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# A Synoptic Revision of Acanthaceae in Egypt, With a New Record From Gebel Elba

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A systematic revision of the native taxa of the family Acanthaceae in Egypt is carried out. The study revealed the presence of nine species belonging to seven genera, two tribes and one subfamily, mostly restricted to the southeastern corner of Egypt. *Monechma* Hochst. is a new record to the flora of Egypt represented by *Monechma debile* (Forssk.) Nees, while the presence of *Justicia ladonoides* Lam. is doubtful. For the investigated taxa, valid name, synonyms, types, general distribution, representative specimens and conservation status are given. Identification keys for the determination of all genera and species are also provided.

***Key words***: Acanthaceae, conservation status, flora of Egypt, *Monechma* Hochst., new record.

## *Introduction*

Acanthaceae is a large tropical family of advanced sympetalous dicotyledons. It comprises about 212 genera and 3175 species of herbs and shrubs; several are cultivated as ornamentals (Mabberley, 2008).

The family has four centers of distribution: Indomalysia, Africa, Brazil and Central America northward into Mexico (Heywood, 1978). It shows a wide range of morphological variation and is readily distinguished by the usual presence of cystoliths in vegetative parts, the presence of floral bracts and bracteoles, the usually bilabiate corollas, the bivalvate elastically dehiscing explosive capsule and by the retinacula (hook-like funicle) projecting the seeds.

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Four general classifications of the family were made by Nees ab Ezenbeck (1847), Bentham (1876), Lindau (1895) and Bremekamp (1965). Other geographically based classifications were presented by Burkill & Clarke (1899-1900) and Balkwill & Norris (1988).

The most important classification is that of Lindau (1895), who recognized four subfamilies of which the Acanthoideae comprised the genera with retinculate fruits; this character is lacking among the genera of the other three subfamilies viz. Nelsonioideae, Thunbergioideae and Mendoncioideae. Meanwhile Bremekamp (1965) categorized Nelsonioideae under Scrophulariaceae, raised Thunbergioideae and Mendoncioideae to familial level (viz. Thunbergiaceae and Mendonciaceae) and divided his restricted Acanthaceae into two groups (viz. Acanthoideae and Ruellioideae) on the basis of presence or absence of cystoliths, articulated stems, monothecate anthers and colpate pollen.

Recently, four molecular systematic studies (Hedren *et al.* 1995, Scotland *et al.* 1995, McDade & Moody 1999 and McDade *et al.* 2000 a) have elucidated the phylogeny of the family using the chloroplast genes *rbc*L, *ndh*F, *trn*L-*trn*F and *trn*L-*trn*F combined with ITS respectively, and have documented the presence of four major well-supported lineages within the family, viz. tribes Acantheae, Barlerieae, Justiceae and Ruellieae. In addition, several studies based on morphological and molecular data have also been examined at the finer levels e.g. McDade *et al.* 2000 b, Manktelow *et al.* 2001, Moylan *et al.* 2004 a, Schmidt-Lebuhn *et al.* 2005, McDade *et al.* 2005, Kiel *et al.* 2006 and Trip 2007).

Scotland & Vollesen (2000) proposed a new classification of Acanthaceae based on combinations of morphological diagnostic features, the three items statements analysis of morphological data and published molecular sequence analysis.

According to Täckholm (1974), El Hadidi & Fayed (1994/95) and Boulos (1995), Acanthaceae is represented in Egypt by six genera and eight species. Recently, Boulos (2002 & 2009) added the near endemic *Blepharis attenuata* Napper as a new record to the flora of Egypt.

The aim of the present work is to revise critically the native taxa of Acanthaceae to prepare the way for a more complete study to be under taken, to provide identification keys for genera and species of this family, as well as to assess the conservation status of each taxon following the categories and criteria of IUCN (2001).

## *Material and methods*

The taxonomic revision is based on herbarium collections kept in different Egyptian Herbaria [Cairo University Herbarium (CAI), the Agricultural Research Centre, Flora and Phytotaxonomy Herbarium (CAIM), National Research Centre, Plant Systematic Herbarium (CAIRC) and Sohag University Herbarium]. For each species, nomenclature, typification, representative specimens, local and global distribution, as well as conservation status are given. A generic description and a key to the species using readily observable characters have been constructed. For each species, the revised collections are cited according to the phytogeographical territories proposed by El Hadidi (2000) (Fig.1).

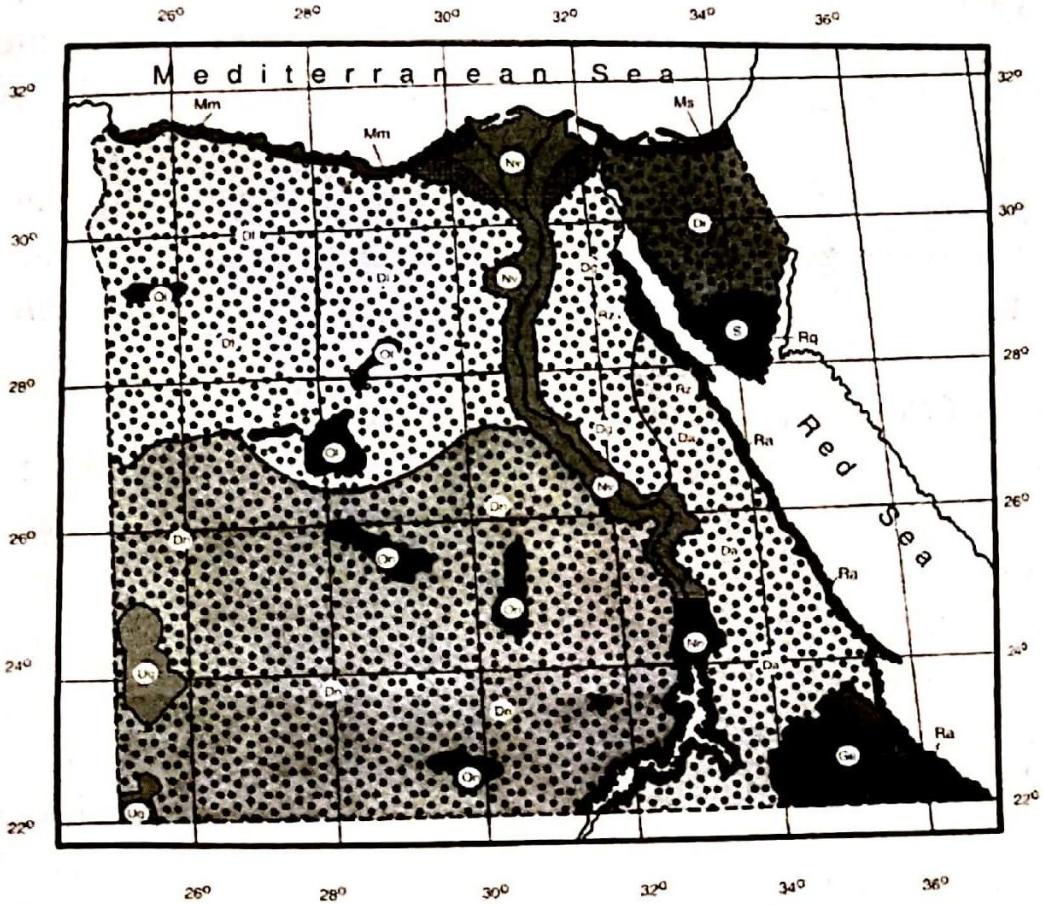


**Figure (1).** The phytogeographical territories of Egypt (after El Hadidi 2000). (Da) Arabian desert, (Dg) Galala desert, (Di) Isthmicdesert, (Dl) Libyan desert, (Dn) Nubian desert, (Ge) Gebel Elba district, (Mm) Mareotis sector of the Mediterranean coastal land, (Ms) Sinaitic sector of the Mediterranean coastal land, (Nn) Nubian sector of the Nile land, (Nv) Nile valley sector of the Nile land, (Ol)oases of the Libyan desert province, (On) oases of the Nubian desert province, (Ra) Arabian sector of the Red Sea coastal plains,(Rq) Aqaba Gulf sector of the Red Sea coastal plains, (Rz) Suez Gulf sector of the Red Sea coastal plains, (S) Mountainous southern Sinai,and (Ug) Gebel Uweinat massive.

## *Results and Discussion*

Acanthaceae is a large tropical family of annual or perennial herbs or under shrubs; stem articulate, often with distinct cystoliths (appear as streaks on stem or leaves). Leaves simple, opposite decussate, exstipulate. Inflorescence cymose or racemose, sometimes flowers solitary; flowers bisexual, mostly zygomorphic, usually subtended by distinct bracts and bracteoles. Calyx lobes 4 or 5, imbricate or valvate; corolla with long or short tube, the limb either (1)-2 lipped or 5- spreading lobes, contorted or imbricate in bud. Stamens 4, didynamous or 2, epipetalous, with or without imperfect stamens, filaments free or partially connate in pairs, anthers uni- to bithecous, thecae confluent or separated sometimes different in size, tailed or not; carpels 2, ovary superior, sessile on a nectariferous disc, 2-locules, each with 2 or more ovules, style 1, stigma 2, often unequal. Capsule usually elastically dehiscent from the apex downwards; seeds flattened, exalbuminous, attached to hook-like outgrowth of funicle (retinaculum).

The present study revealed the presence of nine indigenous species belonging to seven genera, of which *Monechma* Hochst. is a new generic record to the flora of Egypt, represented only by *Monechma debile* (Forssk.) Nees

**1-Synopsis of the Egyptian taxa of Acanthaceae**

The taxa are arranged according to the system proposed by Scotland & Vollesen (2000). Generic name proceeded by asterisk (*) is new record to the flora of Egypt.

Subfamily: Acanthoideae Link

Tribe I: Acantheae Dumort.

1- Genus: *Blepharis* Juss.

1.1- *B. edulis* (Forssk.) Pers.

1.2- *B. attenuata* Napper

Tribe II: Ruellieae Dumort.

Subtribe IIA: Ruelliinae Nees

2- Genus: *Ruellia* L.

2.1- *R. patula* Jacq.

Subtribe IIB: Justiciinae Nees

3- Genus: *Ecbolium* Kurz

3.1- *E. viride* (Forssk.) Alston

4- Genus: *Justicia* L.

4.1- *J. heterocarpa* T. Anderson

5- *Genus: *Monechma* Hochst.
5.1- *M. debile* (Forssk.) Nees
6- Genus: *Dicliptera* Juss. (= *Peristrophe* Nees)
6.1- *D. paniculata* (Forssk.) Darbysh.
Subtribe IIC: Barlerieae L.
7- Genus: *Barleria* L.
7.1- *B. acanthoides* Vahl
7.2- *B. hochstetteri* Nees

**2- Key to the genera of Acanthaceae in Egypt**

1- Sepals 4, free, unequal; seed surfaces covered with hygroscopic hairs ... **2**
- Sepals 5, united at base, subequal; seed surfaces without hairs (If present, restricted to the margin) ..... **3**

2- Cystoliths absent, leaves pseudo-whorls of 4, with spiny margin; corolla 1-lipped. Stamens 4, without staminode ..... **1. *Blepharis***
- Cystoliths present, leaves opposite, with entire margin; corolla tubular to funnel - shaped. Stamens 2, with 2-3 staminodes .... **7. *Barleria***

3- Corolla tubular; stamens 4, united two by two. Seeds 6-10 ... **2. *Ruellia***
- Corolla bilabiate; stamens 2, free. Seeds 2-4 ..... **4**

4- Anther – thecae tailed at base ..... **5**
- Anther – thecae not tailed at the base ..... **6**

5- Flowers bracteate, bracts imbricate; capsules monomorphic, seeds 2 ..... **5. *Monechma***
-Flowers ebracteate (if present bracts inconspicuous); capsules dimorphic, seeds 4 (in normal capsule) ..... **4. *Justicia***

6- Inflorescence of lax panicle-like cymose; bracts subulate, 1- nerveed. Seeds 4, discoid ..... **6. *Dicliptera***
- Inflorescence of compact, terminal and axillary spikes; bracts broadly ovate, anastomosed nerves. Seeds 2, ovoid to cordiform ..... **3. *Ecbolium***

**3- Enumeration of taxa**

**1- *Blepharis*** Juss.

**Type species:** *Blepharis maderaspatensis* (L.) Roth

**Synonym:** *Acanthodium* Delile., Descr. Egypte, Hist. Nat. 1:97(1813), & pl. 33, fig. 2(1826).

Annual or perennial herbs, subshrubs and shrubs; leaves pseudo-whorls of 4, spiny margin. Flowers are decussate in pseudo-spicate cymose inflorescence, each subtended by a spiny bract and 2- bracteoles. Calyx with 4- glumaceous, unequal sepals; corolla 1- lipped, limb 5- lobed, where

the two outer lobes are smaller and tooth-like. Stamens 4, anterior pair bifurcate at top into a short branch bearing the anther and an acute, tooth-like appendage; anther uni-thecous, hairy. Seeds discoid, covered with long white hygroscopic hairs.

A genus of 129 species, in the old world tropics and subtropics, especially numerous in eastern and southern Africa (Vellosen 2000 & 2002). It comprises three subgenera of which subgenus *Acanthodium* is represented in Egypt by two species viz. *Blepharis edulis* (Forssk.)Pers. and the near endemic *B. attenuata* Napper.

Vollesen (2000) & Boulos (2002) reported another species viz. *Blepharis linariifolia* Pers. in Egypt without certainty, where the only record of this species from Egypt collected by Paul von Würtermberg 1840 from Cairo, Ghize (Giza), and is a long way outside the rest of the distribution area. The author has not seen any authentic material of this species from Egypt to confirm its occurrence.

**Key to the species**

**a.** Bracts in the middle of inflorescence ovate to broadly ovate, with 5-7 conspicuous anastomosed veins and (3) 4-7(-8) pairs of spines on each side. Inflorescence mostly compact ..... ***B. edulis***

**b.** Bracts in the middle of inflorescence linear-lanceolate with 3 inconspicuous anastomosed veins and 2-3 pairs of spines on each side. Inflorescence lax ..... ***B. attenuata***

**1.1- *B. edulis*** (Forssk.) Pers., Syn. Pl. 2:180(1806).

**Basionym:** *Acanthus edulis* Forssk., Fl. Aegypt.- Arab. : 114(1775).

**Type:** Yemen: Al luhayyah ("Lohajae") Jan. 1763 *Forsskål* 905 (holotype: C, microfiche 1: I, 1-2!).

**Synonym:** *Acanthodium spicatum* Delile, Descr. Egypte, Hist. Nat. 1: 97, pl.33, f. 2(1813).

**Type:** Egypt, Delile s.n. ( holotype: P).

- *Blepharis linariifolia sensu* Lindau, Ann. R. Ist. Bot. Roma 6:76(1896).

- *Blepharis ciliaris* (L.) B. L. Burtt, *sensu* Täckh., Stud. Fl. Egypt ed.2: 502(1974).

**Distribution:**

In sand plains, wadi beds and rocky slopes of Eastern Desert, Gebel Elba district, Red Sea coastal plains of Egypt. Known from Sudan, Tropical East Africa, Arabia and Iran.

**Selected specimens:**

**Di:** 5 km north of El Hassana; 22/23-9-1991; *El Gibali* s.n.(CAI)- Ras el Nagb, NE Sinai; 13-5-1939; *Drar* 239(CAIM).

**Dg:** Cairo-Suez road, at kilo 116-119 from Cairo; 10-1-1961; *Täckholm* s.n.(CAI)- Bir Suez; 23-1-1927; *Simpson* 4382(CAIM)- Ataka out wash, NE slopes, Nr. 100 km Suez road; 4-2-1951; *W. Haines* s.n. (CAI).

**Ra:** Wadi Abu Had, Hurghada district; 9-6-1960; *Täckholm et al.* 33(CAI)- Gebel Hamata, Red sea coast; 7-2-1961; *Täckholm et al.* 333(CAI)- Gebel Um Gurdi, Red sea coast; 11-2-1961; *Täckholm et al.* 824(CAI).

**Ge:** Gebel Hamara Dom, tributary Ibib; 6-3-1967; *Osborn & Helmy* s.n.(CAI)- Gebel Aideib, G Elba; 2-2-1933; *Shabetai* 2289(CAIM)- Wadi Bir Akwamtra, G Elba; 19/22-2-1967; *Osborn & Helmy* s.n.(CAI)- Wadi Mitikwan; 5-3-1963; *F. Saad* 1320(CAIM).

**Conservation status:**

This species is assessed here as Near Threatened (NT) in accordance with the criteria of IUCN (2001).

**1.2- *B. attenuata*** Napper, Israel J. Bot. 21:164(1972).

**Type:** Israel, *Evenari et al.* B1 (holotype: JUH).

**Synonum:** *Acanthodium spicatum sensu* Nees in DC, Prodr. 11:274(1847), p.p., non Delile (1813).

- *Blepharis edulis sensu* Eig *et al.*, Fl. Palaest. 340(1931).
- *Blepharis ciliaris sensu* Napper, Israel J. Bot. 21:165(1972), excl. spec. ex. Iran.

**Distribution:**

A near endemic species, confined to the wadi beds of mountainous southern Sinai; known also from a restricted area in the Judean Desert, Jordan and southern Syria (Napper, 1972).

**Selected specimens:**

**S:** Sinai; s.d; *Kaiser* 511 & 723(CAIM) - Sinai, Nagb el Hawa; April 1940; *Hassib* s.n.(CAI)- Sinai, Feiran; 4-5-1939; *Drar* 239(CAIM).

**Conservation status:**

Data Deficient (DD). Since I have seen no recent collections this species may be to some degree endangered

***2- Ruellia*** L.

**Type species:** *Ruellia tuberosa* L. (Lectotype: selected by Britton & Brown, 1913).

**Synonym:** *Stephanophysum* Pohl, Pl. Bras. Icon. Descr. 2:83 (1831).

- *Dipteracanthus* Nees in Wall., Pl. Asiat. Rar. 3:75, 81(1832).

Perennial herbs or sub-shrubs; leaves opposite, petiolate, entire, with cystoliths. Flowers 1-3 in axillary cymes, the bracts and bracteoles not imbricate; calyx deeply 5- lobed, sub-equal, corolla funnel form with a long narrow tube and a campanulate limb. Stamens 4, didynamous, anthers bithecous. Capsule clavate, beaked at apex, 6-10 seeded; seeds compressed orbicular with shaggy hairs at the margin.

*Ruellia* is generally considered to be the second largest genus in Acanthaceae after *Justicia*, it comprises ca. 300 tropical and subtropical species (Ezcurra, 1993 and Wasshausen &Wood 2003). Represented in Egypt by one species.

**2.1- *Ruellia patula*** Jacq., Misc. Austriac. 2:358(1781).

**Type:** "Ex India Orientali " Planta Quaedam culta.

**Synonym**: *Ruellia pallida* Vahl, Symb. Bot. 2:72(1791).

**Type:** Yemen: Wadi Sordud ("Surdûd"), Feb. 1763, Forsskål 1638 (lectotype: C, microfiche 88: III, 3-4!).

- *Ruellia strepens sensu* Forssk., Fl. Aegypt.-Arab. :114(1775) non L.

**Distribution:**

Rare in stony ground and rocky hillsides of Gebel Elba district and southern coastal plains of Red Sea. Also known from Sudan, Tropical East Africa, South Africa, SWArabia, India and Pakistan.

**Selected specimens:**

**Ge:** Wadi Aideib, G. Elba; 20-1-1962; *Täckholm et al.* s.n. (CAI)- W. Yahmeib, G. Elba, 30-1-1933; *M. Drar* 104/1253B(CAIM)- Wadi Darawina, January 2004; *Abd El-Ghani & Abd el-Khalik* s.n. (Sohag Univ. Herb.)- Wadi Kansisrob, G. Elba; 25-1-1933; *Shabetai* z-2312(CAIM)- Wadi Akwamtra, mountain tributary, G. Elba; 27-2-1967; *Osborn & Helmy* s.n.(CAI)- Wadi Akwamtra, G. Elba; 21-7-1984; *S. Goodman* s.n(CAI)- Wadi Shellal (Bir area); 24-1-1962; *Täckholm et al.* s.n.(CAI).

**Ra:** At the Red Sea Coast, about 3 Km N of Mersa Halaib; 21-1-1929; *G. Täckholm* s.n. (CAI).

**Conservation status:**

This species is assessed here as Near Threatened (NT) in accordance with the criteria of IUCN (2001).

**3- *Ecbolium*** Kurz

**Type species**: *Ecbolium linneanum* Kurz

perennial or shrubby herbs; stems articulate. Leaves opposite, petiolate, entire, with inconspicuous cystoliths. Flowers sessile, in compact, terminal

and axillary spike; densely bracteates, bracts imbricate papery, greenish, anastomosed nerves, with 2-bracteoles. Calyx with 5- subequal lobed, corolla bilabiate, ascending cochlear aestivation, usually green, tube longer than lobes, the upper lip is bifurcate and the lower one with 3- broadly lobes. Stamens 2, anthers bithecous. Capsule 2-seeded, clavate; seeds ovoid to cordiform, granulated.

According to Vollesen (1989), the genus comprises 22 species distributed in Tropical Africa and Asia; most of these were recorded as endemics to Eastern and Southern Africa. The genus is represented in Egypt by one species.

**3.1- *Ecbolium viride*** (Forssk.) Alston in Trimen, Handb. Fl. Ceylon 6:229(1931).

**Basionym:** *Justicia virdis* Forssk., Fl. Aegypt.-Arab. :5(1775).

**Type:** Yemen: Surdud ("Uadi Surdûd"), Feb. 1763, *Forsskål* s.n (lectotype: BM).

**Synonym:** *Justicia rotundifolia* Nees in Wall., Pl. Asiat. Rar. 3:108(1832).

**Type:** Herb. Wallich 2432 L (ex Herb. Wight).

- *Ecbolium linneanum sensu* auct., non Kurz (1871).

**Distribution:**

Confined to the rocky habitats of Gebel Elba district. Known from Sudan, Tropical East Africa, Somalia, W Arabia, possibly introduced into India.

**Selected specimens:**

**Ge:** Foot of the mount entrance of wadi Aideib, G. Elba; 3-2-1933; *Shabettai* z.2302(CAIM)- Wadi Akwamtra, rocky stream bed, G. Elba; 27-2-1967; *Osborn & Helmy* s.n. (CAI)- Wadi Akwamtra, G. Elba; 21-7-1984; *S.M. Goodman* s.n.(CAI)- Foot of Gebel El Shellal; 3-3-1938; *Khattab* 5564(CAIM).

**Conservation status:**

This species is restricted to the southeastern corner of Egypt (G. Elba) and is known from few gatherings, accordingly it is assessed here as Critically Endangered (CR) in accordance with the criteria of IUCN (2001).

**4- *Justicia*** L.

**Type species:** *Justicia hyssopifolia* L.

Annuals, perennials or low shrubs; stem angular. Leaves opposite, petiolate, entire, with conspicuous cystoliths. Flowers congested in clusters at the axile of the leaves; ebracteate (2- minute bracteoles may be present).

Calyx with 5- subequal lobes, scarious margin; corolla bilabiate, ascending cochlear aestivation, upper lip shallow bilobed and the lower lip 3-lobed. Stamens 2, anthers bithecous, oblique, the lower theca tailed. Capsule dimorphism (normal dehiscent capsules with 4- seeded and indehiscent capsules 1-seeded, aseptate, on the same plant). Seeds obliquely globoid, tuberculate.

*Justicia* L. is the largest genus in Acanthaceae. It comprises ca. 600 species of tropical and warm regions, (especially Tropical America) belonging to 16 sections (Graham, 1988) only section *Harnieria* is represented in Egypt by one species.

**Note:** Täckholm (1974) recorded two closely allied species belonging to *Justicia* viz. *J. heterocarpa* T. Anderson and *J. kotchyi* Hochst.; while Boulos (2002) treated *J. kotchyi* Hochst. as synonym to *J. ladonoides* Lam.. Careful study of the available materials indicated that only *J. heterocarpa* T. Anderson subsp. *heterocarpa* is represented, and the occurrence of *J. ladonoides* Lam. *(= J. kotchyi* Hochst.) in the flora of Egypt is doubtful.

**4.1- *Justicia heterocarpa*** T. Anderson subsp. ***heterocarpa***

**Type:** In rupibus umbrosis prope Tazeroo, oppidum Abyssiniae, ad altitudinem 4000 ped., *Schimper* 2300.

**Distribution:**

Weeds in moist alluvial soils, confined in Egypt to Gebel Elba district. Known also from Central and Eastern Africa, in addition to Socotra and W Arabia.

**Selected specimens:**

**Ge:** Wadi Aideib; 20-1-1962; *Täckholm et al.* s.n.(CAI)- Wadi Aideib; January 2004; *Abd El-Ghani & Abd el-Khalik* s.n. (Sohag Univ. Herb.)- Wadi Yahameib; 22-1-1962; *Täckholm et al.* s.n.(CAI)- Wadi Laseitei; 7-2-1962; *Täckholm et al.* s.n.(CAI)- Wadi Kansisrob; G. Elba; 24-1-1933; *Shabettai* z.2308(CAIM)- Near the well foot of Gebel Elba; 25-3-1928; *Khattab* 6381(CAIM)- Wadi Shellal (Bir area); 24-1-1962; *Täckholm et al.* s.n.(CAI).

**Conservation status:**

As this species is confined to Gebel Elba district, it is assessed here as Near Threatened (NT) in accordance with the criteria of IUCN (2001).

**5- *_Monechma_** Hochst.

**Type species:** *Monechma bracteatum* Hochst.

Annual to perennial herbs; leaves opposite, sessile to petiolate, with cystoliths. Flowers in axillary and terminal small strobilate spike; bracts

imbricate, ciliate to long hairy margins, bracteoles absent or rudiment. Calyx with 5- subequal lobed; corolla bilabiate, ascending cochlear aestivation. Stamens 2, anthers bithecous, obliquely, the lower theca tailed. Capsule 2- seeded, ellipsoid; seeds compressed discoid, yellowish, fine reticulate.

The genus comprises ca. 60 species, mainly distributed in Tropical Africa and one extends through Arabia to India. *Monechma debile* (Forssk.) Nees is recorded as a new species to the flora of Egypt. It is distinguished by imbricate bracts, capsule with 2- compressed discoid and fine reticulate seeds.

**5.1- *Monechma debile*** (Forssk.) Nees in DC., Prodr. 11:411(1847), as 'debilis'. (Photo 1 & Fig. 2).

**Basionym**: *Dianthera debilis* Forssk. Fl. Aegypt.-Arab. : 9(1775).

**Type**: Yemen: Taizz ("In montibus humitioribus prope Taaes"), 1763, Forsskål 391, (lectotype: C, microfiche 38: I, 3-4!).

**Synonym**: *Justicia debilis* (Forssk.) Vahl, Symb. Bot. 2:12(1791).

- *Gendarussa debilis* (Forssk.) Nees in Linnaea 16:302(1842).

**Distribution:**

Very rare weed in Egypt confined to Gebel Elba district. Also known from Arabia and Africa, with slight extension to India.

**Selected specimens:**

**Ge:** Gebel El-Kassira; 8-2-1962; *Täckholm et al.* s.n. (CAI)- Wadi Akwamtra, G. Elba mountain tributary; 27-2-1967; *Osborn & Helmy* s.n. (CAI).

**Conservation status:**

This species is assessed here as Critically Endangered (CR) in accordance with the criteria of IUCN (2001), because it is known from few collections and has not been collected for a long time.

**6- *Dicliptera*** Juss.

**Type species:** *Dicliptera chinensis* (L.) Juss. In Ann. Mus. Hist. Nat. 9: 268(1807). (nom. cons.)

Annuals, perennials or low shrubs; stems angled, much branched. Leaves opposite, petiolate, entire, with cystoliths. Inflorescence of lax, panicle-like cymose, with 2- or 3- inflorescence unites (cymules), umbellately arranged, and each one enclosed by a pair of unequal bracts (3 ry bracts according to Balkwill, 1996); bracts green, subulate, single veined. Calyx with short tube and 5- lanceolate lobes; corolla bilabiate, ascending

cochlear aestivation, upper lip 3-fid, lower lip ovate to elliptic. Stamens 2, anthers bithecous, subequal and slightly overlapping. Capsule 4- seeded, clavate; seeds discoid, blackish brown, hooked tuberculate.

According to Balkwill (1996), the genus *Dicliptera* is pantropical with about 150 species. Darbyshir & Vollesen (2007) concluded that the separation of *Peristrophe* from *Dicliptera* is not supportable and that all taxa accepted within *Peristrophe* should be transferred to *Dicliptera*. In this treatment, *Peristrophe paniculata* is treated as *Dicliptera paniculata* (Forssk.) I. Darbysh.

**6.1- *Dicliptera paniculata*** (Forssk.) I. Darbysh., Kew Bull. 62(1):122(2007).

**Basionym:** *Dianthera paniculata* Forssk., Fl. Aegypt.-Arab.: 7(1775).

**Type**: Yemen: Wadi Sordud ("Surdûd"), Jan. 1763 Forsskål 385(lectotype: C, microfiche 38:I. 3-4, 5-6!).

**Synonym**: *Peristrophe paniculata* (Forssk.) Brummitt in Wood *et al.*, Kew Bull. 38(3): 451 (1983).

- *Peristrophe bicalyculata* (Retz.) Nees in Wall., Pl. Asiat. Rar. 3:113(1832).
- For full synonymy see Darbyshire & Vollesen, Kew Bull. 62(1): 124(2007).

**Distribution:**

Rare in sandy and silty moist soils of Gebel Elba district and southern coastal plain of the Red Sea. Widespread in tropical and subtropical Africa, Arabia, India and Thailand.

**Selected specimens:**

**Ge:** Wadi Aideib, G. Elba; 26-2-1938; *Khattab* 5562(CAIM)- Khor across Wadi Yahameib, 22-1-1962; *Täckholm et al.* s.n.(CAI)- Wadi Darawina, January 2004; *Abd El-Ghani & Abd el-Khalik* s.n. (Sohag Univ. Herb.)- Wadi Kansisrob; 16-2-1067; *Osborn & Helmy* s.n.(CAI)- Gebel Alafoot; 7-2-1962; *Täckholm et al.* s.n.(CAI)- Wadi Selilo, East desert; 8-2-1932; *Drar* 169/932(CAIM)- North of the well, foot of Gebel Elba; 16-3-928; *Khattab* 6279(CAIM)- Wadi Shellal (Bir area); 24-1-1962; *Täckholm et al.* s.n.(CAI).

**Conservation status:**

This species is assessed here as Near Threatened (NT) in accordance with the criteria of IUCN (2001).

**7- *Barleria*** L.

**Type species:** *Barleria cristata* L.

Perennials or low shrubs, plants spiny or unarmed. Leaves opposite, petiolate, entire, with cystoliths. Inflorescence cymose, sometimes reduced to a solitary flower, axillary or terminal; inflorescence units either solitary or dichasial of 3 or more flowers; bracts leaf-like, bracteoles 2, stiff with spinous margin or foliaceous with entire margin. Calyx 4- unequal lobes, 2- outermost lobes much larger than 2- inner lobes; corolla tubular to funnel-shaped, quincuncial aestivation, with 5 unequal lobes. Stamens 2, anthers bithecous, parallel, 2-3 staminodes. Capsule 2-4 seeded, with apical beak or not; seeds discoid, surfaces covered with hygroscopic hairs.

A genus of about 300 species mainly in the old world tropics (especially Eastern and Southern Africa); Balkwill & Balkwill (1997) recognized seven sections belonging to two subgenera, of which section *Barleria* and section *Somalia* represented in Egypt by *B. acanthoides* Vahl & *B. hochstetteri* Nees respectively.

**Key to the species:**

a. Plant spiny, inflorescence scorpioid or single- flowered axillary cymes; capsule 4- seeded, ellipsoid with acute apex ... ***B. acanthoides***

b. Plant unarmed, inflorescence dichasial cymes, axillary or compounded into a terminal synflorescence; capsule 2- seeded, conical with apical beak ..... ***B. hochstetteri***

**7.1- *Barleria acanthoides*** Vahl, Symb. Bot. 1:47(1790).

**Type:** in AEgypto superiore (Ky. ex Nees).

**Distribution:**

Very rare species, known from Arabian Desert of southeastern Egypt. Known also from Sudan, Tropical East Africa, Eritrea, Ethiopia, Somalia and Arabia.

**Selected specimens:**

**Da:** Bir Abrag; 1930; Hassib s.n. (CAI).

**Conservation status:**

This species is only known from one collection, and I therefore cannot assess its conservation status. It is treated here as Data Deficient (DD).

**7.2- *Barleria hochstetteri*** Nees in DC., Prodr. 11:231(1847).

**Type:** In rupibus montis Arabiae Felicis Seddr, *Schimper* (Syntype, microfiche !).

**Synonym:** *Barleria diandra* Hochst. & Steud. ex Nees, in DC, Prodr. 11: 231(1847).

**Distribution:**

Rare in stony wadis and hillsides of the southeastern corner of Egypt. Also known from Sudan, Tropical East Africa, Eriterea, Ethiopia, Somalia and Arabia.

**Selected specimens:**

**Ge**: Entrance of Wadi Aideib, Gebel Elba; 26-2-1938; *Shabetai* z 5561(CAIM)- Wadi Yahameib; 22-1-1962; *Täckholm et al.* s.n.(CAI)- Wadi Kansisrob, G. Elba; 25-1-1933; *Hassib & Fahmy* s.n.(CAI)- Gebel Elba, Wadi Bir Akwamtra, eastern tributary, rocky stream bed; 19-2-1967; *Osborn & Helmy* s.n. (CAI)- Gebel Karam Elba; 7-2-1962; *Täckholm et al.* s.n.(CAI)- West of the well up Gebel Elba; 21-3-1928; *Khattab* 6349(CAIM).

**Conservation status:**

The species has a restricted distribution in the southeastern corner of Egypt, thus it is assessed as Critically Endangered (CR) in accordance with the criteria of IUCN (2001).

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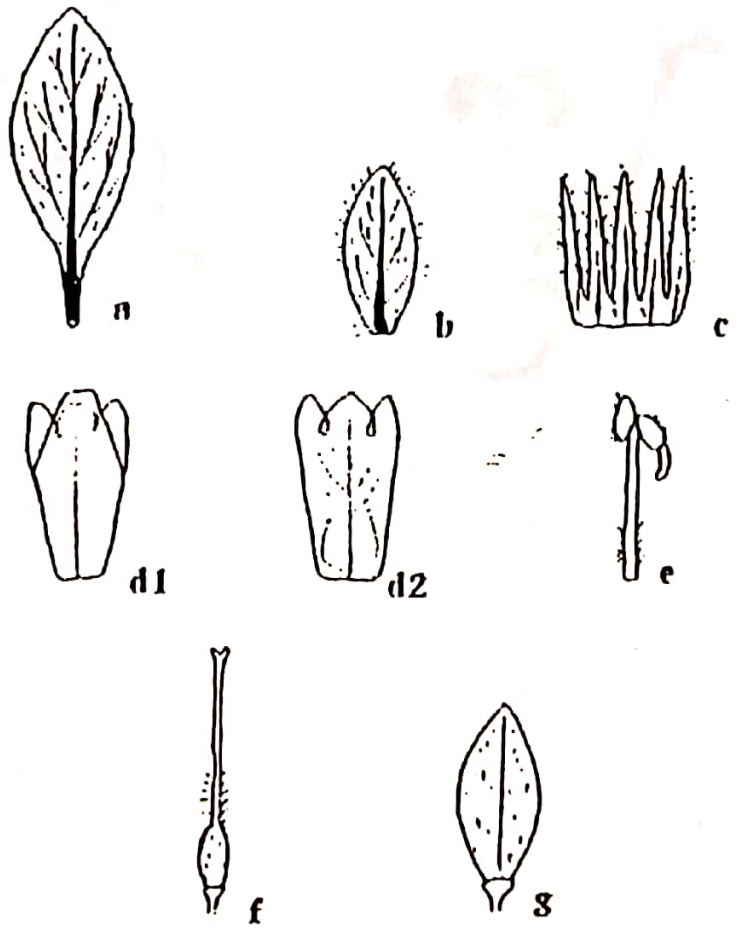


**Figure (2).** Monechma debile (Forssk.) Nees
a. Leaf (x1) – b. Bract (x3) – c. Calyx (x4) – d1. Corolla (x3)
d2. Lower Lip of Corolla (x3) – e. Stamen (x4) – f. Ovary (x5) – g. Capsule (x5)

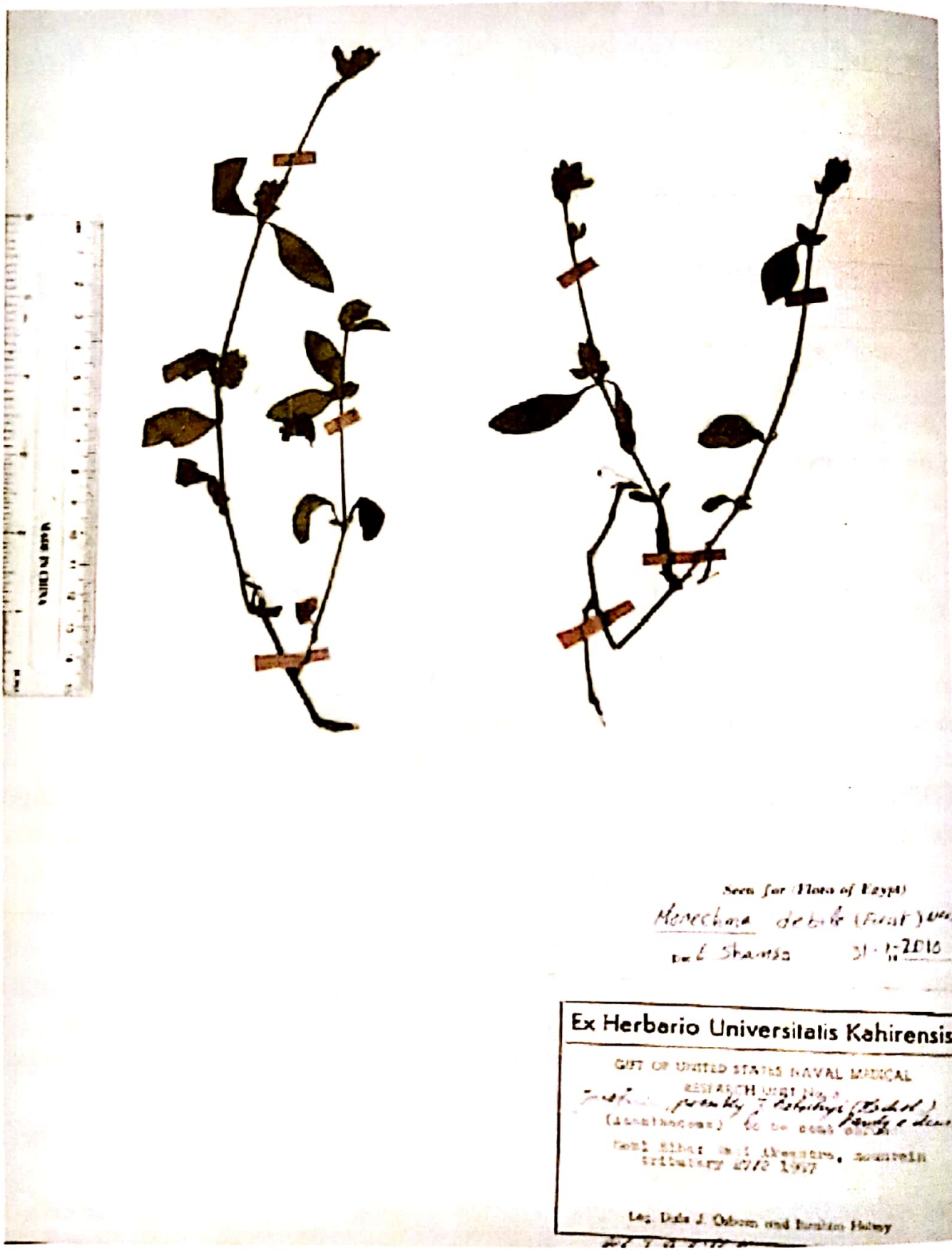


**photo (1):** ***Monechma debile*** **(Forssk.) Nees (Habit).**
**Gebel Elba: Wadi Akwamtra, mountain tributary, 27-2-1967;**
**Osborn & Helmy s.n. (CAI). (New record in Egypt)**