

Plantaginaceae in the flora of Egypt

1. Systematic revision of the indigenous taxa

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Hosny, A. and Waly, N. M. 2001. Plantaginaceae in the flora of Egypt. 1. Systematic revision of the indigenous taxa. *Taeckholmia* 21(2):239-255.

Plantago is the representative genus of Plantaginaceae in Egypt, it comprises 19 species of which *Plantago weldenii* Rchb. is recorded new to the flora of Egypt. Stem, leaf shape and size, and inflorescence are key characters while floral characters are useful for the separation between the closely allied taxa.

Key words: Plantaginaceae, *Plantago*, systematic, Egypt.

Introduction

Plantaginaceae is a family of annual or perennial herbs. It comprises three genera and about 253 species widely distributed in temperate regions and mountains of the tropics. *Plantago* is the major genus with about 250 species, while *Litorrella* has two aquatic or shore species, and *Bougweria* is monotypic (Moore, 1978).

Plantago is readily distinguished by its usually rosulate foliage and apparent parallel venation, the spicate or capitate inflorescence on stout or wiry scapes, the 4-merous flowers with membranous corollas, stamens much exerted on wiry filaments, bicarpellate gynoecium and a dehiscent capsule (*pyxis*) with two or more seeds.

Hallier (1912) and Wettstein (1935), included Plantaginaceae in Tubiflorae as allied to Scrophulariaceae. Bessey (1915), placed it in his Primulales as derived from or related to Plumbaginaceae. Hutchinson (1948), returned it to the Plantaginales and derived this order from primulaceous ancestors.

Plantaginaceae is represented in the flora of Egypt by the genus *Plantago*, which comprises 21 species and 7 varieties (Tackholm, 1974). El Hadidi & Fayed (1994/1995) and Boulos (1995) reported the occurrence of 22 species.

The present account aims to revise critically the indigenous species of *Plantago* based on the collections kept in the Egyptian Herbaria in Particular (CAI & CAIM), as well as field studies.

Phytogeographical subdivision for the representative specimens are those of El Hadidi (1993); Figure (1).

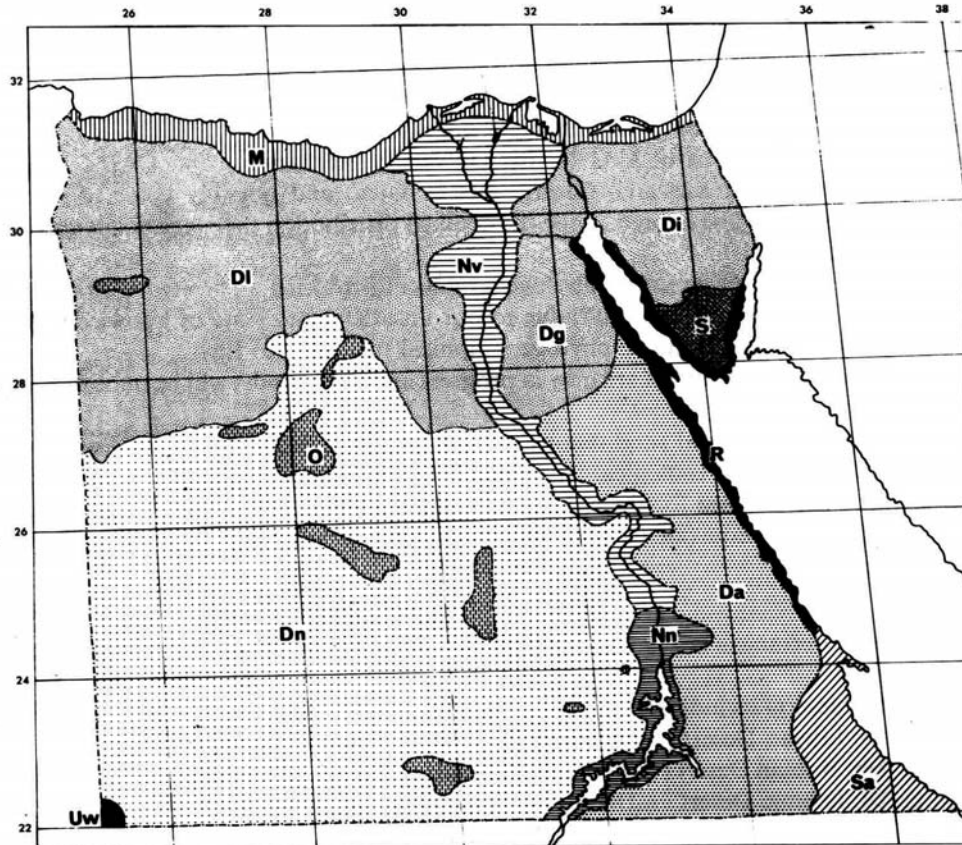


Figure 1. Phytogeographical subdivisions of Egypt. (M) Mediterranean coastal belt, (D1) Libyan Desert, (Dn) Nubian Desert, (Di) Isthmic Desert, (Dg) Galala Desert, (Da) Arabian Desert, (Nv) Nile Valley sector of the Nile-land, (Nn) Nile nubian sector of the Nile land, (O) Oases of (D1) & (Dn), (S) Southern mountainous Sinai, (R) Red Sea coastal plains, (Sa) Gebel Elba district; (Uw) Gebel Uweinat area.

Systematic treatments

1. Characters of systematic value

The present investigation revealed the presence of 19 species among which the following characters are of systematic value.

a. The stem and leaves (Figure 2).

Ten species which belong to subgenus *Plantago* are stemless or characterized by a very short basal stock on which leaves are crowded in rosettes. The other nine species are

characterized by a distinct stem with mostly opposite leaves. Of these, six species belong to subgenus *Psyllium* with stems reaching 20 cm long; and three species which belong to subgenus *Plantago* viz. *Plantago crassifolia*, *P. citiata* and *P. amplexicaulis* which are characterized by a shorter stems not exceeding 5 cm long.

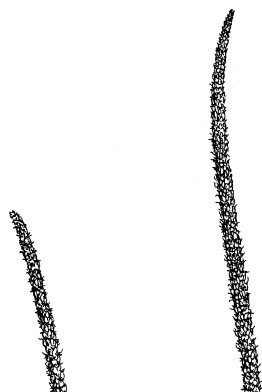
The leaf characters were found useful to distinguish between certain species, viz. *Plantago major*, *P. lagopus* and *P. lanceolata* which are characterized by large (5-20 x 1-16 cm) and long or short petiolate leaves. Leaves are usually smaller (4-15 x 0.2-2 cm) among the other recorded species and without a distinct petiole. They are usually entire or with a few teeth in *Plantago ovata*, *P. cylindrica* and *P. albicans*. Four species are characterized by leaves with prominent teeth or lobes viz. *Plantago crypsoides*, *P. weldenii*, *P. notata* and *P. coronopus*.

b. Inflorescence

The inflorescence is usually distinguished into a lower cylindrical scape and an upper spike of varying shape and size. The length of scape varies between, twice the length of the leaves (10-30 cm long) in *Plantago albicans*, *P. lanceolata*, *P. lagopus* and *P. crassifolia*, or much shorter than leaves (not exceeding 6 cm long) in *Plantago crypsoides* and the species of subgenus *Psyllium*. The other species which belong to subgenus *Plantago* have subequal scape to its subtending leaves; its length mostly reaching 20 cm long (-35cm long in *Plantago major*).

The scapes in most of the species are terete, erect to ascending, procumbent and recurved in *Plantago crypsoides* and clavate in *P. weldenii*.

The spike varies in shape from the cylindrical (12 species) to ovoid or ovoid-globoid (7 species). In *Plantago ovata* and *P. exigua*, spikes are ovoid (c. 2x1 cm), with dense flowers in the former and lax flowers in the latter. Ovoid-globoid spike with mostly dense flowers is characteristic to *Plantago amplexicaulis*, *P. squarrosa*, *P. arenaria* and *P. afra*. The flowers are lax in the spike of *P. sinaica*. The cylindrical spike is long (10-15 cm long) in *Plantago crassifolia* and *P. major*, both with dense flowers, and in *P. cylindrica* and *P. albicans* with lax flowers. The other eight species have a shorter cylindrical spike (2-5 cm long) with dense flowers.





a

b

Figure 2.a. *Plantago major*, plant stemless, leaves ovate, petiolate, scape erect, spike elongate cylindrical, (x 0.5). **b.** *P. crypsoides*, leaves with lobed margin (x 0.75), scape procumbent-curved, spike short cylindrical.





c

d

Figure 2, continued. c. *P. arenaria*, stem long, leaves sessile, entire, spike globose, dense flowered.
d. *P. crassifolia*, stem short, leaves narrow linear (x 0.5).

c. Floral bracts and sepals

The floral bracts (Fig. 3) and sepals (Fig. 4) are reliable characters for the distinction of at least half of the investigated taxa. They are useful for the separation of pairs of habitually similar species. This is the case of the bracts and sepals which are hairy in *Plantago ciliata*, and are glabrous in the habitually similar *P. amplexicaulis*. The bracts are densely woolly and the sepals with apical woolly hairs in *Plantago notata*, these bracts are glabrous and the sepals with short marginal hairs in the habitually similar *P. coronopus*. *Plantago exigua* and *P. afra* are also habitually similar annual herbs with lax leaves on a cauline stem. Both species share some of the floral characters viz. colour of flower

center, shape of posterior sepals and lower bracts; the latter are longer and larger than sepals in *Plantago exigua* and smaller and shorter than sepals in *P. afra*. *Plantago squarrosa* and *P. arenaria* are another two habitually similar species but can be separated by the size of the posterior sepals which are equal in the former and unequal in the latter.

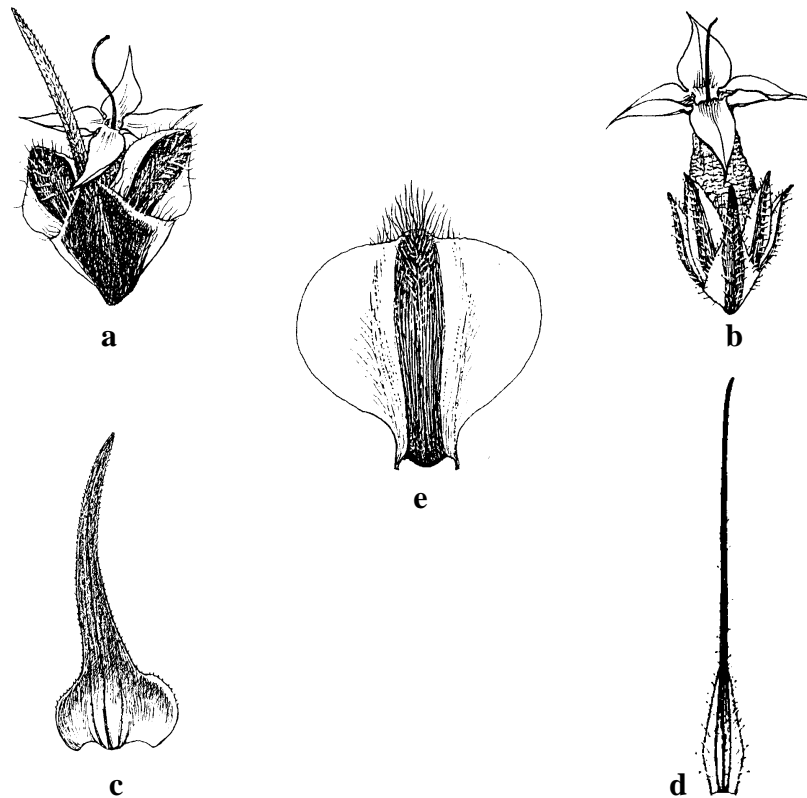
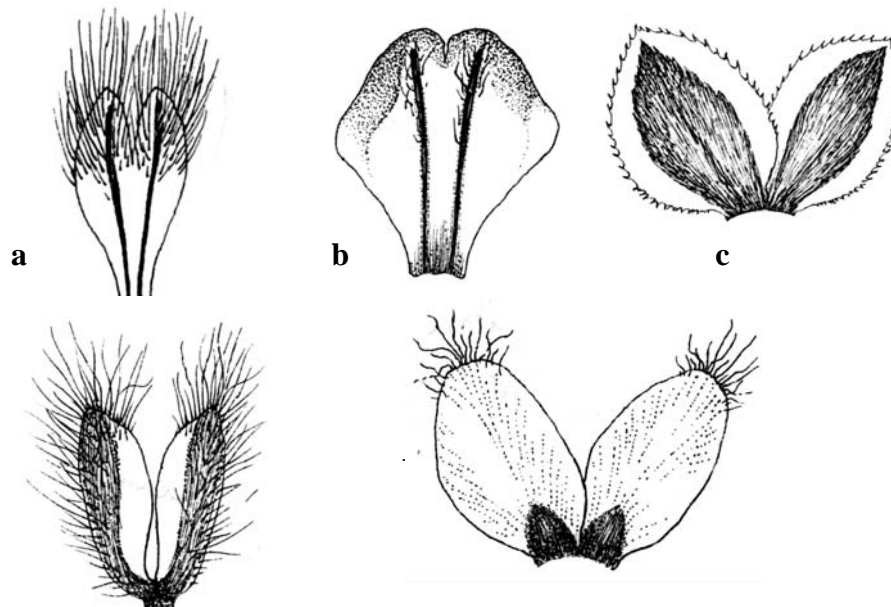


Figure 3. Lower bracts in, **a.** *Plantago arenaria*, (x 10) longer than sepals. **b.** *P. afra*, (x 5) shorter than sepals, **c.** *P. squarrosa*, (x 10) with broad clasping base and linear laminar part. **d.** *P. exigua* (x 3.5) ovate with narrow tip. **e.** *P. cylindrica*, (x 5) orbicular.



d

e

Figure 4. Anterior sepals in, **a.** *Plantago lagopus*, (x 7.5) united with long hairs. **b.** *P. lanceolata*, (x 7.5) united and glabrous. **c.** *P. coronopus*, (x 15) free, margin with short hairs. **d.** *P. notata* (x 7.5) free with apical woolly hairs. **e.** *P. ciliata*, (x 12) free, margin and apex with long hairs.

2. Key to the species

- 1.a. Plants with distinct stems, leaves mostly opposite 2
- b. Plants stemless with rosettes of leaves 10
- 2.a. Stem in mature plants short, 2-5 cm long 3
- b. Stem in mature plants longer, more than 10 cm long 5
- 3.a. Perennial, leaves narrowly linear, 5-10 x 0.1-0.6 cm; scape
10-20 cm long, spike elongate cylindrical 5-12 cm long 4. *P. crassifolia*
- b. Annuals, leaves lanceolate to spatulate 3-18 x 0.5-1.5 cm; scape 2-15 cm
long, spike short cylindrical up to 2.5 cm long or ovoid up to 3 cm long 4
- 4.a. Leaves spatulate, 2-8 x 1.5 cm; bracts and sepals with long
hairs on margin and apex; spike axis densely hairy 12. *P. ciliata*
- b. Leaves lanceolate, 3-18 x 0.5-1.5 cm; bracts and sepals
glabrous or rarely with a few hairs; spike axis glabrous ... 6. *P. amplexicaulis*
- 5.a. Perennial woody plant, leaves densely crowded on the stem 14. *P. sinaica*
- b. Annual herbs, leaves lax on the stem 6
- 6.a. Flower center very dark, posterior sepals flat 15. *P. phaeostoma*
- b. Flower center pale, posterior sepals with a dorsal wing or ridge 7
- 7.a. Lower bracts with broad clasping base and an ovate or linear laminar part ... 8
- b. Lower bracts ovate to lanceolate with narrow tips 9
- 8.a. Leaves linear-spathulate 1-2.5 x 0.1-0.3 cm, posterior sepals
equal 16. *P. squarrosa*
- b. Leaves linear-lanceolate, 2-7 x 0.5-3.5 cm, posterior sepals
unequal 17. *P. arenaria*
- 9.a. Lower bracts longer than sepals, 0.1-0.3 cm long 18. *P. exigua*
- b. Lower bracts shorter than sepals, 0.3- 0.8 cm long 19. *P. afra*
- 10.a. Leaves ovate or broad lanceolate, 1-4 (-16) cm broad 11
- b. Leaves narrowly lanceolate - linear, 0.2-1.5 cm broad 13
- 11.a. Leaves ovate, 6-20 x 1-4(-16) cm, distinctly petiolate, anterior
sepals free 1. *P. major*
- b. Leaves broad lanceolate, 5-15 x 1-2.5 cm, attenuated towards the base,
anterior sepals united 12
- 12.a. Annual herb; anterior sepals with long hairs 8. *P. lagopus*

- b. Perennial herb or undershrub; anterior sepals glabrous or with few short hairs 7. *P. lanceolata*
- 13.a. Leaves entire with few teeth 14
- b. Leaves with prominent teeth or lobes 16
- 14.a. Sepals glabrous, spike ovoid 11. *P. ovata*
- b. Sepals hairy, spike cylindrical 15
- 15.a. Scape 1-9 cm long, equal or shorter than leaves, spike 1.5-13 cm long, flowers dense 10. *P. cylindrica*
- b. Scape 7-30 cm long, twice the length of the leaves, spike 1-15 cm long, flowers lax 9. *P. albicans*
- 16.a. Scape and spikes shorter than leaves, descending 17
- b. Scapes and spikes longer than leaves, erect 18
- 17.a. Scapes procumbent - recurved, sepals hairy 5. *P. crypsoides*
- b. Scapes clavate, sepals glabrous 3. *P. wildenii*
- 18.a. Bracts densely woolly, sepals with apical woolly hairs 13. *P. notata*
- b. Bracts glabrous or sparingly hairy, sepals with short marginal hairs 2. *P. coronopus*

3. Synopsis of the Egyptian species of *Plantago*

The taxa are arranged according to the system proposed by Pilger (1937).

I. Subgenus: *Plantago*

Section: *Plantago*

1. *P. major* L.

Section: *Coronopus*

2. *P. coronopus* L.

* 3. *P. weldenii* Rchb.

4. *P. crassifolia* Forsskal

5. *P. crypsoides* Boiss.

Section: *Bauphula*

6. *P. amplexicaulis* Cav.

Section: *Lagopus* Gord.

7. *P. lanceolata* L.

8. *P. lagopus* L.

Section: *Leucopsyllium* Decne

9. *P. albicans* L.

10. *P. cylindrica* Forsskal

11. *P. ovata* Forsskal

12. *P. ciliata* Desf.

13. *P. notata* Lagasca

II. Subgenus: *Psyllium*

Section: *Psyllium* (Juss)DC.

14. *P. sinaica* (Barneoud) Decne

15. *P. phaeostoma* Boiss. & Heldr.

16. *P. squarrosa* Murray
17. *P. arenaria* waldst. & Kit.
18. *P. exigua* Murray
19. *P. afra* L.

* New record to the flora of Egypt.

Note: Täckholm (1974), El Hadidi & Fayed (1994/95) and Boulos (1995) reported the occurrence of *Plantago sarcophylla* (Boiss.)Zohary without certainty. The same authors reported the occurrence of *Plantago chamaepsyllium* Zohary and *P.bellardi* All.from Sinai Peninsula. No specimens belonging to the three species were seen or collected by the authors and their occurrence in Egypt is uncertain.

4. Enumeration of taxa

I. Subgenus: *Plantago* L.

=*Euplantago* Harms in Engler& Plant., Pflanzenfam. IV,3b:370 (1895).
Annual or perennial herbs, generally stemless; leaves alternate usually rosulate.

Section: *Plantago* L.

=*Polyneuron* Decne, in DC.Prodr.13,1:694(1852).
Perennial, stemless herbs, leaves broad, distinctly petiolate ; seed minute angular.

1. *Plantago major* L., Sp.Pl.ed.1:112(1753). (Fig. 1.a.)

Type: In Europa ad vias, specimen no. 144/1 microfiche (LINN, holotype).

Distribution

Common weed in Farmland and moist places of Egypt. Known from temperate parts of the Old World; naturalized elsewhere.

Representative specimens

M: Sidi Gaber, 8.10.1907; *Guvaine* s.n. (CAI). **Nv:** Matoubas, Rosetta, 6.8.1971; *Imam&al.* s.n. (CAI)-Mansoura, near the town, wheat field, 9.4.1971; *Imam* s.n. (CAI)- Cairo, Orman garden as a weed, 5.4.1928; *Hassib* s.n. (CAI)- El Fogai, Minia, 23.4.1941; *Shabetai* s.n. (CAI)- Kom ombo, 12.5.1959;*M.Abdalla* s.n. (CAIM)- Asswan Dam area, 6.7.1967; *El Hadidi & Ghabbour* s.n. (CAI). **Di:** Tel El-Kebir, 5.8.1931; *Drar* s.n. (CAIM). **O:** El Aguz, Bahariya oasis, 17.4.1935; *Drar* s.n. (CAI)- Kharga Oasis, 2.8.1931; *Drar* s.n. (CAI).

Section: *Coronopus* DC., in Lam. & DC., Fl.Fr. ed.3,3:417 (1805).

Annual or perennial, mostly stemless herbs; leaves narrow often pinnately dentate; seed face with distinct hilum.

2. *Plantago coronopus* L., Sp.Pl.ed.1:115 (1753). (Fig.3.c.)

Type: In Europae glareosis, specimen no. 144/24 microfiche (LINN, holotype).

Distribution:

Coastal plains and weed in barley field of the Mediterranean coastal lands of Egypt. Known from the Mediterranean region.

Representative specimens

M: Sidi Abdel Rahman, 8.3.1978; *Imam & Soliman* s.n. (CAI)- Abu Mandour, 11.3.1978; *Soliman* s.n. (CAI).

***3. *Plantago weldenii* Rchb, Fl.Germ.Excurs. :396 (1831)**

=*P. coronopus* L. subsp. *weldenii* (Rchb.) Arcag., Comp.Fl.Ital.:501 (1882)

=*P. coronopus* L. subsp. *commutata* (Guss.) Pilg. Fedd. Repert.Spec.Nov.Regni. 28:287 (1930).

= *P. commutata* Guss.; Suppl.Fl.Sicual.Prodr.1:46 (1832)

Type: In arenosis maritimis, Ustica Lampedusa, Italy; *Gussone*.

Note: The careful examination of the available materials of *Plantago coronopus* revealed the presence of two distinct taxa: *P. weldenii* with scape and spikes are descending and shorter than leaves; and *P. coronopus* with erect scape and spikes which are longer than leaves. Both species were regarded by some scholars as two subspecies of *P. coronopus*.

Distribution

Coastal plains along the Mediterranean sea and wadi beds of the Eastern desert in Egypt. Known from North Africa, eastwards to SW Asia and Arabian peninsula.

Representative specimens

M: Sidi Barrani, 19.4.1963; *El Megid* s.n. (CAI)- Saniet El-Hagg Aiyad, wadi Habs, between Mersa Matruh and Agiba, 23.3.1974; *Tackholm & al.* s.n.(CAI)- Burg El Arab, 22.3.1956; *El Hadidi* s.n.(CAI)- El Arish, 20.3.1928; *G.Tackholm* s.n.(CAI). **Di:** Wadi El-Maghara, 22.4.1959; *Boulos* s.n.(CAI). **Dg:** Wadi Hof, 17.4.1922; *Simpson* 1114 (CAIM). **Da:** Wadi Araba, Red sea district, 9.2.1966; *Tackholm & Boulos* s.n. (CAI)-Wadi Askhar, S. Galala, 11.3.1937; *Shabetai* 3612 (CAIM).

4. *Plantago crassifolia* Forssk., Fl.Aegypt.-Arab.:31 (1775). (Fig. 1.d.)

Type: *Forsskal*, no. 261 microfiche (C, holotype).

Distribution

Confined in Egypt to the Mediterranean coastal planes, moist places and barely fields. Known from Eastern and southern parts of the Mediterranean region.

Representative specimens

M: Along the seashore road Burg El Arab-Amriya, 27.5.1958; *Boulos* s.n. (CAI)- Near Sidi Beshar, Alexandria, 9.10.1923; *Simpson* 2190 (CAIM)- Gheit El Nassara, Damietta, 11.4.1922; *Simpson* 983 (CAIM).

5. *Plantago crypsoides* Boiss., Fl. Orient. 4:888 (1879). (Fig. 1.b)

Type: In arenosis Egypti circa Alexandria.

Distribution

In Egypt, coastal plains along the Mediterranean including barely fields and orchards, southwards in the northern parts of the Libyan and Isthmic Deserts. Known from Libya.

Representative specimens

M: Sallum, 5 km E of the frontier, 24.5.1963; *Tackholm & al.* s.n. (CAI)- Vicinity of Mersah Matruh, 1.4.1972; *Tackholm & al.* s.n. (CAI)- Fuka, 10.4.1932; *Shabetai* 1717 (CAIM)- King Mariut, 22.1.1928; *G. Tackholm* s.n. (CAI). **DI:** Cairo- Alexandria desert road, 16.4.1961; *Tackholm & al.* s.n.(CAI). **Di:** Wadi Ain El-Gedeirat, 6.4.1939; *Drar* s.n. (CAIM).

Section: *Bauphula* Decne, in DC., Prodr.13,1:719(1852).

Annuals, stem ± elongated, leaves amplexicaulis; seeds large, cymbiform.

6. *Plantago amplexicaulis* Cav., Icon.Descr. 2:22 (1793)

6.a. *P. amplexicaulis* subsp. ***bauphula*** (Edgew) Rech.fil.,Fl.Iran. 15:11(1965).

= *P. bauphula* Edgew., In Hook. Journ. Bot. 2:285 (1840).

Type: Malwa et Pentepotamia, Sikh State; *Edgew.*

Distribution

Sand plains and wadi beds of the Eastern Desert and Gebel Elba district of Egypt. Known from Palestine, northern parts of Arabian peninsula and eastwards in SW Asia.

Representative specimens

Di: Wadi El- Gedierat, 15.3.1930; *Drar* s.n. (CAIM)- El-Kuntilla, 14.5.(1939); *Drar* s.n. (CAIM). **Dg:** The area behind Abboud factories, 7.3.1954; *El Hadidi* s.n. (CAI)- Wadi Aber near Suez, 15.2.1966; *El Hadidi* s.n. (CAI). **Da:** Wadi Halos, 6.2.1961; *Tackholm & al.* s.n. (CAI). **R:** Hurghada, 5.1933; *Muluk* s.n. (CAI)- Gebel Samouki, 6.2.1961; *Tackholm & al.* 232 (CAI)- Gebel Hamata, 7.2.1961; *Tackholm & al.* 325 (CAI). **Ge:** Gebel Elba, wadi Mera Kwan, 10.2.1962; *Tackholm & al.* s.n. (CAI)- Gebel Elba, Khor wadi El Shallal, 24.1.1962; *Tackholm & al.* s.n. (CAI).

Section: *Lagopus* Gord. In Gren. & Godr., Fl. Fr. 2:726(1852-53).

Annual or perennial herbs, stemless, leaves lanceolate, attenuate; seeds concave on ventral side.

7. *Plantago lanceolata* L., Sp.Pl. ed.1:113 (1753). (Fig. 3.b.)

Type: In Europae campis sterilibus.

Distribution

Weed in moist places and the deserts outskirting the arable land of Egypt. Known from central and S Europe, N Africa, SW Asia and Australia.

Representative specimens

Di: Ismailia, from a garden, 23.6.1936; *Shabetai* 4858 (CAIM)- Cairo-Inshas road to the left of the road, 15.4.1960; *Tackholm* s.n. (CAI).

8. *Plantago lagopus* L., Sp.Pl.ed.1:114 (1753). (Fig. 3.a.)

Type: In Gallia Narbonensi, Hispania-Lusitania (LINN, syntype).
=*P. lusitanica* L., Sp.Pl.ed.2:1667 (1763)

Distribution:

Weed in moist places along the Mediterranean coastal land, cultivations of the Nile land and the Oases of Egypt. Known from S Europe, N Africa, SW Asia and eastwards to Pakistan.

Representative specimens

M: King Mariut, 22.1.1928; *G.Tackholm* s.n. (CAI)- Janaklis farm, Abu El-Matamir, 28.5.1967; *Tackholm & al.* s.n. (CAI)- Cairo - Alex. Desert road, between Rest House and Amriya, 2.4.1971; *Ibrahim & Mahdi* s.n. (CAI)- Rafah, near the station, 22.3.1928; *G. Tackholm* s.n. (CAI). **Nv:** Fayium, 3.5.1976; *Chrték* s.n. (CAI)- Fayium, 18.4.1952; *El Hadidi* s.n. (CAI)- Ibshawai, Fayium, 26.3.1923; *Simpson* 2129 (CAIM). **O:** Baweti, Bahariya Oasis, 28.3.1934; *Drar* s.n. (CAI)- Farafra Oasis, Farafra town, 21.3.1968; *G. Romee* 632 (CAI)- Budkhlu, Dakhla Oasis, 1& 12.2.1968; *G. Romee* 155 (CAI)- Ezbet Shiekh Wali, 10.2.1931; *Hassib* s.n. (CAI)-S of Hibis Temple, Kharga Oasis, 9.1.1939; *Runekwitz* s.n. (CAI).

Section: *Leucopsyllium* Decne, in DC. Prodr. 13,1:704 (1852).

Stem short, leaves narrow, often villose; seed thick, longitudinally grooved on ventral side.

9. *Plantago albicans* L., Sp.Pl.ed.1:114 (1753).

Type: Ex Hispania et Narbona.

Distribution

Confined mainly to the moist places, barely fields and orchards of the Mediterranean coastal land of Egypt; also in sand plains and wadi beds of Galala desert. Known from S Europe, N Africa, SW Asia; eastwards to Iran.

Representative specimens

M: Sallum, barely fields, 95 km E of Sallum, 26.5.1963; *Tackholm & al.* s.n. (CAI)- Wadi Habis, between Mersa Matruh and Agiba, 23.3.1974; *Tackholm & al.* s.n. (CAI)- Burg El Arab, 3 1953; *Imam & Ayaad* s.n. (CAIM)- El Arish, 16,3,1928; *Drar* s.n. (CAIM)- Rafah, near the station, 22.3.1928; *G.Tackholm* s.n. (CAI). **DI:** Cairo-Alexandria desert road, Tahrir province, s of Amria, 5.5.1968; *Tackholm & al.* s.n.

(CAI). **Dg:**Wadi, El Maadi, 10.10.1972; *Saad & al.* s.n. (CAIM)- Suez road K 24 from Heliopolis, 17.4.1953; *Fadeel* s.n. (CAI).

10. *Plantago cylindrica* Forssk., Fl.Aegypt.-Arab.:31(1775). (Fig. 3.e.)

Type: Cairo; *Forsskal* 257, microfiche (C, holotype).

Distribution

Confined to the N Mediterranean coastal plains and wadi beds and sand plains of the northern deserts of Egypt. Known from Palestine, Saudi Arabia, eastwards to Iran.

Representative specimens

M: The way between Berg El Arab and El Alamin, 1.6.1964; *Tackholm & al.* s.n. (CAI)- Bir Lehfen S El Arish, 21.3.1928; *G.Tackholm* s.n. (CAI). **Di:** Mitla Pass, 10.5.1939; *Drar* s.n. (CAIM). **Dg:** Wadi Angabia, 3.1953; *El Hadidi* s.n. (CAI)- Wadi Lablab, 6.3.1953; *Boulos* s.n. (CAI)- Wadi Digla of Maadi, 27.1.1966; *El Hadidi & Boulos* s.n. (CAI).

11. *Plantago ovata* Forssk., Fl. Aegypt.-Arab.:31 (1775)

Type: Alexandria, *Forsskal* 253, microfiche (C, holotype).

=*P. decumbens* Forssk., Fl.Aegypt.-Arab.:30 (1775).

Distribution

In Egypt, coastal plains along the Mediterranean and Red Sea, sand plains and wadi beds of the deserts of Sinai specially after rain. Known from NW America, Atlantic Islands, Mediterranean regions, and SW Asia, eastwards to Pakistan.

Representative specimens

M: El Alamin, 110 km W of Alexandria, 27.22.1968; *G.Romee* s.n. (CAI)- El Arish, 20.3.1928; *G. Tackholm* s.n. (CAI). **Di:** A branch of El Maghara, 22.4.1959; *Boulos* s.n. (CAI & CAIM)- Wadi El Gedierat, 19.3.1930; *Drar* s.n. (CAIM)- Nekhl, 10.5.1959; *Drar* s.n. (CAIM)- In the desert N of wadi Timulat on Bilbeis-Ismailia road, 15.4.1960; *Tackholm* s.n.(CAI). **DI:** Abu Rawash road, Giza, 22.3.1957; *Soad* s.n. (CAI). **Dg:** Wadi Aber, G. Ataq, Suez, 15.2.1956; *Tackholm* s.n. (CAI)-Wadi El Ghomeyla, 16.3.1937; *Shabetai* 3611 (CAI & CAIM)- Wadi Lablab, near G. Ahmer, Cairo, 17.3.1957; *Imam & Ayyad* s.n. (CAI). **S:** Wadi Ramliya, W of wadi El-Arbaain, 12.4.1945; *Shabetai* 5656; (CAIM). **R:** Road between Ain Sukhuna and Bir Udeib, 13.3.1954; *Boulos* s.n. (CAI).

12. *Plantago ciliata* Desf., Fl. Atlant.1:137, tab.39, fig.3 (1798).(Fig. 3.e.)

Type: In arenis deserti prope Cassam et Elhammah.

Distribution

In Egypt, sand plains and wadi beds western of the Eastern Desert, Gebel Elba district and the Oases. Known from Canary Island N Africa, SW Asia and Arabia peninsula.

Representative specimens

M: El Amriya, Maruit, 10.4.1971; *Imam & Mahdi* s.n. (CAI). **Di:** Tel El Kebir, 5.8.1931; *Drar* s.n. (CAIM). **DI:** Tahrir Pronince, 8.6.1973; *Ibrahim & al.* s.n. (CAI). **Da:** Wadi Gemal, 6.2.1961; *Tackholm & al.* s.n. (CAI)- 179 km E of Edfu, 10.2.1961; *Tackholm & al.* s.n. (CAI). **O:** El Agguz, Bahariya Oasis, 17.4.1935; *Drar* s.n. (CAIM)- Kharga Oasis, 2.10.1928; *Drar* s.n. (CAIM). **R:** Between El Shatt and Abu Zeneima, 14.4.1937; *Shabetai* (CAIM)- Gebel El Faraied, 6.2.1961; *Tackholm & al.* s.n. (CAI).

13. *Plantago notata* Lag., Gen.Sp.Pl.:7 (1816).(Fig. 3.d.)

Type: Hispania, Pulpi inter Cuevas et Heliocrata.

Distribution

In Egypt, Mediterranean coastal plains and southwards in sandy deserts. Known from Spain, N Africa, SW Asia, Iraq and Iran.

Representative specimens

M: Wadi Umm El Rakham, between Mersa Matruh and Agiba, 23.3.1974; *Tackholm & al.* s.n. (CAI)- Dabaa, 3.5.1955; *Tackholm & al.* s.n. (CAI)- Along the road Amriya-Burg El Arab, 24.3.1961; *Tackholm & al.* s.n. (CAI). **DI:** Cairo-Alexandria desert road, 180 km from Cairo, in field W of the road, 16.4.1967; *Tackholm & al.* s.n. (CAI).

II. Subgenus: *Psyllium* (Juss.) Harms in Engler & Prantl, Pflanzenfam. 4,310:373(1895).

Annual, small shrubs, with more or less elongated, branched stems, leaves opposite, narrow.

Section: *Psyllium* (Juss.)DC. In Lam. & DC., Fl.Fr.ed.3,3:409(1805).

Plant glandulose; spike short, anterior sepals slightly concave, posterior sepals broadly concave, corolla tube glabrous, rugulose.

14. *Plantago sinaica* (Barneoud) Decne, In DC. Prodr.13,1:733 (1852).

Type: not indicated.

=*P. psyllium* L. var. *sinaica* Barneoud, Monogr.*Plantag.*:49(1845).

=*P. arabica* Boiss., Diagn. Fl. Orient. 12:94(1853), nom. illeg.

Distribution

In Egypt, confined to rocky habitats of southern Sinai. Endemic to mountainous Sinai.

Representative specimens

S: Gebel El Deir, near St Catherine Monastery, 10.5.1956; *El Hadidi* s.n. (CAI)- Geneinet El Arbaain, foot of Mt.St.Catherine, 16.4.1937; *Shabetai* s.n. (CAIM)-

Abu Himan, 2.4.1927; *Kaiser* s.n. (CAI)- On the top of Gebel Musa, 22.4.1967; *Tackholm & al.* s.n. (CAI).

15. *Plantago phaeostoma* Boiss. & Heldr., in Boiss. *Diagn.Pl.Orient.* ser.2,4:71(1859).

Type: In Aegypto prope Alexandria; *Samaritani*.

Distribution

In Egypt, coastal plains along the Mediterranean Sea and wadi beds in northern desert. Known from Libya and Arabian peninsula.

Representative specimens

M: Burg El Arab, 28.3.1957; *Tackholm* s.n. (CAI). **Di:** Wadi El Gedeirat, 4.4.1939; *Drar* s.n. (CAI).

16. *Plantago squarrosa* Murray, *Comment. Soc.Regiae Sci. Gott.*4:38 (1782).

(Fig. 2.c.)

Type: not indicated.

= *P. aegyptiaca* Jacq., *Coll.* 1:45 (1786)

Distribution:

In Egypt, the Mediterranean coastal plains, dry and sandy places. Known from Crete, Greece and Libya.

Representative Specimens

M: Saniet El Hagg Ayyd, wadi Habs, between Mersa Matruh and Agiba, 22.3.1974; *Tackholm & al.* s.n. (CAI)- Maamourah, NE Alexandria, 22.3.1911; *Hartmann* s.n. (CAI)- Abu Mandor- Rosetta, 11.3.1978; *Soliman* s.n. (CAI)- Al Arish, 20.3.1928; *G. Tackholm* s.n. (CAI).

17. *Plantago arenaria* Waldst.& Kit., *Pl. Rar.Hung.*1: 51.tab.51(1802). (Fig.1.c

&2.a.)

Type: Described from Hungary.

= *P. psyllium* L., *Sp.Pl.* ed.1:115 (1753). nom. confus

= *P. indica* L., *Syst. Nat.*ed.10:896 (1759). nom. illeg.

= *P. ramosa* (Gilib.) Aschers., *Fl. Brandenb.* 1:547 (1864). nom. illeg.

Distribution

Weed of recent introduction to the Oases of the Western Desert, Egypt. Known from Temperate Europe, N Africa, SW Asia, eastwards to Pakistan.

Representative specimens

O: Bahariya Oasis, El Heiz, Ain Tablamon, 15.5.1978; *Abdel-Ghani* s.n. (CAI)- Dakhla Oasis, Rashda, 6.2.1929; *Drar* s.n. (CAI)- Kharga Oasis, in agris., 12.3.1967; *El Hadidi & al.* s.n. (CAI).

18. *Plantago exigua* Murray, Comment. Soc. Regiae Sci. Gott. 1:94 (1779). (Fig. 2.d.)

Type: ex Aegypto, Verosimiliter.

=*P. pumila* L. fil., Suppl. Pl.:125 (1782).

Distribution

In Egypt, weed in fields and orchards of the Oases as an escape from cultivation. Known from Iran, Afghanistan and Pakistan.

Representative specimens

O: wadi El Natrun, 3.1970; *Naguib* s.n. (CAI)- Bahariya Oasis, El Gedida village, weed in gardens, 20.1.1979; *Abdel-Ghani* s.n. (CAI)- Kharga Oasis, in agris prop. Kharga, 12.3.1967; *El Hadidi & al.* s.n. (CAI).

19. *Plantago afra* L. Sp.Pl. ed.2:167 (1762). (Fig. 2.b.)

=*P. psyllium* sensu L., Sp.Pl. ed.2:167 (1762). nom. ambig.

=*P. parviflora* Desf., Fl. Atlant. 1:141 (1798).

Type: Habitat in regno Tunetano.

Distribution

In Egypt, coastal plains along the Mediterranean and Red Sea coastal lands, Sinai and Elba District. Known from N Africa, eastwards to SW Asia.

Representative specimens

M: Bir-Lehfen, El Arish, 21.3.1928; *G.Tackholm* s.n. (CAI). **Di:** Tel El Kebir, 9.2.1939; *Shabetai* 7609 (CAIM). **DI:** Wadi Natroun, 11.5.1970; *Imam* s.n. (CAI). **Dg:** Wadi Nooz, N Galala, 2.4.1929; *Simpson* 2853 (CAIM). **O:** El Kharga Oasis, 19.3.1962; *Sharobim & Shalaby* 1678 (CAIM). **S:** Ain Shenarah, 18.4.1927; *Kaiser* 1270 ((CAIM). **R:** Wadi El Hankaila, near the gold mines, 4.2.1961; *Tackholm & al.* 338 (CAI). **Ge:** Wadi Mawaw, 28.1.1962; *Tackholm & al.* 885 & 950 (CAI)- Wadi Kansisrob, 24.1.1933; *Shabetai* 2700 (CAIM).

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