CHROMOSOME NUMBERS IN SOME ANGIOSPERMS

By

Goichi NAKAJIMA

Tochigiken Normal School, Utsunomiya

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Counts for the reduced number of chromosomes were made in P. M. C.-s, and for the somatic one in root tip cells. CARNOY's fluid was employed for the fixation of anthers. The root tips were always taken from plants cultivated in pots. In *Heloniopsis orientalis* KOIDZ., *Anemone laevigata* KOIDZ., *Kerria japonica* DC., *Clematis heracleaefolia* DC., *Coptis japonica* MAKINO., *Cimicifuga foetida* L., *Reineckia caprea* KUNTH., *Smilax Sieboldi* MIQ. and four species of *Dioscorea*, the root tips were fixed with NAWASCHIN's solution, but in all other plants they were fixed with FLEMMING's medium solution.

All fixed materials were imbedded in paraffin, cut 15-18 μ thick, and stained with HEIDENHAIN's iron-alum-haematoxylin.

The figures were drawn on a drawing stand as well as on the plane of the table by the aid of ABBE's large camera. For Figs. 1-3, 21-22, LEITZ 1/12 oil immersion and ZEISS $\times 15$ compensation ocular were used, and for all the remaining Figs. ZEISS apochromatic objective 1.5 mm and ZEISS $\times 15$ compensation ocular.

Magnifications are $\times 2500$ for Figs. 1-3, 21-22, 26-27, $\times 2270$ for Figs. 6-8, 11-18, 23, and $\times 3000$ for Figs. 4-5, 9-10, 19-20, 24-25, 28.

RESULTS

Physalis Alkekengi L. var. *Francheti* MAKINO. $2n=24$ (Fig. 1)

According to DE VILMORIN and SIMONET (1928) and YAMAMOTO and SAKAI (1932) the reduced number is invariably 12. My own counts correspond to the results given by the previous authors. 24 chromosomes were clearly seen in root tip cells.

Celastrus articulatus THUNB. $n=23$ (Fig. 2)

23 chromosomes varying slightly in size were observed in first metaphase.

Chaenomeles Maulei LAVALL.

$n=17$ (Fig. 3)

17 small chromosomes were observed in heterotypic metaphase.

Kerria japonica DC. var. *typica* MAKINO.

$2n=18$ (Fig. 4)

18 curved or rod shaped somatic chromosomes were observed.

Drosera rotundifolia L.

$n=10$ (Fig. 5)

The reduced number was reported by BEHRE (1929) to be 10. My counts in second metaphase gave the same result.

Anemone hepatica L.

$2n=14$ (Fig. 6)

A. laevigata KOIDZ.

$2n=14$ (Fig. 7)

LANGLET (1927) reported that the reduced number in *A. hepatica* is 7.

My somatic counts correspond to this. In *A. laevigata* Koidz. the somatic chromosomes were very large.

Clematis heracleaefolia DC. var. *stans* O. KUNTZE. $\delta 2n=16$ (Fig. 8)

16 somatic chromosomes were observed in male plants. Four chromosomes have each a satellite at the terminal end. A satellite of one of these chromosomes seems to be larger than any of the other three.

Coptis japonica MAKINO. $\delta 2n=18$ (Fig. 9) $\varphi 2n=18$ (Fig. 10)

18 somatic chromosomes were observed in male and female plants.

Cimicifuga foetida L. var. *intermedia* REGEL. $2n=16$ (Fig. 11)

LANGLET (1927) reported that the somatic number is 16 in *C. foetida*, L. I observed 16 large somatic chromosomes of varying size in this variety.

Dioscorea Tokoro MAKINO. $\delta 2n=20$ (Fig. 12)

D. gracillima MIQ. $\delta 2n=20$ (Fig. 13) $\varphi 2n=20$ (Fig. 14)

D. japonica THUNB. $\delta 2n=40$ (Fig. 15)

D. Batatas DECNE. $\delta 2n=ca. 140$ (Fig. 16)

According to MEURMAN (1925) the reduced number of *D. sinuata* was 17 in male plants, and that in *D. caucasica* 10. I counted 20 small somatic chromosomes in male plants of *D. Tokoro* MAK. and also in male and female plants of *D. gracillima* MIQ.. In male plants of *D. japonica* THUNB. I observed 40 small somatic chromosomes. In *D. Batatas* DECNE. the number of somatic chromosomes could not be decided precisely, as it was very numerous. About 140 chromosomes were counted in somatic cells of male plants. The chromosomes of the four species given above were all rod shaped and small in size.

So far as the present investigations are concerned, the numbers of chromosomes in *Dioscorea* are the multiples of 10. The results of observation on the sex chromosomes in these four species will be reported later.

Reineckia carnea KUNTH. $2n=38$ (Fig. 17)

38 large curved or rod shaped somatic chromosomes of similar size were observed.

Smilax Sieboldi MIQ. $2n=32$ (Fig. 18)

32 curved or rod shaped somatic chromosomes of varying size were counted clearly. Two of them are provided with satellites.

Heloniopsis orientalis KOIDZ. $2n=34$ (Fig. 19)

34 rod shaped somatic chromosomes of varying size were observed. Two of them have a terminal appendage (a headless trabant) at one end, which is called "seta" by Kihara (1931).

Colocasia antiquorum SCHOTT. var. *esculentum* SCHOTT. $2n=42$ (Fig. 20)

42 rod shaped or curved somatic chromosomes were observed.

Amorphophallus Konjac C. KOCH. $2n=26$ (Fig. 21)

26 curved somatic chromosomes were observed.

Arisaema serratum SCHOTT.

♂ $2n=26$ (Fig. 22)

A. Thunbergii BLUME.

♂ $2n=28$ (Fig. 23) ♀ $2n=28$ (Fig. 24)

26 curved or rod shaped somatic chromosomes were observed in male plants of *A. serratum*. In *A. Thunbergii* 28 slender somatic chromosomes were observed in male and female plants. The chromosomes of the latter species seem to have a median or submedian constriction. Some possess one more terminal constriction.

Acorus gramineus SOLAND.

$n=12$ (Fig. 25)

12 reduced chromosomes were counted in homotypic metaphase.

Phalaris canariensis L.

$n=14$ (Fig. 26) $2n=28$ (Fig. 27)

The reduced number was reported to be 6 by AVDULOW (1928) and CHURCH (1929). My counts in the same species are on the contrary 14 in haploid and 28 in diploid.

Poa pratensis L.

$2n=70$ (Fig. 28)

STÄHLIN (1929) observed the somatic number to be 56. I counted 70 rod shaped or curved somatic chromosomes in the same species.

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