in tropical leguminous weeds, an initial collection of 26 species of herbaceous weed legumes was made. Of these, the nodulation status of 22 species had been reported earlier[1] and the present authors could confirm the reports in all these cases. In the case of *Cassia occidentalis* L the reports on nodulation were conflicting[1-3]. The present study revealed only the absence of nodules in this species in the specimens collected from five different sites in and around the University campus. The soil at these sites was red loamy with pH 7.8 and 70–80 kg Nha^{-1}. Laboratory inoculation studies are in progress to test its nodulating ability. Our collection included three hitherto unreported species with regard to their nodulation status. They were *Cassia auriculata* L, *Crotalaria angulata* Miller and *Rhyncosia velutina* W and A. In *C. auriculata* L there were no nodules in the many specimens examined from the same locations and soil type mentioned previously for *C. occidentalis*. Further, *C. auriculata* as well as *C. occidentalis* showed coloured roots agreeing with an earlier observation that non-nodulated roots are generally coloured while nodulated ones are nearly white[4]. In nature fairly profuse nodulation was observed on the roots of *Crotalaria angulata* and *Rhyncosia velutina*. In *C. angulata* the nodules were elongated free or clustered while in *R. velutina* they were globose and single. Nodule frequency showed variation depending on the place of collection. Further work is in progress.

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CHROMOSOME STUDIES IN *CALATHEA*

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THE family Marantaceae of Scitamineae is distributed in both tropical and temperate zones in India. It has ornamental value as well as commercial importance of arrowroot. Ornamentation is confined to the colouring of leaves. The few reports[1-4], reveal a series of aneuploid chromosome numbers in this family[1, 3, 4]. In view of the scanty data on the cytology of this commercially important genus, the present investigation was undertaken.

For the present study on chromosome characteristics, 6 species of *Calathea* of Marantaceae were selected. They include : (i) *Calathea lietzei* E Morr, (ii) *C. undulata* Regel, (iii) *C. picturata* C Koch and Linden var *vandenheckii*, (iv) *C. kegeliana*, (v) *C. insignis* Petersen, and (vi) *C. ornata* Koern var *roseo-lineata*. Somatic chromosomes were studied from root tip cells following acetic-orcein (2%)

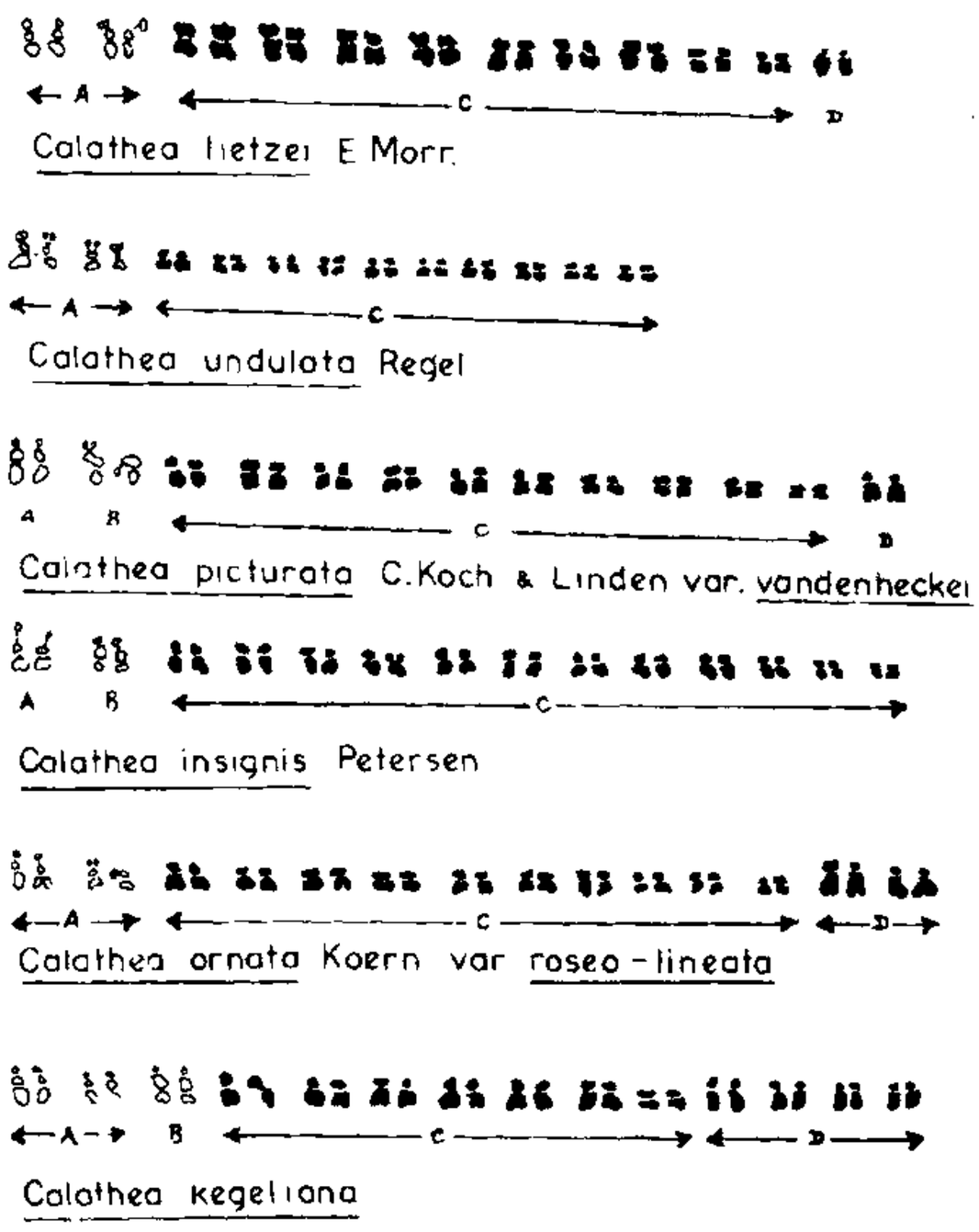
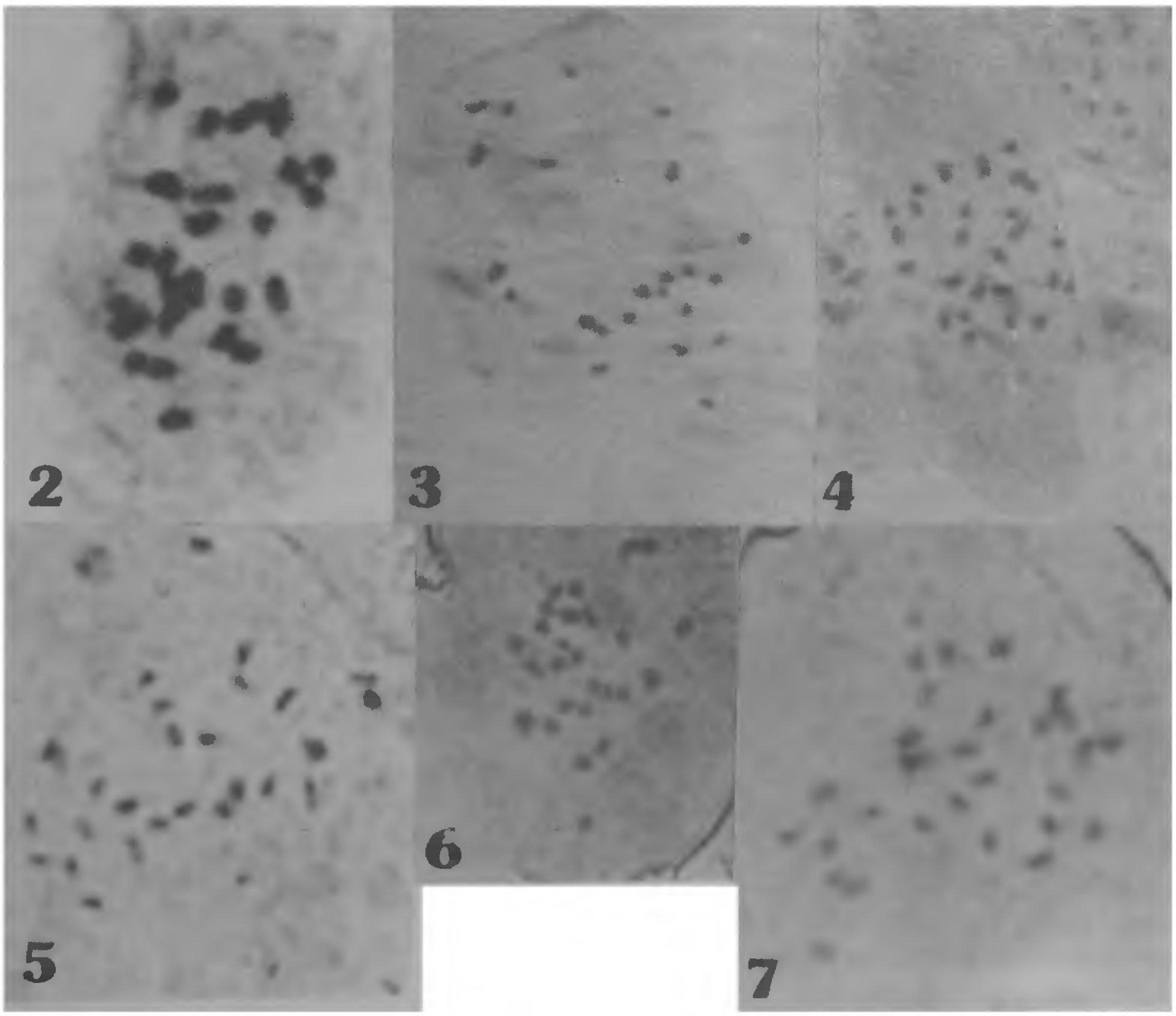


Figure 1. Comparative representation of karyograms in species of *Calathea* (ca × 1350).

Table 1 *Comparative representation of different chromosomal parameters in species of Calathea Mey*

Name of the species	Somatic chromosome number ($2n$)	Karyotype formula	Range of chromosome length (μm)
Calathea lietzei E Morr	24	$A_4C_{18}D_2$	1.11–2.04
C. undulata Regel	24	A_4C_{20}	0.81–2.04
C. picturata C Koch and Linden var *vandenheckii*	26	$A_2B_2C_{20}D_2$	0.74–2.59
C. kegeliana	28	$A_4B_2C_{16}D_6$	0.74–2.04
C. insignis Petersen	28	$A_2B_2C_{24}$	0.81–1.67
C. ornata Koern var *roseo-lineata*	28	$A_4C_{22}D_2$	0.74–1.85



Figures 2–7. Somatic metaphases revealing normal chromosome numbers in different species of *Calathea* Mey. **2.** *Calathea lietzei* E Morr ($2n=24$) (ca × 1350); **3.** *C. undulata* Regel ($2n=24$) (ca × 1150); **4.** *C. picturata* C Koch and Linden var *vandenheckii* ($2n=26$) (ca × 1350); **5.** *C. kegeliana* ($2n=28$) (ca × 1500); **6.** *C. insignis* Petersen ($2n=28$) (ca × 1700); **7.** *C. ornata* Koern var *roseo-lineata* ($2n=28$) (ca × 1600).

staining schedule after pretreatment and fixation in 1/4th saturated paradichlorobenzene solution and acetic-ethanol (1:3) mixture respectively.

In the present investigation, six different species have been studied of which two are with $2n=24$, one with $2n=26$ and three with $2n=28$ chromosomes (table 1 and figures 2–7). Chromosomes are, in general, medium to short in length and nucleolar chromosomes are slightly longer as compared to the centromeric ones (figure 1). The chromosomes can be distinguished into four types according to the number of constrictions and the nature of centromeres (figure 1). The detailed karyotype analysis shows a gross morphological similarity in the complements, though cryptic structural details distinguish one species from the other. In addition to interspecific difference in chromosome number, intraspecific variation has also been recorded. However, in spite of their difference in somatic chromosome number, all these species have more or less equal amount of 4C nuclear DNA[5, 6]. Intraspecific variations have been recorded in all these species, excepting *C. insignis*. Such intraspecific variation indicates that the species are interrelated being derivatives from each other. The clonal propagation might have contributed to the origin of new genotypes through chromosomal mosaicism in the somatic tissue[7]. Detailed analysis, however, indicates minute difference in karyotypes between species, suggesting the importance of structural alteration of chromosomes in evolution.

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STIGMA AND STYLE IN *CHEIRANTHUS*

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POLLEN tubes grow through the stigma and style and reach the embryo sac and effect fertilization. Studies on histological and cytochemical details of these structures are important in understanding the reproductive biology of angiosperms. Research efforts in this regard on members of the family Cruciferae are very few. The growth of pollen tube through stigmatic papillae and stylar transmitting tissue has been studied in *Brassica nigra*[1] and *Diplotaxis tenuifolia*[2]. A more recent study[3] deals with the structure of stigmatic papillae of *Raphanus* and pollen tube growth through them. This paper presents structural and cytochemical details of the stigma and style in *Cheiranthus* × kewensis, a plant of ornamental value.

For histology, pistils were fixed in 10% aq. acrolein for 24 hr at 0°C, followed by dehydration, infiltration and embedding according to Feder and O'Brien[4]. Sections were cut at a thickness of 2–4 μ with glass knives on a Spencer AO microtome. The sections were stained with periodic acid-Schiff's (PAS reagent[4] and counterstained with aniline blue[5]. Non-specific esterases and acid phosphatases were localized on the stigma surface at various stages of development. The former were localized using α-naphthyl acetate as the substrate in a coupling reaction with fast blue B[6]. For acid phosphatases, α-naphthyl acid phosphate was used as a substrate with fast garnet GBC as the coupler[7]. Control stigmas were incubated without the substrate.

A mature pistil is about 1 cm long with a short style (2 mm long). The stigma is bi-lobed and dry-papillate type, characteristic of the Cruciferae[8]. The papillae extend down the style along the central groove. Structurally, the stigma is divisible into two parts: the outer papillar surface and an inner stigmatic tissue which is continuous with the transmitting tissue in the style (figure 1). The papillae are elongated, thin-walled and unicellular. Their tips are slightly curved and swollen. The nucleus in each papilla remains at the base, surrounded by scanty cytoplasm whereas the tip is highly vacuolated (figure 3) as also reported in *Raphanus*[3]. The surface of papilla is covered by a thin cuticle. The stigmatic tissue has thick-walled cells and small