

Taxonomic Revision of the Genus *Cuscuta* L. in Saudi Arabia

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ABSTRACT. A study of four species of *Cuscuta* L. present in Saudi Arabia has been carried out. The study gives detailed morphological descriptions of three species, viz. *C. campestris* Yuncker, *C. pedicellata* Ledeb. and *C. planiflora* Tenore and their distribution in Saudi Arabia. *C. hyalina* Roth., *C. monogyna* Vahl and the possible occurrence of few other species in the Kingdom are discussed briefly. A tentative Key is also provided for its identification.

Cuscuta (Dodder) is a well-known total parasite, distributed all over the world especially in the warmer and temperate regions. It is a twining non-chlorophyllous plant that attacks on crop, fodder and wild plants causing moderate to heavy infestations in the fields.

The genus includes about 140 species, mostly concentrated in the Americas, of which many have extended their boundaries through being carried along with their host plants. The number of species distinguished by Yuncker (1932) is 170 with a number of subgenera and sections. Verdcourt (1963) and Austin (1980) are of the opinion that Yuncker's concept regarding the separation of species is narrow and at least few characters used for segregation are due to the seasonal variations or change in the habitat. Most of the species have distinct ecological behaviour, parasitizing on a number of cultivated and range plants. In Saudi Arabia the genus is represented by 4 or 5 taxa. Among the species described here, *C. planiflora* Tenore is the only species native to this region. Migahid (1989) reported only two species viz. *C. pedicellata* Ledeb. and *C. planiflora* Ten. while Collenette (1985) included *C. campestris* Yuncker and *C. hyalina* Roth. The author has not seen any specimen of the latter species. Mandaville (1990) reports all 3 except *C. hyalina* from Eastern province.

Distribution of Cuscuta species in Saudi Arabia.

In *C. hyalina* Roth., clusters are often 3-flowered, pedicellate and calyx lobes acute, often exceeding the corolla lobes. Unlike in other species, corolla scales are absent in this species, except in var. *nubiana* Yuncker, reported by Andrews (1956) from Sudan, which has sometimes traces of few teeth at the base of the stamens. It is reported one time only from Jabal Sharda in the south-western part of Saudi Arabia (Collenette no. 3259). Blatter (1919-36) and Chaudhary and Akram (1987) reported *C. monogyna* Vahl from Arabian Peninsula. Since most of Blatter's collections were from Yemen and in the southern parts of Saudi Arabia, this species could possibly be seen in regions bordering Yemen. This species is characterised by its thick stem (more than 1.5 mm) and solitary style. *C. palaestina* Boiss. and *C. epilinum* Weihe ex Boenn. are the other two species distributed in the neighbouring countries (Tackholm 1974 and Blatter 1919-36) and possibly present in Saudi Arabia. Of which *C. epilinum* can be easily identified by its association with cultivated flax (*Linum usitatissimum* L.) where as in *C. palaestina* Boiss. flowers are sessile, 3-4-merous with linear stigma. Vernacular names of this genus varies from region to region but the common names are Hamool, Dubbay, Suyah, Dan el erneb, Khaniq-el-kirsenneh, shabbakah etc.

Systematic Treatment

Cuscuta L.

Sp. Pl. 124 (1753); Gen. Pl., ed. 5. 60 (1754).

Syn.: *Anthanema*, Rafin. Fl. Tellur. 4. 90 (1836); *Cassytha*, Gesner, ex S.F. Gray, Nat. Arr. Brit. Pl. 2 345 (1821) non L. Sp. Pl. ed. 1. 35(1753).

Type: *Cuscuta europaea* L.

Annual or perennial plants parasitizing on other plants by means of haustoria. Stems filiform, twining, non-chlorophyllous, yellow to reddish in colour. Leaves reduced to scales. Inflorescence in lax or compact cymose clusters. Flowers 4-5-merous, sessile or shortly pedicellate, hypogynous, regular. Calyx of 4 or 5 sepals, gamosepalous, lobes sub-acute or obtuse, entire. Corolla white, gamopetalous, urceolate to campanulate; petals 4 or 5, lobes acute with fimbriate or dentate scales below the stamens; scales equalling the number of stamens. Stamens as many as the perianth lobes, epipetalous; filaments short or as long as the corolla lobes; anthers 2-celled; pollen grains smooth. Ovary 2-celled, 4-ovuled, globular, glabrous; ovule anatropous, unitegmic, micropyle narrow reaching up to the embryo sac; embryo sac polygonum type; styles 2, distinct; stigmas 2, linear or capitate. Capsule globose to sub-globose, membranous, irregularly or regularly circumscissile near base. Seeds small, usually 4, ovoid or sub-globose; endosperm free nuclear; embryo filiform and spirally twisted with generally no trace of cotyledons.

Key to the species occurring in Saudi Arabia

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|--|--------------------------|
| 1. Style 1.
(See paragraph 'Distribution of <i>Cuscuta</i>
species in Saudi Arabia'). | <i>C. monogyna</i> |
| 1+ Styles 2 | 2 |
| 2. Stigmas linear | 3 |
| 2+ Stigmas capitate | 4 |
| 3. Flowers sessile,
pentamerous; corolla
appendages (scales) not reaching the
stamens. | 3. <i>C. planiflora</i> |
| 3+ Flowers pedicellate to subsessile,
usually tetramerous; corolla appendages
(scales) reaching upto the base of
the filaments. | 2. <i>C. pedicellata</i> |
| 4. Inflorescence in lax cymose clusters, 7-15
flowered; scales fimbriate. | 1. <i>C. campestris</i> |
| 4+ Inflorescence often 3-flowered cymes;
scales absent. (See paragraph 'Distribution of
<i>Cuscuta</i> species in Saudi Arabia') | <i>C. hyalina</i> |

1. *C. campestris* Yuncker in Mem. Torrey Bot. Club 18:138, f.14 (1932).

Type: Texas [Houston, 5 (6?) 1842], Lindheimer 126 (holotype-MO).

Syn.: *C. arvensis* Fiori and Paol., Fl. Anal. Ital. 2: 929 (1928) et auct., nom. illegit.,
non Beyrich (in sched.).

Fig. d-f.

Stem 1-1.5 mm in thickness, yellowish, branched. Scales ovate, acute, 1-1.5 mm long. Inflorescence in lax cymose heads. Flowers 3-4 mm wide, pedicellate with 1-1.5 mm long pedicels. calyx 1.5-1.75 mm long, 5-lobed; lobes obtuse, entire. Corolla 2-2.5 mm long, white, 5-lobed, acute: appendages short, ending below the stamens. Filaments as long as or a little shorter than corolla lobes; anthers obtuse, oblong. Ovary 0.5-0.75 mm in diameter, globular, Styles short, distinct; stigmas capitate. Capsule 2.5-3 mm in diameter, exposed, sub-globular, membranous, glabrous, dehiscent irregularly. Seeds 1-1.5 × 0.75-1 mm, usually 2 in each chamber, ovate, glabrous, tubercled.

Distribution: An American species widely spread all over the world. In Saudi Arabia it is seen in the central and eastern parts only.

Specimens examined: Dereiya, Riyadh, 7-8-1990, *J. Thomas*, 804 (KSU); RAWRC, Riyadh, April, 1978, *S. Chaudhary* (E); Dirab, 9-3-1981, *S. Chaudhary*, 8727 (RIY); NAWRC, Riyadh, April, 1978, *S. Chaudhary*, 8733 (RIY); Qateef, 28-1-1979, *S. Chaudhary*, 8732 (RIY); Onaiza, 28-5-1978, *S. Chaudhary* 8730 (RIY).

2. *C. pedicellata* Ledeb., Fl. Alt. 1: 293 (1829).

Syn.: *C. arabica* Fresen. in Mus. Senckenb. 1: 165 (1834); Blatter, l.c. 330; Schwartz, l.c. 203.

Fig. g-i.

Stem yellowish-red, slender, 0.75-1 mm in thickness, glabrous. Scales small, ovate, acute. Inflorescence 3-9 mm wide, consisting of 4-9 flowers in a small umbel or sub-capitate cluster. Flowers mostly tetramerous, pedicellate; pedicels of different length, 0.5-1.25 mm long. Calyx gamosepalous, lobes 4 or 5, ovate, sub-acute, entire, membranous. Corolla 1.5-2 mm long, yellowish-white, campanulate, lobes 4 or 5, acute; scales membranous, fimbriate, reaching up to the filaments. Stamens included, as many as the corolla lobes; filaments short; anthers acute. Ovary globular, glabrous, 2-celled, 4-ovuled; styles slender; stigmas subulate. Capsule 2-2.5 mm long, sub-globose, glabrous, dehiscent irregularly. Seeds 1-1.5 mm long, ovoid to sub-orbicular, usually 4 in each capsule.

Distribution: Central, eastern and south-western parts of Saudi Arabia, Egypt and Palestine. It is a rare species in Saudi Arabia.

Specimens Examined: Najran, 24-3-1395 H., Abdulla El-Sheikh and Ghamdi, I. 137 (KSU); Riyadh, 24-3-1403 H., Hassan, H.M., 138 (KSU).

3. *C. planiflora* Tenore, Fl. Napolit, 3: 250 (1824-1829).

Type: Napoli, Tenore (Holotype-MO, Isotype-NAP).

Syn.: *C. approximata*, Bab. in Ann. and Mag. Nat. Hist. 13. 253 (1844); *C. brevistyla* A. Buaun ex A. Rich. Tent. Fl. Abyss. 2:79 (1851); Blatter, l.c. 330; *C. balansae* Boiss. and Reut. var. *mossamedensis* (Hiern) Yuncker in Mem. Torr. Bot. Club, 18: 291 (1932).

Stem 1-1.5 mm in thickness. filiform, yellowish to red. Leaves ovate to ovate-elliptic; 1-1.5 mm long. Inflorescence of dense glomerules, 5-8 in each cluster. Flowers white, sometimes pink. Calyx 1.5-1.75 mm long, about as long as or slightly shorter than corolla, deeply cleft to almost free, lobes 5, sub-acute. Corolla 1.75-2 mm long, white or pink, campanulate, lobes 5, about as long as the tube, sub-acute to obtuse; appendages small, not reaching the stamens, dentate. Stamens 5, shorter than corolla lobes; filaments short; anthers 0.5-0.75 mm long. Ovary 0.5-0.75 mm long, sub-globular, glabrous, 2-carpelled; styles 2, distinct or rarely united; stigmas 2, slender. Capsule depressed-globose.

Distribution: Saudi Arabia, Egypt, Palestine, Jordan, Syria, Lebanon, Bahrain, Iran, Pakistan and Afghanistan.

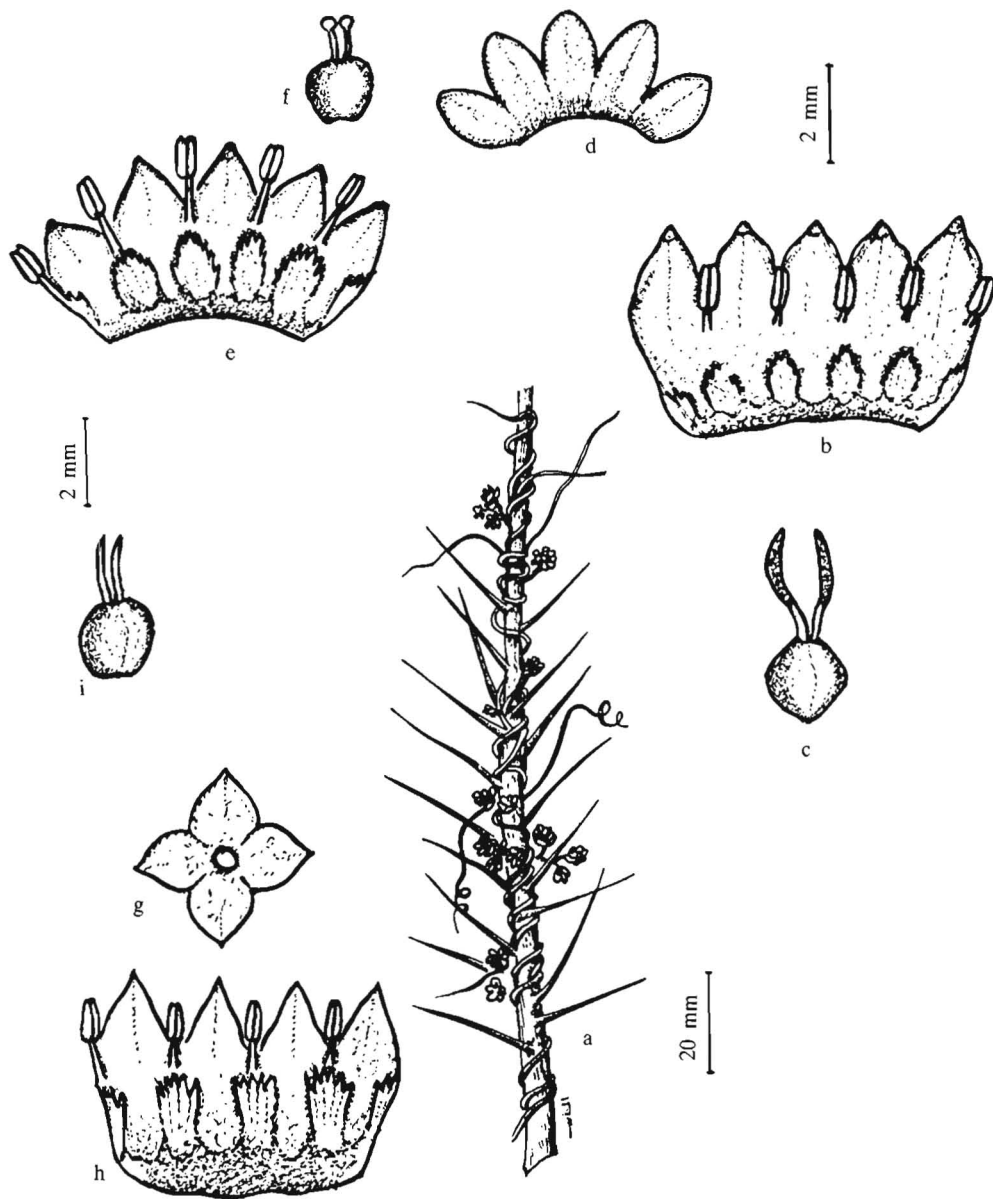
Specimens Examined: Tapline road, area of Khawr ad Duhaynah, East of Saudi Arabia, 14-4-1982, Podzorski, A.C. 856 (E); Higaz road, 25-3-1983, Duraibe, I. 135 (KSU); Al-Harra, 13-3-1987, Chaudhary, S. and Juwaid, A. 10786 (RIY); Hammad, 14-4-1984, Heemstra, H. (7344), 8567 (RIY); Dirab, 9-3-1981, Chaudhary, S. 8725 (RIY); Buseita, 8-3-1988, Heemstra, H. (7490), 13254 (RIY); Near Tabuk, 6-11-1991, Alfarhan, 1149 (KSU).

This is a complex species consisting of number of varieties. Verdcourt (1963) recognized 5 varieties from Eastern Africa. All the specimens studied in Saudi Arabia under *C. planiflora* can be attributed to var. *planiflora*. Blatter (1919-36) reported *C. epithymum* L. from Western Arabia and Sinai mountains. *C. planiflora* var. *holstii* Bak. and Rendle, a variety reported from East African countries has close resemblance with European *C. epithymum* (L.) Murr. Though the corolla lobes are broad and overlapping at the base, its morphological distinction with *C. planiflora* is very narrow (Verdcourt 1963). Var. *holstii* Bak. and Rendle and var. *approximata* (Bab.) Engelm. (var. *approximata*, a taxon previously treated as a species by many workers and occurring in the neighbouring Egypt and Palestine) differs from var. *planiflora* by its larger flowers with 2-3.5 mm long corolla and 1-2.2 mm long style including stigma.

There are variations in the length of the corolla scales. Usually the scales are found only at the base of the corolla tube but one specimen collected from Tabuk area (KSU-1149) has scales, at least in few flowers, reaching up to the base of the stamens. More material is needed to consider its varietal status.

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a-c. *C. planiflora* Tenore a. Habit on host plant, b. Corolla opened to show the stamens and scales, c. Pistil; d-f. *C. campestris* Yunck. d. Calyx, e. Corolla opened to show the stamens and scales, f. Pistil; g-i. *C. pedicellata* Ledeb. g. Calyx, h. Corolla opened to show the stamens and scales, i. Pistil.

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دراسة تصنيفية للجنس *Cuscuta* L. في المملكة العربية السعودية

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أجريت دراسة لأربعة أنواع تنتمي للجنس *Cuscuta* L. والتي تعيش متطفلة على كثير من النباتات المزروعة والبرية مما يتسبب في موتها.

تنتشر أنواع هذا الجنس في جميع أنحاء العالم وخاصة في أمريكا ومنها أنتشر في بقية أنحاء العالم من خلال نقل المحاصيل الزراعية. يحتوي الجنس *Cuscuta* L. على ١٤٠ نوعاً تنمو ثلاثة أنواع منها في المملكة العربية السعودية وهي *C. campestris* و *C. pedicellata* و *C. planiflora* ويعتبر النوع *C. planiflora* الوحيد المتوطن في المنطقة.

تسبب الأنواع النامية في المملكة العربية السعودية كثير من المشاكل للنباتات المزروعة نتيجة لتطفلها عليها، كذلك تتطفل على النباتات الرعوية. توجد فروقات تصنيفية ضئيلة بين الأنواع النباتية مما يسبب مشاكل في التعرف عليها. أحتوت الدراسة على وصف للأنواع النامية في المملكة وصفاً ظاهرياً مفصلاً مع ذكر توزيعها الجغرافي المحلي والعالمي كما نوقش باختصار إمكانية وجود النوعين *C. monogyna* و *C. hyalina* وأنواع أخرى في المملكة. كما تقدم الدراسة مفتاح للفصل بين الأنواع.