

**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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The present study is based on the specimens present in the herbaria at the Research Centre for Medicinal, Aromatic and Poisonous Plants, College of Pharmacy, King Saud University (Coll. Pharm.); Regional Agriculture and Water Research Centre, Ministry of Agriculture and Water, Riyadh (RIY) and Botany Department, College of Science, King Saud University (Bot. dept). The abbreviations Coll. Pharm. and Bot. dept. are arbitrary.

Key to the Genera

- | | | | |
|----|---|---|------------------------|
| 1 | + | Fruit a berry ----- | 2 |
| | - | Fruit a capsule ----- | 8 |
| 2 | + | Calyx inflated ----- | 3 |
| | - | Calyx not inflated ----- | 4 |
| 3 | + | Anthers connivent. Flowers in short umbellate cymes ----- | 11. <i>Withania</i> |
| | - | Anthers not connivent. Flowers solitary, axillary ----- | 9. <i>Physalis</i> |
| 4 | + | Anthers connivent ----- | 5 |
| | - | Anthers not connivent ----- | 7 |
| 5 | + | Anthers dehiscing by apical pores or slits ----- | 10. <i>Solanum</i> |
| | - | Anthers dehiscing longitudinally ----- | 6 |
| 6 | + | Leaves entire or repand. Corolla white or purplish. Berry dry, inflated ----- | 1. <i>Capsicum</i> |
| | - | Leaves interruptedly imparipinnate. Corolla yellow. Berry fleshy ----- | 6. <i>Lycopersicon</i> |
| 7 | + | Flowers solitary or in pairs ----- | 5. <i>Lycium</i> |
| | - | Flowers in panicles or racemes ----- | 2. <i>Cestrum</i> |
| 8 | + | Fruit a 2-loculed, circumscissile capsule ----- | 4. <i>Hyoscyamus</i> |
| | - | Fruit a 2-4-loculed, septicidal capsule ----- | 9 |
| 9 | + | Capsule spiny or tubercled, 4-loculed ----- | 3. <i>Datura</i> |
| | - | Capsule smooth, 2-loculed ----- | 10 |
| 10 | + | Flowers in terminal panicles ----- | 7. <i>Nicotiana</i> |
| | - | Flowers axillary, solitary ----- | 8. <i>Petunia</i> |

1. *Capsicum* L.

Sp.Pl.188.1753; Gen.Pl.ed.5.n. 252. 1754.

Much branched annuals, perennial herbs or shrubs. Leaves entire, repand. Flowers axillary, solitary or rarely in groups of 2 or 3. Calyx campanulate, truncate or dentate, slightly accrescent in fruit. Corolla subrotate, lobes valvate. Stamens 5, adnate to the top of corolla tube; anthers bluish, dehiscing longitudinally; filaments filiform. Ovary usually 2-celled, ovules many; style filiform; stigma more or less clavate. Berry globose, conical, linear or somewhat oblong, small to large, indehiscent. Seeds compressed, rugose or nearly smooth.

Distribution: About 50 species are distributed in tropical America. A few species are widely cultivated all over the world. In Saudi Arabia 2 species are cultivated.

- | | | | |
|---|---|--|---------------------|
| 1 | + | Herb. Calyx dentate. Flowers usually solitary, dingy-white ----- | 1. <i>C. annuum</i> |
|---|---|--|---------------------|

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, 2-25 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.

- 1 + Day blooming, pubescent shrub. Berry black ----- 1. *C. diurnum*
 - Night blooming, glabrous shrub. Berry white ----- 2. *C. nocturnum*

1. *C. diurnum* L., Sp. Pl. 191. 1753.

A shrub or small tree, rarely scandent, pubescent, up to 5 m tall. Leaves petio- late, oblong or oblong-elliptic, entire, obtuse or acute, 6-12 x 3-6 cm. Flowers axillary, fascicled, long pedicellate, fragrant by day. Calyx campanulate, 3-4 mm long. Corolla 1.5-2 cm long, greenish white to yellowish. Berry black, glossy.

Distribution: America. Cultivated for its flowers which are fragrant during the day.

Type: Lectotype, described from Chilli, Havana, Herb. Linn. 258. 4 (Linn).

2. *C. nocturnum* L., Sp. Pl. 191. 1753.

Scandent or spreading shrub up to 4 m tall, glabrescent, young parts pubescent with crisped, simple hairs. Leaves petioled, oblong or oblong-elliptic, entire. Flowers axillary, fascicled or in spike like racemes, short pedicelled, very fragrant at night. Calyx campanulate, 4-5 mm long, Corolla up to 2.5 cm long, greenish-white to creamy. Stamens included; filaments with an erect projection just below the point of insertion. Berry white.

Distribution: Native to Central America, (Symon, 1981a). In many countries it is cultivated for its flowers which are fragrant at night.

Type: Habitat in Jamaica, Chilli. Hort. Cliff (BM).

Representative specimens: Central province: Shad, before Al-Beer from Riyadh, near petrol pump, flowers yellowish white, 2 m tall cult. shrub, 16.5.1984. S. *Abedin* & M.A. *Al-Yahya* 10942 (Coll. Pharm.); Riyadh, flowers greenish white, 2 m tall cult. shrub, 24.11.1984. S. *Abedin* & M.A. *Al-Yahya* 10990 (Coll. Pharm.).

3. *Datura* Linn.

Sp. Pl.179. 1753; Gen. Pl. ed 5 n. 218. 1754; S.Satina & Avery in Avery *et al.*, Genus *Datura* 17. 1959; Tackh., St. Fl. Egy. ed. 2. 479. 1974; Migahid, H. Saudi Arab. ed.2:490. 1978.

Annual or perennial herbs or under shrubs with unpleasant odour. Leaves petio- late, alternate, large, Flowers large salitary, axillary, pedicellate, Calyx long, tubuler, 5-toothed, upper part abscissing in fruit, leaving a basal persistent collar. Corolla large, funnel shaped, long-tubular, 5-10 lobed. Stamens 5,1 included, attached at the base of the corolla tube. Ovary prickly, globose or oblong-globular, septicidally 4- valved.

Distribution: About 10 species in tropical and warm temperate regions, especially tropical America and Australia, Only 4 species are known from Saudi Arabia.

- 1 + Fruits erect, dehiscens 4-valved ----- 2
 - Fruits drooping, dehiscens irregular ----- 3
 2 + Calyx teeth usually 5-10 mm long, unequal. Fruit with rather slender + equal spines not more than 15 mm long. ----- 4. *D. stramonium*
 - Calyx teeth 3-5 mm long, subequal. Fruit with stout, conical, unequal spines, upper longer and more stout than the lower, 10-30 mm long ----- 1. *D. ferox*
 3 + Flowers with large, triangular teeth between the corolla lobes. Plant densely pubescent ----- 2. *D. innoxia*

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., Encyl 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).

Representative specimens: Central Province: Riyadh, RAWRC, 1.4.1979. *S. Chaudhary* 5693 (RIY); RAWRC. Feb. 1979. *Z. Howaishell* 5694 (RIY); RAWRC. 15.11.1980. *S. Chaudhary* E-734 (RIY); Near King Abdul Aziz Hospital, flowers white, fruit spiny, 50 cm tall, 15.2.1982. *S. Abedin, M.A. Al-Yahya & H. Haroon Mirza* 10013-a. (Coll. Pharm.).

3. *D. metel* Linn., Sp. Pl. 179. 1753; Blatter, Fl. Arab. 338. 1919-36; Schwartz, Fl. Trop. Arab. 238. 1939; Satina & Avery l.c., 32; Tackh., l.c. 479; Migahid, l.c. 490; *D. fastuosa* L., Syst. Nat. ed. 10.932.1759. Collenette, l.c. 459.

An erect, subdichotomously branched, glabrescent, 0.5-3 m tall, annual or biennial herb. Leaves petiolate, blade ovate, subentire, acute, 10-20x6-15 cm. Flowers in the branch forks, 1-3 in each, finally drooping; pedicel 5-10 mm long. Calyx tubular, 5-7 cm long, teeth triangular. Corolla funnel shaped, 10-15x7-10 cm, teeth 10, alternately short and long, white to purplish or bluish-purple. Stamens included. Ovary globose, mucronate. Capsule globose, 4-5 cm across, glabrescent, roughly tubercled or spiny, drooping, dehiscing irregularly, subtended by a collar formed from the basal portion of the calyx.

Distribution: Native of tropical America, frequently cultivated for its medicinal value.

Type: Described from Asia and Africa, Herb. Linn. 243.4 (Linn).

Representative Specimens: Southern Province: Jabal Fayfa, 20.11.80. *S. Chaudhary* 931 (RIY).

There is a confusion in the correct identity of *D. metel* L., which is often treated as nomina confuse (Schoenback-temesy, in Rech. f., Fl.I.100: 46. 1972; Y. Nasir in Nasir & Ali, Fl. Pak. 168: 44. 1985).

4. *D. stramonium* Linn., Sp. Pl. 179. 1753; Blatter, l.c., 338; Schwartz, l.c. 239; Satina & Avery l.c., 18; Tackh., l.c. 479. pl. 167; Migahid, l.c. 490. f. 492. 493; Collenette l.c. 460; *D. tatula* Linn., Sp. Pl. ed. 2, 256. 1762.

An erect, annual, subdichotomously branched, almost glabrous or glabrescent, up to 2 m tall herb. Leaves petiolate, ovate, coarsely toothed or lobed, slightly oblique at base, acute-acuminate, slightly pubescent when young, 6-20x4-15 cm. Flowers short pedicelled. Calyx tube 3-4 cm long, teeth 5, triangular. Corolla 5-10 cm long, white to purplish, lobes acuminate. Stamens included. Capsule ovoid, shortly pubescent, erect, 3-5x2.5-3.5 cm, dehiscing by 4 valves, spines up to 1 cm long. Seeds reniform 3-4 mm in diameter.

Distribution: Cosmopolitan.

Type: Described from America Herb. Linn. 243-1 (LINN).

Representative specimens: Central Province: Riyadh, RAWRC, 5.12.83. *A. Cooke* 7870, 7871 (RIY); Riyadh, RAWRC, 19.2.1979, flowers deep blue/purple. *Z. Howaishell* 5698 (RIY); Riyadh, College of Pharmacy, KSU, flowers purplish, 40 cm tall cultivated by J.S. Mossa from seeds obtained by M.A. Al-Yahya, 26.10.1983. *S. Abedin and J.S. Mossa* 10839 (Coll. Pharm.).

4. *Hyoscyamus* Linn.

Sp.Pl.179-180. 1753; Gen. Pl. ed. 5. n. 1754.

Erect, annual to perennial, hairy or glabrous herb. Leaves sinuate to pinnatipartite 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, slightly 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 enlarged, 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.

An erect, annual or perennial, branched, up to 60 cm tall, glabrous or pubescent herb. Lower leaves petiolate, upper leaves sessile or short petiolate, petiole up to 5 cm long, winged; blade fleshy, ovate, rhombic or broadly elliptic, entire, obscurely broadly toothed or lobed, acute, 3-10x5 cm. Inflorescence a bracteate, terminal spike. Flowers sessile or lower ones short pedicellate, pedicel up to 1.5 cm long in fruit. Calyx fleshy, 1.5-2.5x1 cm, in fruit accrescent, 3-4x2-2.5 cm, teeth broadly triangular, acute, c.5 mm long. Corolla exceeding the calyx, 2-3 cm long, greenish white. Stamens slightly exerted; anthers elongate, yellowish to purple; filaments yellowish to purplish. Ovary ovoid; style longer than stamens, purplish; stigma 0.5 mm in diameter, capitate, purple.

Distribution: Africa, Arabia and Persia. It is very common in the northern region of the Kingdom.

Representative specimens: Northern Province: Tabuk, 30.8.1983. S. Chaudhary 7688 (RIY); 60 km S. of NABK. 4.5.1981. M.A. Al-Yahya 440-D (Coll. Pharm.); Tabuk, 10.4.1980. M.A. Al-Yahya 118 (Coll. Pharm.).

3. *H. pusillus* Linn., Sp. Pl. 180. 1753; Blatt., l.c. 339; Tackh., l.c. 483, Migahid, l.c. 491; Collenette, l.c. 461.

An erect, branched or simple, usually glabrous herb, up to 40 cm tall. Petiole 1-3.5 cm long. Leaves oblong to oblong-lanceolate, pinnatifid to sinuate or entire, 1-4x0.5-2 cm. Inflorescence a bracteate terminal cyme. Flowers sessile. Calyx 0.6-0.8x0.3-0.4 cm accrescent, in fruit, 1.5-2.5x0.5-1 cm, teeth triangular, c.5 mm long, spiny-tipped. Corolla small, 0.8-1.5x0.5-0.7 cm, yellowish with purple centre. Stamens included; anthers yellow. Ovary ovoid; style short, included.

Distribution: S.E. Europe, Egypt, C.S. & W.Asia including Saudi Arabia, Persia and Pakistan.

Type: Described from Iran. Herb. Linn. 244.5 (LINN).

Representative specimens: Northern Province: Al-Jauf, 6.5. 1980. M.A. Al-Yahya 129-a (Coll. Pharm.); Hail, 22.3.1981. S. Chaudhary 551 (RIY); Central Province: Jabal Ghad, flowers yellow with dark throat, 24.2.1982. S. Abedin and M.A. Al-Yahya 10102 (Coll. Pharm.) 100 km SW of Buraydah, 50 cm tall, flowers yellow with black centre, filaments reddish, 26.2.1985. I.S. Collenette 5090 (RIY).

5. *Lycium* Linn.

Sp. Pl. 192. 1753; Gen. Pl. ed. 5. n. 262. 1754.

A glabrous or pubescent spiny shrub or small tree. Leaves usually in clusters or alternate, linear to lanceolate, entire. Flowers solitary, axillary or sometimes in clusters. Calyx campanulate or tubular, truncate or irregularly 3-5 toothed, bilabiate, persistent. Corolla tubular, funnel-shaped, lobes 4-5, imbricate, spreading. Stamens 4-5, inserted at or above the middle of the corolla tube, included or exerted. Ovary 2-celled; style filiform; stigma capitate or bilobed. Berry small, globose, or ovate, red or black. Seeds usually many.

Distribution: About 100 species in tropical and subtropical regions. About half the species are American, mostly, in Argentina. Only 3 species are known from Saudi Arabia. A difficult genus taxonomically and the limits of the species recognised here are not clear.

- 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.

3. *L. shawii* Roemer & Schultes, Syst. Veg. 4: 693.1819; De Marco & Dinellii, l.c.235; Tackh., l.c.486; Migahid, l.c. 491; Batanouny, Ecol. F1 Qatar 150. 1981; Collenette, Illus. F1. Saudi Arabia, 463.1985;

L. persicum Miers in Ann. Mag. Nat. Hist. Ser. 2.14: 12.1845; Blatter, l.c. 337; Post & Dinsmore, l.c. 260;

L. arabicum Schweinf. ex Boiss., Fl. Or. 4: 289. 1879, nom. illeg.; Schwartz, Fl. Trop. Arab. 233. 1939.

Spiny shrub, 1-3 m tall, glabrous or pubescent. Leaves almost sessile, alternate or in fascicles of 2-10, oblanceolate, linear or elliptic, glabrous or hairy, entire, obtuse or acute, 0.5-2x0.3-0.8 cm. Flowers solitary, or in pairs, axillary, pedicel 0.3-1 cm long, hairy or glabrous. Calyx glabrous or hairy outside, c.5x1.5 mm, 5-toothed, teeth triangular, 0.5 mm long, regular, in fruit slightly enlarging and splitting irregularly into 3 teeth. Corolla bluish, tubular, tube 1.2-1.5 cm long; lobes 5, minutely ciliate, spreading, more blue than tube, c. 2 mm long, obtuse. Stamens 5, inserted a little above the middle of the corolla tube, included; anthers oblong or globular, c. 1 mm across; filaments filiform, glabrous, + 4-5 mm long. Ovary ovoid, 1.5x1 mm, subtended by a disc; style filiform, 1.2-1.4 mm long; stigma capitate, c. 1 mm in diameter. Berries red, edible, of pea size.

Key to the varieties

- 1 + All parts glabrous or young var. parts sparsely pubescent. ----- *Leptophyllum*
 - Branches, leaves, pedicels and outer calyx pubescent, densely so on young parts ----- var. *shawii*

i) *Lycium shawii* var. *shawii*

Distribution: Arabia, tropical Africa and Egypt.

Representative Specimens: Southern Province: Jabl Fayfa, 4.3.79. *S. Chaudhary* 5700 (RIY); Western Province: Malah Valley, flowers bluish, 1 m tall, spiny shrub. 1.3.83. *S. Abedin & M.A. Al-Yahya* 10622 (Coll. Pharm.); Yanbu, 28.11.79. *M.A. Al-Yahya* 38 (Coll. Pharm.); Central Province: Umm-Al-Asafeer, Shaqra, 15.12.1979. *S. Chaudhary* 2049 (RIY); Haayer Valley, 1.3.1981. *S. Chaudhary* 5703 (RIY); Majmaa, Sporting, 1981. *R. Alexander* 4047 (RIY); Near Haayer Valley, Oct. 1981. *S. Chaudhary* 5702 (RIY); Nisah Valley, 14.12.1981. *S. Chaudhary* 3972 (RIY); Ad Dibdibah, south of Hafar-al-Batin, small bush, 2-2.5 m high, 15.4.1982. *A.C. Podzorski* 3654 (RIY); Haayer Area, Feb., 1983. *S. Chaudhary & R. Bhatti* 7615 (RIY); Al-Attar, flowers white, fruit red, 1 m tall spiny shrub, common, 17.5.1984. *S. Abedin & M. A. Al-Yahya* 10987 (Coll. Pharm.)

ii) *Lycium shawii* var. *leptophyllum* (Dunal) Tackh. & Boulos ex A. Baytop in Davis, Fl. Tur. 6: 447. 1978.

L. leptophyllum Dunal in D.C., Prodr. 13: 5244.1852.

Distribution: N. Africa, Palestine, Turkey, Arabia, Iran and Pakistan.

Representative specimens: Southern Province: Biljurshi, 1965 (23.5.1385 Hijra), *Al-Kharobi* s.n. (RIY); Central Province: Al-Qaseem, Jabal Ghad, with red fruits, 1 m tall, 22.4.1982. *S. Abedin and M.A. Al-Yahya* 10151 (Coll. Pharm.); Western Province: Wadi Fatimah, 24.4.1967. *De Marco* 123 (RIY); 25 km SE of Taif, rocky hills and

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*

- Petiole not winged, upper leaves petiolate. Corolla greenish yellow, 2 cm across, lobes obtuse apiculate ----- 1. *N. rustica*

1. *M. rustica* Linn., Sp. Pl. 180. 1753; Schwartz, Fl. Trop. Arab. 239. 1939.

Viscid hairy, 1-1.5 m tall, annual herb. Leaves petiolate; blade large, lower ones 30x20 cm, ovate, obtuse. Calyx cyathiform, 5-8 mm long, 5 toothed, teeth acute, unequal. Corolla salver-shaped, greenish yellow, 1.2-1.7x2 cm, lobes obtuse-apiculate. Capsule subglobose, 0.7-1.5 cm in diameter.

Distribution: Possibly native of N. America, cultivated in America and Africa, also in other parts of the world.

Type: Described from N. America. Herb. Linn. 245. 2(LINN).

Representative specimens: Central Province; Riyadh, RAWRC, flowers greenish yellow, 19.5.1984. S. Chaudhary 8294 (RIY).

2. *N. tabacum* Linn., Sp. Pl. 180. 1753; Blatt., Fl. Arab. 359. 1919-36; Schwartz; l.c. 239.

An annual herb up to 1.5 m tall, similar to the above species but with a winged petiole, upper leaves sessile, corolla pinkish red and large, 3.0-4.4 cm across.

Distribution: Probably originated in N. America. Widely cultivated for tobacco with numerous cultivars.

Type: Described from America. Herb Linn. 245. 1 (LINN).

Representative specimens: Central Province: Riyadh, RAWRC, flowers pinkish, January, 1984, S. Chaudhary 7929 (RIY).

8. *Petunia* Juss.

Ann. Mus. Par. 2: 215. t. 47. 1803.

A branched, viscid pubescent, annual to perennial, often sprawling herb. Leaves simple, alternate, ovate, elliptic-ovate to elliptic-lanceolate, cordate or truncate at base, acute, entire. Flowers axillary, solitary, violet to white or pale yellow, bluish, pink or red. Calyx 5-parted. Corolla funnel-shaped or salverform. Stamens 4 fertile and didynamous, 1 smaller or rudimentary. Capsule 2-celled. Seeds many.

Distribution: About 40 species native to tropical and warm temperate S. America, especially Brazil. In Saudi Arabia only 1 cultivated hybrid is known.

P. x hybrida Hort. ex Vilm., Fl. Pl. Terrn. 615. 1865.

An annual herb, erect or scandent, 30-50 cm high, viscid pubescent with glandular hairs. Leaves broadly ovate. Flowers axillary, solitary, varying in size, shape and colour, 5-12 cm in diameter, often deeply fringed or double, white to deep red-purple, variously striped or with star like markings radiating from the base.

Distribution: This complex of hybrids involving several species is widely cultivated for ornamental purpose throughout the world.

9. *Physalis* Linn.

Sp. Pl. 182. 1753; Gen. Pl. Ed. 5. n. 223. 1754.

Annual to perennial herbs with creeping rhizomes. Leaves alternate, + entire. Flowers solitary, axillary, drooping, pedicellate. Calyx campanulate, 5-toothed or lobed, accrescent and inflated in fruit. Corolla 5-lobed, subrotate. Stamens 5. Ovary

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 |

- 4 + Plants stellate hairy ----- 5
 - Plants dendritic or simple hairy ----- 6
- 5 + Flowers in terminal or pseudoterminal racemes ----- 7. *S. terminale*
 - Flowers not terminal ----- 6. *S. schimperianum*
- 6 + Dendritic hairs common on young parts. Fruits orange red, yellow or Scarlet
 c.2 cm across ----- 3. *S. diflorum*
 - Dendritic hairs absent, only simple hairs present or plant glabrous. Fruits not
 showy, less than 1 cm across. ----- 7
- 7 + Fruits black ----- 1. *S. nigrum*
 - Fruits yellow to yellowish orange. ----- 2. *S. villosum*
- 8 + Prickles straight ----- 9
 - Prickles curved ----- 13
- 9 + Leaves 1.5-2.5 cm long. Fruits orange, orange-red or yellowish-red ----- 10
 - Leaves (2-) 3-15 cm long. Fruits yellow ----- 11
- 10 + Densely spiny herb. Leaves (midrib) and petiole spiny. Flowers in peduncled
 cyme. Fruiting pedicel c.1 cm long ----- 10. *S. macracanthum*
 - Sparsely spiny undershrub. Leaves and petiole not spiny. Flowers solitary or
 paired. Fruiting pedicel very slender, 3.5-4 cm long ----- 11. *S. cordatum*
- 11 + Sparsely hairy prostrate herb. Leaves membranous. ----- 16. *S. surattense*
 - Densely hairy erect herb or undershrub. Leaves coriaceous. ----- 12
- 12 + Stem densely prickly. Leaf lamina lanceolate to ovatelanceolate, 2-4 cm broad.
 ----- 12. *S. elaeagnifolium*
 - Stem sparsely prickly. Leaf lamina broadly ovate to ovateoblong, 3.5-9 cm
 broad ----- 9. *S. anguivi*
- 13 + Leaves up to 4 cm long. ----- 14
 - Leaves more than 4 cm long ----- 15
- 14 + Flowers in peduncled cymes. Young parts white tomentose. ----- *S. forskalii*
 - Flowers solitary or fascicled. Young parts not as above ----- 8. *S. glabratum*
- 15 + Fruits enclosed in inflated calyx ----- 15. *S. coagulans*
 - Fruits exposed, calyx not inflated. ----- 16
- 16 + All flowers bisexual. Calyx 3-4 mm long. Berry 7-10 mm across. - 9. *S. anguivi*
 - Upper flowers staminate. Calyx 6-7 mm long. Berry 20-30 mm across. -----
 ----- 13. *S. incanum*

1. *S. nigrum* Linn., Sp. Pl. 186. 1753; Forssk., Fl. Aegypt. 46. 1775; Blatter, Fl. Arab. 334. 1919-36; Post & Dinsmore, Fl. Syr. Pales. Sin. 256. 1933; Schwartz, Fl. Trop. Arab. 234. 1939; De Marco & Dinelli, An. Bot. 33: 235. 1974; Tackh., St. Fl. Egy. 473. 1974; Migahid, Fl. Saudi Arab. ed. 2. 491. 1978; Chaudhary & Al-Howaishel, Trop. Pest Manag. 26(3): 302. 1980; Chaudhary *et al.*, 27(2): 189. 1981; Batanouny, Ecol. Fl. Qatar 150. 1981; Nsir, Y. in Nasir, E. & Ali, Fl. Pak. 168: 6. 1985.

An annual, glabrescent or pilose, 0.6-1.5 m tall, branched herb. Petiole 1-4 cm. Leaves ovate, elliptic or lanceolate, entire to broadly and irregularly dentate, glabrescent or young leaves covered with uniseriate, glandular or eglandular hairs on both sides, acute, at base tapering and decurrent into petiole, 10 x 7 cm. Cymes pedunculate, lax, 4-10 flowered. Peduncle 1-3 cm long. Pedicel 0.5-1.5 cm long, reflexed in fruit. Calyx c.2 mm long, lobes obtuse. Corolla 5-7 mm long, white to lilac or purplish, petals clavate hairy on the margin and along the median line outside, lobes

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*

i) *S. villosum* Mill. ssp. *villosum*

S. nigrum L. var. *villosum* Linn., Sp. Pl. 186., 1753; *S. luteum* Miller, Gard. Dict. Ed. 8. n. 3. 1768; *S. nigrum* ssp. *villosum* (Linn.) Ehrb., Hann. Mag. Mag. 14: 218. 1780. 1780; *S. villosum* (Linn.) Willd., Enum. Pl. 236. 1809, non Miller 1768, nec Lam. 1794;

Distribution: C. and S. Europe, S.W. to S. Asia and Transcaspia.

Lectotype: Cultivated in Chelsea Physic Garden, Origin Barbados. *Miller s.n.* (BM).

ii) *S. villosum* Mill. ssp. *miniatum* (Bernh. ex Willd.) Edmonds in Bot. J. Linn. Soc. 89(2): 166. 1984.

S. miniatum Bernh. ex Willd., En. Pl. 1: 236. 1809; *S. villosum* Mill. ssp. *puniceum* (Kirsch.) Edmonds in Bot. J. Linn. Soc. 78: 215. 1979; Collenette, l.c. 466; *S. alatum* Moench, Menth. 474. 1794; Post, l.c. 257.

Distribution: C. and S. Europe, S.W. Asia to Pakistan and Transcaspia.

Lectotype: (By Edmonds, 1984): Herb. Willdenow 4366, Sheet 3(B).

Representative Specimens: Southern Province: Jabal Fayfa, 4 & 6.3.1979. *S. Chaudhary* 5735 (RIY); Central Province: Onaiza, 28.5.1978. *S. Chaudhary* 5733 (RIY); Riyadh, RAWRC, berries orange, *S. Chaudhary* E-527, E-590; 6986 (RIY); Western Province: Malah Valley, flowers white, 20 cm high, 1.3.1983, *S. Abedin and M.A. Al-Yahya* 10629 (Coll. Pharm.); Taif-Turba area, 9.3.1977. *S. Chaudhary* 5732 (RIY); Taif, R/S, 25.9.1978. *S. Chaudhary* 5737 (RIY), Jeddah, Wadi Khulays, 7.3.1967. *R. Bavazzano* 5106 (RIY); Farm, near Al-Rawshan, a weed in agricultural areas, latitude 20° 03' N, longitude 42° 35' E, altitude 1122m, 20.5.1978. *A. Vandenberg* 36 (RIY).

3. *S. diflorum* Vell., Cone Fl. Flum. 84; 2: t. 102. 1811; *S. capsicastrum* Link ex Schauer in Otto Dietr., Allg. Gartenz 1: 228. 1833.

An undershrub up to 60 cm tall. Branches and leaves with dendritic hairs. Petiole 0.5-1 cm long. Leaves ovate-lanceolate or narrowly elliptic to elliptic-cuneate, acute, entire to repand, 2-7x0.8-2.5 cm. Inflorescence 1-3-flowered cyme. Flowers pedicellate. Calyx 5-lobed, lobes connate at the base, linear-lanceolate, up to 7 mm long in fruit. Corolla ± 1 cm across, white. Fruit ovoid to globose, 1.5-2 cm in diameter, glabrous, orange-red, yellow or scarlet. Seeds many, yellowish, flat, 2-3 mm in diameter, kidney shaped.

Distribution: A Brazilian species cultivated for its beautiful fruits. Although this species has generally been known in the past as *S. capsicastrum* but it appears that the correct epithet is that of Vellozo.

Representative Specimens: Central Province: Riyadh, RAWRC, fruit 1-1.5 cm in diameter, orange and yellow as well, 25 cm high, cultivated 1.1.1984. *S. Abedin & M.A. Al-Yahya* 10846, 10847 (Coll. Pharm.).

4. *S. tuberosum* L., Sp. Pl. 185. 1753.

A biennial to perennial spreading herb with underground tubers. Leaves compound, imparipinnate, leaflets 6-8 pairs, alternately small and large, large ones ovate, small ones ovate or suborbicular. Inflorescence a terminal cyme. Pedicel articulate. Calyx teeth lanceolate to acuminate. Corolla white or purple, 2.5-3.5 cm across.

Distribution: Native of *S. America*, cultivated throughout the world for its edible tubers (potatoes). Arabic 'Batatam', 'Batata'.

Lectotype: Described from Peru. Herb. Linn. 248.12 (LINN).

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, *Forskal* 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. yemense* 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

lobed, acute, slightly oblique at base, 3-10x1.5-5 cm. Inflorescence terminal, many flowered. Pedicel 1-2 cm long. Calyx stellate hairy outside, 6 mm long, distinct below the middle; lobes linear-lanceolate. Corolla stellate pubescent outside, 1-2 cm across, purplish; lobes lanceolate. Anthers sessile, 5-6 mm long. Ovary globose, glabrous; style c. 1 cm long, glabrous. Berries globose, glabrous, scarlet-red, 6-8 mm across. Seeds many, c. 1.5 mm across.

Distribution: Africa, Arabia.

Type: Yemen in montibus altioribus. Ad Mochham in umbrosis *Forsskal* (C).

Representative Specimens: Southern Province, Al-Qura, near Abha. *M.A. Al Yahya & J.S. Mossa* 26, 186 (Coll. Pharm.); *ibid*, flowers purplish, 1 m tall. *S. Abedin, J.S. Mossa & Al Said* 11373 (Coll. Pharm.); Abha, *Dellono* 5106 (RIY); *ibid*, flowers purple, 1 m tall. *S. Abedin & J.S. Mossa* 10347 (Coll. Pharm.); Najran Road, 120 Km from Abha, flowers large, purple, berries scarlet-red. *S. Chaudhary & Z. Howaishell* 5720 (RIY).

8. *S. glabratum* Dun., *Hist. Sol.* 240. 1813.

S. sepicula Dun. in DC., *Prodr.* 13(1): 283. 1852; *Blatter*, 1.c. 335; *Schwartz*, 1.c. 236; *De Marco & Dinelli*, 1.c. 235; *Chaudhary & Al-Howaishel*, 1.c. 302; *Collenete*, 1.c. 464, 465.

An undershrub. Stem almost glabrous or sparsely hairy, more so on the young parts, densely covered with small, recurved, compressed prickles. Leaves sessile, hastate or sinuately or pinnately lobed, greyish-green to green, acute, sparsely stellate hairy on both surfaces, unarmed or rarely with a few, yellowish prickles on the midrib below, 1-4x0.5-1.5 cm. Flowers mostly in pairs, sometimes solitary. Pedicel 0.4-1.5 cm long, prickly or unarmed. Calyx 2-3 mm long, divided nearly to the middle, in fruit almost to the base, sparsely stellate-hairy outside; lobes linear. Corolla 5-lobed, lobes nearly divided to the base, linear-lanceolate, stellate hairy outside, and along the midline inside, 8-12x20 mm, violet to purple. Anthers subsessile, yellowish, \pm 6 mm long. Ovary globose; style 7-8 mm long, stellate-hairy, stigma 1 mm across. Berry globose, orange-red, 4-8 mm across, pendulous, glabrous or rarely with a few stellate hairs. Seeds many, yellowish, \pm 1.5 mm across, circular, flat.

Distribution: Tropical Africa and Arabia.

Representative Specimens: Southern Province: Abha, *M.A. Al-Yahya & J.S. Mossa* 181 (Coll. Pharm.); 45 KM N of Khamis Mushayat, *De Marco* 176 (RIY); Abha, *S. Abedin, J.S. Mossa & Al-Said* 11352 (Coll. Pharm.); Khamis Musbayat, *S. Abedin, J.S. Mossa & Al-Said* 11384 (Coll. Pharm.); 30 KM N of Khamis Mushayat, *S. Abedin, J.S. Mossa, Al-Said* 11411 (Coll. Pharm.); Western Province: Taif, Hama Saysad, *Shaheen* 7665 (RIY); Taif, December 1965, *A. Muttalib* 7666 (RIY); Hama Al-Foqa, 45 KM, SE of Biljurshi, 1900 m. *D.R. Duba* 58 (RIY); Taif, with orange fruits, 40 cm high undershrub, 12.4.1985. *S. Abedin, J.S. Mossa & Al-Said* 11222 (Coll. Pharm.); Central Province: Riyadh, King Saud University, near College of Pharmacy, growing around palm tree, soil wet (seems to be introduction). *S. Abedin & M.A. Al-Yahya* 11490 (Coll. Pharm.).

9. *S. anguivi* Lam., *Tabl. Encycl.* 2:23.1794; *Hepper*, *Bot. J. Linn. Soc.* 76: 290. 1978. *Nasir, Y.*, 1.c. 14.f.3.A-B. *S. indicum* auct. non L., *Schwartz*, 1.c. 235.

An undershrub, 1-2 m tall, densely stellate hairy, rays curved, also straight. Petiole 1.5-2.5 cm long. Leaves lanceolate to broadly ovate or ovate-oblong, repand to

sinuately lobed, stellate hairy, upper surface with one ray longer than the rest, those of the lower almost with equal rays, not or sparsely prickly on the mid vein, 3-15x2-9 cm. Flowers in groups of 4-15; pedicel with or without prickles, densely stellate hairy. Calyx stellate hairy outside, divided to the middle, c.4-5 mm long, lobes triangular. Corolla purplish, densely stellate hairy when young, 15-20 mm across, lobes lanceolate, acute. Anthers 6-7 mm long; filaments short. Ovary globose stellate hairy; style little longer than stamens, stellate hairy. Berry globose, glabrous, yellow to scarlet, 5-10 mm across. Seeds subreniform, foveolate, 2-3 mm across.

Distribution: S. & S.E. Asia, Arabia and tropical Africa. It is a new record from this area.

Type: Described from Madagascar, *Commerson* (MPU, syntype P).

Representative Specimens: Southern Province: 10 km SW of Abha altitude 2500 m. *U. Baererle, P. Konig & A. Mahmoud* 82-1529 (Bot. dept.).

10. *S. macracanthum* A. Rich. *Tent. Fl. Abyss.* 2: 106. 1847. *Collenette*, l.c. 464, 465.

A much branched, densely spiny perennial herb, spines straight, yellow 5-12 mm long. Stem and leaves densely stellate-hairy, rays almost equal and adpressed, central one much longer and erect. Petiole 0.3-12 mm long. Leaves ovate to oblong-ovate, usually obtuse, repand to sinuately lobed, both surfaces with 1 or 2 spines on the midvein. Flowers few in lateral cymes; peduncle and pedicel spiny. Calyx connate to the middle, 3-4 mm long, densely stellate-hairy and spiny outside. Corolla lobes ovate or ovate, stellate hairy outside. Ovary stellate hairy. Berry glabrous, globose, orange, 0.7-1.5 cm across, immature fruits stellate hairy. Seeds subreniform, 2-3 mm across, foveolate.

Distribution: Ethiopia and Saudi Arabia.

Type: Described from Shoa, Ethiopia.

Representative Specimens: Southern Province: Al Namas, with red berries, spines straight, 40 cm high. *S. Abedin, J.S. Mossa & M. Al Said* 11320 (Coll. Pharm.); Ad-Dhana water fall, near Tanumah, in thick vegetation, near pond. *I.S. Collenette* 4917 (RIY); Tanumah, *I.S. Collenette* 2933 (BM).

11. *S. cordatum* Forssk., *F1. Aegypt. - Arab.* 47. 1775; *Nasir, Y.*, l.c. 12. f.2.E-F.

S. gracilipes Decne., *Voy. Inde. Jacquemont*, 4(3): 113 t. 119. 1844.

A scrambling, brown stemmed undershrub with sparsely branching stems up to 70 cm long or more, stellate-pubescent, flaking on old branches, prickles few, 3-5 mm long, recurved. Petiole 0.3-2 cm long. Blade subcordate, broadly-ovate to orbicular-oblong, entire, obtuse, 0.6-2.5x0.4-2 cm, stellate-pubescent on both surfaces. Flowers axillary or terminal, solitary or in pairs. Pedicel 6-8 mm long, stellate-pubescent, enlarged in fruit to 3-4 cm long, very slender and becoming wavy. Calyx connate to or above the middle, 2-4 mm long, stellate-pubescent outside; teeth triangular 1-3 mm long. Corolla purple, pubescent outside, 0.5-1 cm long, connate to the middle; lobes acute to obtuse. Anthers 5 mm long, subsessile. Ovary oblong, glabrous; style c. 7 mm long, glabrous. Berry rounded, orange, 4-8 mm across, with persistent reflexed calyx. Seeds subreniform, 2-2.5 mm across, tubercled.

Distribution: Africa, Arabia, Pakistan and India. It is the first record from Saudi Arabia.

Type: Described from Hadak, Arabia.

Representative Specimens: Southern Province: Near Al Masane Camp, 98 km E of Abha, Najran Road, Wadi Yitam, altitude 4800 ft., fruits orange on single stalk to 3.8 cm long. *I.S. Collette* 5503 (RIY).

12. *S. elaeagnifolium* Cav., Icon. Descr. 3: 22. t. 243. 1794; Tackh., 1.c. 474; S. Chaudhary, et al., 1.c. 139; Batanouny, 1.c. 150; Nasir, Y. 1.c. 14.f.2.G.H.

An erect, sparingly branched, hoary undershrub, up to 50 cm tall, usually reddish-prickly, prickles sharp, needle-like, 2-6 mm long, sometimes restricted only to calyx; branches and leaves with dense, stellate hairs. Petiole 0.5-2.5 cm long. Leaves linear to lanceolate or oblong-lanceolate, acute or obtuse, entire to shallowly sinuate, rounded, truncate or cuneate at base, c. 3-10x1-2.5 cm, upper surface canescent, lower hoary. Inflorescence a few-flowered pedunculate cyme, rarely the flowers solitary, peduncle 0.5-2.0 cm long. Pedicel 0.5-2.0 cm long, thickened above in fruit. Calyx 5-10 mm long, stellate hairy, prickly outside; lobes linear, 2-6 mm long. Corolla 2.5-3.5 cm across, connate below the middle, densely stellate-pubescent outside, glabrous or very sparsely adpressed stellate-hairy inside; lobes lanceolate, acute to acuminate, purplish to purple. Anthers 7-10 mm long, yellow, linear; filaments 2-3 mm long. Ovary globose, densely stellate pubescent; style longer than stamens, 1.2-1.3 cm long, glabrous, pubescent only at the bottom; stigma elongate. Berry globose, leathery dry, yellow, 0.7-1.3 cm across. Seeds many, brown, compressed, ovate-circular, 2-3 mm across.

Distribution: Temperate America, introduced in Mediterranean, Arabia, Africa and Australia. It is recorded for the first time from the Kingdom.

Type: Habitat in America calidiore, 4 Floret a Julio usque ad Octob. in regio horto Matritensi. (verisim, MA, also C, A).

Representative Specimens: Central Province: Al-Kharj, 21.3.1978. *S. Chaudhary* 5723 (RIY); Ibid, June, 78. *S. Chaudhary* 5722 (RIY); Ibid, April, 1979. *S. Chaudhary* 5727 (RIY); Ibid, 5.5.79. *S. Chaudhary* 5728 (RIY).

13. *S. incanum* Linn., Sp. Pl. 188. 1753; Forssk., 1.c. 46; Blatter, 1.c. 333; Post, 1.c. 258; Schwartz; 1.c. 237; Mandaville, Field Res. Pub., Miami 10. 1973; De Marco & Dinelli, 1.c. 235; Tackh. 1.c. 474; Migahid, 1.c. 492; Chaudhary & Al-Howaishel, 1.c. 302; Nasir, Y. 1.c.16.f.3,C-E; Collette, 1.c. 464, 465.

A densely stellate-tomentose, greyish or yellowish-green 1-2 m tall, prickly shrub, prickles stout, sharp, yellow, 2-7 mm long, broad at base, yellowish, recurved. Petiole 1-5 cm long, prickly or unarmed. Leaves ovate, ovate-elliptic or lanceolate, cordate, entire to sinuately lobed, acute or obtuse, prickly on the midrib below, 4-15x2-8 cm. Flowers solitary or paired, if paired then the upper unisexual (staminate) and the lower bisexual; pedicel short, 0.5-1 cm, accrescent in fruit, up to 2.2 cm long, prickly. Calyx 5-parted, 3-4 mm long, slightly accrescent and becoming hard in fruit, lobes triangular, unarmed or in fruit usually prickly. Corolla violet or purple, 1-2x1.5-3 cm, lobes lanceolate, densely stellate-tomentose outside, sparsely stellate-hairy on the central line. Anthers yellowish to purplish, sessile, 3-5 mm long, oblong. Ovary globose, glabrous; style longer than stamens, stellate hairy below. Berry globose, glabrous, yellow, 1.5-4 cm across. Seeds many, yellowish-brown compressed, 2-3 mm across, rugose.

Distribution: Africa, Arabian peninsula Pakistan and India.

Two varieties are recognised which can be distinguished as below:

Key to the varieties

- 1 + Plant greyish-green. Flower purple, more than 2 cm across. ---- i) var. *incanum*
 Plant yellowish-green. Flowers violet, less than 2 cm across. -----
 ----- ii) var. *unguiculatum*

i) *S. incanum* Linn. var. *incanum*

Neotype: Herb. J. Burser. Vol. IX. No.20 (UPC microfische series no. 1064. 51: 1-4) -
 fide Hepper & Jaeger (1983).

Representative specimens: Southern Province, Abha, Al-Qaraa, 4.4.1978. *Abdul Rehman Dawoodi* s.n. (RIY); Najran, Jan. 1980. *S. Chaudhary* 6963 (RIY); Jabal Fayfa, 19.11.1981. *S. Chaudhary* 978 (RIY); North Asir Mountains, 440 km from Jeddah, just south of Biljurshi altitude; 2,000 m., 23.04.1983. *A.C. Podzorski* 1087 (RIY); Western Province: Yanbu, Jan. 1979, *M.A. Al-Yahya* 1 a (Coll. Pharm.).

ii) *S. incanum* Linn. var. *unguiculatum* (A. Rich.) Abedin, Al-Yahya; Chaudhary & Mossa, Comb. et. *Stat. Nov.*

S. unguiculatum A. Rich, Tent. Fl. Abyss. 2: 102. 1851: De Marco & Dinelli, 1.c. 235; Tackh., 1.c. 474; Migahid 1.c. 492; Chaudhary & Al-Howaishel, 1.c. 302.

Type: (P)

Representative specimens: Southern Province: Najran, 16.1.1979. *S. Chaudhary* 5772 (RIY); Jabal Fayfa, March, 1979 *S. Chaudhary* 1054 (RIY); near Abha, disturbed area, latitude 18° 14' N, longitude 42° 30'E, elevation 2200 m, 17.10.1978. *D.R. Duba* 135 (RIY); Abha, Jabal Nahran, Nov. 1979. *M.A. Al-Yahya* and *J.S. Mossa* 16, 33 (Coll. Pharm.); Abha, flowers purplish, 60 cm tall, prickly, perennial herb, 22.11. 1982. *S. Abedin & J.S. Mossa* 10350 (Coll. Pharm.). Western Province: Taif Research Station 25.9.78. *S. Chaudhary* 5775 (RIY); Sader-El-Unaigh, near Warqan, flowers purple, 60 cm tall, 6.3. 1983. *S. Abedin & M.A. Al-Yahya* 10768 (Coll. Pharm.).

The present variety has been considered as a separate species (De Marco & Dinelli, 1974; Tackholm, 1974; Migahid, 1978 and Chaudhary & Al-Howaishel, 1980), different from *S. incanum* L. on the basis of colour of the indumentum in particular and size and colour of the flowers in general. The size and colour of the flowers are variable characters, while the difference in the colour of the indumentum, whether the plant is greyish or yellowish-green is not so prominent as to distinct the two taxa satisfactorily. However, varietal status seems reasonable on the basis of the combination of characters keyed as above.

14. *S. melongena* Linn., Sp. Pl. 186. 1753.

Annual erect herb, up to 1 m tall, prickly or unarmed, stellate-hairy. Leaves petiolate, simple, somewhat ovate or oblong, acute-obtuse, entire or shallowly sinuate, angled or lobed, sometimes prickly on the midrib. Corolla rotate, usually 5-lobed, 3-4 cm across, pale violet to violet purple. Stamens usually 5. Fruits large, elongate-ovoid or pyriform, glabrous, white, yellowish or balckish-purple, 2-25x3-15 cm. Seeds many, pale, circular, flat, c.2 mm in diameter.

Distribution: Native of India, widely cultivated all over the world for its fruits (aubergine) which are cooked as a vegetable or used as pickle. Arabic "Bazanjan", "Aswad".

Lecto type: (by D'Arcy, 1974). Herb. Linn. 248.28 (LINN).

Representative specimens: Southern Province: Abu-Arish, near Gizan, flowers, purple, 25 cm high, cultivated for fruits, 24.1.1984. *S. Abedin* and *J.S. Mossa* 10892 (Coll. Pharm.).

15. *S. coagulans* Forssk., Fl. Aegypt-Arab. 47.1775; Collenette, 1.c. 464, 465; *S. dubium* Frese. in Mus. Senckenb. 1: 166. 1833; Blatter, 1.c. 332; Schwartz, 1.c. 237; De Marco & Dinelli, 1.c. 235; Tackh., 1.c. 474; Migahid, 1.c. 492; Chaudhary & Al-howaisel in Trop. P. Manag. 26 (3): 302. 1980; Chaudhary *et al.* in Trop. P. Manag. 27 (2): 189. 1981.

A small, densely pubescent to glabrescent, yellowish prickly or unarmed, branched shrub. Petiole 4-13 cm long, prickly; leaves ovate, ovate-lanceolate to lanceolate, oblique cordate, sinuate to lobed, obtuse or acute, 5-13x3-10 cm. Inflorescence a sessile or pedunculate cyme, peduncle 0-1 cm with 2-6 flowers. Pedicel 0.5-2 cm long. Calyx divided below the middle, 5-7 mm long, accrescent in fruit up to 1.5 cm, smooth or densely prickly in fruit, prickles 3-7 mm long, stellate pubescent outside; lobes linear, acute. Corolla 7-8 mm long, stellate-pubescent outside; lobes lanceolate, acute, pale violet to purple. Anthers 5, 1 longer than the rest, sessile, oblong, ovary globose, stellate-hairy above; style + equalling corolla, stellate-hairy from base to above the middle, dilated slightly, reflexed at the top. Berry globose, yellow, pendulous, 0.5-1 cm across, included in the enlarged prickly calyx, glaucous. Seeds many, black, very shiny, flat, circular.

Distribution: Arabian peninsula, tropical Africa and Egypt.

Type: Yemen, Forsskal (C).

Representative specimens: Western Province; Jeddah, 25. 7. 1978. *S. Chaudhary* 5738 (RIY); Abu-Arish, 23.3.1979. *S. Chaudhary* 5725 (RIY); Southern Province; Gizan-Al-Salama, 27.1.1980. *M.A. Al-Yahya* and *J.S. Mossa* 57 (Coll. Pharm.).

16. *S. surattense* Burm. f., Fl. Ind. 57. 1768; Tackh., 1.c. 474; Migahid, 1.c. 492; Nasir, Y., 1.c. 10.f.2.A-D; Collenette, 1.c. 466; *S. armatum* Forssk., 1.c. 47; *S. xanthocarpum* Schrad & Wendl., Sert. Hanov. 1.8.t.2. 1795; Schwartz, 1.c. 237; *S. arabicum* Dun., Hist. Solan. 240. 1813.

Perennial, prostrate, very prickly herb. Young branches stellate-hairy; prickles straight, pale yellow, up to 2 cm long. Petiole 1-3 cm long, prickly. Leaf membranous, dark green, oblong, oblong-lanceolate or elliptic-ovate, 5-10x3-6 cm, sinuate to subpinnatifid, lobes 5-9, very sparsely stellate hairy, upper surface prickly on the veins. Inflorescence 5-8 flowered, axillary cyme, rarely the flowers solitary. Calyx sparsely stellate-hairy and prickly outside. Corolla 2-2.5 cm across, rose-violet to bluish-purple, densely stellate-hairy outside. Stamens 5, equal. Ovary subglobose. Berry 1-2 cm in diameter, globose, glabrous, shining yellow.

Distribution: Africa, Arabian peninsula, Pakistan, India and extending upto Malay.

Type: In insula Zuratta, *D. Garcin* (G).

Representative specimens: Southern province, Wadi Bani Malik, 7.4.1983. *S. Chaudhary* 7546 (RIY).

11. *Withania* Pauquy

Diss. Bellad. 14. 1825 (nom. cons.)

Perennial, hairy, unarmed herbs or shrubs. Leaves alternate, upper ones usually

opposite, petiolate, entire. Inflorescence short, umbellate, axillary cymes. Flowers bisexual or unisexual (plants then dioecious). Calyx 5-lobed, campanulate, very small, accrescent and loosely or tightly enclosing the fruit. Corolla 5-lobed, slightly exceeding the calyx. Stamens 5-6 (-7), inserted near the base of corolla; filaments slightly flattened; anthers erect, connivent dehiscing longitudinally. Ovary 2-celled; style filiform; stigma shortly and widely bilamellate or subglobose. Fruit a globose berry.

Distribution: About 10 species found in *S. America*, Australia, Mediterranean, S. Africa, Canaries, S. and S.W. Asia.

W. somnifera (Linn.) Dun. in DC., Prodr. 13 (1): 453. 1852; Boiss., Fl. Or. 4: 287. 1879, Blatter, Fl. Arab. 336. 1919-36; Schwartz, Fl. Trop. Arab. 2-3. 1939; Mandaville Field Res. Pub. n. 95. 10. 1973; Tackh., St. Fl. Egy. ed. 2. Pl. 164. 474. 1974; De Marco & Dinelli, l.c. 235; Migahid, Fl. Saudi Arab ed. 2.1: 494. f. 502 & 503. 1978; Collenette, Illus. fl. Saudi Arabia 467. 1985; *Physalis somnifera* Linn., Sp. Pl. 182. 1753.

An erect, much branched, 0.5-1.5 m tall shrub. All parts densely, pubescent with soft, erect, deditric hairs. petiole 1-3 cm long. Leaves ovate to broadly ovate, ovate-lanceolate or elliptic, entire, acute to obtuse, attenuate to truncate at base, hairy on both surfaces, densely so below, 2-12x1-10 cm. Flowers bisexual, solitary or in fascicles of 2-16, congested. Pedicel 1-8 mm long, visible or not. Calyx 2-4 mm long, campanulate, densely hairy outside, in fruit membranous and enlarging up to 2.2 cm including 1-5 mm long linear acumen. Corolla yellowish green, 5-8 mm long, campanulate, lobes ovate-triangular, hairy outside, margin somewhat clavate hairy. Stamens small, c.3 mm long; anthers apiculate. Ovary glabrous; stigma globose. Berry globose, 5-7 mm in diameter, shining red, enclosed by the calyx.

A variable species specially in leaf indumentum. Two subspecies are recognised which can be distinguished as under:

Key to the sub-species

- + Leaves acute, attenuate at base, densely pubescent. Flowers 4-16, congested; pedicel 1-5 mm long, usually not visible. Fruiting calyx with c. 4 mm long linear acumen at apex. ----- i) ssp. *somnifera*
- Leaves obtuse, + truncate at base, glabrous or little hairy, Flowers 1-4, loose; pedicel 4-8 mm long, visible. Fruiting calyx with c.2 mm long linear acumen at apex. ----- ii) ssp. *obtusifolia*

i) *W. somnifera* (Linn.) Dun. ssp. *somnifera*

Distribution: Australia, Africa, Mediterranean region, The Canaries, Arabia, Iran, India and Sri Lanka.

Type: Described from Mexico, Crete and Spain.

Representative specimens: Northern Province; Quriyah, fruits yellowish green, 40 cm high, Palm garden, sandy soil, well irrigated. *S. Abedin*, *M.A. Alyahya* and *M. Al Said* 11032-11035 (Coll. Pharm.); Southern Province, Abha, Elmakhoda El-Ola. *M.A. Al Yahya* & *J.S. Mossa* 18, 172 (Coll. Pharm.); Western Province, Wadi Al Hadda, fruits red, 60 cm high. *S. Abedin* & *M.A. Al-Yahya* 11173 (Coll. Pharm.). Al-Taif, fruits red, 1 m tall shrub. *S. Abedin* & *M.A. Al Yahya* 11238 (Coll. Pharm.). Central Province, Riyadh, *M.A. Al Yahya* 41a (Coll. Pharm.).

ii) *W. somnifera* (Linn.) Dun. spp. *obtusifolia* (Tackh). Abedin, Al-Yahya, Chaudhary and Mossa, *Stat. Nov.*

W. obtusifolia Tackh. in *Svensk Comb. et Bot. Tidskr.* 26: 370. 1932; *F1. Egy.* 135. 1956; *ibid.* ed. 2. 476. 1974; De Marco & Dinelli, *An. Bot.* 33: 235. 1974.

Distribution: Egypt and Saudi Arabia.

Type: Described from Egypt.

Representative specimens: Southern province, Abha, with berries, 0.5-1 m tall, 24.1. 82. S. Abedin and J.S. Mossa, 10373, 10394 (Coll. Pharm.); Western province, Mecca - Taif, 1300 m, *Ficus salicifolia* zone, *E1-Sheikh*, Frey, Konig, Kurschner Mahmood and Migahid 7559 (Bot. Dept.); *ibid.*, *Acacia asak* zone, Frey, Kurschner Mighid and *E1 Sheikh* 6533 (Bot. Dept.).

The present taxon was described by Vivi-Tackholm (1932) as a distinct species. She differentiated her species *W. obtusifolia* on the basis of obtuse leaves from *W. somnifera* where leaves are acute. Besides this character the present authors have also noticed some other characters as mentioned in the Key. But there is overlapping in these characters and this does not seem reasonable to maintain specific status. However, the characters are sufficient enough as to support the subspecific status which is followed here. It is reported for the first time from Saudi Arabia.

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