. (CAI)–(Di) Suez, El Arbaain; 25.7.1936; *Shabetai* z 6039 (CAIM).

6. *Peplidium* Delile, Descr. Egypte, Hist. Nat. 2:149 (1813)

A genus of two species (Muschler 1912, p.874) of which one is widely distributed over the warmer parts of Asia and Africa.

6.1. *Peplidium humifusum* Delile, Descr. Egypte, Hist. Nat. 2:148, pl.4, fig.2 (1813); Boiss., Fl. Orient. 4:427(1879); Täckh., Stud. Fl. Egypt ed.2:496 (1974).

Type: Les champs humides de Damiette, *Delile*.

Hedyotis maritima L.f., Suppl. Pl. 119 (1781).

Type: India Orientalis, *K.Koenig*.

Distribution:

Weed in moist places and along canal banks of the Nile Delta and its outskirts in the Isthmic Desert .

Known from the Tropics and subtropics of the Old World.

Selected specimens:

(Nv) 20 km N. Tanta; 21.9.1993; El Garf s.n.(CAI)–(Di) El Qantara El Gharbiya, Ismailia; 20.8.1981; *A. Amer* 285(CAI).

7. *Limosella* L. Sp. Pl. ed. 1:631(1753).

A cosmopolitan genus of 15 species.

7.1. *Limosella aquatica* L., Sp. Pl. ed.1:631(1753); Boiss., Fl. Orient. 4:428(1879); Täckh., Stud. Fl. Egypt ed. 2:496(1974).

Type: in Europae septentrionalis inundatis, specimen no. 7941/1 (LINN, microfiche!)

Distribution:

Rare weed along irrigation canals of the Nile Delta. Widespread in Temperate Europe and Asia eastwards to Japan, Temperate N. America and N. Africa.

Selected specimens:

(Nv) Zawiyet El Aryan, near Giza; 9.2.1923; *Simpson* 1793(CAIM).

8. *Lindernia* All. Melanges Philos.Math.Soc.Roy.Turin (Misc.Taur.) 3(1): 178(1766).

A genus of about 80 species in the Tropics and Subtropics of the Old World.

8.1 *Lindernia parviflora* (Roxb.) Haines, Bot. Bihar Orissa. 4:635(1922); Täckh., Stud.Fl.Egypt ed.2:500 (1974)

Gratiola parviflora Roxb., Pl.Coromand. 3:3, t.203(1819).

Type: In India Orientali frequens a Peninsula, *Wight* 2200 (CAL)

Distribution:

Recorded once along the Nile banks north of Aswan. Also known from Tropics of the Old World.

Selected specimens:

(Nv) Nile bank near Gebel Silsila, Kom Ombo; 11.2. 1964; *Täckholm et al.* 93 (CAI).

9. *Jamesbrittania* Kuntze, Revis.Gen.Pl. 2:466 (1891).

A monotypic genus, in the Tropics of the Old World and Australia.

9.1. *Jemesbrittania dissecta* (Delile) Kuntze, Revis. Gen.Pl. 2:466(1891).

Capraria dissecta Delile, Descr. Egypte, Hist. Nat.2:239, pl. 32, fig.3(1813).

Type: Les champs marecageux, ensemences, a deux lieues de Belbeys, le 15.2.1801; *Delile*.

Sutura dissecta Walp., Repert.Bot.Syst. 3(2):271(1844).

S. glandulosa Roth, Nov.Pl.Sp. 291(1821); Boiss., Fl.Orient. 4:422 (1879); Täckh., Stud. Fl. Egypt ed. 2:494(1974).

Distribution:

Banks of the Nile at Aswan area. Known from N. & C. Sudan, Arabian Peninsula, India and Australia.

Selected specimens:

(Nn) Kom Ombo, G. Silsila, at the Nile; 11.2.1964; *Täckhlom et al.* s.n. (CAI); Aswan Dam; 29.9.1926; *Drar* 4229 (CAIM).

10. *Anarrhinum* Desf. Fl.Atl.2:51 (1798), Nom.Cons.

Simbuleta Forssk., Fl.Aegypt.-Arab. 115(1775).

A genus of about 12 species in S. & W. Europe, N. Africa and S.W. Asia.

10.1. *Anarrhinum forsskaohlii* (J.F.Gmel.) Cufod., Bull. Jard. Bot. Bruxelles 33 (4Suppl.):891(1963).

Key to the subspecies

- a. Plant glandular pilose; basal leaves spatulate with 3-5(-8) teeth at upper half of the leaf, upper leaves linear-oblancoelate, with entire margin, sometimes trisect subsp. *forsskaohlii*
 - b. Plant subglabrous to glandular pubescent; all leaves oblancoelate to oblancoelate-linear, with entire margin subsp. *pubescens*
- ** a. subsp. *forsskaohlii*

Hepper & Friis, Pl.Forssk.Fl.Aegypt.-Arab.227(1994). *Simbulata forsskaohlii* J.F.Gmel., Syst.Nat. 2:242(1791).

Type: Yemen, in monte Kurma tantum, 1763, *Forsskal* s.n.(C).

Distribution:

Confined to mountainous southern Sinai. Known from N.E. Africa, E. Mediterranean and S.W.Asia.

Selected specimens:

(S) Wadi El Arbaain, April 1940; *Hassib* s.n. (CAI); Stepway on Gebel Musa; 22.4.1961; *Täckholm et al.* s.n. (CAI).

- b. subsp. *pubescens* (Fresen.) D.A. Sutton, Rev.Tribe Antirr.258 (1988).
A. pubescens Fresen., Beitr. Fl. Aegypt. 1(1):89(1834); Boiss., Fl. Orient. 4:363(1879); Täckh., Stud.,Fl.Egypt ed.2:486(1974); Abdallah *et al.*, Notes A.R.C. Herb. Egypt 6:185(1984); El Hussein & Zareh in *Taeckholmia* 12:66(1989).

Type: In monte Sinai, 1832; *Bové* 71 & 74 (P, syntype).

Simbulata pubescens Wettst., in Engl. & Prantl, Nat.Pflanzenfam. 4(3b): 60(1895).

Distribution:

Endemic to mountainous southern Sinai.

Selected specimens:

(S) Entre le debis granatique, Montis Sinai; Juin 1832; *Bové* 71 (K) Ras Safsafa near the entrance of Wadi El Arbaain; 23.4.1961; *Täckholm et al.* s.n. (CAI).

11. *Misopates* Raf.,Autik.Bot. 158(1840)

A genus which comprises about 7 species in Europe, N. Africa, W. Atlantic Islands, S.W. & S.C. Asia.

Note: According to Täckholm (1974:491, 493) *Misopates orontium* (= *Antirrhinum orontium*) is represented in Egypt by var. *orontium* which is a common weed of the farmland, and var. *abyssinium* Hochst. ex A. Rich. which is a very rare species in Gebel Elba district. The differences in leaf size and the number of flowers/inflorescence are not justifying their treatment as distinct varieties.

11.1. *Misopates orontium* (L.) Raf., Autik. Bot. 158(1840); Abdallah *et al.*, Notes A.R.C. Herb. Egypt 6:186(1984); El Hussein & Zareh in Taekholmia 12:66(1989).

Antirrhinum orontium L., Sp. Pl. ed. 1:617(1753); Boiss., Fl. Orient. 4:385(1879); Täckh., Stud. Fl. Egypt ed. 2:491(1974).

Type: In Europae agris et arvis, Specimen no. 767/61 (LINN, microfiche !).

Distribution:

Weed in fields, roadsides and waste places, also in sand plains, wadi beds and rocky slopes of the desert. Known from S.W. Asia.

Selected specimens:

(M) El Maqatala, between M. Matruh & Sidi Barani; 22.4.1973; A. Amin *et al.* s.n. (CAI); Rafah, near station; 22/3/1928; G. Täckholm s.n. (CAI)–(Di) Ismailia, as weed in a park along the canal; 18.3.1927; G. Täckholm s.n. (CAI)–(Dg) Wadi Amloug, 60 km south of Suez; 26.2.1964; Kassas s.n. (CAI)–(Nv) Along the road to Bilbais; 27.3.1968; V. Täckholm s.n. (CAI)–(O) Kharga Oasis, near Hibis Temple; 7.2.1952; Täckholm & Kassas 21 (CAI)–(S) Wadi Isla; April 1940; Hassib s.n. (CAI)–(R) Gebel Hamata, Red Sea coast; 7.2.1961; Täckholm *et al.* s.n. (CAI)–(Sa) Gebel Elba district, G. Shandodai; 10.2.1962; V. Täckholm *et al.* s.n. (CAI).

12. *Kickxia* Dumort., Fl. Belg. 35(1827)

A genus of about 46 species distributed in Mediterranean N. Africa, Tropical Africa, also in Europe and S.W. Asia and India (Sutton, 1988).

Note: According to Täckholm (1974:490-91), *Kickxia* is the largest genus of Scrophulariaceae in Egypt, being represented by 12 species. Among these, *Kickxia spartioides* (Brouss. ex Buch.) Janch. and *K. heterophylla* (Shousb.) Dandy are treated here as *K. pseudoscoparia* V.W. Smith & D.A. Sutton and *K. gracilis* (Benth.) D.A. Sutton respectively.

The careful examination of the available material belonging to *Kickxia elatine* (L.) Dumort. and *K. spuria* (L.) Dumort. showed their great similarity (cf. Täckholm, op. cit.:491); the latter is treated here as subsp. *elatine*.

Another three species, viz. *Kickxia acerbiana* (Boiss.) Täckh. & Boulos, *K. scariosepala* Täckh. & Boulos and *K. kneukeri* (Bornm.) Täckh. & Boulos, are habitually similar and are recorded from the Galala Desert and Sinai. The latter two taxa are regarded here as conspecific to *Kickxia acerbiana*.

Key to the species

- 1.a. Flowers crowded, arranged along densely leafy branches in spike-like racemes 2. *K. floribunda*
- b. Flowers solitary in leaf axils, arranged in lax raceme-like inflorescence 2
- 2.a. Climbing or prostrate herb, upper part of stem slender, scandant, pedicels mostly twining 7. *K. gracilis*
- b. Erect to ascending or procumbent herbs or subshrubs, upper part of stem rather stout, not scandant; pedicels not twining 3
- 3.a. Stem glabrous, or sparsely hairy at lower part 4
- b. Stems hairy all over 6
- 4.a. Pedicels 20-30 mm long; capsule globose 9. *K. hastata*
- b. Pedicels up to 10 mm long; capsule ovoid or oblong-ovoid 5
- 5.a. Capsule ovoid, 2-2.3 mm long, stalk 2-3 mm long 8. *K. pseudoscoparia*
- b. Capsule oblong-ovoid, 4.4-5 mm long, stalk 8-10 mm long 6. *K. macilenta*
- 6.a. Anthers hairy at the lower part of lobes; 6-15 seeds per capsule 7
- b. Anthers glabrous; seeds more than 15 per capsule 8
- 7.a. Stem filiform, not viscid; spur ± straight, 3.5-6 mm long 1. *K. elatine*
- b. Stem stiff, spinescent at late stages; spur curved, 8-9 mm long 3. *K. aegyptiaca*
- 8.a. Sepals lanceolate, 4-4.5 x 1 mm, with broad scarious margin; corolla 8-11 mm long (not including the spur) 4. *K. acerbiana*
- b. Sepals lanceolate-linear, 3-4 x 0.7- 0.8 mm, with narrow scarious margin; corolla 5-5.5mm long (not including the spur) 5. *K. nubica*

12.1 *Kickxia elatine* (L.) Dumort., Fl.Belg. 35 (1827).

Key to subspecies

- a. Stems ± slender and weak, less branched above, sparsely villous; leaves with obtuse to subacute apex; pedicels (13-) 15- 22 mm long subsp. *elatine*
- b. Stems relatively stout, much branched above, densely villous; leaves with acute to mucronate apex; pedicels 5-15 mm long subsp. *crinita*

a. subsp. *elatine*.

Antirrhinum elatine L.,Sp.Pl.ed.1:612(1753).

Type: in Germaniae, Angliae, Specimens no. 677/2 (LINN, micro- fiche !)

Linaria elatine (L.) Mill.,Gard.Dict.Abr.ed. 8,no 16 (1768); Boiss., Fl.Orient. 4:367(1879); Muschl., Man. Fl.Egypt 2:864(1912).

K. spuria (L.) Dumort. sensu Täckh., Stud. Fl. Egypt. ed. 2:491(1974).

Distribution:

Weed in moist places of the Nile Delta and Oases. Known from W.& C. Europe to parts of S.E. Europe, widely introduced and naturalized elsewhere in temperate regions.

Selected specimens:

(Nv) Am Grabenrandern im Palmenhaine von Marg, Nordwärts Kairo; 14.1.1908; *Hartmann* s.n. (CAI)–(O) Bahariya Oasis, El Heiz, Ain El Aza; 13.9.1971; *Imam et al.* s.n. (CAI) Kharga Oasis, close to Hibis Temple; 13.8.1967; *El Hadidi* s.n. (CAI).

b. subsp. *crinita* (Mabille) Greuter, in *Boissiera* 13:108(1967); Täckh., *Stud. Fl. Egypt* ed. 2:491(1974)

Linaria crinata Mabille, *Rech.Pl.Corse.fasc.1:30*(1867).

Type: Corsica; Furiani, Pres de Bastia; 8.vii.1866; *Mabille* 161 (BM, isotype).

Linaria elatine (L.) Dumort. var. *villosa* Boiss., *Fl.Orient.* 4:367(1879); Asch. & Schweinf., *Ill.Fl.Egypte* 2:115(1887); Muschl., *Man.Fl.Egypt* 2:864(1912).

Distribution:

Weed in moist places of the Nile Delta, Oases and the Mediterranean coastal land. Known from S.E. Europe, N. Africa, S.W. Asia, widely naturalized in temperate regions.

Selected specimens:

(M) Ikingi Maruit; 22.1.1928; G.*Täckholm* s.n. (CAI)–(Nv) El Marg; 11.5.1922; *Simpson* 1542 (CAIM)–(O) Dakhla Oasis, Zineyda; 12.4.1928; *Simpson* 6000 (CAIM).

12.2. *Kickxia floribunda* (Boiss.) Täckh. & Boulos, *Stud. Fl. Egypt* ed. 2:491(1974); Abdallah *et al.*, *Notes A.R.C.Herb. Egypt* 6:185(1984); El Hussein & Zareh in *Taeckholmia* 12:65(1989).

Linaria floribunda Boiss., *Diag.Pl.Orient. ser.1*(2), 12:40(1853); Boiss., *Fl.Orient.* 4:365(1879); Täckh., *Stud.Fl.Egypt* ed. 1:126(1956).

Type: Palaestine. Pays du Amalcitis; iv.v.1846; *Boissier* s.n. (G, Boiss. syntype, BM, photo.).

Distribution:

Weed in fields and waste places of E. Mediterranean region, Isthmic Desert and Red Sea coast. Known from S. W. Asia.

Selected specimens:

(M) Wadi El Arish; 26.12.1923; *Simpson* 2260 (K)–(Di) Wadi El Maghara; 23.4.1959; *Boulos* s.n. (CAI)–(R) Wadi Aber, Gebel Ataqa, S. Suez; 8.3.1954; *Boulos* s.n. (CAI).

12.3. *Kickxia aegyptiaca* (L.) Nabelek, in Publ.Fac.Sci.Univ.Masaryk 70(3):31(1926); Täckh., Stud.Fl.Egypt ed.2:490(1974); Abdallah *et al.*, A.R.C. Herb. Egypt 6:185(1984); El Hussein & Zareh in Taekholmia 12:65(1989); Hepper & Friis, Pl.Forssk.Fl.Aegypt.-Arab.228(1994).

Antirrhinum aegyptiacum L., Sp.Pl.ed.1:613(1753).

Type: Aegyptus, Specimens no.767/ 7& 8 (LINN, microfiche !)

Linaria aegyptiaca (L.)Dum.-Cours., Bot.Cult. 2:92(1802; Boiss., Fl.Orient. 4:369(1879); Täckh., Stud.Fl.Egypt ed.1:126(1956).

Type: in desertis Egypti mediae, *Delile*.

Didtribution:

In sand plains, wadi beds of the northern and eastern deserts, Sinai, the Mediterranean coastal lands and the Oases. Known from N. Africa, E. Mediterranean and Arabian Peninsula.

Selected specimens:

(**M**) Plateau of Sallum; 21.4.1973; *A.Amin et al.* s.n. (CAI); Burg El Arab; 8.4.1955; *El Hadidi* s.n. (CAI)–(**Di**) El Qattamiya, Suez road; 27.3.1989; *El Garf* s.n.(CAI)–(**Dg**) Wadi Digla; 15.4.1979; *Atta et al.* 113 (CAIM)–(**DI**) Ad Pyramids Gises; 29.3. 1835 *Wiest* 533 (K)–(**Da**) Wadi Qasa, E. Girga; 6.3.1981; *Boulos* 1466 (CAIM)–(**S**) Sinai, wadi Saal; 3.6.1984; *Shabana* s.n. (CAI)–(**R**) Wadi Araba; 28.4.1995; *E. Shams* s.n. (CAI).

12.4. *Kickxia acerbiana* (Boiss.) Täckh. & Boulos, Stud.Fl.Egypt ed.2:491(1974); El Hussieni & Zareh in Taekholmia 12:65 (1989).

Linaria acerbiana Boiss., Fl.Orient. 4:366(1879); Täckh., Stud. Fl. Egypt ed.1:126(1956).

Type: in deserto Egypti ad mar Rubrum, *Acerbi* s.n. (B, syntype).

Linaria kneuckeri Bornm., Allg. Bot. Zeitschr. 15:130(1909); Muschl., Man, Fl. Egypt ,2:865(1912)

Kickxia kneuckeri (Bornm.)Täckh. & Boulos sensu Täckh., Stud. Fl. Egypt ed. 2:491(1974).

Kickxia scariosepala Täckh. & Boulos sensu Täckh., Stud. Fl. Egypt ed. 2:491(1974).

Type: Sinai, In mountains of Feiran Oasis; 13.3.1956; *Täckholm* 187 (CAI, holotype !)

Distribution:

Common in the Eastern Desert, mountainous southern Sinai, coastal plains along the Red Sea and Gebel Elba district. Known from N. Africa and S.W. Asia.

Selected specimens:

(Di) Cairo-Suez road; Jan. 1957; *Imam* s.n.(CAI)–(Dg) Wadi Qisseib; 9.2.1956; *A.Amin* s.n. (CAI)–(Da): Wadi Allaqi; 7.4.1963; *Abdallah* 1425 (CAIM)–(S) In the mountains of Feiran Oasis; 13.3.1956; *Täckhlom* 187 (CAI)–(R) Between Quseir and Ras Banas; 1867; *Schweinfurth* 231 (K)–(Sa) Wadi Oalak, 27.1.1962; *V. Täckholm et al.* 718 (CAI).

12.5. *Kickxia nubica* (Skan) Dandy in F.W.Andrews, Fl.Pl.Sudan 3:137(1956); Täckh., Stud.Fl.Egypt ed.2:491(1974).

Linaria nubica Skan, in Dyer, Fl. Trop. Afr. 4,(2/2):290 (1906); Täckh., Stud. Fl. Egypt ed. 1:126 (1956).

Type: Sudan, Nubia about 21 lat., (near Muhammad Qal),0-4000 ft,1896 *Bent* s.n. (K).

Distribution:

Rare herb in wadis of the Eastern Desert and Gebel Elba district. Known from the Sudan Republic to Tropical Africa.

Selected specimens:

(Dg) Wadi Digla; 25.3.1985; *M. Shadad* s.n. (CAI)–(Sa) Gebel Hamara Dom; 6.3.1967; *Osborn & Helmy* s.n. (CAI).

12.6. *Kickxia macilenta* (Decne) Danin, in Notes R.B.G.Edinb. 32(2):265 (1973); Täckh., Stud. Fl. Egypt ed. 2:490(1974); *Abdallah et al.*, Notes A.R.C. Herb. Egypt 6:185 (1984); El Hussein & Zareh in *Taeckholmia* 12:65(1989).

Linaria macilenta Decne., in Ann.Sci.Nat.Bot. ser.2,2:252(1834); Boiss.,Fl.Orient. 4:379(1879).

Type: Le desert du Sinai, 1832, *Bové* 75. (P, holotype, G & K, isotypes).

Distribution:

Confined to wadi beds of mountainous, southern Sinai and Isthmic Desert. Known from Palestine and Jordan.

Selected specimens:

(S) Desert du Sinai; Juin 1832; *Bové* 74 & 75 (K); Near Monastery of St. Catherine; 10.5.1956; *Hadidi* s.n. (CAI).

** **12.7. *Kickxia gracilis*** (Benth.) D.A. Sutton, Rev.Tribe Antirr. 222 (1988).

Linaria gracilis R.Br. ex Benth., in DC. Prodr. 10:269(1846), non (Pers.) Lam. & DC. (1806) nec. Auct.

Type: Ethiopia; "Abyssinia" *Salt* s.n. (BM).

K. heterophylla (Bornm.) Täckh. & Boulos, sensu Täckh. Stud. Fl. Egypt. ed. 2:490(1974).

Distribution:

Common in wadi beds of Gebel Elba district and mountainous southern Sinai. Known from N.W. Asia.

Selected specimens:

(Da) Gebel Hadarba; 1925-26; *Murray* 3823 (K)–(S) Sinai, Mountainous region; April 1940; *Hassib* s.n. (CAI)–(Sa) Wadi Serimatai; 23.1.1962 & 9.2.1962; *V. Täckholm et al.* 360 & 1934 (CAI); Wadi Rabdeit; 21.1.1933; *Shabetai* f 1702 (K).

** 12.8. *Kickxia pseudoscoparia* V.W.Smith & D.A.Sutton, Rev. Tribe Antirr. 231(1988).

Type: Saudi Arabia, Asir, Taif, 30.v.1971; *Popov* 71/160 (BM).

K. spartioides (Brouss. ex Buch.) Janch. sensu Täckh., Stud. Fl. Egypt., ed. 2:490(1974).

Distribution:

Rare in wadis of Gebel Elba district and Isthmic Desert. Known mainly from the mountains of western Saudi Arabia.

Selected specimens:

(Di) Ras El Naqb, N.E. Sinai; 13.5.1939; *Drar* s.n. (CAIM)–(Sa) Wadi Mera Kwan; 10.2.1962; *V. Täckholm et al.* 2000 (CAI).

12.9. *Kickxia hastata* (R.Br. ex Benth.) Dandy, in F.W.Andrews, Fl. Pl. Sudan 3:137(1956); Täckh., Stud.Fl.Egypt ed.2:490(1974).

Linaria hastata R.Br. ex Benth., in DC. Prodr. 10:269(1846); Täckh., Stud. Fl. Egypt ed.1:126(1956).

Type: Ethiopia "Abyssinia" sin Ioco, *Schimper* 1042 (G).

Distribution:

Confined to wadi beds of Gebel Elba district. Known from N.E. Africa and Arabian Peninsula.

Selected specimens:

(Sa) Wadi Ideib; 15.1.1933; *Hassib* s.n. (CAI); Wadi Ehmit; 30.1.1933; *Shabetai* f.1626 (K).

13. *Linaria* Mill., Gard.Dist.Abr.ed.4:2(1754)

A genus of about 150 species distributed in Europe except for extreme north, Asia except for southeast and extreme north, N. Africa; frequently introduced and naturalized elsewhere in temperate regions.

Note: According to Täckholm (1974:487-88), *Linaria* was represented in Egypt by seven species. The careful examination of the mature seeds of the available specimens named *Linaria micrantha* proved that they belong to *L. simplex* (Willd.) DC. The seeds of the first are flat with membranous wings, while those of *Linaria simplex* are plane with winged margins. On the otherhand, Sickenberger (1901:264) reported *Linaria chalepensis* (L.) Mill. from the Mediterranean coastal land without certainty. No specimens of this species were traced.

Key to the species

- 1.a. Seeds compressed discoid, margin with encircling broad wing 4. *L. simplex*
- b. Seeds reniform, margin wingless 2
- 2.a. Corolla 8- 11 mm long (including the spur), spur 2.5 - 3.5 mm long 3
- b. Corolla 12 -18 mm long (including the spur), spur longer, 6 -9 (-15) mm long. 4
- 3.a. Fertile branches with filiform leaves ,1 -2 mm broad, flowers in ± lax terminal racemes 5. *L. tenuis*
- b. Fertile branches with oblong-elliptic to oblong-lanceolate, 3 - 6 mm broad, flowers in congested terminal racemes 3. *L. albifrons*
- 4.a. Sepals oblong-linear, 3.5-4x0.5 mm, with green margins, leaves with entire margin and acuminate apex 2. *L.joppensis*
- b. Sepals oblanceolate-oblong, 4.6x1.2 mm, with narrow, scarious margins; leaves with revolute margin and acute apex 1. *L. haelava*

13.1. *Linaria haelava* (Forssk.) F.Dietr., Nachtr.Vollst. Lexic. Gartn. 4:400(1818); Boiss.,Fl.Orient. 4:381(1879); Täckh., Stud. Fl. Egypt, ed. 2:488(1974); Abdallah *et al.*, Notes A.R.C.Herb. Egypt 6:186(1984); El Husseini & Zareh in Taeckholmia 12:66(1989); Hepper & Friis, Pl. Forssk. Fl. Aegypt.-Arab. 228(1994).

Antirrhinum haelava Forssk., Fl.Egypt.-Arab. 111(1775).

Type: In desertis Kahirinis, 1762; *Forsskal* 397 (C).

Distribution:

Mediterranean coastal land; wadis of Libyan, Isthmic and Galala Deserts and mountainous southern Sinai. Known from N. Africa, Palestine and Arabian Peninsula.

Selected specimens:

(M) Matruh-Sallum; 3.4.1969; *Abbas et al.* 2464 (CAIM); *El Hamam*, Maruit; 27.2.1929; *Shabetai* z 1198 (CAIM); Alexandria, Mex; 23.1.1928; *G.Täckholm* s.n.(CAI); Rafah; 10.3.1921; *El Hefnawy* s.n.(CAIM)–(Di) Wadi Ain El Gederate; 14.3.1930 & 6.4.1939; *Drar* s.n.(CAIM); Mitla pass; 7.4.1990; *El Garf* s.n. (CAI)–(Dg) Wadi Liblab; 1.3.1952; *A.Amin et al.* s.n. (CAI); Bei Kairo - Helwan; 15.3.1904; *Keller* 324 (K)–(DI) Near Giza Pyramids; 20.3.1931; *Shabetai* 195 (K).

13.2. *Linaria joppensis* Bornm., in Verh.Zool.-Bot. Gen.Wein 48(9):612(1898); Täckh., Stud., Fl.Egypt ed.2:488(1974); Abdallah *et al.*, Notes A.R.C. Egypt 6:187(1984); El Hussein & Zareh in *Taekholmia* 12:66(1989).

Type: Palestine, Bei Wadachnin zwischen Asdodo (Ashdod) und Jaffa; 9.iv.1898; *Bornmüller* 1207 (WRSL).

Distribution:

Restricted to the Sinaitic sector of the Mediterranean coastal land. Known from E. Mediterranean countries.

Selected specimens:

(M) Rafah; 4.6.1945; *Davis* 10419 (K); Rafah, El Malaha; 9.4.1956; *Khattab* 55 (CAIM).

13.3. *Linaria albifrons* (Sm.) Spreng., Syst.Veg. 2:793(1825); Boiss., Fl. Orient. 4: 382 (1879); Täckh., Stud.Fl.Egypt ed.2:488(1974); Abdallah *et al.*, Notes A.R.C.Herb Egypt 6:186(1984); El Hussein & Zareh in *Taekholmia* 12:66(1989).

Antirrhinum albifrons Sm. In Sibth. et Sm., Fl.Graec.Prodr. 1(2):432(1809).

Type: In insula Rhodo (Rhodes) (OXF).

Distribution:

Sandy plains of the Mediterranean coastal land. Known from S.W. Asia, westwards in N. Africa.

Selected specimens:

(M) Messaod, Sallum; 14.4.1934; *Shabetai* z 3212 (CAIM); Ras El Hekma; 22.3.1974; *V. Täckholm et al.* s.n. (CAI); Alexandria, Ramleh; 21.1.1928; *G. Täckholm* s.n. (CAI); Rafah, near the station; 22.3.1928; *G. Täckholm* s.n. (CAI).

13.4. *Linaria simplex* Desf., Tabl. Ecole.Bot.ed.1:65(1804); Täckh., Stud. Fl.Egypt ed.2:488(1974); Abdallah *et al.* Notes A.R.C. Herb.Egypt 6:187(1984); El Hussein & Zareh in *Taekholmia* 12:65(1989).

Type: In Europa australis, *Burser* 12/28 (UPS).

Antirrhinum simplex Willd., Sp. Pl. 3(1):243(1800), non Link.

Linaria simplex (Willd.) DC., in Lam.& DC., Fl. Franc. ed.3,3:588 (1805); nom.illeg.

L. parviflora (Jacq.) Halacsy, Consp.Fl.Graec. 2(2):413(1902); Täckh., Stud. Fl. Egypt ed1:125(1956).

Distribution:

Confined to mountainous southern Sinai. Known from S. Europe, N. Africa and S.W. Asia.

Selected specimens:

(S) Sil Umm Gassab; 4.2.1928; *Kaiser* s.n. (CAIM); St. Catherine monastery; 1.4.1967; *Chertek & Kosinová* s.n. (CAI).

13.5. *Linaria tenuis* (Viv.) Spreng., Syst. Veg. 2:759(1825); Täckh., Stud. Fl.Egypt ed. 2:488(1974); Abdallah *et al.*, Notes A.R.C. Herb.Egypt 6:186(1984); El Husseini & Zareh in *Taeckholmia* 12:66(1989).

Antirrhinum tenue Viv.,Fl.Libyc.Prodr.33,tab.16;f.5&6(1824).

Type: Libya, in tumulis arenosis Magnae Syrteose *Viviani* s.n. (Fl).

Linaria ascalonica Boiss. et Kotschy., in Boiss., Diagn Pl. Oreint. ser.2 (3),3:165(1856); Boiss., Fl.Oreint. 4:382(1879); Muschl., Man. Fl. Egypt 2: 867(1912).

Type: ad Ascalon Palaestinae, *Kotschy*.

Distribution:

Confined to the Mediterranean coastal land of Sinai; southwards to Isthmic Desert. Known from S.W. Asia.

Selected specimens:

(M) El-Arish, 20.3.1928; *G.Täckholm* s.n. (CAI); Rafah; 20.4.1930; *Shabetai* 196 & z 3888 (CAIM & K)–(Di) A branch of Wadi El Maghara, N. Sinai; 22.4.1959); *Boulos* s.n. (CAI).

14. *Scrophularia* L.,Sp.Pl.ed.1:619(1753).

A genus of about 300 species, mainly in the Euro-Siberian and Mediterranean regions as well as Tropical America.

Note: *Scrophularia* is represented in Egypt by six species (Täckholm 1974:393), among which *S. xanthoglossa* is a polymorphic species represented by two varieties. The revision of the specimens belonging to this species led to the discovery of *S. sinaica* as a new record to the flora of Egypt.

Key to the species

- 1.a. Annual herb, ovary conical or pyriform, 2-3 x 2 mm 1. *S. arguta*
- b. Perennial herbs or undershrubs, ovary ovoid, 1-2x0.8-2 mm 2
- 2.a. Leaves undivided, margin dentate or entire 3
- b. Leaves deeply pinnatifid to pinnatisect 4
- 3.a. Leaves petiolate, ovate with dentate or incised margin, petiole
5-20 mm long; staminoid spatulate to broadly ovate 6. *S. libanotica*
- b. Leaves sessile, oblong to spatulate, with entire margin,
staminoid linear to oblong 5. *S. hypericifolia*
- 4.a. Leaf lobes obtuse, with white cartilagenous margin 2. *S. deserti*
- b. Leaflobes acute to subacute, with green margin 5
- 5.a. Corolla 3-4.5 mm long, staminoid yellow orbicular, 1 - 1.2 x 1.5-
2 mm 3. *S. sinaica*
- b. Corolla 5-6 mm long, staminoid absent or rudiment 4. *S. canina*

14.1. *Scrophularia arguta* Sol., in Aiton, Hort. Kew., ed.1,2:34(1789); Boiss., Fl.Orient. 4:395(1879); Täckh., Stud. Fl.Egypt ed.2:493 (1974).

Type: Oman, in regio Mascate Arabiae secus torrentes, *Aucher* 5057.

S. rostrata Hochst., in Schimp. Ex Boiss., Fl.Orient. 4: 395 (1879) pro.syn.

Distribution:

Rocky slopes of southern Red Sea mountains and Gebel Elba district. Known from S. Europe, N. Africa, Canary Island and Arabian Peninsula.

Selected specimens:

(R) Gebel Hamata, Red Sea coast; 7.2.1961; *V. Tackholm et al.* 442 (CAI)–(Sa) Wadi Aideib; 1.2.1933; *Shabetai* z 2744 (CAIM).

14.2 *Scrophularia deserti* Delile, Descr.Egypte, Hist.Nat. 2:240, pl.33, fig.1 (1813); Boiss., Fl.Orient. 4:382 (1879); Täckh., Stud.Fl.Egypt ed.2:493 (1974); El Hussein & Zareh in *Taeckholmia* 12:65(1989).

Type: Egypte, Vallee de L'Egarement, le 26 Janvier 1800; *Delile* (P).

S. marginata Boiss., Diag. Pl. Orient. Ser.1,1(4):72(1844).

Distribution:

Desert plains and wadi beds of Galala and Isthmic Deserts, mountainous southern Sinai and W. Mediterranean coastal land. Known from S.W. Asia.

Selected specimens:

(M) Rosetta; 29.4.1927; *G.Tackholm* s.n. (CAI)–(Di) Ras El Naqb, Gulf; 13.5.1939; *Drar* 835 (CAIM)–(Dg) Suez, G. Ataqa; 14.8.1932; *Shabetai* z 5327 (CAIM)–(S) Sinai, *Aucher- Eloy* 1769 (K).

** 14.3. *Scrophularia sinaica* Benth., in DC.Prodr. 10:314(1846).

Key to the varieties

- a. Cymes short peduncled, up to 25 mm long, with 3-5 (-7) flowers each var. *sinaica*
- b. Cymes long peduncled, 40-70 mm long, with 9-13 flowers each var. *ampliantha*

** a. var. *sinaica*.

Type : in deserto Sinaica, *Schimper* 320 (G , microfche !).

S. Xanthoglossa Boiss., Diag.Pl.Orient. ser.1(2) 12:38 (1853); sensu Täckh., Stud.Fl.Egypt ed.2:493 (1974); Abdallah *et al.*, Notes A.R.C.Herb. Egypt 6:188 (1984); El. Hussein & Zareh in *Taeckholmia* 12:56(1989).

Type: Jerusalem, April 1846; *Boissier*.

Distribution:

Wadi beds and rocky slopes of Isthmic and Galala Deserts, as well as mountainous southern Sinai. Known from Palestine, Syria, Libanon, Iraq and Iran.

Selected specimens:

(Di) Wadi Heridin, S. El Arish; 5.4.1939; *Drar* s.n. (CAIM)–(Dg) Wadi Abar; Gebel Ataqa; 30.4.1939; *Drar* 41 (CAIM)–(S) Gebel Deir, near the monastery of St. Catherine, Sinai; 9.5.1956; *K. Täckholm* s.n.(CAI).

** b. var. *ampliantha* (Eig) E. Shamso stat. nov.

S. xanthoglossa Benth. var. *ampliantha* Eig, Palest. J.Bot.Jerus. 3:87(1944); *Feinbrun*, Fl.Palaest.3:198(1978).

Type: Palestine, between Rishon-le-Tsion and Nahlath-Yehuda; 25.3.1925; *Eig*.

Distribution:

Rocky slopes of wadi beds of Galala Desert and mountainous southern Sinai. Known from E. Mediterranean subregion.

Selected specimens:

(Dg) Wadi Hof; 8.3.1974; *Hadidi et al.* s.n. (CAI)–(S) On the stepway to Gebel Musa , Sinai; 11.5.1956; *V. Täckholm* s.n. (CAI).

14.4. *Scrophularia canina* L., Sp.Pl. ed.1:621(1753); Boiss., Fl.Orient. 4:419 (1879); Täckh., Stud.Fl.Egypt ed.2:439 (1974).

Type: Helvetia, Narbona, Italia, Specimen no. 773/16 (LINN, microfiche !).

S. pinnata Mill., Gard.Dict. ed.8, no.15 (1768).

Distribution:

Sallum plateau of the W. Mediterranean coastal land. Known from Europe, S. Russia, N.W. Africa and eastwards to S.W. Asia.

Selected specimens:

(M) Sallum, Wadi El Ramla; 14.4.1934; *Shabetai* z 3052 (CAIM).

14.5. *Scrophularia hypericifolia* Wydler, Mem.Soc.Phys.Hist.Nat. Geneve 4:166(1828); Boiss., Fl.Orient. 4:421 (1879); Täckh., Stud.Fl.Egypt ed.2:493 (1974); El Hussein & Zareh in Taeckholmia 12:65(1989).

Type: Mesopotamia, inter Aleppo et Begdad, *Oliver*.

S. syriaca Benth., in DC. Prodr. 10:316 (1846).

Distribution:

Sandy depressions of northern Sinai. Known from S.W. Asia.

Selected specimens:

(M) Rafa; 8.4.1956; *Khattab* 78 (CAIM)–(Di) El Manayif, Ismailia; 28.6.1924; *Simpson* 2864 (K & CAIM).

14.6. *Scrophularia libanotica* Boiss., Diagn.Pl.Orient. ser.1(2) 12:36 (1853); Täckh., Stud.Fl.Egypt ed.2:493(1974); Abdallah *et al.*, Notes A.R.C.Herb Egypt 6:187 (1984); El Hussein & Zareh in Taeckholmia 12:65(1989).

Type: in fissuris rupium montis Santae Catharinae; 1835; *Schimper* 350 (G, microfiche !).

S. urvilleana Decne., in Ann.Sci.Nat.Bot. ser.2,2:252(1834), non Wydler (1828).

Type: entre rochers humides au Mont St. Catherine; *Bové* 69.

S. variegata M.B. var. *libanotica* Boiss., Fl.Orient.4:418(1879).

Distribution:

Rocky slopes and crevices of the wadis in mountainous southern Sinai. Known from S.W. Asia.

Selected specimens:

(S) Sinai, below the summit of Gebel Musa; 22.4.1961; *V. Täckholm et al.* s.n. (CAI).

15. *Veronica* L., Sp.Pl.ed.1:9 (1753).

A genus of about 300 species in Temperate regions of both hemispheres or mountains in the Tropics.

Note: *Veronica* was regarded by Täckholm (1974:496-99) as the second largest genus of Scrophulariaceae; being represented by 10 species. Among these, a group of three species viz *Veronica syriaca*, *V. macropoda* and *V. biloba* are tiny herbs (about 5 cm high), confined to the shady and moist rocky habitats in southern Sinai. These were regarded by El Hadidi (1969:151) as closely related to *Veronia musa* Täckh. & Hadidi, which was described from Gebel Musa area (S. Sinai). The available material of the above mentioned three species is insufficient to confirm their occurrence in Sinai with certainty.

Veronica anagallis-aquatica L. sensu Täckholm (1974:498) is a polymorphic species represented by at least three varieties. Careful study of a wealth of specimens showed that it is eventually an aggregate that comprises: *Veronica anagallis-aquatica* s.str., *V. catenata* and *V. anagalloides*. According to Chrtek & Osbornová (1981), *Veronica beccabunga* L. does not occur in Egypt and the specimens seen for this taxon belong to *Veronica scardica* which is a new record to the flora of Egypt.

Careful study of the specimens kept under *Veronica campylopoda* Boiss. led to the discovery of another habitually similar but rather distinct species, viz. *Veronica rubrifolia* Boiss., which is a new record to the flora of Sinai and Egypt.

Key to the species

- 1.a. Flowers solitary in leaf-axils; bracts similar to cauline leaves 2
- b. Flowers in axillary or terminal racemes; bracts much reduced, distinct from
cauline leaves 3
- 2.a. Capsule 5-6 mm long, with deep sinus at apex, pericarp with
anastomosed veins 7 *V. persica*.
- b. Capsule 2-4 mm long, emarginate or with shallow sinus at apex,
pericarp with indistinct veins 8. *V. polita*
- 3.a. Flowers in terminal racemes 4
- b. Flowers in axillary racemes 5
- 4.a. Leaves sessile, oblanceolate to elliptical, with dentate margin
capsule broadly pyriform with emarginate apex 10. *V. rubrifolia*
- b. Leaves petiolate, ovate-oblong, with entire margin;
capsule compressed with deep sinus, divided nearly to the
base into 2-divaricate lobes 9. *V. campylopoda*
- 5.a. Plant dwarf, 5-7 cm tall 6. *V. musa*
- b. Plant long, 15-70 cm tall 6
- 6.a. Each leaf-pair with two opposite racemes 7
- b. Each leaf-pair with only one raceme 9
- 7.a. Leaf-base subcordate or cuneate; capsule acute at
apex 2 *V.anagallis- aquatica*

- b. Leaf-base amplexicaul-truncate or amplexicaul-subcordate; capsule emarginate to notched at apex 8
- 8.a. Perennial, cauline leaves oblong-ovate to oblong-lanceolate; racemes 100-160 mm long, loose, bow-like; pedicels mostly twice the length of the bracts (5-7mm long) 4. *V. catenata*
- b. Annual, cauline leaves lanceolate to linear-lanceolate; racemes 30-70 (-100) mm long, \pm dense, straight, pedicels as long as or nearly half the length of the bracts (2-3 mm long) 1. *V. anagalloides*.
- 9.a. Leaves sub-orbicular, with mucronate apex, attenuated towards the base; sepals elliptical, with acute apex; capsule with acute apex 5. *V. kaiseri*
- b. Leaves ovate-elliptical to ovate, with obtuse to acute apex, petiolate; sepals oblanceolate to obovate, with sub-obtuse apex; capsule with emarginate apex 3. *V. scardica*

15.1 *Veronica anagalloides* Guss, Pl. Rar. 5:tab. 3(1826); Boiss., Fl. Orient 4:437(1879).

Type: Italia in stagnis depressis Calabriae Orientalis prope Catanzaro al fiume Magliacone, *Gussone* (PAL).

V. haussknechtii Boiss., Fl.Orient. 4:438 (1879).

V. comosa K.Richt., in Stapf, Denkschr.Math.-Nat.Ci.Kais.Akad.Wiss., W. 50(2):24 (1885).

V. anagallis-aquatica L. subsp. *anagalloides* (Guss.)Rouy,Fl.France 2:39 (1909); sensu Täckh., Stud.Fl.Egypt ed.1:131 (1956).

V. anagallis-aquatica L. var *anagalloides* sensu Täckh., Stud. Fl.Egypt ed.2:498 (1974).

V. anagalloides Guss. subsp. *taeckholmiorum* Chrték & Osb.-Kos., Folia Geobot. Phytotax., Praha 16:426(1981).

Distribution:

Moist and shady places, also along irrigation canals of the Nile Valley. Known from Temperate Europe eastwards to S.W. Asia.

Selected specimens:

(Nv) Damanhur; 18.3.1988; *A.Amer* 16173 (CAI); El Marg, Cairo; 14.3.1880; *Schweinfurth* 195 (K & CAI); Sohag-Khazindara; 20.1.1986; *Hadidi* s.n. (CAI).

15.2. *Veronica anagallis-aquatica* L.,Sp.Pl.ed.1:12(1753).

- a. var. *nilotica* R.Uechtr, in Asch.& Schweinf., Ill.Fl.Egypte 2:117(1887); Täckh., Stud.Fl.Egypt ed.2.:498(1974).

Type: regions des cataractes Heuser et suermoundt, *Ehrenberg*.

Distribution:

Very rare plant on canal banks in the southern sector of the Nile Valley. Known from Sudanese Nubia.

Selected specimens:

(Nn) Nile bank at the Cataract hotel, Aswan; 2.7.1967; *El Hadidi & Ghabour* s.n.(CAI); Abu Simbil; 14.3.1963; *Abdallah* 1597(CAIM).

**15.3. *Veronica scardica* Griseb., Spic.Fl.Rumel. 2(4):31 (1844).

Type: In Albania boreali, 1839, *Grisebach* (GOET).

V. gracilis R. Uechtr. Ex Velen. In Abh.K.Bohm.Ges.wiss.(Math.-Nat.) 7 (1B):35 (1886), non R.Br.(1810).

V. beccabunga L. var. *aegyptiaca* Täckh., Stud.Fl.Egypt ed.1:131(1956) & ed.2:498 (1974).

V. scardica Griseb. subsp. *africana* Chrtk & Osb.-Kos., Folia Geobot. Phytotax., Praha 16:433 (1981).

Distribution:

Weed in moist places of the Nile Delta, Faiyum Governorate and the Oases. Known from S.E. Europe and Mediterranean basin.

Selected specimens:

(Nv) Giza, at the Nile; 6.3.1927; *G. Täckholm* s.n. (CAI); Kafr Mahfus & Beni Othman, El Faiyum; 20.11.1968; *Hadidi* s.n. (CAI)–(O) Bahariya, Al Harra, Ain Gilt; 13.4.1980; *M. Abd El Ghani* 2612 (CAI & K); Dakhla oasis, 12.4.1928; *Simpson* 6004 (CAIM); At Kharga town; 9.2.1952; *V. Täckholm & Kassas* s.n. (CAI).

15.4. *Veronica catenata* Pennell, Rhodora, 23:37(1921).

Type: Hot springs, South Dakota, 16.6.1882; *P.A.Rydberg* 926 (Herb. NY Bot. Garden).

V. anagallis-aquatica var. *aquatica* sensu Täckh., Stud.Fl.Egypt ed.1:131 (1956) & ed.2.:498 (1974).

Distribution:

Common in moist and shady places of the Nile Delta, the orchards of Fayium, the Oases and mountainous southern Sinai, cultivation of Ismailia and Hurgada; the Alexandria and Rosette district. Known from most Europe.

Selected specimens:

(M) Miska at Victoria, Alexandria; 9.10.1923; *Simpson* 2194 (K)–(Di) Ezbet El Madarsa; 25.4.1980; *El Bakry* 7 (K)–(Nv) El Gedia, Kafr El Sheikh; 3.4.1993; *E. Shams* s.n. (CAI); El Guezireh-Cairo; 22.2.1911; *Hartmann* s.n. (CAI)– (O) Bahariya, El Haiz; 20.3.1940; *Drar* 52 (CAIM); Dakhla Oasis, Bir El Kodja; 17.3.1967; *El Hadidi et al.* s.n. (CAI); North of El Kharga; 23.1.1924; *Simpson* 2147 (K)–(S) Feiran Oasis; 5.5.1939; *Drar* 269 (CAIM); Wadi Catherine, S. Sinai; 20.4.1962; *Khattab et al.* 1039 (CAIM)–(R) Hurgada; 4.3.1936; *Nasr* s.n. (CAI).

15.5. *Veronica kaiseri* Täckh., in *Svensk. Bot. Tidskr.* 36:250 (1942); Täckh., *Stud. Fl. Egypt* ed.1:131(1956); Täckh., *Stud. Fl. Egypt* ed.2:498(1974); Abdallah *et al.*, *Notes A.R.C. Herb. Egypt* 6:190(1984); El Hussein & Zareh in *Taeckholmia* 12:66(1989).

Type: Egypt, Sinai; Sheikh Umm Hussan Shiddeq; 9.9.1926; *Kaiser* 538 (CAI, holotype !).

Distribution:

Moist shady places in the wadi beds of mountainous southern Sinai. Endemic to Sinai.

Selected specimens:

(S) Sinai, Sheikh Umm Hussan Shiddeq; 9.9.1926; *Kaiser* 538(CAI & CAIM); Gebel Musa; 7.5.1969; *Shalaby & El Hedini* s.n. (CAIM); Wadi Isla, S. Sinai; 17.4.1962; *Abdallah* 821 (CAIM).

15.6. *Veronica musa* Täckh. & Hadidi in El Hadidi, *Bull. Soc. Géog. Egypte*, XL:151 (1969); Täckh., *Stud. Fl. Egypt* ed. 2:499(1974).

Type: On the step way of Gebel Musa; 1956; *El Hadidi* s.n. (CAI, holotype !)

V. islensis Gamal El din, in *Sendtnera* 1:242(1993).

Type: Egypt; Sinai Peninsula, Wadi Isla, in fresh water canal; 1.10.1990; *Gamal-El din* (Herb Suez Canal University).

Distribution:

Moist shady, rock crevices in mountainous southern Sinai. Endemic to southern Sinai.

Selected specimens:

(S) On the step way of Gebel Musa; 1956; *El Hadidi* s.n. (CAI).

15.7. *Veronica persica* Poir., in Lam., *Encycl.* 8:542(1808); Asch. & Schweinf., *Ill. Fl. Egypte* 2:117 (1887); Täckh., *Stud. Fl. Egypt* ed.2: 498 (1974).

Type: Persia; cult. in Paris, *Lamarck* (P).

V. tournefortii C.C.Gmel., Fl.Bad. 1:39 (1805), pro parte; Täckh., Stud. Fl.Egypt ed.1:131(1956).

Distribution:

Weed in moist shady places and along irrigation canals of the Nile Delta and Alexandria, probably introduced and naturalized. Known from S.W. Asia; also naturalized as a weed in N. Africa, Europe, C. Asia, Japan and Newzealand.

Selected specimens:

(M) Alexandria; Samouha, cultivations behind Nuzha gardens; 23.3.1956; *V. Täckholm & El Hadidi* s.n. (CAI)–(Nv) Beheira Governorate, Mahmudiya; 17.3.1987; *A.Amer* 9501 (CAI).

15.8. *Veronica polita* Fr., Novit. Fl.Svec. 5:63(1819); Täckh., Stud.Fl. Egypt ed.1: 131 (1956); Täckh., Stud.Fl.Egypt ed.2:498 (1974).

Type: Sweden; “ubique in arvis Scaniae”; *Fries* (UPS).

Distribution:

Weed in moist shady places and along irrigation canals of the Nile Delta and the Oases. Known from Temperate Europe and Temperate Asia, also from Mediterranean region.

Selected specimens:

(M) Alexandria; Mahmudiya canal; 11.2.1909; *Maire* s.n. (CAI)–(Nv) Beheira Governorate, Kafr El Dauwar; 12.3.1988; *A.Amer* 16533 (CAI); Farouk’s rest house at Helwan; 6.4.1953; *Boulos* s.n. (CAI)–(O) Kharga Oasis, South of Kharga town; 15.1.1928; *G. Täckholm* s.n. (CAI).

15.9. *Veronica campylopoda* Boiss., Diagn. Pl.Orient. ser.1(1), 4:80(1844); Boiss., Fl.Orient. 4:464 (1879); Täckh., Stud., Fl.Egypt, ed.2:499 (1974); El Husseini & Zareh in *Taekholmia* 12:66 (1989).

Type: Sinai, ad radices montis Sinai locis planis in glareosis graniticis 1835, *Schimper* 118 (M, syntype, microfiche !).

Distribution:

Rare herb in moist places and gardens of South Sinai. Known from Syria, Armenia, Iran, Afghanistan and C. Asia.

Selected specimens:

(S) ad radices montis Sinai; 19.4.1835; *Schimper* 118 (K); In the garden of Deir El Rabba, at the entrance of Wadi El Arbaain; 23-25.4.1961; *V. Täckholm et al.* s.n. (CAI).

**15.10. *Veronica rubrifolia* Boiss.,

a. subsp. ***respectatissima*** M.A.Fisch., Rech.f., Fl.Iran. 147:71 (1981); El Hussein & Zareh in *Taeckholmia* **12**:66(1989).

Type: Persia; Qashqai; 5.6.1974; *Rechinger* 47340 (W).

Distribution:

Rare herb on rocky slopes of southern Sinai. Also recorded from Afghanistan, Iran, Pakistan and Tadzhikistan.

Selected specimens:

(S) On the step way to Gebel Musa, Sinai; 11.5.1956; *V. Täckholm* s.n. (CAI).

16. *Striga* Lour., Fl. Cochinch. Ed.1,1:22 (1790).

A genus with about 40 species in the Tropics of Old World.

Note: According to Täckholm (1974:499), *Striga* was represented in Egypt by three species, among which *S. gesnerioides* was recorded once from Kharga Oasis. No specimens were seen and its occurrence in Egypt is doubtful.

Key to the species:

- a. Flowers 25-35 mm long, calyx 5-nerved, corolla violet 1. *S. hermonthica*
- b. Flowers 14-16 mm long, calyx 10-nerved, corolla scarlet red 2. *S. asiatica*.

16.1 *Striga hermonthica* (Delile) Benth., in Hook., Comp.Bot.Mag 1:365(1836); Boiss., Fl.Orient. 4:469 (1879); Täckh., Stud.Fl.Egypt ed.2:499 (1974).

Buchnera hermonthica Delile, Descr.Egypte, Hist.Nat. 2:245, Pl.34, fig.3(1813).

Type: in cultis Egypti mediae et superioris, *Delile*.

Distribution:

Parasite on grasses, particularly sugar-cane in the Nile Valley. Known from Tropical Africa and Arabian Peninsula.

Selected specimens:

(DI) North of Wadi El Natroun; 21.9.1967; *El Hadidi* s.n. (CAI)–(Nv) Helwan; 19.8.1912; *B.Bolland* s.n. (CAIM); along Ibrahimiah canal at Manfalout; 17.10.1971; *Imam et al.* s.n. (CAI)–(Nn) W. Koshyamna, W. El Allaqi; 22.3.1962; *Abdallah et al.* s.n. (CAIM); Adendan, Nubia; 19.1.1964; *Boulos* s.n. (CAI).

16.2. *Striga asiatica* (L.) Kuntze, Revis. Gen. Pl. 2:466 (1891); Täckh., Stud. Fl. Egypt ed.2:499 (1974).

Buchnera asiatica L., Sp.Pl.ed.1:630 (1753).

Type: in Zeylona, China.

Striga lutea Lour., Fl. Cochinch. ed. 1, 1:22 (1790); Muschl., Man. Fl. Egypt 2:880 (1912).

Type: Canton, Loureiro (P).

Distribution:

Parasite on Maize, only known in the vicinity of Abu Zaabal of the Nile Delta. Known from Tropical and South Africa, India Sri-lanka and S.E. Asia.

Selected specimens:

(Nv) Abu Zaabal; 5.10.1928; *Shabetai* z 149 (CAI); Abu Zaabal; 11.8.1966; *Khattab* 1234 (CAIM).

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