with ageing as well as due to SO2-treatment. The impact of such changes was much pronounced in broad bean in which the O₂⁻ induced destruction of chlorophyll pigments were higher than that in gram plants, suggesting higher SO2 tolerance of gram plants in comparison to broad bean (figure 1).

Thus, the present study provides a biochemical basis for differential SO2 sensitivity of leaves of different ages, which reveal that susceptibility of plants to SO2 depends greatly upon their O₂⁻ scavenging capacity and that plants with higher SOD activity vis-a-vis less inactivation of their SOD are tolerant.

Financial assistance from UGC, New Delhi to PKN and SBA is gratefully acknowledged.

25 August 1986

Figure 1. Effects of SO2 on SOD activity and chlorophyll contents of Cicer arietinum (CA) and Vicia faba (VF) leaves at different stages of development (Y = young, M = mature, O = old). Values are mean of 5 separate observations. Bars represent ± SD.


**COLCHICINE-INDUCED TETRAPLOIDS IN CARDAMOM (ELETTARIA CARDAMOMUM MATON)**

M. R. SUDHARSHAN
Indian Cardamom Research Institute, Regional Station, Sakleshpur 573 134, India.

_EleTTARIA CARDAMOMUM_ Maton, a monotypic member of the family Zingiberaceae, forms the chief source of the well-known spice, small cardamom. Literature survey shows that only diploid chromosome numbers have so far been reported in this species1-3. Successful induction of tetraploid plants is reported in this note.

Germinating seeds were treated with 0.5% aqueous colchicine solution for 90 min. The seedlings raised from the treated seeds along with their controls were initially grown in polyethylene bags and transplanted to the field when they were ten-month-old. Cytological studies confirmed the tetraploid nature of the treated seedlings with 2n = 4x = 96 chromosome and the control diploids 2n = 2x = 48 chromosomes (figures 1 and 2).

The induced tetraploids resembled their diploid progenitors in gross morphology. However, marked difference could be observed in the leaf anatomical characters. Colchitetraploids had thicker leaves (221.25 µm) than diploid controls (185.19 µm). A study of stomatal index showed that the induced tetraploids had fewer stomata per unit area and
larger stomata than diploids (figures 3 and 4). Meiotic studies showed that there were few occurrence of abnormalities like lagging and elimination of chromosomes at anaphase I and II. Pollen fertility was good as adjudged by the germination count. Colchitetraploids were fertile and set capsules when crossed inter se as well as with diploids.

The production of colchipsoids offers possibilities for improvement of cross-pollinated diploid crops. In cardamom, which is a cross-pollinated diploid crop, induction of fertile tetraploids may offer interesting opportunities for crop improvement.

The author is thankful to Dr K. J. Madhusoodanan for valuable suggestions and to Shri P. K. Zachariah and Shri C. Kunhikrishnan Nair for encouragement.

5 August 1986; Revised 6 October 1986


ON THE VASCULAR PIGMENT OF SOME FRESHWATER LAMELLIBRANCH MOLLUSCS

A. S. NARAIN, K. SINGH* and S. L. SRIVASTAVA*

Department of Zoology and * Department of Physics, University of Gorakhpur, Gorakhpur 273 001, India. †Department of Zoology, Digvijay Nath Post-graduate College, Gorakhpur 273 001, India.

MOLLUSCS are most interesting with regard to their respiratory pigment because the distribution of the pigment shows no ecological or evolutionary correlations. They possess two main types of vascular pigment, viz hemoglobin and hemocyanin. Bivalves are usually reported to have hemoglobin. The pigment is dissolved in the plasma or is lodged within the erythrocytes, if present. The study of the vascular pigment of the bivalves of Gorakhpur area was initiated by Narain. He detected traces of ferric ions in the blood of Lamellidens corianus but could not establish the presence of hemoglobin. The present study examines the issue in greater detail in the case of Lamellidens corianus and other freshwater mussels (Indonesia caerulea and Parreysia favidus).

The mussels lack erythrocytes, hence it was presumed that the vascular pigment must be dissolved in their plasma. The plasma of 10 mussels (obtained by centrifuging the blood for 5 min at 3000 rpm) was subjected to spectrophotometry in UV (50000–28000 cm⁻¹), VIS (30000–13000 cm⁻¹) and IR (4000–400 cm⁻¹) ranges. To define peaks better, the plasma was diluted 10 times with double-distilled pyrogen-free water for UV and VIS spectra and dispersed in nujol after air-drying at 37°C for IR spectra.

The absorption spectra of the colourless plasma of all the mussels (figure 1) are noticeably uniform in general pattern. This indicates the presence of a similar vascular pigment. The absorption maxima are distributed as follows: