

# INDUCED TETRAPLOIDY IN *CATHARANTHUS ROSEUS* (L) G. DON.

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*Catharanthus roseus* (L) G. Don. until recently known as *Vinca rosea* L., commonly known as "Madagascar-periwinkle" and "Cape-periwinkle" belongs to the family Apocyanaceae. Though originally a native of Central America, it is now found growing either cultivated in gardens or as a weed all over the tropics. It is especially abundant on sandy beaches and deserted places like cemeteries, hence its common name the "dead man's flower". It has a tubular flower with a small orifice and 5-lobed corolla. Three varieties are met with: white, pink and white with a pink eye at the orifice. These breed true but crosses between the white and pink-eyed varieties produced pink which threw out white and pink eye in the F<sub>2</sub> generation (E. K. Janaki Ammal—unpublished). The heterozygous pink is slightly paler than the homozygous and can be easily detected in populations. Pure strains of homozygous pink can sometimes be seen in regions like Cape Comorin where a form with tomentose leaves has also been observed. Tomentose character is found to be dominant.

The plant is used medicinally as a remedy in diabetic carbuncles. The decoction of the root is also used as a tonic (Chopra *et al.*, 1956). More than 20 different alkaloids have been reported from different parts of the *C. roseus* plant and considerable work has been done concerning the biological properties of these alkaloids. General interest in this plant has increased during the past few years after the isolation of the alkaloid Vincalencobastine (VLB) which has been found effective against Hodgkins disease, choriocarcinoma and some other forms of cancer during clinical trials (Farnsworth, 1961).

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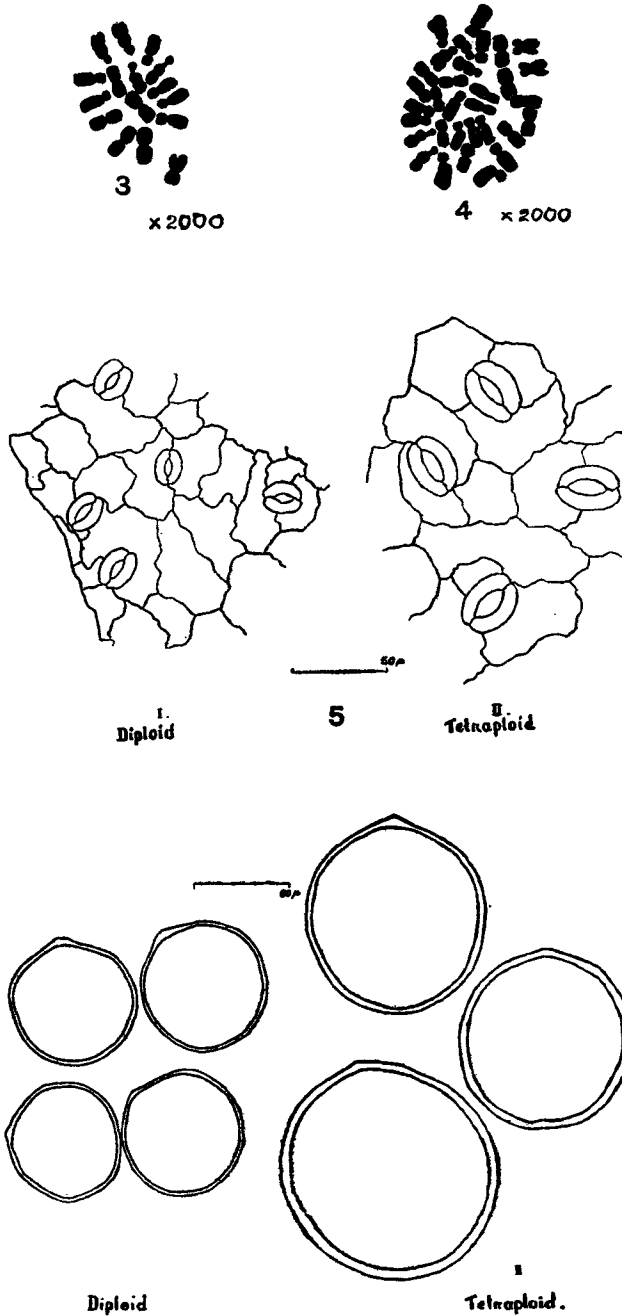


FIG. 3. Somatic chromosome of diploid *C. roseus*  $2n = 16$ ,  $\times 2,000$ .  
 FIG. 4. Somatic chromosome of tetraploid *C. roseus*  $2n = 32$ ,  $\times 2,000$ .  
 FIG. 5. Showing stomata of diploid and tetraploid *C. roseus*.  
 FIG. 6. Pollen grains of diploid and tetraploid *C. roseus*.

Pharmacological studies of alkaloid report carried out in the Regional Research Laboratory, Jammu, on the total alkaloids of *C. roseus* indicated that the drug possesses sustained and more significant, hypotensive and sedative properties than *Rauwolfia serpentina* (Nazir, B. N. and Handa, K. L., 1959). They also found that there was difference in the amount of total alkaloids in geographical races. The total alkaloids from South Kerala being higher than those of Jammu plants while the reserpine content of the North Indian form was higher than that of the South Indian. The genetical study of this plant was, therefore, taken up in a more detailed way.

The first chromosome studies in *C. roseus* was made by Furasato (1940) who found  $2n = 16$ . Tetraploidy was also induced for the first time by him and subsequently by Schnell (1941). With a view to possible increase in the alkaloid content, tetraploidy has been induced in *C. roseus* by treatment with colchicine. To induce tetraploidy, both pre-soaked seeds and apical buds of about 10 days old seedlings were treated with aqueous solution of colchicine ranging from 0.05 to 0.5 per cent. concentration. 0.5 per cent. colchicine solution was found to be fatal for both seeds and seedlings. The maximum number of tetraploid plants in case of seed treatment were obtained from the seeds treated with 0.2 per cent. colchicine solution for 24 hours. In the case of seedlings, treated with drop method, the best results were obtained from the seedlings treated with 0.4 per cent. solution twice daily for 6 days.

The tetraploids showed marked difference from the diploid ones (Fig. 1). As is the case with most tetraploid plants the growth is slow at first, but later on it grows more rapidly than the diploids. The leaves are broader and sometimes crumpled. Stomata in the tetraploid are markedly larger than in the diploid (Fig. 5). Flowers are remarkably bigger in diameter and deeper in colour than the diploids (Fig. 2).

The somatic chromosomes of the diploid and tetraploid are shown in Figs. 3 and 4. The tetraploid plants are highly sterile and examination of pollen grains showed the viable ones to be much larger than the diploids (Fig. 6).

#### SUMMARY

Tetraploidy has been induced in *Catharanthus roseus* by treatment with colchicine. These tetraploids are more vigorous in their growth and have bigger flowers, larger stomata than the normal diploids.

## REFERENCES

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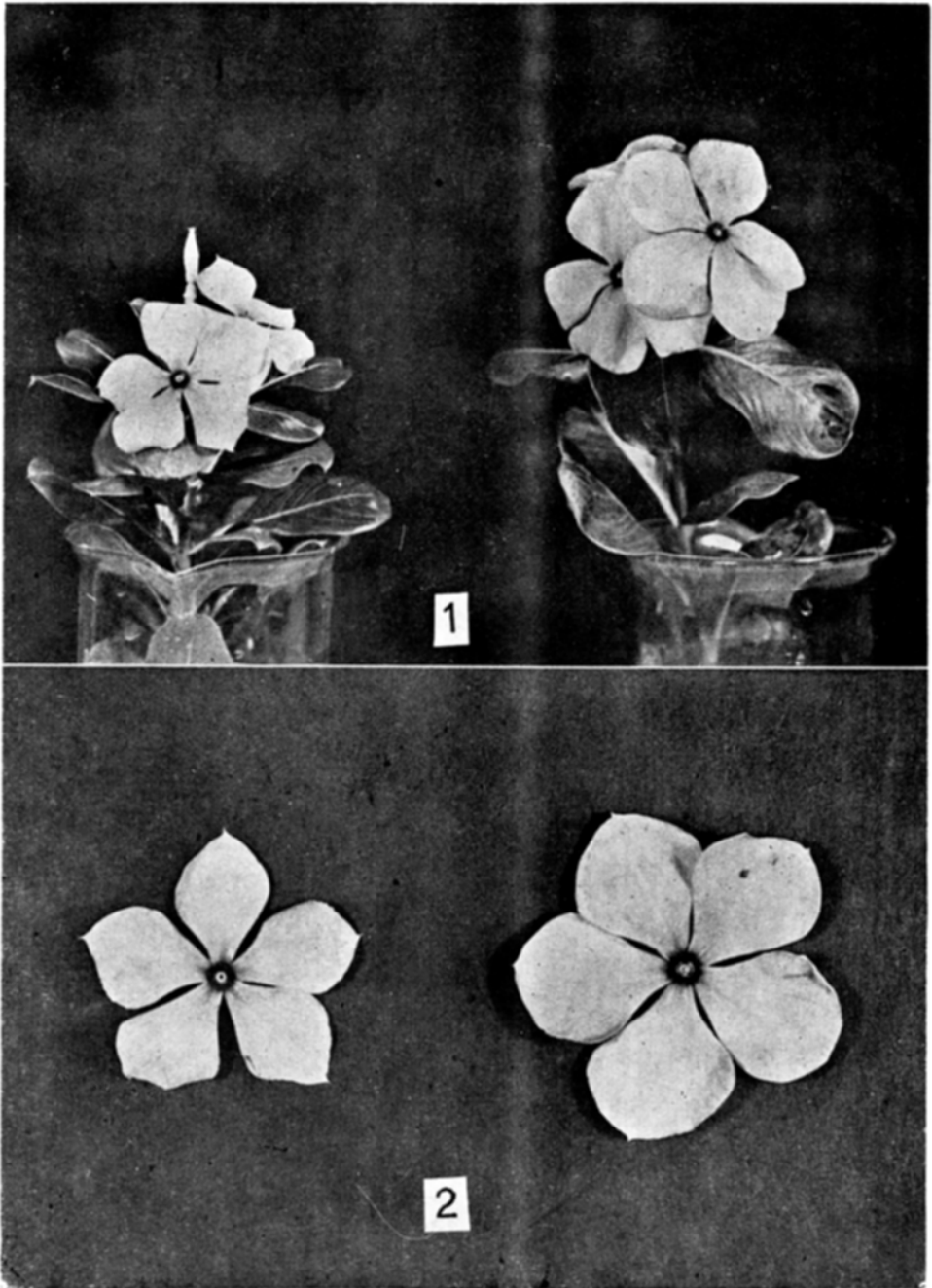


FIG. 1. Showing diploid and tetraploid shoots of *Catharanthus roseus*.  
FIG. 2. Showing diploid and tetraploid flowers of *C. roseus*.