TABLE I

Changes in phenolic compounds in seed parts during dry storage after ripening

Phenolic compound	Days of after-ripening					
	0		20		40	
	Cotyledons	Embryonic axes	Cotyledons	Embryonic axes	Cotyledons	Embryonic axes
P-coumaric acid (μgm/gm. dry weight)	95·3	547·3	64·3	456·2	60·03	316·2
Coumarin (mg/gm. dry weight)	9·0	17·0	7·2	15·3	4·5	12·0

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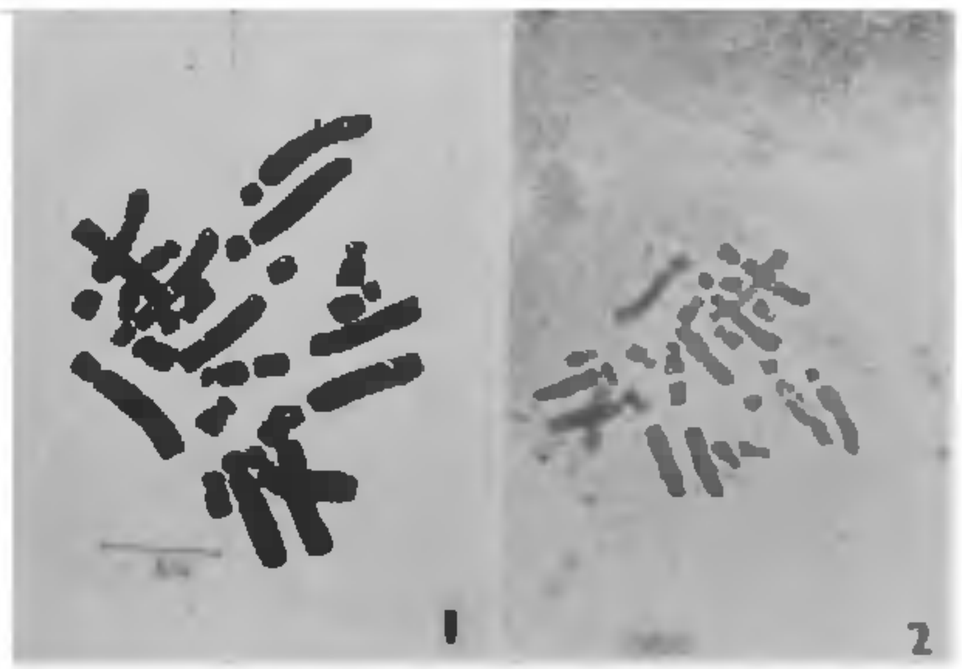
1. Amen, R. D., *Bot. Rev.*, 1968, **54**, 1.
2. Sreeramulu, N., *Ph.D. Thesis*, S.V. University, 1968.
3. Rao, M. R. K., *Ph.D. Thesis*, S.V. University, 1974.
4. Villiers, T. A. and Wareing, P. F., *J. Expt. Bot.*, 1960, **16**, 533.
5. Gordin–Sharir, A. and Wareing, P. F., *Nature*, 1964, **204**, 1308.
6. Das, V. S. R., Raju, P. V. and Rao, M. P., *Curr. Sci.*, 1966, **35**, 50.
7. Corcoran, M. R. and Phinney, B. O., *Physiol. Plant*, 1962, **15**, 252.
8. Brian, P. W., Hemming, H. G. and Lowe, D., *Ann. Bot.*, 1964, **28**, 369.
9. Bate Smith, E. C., *Biochem. J.*, 1954, **58**, 122.
10. Das, V. S. R. and Rao, J. V. S., *Curr. Sci.*, 1964, **33**, 471.
11. Kefeli, V. L. and Kadirov, C. Sh., *Ann. Rev. Plant Physiol.*, 1971, **22**, 185.
12. Sengupta, U. K., Sirohi, G. S., Kaim, M. S. and Pokhriyal, T. S., *Indian J. Plant Physiol.*, 1977, **20**, 92.

OCCURRENCE OF TRIPLOIDY IN *ALOE VERA* TOURN. EX LINN.

Aloe vera Tourn. ex Linn. belonging to the family Liliaceae is a native of North Africa, Canary Islands and Spain. It has spread to the East and West Indies, India, China and other countries. This species is naturalised in India and found in a semi-wild state in all parts of India up to Cape Comorin. This plant is extensively used in the Indian system of medicine specially as a stomachic, purgative, emmenagogue, anthelmintic, in piles and rectal fissures[1]. This plant is also used to reduce body temperature. While making a cytological study of this species grown at the Ethno Botanical Garden of the Botany Field Research Laboratory, a plant collected from the monazite region of Cape Comorin was found to be a triploid ($2n=3x=21$) and is being communicated in this note.

For karyotype analysis root tips were fixed in 1 : 3 acetic acid-ethanol and stained in 2% acetic-orcein and 1N HCl mixture (9 : 1). Several metaphase plates from different root tips were examined and those with well spread chromosomes were drawn at a magnification of × 1,800 (Fig. 1). Microphotographs were taken from temporary preparations using a ZORKI 4 camera (Fig. 2).



FIGS. 1 and 2. Somatic metaphase chromosomes of triploid *A. vera* ($2n = 3x = 21$). Fig. 1. Camera lucida drawing. Fig. 2. Microphotograph (× 1,350).

The somatic chromosome number showed $2n = 3x = 21$ with 12 long chromosomes and 9 short chromosomes. The long chromosomes range in length from 10·34 μm to 13·33 μm and the short chromosomes from 3·33 μm to 4·00 μm. Depending upon the length of the chromosomes as well as the arm ratio and centromeric index, based on Levan *et al.*,[2] the following groupings were made :

TABLE I

Measurements of somatic chromosomes of triploid A. vera *at metaphase*

Chromosome type	Chromosome number	Long arm (l) in μm	Short arm (s) in μm	Total length (c) in μm	Arm ratio (r)	Centromeric index (i)	Chromosome nomenclature
A	1–3	11·00	2·33	13·33	4·73	17·48	st
B	4–6	11·00	1·67	12·67	6·59	13·18	st
C	7–9	9·67	2·33	12·00	4·15	19·42	st
D	10–12	8·67	1·67	10·34	5·19	16·15	st
E	13–15	2·67	1·33	4·00	2·00	33·25	sm
F	16–21	2·33	1·00	3·33	2·33	30·03	sm

$c = l + s$; $r = l/s$; $i = 100\, s/c$.

Type: A—Long chromosomes, 13·33 μm long with the centromere in the subterminal region (st)—chromosomes 1–3.

Type: B—Long chromosomes, 12·67 μm long with the centromere in the subterminal region (st)—chromosomes 4–6.

Type: C—Long chromosomes, 12·00 μm long with the centromere in the subterminal region (st)—chromosomes 7–9.

Type: D—Long chromosomes, 10·34 μm long with the centromere in the subterminal region (st)—chromosomes 10–12.

Type: E—Short chromosomes, 4·00 μm long with the centromere in the submedian region (sm)—chromosomes 13–15.

Type: F—Short chromosomes, 3·33 μm long with the centromere in the submedian region (sm)—chromosomes 16–21.

Detailed observations on each type are presented in Table I.

The karyotype is asymmetrical as the chromosomes vary in length and possess submedian and subterminal centromeres. According to the classification of Stebbins[3], the karyotype can be placed in category 1B. As the karyotype consists of two sharply distinct classes of chromosomes, long and short, the karyotype is bimodal. This type of bimodal and asymmetrical karyotype with a basic number of seven pairs of chromosomes, of which four are long and acrocentric and three are short is characteristic of the tribe *Aloineae*.

Interestingly, all the chromosome types in this case are either in 3s or in multiples of 3 suggesting its autotriploid nature. Non-reduction during gamete formation in one of the parents is a possible cause for the origin of this triploid plant. This view is also expressed by Brandham[4] in the case of the triploid plant of *A. jucunda*, which he has shown to be autotriploid.

The diploid chromosome number of $2n = 14$ was reported by many investigators[5–7]. The present plant is a new addition to the list of polyploids in *Aloe* and is probably the first report of triploidy in *Aloe vera*. The other known previous records of triploidy in *Aloe* are *A. humilis* reported by Sharma and Mallick[8] and *A. jucunda* reported by Brandham[4]. Production of triploids by crossing diploid *A. rauhii* with tetraploid *A. dawei* is reported by Brandham[9] with $2n = 3x = 21$ chromosomes.

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1. Chopra, R. N., Nayar, S. L. and Chopra, I. C., *Glossary of Indian Medicinal Plants*, Council of Scientific and Industrial Research, New Delhi, 1956.
2. Levan, A., Fredga, K. and Sandberg, A. A., *Hereditas*, 1964, **52**, 201.
3. Stebbins, G. L., *Chromosomal Evolution in Higher Plants*, Edward Arnold Ltd., London, 1971.
4. Brandham, P. E., *Kew Bull.*, 1971, **25**, 381.
5. Sutaria, R. N., *J. Indian Bot. Soc.*, 1932, **11**, 132.
6. Vig, B. K., *Curr. Sci.*, 1965, **34**, 25.
7. —, *Bull. Torrey Bot. Club*, 1968, **95**, 254.
8. Sharma, A. K. and Mallick, R., *Jour. Genet.*, 1965, **59**, 110.
9. Brandham, P. E., *Chromosoma (Berl.)*, 1975, **51**, 269.