THE CHROMOSOME NUMBERS OF SOME CUSCUTA L. (CUSCUTACEAE) SPECIES FROM ISFAHAN, IRAN

A. Aryavand

Aryavand, A. 1987 12 20: The chromosome numbers of some *Cuscuta* L. (*Cuscutacese*) species from Isfahan, Iran. –*Iran. Journ. Bot. 3(2): 177 – 182.* Tehran.

The chromosome numbers of four taxa of the *Cuscuta* L. from Isfahan area (Iran) are presented. The morphologic and cytologic differences between the two closely related species (*C. campestris* Yunck. and *C. chinensis* Lam.) are discussed, and the chromosome numbers of *C. chinensis* (2n=28), and the tetraploid race of *C. planiflora* Ten. var. *sicula* (Ten. ex Engelm.) Trab. (2n=28) is being reported for the first time. The differences between the variety *C. planiflora* Ten. var. *sicula* (Ten. ex Engelm.) Trab. with the typical variety are discussed.

The other counts, of *C. campestris* (2n=56), and *C. monogyna* (2n=28) agree with earlier findings. Also, the basic chromosome number of the genus *Cuscuta* L. is briefly discussed.

Ahmad Aryavand, Department of Biology, University of Isfahan, Isfahan, Iran.

اعداد کروموزومی برخی از گونه‌های سس Cuscuta L. (Cuscutaceae) در اصفهان (ایران)

از: احمد آریاوند

اعداد کروموزومی چهار واحد از جنس *Cuscuta* L. از منطقه اصفهان (ایران) معرفی گردیده است. اختلافات مورفولوژیکی و سیتولوژیکی دو گونه‌مجاور *C. campestris* Yunck و *C. chinensis* Lam. بحث شده و اعداد کروموزومی *C. chinensis* (2n=28) و نژاد تتراپلوئیدی *C. planiflora* Ten. var. *sicula* (Ten. ex Engelm.) Trab. برای اولین بار گزارش گردیده است. اختلاف این واریته با واریته اصلی گونه بحث شده است. شمارش‌های کروموزومی در *C. campestris* (2n=56) و *C. monogyna* (2n=28) با نتایج مولفین دیگر تطبیق مینماید. هم‌چنین عدد کروموزومی پایه در جنس *Cuscuta* L. بطور اجمال مورد بررسی قرار گرفته است.

INTRODUCTION

From 24 species of *Cuscuta* L. cited in the Flora Iranica (Yuncker et Rechinger 1964), 17 species have been recorded from Iran. In the Flora Iranica, *Cuscuta campestris* Yunck. is not reported for Iran. Later, this species was found by K. H. Rechinger, H. Sabeti, M. Iranshahr, etc.. from several regions of Iran. Morphological and cytological characteristic of four *Cuscuta* L. species from Isfahan area are studied, and are reported in this paper. These species are parasites and cause considerable damages to several agricultural and adventive plants.

MATERIALS AND METHODS

Flower buds were fixed in Carnoy's mixture in the field. For each taxa three herbarium specimens are kept in the Herbarium of the Faculty of Sciences at the University of Isfahan (Iran). In the case of *C. chinensis* the root tips from germinated seeds were studied. Floret buds or root tips were squashed and stained with Fe acetocarmine (Aryavand 1975).

In this paper, the taxa have been cited according to the Flora Iranica (Yuncker et Rechinger, 1964) and its nomenclature is followed. Only the figures of chromosomes of plants which have not previously been studied from cytotaxonomic point of view or have special interests are drawn.

RESULTS

1. Cuscuta campestris Yunck.

Localities: Isfahan: University campus, 1600 m. s. m.; Yazd Abad, 10 km S. of Isfahan, 1580 m. s. m.

Hosts: *Dahlia* sp., *Pelargonium zonale*, *Alhagi camelorum*, etc.

Chromosome numbers: 2n=56, mitosis in the ovary.

This species which was originally native to North America and at present is almost widespread (Plitmann, 1978) belongs to the sect. *Cleistogrammica* Engelm. Its entrance to Iran is very recent, probably after 1960. Parsa 1949 and Yuncker et Rechinger 1964 have not recorded this species from Iran. This species was found later from several regions of Iran by K. H. Rechinger, H. Sabeti, M. Iranshahr, M. Assadi and etc. (refer to the Herbarium specimens of Herbarium of the Plant Pests and Diseases Research Institute of Evin, Tehran, and the Botanical Department of Research Institute of Forests and

Rangelands, Tehran).

In this species, capsules are not dehiscent after fruit maturity. The seeds are not disseminated unless the capsules are crushed. The diameter of the hole at the bottom of the capsule is equal to the diameter of the pedicel of the fruit.

Calyx and corolla are rough and coarse. The parasite forms a network on the host plant. While, in the *Cuscuta chinensis* which is discussed later, the capsules become dehiscent and the seeds disseminate through a hole near the base of the capsule. Comparing to the *Cuscuta campestris,* in this species calyx and corolla are more fleshy.

Cytotaxonomic results (2n=56) agree with earlier counts (Fogelberg 1938 and Beuret et al. 1980 on the materials from Switzerland). Thus, in spite of the variability of the dimensions of the inflorescense, colour of flowers and size of capsule (Plitmann, op. cit.), the chromosome number of this species seems to be constant.

2. **Cuscuta chinensis** Lam.

Localities: Isfahan: University campus, 1600 m. s. m.; Yazd Abad, 10 km S. Isfahan, 1580 m. s. m.

Host: *Ocimum basilicum* L.

Chromosome number: 2n=28, mitosis in the root tip, Fig. 1.

This species, belongs to the sect. *Eugrammica* Yunck. and has a wide distribution from Ethiopia, south of Yemen, Iran, Afghanistan, Ceylon, China to Australia.

According to my knowledge, there are no previous counts for this taxon, and its chromosome number (2n=28) is being reported for the first time. Regarding to the basic chromosome number (x=7) in the *Cuscuta,* this species is tetraploid, while, *Cuscuta campestris* Yunck. (2n=56) is octoploid. Considering, the difficulties in distinction between the two species, in some cases, in this regard, the difference in chromosome number is useful.

3. **Cuscuta monogyna** Vahl,

Localities: Isfahan: University campus, 1600 m. s. m.; Abianeh, 100 km N Isfahan, 2450 m. s. m.

Host: *Punica granatum, Vitis vinifera, Vinca rosea,* etc.

Chromosome numbers: 2n=28, mitosis in the ovary.

This species, belongs to the sect. *Monogynella* Engelm. and has a wide

distribution from Europe, north and west Africa, west and central Asia to west China (Yuncker et Rechinger, 1964). Cytotaxonomic results (2n=28) agree with previous counts of Finn, 1937 (refer to Bolkhoskikh et al. 1969). Because of inaccessibility of this paper, unfortunately it cannot be discussed here.

4. **Cuscuta planiflora** Ten. var. **sicula** (Ten. ex Engelm.) Trab.

Locality: Isfahan: University campus, 1600 m. s. m.

Host: *Vinca rosea.*

Chromosome numbers: 2n=28, mitosis in the ovary, Fig. 2.

This species belongs to the sect. *Cuscuta* and has two varieties in Iran, var. *sicula* has a wider distribution than var. *papillosa* Engelm. and is found in Spain, Mauritani, Mediterranean region and south of Iran. Mehra and Vasudevan (1972) have reported the chromosome number (n=7) in some specimens of *C. planiflora* from Tang Marg in Kashmir of India. Our specimen belongs to the var. *sicula* and is tetraploid and its chromosome number is being reported for the first time.

According to Plitmann (op. cit.) the distribution of var. *sicula* often includes the steppe and desert areas, it has broad calyx lobes which are almost equal to the tube in length, and are less turgid than the typical variety, however, in view of the variation in *C. planiflora* the differential characters of this variety are not clear-cut and hence it should be included in var. *planiflora.* But, regarding two different chromosome numbers 24=14 (Kashmir specimen) and 2n=28 (specimens of Iran), it can be suggested that there are at least two chromosome races in this taxon. Future work can provide more information on the subject.

DISCUSSION

The genus *Cuscuta* L. contains about 200 species (Emberger, 1960), among them only 26 species have been studied cytotaxonomically (refer to Bolkhoskikh et al. 1969, Moore 1973, 1974 and 1977). For this reason it is premature to speculate about their basic chromosome number. However, the counts in this report show the basic chromosome number of four taxa is x=7, with tetraploid and octoploid level.

ACKNOWLEDGEMENT

The author wishes to thank Dr. M.

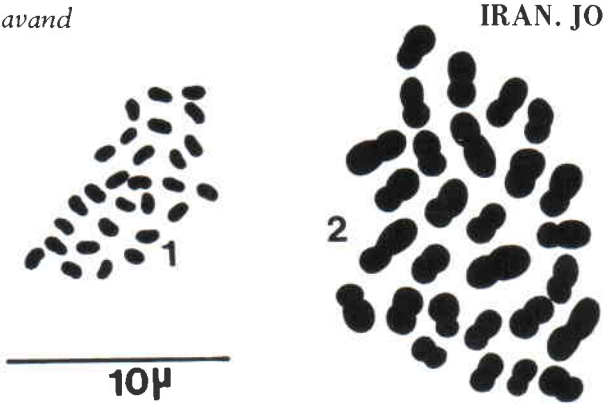

Fig. 1—2: —1. *Cuscuta chinensis* Lam., mitosis in the root tip (2n = 28). —2. *C. planiflora* Ten. var. *sicula* (Ten. ex Engelm.) Trab., mitosis in the ovary (2n = 28).

Iranshahr, the researcher and taxonomist of the Plant Pests and Diseases Research Institute, EVIN (Tehran) for his valuable help and advise.

REFERENCES

Aryavand, A. 1975: Contribution a l'etude cytotaxonomique de quelques Angiospermes de l'Iran. —Bot. Notiser 128: 299—311.

Beuret, E. & G. Neury, 1980: La cuscute champetre (Cuscuta campestris Yunck.), un nouveau parasite des cultures valaisannes. Le maraicher 2: 23—27.

Bolkhoskikh, Z., V. Grif, T. Matvejeva & O. Zakharyeva 1969: Chromosome numbers of flowering plants. 926 pp.— Leningrad.

Emberger, L. 1960: Traite de Botanique, systematique, t. II. les vegetaux Vasculaires. 1539 pp., Masson et Cie. —Paris.

Fogelberg, S. O. 1938: The cytology of Cuscuta.— Bull. Torrey Bot. Club. 65, 9: 631—646.

Mehra, P. N. & K. N. Vasudevan, 1972: In IOPB chromosome number reports xxxvi.— Taxon 21: 333—346.

Moore, R. J. 1973: Index to plant chromosome numbers 1967—1971.— Regnum Vegetabile 90: 539 pp.

Moore, R. J. 1974: Index to plant chromosome numbers for 1972.— Regnum Vegetabile 91: 108 pp.

Moore, R. J. 1977: Index to plant chromosome numbers for 1973—1974.— Regnum Vegetabile 96: 257 pp.

Parsa, A. 1949: Flore de l'Iran, vol. II, 1508 pp.—Teheran.

Plitmann, U. 1978: Cuscuta L. in P. H. Davis, Flora of Turkey and the East Aegean Islands. Vol. 6. —Edinburgh.

Yuncker, T. G. & K. H. Rechinger, 1964: Cuscutaceae in K. H. Rechinger Flora Iranica, no. 8. —Graz.