Chromosome Studies in *Dianthus*. I*

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The number of chromosomes in *Dianthus* has been previously reported by two investigators. According to BLACKBURN (1928), *D. barbatus* and *D. deltoides* each have 15 gametic number of chromosomes. ROHWEDER (1929) determined the chromosome number of the following 8 species: $n=15$ in *D. carthusianorum*, *D. giganteus*, *D. superbus*, and *D. plumarius*; $n=30$ in *D. arenarius*; $n=45$ in *D. Sternbergii*, *D. Séquiérii*, *D. collius*, and *D. plumarius*.

At the suggestion of Dr. SINOTÔ, the writer has been studying the chromosomes of the same genus and has so far obtained the somatic chromosome numbers in root-tip cells of 24 species¹⁾, as are given in the Table 1.

Table 1

Plant-name	Chromosome number (2n)	Plant-name	Chromosome number (2n)
<i>D. erythrocoreus</i>	30 (Fig. 1)	<i>D. Hoeltzeri</i>	90 (Fig. 13)
<i>D. Armeria</i>	30 (Fig. 2)	<i>D. compactus</i>	90 (Fig. 14)
<i>D. cruentus</i>	30 (Fig. 3)	<i>D. pallens</i>	90 (Fig. 15)
<i>D. subfastigiatus</i>	30 (Fig. 4)	<i>D. petracus</i>	90 (Fig. 16)
<i>D. Velenowskyi</i>	30 (Fig. 5)	<i>D. versicolor</i>	90 (Fig. 17)
<i>D. barbatus</i>	30 (Fig. 6)	<i>D. fragrans</i>	90 (Fig. 18)
<i>D. sylvestris</i>	30 (Fig. 7)	<i>D. racemosus</i>	90 (Fig. 19)
<i>D. chinensis</i>	30 (Fig. 8)	<i>D. squarrosus</i>	90 (Fig. 20)
<i>D. dentosus</i>	30 (Fig. 9)	<i>D. orbelicus</i>	90 (Fig. 21)
<i>D. japonicus</i>	30 (Fig. 10)	<i>D. pubescens</i>	90 (Fig. 22)
<i>D. laciniatus</i>	60 (Fig. 11)	<i>D. liburunicus</i>	90 (Fig. 23)
<i>D. wimmeri</i>	60 (Fig. 12)	<i>D. atrorubens</i>	90 (Fig. 24)

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Figs. 1-15. Root-tip cells of 15 different species of *Dianthus*, showing 2n-chromosomes (cf. Table 1). $\times 1700$.

Figs. 16-24. Root-tip cells of 9 different species of *Dianthus*, showing 2n-chromosomes (cf. Table 1). Fig. 25. A root-tip cell of *Dianthus*, showing a prophase nucleus. $\times 1700$.

Thus it is seen in the Table 1 that the *Dianthus* species examined comprise 3 different chromosome numbers, $2n=30, 60, 90$, being the multiples of 15. The chromosomes of all these species are very small, and there is no remarkable size difference in each species, though their size varies among some different species. At prophase prochromosomes are observed, but their number is much less than that of the chromosomes (Fig. 25). Generally the resting nuclei have no visible contents except one or more nucleoli.

Table 2

Plant-name	Number of the seeds weighed	Total weight of the seeds weighed (g)	Average weight of a seed (g)	Size group of seeds	Chromosome number (2n)
<i>D. deltoidea</i>	100	0.0199	0.000199	Small	30
<i>D. erythrocorys</i>	105	0.0230	0.000210	"	30
<i>D. Armeria</i>	100	0.0290	0.000290	"	30
<i>D. carthusianorum</i>	40	0.0130	0.000320	"	30
<i>D. subfastigiatus</i>	70	0.0400	0.000570	Medium	30
<i>D. superbus</i>	63	0.0423	0.000660	"	30
<i>D. dentosus</i>	60	0.0404	0.000670	"	30
<i>D. sylvestris</i>	50	0.0494	0.000980	"	30
<i>D. barbatus</i>	127	0.1690	0.001100	"	30
<i>D. chinensis</i>	41	0.0510	0.001260	"	30
<i>D. wimmeri</i>	50	0.0410	0.000820	"	60
<i>D. Séguierii</i>	63	0.0690	0.001090	"	90
<i>D. Sternbergii</i>	63	0.0716	0.001150	"	90
<i>D. plumarius</i>	100	0.1345	0.001340	Large	90
<i>D. liburonicus</i>	6	0.0081	0.001350	"	90
<i>D. squarrosus</i>	44	0.0600	0.001360	"	90
<i>D. petratus</i>	100	0.1367	0.001360	"	90
<i>D. pallens</i>	50	0.0699	0.001390	"	90
<i>D. orbericus</i>	32	0.0470	0.001460	"	90
<i>D. Hoeltzeri</i>	63	0.0950	0.001500	"	90
<i>D. atrorubens</i>	100	0.1720	0.001720	"	90

From the data given in the Table 2 there seems to exist a relation between the number or volume of chromosomes in different species and the size or weight of their seeds, the increase in size being proportional to that of weight. With respect to the seed size, the species of *Dianthus* examined show three different groups, large, medium, and small. The plants of these three groups have 90 ; 90, 60 or 30 ; and 30 chromosomes respectively (Table 2). It is worthy of note that the chromosomes of the small seed group are generally smaller than those of the medium, even when they have the same number of chromosomes ($n=30$), as will be seen by the comparison of the chromosomes of *D. erythrocorys* (Fig. 1) and *D. Armeria* (Fig. 2) with those of *D. barbatus* (Fig. 6) and *D. chinensis* (Fig. 8), and in the same seed group the chromosomes of a group with a smaller number of chromosomes are generally larger than those of a group with larger number of chromosomes, as the comparison of the chromosomes of *D. barbatus* (Fig. 6), *D. chinensis* (Fig. 8), *D. dentosus* (Fig. 9) with those of *D. wimmeri* (Fig. 12) will show.

Literature

BLACKBURN, K. B. (1928), Chromosome number in *Silene* and the neighbouring genera. Zs. f. ind. Abst.- u. Vererb., Supplementbd. 1 : 439-446.

ROHWEDER, H. (1929), Über Kernuntersuchungen an *Dianthus*-Arten. Ber. deut. bot. Ges., 47 : 81-86.