

**CYTOLOGY OF ATALANTIA CEYLANICA (ARN.)**

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ATALANTIA is an allied genus of *Citrus* belonging to the family Rutaceae. Of the eleven species in this genus only *A. buxifolia* and *A. citroides* have been cytologically studied and reported<sup>1</sup> to be diploids ( $2n = 18$ ). During the present investigations male meiosis of a natural tetraploid species *A. ceylanica* has been studied and its possible mode of origin has been discussed.

*A. ceylanica* is a bushy plant with spines 1–2.5 cm long (figure 1). Flowers white, 1.25 cm in diameter, arranged in a racemose cyme, petals 4, ovary two-celled, sessile, two ovules/locule, style short, stigma clavate. Fruit is a berry, globular, 13–19 mm diameter and two-seeded.

Meiotic studies showed  $2n = 36$  chromosomes in the pollen mother cells at anaphase I. 63.64% PMCs showed formation of 18 bivalents at metaphase I (figure 2); 27.3% PMCs had univalents ranging from 2 to 6 per cell. Two quadrivalents per cell were observed in 9% PMCs. Anaphase I separation of chromosomes was equal in 82% cells, whereas 18%

cells showed three lagging bivalents. Cytomixis was observed in 89% PMCs at premetaphase stages. Pollen fertility, as determined by stainability in acetocarmine solution, was 58%.

The  $2n = 36$  chromosome number recorded for the first time in *A. ceylanica* showed that it is a tetraploid species. A high frequency of bivalents observed at metaphase I of meiosis indicates the allopolyploid nature of the species. The hybrid and polyploid nature of the species is further revealed by the presence of cytomixis in 89% PMCs at premetaphase stages. The presence of a small number of quadrivalents may be due to homoeologous pairing as observed in *Primula kewensis*<sup>2</sup> and *Lycopersicon*<sup>3</sup>.

The taxonomic status of this species is controversial; it differs from other species of the genus in having very large seeds with very little pulp vesicles and therefore, has been placed<sup>4</sup> under a separate sub genus *Rissoa*. The other species resembling *A. ceylanica* is *A. guillaumini* which also has large seeds almost completely filling the fruit locule. Trimen<sup>5</sup> considered *A. ceylanica* as a synonym of *A. monophylla* (*Limonia monophylla*) because of their resemblance in all characters except for seeds which are small and pulp vesicles, which are abundant in



Figures 1 and 2. 1. Flowering branch of *A. ceylanica*. 2. PMC metaphase I showing 18 bivalents ( $\times 2300$ ).

*A. monophylla*. It, therefore, appears that *A. ceylanica* might have derived from two species, *A. monophylla* and *A. guillaumini* by hybridization and subsequent polyploidization of the hybrid.

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## COLCHICINE-INDUCED MONOECIOUS MUTANT IN MULBERRY

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THOUGH colchicine has been known as a polyploidizing agent, a number of cases have been reported in *Sorghum*<sup>1-3</sup>, *flax*<sup>4</sup>, *barley*<sup>5</sup>, *cotton*<sup>6</sup>, *Torenia fourneiri*<sup>7</sup>, *Trigonella foenum-graecum*<sup>8</sup> and mulberry<sup>9</sup> which indicate that it can cause chimeral sector, somatic reduction, gene mutations and modifications of sex expression. The present investigation is the continuation of the earlier report<sup>9</sup> and deals with cytomorphological studies in colchicine-induced monoecious mutant in a popular variety of mulberry, *Morus alba* var. *Kanva-2*.

**Table 1** Comparative account of morphological characters of female and colchicine induced monoecious mutant

Characters (cm)	Female	Mutant
<b>Growth habit</b>		
Height of the plant	165.20	221
Number of branches	3	5
Internodal distance	4.02	3.80
Sprouting (%)	82.00	81.60
Rooting (%)	79.00	78.00
<b>Leaf</b>		
Leaf size (cm <sup>2</sup> )	176.35	182.75
Weight of 100 leaves (g)	325.00	405.00
Water content of the leaf (%)	66.25	72.76
Number of stomata per unit area	65.25	61.00
Stomatal size (L × W)(μ)	14.20 × 12.80	12.80 × 11.72
Leaf texture and colour	Smooth, Green	Smooth, Dark Green
<b>Flower</b>		
Male inflorescence size (L × W)	—	3.80 × 1.20
Female inflorescence size (L × W)	1.28 × 0.87	1.30 × 0.80
Number of flowers per male inflorescence	—	46
Number of flowers per female inflorescence	26	24
Pollen fertility (%)	—	91.63
<b>Fruit</b>		
Sorosis size (L × W)	2.20 × 1.1	2.25 × 1.1
Seed set (%)	82.00	81.07