

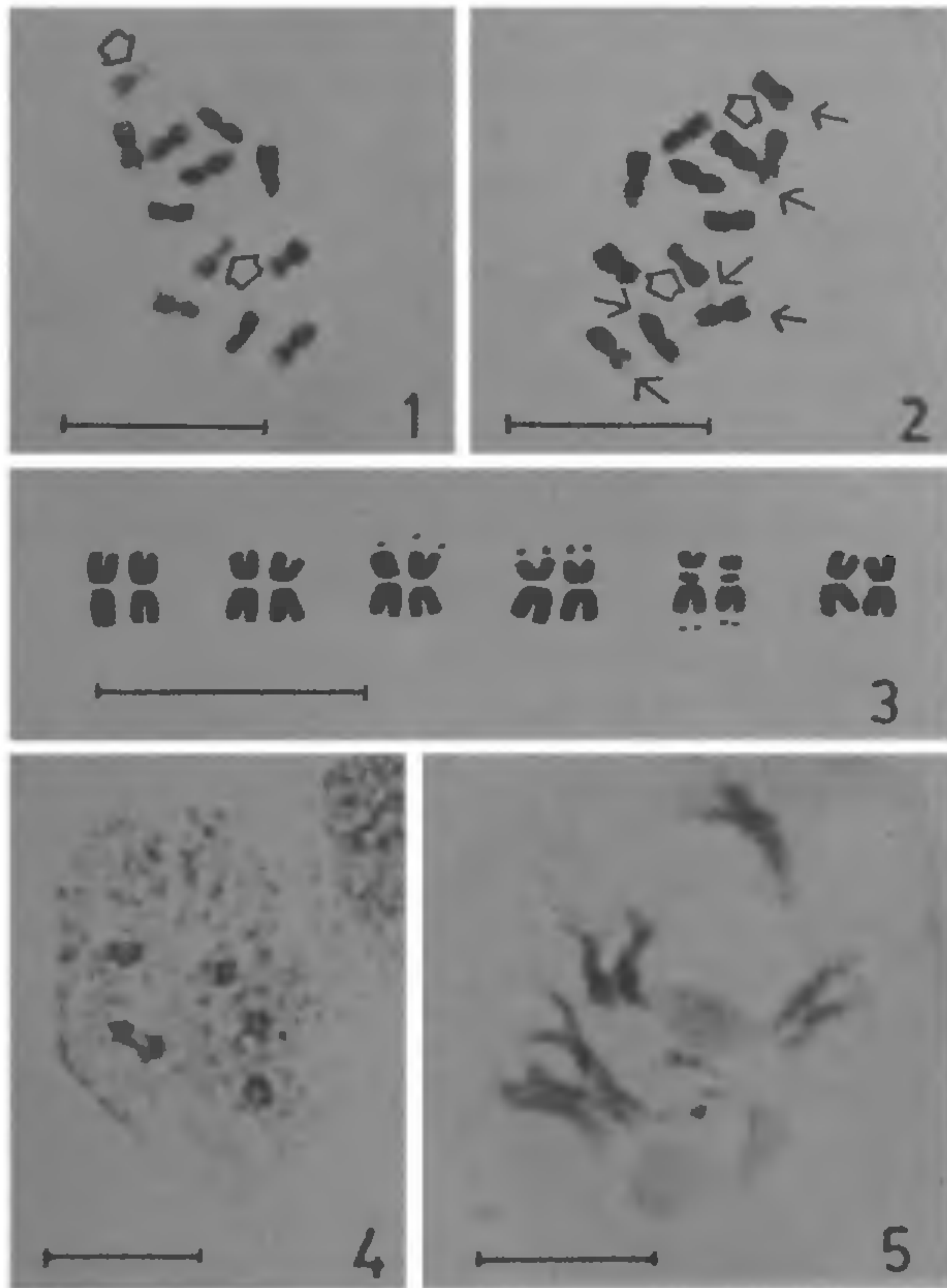
STUDIES ON NUCLEOLUS AND NUCLEOLAR CHROMOSOMES IN ANGIOSPERMS. XIII. FURTHER OBSERVATIONS ON PLANT CHROMOSOMES WITH TERTIARY CONSTRICTIONS.

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CHROMOSOMES with tertiary constrictions have been reported from time to time¹⁻⁶ and all these reports are from plant kingdom. The present note records another case, a tertiary constriction in chromosome 5 of *Plantago exigua* Murray.



Figures 1-5. 1-3. Somatic chromosome complement and Karyoidiogram of *P. exigua*. Note tertiary constrictions in figures 1 & 2. 4. Root tip cell bearing 6 nucleoli. 5. A pmc at an early prophase I showing two nucleoli and three nucleolar bivalents attached by their terminal ends (scale - 10 μ m):

The diploid complement of *P. exigua* consists of 12 chromosomes, which are either meta- or submetacentric (figures 1 & 2). Three of the six chromosome pairs, occupying 3rd, 4th and 5th position in the idiogram drawn in descending order of length (figure 3), bear distal satellites. Chromosomes of the fifth pair are unique in having three constrictions; of these one is the centromere, and the other two represent secondary and tertiary constrictions. They are located at the distal end of long arm, and in the neighbourhood of the centromere, respectively. These constrictions respond similarly to *p*-dichlorobenzene and 8-hydroxyquinoline pretreatments.

Interphase nuclei of the root tip cells of *P. exigua* carry a maximum of six nucleoli (figure 4). The percentage frequency of mono-, bi-, tri-, tetra-, penta- and hexanucleolate nuclei is 84.46, 10.84, 3.59, 0.51, 0.34 and 0.26 respectively.

Organization of six nucleoli per nucleus indicates that, of the two constrictions (other than centromere), only one is functional in terms of nucleolar organization. Observations on the mode of attachment of bivalents to the nucleolus during meiotic prophase indicate that the NOR in the chromosome bearing three constrictions is located near the distal end. This is the reason why like the two bivalents, this also keeps attached to the nucleolus along its terminal end. The tertiary constriction appears like a heterochromatic gap at this stage (figure 5).

Data collected in our laboratory^{5,6} on *Allium cepa* L, *Heracleum candicans* Wall and *P. exigua* indicate that the chromosomes with three constrictions possess only a single NOR.

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