

CHROMOSOME NUMBERS OF SOME FLOWERING PLANTS OF SPAIN AND S. FRANCE

TH. W. J. GADELLA, E. KLIPHUIS AND E. A. MENNEGA
(*Botanical Museum and Herbarium, Utrecht*)

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ABSTRACT

The chromosome numbers of 32 plant species from Spain and S. France, all collected in natural habitats, were determined. Voucher specimens have been deposited in the Utrecht Herbarium.

INTRODUCTION

Very often voucher specimens of cytologically studied plants were not preserved in herbaria. Consequently it is impossible for later investigators to check the chromosome numbers given. For this reason lists of documented chromosome numbers prove to be very useful (cf. the lists published in Madroño and the I.O.P.B. reports published in Taxon). Moreover, in many cases the available information pertains only to the study of one or a few plants of mostly a very limited part of the distribution-area of the species concerned. For these reasons it was decided to study a number of plants, collected in Spain and S. France by Mr. E. A. Mennega during a botanical excursion. Voucher specimens of all the investigated material have been deposited in the Botanical Museum and Herbarium, Utrecht.

MATERIAL AND METHODS

Plants were collected in the form of seed samples or of bulbs. The seeds were germinated, and the seedlings, as well as the bulbs were grown in the Botanical Garden of the State University of Utrecht, "Cantonspark" in Baarn. All identifications were carried out on this material by Mr. E. A. Mennega. At the time of collecting the plants were not in flower. The chromosome counts are based on the study of roottip-mitoses. For this purpose the roottips were fixed in Karpechenko, embedded in paraffin, sectioned at 15 micron and stained according to Heidenhain's haematoxylin method.

RESULTS

The results are given in the following table.

This table gives a summary of the authors' chromosome counts with indication of the origin of the material and a survey of the cytological investigations carried out up to the present.

TABLE

BORAGINACEAE

Cerinthe major L.

coll. no.: 130 $2n = 16$

origin: Sierra de Carbonera, N. of Gibraltar (prov. of Cadiz)
 references:

BRITTON, D. M. 1951 (Switzerland) $2n = 16$

Cerintho major L. var. *purpurascens* Boiss.

coll. no.: 135 $2n = 16$

origin: on wall in Tarifa (prov. of Cadiz)

Echium italicum L.

coll. no.: 114 $2n = 32$

origin: roadside between Lanjaron and Orgiva, S. of Granada
 (prov. of Granada)

coll. no.: 38 $2n = 32$

origin: roadside near Sagunto (prov. of Valencia)

CARYOPHYLLACEAE

Silene secundiflora Otth

coll. no.: 34 $2n = 24$

origin: ruins of amphitheatre in Sagunto (prov. of Valencia)

Silene ramosissima Desf.

coll. no.: 139 $2n = 24$

origin: coastal road W. of Tarifa (prov. of Cadiz)

Tunica prolifera (L.) Scop.

coll. no.: 144 $2n = 60$

origin: Sierra de Magina, S.E. of Jaen (prov. of Jaen)

CISTACEAE

Cistus salvifolius L.

coll. no.: 39 $2n = 18$

origin: dunes near Albufera, lagoon S. of Valencia (prov. of
 Valencia)

references:

CHIARUGI, A. 1925. (Italy) $n = 9$

SIMONET, M. 1937. (France, Antibes) $n = 9; 2n = 18$

DANSEREAU, P. 1940. (Medit.) $n = 9; 2n = 18$

BOWDEN, W. M. 1945. (cult.) $2n = 18$

ATSMON, D. and N. FEINBRUN. 1960. (Israel) $2n = 18$

LÖVE, A. and E. KJELLQUIST. 1964. (Portugal) $2n = 18$

Helianthemum ledifolium (L.) Willd.

coll. no.: 125 $2n = 20$

origin: aside coastal road near Estepona (prov. of Malaga)

COMPOSITAE

Centaurea polyacantha Willd.

coll. no.: 127 $2n = 22$

origin: Sierra de Carbonera, N. of Gibraltar (prov. of Cadiz)

references:

GUINOCHET, M. and J. FOISSAC 1962. (unknown) . $2n = 22$

Cirsium acarna (L.) Moench

coll. no.: 61 $2n = 22$

origin: Monte Mongo, near Javea (prov. of Alicante)

Helichrysum stoechas (L.) DC.

coll. no.: 176 $2n = 28$

origin: dunes near Albufera, lagoon S. of Valencia (prov. of
 Valencia)

references:

LORENZO-ANDREU, A. and P. GARCIA-SANZ.

1950. (Spain) $2n = 28$

Inula viscosa (L.) Ait.

coll. no.: 3 $2n = 34$

origin: roadside between Narbonne and Perpignan (S. France)

references:

- RODOLICO, A. 1933. (Italy) $n = 9$
Phagnalon rupestre DC.
 coll. no.: 8 $2n = 18$
 origin: Castelldefels, S. of Barcelona (prov. of Barcelona)
 coll. no.: 26 $2n = 18$
 origin: roadside between Alcalá and Cuevas (prov. of Castellon de la Plana)
 coll. no.: 73 $2n = 18$
 origin: steppe near Santa Pola, S. of Alicante (prov. of Alicante)
 references:
 LARSEN, K. 1956. (Italy) $2n = 18$
Silybum marianum (L.) Gaertn.
 coll. no.: 37 $2n = 34$
 origin: roadside near Sagunto (prov. of Valencia)
 coll. no.: 118 $2n = 34$
 origin: roadside between Motril and Malaga, near Almuñécar (prov. of Granada)
 references:
 HEISER, C. B. and T. W. WHITAKER. 1948. (U.S.A., California) $2n = 34$
 LARSEN, K. 1956. (Italy) $2n = 34$
 SKALINSKA, M. *et al.* 1959. (Poland) $2n = 34$
 MOORE, R. J. and C. FRANKTON. 1962. (cult.) $2n = 34$
Tolpis barbata Gaertn.
 coll. no.: 123 $2n = 18$
 origin: coastal road near Marbella (prov. of Malaga)
- CRUCIFERAE**
- Lobularia maritima* (L.) Desv.
 coll. no.: 10 $2n = 24$
 origin: Castelldefels, S. of Barcelona (prov. of Barcelona)
 references:
 LARSEN, K. 1955. (Italy) $2n = 24$
Vella annua L.
 coll. no.: 74 $2n = 16$
 origin: steppe near Santa Pola, S. of Alicante (prov. of Alicante)
 references:
 MANTON, I. 1932. (cult.) $2n = 16, 32$
- EUPHORBIACEAE**
- Euphorbia segetalis* L.
 coll. no.: 28 $2n = 16$
 origin: roadside between Alcalá and Cuevas (prov. of Castellon de la Plana)
 references:
 PERRY, B. A. 1943. (Portugal, cult.) $2n = 16$
- LABIATAE**
- Salvia verbenaca* L.
 coll. no.: 5 $2n = 59$
 origin: roadside between Narbonne and Perpignan (S. France)
 coll. no.: 21 $2n = 64$
 origin: El puente del diable, N. of Tarragona (prov. of Tarragona)
 references:
 BENOIST, E. 1937. (cult.) $2n = 54$
 REESE, G. 1957. (Algeria) $2n = 42$
- LILIACEAE**
- Allium polyanthum* Bor.
 coll. no.: 17 $2n = 20$
 origin: El puente del diable, N. of Tarragona (prov. of Tarragona)

Medicago orbicularis (L.) All.

- coll. no.: 15 $2n = 16$
 origin: El puente del diable, N. of Tarragona (prov. of Tarragona)
 references:
 GHIMPU, V. 1928, 1930. (cult.) $2n = 16$
 FRYER, J. R. 1930. (cult.) $2n = 16$
 LARSEN, K. 1955. (Italy) $2n = 16$
 HEYN, CH. 1956. (Israel) $2n = 16$

Vicia sativa L.

- coll. no.: 16 $2n = 12$
 origin: El puente del diable, N. of Tarragona (prov. of Tarragona)
 references:
 SWESCHNIKOWA, I. 1927. (cult.) $2n = 12$
 BLEIER, H. 1929. (cult.) $n = 6$
 SWESCHNIKOWA, I. *et al.* 1936. (cult.) $2n = 12$
 SENN, H. A. 1938. (cult.) $2n = 12$
 MORIYA, A. and A. KONDO. 1950. (Japan) 6, 7
 LARSEN, K. 1956. (Italy) $2n = 12$
 YAMAMOTO, K. 1961. (Morocco) $2n = (10) 12$

PRIMULACEAE

Coris monspeliensis L.

- coll. no.: 44 $2n = 56$
 origin: dunes near Albufera, lagoon S. of Valencia (prov. of Valencia)

RANUNCULACEAE

Ranunculus acetosellifolius Boiss.

- coll. no.: 98 $2n = 16$
 origin: near University inn in Sierra Nevada, ± 2500 m (prov. of Granada)

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REFERENCES

- ATSMON, D. and N. FEINBRUN. 1960. *Caryologia* **13**: 240.
 BENOIST, E. 1937. *Rev. Cytol. Cytophysiol. Végét.* **2**: 415.
 BLEIER, H. 1928. *Genetica* **11**: 111.
 BOWDEN, W. M. 1945. *Am. Journ. Bot.* **32**: 81.
 ———. 1945. *Am. Journ. Bot.* **32**: 191.
 BRITTON, D. M. 1951. *Brittonia* **7**: 233.
 CHENNAVEERAI AH, M. S. and T. S. MAHABALE. 1959. *Canad. Journ. Bot.* **37**: 345.
 CHIARUGI, A. 1925. *Nuov. Giorn. Bot. Ital.* **32**: 223.
 DANSEREAU, P. 1940. *Ann. des Epiphytes et de Phytogénétique* **6**: 7.
 DELAUNAY, L. N. 1926. *Zeitschr. Zellf. mikrosk. Anat.* **4**: 338.
 FERNANDES, A., J. GARCIA and R. FERNANDES. 1948. *Mem. Soc. Brot.* **4**: 1.
 FERNANDES, A. 1950. *Bol. Soc. Brot.* **24**: 291.
 FRYER, J. R. 1930. *Canad. Journ. Res.* **3**: 3.
 GHIMPU, V. 1928. *C.r. Acad. Sci. Paris* **187**: 245.
 ———. 1930. *Arch. Anat. Microsc.* **26**: 135.
 GUINOCHET, M. and J. FOISSAC. 1962. *Rev. Cytol. Biol. Végét.* **25**: 373.
 HEISER, C. B. and T. W. WHITAKER. 1948. *Am. Journ. Bot.* **35**: 179.
 HEITZ, E. 1926. *Zeitschr. f. Bot.* **18**: 625.
 HEYN, C. 1956. *Caryologia* **9**: 160.
 LARSEN, K. 1955. *Bot. Tidsskr.* **52**: 8.
 ———. 1955. *Bot. Not.* **108**: 263.
 ———. 1956. *Bot. Not.* **109**: 293.

- LEVAN, A. 1944. *Hereditas* **30**: 217.
- LORENZO-ANDREU, A. and P. GARCIA-SANZ. 1950. *Ann. Aula Dei* **2**: 12.
- LÖVE, A. and E. KJELLQUIST. 1964. *Port. Act. Biol.* **A VIII**: 69.
- MANTON, I. 1932. *Ann. Bot.* **46**: 509.
- MOORE, R. J. and C. FRANKTON. 1962. *Canad. Journ. Bot.* **40**: 281.
- and ———. 1962. *Canad. Journ. Bot.* **40**: 1187.
- MORIYA, A. and A. KONDO. 1950. *Jap. Journ. Genet.* **25**: 131.
- NAKAJIMA, C. 1936. *Jap. Journ. Genet.* **12**: 211.
- NEVES BARROS, J. DE. 1952. *Bol. Soc. Brot.* **26**: 1.
- PERRY, B. A. 1943. *Am. Journ. Bot.* **30**: 527.
- REESE, G. 1957. *Flora* **144**: 598.
- RESENDE, F. and P. DA FRANCA. 1946. *Port. Act. Biol.* **1**: 289.
- RODOLICO, A. 1933. *Nuov. Giorn. Bot. Ital.* **40**: 421.
- SENN, H. A. 1938. *Bibliogr. Gen.* **12**: 175.
- SIMONET, M. 1937. *C.r. Acad. Sci. Paris* **205**: 1090.
- SKALINSKA, M., R. CZAPIK and M. PIOTROWICZ. 1959. *Acta Soc. Bot. Polon.* **28**: 487.
- SWESCHNIKOWA, I. 1927. *Intern. Kongress f. Vererbungswirtsch. Berlin* vol. **2**: 1415.
- , et al. 1936. *Bull. Appl. Bot. Gen. and Plant Breed.* ser. **II**. **9**: 63.
- TSCHETCHOW, W. and N. KARTASCHOWA. 1932. *Cytologia* **3**: 221.
- YAMAMOTO, K. 1961. *Techn. Bull. Fac. Agr. Kagawa Univ.* **13**: 15.