

CHROMOSOME NUMBERS OF SUCCULENT PLANTS

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THE following lists of chromosome numbers have been compiled from the collection of succulent plants established at the John Innes Horticultural Institution by G. D. Rowley, to whom I am grateful for help in the identification of certain species and for enlarging the collection for cytological studies.

The majority of observations were made from root-tip squashes pretreated with α -bromonaphthalene, fixed in acetic alcohol and stained in Feulgen, few flowers being available for the study of meiosis.

Two main groups were studied,

(a) *Aloinæ*—3 genera. (b) *Ficoidaceæ*—33 genera.

With one exception—noted below—the plants are all South African in distribution.

The basic number of the *Ficoidaceæ* is 9. The chromosomes are small and all with median centromeres, there being no differentiation of types.

The basic number of the *Aloinæ* is 7, and here there is far more differentiation between the chromosomes. They can be split up into four groups A, B, C and D as shown in fig. 1 (page 280).

There are slight differences between the karyotypes of the three genera—mainly differences involving the position of the satellites. When satellites are present in *Haworthia* they are similar in position to those in *Aloë*. Resende (1937), however, reported that the number of satellites is not constant for all the species in certain genera in the *Aloinæ*.

The degrees of polypliody in both the *Aloinæ* and the *Ficoidaceæ* are summarised in table 1.

TABLE 1

	2x	3x	4x	5x	6x	7x	8x
<i>Ficoidaceæ</i> . . .	148 (51)	7 (4)	53 (12)	...	3 (2)	...	1 (1)
<i>Aloë</i> . . .	82 (15)	...	...	1 (...)	4 (4)	...	...
<i>Gasteria</i> . . .	23 (11)	1 (...)	3 (...)	...	...	...	...
<i>Haworthia</i> . . .	75 (35)	5 (2)	24 (5)	5 (2)	10 (3)	1 (...)	2 (1)
Total (<i>Aloë</i> excepted) .	246	13	80	5	13	1	3

(The numbers in brackets refer to the 148 individuals reported in the present list of chromosome numbers.)

It will be noticed that apart from *Aloë* the even-numbered species fall into geometrical progressions and the odd-numbered species may be regarded as a function of the numbers above and below each.

If these are a and b then the value $1/9\sqrt{ab}$ roughly fits. The odd numbers are therefore presumably hybrids between species above and below them in polyploidy.

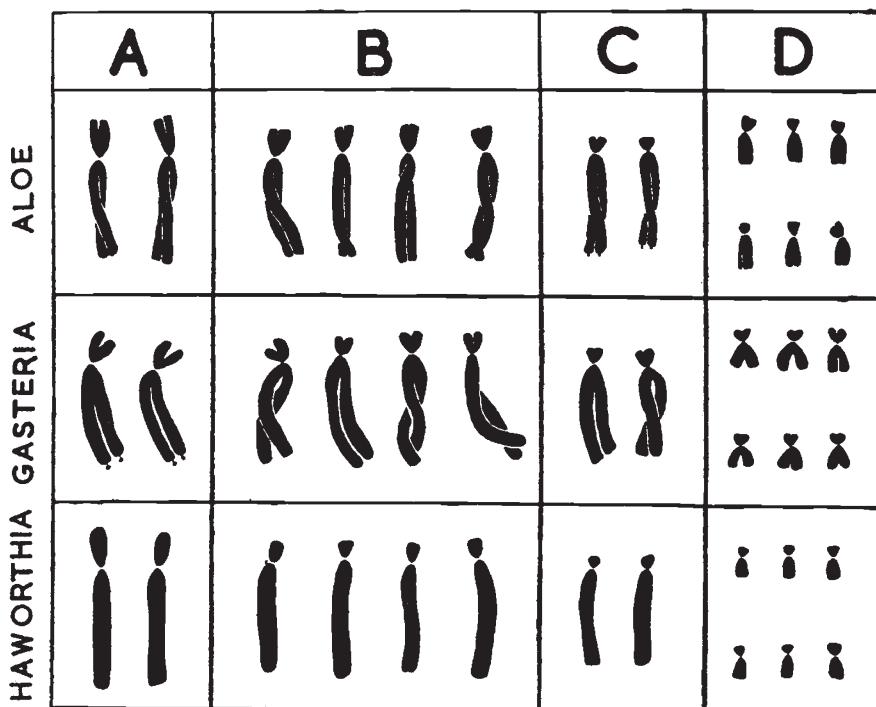


FIG.

In conclusion it should be pointed out that no "chromatic agglutination" as referred to by other workers (Resende, Rijo and Pinto-Lopes) was seen in any normal preparations of the *Aloinæ*. However, stickiness was easily induced by over-hydrolysis of the material prior to Feulgen staining and this may have been the cause of the trouble.

ALOINÆ: $x = 7$

ALOE	2x
<i>arborescens</i> Miller	
<i>aristata</i> Schult.	
<i>brevisolia</i> Miller	
<i>coccinea</i> ?	
<i>commixta</i> Berger	
<i>greenii</i> Baker	
<i>longifolia</i> Haw.	
<i>plicatilis</i> Miller	
<i>salaris</i> Hort.	
<i>saponaria</i> Haw.	
<i>schimperi</i> * Todaro	
<i>sp.</i> (J. Brown, Southall)	
<i>spinosisima</i> Hort.	
<i>striatula</i> Haw.	
<i>variegata</i> Linn.	

6x

<i>ciliaris</i> Haw. (Edinburgh)
<i>ciliaris</i> Haw. (J. Brown)
<i>ciliaris</i> Haw. (Monaco)
<i>ciliaris</i> Haw. (V. Higgins †)
<i>ciliaris</i> Haw., <i>tidmarshii</i> Schönl.
<i>tenuifolia</i> Lam.
<i>tenuior</i> Haw.

* Abyssinian.

† Parent plant and 1950 seedling.

ALOINÆ—continued

GASTERIA

- armstrongii* Schönl.
bayfieldii Baker
beckeri Schönl.
carinata Duval
colubrina N. E. Brown
croucheri Baker

2x

- lævis* Haw.
liliputana v. Poelln.
pulchra Haw.
rurex Hort.
sp. Hort.

HAWORTHIA

- angusta* ?
aristata Haw.
aspera Haw.
atrovirens Haw.
attenuata Haw.
beanii G. G. Smith
beanii G. G. Smith, *minor* G. G. S.
coactata Haw.
correcta v. Poelln.
cuspidata Haw.
cymbiformis Duval
fulva G. G. S.
glabrata Baker
herrei v. Poelln.
herrei v. Poelln., *depauperata* v. Poelln.
hilliana v. Poelln.
icosiphylla Baker
krausiana ?
levida G. G. S.
maughanii v. Poelln.
mucronata Haw., *polyphylla* ?
perplexa v. Poelln.
planifolia Haw.
pumila Duval
ramosa G. G. S.
reinwardtii Haw., *brevicula* G. G. S.
reinwardtii Haw., *grandicula* G. G. S.
reinwardtii Haw., *kaffirdriftensis*, G. G. S.
reinwardtii Haw., *riebeckensis* G. G. S.
subregularis Baker
syringoidea ?

2x

- tortuosa* Haw., var.
truncata Schönl.
turgida Haw.
viscosa Haw.

3x

- reinwardtii* Haw., *chalumnensis* G. G. S.
reinwardtii Haw., *peddiensis* G. G. S.

4x

- glaуca* Baker
greenii Baker, *silvicola* G. G. S.
reinwardtii Haw., *committeensis*, G. G. S.
reinwardtii Haw., *huntsdriftensis* G. G. S.
reinwardtii Haw., *valida* G. G. S.

5x

- rubrobrunea* v. Poelln.
sampaiana Res., *brotereana* Res.

5x + 1

- sampaiana* Res.

6x

- coactata* Haw., v. *haworthii* Res.,
 ,, v. *kraussii* Res.
coactatooides Res.

8x

- tessellata* Haw.

FICOIDACEÆ : $x = 9$

(i) 2x Genera

APtenia

- cordifolia* Schwant.

ARGYRODERMA

- ovale* L. Bol.

ARIDARIA

- canaliculata* L. Bol.

- tetragona* L. Bol.

ASTRIDIA

- maxima* Schwant.

BIJLIA

- cana* N. E. Br.

CARPOBROTUS

- edulis* N. E. Br.

- fourcadei* L. Bol.

CARRUANTHUS

- caninus* Schwant.

CEROCHLAMYS

- pachyphylla* L. Bol.

CONICOSIA

- capensis* N. E. Br.

- communis* N. E. Br.

- pugioniformis* N. E. Br.

FICOIDACEÆ—continued

(1) *2x Genera*—*continued*

CORPUSCULARIA	ODONTOPHORUS
<i>lehmannii</i> Schwant.	<i>marlothii</i> N. E. Br.
CYLINDROPHYLLUM	PLEIOSPILOS
<i>calamiforme</i> Schwant.	<i>prismaticus</i> Schwant.
DINTERANTHUS	PRENIA
<i>microspermus</i> Schwant.	<i>relaxata</i> N. E. Br.
ECHINUS	PSILOCAULON
<i>maximiliani</i> N. E. Br.	<i>granulicaule</i> N. E. Br.
EREPSIA	RHINEPHYLLUM
<i>inclaudens</i> N. E. Br.	<i>comptonii</i> L. Bol.
HEREROA	STOMATIUM
<i>incurva</i> L. Bol.	<i>conradii</i> ?
<i>stanfordiae</i> L. Bol.	<i>paucidens</i> L. Bol.
NANANTHUS	<i>rosei</i> ?
<i>alooides</i> N. E. Br.	
<i>crassipes</i> L. Bol.	

(ii) $4x$ Genera

DROSANTHEMUM *candens* Schwant. **HYMENOCYCLUS** *purpureus* Graessn.

(iii) Mixed Genera

BERGERANTHUS				FAUCARIA			
<i>artus</i> L. Bol.	.	.	18	<i>brittenæ</i> L. Bol.	.	.	18
<i>multiceps</i> Schwant.	.	.	18	<i>jamesii</i> L. Bol.	.	.	18
<i>scapiger</i> N. E. Br.	.	.	27	<i>speciosa</i> L. Bol.	.	.	18
<i>vespertinus</i> Schwant.	.	.	36	<i>haagei</i> Tisch.	.	.	27
CEPHALOPHYLLUM				MESEMBRYANTHEMUM			
<i>acutum</i> L. Bol.	.	.	18	<i>aureum</i> Linn.	.	.	18
<i>platycalyx</i> L. Bol.	.	.	36	<i>haworthiæ</i> Don.	.	.	18
CHEIRIDOPSIS				<i>incanescens</i>	.	.	18
<i>carnea</i> N. E. Br.	.	.	18	<i>mallesonæ</i> L. Bol.	.	.	18
<i>inspersa</i> N. E. Br.	.	.	18	<i>productum</i> Haw.	.	.	18
<i>meyeri</i> N. E. Br.	.	.	18	<i>roseum</i> Willd.	.	.	18
<i>inæqualis</i> L. Bol.	.	.	27	<i>brownii</i> Hook. f.	.	.	27
<i>bibracteata</i> N. E. Br.	.	.	36	<i>glaucum</i> Linn.	.	.	36
<i>vanzijlii</i> L. Bol.	.	.	36	RUSCHIA			
DELOSPERMA				<i>impressa</i> L. Bol.	.	.	18
<i>aberdeenense</i> L. Bol.	.	.	18	<i>perfoliata</i> Schwant.	.	.	18
<i>rogersii</i> L. Bol.	.	.	36	<i>piscadora</i> Schwant.	.	.	18
DISPHYMA				<i>rupicola</i> L. Bol.	.	.	18
<i>sp. II.</i>	.	.	36	<i>karrachabensis</i> L. Bol.	.	.	36
TRICHODIADEMA				<i>nonimpressa</i> L. Bol.	.	.	36
				<i>uncinata</i> Schwant.	.	.	54

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