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KARYOTYPE ANALYSIS IN DIFFERENT VARIETIES OF *CORIANDRUM SATIVUM* L.

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CORIANDRUM SATIVUM L. commonly known as coriander is widely cultivated because of its economic importance. A few reports[1–3] revealed that the diploid chromosome number $2n=22$. The present investigation was taken up in view of the scanty data on cytology of the varieties of the species.

The 8 varieties, namely, *C. sativum* var. KMU 27, Sutton 1678, KBI 1626, KBI 1627, Punjab dwarf, UDI, UD 41 and Chelsea 122 were collected from the Sutton Seed Nursery, Calcutta and from different institutes of USSR, Leipzig and London.

Somatic chromosomes were studied from root tip cells following 2% aceto-orcein staining after pretreatment and fixation in saturated paradichlorobenzene and aesculine solution, and 1:3 acetic ethanol mixture, respectively. Prior to staining a cold hydrolysis of fixed root tips in 5N HCl for 7 min was done.

In the present investigation karyotype analyses of 8 varieties of coriander were carried out. All of them showed $2n=22$ chromosomes and, in general, the chromosomes were of medium to short size. The chromosomes can be distinguished into 7 types (figure 1) according to their length and the position of the constrictions of the chromosomes. Only in the var. UD1 one pair of supernumerary constricted chromosomes of type D were observed, which is a common characteristic feature of some umbelliferous species[2]. Secondary constricted chromosomes varied from 4 to 8 in number. F type (submedian) of chromosomes were present in all the varieties. The absence of A (secondary constricted chromosomes with submedian and subterminal constrictions) and G (median) type of chromosomes was noted in UD1. Perhaps, 4 chromosomes, each of A and G type of var. Sutton 1678, were involved in the D and F types of chromosome production. The detailed karyotype analysis (table 1, figures 2–9 and 2a–9a) showed a gross morphological similarity in the complements, though cryptic structural details distinguish their genetic drift among the varieties. In the different varieties of coriander the TF% values ranged from 17.46% in KMU 27 to 30.08% in KBI 1627 (table 1). The variation in chromosome size in a complement, as noted in TF% values, depends mainly on genetically controlled coiling or uncoiling of the chromosome arms[4]. Detailed chromosomal analyses indicated minute differences in karyotypes among varieties; this may indicate the importance of structural alteration of chromosomes in evolution[5,6]. It is suggested that the micro-evolution of genomic constituents or changes of unique sequences of genes are responsible for synthesis/origin of new varieties.

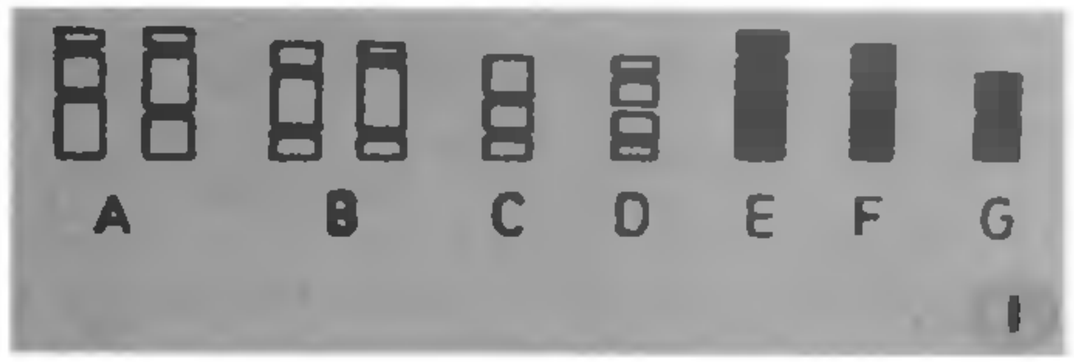
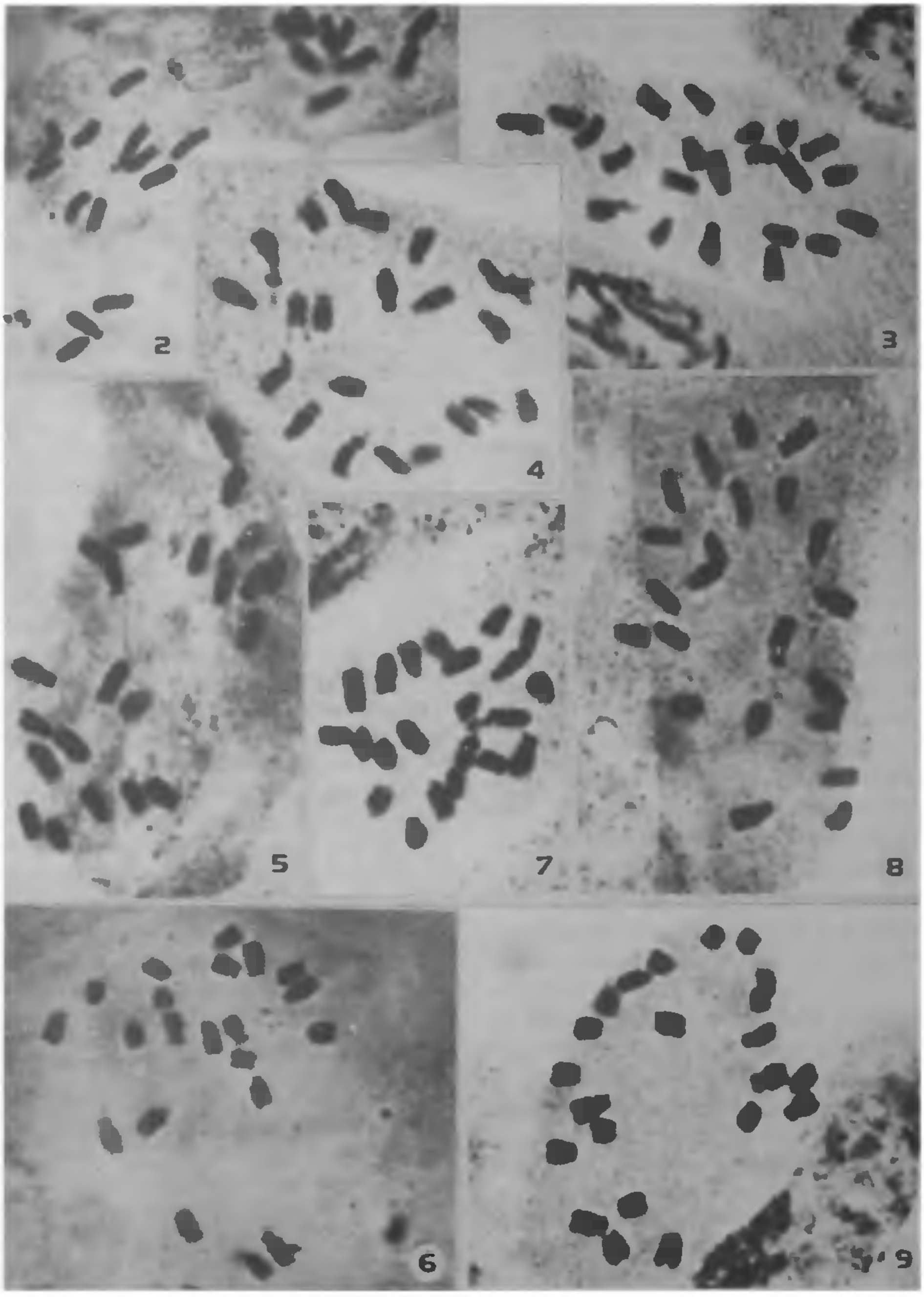


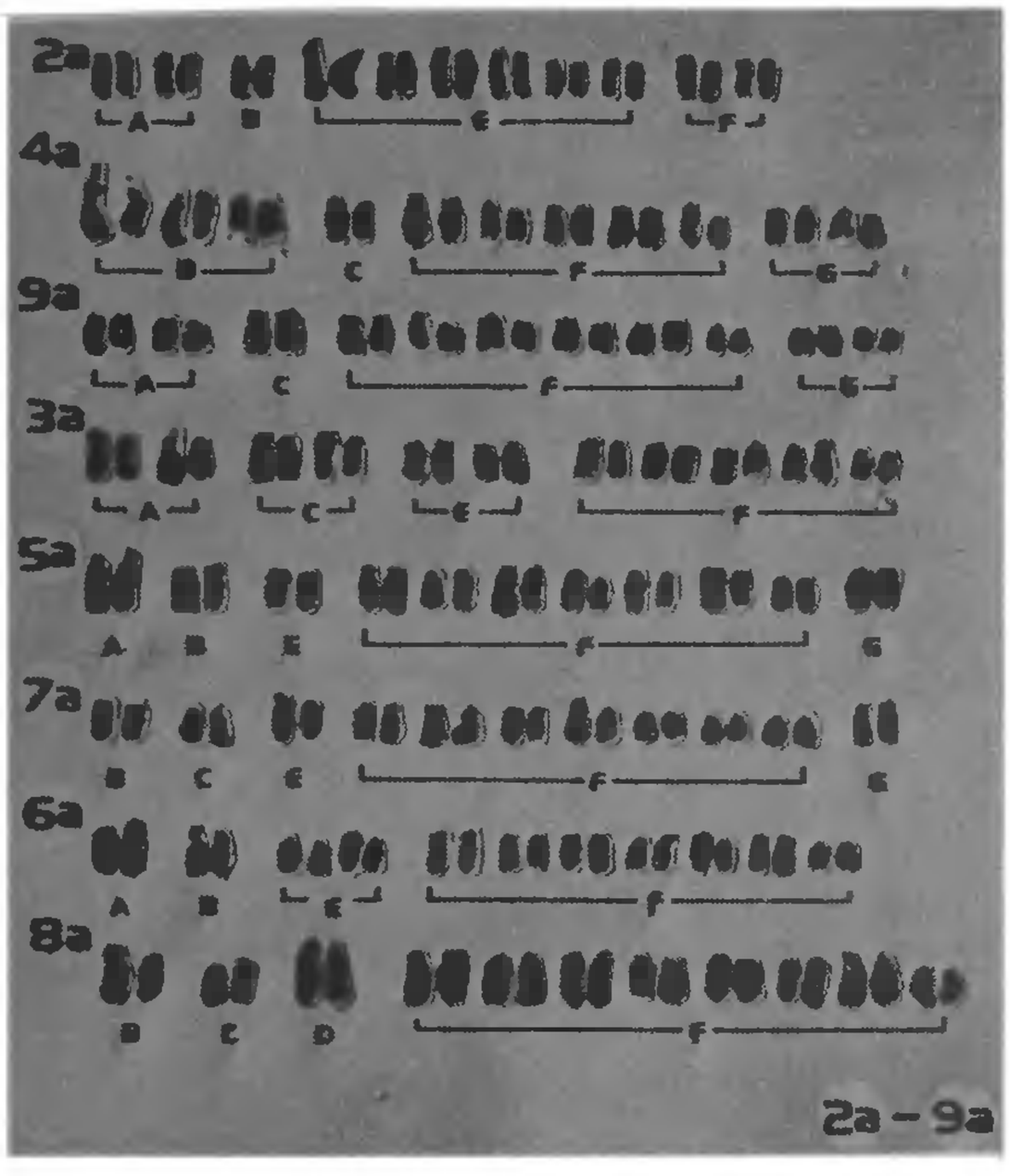
Figure 1. Diagrammatic representation of common chromosome types present in 8 varieties of *C. sativum* L.

Table 1 *Comparison of karyotypes of the varieties of C. sativum L.*

Varieties ($2n=22$)	Karyotype formulae	No. of chromosomes bearing secondary constrictions	TF%	Range of chromosome length (μm)
KMU 27	$A_4B_2E_{12}F_4$	6	17.46	3.61 6.70
Punjab dwarf	$A_4C_4E_4F_{10}$	8	23.31	2.58 3.61
Sutton 1678	$B_6C_2F_{10}G_4$	8	23.86	2.06 3.61
KBI 1626	$A_2B_2E_2F_{14}G_2$	4	23.90	2.32 3.35
Chelsea 122	$A_2B_2E_4F_{14}$	4	24.32	2.06-3.61
UD 41	$B_2C_2E_2F_{14}G_2$	4	27.45	1.54 3.34
UD I	$B_2C_2D_2F_{16}$	6	28.34	2.58 3.09
KBI 1627	$A_4C_2F_{12}G_4$	6	30.08	2.58 3.61



Figures 2–9. Normal karyotypes ($2n=22$) of different varieties of *C. sativum* L. at metaphase (×2260). **2.** KMU 27 (×1620); **3.** Punjab dwarf; **4.** Sutton 1678; **5.** KBI 1626; **6.** Chelsea 122; **7.** UD41; **8.** UD1, and **9.** KBI 1627.



Figures 2a–9a. Comparison of karyograms of the varieties of *C. sativum* L. (× 1150).

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EFFECT OF SAPONINS ON USTILOSPORE GERMINATION OF SMUT

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CERTAIN secondary plant constituents are known to possess the property of not only being cidal but very often used to arrest/check the growth and activity of several micro-organisms[1–3]. The present communication deals with the studies on the effect of saponins isolated and purified from the plants *Madhuca butyracea* Macbride, *Mimusops littoralis* L. (Sapotaceae), *Costus speciosus* Sm. (Zingiberaceae), *Momordica charantia* L. (Cucurbitaceae) and *Entada scandens* Roxb. (Mimosaceae)[4–6] on the germination of ustilospores of the three species of *Ustilago* viz., *U. cynodontis*, *U. scitaminea* and *U. tritici* and one species of *Cintractia*, i.e., *C. limitata*. The saponin from *C. speciosus* has steroidal aglycone moiety, i.e., diosgenin whereas the rest have triterpenoidal aglycones, viz., protobassic acid (*M. butyracea* and *M. littoralis*), entagenic acid (*Entada scandens*) and momordicosides (*M. charantia*) besides the usual sugar moieties such as xylose, arabinose, rhamnose and glucose. All the saponins were tested with four dilutions of 100% (1:1), (w/v). 50%, 25% and 1% against ustilospore germination taking 2,000 spores per ml following the method of Duran and Safeeulla[7] with slight modifications wherein, instead of using the watch glass, the spore suspension was inoculated in different dilutions of various saponins on a slide in a moist chamber with 100% relative humidity. The slides were incubated for 24 h at 30°C, stained in lactophenol and the per cent spore germination was recorded using sterilized distilled water for *Ustilago* species and potato decoction for *C. limitata*.

The effect of different dilutions of saponins of five plants varied on ustilospore germination. The inhibiting effect was observed at dilutions of 25–50% for *C. limitata*, that of 1–25% for *Ustilago cynodontis* and *U. scitaminea* and 50–100% for *U. tritici*. The saponins from *Costus speciosus* and *Madhuca butyracea* completely inhibited the ustilospore germination of *U. scitaminea* at all the dilutions. However, the former saponin also had similar inhibitory effect on the germination of *C. limitata* but in case of *U. cynodontis* it effected only 28% of ustilospore germination and which was almost equal (54.3) to the control (53.1%) in case of *U. tritici*. The saponin from *M. charantia* inhibited the ustilospore germinaiton of *C. limitata* at 50 and 100% dilutions only (table 1).

The saponins from *M. littoralis* (50% and 25% dilution) restricted the germination of ustilospore to the tune of 3.75 and 3.05% for *U. tritici*, *E. scandens* (100% dilution) to 8.6% for *C. limitata* and 7.9% for *U. tritici*, and *M. charantia* (100%) to 5.1% for *U. cynodontis* and 8.3% for *U. scitaminea*. However,