

The F_1 of normal \times crinkled leaf segregated for 13:3 ratio of normal leaf phenotype to crinkled leaf in F_2 of TMV.1 \times crinkled leaf and crinkled leaf \times TMV.1. The same ratio of 13:3 was again obtained in direct as well as reciprocal crosses of TMV.1 \times small leaf and CO.5 \times small leaf indicating digenic inheritance nature.

In respect of crosses with small leaf phenotype with CO.3 blackgram, the F_2 generation of normal \times small leaf phenotype and its reciprocal cross showed 3:1 segregation ratio for normal to small leaf phenotype.

The two distinct crosses of blackgram cultivar, TMV.1 \times crinkled leaf and TMV.1 \times small leaf gave segregation for digenic ratio of 13:3 only of normal to crinkled and normal to small leaf, respectively, indicating that genes controlling the two distinct phenotypes of crinkled leaf and small leaf are different from one another.

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QUANTITATIVE ESTIMATION OF RUTIN IN *RAUVOLFIA SERPENTINA* BENTH. EX KURZ

K. R. BHARDWAJ

Department of Botany, Mukand Lal National College, Yamuna Nagar 135 001, India.

RAUVOLFIA SERPENTINA, commonly known as *chotachand* or *sarpagandha* (Hindi), is a miracle drug-yielding plant of India because of its immense therapeutical value¹. In tissue culture experiments of *R. serpentina*, the main emphasis is on economically important primary and secondary chemical constituents^{2,3}. Generally the roots are administered orally to reduce blood pressure. This plant has not been studied for rutin estimation. Rutin is used to decrease the fragility of blood capillaries, as a herbal remedy acting as an antioxidant towards adrenaline and ascorbic acid and is also said to relax the smooth muscles⁴. A preliminary study has therefore been made to determine rutin in root, bark and leaves.

The plant material, collected from the Forest Research Institute, Dehra Dun was separated into roots, leaves and bark, dried under shade and powdered. The procedure for extraction, separation and identification of rutin was according to Uppal *et al*⁵ and quantitative determination has been done following Balandina *et al*⁶.

Table 1 Estimation of rutin in *R. Serpentina**

Parts	Per cent
Root	8.3
Stem bark	2.8
Leaves	1.5

*Mean of 50 replicates.

The extract gave a positive test for 3-hydroxy flavones. The compound so obtained was confirmed with the authentic sample of quercetin-3-rutinoside (rutin). The amount of rutin has been found to be maximum in root, minimum in leaves and medium in bark (table 1). Rutin has already been reported in *Polygonum*⁶, *Capparis spinosa*, *Fagopyrum cymosum*, *Lycopersicon esculentum*, and *Ruta graveolens*¹. This compound is also added in multivitamin preparations and possesses antibiotic properties since it inhibits germination of uredospores of *Puccinia graminis* f. *tritici*⁴.

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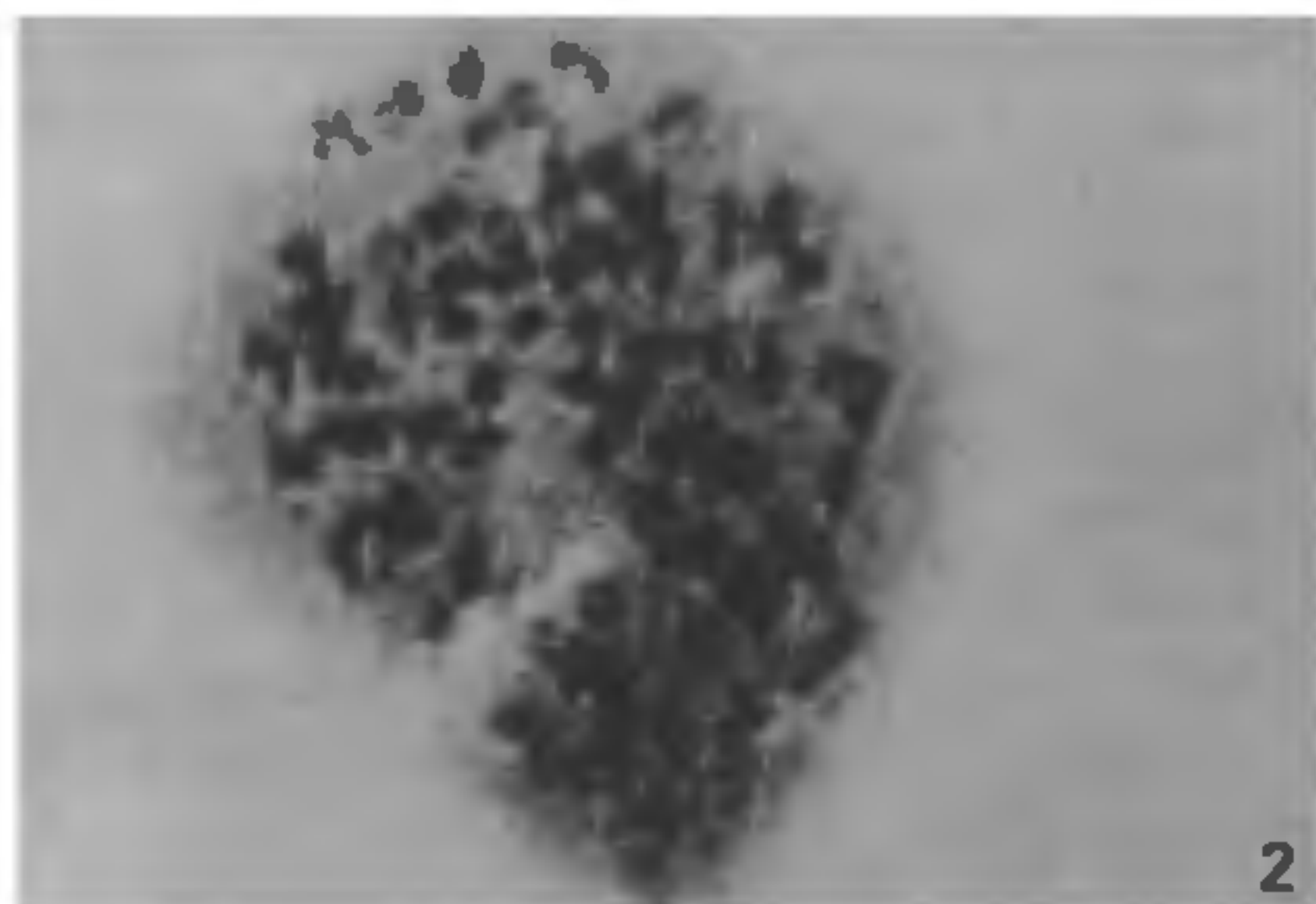
1. Chopra, R. N., Nayar, S. L. and Chopra, I. C., *Glossary of Indian medicinal plants*, CSIR, New Delhi, 1956.
2. Mitra, G. C., In: *Recent advances in botany*, (ed.) P. Kachroo, Bishen Singh Mahendra Pal Singh, Dehra Dun, India, 1976, p. 287.
3. Mitra, G. C. and Kaul, K. N., *Indian J. Exp. Biol.*, 1964, 2, 49.
4. Bhambe, S. and George, C. X., *Curr. Sci.*, 1972, 41, 258.
5. Uppal, D. S., Bajaj, K. L. and Bhatia, I. S., *J. Inst. Chem. (India)*, 1972, 64, 103.
6. Balandina, I. A., Grinkevich and Krivut, B. A., *Khim. Farm. Zh.*, 1980, 14, 60.

CYTOLOGY OF *CHRISTELLA MULTIAURICULATA* PUNETHIA

N. PUNETHIA and ABHA SEN

Botany Department, Govt. P. G. College, Pithoragarh 262 501, India.

A large genus of thelypteroid ferns, *Christella* Léveillé is represented by as many as 52 species¹ which are fairly common in the warmer parts of the world. Of the six species found in the Western Himalayas², *C. dentata* (Forssk.) Brownsey and



Figures 1 and 2. 1. *Christella multiauriculata* Punetha, Holotype; 2. 72 bivalents during meiosis in a spore mother cell of *C. multiauriculata*.

Jermy is fairly widespread all over the region and is extremely variable in its leaf morphology. Its variable leaf morphology lead many taxonomists to establish several varieties within it¹. Recently Punetha³ described a new species, *C. multiauriculata* from Kumaon, which in general morphology is identical to *C. dentata* but differs distinctly from the latter in having slender capitate hairs between veins on the lower surface of the leaflets, several pairs of

pinnae above the base having well-developed auricles on the acroscopic bases (hence the name) and presence of a few pairs of basal pinnae reduced and not more widely spaced (figure 1). Cytologically, *C. dentata* (Forssk.) Brownsey and Jermy have been represented by diploid and tetraploid races⁴. No hybrids have so far been found in nature, however, intraspecific crossing between diploid and tetraploid resulted triploids⁵.

The cytology of the fern was studied to determine whether *C. multiauriculata* is a distinct species or whether they are mere cytological variations, Acetocarmine smears of developing sori showed unequivocally 72 bivalents suggesting that *C. multiauriculata* is a sexual tetraploid species (figure 2).

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1. Holttum, R. E., *Kew Bull.*, 1976, **31**, 314.
2. Khullar, S. P., Sharma, S. S. and Paramjit Singh, *Nova Hedwigia*, 1983, **38**, 622.
3. Punetha, N., *J. Indian Bot. Soc.*, 1987, (in press).
4. Löve, A., Löve, D. and Pichi Sermolli, R. E. G., *Cytotaxonomical atlas of the pteridophyta*, Vaduz, J. Cramer, 1977.
5. Ghatak, J. and Manton, I., *Br. Fern. Gaz.*, 1971, **10**, 183.

GENOTYPIC DIFFERENCES OF *IN VITRO* LATERAL BUD ESTABLISHMENT AND SHOOT PROLIFERATION IN PAPAYA

PURNIMA and SANDHYA BISHT

Biotechnology Centre, Indian Agricultural Research Institute, New Delhi 110 012, India.

PAPAYA (*Carica papaya*) is a principal horticultural crop of tropics and is a good source of provitamin 'A' and ascorbic acid. It also yields an alkaloid, carpaine, which is used as a heart depressant, amoebicide and as diuretic¹. Some papaya production is devoted to the recovery of papain, a proteolytic enzyme with several commercial applications².

Papaya, like other higher plants, has an indeterminate mode of growth. The leaf axes contain subsidiary meristems each of which is capable of growing into a shoot that is identical to the main axis. These axillary buds, when cultured in hormone