

IDENTIFICATION OF THE MEMBERS OF THE GENUS *CUSCUTA* AS REPRESENTED IN PAKISTAN AND KASHMIR

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Seventeen species of the genus *Cuscuta* L. were studied with the help of all herbaria in Pakistan, Edinbargh and Munchen. The variations in all the existing species are reported. A complete key for the species of the genus *Cuscuta* has also been added. All plants found in Pakistan and Azad Kashmir are covered in this study. All host plants of every species of the genus *Cuscuta* on which they are parasitic have been reported here.

INTRODUCTION

The treatment of genus *Cuscuta* in Hooker's *Flora of British India* [6] has long been out of date as there are several species and varieties to be found in this area which have not been mentioned in that work. During the course of time an excellent monograph on *Cuscuta* has been published by Yuncker [7] which formed the basis of treatments on *Cuscuta* in Rechinger's *Flora Iranica* [8] and in *Symbolae Afghanicae* [2]. S.M.A. Kazmi had taken up the preparation of *Cuscutaceae* for the *Flora of West Pakistan*, edited by Nasir and Ali but has left the country on a foreign assignment leaving his notes and material with this author. Kazmi checked the material at Edinburgh and Munchen besides the material preserved at the herbaria at Peshawar, Karachi and Rawalpindi. With his consent I checked the material further and have prepared a key of the species found in Pakistan. Under every species I have edited the specimens examined. The abbreviations of the Herbaria are according to *Index Herbarium* (1972). I hope it will help in the identification of dodders which sometime do damage to both wild and cultivated crops, and will serve the purpose until the family is published in the *Flora of Pakistan*.

Superficially many of the species are very similar and it is essential that the inflorescences, mature flowers and fruits are collected and examined in order to distinguish different species. Although some species grew on many different hosts it is often helpful to know the host on which the parasite grows. Some species appear to be more conservative in their taste than others. Those which grow on woody hosts are not usually to be expected on herbs. On the plains the species which does the most harm is *Cuscuta reflexa* which often covers and destroys various trees and shrubs

and is very common on *Zizyphus* trees. in the *C. approximata* often damages cultivated legumes.

Many botanists classify dodders under *Convolvulaceae* but because of their adaptation to parasitism Aucher and Choisy [1] have created a new family *Cuscutaceae* for these plants and consider this group separate from *Convolvulaceae*.

CUSCUTA

L., Sp. Pl. 124 (1753) and Gen. Pl., ed. 5:60 (1754); In Hook. Fl. Brit. India vol. IV. pp. 180; Yuncker in Mem. Torr. Bot. Club 18: 121 (1932); Yuncker and Rechinger in Rechinger Fl. Iranica, 8: 1-16 (1964); Butkov in Fl. U.S.S.R. 19: 38 (1953).

Twining herbaceous parasites, annual or rarely perennial in host tissue; free living for a brief period after germination until attachment to the host is accomplished. Leaves reduced to scales, plants yellowish or reddish, practically devoid of chlorophyll, affixed to the host by means of haustoria. Inflorescence lax or compact cymose clusters. Flowers sessile or shortly pedicelled. Sepals 4-5, united at the base. Corolla lobes 4-5, inserted at the throat and alternating with the corolla lobes; a whorl of thin fringed scales opposite to and below the stamens is present in most species. Ovary 2-locular, each loculus with 2 ovules. Fruit a capsule, splitting round the base or remaining closed. Seeds subglobose or angular, granular. Embryo and seedling thread like without cotyledons.

A genus of more than 140 species, spreaded throughout most of the world, and represented in Pakistan by the following species.

KEY TO THE SPECIES

- | | | | |
|---|--------------------------------------|---|--|
| 1. +Styles connate
(subgen. monogyna) | 2 | | |
| –Styles distinct | 6 | | |
| 2. +Stigma elongate, usually
longer than the style | 1. <i>C. reflexa</i> Roxb. | | |
| –Stigma equalling or
shorter than style | 3 | | |
| 3. +Appendages (scales) usually
half the length of the corolla
tube. | 4 | | |
| –Appendages (scales) longer,
usually equalling the anthers. | 5 | | |
| 4. +Stigma globose to short,
conical, style longer than
stigma | 2. <i>C. lupuliformis</i>
Krocker | | |
| –Stigma elongate, conical or
liguliform, style nearly
equalling the stigma in length,
flowers more or less 7 mm
long. | 3. <i>C. gigantea</i> Griff. | | |
| 5. +Appendages prominent
reaching the bases of anthers. | 4. <i>C. lehmanniana</i>
Bunge | | |
| –Appendages narrowly costate,
globose flat-peltateconvolute
to rarely ligulate. | 5. <i>C. monogyna</i>
Vahl. | | |
| 6. +Stigma distinct from the style,
globose flat-peltateconvolute
to rarely ligulate. | 7 | | |
| –Stigma sometimes not distinct,
much longer than broad. | 10 | | |
| 7. +Capsules not opening by
transverse slit. | 8 | | |
| –Capsules opening by transverse
slit. | 9 | | |
| 8. +Corolla lobes orbicular-ovate,
obtuse, erect to patent. | 6. <i>C. australis</i> R. Br. | | |
| –Corolla lobes broad-triangular,
acute, apices usually inflexed. | 7. <i>C. campestris</i>
Yunck. | | |
| 9. +Calyx lobes obtuse to acutish,
corolla lobes triangular-ovate to
oblong-ovate, acute to obtusish,
tube short. | 8. <i>C. chinensis</i> Lam | | |
| –Calyx lobes acuminate, corolla
lobes lanceolate, acuminate, | | | |
| | | tube usually longer. | 9. <i>C. hyalina</i> Roth. |
| | | 10. +Capsule not opening by trans-
verse slit, corolla papillose. | 10. <i>C. capitata</i> Roxb. |
| | | –Capsule opening by trans-
verse slit. | 11 |
| | | 11. +Capsule opening by irregular
by transverse slit, style absent
to very short, thick. | 12 |
| | | –Capsule opening regularly by
transverse slit, style and stigma
narrow. | 14 |
| | | 12. +Flowers 3.5-4 mm long, corolla
lobes longer than broad, calyx
lobes turgid at the tips, calyx
abruptly narrowed in a
pedicel. | 11. <i>C. kotschyana</i>
Boiss. |
| | | –Flowers 2.5-3 mm long,
corolla lobes broader than long,
calyx lobes not turgid at tips,
calyx gradually narrowed into
the pedicel. | 12. <i>C. pulchella</i>
Engelm. |
| | | 13. +Flowers pedicellate, calyx
truncate, lobes indistinct | 13. <i>C. babylonica</i>
Auch. & Chisoy |
| | | –Flowers sessile, calyx not
truncate, lobes distinct | 15 |
| | | 14. +Flowers membranous, style
equalling or shorter than the
ovary, flowers usually 4 partite,
calyx lobes obtuse | 14. <i>C. pellucida</i> Butkov |
| | | –Flowers coriaceous, style
shorter or longer than the
ovary flowers usually 5-partite,
calyx lobes obtuse to acute. | 16 |
| | | 15. +Calyx lobes at the apex not
turgid, stigma usually horizontal
in fruits. | 15. <i>C. brevistyla</i> Braun
& A. Rich. |
| | | –Calyx lobes at the apex
turgid, stigma usually vertical in
fruits. | 17 |
| | | 16. +Calyx deeply divided,
flowers 2-3 mm long, corolla
lobes roundish at apices, squame
not lobed. | 16. <i>C. planiflora</i> Ten. |
| | | –Calyx not deeply divided,
flowers longer than above,
corolla lobes obtuse at apices. | |

squame bilobed.

17. *C. approximata*
Babington

1. *Cuscuta reflexa* Roxb., Plants of the Coromandel coast, 2:3, tab. 104 (1798) *Type*: not known.

PAKISTAN: N.W.F.P.: Swat: Ushu, ca 2400 m, on *Viburnum* and *Indigofera* spp., K.H. Rechinger 19497 (M, W); Utror, ca 2500 m, on *Indigofera* sp., K.H. Rechinger 19562 (M,W); Jhamra, ca 2500 m, on *Viscia rigidula* Royle, Nasir and Siddiqui 1056 (RAW); between Utror and Kalam, ca 2300 m, on some Umbellifer, Nasir and Siddiqui 970 (RAW). Mountain west of Swat river above Bahrain, ca 1800:1813 m, R.J. Rodjin 5583 (RAW): Sho Nala, 2000-2300 m, on some leguminous plant, A. Rehman 68 (RAW); to Kalam, ca 2000 m, R.R. Stewart 24565 (RAW). Hazara: Kaghan valley, between Naran and Saifulmaluk lake, ca 3000 m, on rosaceous plant, S.M.A. Kazmi 2243, 2287 (PES). Peshawar: Peshawar University Campus, ca 350 m, on *Legustrum* hedges, S.M.A. Kazmi, s.n. Feb. 1973 (PES). Northern Areas: Gilgit: near Badwan, Gilgit road, ca 2600 m, R.R. Stewart 19584 (RAW). Punjab: Rawalpindi: Lawrence College road, Mrree, 2000-2300 m, on some leguminous plant, R.R. Stewart 21436 (RAW); Ghoragali, Murree Hills, ca 2200 m, on *Ficus palmata* R.R. Stewart 13087 (RAW); Murree Hills, Potha, ca 1480 m, on *Setaria* and *Cyprus* spp., R.R. Stewart 23452 (RAW). **Baluchistan:** Quetta: Murdar Range, dry rocky valley, ca 2000 m, rare on leguminous Shurbs, James Sinclair 2740-41 (E).

KASHMIR: Rajauri, 700-1300 m, Schluginweit Cat No. 12568 (M); Kishanganga valley, ca 2600 m, on *Viburnum nervosum*, E. Lindlow and G. Sherriff 1519 (E); Tangmarg, damp ground around fields, ca 2000 m, O. Polunin 56/302 (E).

Distribution: Java, India, Nepal, Afghanistan, Ceylon, China.

2.1. *Cuscuta lupuliformis* Krock. Fl. Siles., 1: 261, tab. 36 (1787)-*Type*: Silesia, Germania.

Var. *asiatica* Engelm., Trans. Acad. Sci. St. Luis., 1: 516 (1859)-*Type*: Ad riv. Volgam, Fischer (MO).

PAKISTAN: NWFP: Chitral: Madakhasht on *Sambucus*, Khan Bahadar in Kazmi 6660 (PES) kalash in valle Bromboret, Devasguru, 1500-1700 m, Kerst 2079 (fide Fl. Iranica).

Distribution of var.: Afghanistan, East Europe to West Asia in Turkistan and China.

3. *Cuscuta gigantea* Griff., Plant Asiat., 1:43 (1847)-*Type*: Griffith 1031, 683 (K).

PAKISTAN: NWFP: Hazara Distr.: Kaghan valley, Shogran, Iftikhar and Mahmood, 177 (PES); Hill territory,

Shmlai to Chail Sar, 2000 ft., Burt and Kazmi 1197 (E).

Northern Areas: Gilgit: Boum Bar Glacier, ca 40 miles w. of Yasin, 3800 m., on *Ephedra*, David Broadhead 7841 (RAW). **Baluchistan:** Quetta Distr. Sor Eang, S. Anwer Ali Shah 6175 (RAW).

KASHMIR: Nil Nag, Drummond 15040 (E).

Distribution: Afghanistan.

4. *Cuscuta lehmanniana* Bunge, in A. Lehm., Mem. Sav. Etrang. Petersb. 396 (1851) Var. *lehmanniana*. *Type*: Uzbekistan: Bukhara, A. Lehmann (MO).

PAKISTAN: Baluchistan, Quetta Distr.: Quetta, on legume, E. Nasir 28404 (RAW). Northern Areas: Hunza and Nagar Gebiet, on *Artemisia*, 2500 m, F. Lobbichler 549 (M).

KASHMIR: Chhantir Gehm 2750 m., F. Schmid 2127 (RAW).

Distribution: Turkistan, Afghanistan, central Asia, Russia and China.

5. *Cuscuta monogyna* Vahl., Symb. Bot. 2:32 (1791)-*Type*: "Hab. in Oriente" **PAKISTAN: Baluchistan:** Blatter (Fide Rech. F. Fl. Iranica); Quetta Distr.: Quetta Forest Nursery, on *Pistatia* sp., Zafar Ali and Y. Nasir 5850 (RAW): Quetta, ca 1700 m, Y. Nasir and Zaffar Ali 5798 (RAW). Northern Areas: Hunza und Nagar Gebiet, 74° 17' o L 36° 23' n Br., 2500 m, auf Artemisia, F. Lobbichler 549 (M). *Distribution:* Iran, Afghanistan, Iraq.

6. *Cuscuta australis* R. Br., Prodr. Fl. Nov. Holl., 1:491 (1810). Subsp. *cesatiana* (Bertol) Feinbr. Israel J. Bot., 19:19 (1970) Syn.: *C. australis* Var. *cesatiana* (Bertol.) Yunck. Me. Torrey Bot. Club. 18: 126 (1932). *C. cesatiana* Bertol., Fl. Ital., 7: 623 (1847)-*Type*: Verelli, Italia (M).

KASHMIR: Dal Lake on *Polygonum*, 1700 m., R.R. Stewart 22419 (RAW).

Distribution: India, Iran, Switzerland.

7. *Cuscuta campestris* Yunck. Me. Torrey Bot. Club 18: 138 (1932)-*Type*: Texas, Lindheimer 126 (MO).

PAKISTAN: NWFP: Mohmand Agency. Warsak Dam, on *Zizyphus*, S.M.A. Kazmi 4328 (PES).

Baluchistan: Babli, on *Alhagi*, M. Qaiser 15 (KUH).

Distribution: Afghanistan, Turkey, America.

8. *Cuscuta chinensis* Lam. Encycl. Meth. Bot. 2: 229 (1786)-*Type*: specimen from China cultivated at Paris Garden, Lam. (P) Var. *chinensis*.

KASHMIR: Locality not given, Schluginweit, Cat. No. 4590 dated 10/1856 (M).

Distribution: Abyssinia and Sokotra to Afghanistan, Ceylon, Australia and China.

9. *Cuscuta hyalina* Roth., Nov. Plant. Spec. 100 (1821)-*Type*: India, "Orentale", Heyne (E-Holo, K-iso!).

PAKISTAN: *Sind:* Diplo, on *Trianthema*, M.B. Zaman and S.M. Hussain s.n. 3.11. 1956 (RAW). 12 miles from Mithi on way to Diplo, A. Qaiser, A. Ghafoor and Abrar Hussain, 3717 (KUH); Karachi, near Liaqat Market, Malir Colony, Abrar Hussain s.n., 2.6. 1969 (KUH); Karachi, Drigh Road, on *Zaleyapenlandra*, A. Rehman, 25694 (RAW); Karachi, behind Pakistan quarters, Lawrence Road, on *Amaranthus* sp., S.M.H. Jafri 2458 (E); Karachi, Darsano-Chano village near Malir, Kazmi, 4130 (PES). *Baluchistan:* without locality, Stocks 478 (fide Rech. Fl. Iranica).

Distribution: India, East, South and North Africa.

10. *Cuscuta capitata* Roxb., Hort. Beng. 12 (1814)—*Type:* India, Roxburgh.

PAKISTAN: *NWFP:* South Waziristan, Wana, 1300 ft., Anwer Masih 3960, 6.9.1956 (RAW).

Distribution: Afghanistan, Iran.

11. *Cuscuta kotschyana* Boiss. Diagn. Pl. Or. 1,7: 29 (1846)—*Type:* India, Roxburgh.

PAKISTAN: *NWFP:* South Waziristan, Wana, 1300 ft., Anwer Masih 3960, 6.9.1956 (RAW).

Distribution: Afghanistan, Iran.

12. *Cuscuta pulchella* Engelm., Trans. Acad. Sci. St-Louis, 1:472 (1859)—*Type:* "Topchee", Griffith 690-91.

PAKISTAN: *NWFP:* South Waziristan, Wana 1500 m. on *Artemisia*, Lowndes 664 (E) Near Chitral on *Artemisia* Hassanuddin 113 (RAW).

Distribution: Afghanistan, Iraq.

13. *Cuscuta babylonica* Auch. and Choisy, Mem. Soc. Phys. Geneva, 9:270 (1841) — *Type:* Baghdad, Aucher Eloy, 1420 (Herb. DC in G, P). *Var. baylonica*

PAKISTAN: *NWFP:* Chitral Madakasht, Khan Bahadar in Kazmi 6661 (PES). *Northern areas:* Baltistan: Without locality, Schlaginweit, cat. No. 6513, 5599, July 1856 (M).

Distribution of var. Afghanistan, Turkestan, Iran, Iraq.

14. *Cuscuta pellucida* Butkov. in Not. Syst. Herb. Inst. Bot. Zool. As. Sci. Uzbek. 11:53 (1948). *Syn.:* *Cuscuta indica* (Engelm.) Petr. in Fl. USSR., 19:52 (1953); *Cuscuta europae* var. *indica* Engelm. l.c. 499 (1859).

PAKISTAN: *NWFP:* Hazara: between Naran and Saifulmaluk, ca 3000 m., Kazmi 2244 (PES); Swat: Gabriel, on *Sambucus*, Stewart, Nasir and Siddiqui 1532 (RAW); Sho Nala, on *Indigofera*, A. Rehman 65 (RAW). Chitral: Golen Gol, 3300 m, on *Swertia*. S.A. Bowes Lyon 62 (E); Near Chitral, Hasanuddin 66a (RAW); Chitral region, on *Artemisia*, Hassanuddin 113 (RAW); Chitral, Rhumbur, 1800-2000 m, Siddique and Rehman 26850 (RAW); *Northern Areas:* Baltistan: Skardu, E. Nasir and G.L. Webster 5739 (RAW); Satpura Nullah above Skardu, 3000 m, R.R. Stewart 20358 (RAW); Gilgit, Chilem to Gudei, ca 3000

m, on *Galium* sp., E. Nasir and Webster 6420 (RAW).

KASHMIR: Ladak, Himis, ca 3600 m. R.R. Stewart 451a (RAW); Rama to Gorikot, Astore Valley, R.R. Stewart 22947 (RAW).

Distribution: Indian Punjab, Afghanistan.

15. *Cuscuta brevistyla* A.C.H. Braun ex A. Rich., Tent. Fl. Abyss. 2:79 (1851). *Type:* Axum, Eethiopia, Schimper 1486 (G).

PAKISTAN: *Baluchistan:* Makran, Azaran to Hoshab, Lamond 352 (E), Kazmi 1197 (PES). *NWFP:* Chitral, Vedinkot, w. of Barobill Pass, Ca 3300 m, on *Epilobium*, Stainton 2961 (E). *Northern areas:* Gilgit, 1550 m, Lucerne field, O. Polunin 6012 (E); Hunza-Nagar Gebiet, 3000 m., Lobbichler 400 (M).

Distribution: Afghanistan, Iraq, Spain, Island of Canary and Mauretania and in east Persia and India.

16. *Cuscuta planiflora* Ten. Fl. Nipolit. 3:250, tab. 220, fig. 3 (1824-1829). *Var. pappitosa* Engelm., Trans. Acad. Sci. St. Louis, 1: 467 (1859)—*Type:* Tunis, Kralik 410a (Mo-Lecto.).

PAKISTAN: *Baluchistan:* Ziarat 2600 m., on *Thymus*, J.H. Lace 3876 (E). *Northern Areas:* Hunza and Nagar Gebiet, 2000 m., on *Artemisia*, F. Lobbichler 628 (M).

Distribution of species: Afghanistan, Africa, Mediterranean, Iran, Turkey.

17. *Cuscuta approximata* Babington, Ann. Nat. Hist., 13: 253 (1844). *Syn.:* *C. planiflora* var. *approximata* Engelm., Trans. Acad. Sci. St. Louis 1:465 (1859)—*Type:* A specimen cultivated in England from seeds from Afghanistan, Betall (K, iso). *Subsp. approximate.*

PAKISTAN: *Baluchistan:* Ziarat, on *Perowskea*, Jafri and Akbar 2165 (KUH); 10 miles from Chamman on way to Quetta, on *Alhagi* sp., Sultanul Abedin 3151 (E); Ziarat, Annon., s.n. dated 24.7.1962 (KUH); Ziarat, 2600 m., S.M.H. Jafri and K. Akhtar 2132 (RAW) Qilla Abdullah, 1600 m., on *Alhagi* sp., Zafar Ali 5707 (RAW); Quetta, Zafar Ali 4700 (RAW); Ziarat, Punjgur Univ. Collection 66 (RAW); Hoshab to Turbat, Kazmi 1115 (PES); Ziarat, stony hills on *Labiatae* Jafri and Akbar 2132 (E); Makran: Hoshab to Punjgur, south of Balgathar plain, on *Convolvulus*, J. Lamond 538 (E); Makran. Ca 20 k; W. of Hoshab, rocky area, sandy soil, Lamond, 520 (E) Punjgur irrigation scheme, on *Convolvulus*, Kazmi 1219 (PES); Hanna valley, James Sinclair 2808 (E); 10 miles from Chamman on way to Quetta, Sultanul Abedin, 3151 (KUH). *NWFP:* Swat: Kalam, 2300 m, on *Indigofera*, R.R. Stewart and A. Rehman 25103 (RAW); Swat, on *Otoestegia*, Anon. 99, dated April 1949 (RAW), on *Swertia*, R.R. Stewart 24643 (RAW); Chitral: Chambak Top, 3300-3600 m, Siddiqui and Reh-

man 26849 (RAW). Bombrait 2100 m, on *Siphora*, Y. Nasir s.n. 12.7.68 (RAW); Chitral 1800 m., Y. Nasir s.n. 7.6.68 (RAW); Drosh, 1800 m., Y. Nasir 4969 (RAW); Khyber Pass, Laker Sar, on *Umbellifer*, 2100 m., D. Lowndes 694 (E); Hazara; Baghnotar, 1600 m., *Otoestegia* sp., Gordon College Collection 23453 (RAW). *Northern areas*: Karakorum: Nagar, 2600 m., meadow, mostly on Lucerne, O. Polunin 6084 (E) Gilgit, above Mimipin, nagar, 2300-2600 m., on *Artemisia*, R.R. Stewart s.n. 16.8.54 (RAW); Hunza-Nagar Gebeit, 2000 m., on *Medicago*, F. Lobbichler 644 (M), Kazmi 2244 (PES); Baltistan; Schlaginweit cat No. 5516 dated 2.9.1856 (M); Skardu, 2300-2500 m., Legume, Schlaginweit cat No. 796, dated 6 Aug.-4 Sept., 1856 (M); Kande, Hushe Valley, E. Nasir and Webster 5932 (RAW) Satpura, 3300 m, Nasir and Webster 6323 (RAW); Gilgit: Kargah, 2600-2900 m., F. Schmid 1982 (RAW). Sind. Khairpur, on *Medicago*, S.M.H. Jafri 3876 on *Trifolium* sp., M. Qaiser, Asad Raza and Abrar Hussain 613 (KUH) Jacobabad, Hazari Gaon, Marghoob Hussain s.n. dated 12.4.1964 (KUH).

KASHMIR: srinagar, Takht, 2000 m., R.R. Stewart 4156 (RAW) Rattu and Rapal Nullah, 2600 m., on alfalfa, R.R. Stewart 22866 (RAW); Ladak, Chujagund, 3100 m. R.R. Stewart 21052 (RAW); Dras, on *Scorzonera*, R.R.

Stewart and I.D. Stewart and E. Nasir 22358 (RAW); Ladak, Schlaginweit cat. No. 1199 dated 7, 1856 (M).

Distribution: Iran, Afghanistan, Europe, Turkey, Iraq, S.W. Asia, N. Africa and Turkestan.

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