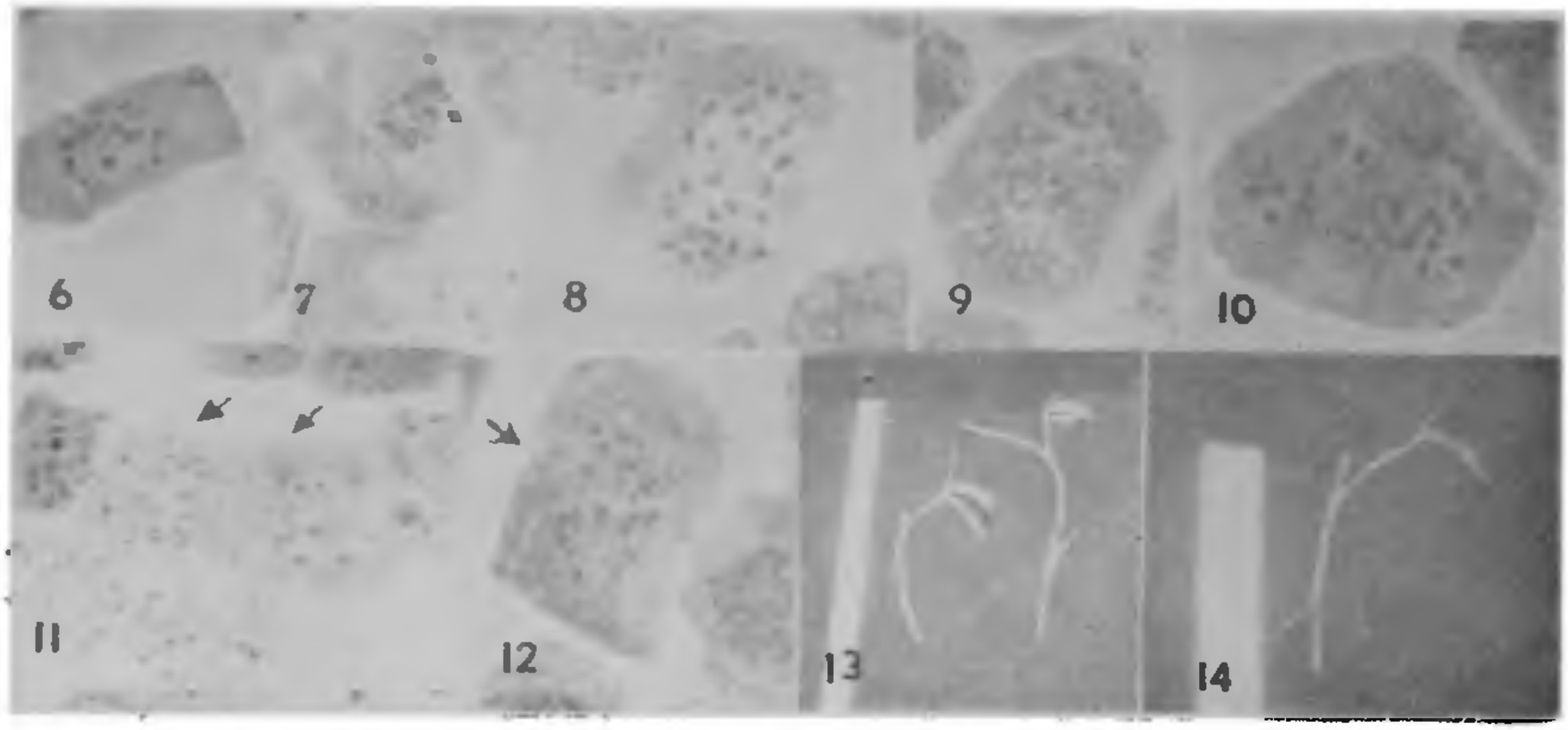

FIGS. 6–14. Photomicrographs of somatic chromosomes of *C. speciosus* at metaphase. Fig. 6. Shoranur (diploid), × 628. Fig. 7. Nedumboyil (diploid), × 593. Fig. 8. Kakkayam (triploid), × 620. Fig. 9. Shoranur (tetraploid), × 630. Fig. 10. Jammu (tetraploid), × 630. Fig. 11. Nedumboyil—arrows indicate triploid cells in diploid tissue, × 655. Fig. 12. Jammu—arrow indicates a triploid cell in tetraploid tissue, × 614. Figs. 13–14. Rooted aerial stem cuttings, after 10 and 20 days respectively.

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INDUCED TETRAPLOIDY IN *SOLANUM NIGRUM* L. COMPLEX

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Solanum nodiflorum Jacq. and *Solanum americanum* Mill. are diploids ($2n = 24$) of the *Solanum nigrum* L. complex. Autotetraploidy was induced in *S. nodiflorum* and *S. americanum* with the help of 0·2% colchicine at the seedling stage. The induced tetraploids were an enlarged replica of their corresponding diploids and resembled them in all characters, including the colour of the fruit. A comparative morphological and cytological study of induced tetraploids with natural tetraploid *S. nigrum* showed that the natural tetraploids are not the autotetraploids of either *S. nodiflorum* or *S. americanum*. It is thus clear that

the diploid members of *S. nigrum* complex have not directly contributed to the evolution of natural tetraploid *S. nigrum*[1–4].

A comparative morphological study of induced tetraploids from *S. nodiflorum* and *S. americanum* revealed that, although close similarity was observed regarding pollen fertility and seed set at diploid level, marked differences were observed at tetraploid level. The tetraploid produced from *S. nodiflorum* was highly fertile (89·87%) with 6 to 55 seeds per fruit whereas that produced from *S. americanum* was highly sterile (62%) with 0 to 4 seeds per fruit. The seeds were larger in size and homogeneous in the former while in the latter the seeds were grouped into three classes —large, medium and small. This is perhaps due to their different chromosome numbers. The progeny of tetraploid *S. nodiflorum* did not exhibit either morphological or cytological variation.

Seventy-five seeds were obtained from tetraploid of *S. americanum* and sown. Of these, only four germinated, two died in the seedling stage and only two plants survived and grew to maturity. Cytological study of these plants revealed that these plants were not tetraploid as expected but proved to be triploids with chromosome number $2n = 36$.

Recovery of only triploid plants from autotetraploids may be due to some genetic factor(s) which favours the rather rare gametic combination of 24 + 12 to survive successfully, while all other combinations are eliminated. The unequal separation of chromosomes, at anaphase I, in the pollen mother cells, which was seen in considerable frequency (68·15%) in the induced tetraploids might have given a few haploid gametes, which on fusion with normal diploid gametes resulted in triploid plants. Meiosis in triploid plants was characterised by a high frequency of trivalents at both diakinesis and metaphase I as expected in an autotriploid.

One of the two triploid plants was damaged accidentally and died before the fruiting stage. The other triploid plant was left for open pollination to observe the seed setting. Fertility was very poor in the triploid (14·03%). However, it resulted in developing 25 seeds which on germination gave rise to aneuploids with 25 and 26 chromosomes, as expected from an autotriploid. This could be possible because of random assortments of trivalent chromosomes, at anaphase I in the autotriploid, which range from 12 to 24. Meiosis in these aneuploids revealed that the 25-chromosome plant was a primary trisomic whereas the plant with 26 chromosomes was a double trisomic. Details will be published elsewhere.

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HETEROCHROMATIN IN THE FIRST INBRED GENERATION OF RADISH (*RAPHANUS SATIVUS* L.)

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Chromocentres, which represent constitutive heterochromatin, are observed in the interphase nuclei of many plant species as dark staining heteropycnotic bodies[1–6]. They roughly correspond to the centromeric regions of prophase chromosomes. Radish is a suitable material for studying constitutive heterochromatin, for, its cells exhibit chromocentres in the interpahse nuclei. Studies of chromocentres in inbred plants, of an allogamous population like radish may aid in understanding the genetics of heterochromatin. The present study has been undertaken to see the effect of inbreeding on the number and distribution of chromocentres in plants of the first inbred generation in radish.

Plants belonging to three families of the first inbred generation (I_1), namely P_1, P_2 and P_3, and the varietal population 'Pusa Desi' constituted the material for the present study. Plants of the population on selfing showed a marked decline in fertility and vigour (unpublished). Methods for cytological analysis were the same as used earlier[5–6].

Inbreeding had a marked effect on the number and distribution of chromocentres. Mean number of chromocentres in the inbred families was noticeably higher than that in the population (Table I). P_2 differed significantly from the population in this parameter ($P > 0·05$). However, there was no significant difference among the inbred families in the mean number of chromocentres. The distribution of chromocentres in the inbred families also showed a wider range than that in the population. The number of chromocentres *per* nucleus ranged from 11 to 18 in all the forms but the majority of nuclei had 13 to 15 chromocentres. Interestingly, nuclei having 17–18 chromocentres were more frequent in the inbred families. Besides, plants of the inbred families showed segregation for the mean number of chromocentres. They had both lower and higher number of chromocentres *per* nucleus than those of the population, from which they were derived.