escence and the number of glands in the first branch of the inflorescence were recorded in the plants of both healthy and infected in each variety. The flowers formed in the healthy and infected plants of different varieties were observed under the microscope for pollen sterility, if any.

The infected plants of all the 16 varieties exhibited characteristic elongation of the inflorescences as compared to the healthy plants. Both the main axis and the branches or inflorescences were affected similarly (figure 1a–e). The glands at the base of the flowers enlarged and their numbers increased in the infected plants (figure 1e). However, no flowers at all these gland points could be observed and few flowers were noted only at the tips of the inflorescence branches (figure 1d and e). All the infected plants of the 16 different varieties of green gram recorded an increase of 9.4–65.6 % in the length of the main inflorescence axis, 3.1–121.1 % increase in the length of the first branch of the inflorescence and 107.7–350.6 % increase in the number of glands on the first branch of the inflorescence as compared to the corresponding healthy plants. Further, commencement as well as attainment of 50 % flowering were delayed by 4 to 10 days in the infected as compared to the healthy.

Several workers have reported reduction in the number of flowers and pods of the infected plants, as observed here, in many legume viruses[2–7]. There was no flower drop in any of the varieties tested, unlike in mosaic disease of urd[8]. Microscopic examinations revealed no pollen sterility in flowers of either infected or healthy series.

Such a unique and rare phenomenon of abnormal elongation of inflorescence in DEMV-infected green gram varieties as observed here, seems to have not been reported so far in any virus-host combination, especially in legumes. In addition to the above described elongation of the inflorescences, the proliferation in the numbers and size of nectaries (figure 1e) is another prominent morphological abnormality observed. These effects may probably be attributed to greater metabolic disturbance and hormone imbalance in the DEMV-infected green gram varieties. Susceptibility or resistance to infection is known to be influenced by growth regulatory substances[9,10] and they, in turn, would affect the physiology of virosed plants and such changes may lead on to the effects on virus infection and symptom expression.

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MEIOSIS IN AN INTERSPECIFIC MANDARIN HYBRID 'KINNOW' (*CITRUS NOBILIS* LOUR. × *CITRUS DELICIOSA* TEN.)

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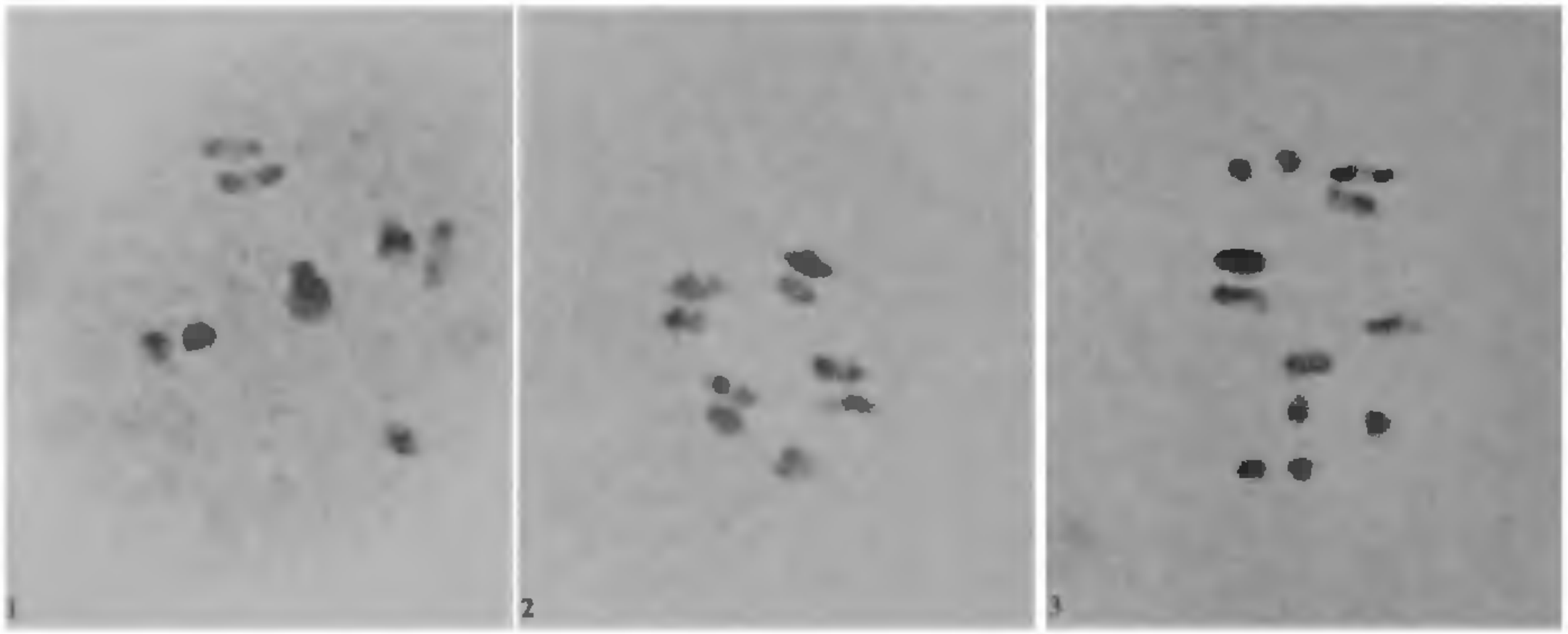
THE degree of pairing of chromosomes in interspecific hybrids can be considered a measure of chromosome homology and hence as evidence of degree of species relationship and their ancestral origin[1]. Meiosis was studied in an interspecific mandarin hybrid KINNOW (*Citrus nobilis* Lour. × *C. deliciosa* Ten.) ($2n = 18$) to find out the genome relationship between the two species.

Meiotic studies in KINNOW revealed the presence of nine bivalents in all the PMCs studied, frequency of ring bivalents ranged from 0–6 per PMC with a mean of 3.34

Table 1 *Bivalent associations in KINNOW at metaphase I.*

Number of bivalent groups	Number of PMCs
3	112 (28)
4	44 (11)
5	96 (24)
6	108 (27)
7	40 (10)

Figures in parentheses give percentage values



Figures 1–3. 1. PMC showing secondary association of bivalents at diakinesis (× 2372) **2.** Four groups of bivalents in PMC at metaphase I (× 2372) **3.** Precocious separation and secondary association of bivalents at metaphase I (× 2372).

per PMC and chiasma frequency ranged from 9–15 per PMC with a mean of 12.31 chiasma per PMC. The bivalents showed secondary associations in the groups ranging from 3 to 7 per PMC (table 1; figures 1, 2). PMCs (5%) showed early separation of bivalents and 2% PMCs unequal distribution of chromosomes at anaphase I (figure 3), rest of the PMCs showed equal separation of chromosomes at anaphase I and II; pollen fertility is 98%. Swingle[2] has kept both *C. nobilis* Lour. and *C. deliciosa* Ten. under *C. reticulata*; whereas Tanaka[3] has kept *C. nobilis* in sub section euacrumen of section acrumen and *C. deliciosa* in sub section microacrumen of the same section. This classification, however, was based on the differences in size of leaves, flowers and fruits (large leaves, flowers and fruits in euacrumen and small leaves, flowers and medium to large fruits in microacrumen). Present studies show a close homology between the genomes of two species as evidenced by regular bivalent formation and fairly high chiasma frequency.

Based on the secondary association of bivalents at metaphase I, the basic chromosome number in different plant species has been derived[4–7]. The presence of secondary association here suggests a remote polyploid origin of the genus, the maximum association in three groups of three bivalents each further indicates a basic chromosome number three ($n = 3$) for the present day *Citrus*. This also supports the observation of Banerjee[8] of three as the basic chromosome number in *Citrus*.

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INFLUENCE OF BUTACHLOR ON THE GROWTH AND AMMONIA ASSIMILATING ENZYMES OF *AZOLLA*

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AZOLLA is a water fern in which nitrogen fixing blue green alga—*Anabaena azollae* fix atmospheric nit-