

**CONTRIBUTION TO THE FLORA OF SAUDI ARABIA
PART II. A REVISION OF THE
FAMILY SOLANACEAE**

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Abstract

The family Solanaceae in the Kingdom of Saudi Arabia has been revised. It is represented by 43 taxa distributed in 11 genera (including 12 cultivated species). Two new status viz., *Solanum incanum* L. var. *unguiculatum* (A. Rich) Abedin, Al-Yahya, Chaudhary & Mossa and *Withania somnifera* (L.) Dun subsp. *obtusifolia* (Tackh.) Abedin, Al-Yahya, Chaudhary & Mossa has been suggested and five taxa recorded for the first time are *Solanum auguivi* Lam., *S. cordatum* Forsk., *S. ekeagnifolium* Cav., *Withania somnifera* (L.) Dun. subsp. *obtusifolia* (Tackh.) Abedin, Al-Yahya, Chaudhary & Mossa and *Datura ferox* L. There is an increase of 5 genera with 27 taxa and 6 genera with 22 taxa respectively against previous reports (Migahid, 1978; Collette, 1985). Key to genera, species their descriptions and geographical distribution are given.

Introduction

The family Solanaceae comprises of c. 90 genera and c. 2600 species (Mabberley, 1989). It is represented by 42 taxa. During recent studies De Marco & Dinelli (1974) enumerated 7 genera and 30 species, *Solanum* L., being the largest with 13 species. In the *Flora of Saudi Arabia*, Migahid (1978) included 14 species distributed in 6 genera, including *Solanum* L., with only 6 species. Many species recorded by De Marco & Dinelli (1974) were not included in Migahid's Flora, which included a key to the genera and a short description of each of the species. Collette (1985) in her work *An Illustrated Guide to the Flowers of the Saudi Arabia* recorded 5 genera and 25 species, including 6 with uncertain identity. In the present paper an attempt has been made to give taxonomic details of the various taxa of the family found in Saudi Arabia. Keys to the genera and species are provided which are then enumerated in alphabetical order except *Solanum* L., where species are given according to their affinities. Selected synonymy followed by distributions, types specimens citation and, in some cases, comments are also given. In almost all cases the typification, based on study of literature, is given.

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Shrub - Calyx truncate. Flowers usually in pairs or several in clusters,
greenish-white, waxy ----- 2. *C. frutescens*

1. *C. annuum* L., Sp. Pl. 188. 1753.

An erect, annual, glabrous, cultivated herb, rarely suffrutescent. Stem branched, angular. Petiole 1-2 cm long. Leaves ovate to lanceolate, entire., acuminate, glabrous except along the midrib on lower surface, 4-8 x 2-5 cm. Flowers solitary or rarely in pairs, pedicellate. Calyx toothed. Corolla 5-6 lobed, + 1 cm across, dingy-white with purplish spots, lobes ovate, acuminate. Ovary glabrous. Berry variable in size and shape, 2-2.5 cm long, linear to lanceolate, red, sometimes orange, yellow or blackish. Seeds many, compressed, circular, 2-2.5 mm in diameter, pale.

Distribution: Native of Mexico, widely cultivated throughout the world for its edible fruits.

Type: Described from C. America.

2. *C. frutescens* L., Sp. Pl. 189. 1753.

b An erect, nearly glabrous, shrubby plant, to 1 m tall. Leaves petiolate, ovate, acuminate, entire. Flowers usually in pairs, pedicellate. Calyx truncate, cup-shaped, rarely obscurely toothed. Corolla greenish-white, lobes lanceolate. Ovary glabrous. Berry ovoid-oblong, red, always pungent. Seeds many, 1.5-2.5 mm in diameter.

Distribution: Tropical America. Cultivated in most parts of the world for the edible berries, which are pungent and hot.

Type: Habitat in India.

Jansen (1981) studied the *Capsicum* species growing in Ethiopia and has merged the 2 species recognized here under *C. annum* L., since combinations of characteristics of the two taxa occur often. Smith & Heiser (1951) showed that morphological differences were also accompanied by genetical differences. On crossing *C. annum* L., as the female parent with *C. frutescens* L., as the male parent, non-viable seeds were produced, while only a few viable seeds were produced in a reverse cross. Admittedly there is an overlap in characters, but if all the characters are considered the 2 species can be clearly differentiated. Thiselton-Dyer (1908), differentiated the 2 species only on the basis of whether the calyx is truncate (*C. frutescens* L.) or dentate (*C. annum* L.).

Symon (1981) keyed out these two species and found that in *C. frutescens* L., there was usually one pedicel after first flowering, rarely more. Further, the two species were differentiated on the basis of the colour of the corolla and shape of the fruit. There are thus sufficient characters to maintain two distinct taxa, and the material studied from this country is well differentiated.

2. *Cestrum* Linn.

Sp. Pl. 191. 1753; Gen. Pl. ed. 5. n. 261. 1754.

Large shrubs to trees. Leaves alternate, entire. Inflorescence axillary, cymose or fasciated. Calyx campanulate, 5-lobed. Corolla salver-form. Stamens 5, inserted near the middle of the corolla tube, included. Ovary 2-celled; style filiform; stigma dilated. Berry globose, indehiscent, slightly fleshy. Seeds few.

Distribution: About 175 species, mainly distributed in tropical America. Also found in the Old World. Only 2 species are known in cultivation in Saudi Arabia.

Flowers with minute dentations between the corolla lobes. Plant glabrous or young parts glabrescent ----- 3. *D. metel*
 1. *D. ferox* Linn., Amoen. Acad. 3:403. 1756; S. Satina & Avery in Avery et al. 1.c., 21.f. 3b.4.

An erect, annual, subdichotomously branched, nearly glabrous or glabrescent, 0.5 to 1.5 m tall herb. Branches spreading, leaves petiolate, ovate, coarsely toothed, slightly oblique at base. Flowers short pedicelled, solitary. Calyx tube 1.5-3 cm long; teeth 5, very small. Corolla 4-6 x 2-3 cm, white. Stamens white, included. Capsule ovoid, erect, 2-3x1.5-2 cm, pubescent, covered by unequal, 1-3 cm long, conical based, stout spines, these longer towards the top, beset with the persistent basal part of reflexed, frill like, 5-6 mm long calyx, dehiscing by 4 valves. Seeds innumerable, black, 4-5x3-4 mm, reniform, somewhat shining, foveolate, rugose on the dorsal side.

Distribution: It was originally described from China and said to be distributed widely in warm regions throughout the world (S. Satina & Avery, 1959). In Saudi Arabia only two plants were seen growing wild in Al Haggoo, 47 Km from Salama towards Jizan. It was a dry valley and no other *Datura* species was found in this locality. It is recorded for the first time from Saudi Arabia.

Type: Described from China.

Representative specimens: Southern Province: Al Haququoo (Al Haggoo), 47 km from Salama towards Jizan, flowers white, fruit erect with long broad spines, growing in dry valley, c 30-50 cm high with spreading branches 13.1.1988. S. Abedin, J.S. Mossa and M. Al Said, 11852 (Coll. Pharm).

It has been found in some works (F1. Eur., Gray's Manual of Botany, Hortus Third, 2nd pr., Encycl of Cult. Plants) that fruit of this species is described with 4 large spines towards the top and in general resembles *D. stramonium* L. The fruit is sparsely covered by unequal 1-3 cm long, conical based stout spines which are definitely larger towards top but these are many in number. There are also other important and definite characters besides fruit. In *D. ferox* L., the branches are spreading; calyx 1.5-3 cm long; corolla 4-6 cm long; seeds large, 4-5x3-4 mm; frill - the reflexed, basal part of persistent calyx 5-6 mm long while in *D. stramonium* L., calyx 3-4 cm long; corolla 5-10 cm long; seeds smaller and with thinner dorsal side; frill 3-4 mm long.

2. *D. innoxia* Mill., Gard. Dict. ed. 8. n. 5. 1768; Satina & Avery 1.c., 28; Tackh., 1.c. 482 pl. 168; Migahid, 1.c. Collenette, Illus. F1. Saudi Arabia, 460, 1985.

An erect, softly and densely pubescent, branched, up to 2 m tall, perennial herb. Petiole 5-12 cm long; leaves broadly ovate, entire or sinuate, acute, densely hairy, 18x10 cm. Pedicel 1-2 cm long, slightly enlarging in fruit. Calyx tubular, teeth acuminate, 1-2 cm long tube up to 10 cm long, falling off in fruit, leaving 1-2 cm long basal collar. Corolla white, 15-20 cm long, + 8 cm across. Stamens 10-15 cm long. Capsule 3.5-5 cm across, globose, glandular hairy, drooping, spines 0.8-1.2 cm long. Seeds brownish, rugose, kidney shaped, 3-4 x 2-3 mm.

Distribution: Native to C. America. Naturalized in Mediterranean areas. N. America, Sudan, Saudi Arabia, Pakistan and Afghanistan.

Type: Described from material cultivated at Chelsea Physic Garden, provenance (Mexico) La Vera Cruz (holotype: BM).

Erect, annual to perennial, hairy or glabrous herb. Leaves sinuate to pinnatipar-
tite or rarely entire. Inflorescence a bracteate scorpioid cyme. Flowers somewhat
zygomorphic. Calyx tubular-campanulate or urceolate, 5-dentate, accrescent in fruit,
ribbed. Corolla funnel-shaped, lobes broad, imbricate, oblique. Stamens 5, inserted
about or below middle of the corolla tube, usually exserted; filaments filiform, slight-
ly dilate at the base; anthers ovate or oblong. Ovary 2-celled; style filiform; stigma
capitate. Capsule enclosed in the enlarged calyx, 2-valved, circumscissile. Seeds
tubercled or pitted, reniform to orbicular.

Distribution: About 20 species distributed in Mediterranean region, S.W. & C. Asia.
Represented by 5 species in Saudi Arabia. Of these the authors have recorded 3
species, while S.I. Collenette (1985) recorded 2 more, viz., *H. aureus* cf. L. and *H.*
desertorum (Asch. ex Boiss.) Tackh. All these species are keyed out below.

Key to the species

- 1 + Corolla 1.0-1.5 cm long, equal to or slightly exceeding the calyx. Fruiting
calyx scarcely enlarged 1-2 x 1-1.5 cm. ----- 3. *H. pusillus*
- Corolla 1.5-4 cm long, much exceeding the calyx. Fruiting calyx much en-
larged, 2-3.5 x 1.5-2 cm. ----- 2
- 2 + Leaves fleshy. Flowers white greenish or purple with violet spots -----
----- 2. *H. muticus*
- Leaves not fleshy. Flowers pale or bright yellow with violet throat ----- 3
- 3 + Not or little branched annual herb ----- *H. desertorum*
- Richly branched perennial herb ----- 4
- 4 + Leaves lobed, lobes obtuse with entire margin. Flowers greenish-yellow.
Stamens included ----- 1. *H. albus*
- Leaves lobed, lobes acute with dentate margin. Flowers golden yellow.
Stamens long exserted ----- *H. aureus*

1. *H. albus* Linn., Sp. Pl. 180. 1753; Blatt., Fl. Arab. 338. 1919-36; Tackh., St. Fl. Egy.
ed. 2 483. 1974; Migahid, Fl. Saudi Arabia ed. 2.1: 491. 1978; Collenette, Illus. Fl.
Saudi Arabia, 460, 1985.

Usually perennial, up to 60 cm tall, branched, villous-viscid herb. Petiole 2-3 cm
long, leaves ovate-orbicular, cuneate to cordate at base, 3-11x8 cm; lobed, the lobes
obtuse with entire margin. Inflorescence a terminal leafy cyme. Pedicel 1-1.5 cm
long. Calyx 1-1.5 cm long, accrescent, in fruit, 2-3.5 x 1.5-2 cm, membranous, 10-
ribbed, teeth acuminate, c.5 mm long. Corolla pale yellow with purple throat, 1.5-3
cm long, lobes oblique, lobes unequal. Stamens included or slightly exserted; anthers
pale yellow, elongate; filaments filiform, purple 1-1.5 cm long. Ovary ovoid; style
filiform, as long as corolla, purple, yellowish at the top; stigma bilobed, 1 mm across.

Distribution: Mediterranean region, Arabia and S. Russia.

Type: Habitat in Europa australi. Herb. Linn. 244.2 (LINN)

Representative specimens: Northern Province: Tabouk-Elzeetah (El-Qattar) 10-
4.1980. *M.A. Al-Yahya* 119 (Coll. Pharm.).

2. *H. muticus* Linn., Mant. 45. 1767; Blatt. 1.c. 338; Schwartz, Fl. Trop. Arab. 233.
1939; Tackh., 1.c., 483; Migahid, 1.c. 490; Collenette 1.c. 461.

- 1 + Corolla as broad as long, red, stamens exerted. ----- 1. *L. barbarum*
 - Corolla elongated, white to purplish. Stamens included ----- 2
 2 + Calyx 1/4 as long as corolla. Corolla lobes 1/4-1/5 as long as the corolla tube
 ----- 3. *L. shawii*
 - Calyx much less. Corolla lobes at least 1/3 rd of length of tube -----
 ----- 2. *L. europaeum*

1. *L. barbarum* Linn., Sp. Pl. 192. 1753; Post & Dinsmore, Fl. Syr. Pal. Sin. 2: 261. 1933; De Marco & Dinelli in An. Bot. 33: 235. 1974; Tackh., Fl. Egy. ed. 2. 476. 1974; Migahid, Fl. Saudi Arab. ed. 2. 491. 1978; *L. vulgare* Dun. in DC., Prodr. 13(1): 509. 1854; Blatter, Fl. Arab. 337. 1919-36.

Usually a glabrous, 1-4 m tall, spiny shrub. Leaves long, loose, oblong-spathulate or narrowly elliptic to lanceolate. Flowers 1-8; pedicel 0.3-2 cm long. Calyx somewhat bilabiate, 3-5 mm long, teeth 3-4. Corolla red, + 1 cm long, lobes 4-5 mm long, obtuse, spreading. Stamens exerted; filaments with a dense tuft of hairs at base. Berry red, ovoid-ellipsoid.

Distribution: Native of China, Europe, N. Africa, Arabia and Turkey. It is cultivated in some countries as hedge.

Type: Described from Asia (China). Herb. Linn. 259.6 (LINN).

Representative Specimens: A glabrous shrub, fruiting pedicel 1-2 cm long, berries red. Al Qaseem, 1980. *M.A. Al-Yahya* s.n. (Coll. Pharm.).

This species has been reported from Saudi Arabia by De Marco & Dinelli (1974) and Migahid (1978). The specimens of various taxa reported by Migahid should be in the Herbarium, Botany department, King Saud University, Riyadh. But the present authors have not found any specimens there. Migahid records the species from Northern, Central (NJe) and Eastern Provinces of the Kingdom. The only specimen cited above and identified by Prof. Migahid bears leaves and fruits; the leaves are large and loose and fruits are red, with long pedicel and 3-4 toothed calyx.

2. *L. europaeum* Linn., Sp. Pl. 192. 1753; De Marco & Dinelli, 1.c. 235; Post & Dinsmore, 1.c. 260; Tackh., 1.c. 479.

A thorny shrub, up to 1.5 m tall. Branches densely and shortly pubescent when young. Leaves variable in dry season, small, 1-2.5 cm long and in favourable conditions up to 6 cm long, subsessile, oblanceolate or linear-oblong. Flowers solitary, axillary; pedicel slender, 0.5-1 cm long. Calyx small, less than 1/4th of the corolla, equally toothed, in fruit somewhat 2-lipped. Corolla white to purplish, c. 1 - 1.4 cm long, throat pubescent; lobes 1/3 as long as tube, lobes densely ciliate. Stamens included; filaments glabrous. Berry globose, red.

Distribution: Mediterranean area.

Type: Described from Southern Europe. Herb Linn. 259.7 (LINN).

Note: This mediterranean element is reported from Saudi Arabia by De Marco & Dinelli (1974) but seems a doubtful record, there are many inaccuracies in the De Marco & Dinelli's checklist (Hedge & King, 1998). The closely related species *L. depressum* Stocks distributed in S.W. Asia from W. Syria to Turkestan and Pakistan (Baytop, 1978) may possibly be found in the Kingdom. It is differentiated from *L. europaeum* Linn., by having glabrous branches, and a corolla 0.7-1 cm long with a glabrous throat; in *L. europaeum* Linn., the young branches are densely and shortly pubescent and the corolla is c. 1-1.4 cm long with a pubescent throat.

plains, altitude 1400 m, 14.9. 1977. *D.R. Duba* 26 (RIY); Taif, Sudhair, 23.9.1970. *S. Chaudhary* 5701 (RIY); Taif, 25.9.1978. *S. Chaudhary* 5699 (RIY).

6. *Lycopersicon* Mill.

Gard. Dict. Abr. ed. 4. 1768.

Annual, glandular hairy herb. Leaves compound. Inflorescence an axillary cyme, pedunculate, pedicels articulate. Sepals connate at base, accrescent and reflexed in fruit. Corolla, yellow, deeply divided. Stamens inserted at corolla throat; anthers connivent, each with an appendage at apex; filaments short. Fruit a berry.

Distribution: About 8 species, distributed in S. America. One species is extensively cultivated in Saudi Arabia and elsewhere.

L. esculentum Mill., Gard. Dict. ed. 8. n. 2. 1768; Blatt., Fl. Arab. 333. 1919-36; Schwartz, Fl. Trop. Arab. 238, 1939.

Solanum lycopersicum Linn., Sp. Pl. 185. 1753.

Annual, erect or sprawling, branched, up to 1.5 m tall herb. Leaves petiolate, compound, imparipinnate, glandular-hairy, 15-40 cm long; leaflets ovate-lanceolate, dentate, alternately small and large. Calyx 5-6 (-8) lobed, glandular hairy outside. Corolla 5-6 (-8) lobed, deeply divided. Fruit a large berry, globose, subglobose or elongate, 4-10 cm across, usually red, sometimes yellowish. Seeds many, compressed, pilose, 2-3 mm long.

Distribution: Native of S. America. Widely cultivated all over the world.

Type: Described from cultivated material of unknown origin.

Representative Specimens: Southern Province: Abu-Arish, near Gizan, flowers yellowish, cultivated for fruits, 24.1.1984. *S. Abedin & J.S. Mossa* 10895 (Coll. Pharm.).

The fruit, tomato, is edible and used fresh or cooked, in many forms. It is rich in vitamin-C. Arabic "Tamatum", "Banadoura".

7. *Nicotiana* Linn.

Sp. Pl. 180. 1753; Gen Pl. ed. 5. n. 248. 1754.

Annual to perennial herbs or undershrubs, usually with glandular hairs. Leaves alternate, simple, entire. Inflorescence a terminal panicle. Calyx tubular, 5-fid, scarcely accrescent. Corolla funnel - or salver-shaped with a long tube. Stamens 5, one longer, inserted below the middle of the tube, anthers dehiscent longitudinally, deeply 2-lobed, Ovary usually 2-celled, stigma 2-lobed. Fruit usually 2-celled, septical capsule. Seeds many.

Distribution: About 60 species found in America, South Pacific, Australia and S.W. Africa. A few species are widely cultivated in warm countries. Only 2 species in Saudi Arabia are occasionally cultivated.

Key to the Species

- 1 + Petiole winged, upper leaves sessile. Corolla pinkish red, 3.0-5.5 cm across, lobes acuminate - 2. *N. tabacum*

2-celled; style filiform; stigma shortly 2-lobed. Berry small, globose, enclosed in the inflated, membranous calyx.

Distribution: About 100 species distributed throughout the globe, chiefly in Mexico.

In Saudi Arabia, it is represented by 1 cultivated species.

Physalis peruviana Linn., Sp. Pl. ed. 2. 1670. 1763. *P. edulis* Sim. in Bot. Mag. 27: 1068. 1807.

An erect, branched, perennial herb, densely pubescent, 0.3-1 m tall. Petiole 4- c.8 cm long; leaves broadly ovate, cordate, acuminate, entire or serrate, densely simple-hairy, 6-10 x 5-8 cm. Flowers solitary, axillary, pendulous, pedicel 0.5-1 cm long. Calyx 5-lobed, \pm 1 cm across; lobes lanceolate, acute c.5 mm long; accrescent in fruit, up to 3 x c. 4 cm inflated. Corolla c.2 cm in diameter, yellowish, slightly 5-lobed, each lobe with a dark purple spot at its base. Stamens inserted near the corolla base, c. 1 cm long; filaments purple, anthers 3.5-4 mm long, oblong, bluish purple. Ovary globose, 2-celled, 4-6 mm across; style c. 8 mm long; stigma subcapitate. Berry globose, yellow, glabrous, 1-2 cm in diameter, enclosed in the much enlarged bladder-like calyx. Seeds many, brownish, c. 2 mm long.

Distribution: Native of S America, naturalized throughout the tropics; occasionally cultivated in the Kingdom.

Type: Hort. Uppsala ex Peru., Herb. L. 247.7 (LINN).

Representative specimens: Central Province: Riyadh, RAWRC. Flowers yellowish. May, 1984. *S. Chaudhary* 8291 (RIY).

10. *Solanum* L.

Sp. Pl. 186. 1753; Gen. Pl. ed. 5. n. 224. 1754.

Annual herbs to shrubs, sometimes scrambling or tree-like, usually hairy, hairs simple or stellate, with or without prickles. Leaves alternate, exstipulate, simple or compound. Inflorescence terminal or axillary cyme or flowers solitary. Flowers actinomorphic, usually bisexual, mostly pentamerous, rarely tetra or hexamerous. Calyx 4-6 lobed, persistent, hairy, often accrescent in fruit. Corolla 4-6 lobed, usually rotate, lobes often recurved. Stamens 5, distinct, epipetalous; anthers often large and connivent, dehiscing by 2 terminal pores or slits. Ovary usually 2 celled, each cell with many ovules; style terminal; stigma 2-lobed. Fruit a many-seeded berry.

Distribution: About 1500-2000 species distributed in tropical and temperate regions.

In Saudi Arabia it is represented by probably 19 taxa including 3 to 4 cultivated species.

- | | | |
|---|--|-------------------------|
| 1 | + Plants with underground tubers. Leaves imparipinnate ----- | 4. <i>S. tuberosum</i> |
| | - Plants not tuberous. Leaves simple or lobed. ----- | 2 |
| 2 | + Fruits white to dark purple, large, 5-20 x 4-15 cm. Cultivated as a vegetable ----- | 14. <i>S. melongena</i> |
| | - Fruits yellow, orange, red or black, small, 0.5-3 cm in diameter. Mostly wild. (<i>S. nigrum</i> and <i>S. difflorum</i> are cultivated for medicinal and ornamental purposes respectively) ----- | 3 |
| 3 | + Plants unarmed ----- | 4 |
| | Plants armed ----- | 8 |

lanceolate, acute. Anthers 1-2.5 mm long, oblong, yellowish. Ovary globose; style c. 3 mm long, densely hairy below, recurved above; stigma capitate. Berry usually wider than long, glabrous, purplish/black, 6-8 mm in diameter. Seeds many, 1.7-2.4 mm long, brownish, flat, obovate, rugose.

S. nigrum L., is often a blanket name to cover *S. villosum* Mill., and *S. grossedentatum* L., and with other related species forms a complex group, and that the taxonomy is still far from clear. *S. villosum* Mill., is treated separately while *S. grossedentatum* is included within the concept of the species.

The two subspecies are recognised which can be distinguished as below:

Key to the subspecies

- + Glandular hairy plant ----- ii) ssp. *schultesii*
 - Eglandular hairy plant ----- i) ssp. *nigrum*

i) *S. nigrum* Linn. spp. *nigrum*

Distribution: Cosmopolitan except polar regions.

Type: Described from Europe. Herb. Cliff. (BM) Lectotype: Herb. Linn. 248. 18 (LINN).

Representative specimens: Central province, Jalajal, Flowers white, fruits black, 30 cm tall herb. *S. Abedin, M.A. Al-Yahya and M. Al-Said* 11130 (Coll. Pharm.); Riyadh, King Saud University Campus. Flowers white, fruits black, reflexed, 30 cm high, along roadside. *S. Abedin and M.A. Al-Yahya* 11223, 11224 (Coll. Pharm.).

ii) *S. nigrum* Linn. ssp. *schultesii* (Opiz). Wessely in Feddes Rep. 63: 311. 1960; *S. schultesii* Opiz, OK. Fl. Bohm. 3 (2): 24. 1843.

Distribution: Temperate and warm regions.

Syntypes: Im Baumgarten, 18.10.1835. *Opiz*, um Prag, The authors have not seen any specimens of this ssp. Its occurrence is doubtful.

2. *S. villosum* Miller, Gard. Dict. Ed. 8. n. 2. 1768. Collenette, Illus. fl. Saudi Arabia 466. 1985.

Annual, erect herb, up to 60 cm, glabrescent or young parts covered with simple, adpressed, glandular hairs. Petiole 1-2 cm. Leaves ovate-lanceolate to ovate, 3-5x2-3.5 cm, cuneate, entire to dentate, acute, somewhat decurrent into petiole. Flowers 3-6 in peduncled cymes, peduncle 0.4-2 cm long, pedicels equal to or a little longer than peduncle. Calyx 2-2.5 mm long, divided to the middle, sparsely adpressed hairy, lobes obtuse. Corolla white to pale purple, 5-6 mm long, divided to or below the middle; lobes clavate hairy on the margin and sparsely so along the purple median line outside. Anthers 0.5-2.5 mm long. Ovary globose; style filiform, 5-6 mm long; stigma globose. Berry usually longer than broad, glabrous, orange, 6-9 mm in diameter. Seeds 1.6-2 mm long, compressed, rugose.

Key to the subspecies

- + Plants villous, hairs glandular and eglandular. Stem with smooth ridges.
 ----- i) ssp. *villosum*
 + Plant subglabrous to pubescent, hairs eglandular. Stem usually with denticulate ridges. ----- ii) ssp. *miniatum*

5. *S. forskalii* Dun. in Hist. Solan. 237. 1813; Nasir, Y. 1.c. 13. f. 2.1. *S. albicaule* Kotschy ex Dun. in DC., Prodr. 13(1): 204. 1852; Blatter, 1.c. 331; Schwartz, 1.c. 236; De Marco & Dinelli 1.c. 234; Migahid, 1.c. 494; Collenette, 1.c. 464, 465; *S. scindicum* Prain in J. Asiat. Soc. Beng. 65: 542. 1896.

An undershrub 40-70 cm tall, with dense recurved prickles and stellate hairs on all parts including outer side of calyx and corolla, young branches more hairy. Petiole 0.3-2 cm long. Leaves ovate-orbicular, entire, sometimes slightly lobed, truncate to cordate, acute, lower surface hairy, large leaves with a few prickles on the midrib, 0.5-4x0.5-2.5 cm. Inflorescence short peduncled racemose cyme. Pedicel short, 4-8 mm long, hairy. Calyx small, 5-toothed, c. 3 mm long, teeth c. 1 mm long. Corolla rotate, connate at the base, 0.8-1.2 cm long, lobes linear or linear-lanceolate, 0.6-1 cm, violet. Anthers subsessile, 5-6 mm long, yellowish. Ovary globose, glabrous, 1-2 mm long; style glabrous, in upper flowers longer than stamens, 7-8 mm long, in lower flowers shorter or equalling the anthers; stigma dark purple. Berry globose, glabrous, pendulous, 4-7 mm across, yellow on maturity.

Distribution: Egypt, tropical Africa, Arabia, Pakistan (Sind) and India (Rajputana).

Holotype: Yemen, *Forsk. 414* (C).

Representative specimens: Southern Province; Abha, 17.10.1979. *S. Chaudhary* 2008 (RIY); Dharb-Abha Road, 5.5.1982. *S. Chaudhary* 7208 (RIY); Jabal, Farasan Island, flowers lilac, 2.2 cm wide, ripe fruits orange, growing in the crevice of fossil coral, NNE. of village, 3.2.85. *I.S. Collenette* 5019 (RIY); Western Province: Wadi Namra, N.E. of Al-Mudhaylifa, growing under *Adenium obesum* on rocky slope, flowers purple, woody herb to 70 cm. *A.C. Podzorski* 1014 (RIY).

6. *S. schimperianum* Hochst. ex Dun in DC., Prodr. 13(1): 94. 1852; Collenette, 1.c. 464-5. *S. polyanthemum* Hochst. ex Dun. in DC., Prodr. 13(1): 94. 1852; *S. carense* Dun. in DC., Prodr. 13(1): 105. 1852; Blatter, 1.c. 331; Schwartz, 1.c. 235; Tackh., 1.c.; *S. yemensis* Bitter in Fedde, Repert 12: 433. 1913.

An unarmed shrub with stellate hairs on the young branches. Petiole 0.5-1.5 cm long. Leaves lanceolate to elliptic, usually entire, acute, slightly oblique at base, both surfaces sparsely stellate hairy, 2-4x1.5-2.5 cm. Inflorescence a few-flowered, racemose cyme with a 0.6-1 cm long peduncle; pedicel 1-2 cm long, stellate-pubescent. Calyx stellate hairy outside, \pm 6 mm long, divided almost to the base; lobes narrowly lanceolate. Corolla stellate hairy outside, 1-2 cm across, divided to or below the middle; lobes lanceolate, purplish to purple. Anthers subsessile, c. 6 mm long, slightly tapering above; filament c. 1 mm long. Ovary globose, glabrous, style c. 1 cm long, glabrous. Berry globose, glabrous, orange-red to scarlet-red, 0.6-1 cm in diameter. Seeds many, flat, circular, 1.5 mm across, pale to brownish, rugose.

Distribution: Tropical Africa and Arabia.

Type: Echiopia Adua, *Schimper*, 202.

Representative Specimens: Southern Province: Abha, flowers purple, berries scarlet-red, 0.3-1 m tall, *S. Abedin* and *J.S. Mossa* 10345 (Coll. Pharm.) Central Province: Wadi Daher, glandular sticky, flowers large, purple *S. Chaudhary* 5721 (RIY).

7. *S. terminale* Forssk., Fl. Aegypt. - Arab. 45. 1775. *S. bifurcum* Hochst. ex Dun. in DC. Prodr. 13(1): 77. 1852.

An unarmed shrub to 1 m tall, young parts stellate-hairy, later becoming almost glabrous. Petiole 1-3 cm long; leaves lanceolate to broadly ovate, entire to sinuately

