progenies (Table 1).

From the results it is clear that the cytological variation is only slightly smaller than the morphological variation in the progenies. (Figs. 1, 2).

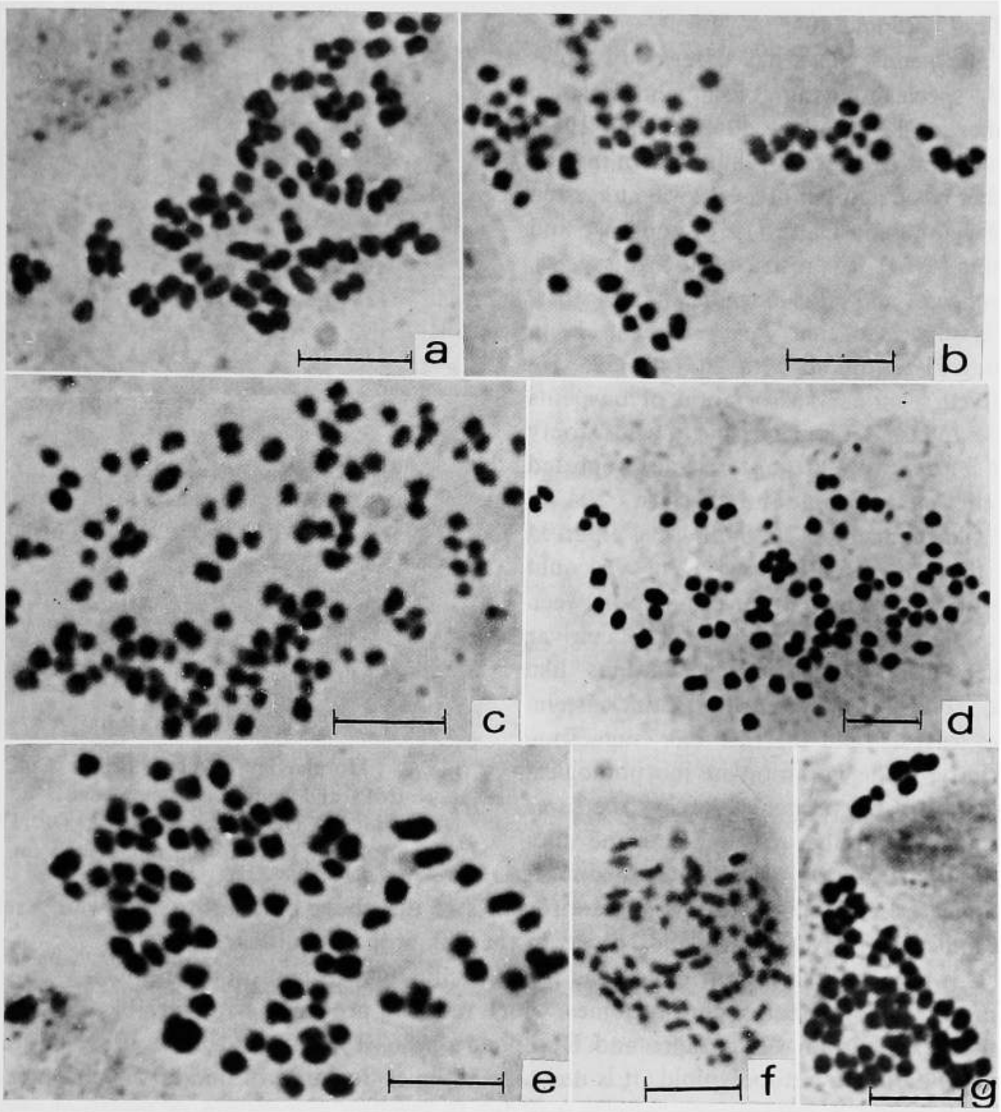

Fig. 1: Mitotic metaphase of Coll. No. 1344 (MP) and some of its progenies: a) Coll. No. 1344 (2n=78). b) OP.10 (2n=73). c) OP.5 (2n=104). d) OP.117 (2n=78). e) OP.18 (2n=78). f) OP.13 (2n=65). g) OP.27 (2n=55). Bar represents 4 μm

Discussion

The somatic chromosome number in all the cultivated, and in many of the wild, varieties of *Piper nigrum* is reported as 2n=52 (Mathew 1958, Martin and Gregory 1962, Mathew 1973, Samuel and Bavappa 1981, Jose and Sharma 1984, Okada 1986, Samuel and Morawetz 1989). Somatic chromosome number of 2n=104 was reported in a few wild varieties of *P. nigrum* by Mathew (1958, 1973) and Jose and Sharma (1984). Variable chromosome numbers of 2n=36 and 2n=60 in *P. nigrum* were also reported by Dasgupta and Datta (1976). In the present study, somatic chromosome number of 2n=78 was found in many of mitotic metaphase plates of the cultivar Coll. No. 1344, a number not previously reported, either in cultivated or wild varieties of *P. nigrum*. Progenies of the cultivar showed a range of chromosomal variation from 2n=52 to 2n=104. Out of the 20 progenies examined, six showed chromosome number of 2n=78, five 2n=65, three 2n=82, and the other six with chromosome number (2n) 52, 55, 72, 73, 76 and 104.

The genus *Piper* has a series of polyploid species having basic chromosome number x=13 (Mathew 1958, Okada 1986, Samuel and Morawetz 1989). Even though another basic number of x=12 was suggested by Dasgupta and Datta (1976) and Jose and Sharma (1984), it is restricted to two species, *P. cubeba* and *P. magnificum*. Mathew (1973) suggested that *P. nigrum* can be a diplodized tetraploid with 2n=4x=52. He observed secondary association of bivalents in metaphase I of meiosis in a wild variety of *P. nigrum* with 2n=52. He also reported somatic chromosome number 2n=104 in two wild plants of *P. nigrum*. It is inferred that the present cultivar with 2n=78 could have originated by natural crossing between 2n=52 and 2n=104 plants. The cultivar studied also showed a few features like loose spike (partial sterility), thick stem, large leaves, bold berries *etc.* suggesting hybridity. The variation in morphological characters of the progenies having the same chromosome number may indicate the allopolyploid nature of the parent. The morphological resemblance of a few of the progenies of the above cultivar to the wild varieties may indicate involvement of wild species in the origin of this cultivar.

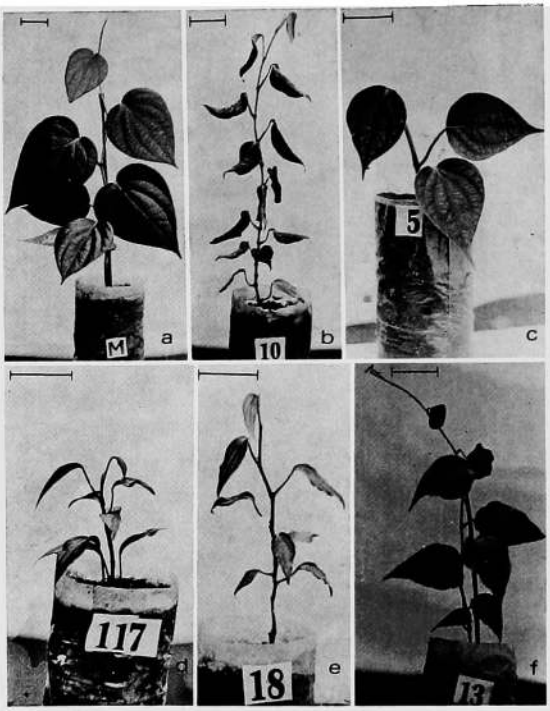

Fig. 2: Morphology of black pepper Coll. No. 1344 (MP) and some of its progenies: a, Coll. No. 1344. b, OP.10. c, OP.5. d, OP.117. e, OP.18. f, OP.13. Bar represents 5 cm.

It is reported that autotriploids and inter-specific hybrids can produce pollen grains containing variable number of chromosomes, which result in progenies with variable chromosome numbers (Bezbaruah 1976, Sapre and Deshpande 1986, Tyagi and Ahmed 1989, Sapre and Mishra 1990). In autopolyploids it is due to random segregation of one of the chromosomes in trivalent and in interspecific hybrids it is due to random segregation of unpaired chromosomes. Cytomixis in pollen mother cells will also produce pollen grains with variable chromosome number (Murty and Tiwari 1986, Kundu and Sharma 1988, Sen and Bhattacharya 1988). Cytomixis is common in interspecific hybrids and it is one of the causes for pollen sterility in most cases, even though it produces viable pollen grains with aneuploid chromosome numbers (Murthy and Tiwari 1986, Sapre and Deshpande 1987, Bhal and Tyagi 1988, Kundu and Sharma 1988, Sen and Bhattacharya 1988).

In the present study, among 20 morphological variants analysed, eight were aneuploids of higher level. The morphological variation reflects presence or absence of one or a group of chromosomes which are to be identified by karyotypic analysis or chromosome banding. To reveal the mechanism by which the wide range of chromosome numbers arises among the progenies of this cultivar requires a detailed meiotic study.