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Short Communication

CHROMOSOME NUMBER IN *Piper* spp.*

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Cytological studies in nine *Piper* spp. were conducted to find out the chromosome number of these species. The procedure for mitotic studies in *Piper* spp. was standardized. Chromosome number of 36, 52, 32, 32, 24, 25, 32, 52, 52 and 32 was observed in *P. argyrophyllum, P. attennuatum, P. bababudani, P. betle, P. chaba, P. colubrinum, P. longum, P. nigrum* (Panniyur-1), *P. nigrum* (wild) and *P. pseudonigrum* respectively. Except for the South American species, *P. colubrinum*, all the species studied possessed chromosomes in multiples of four, suggesting a basic number of four for the Indian *Piper*.

Key words : *Piper* spp., cytology, chromosome number

The genus *Piper* is the largest in the family Piperaceae comprising over 3000 species. The species of the genus are distributed mainly in South America, Malaysia, Indonesia and India. In India, the genus has a disjunct distribution concentrated mainly in the Eastern Himalayas and in the Western Ghats. Many economically important species such as *P. nigrum* (black pepper), *P. betle* (betel vine), *P. longum* (thippali), *P. chaba* (chaba thippali) etc. are included in the genus. Of these species, *P. nigrum*, black pepper is the most important spice crop of Kerala and an important foreign exchange earner. Despite the great economic importance and the wide distribution of a large number of species and varieties in *Piper*, cytological studies in the genus *Piper* is still in its infancy and the available reports are highly controversial. This may be due to the large number of extremely small chromosomes in *Piper* species. Under these circumstances, cytological studies in nine *Piper* species were undertaken with the objective of finding out the chromosome number of these species.

Materials included nine species of *Piper* maintained in the germplasm collection of the Department of Plantation Crops and Spices, College of Horticulture, Vellanikkara. The list of species are given in Table 1.

Table 1. *Piper* spp. included in the study

Sl. No.	Name of spp.	Acc. No.
1.	*P. argyrophyllum* Miq.	P-48
2.	*P. attenuatum* Buch. Ham.	P-80
3.	*P. bababudani* Rahiman	P-89
4.	*P. betle* L (var. Kasoori)	P-87
5.	*P. chaba* Hunter	P-86
6.	*P. colubrinum* Lamk.	P-85
7.	*P. longum* L	P-92
8.	*P. nigrum* L (Panniyur-1)	P-33
9.	*P. nigrum* L (wild)	Pn-134
10.	*P. psuedonigrum* Velayudhan and Amalraj	P-45

To find out the somatic chromosome number of different *Piper* spp., mitotic studies were carried out using root tip squash method. The roots were

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collected between 11.15 a.m. and 12.15 pm. and pre-treated in 8-hydroxyquinoline for two to three hours at 4°C. The pre-treated roots were fixed in Carnoy's A/Carnoy's B for one or two days. The material was then hydrolysed in 1N hydrochloric acid in a water bath maintained at a temperature of 60°C for 15 minutes. After that the roots were stained in 0.5 per cent aceto orcein for 45 minutes. After staining, the root tips were taken from the stain, squashed and slides were prepared.

Somatic chromosome number of nine different *Piper* spp. studied are given in Table 2.

Table 2. Somatic chromosome number in *Piper* spp.

Sl. No.	Species	Chromosome number (2 n)
1.	*P. argyrophyllum*	36
2.	*P. attenuatum*	52
3.	*P. bababudani*	32
4.	*P. betle*	32
5.	*P. chaba*	24
6.	*P. colubrinum*	26
7.	*P. longum*	32
8.	*P. nigrum*	52
9.	*P. pseudonigrum*	32

Chromosome number of *P. argyrophyllum* was reported as 2n=36 and 39 (Samuel and Bavappa, 1981) and 2n=52 (Rahiman and Nair, 1986 and IISR, unpublished). The results of the present investigation agree with the result obtained by Samuel and Bavappa (1981) as 2n=36. Somatic chromosome number of *P. attenuatum* had been reported differently by different workers, 2n=26 and 39 (Samuel and Bavappa, 1981), 2n=36 (Bai and Subramanian, 1985), 2n=104 (IISR, unpublished). However, chromosome number of 2n=52 was also reported by various workers like Jose and Sharma (1983 and 1984), Rahiman and Nair (1986) and IISR (unpublished). The result of the present study is in agreement with their results. Chromosome number of *P. bababudani* was observed to be 2n=32. This was contradictory to the report of Rahiman (1981) as 2n=52. Somatic chromosome number of *P. betle* was also varyingly reported by different workers as 2n=78 (Mathew, 1958), 2n=64 (Sharma and Bhattacharya, 1959; Dasgupta and Datta, 1976) etc. The result of the present study is in agreement with the earlier findings of Johnson (1910) and Janakiammal (1945) who reported the 2n number as 32.

Chromosome number of *P. chaba* was reported as 2n=104 by Jose and Sharma (1984). Janakiammal (1945) observed the chromosome number as 2n=24 and the result of the present study is in confirmation with the latter findings. In *P. colubrunim*, there is no published report on chromosome number. However, there was one unpublished report from IISR where the 2n number was reported as 26 and the result of the present study do agree with their findings. In *P. longum*, chromosome number was reported varyingly by different workers as 2n=52 (Mathew, 1958; Jose and Sharma, 1983 and 1984; Rahiman and Nair, 1986), 2n=48 (Dasgupta and Dutta, 1976) etc. In the current study, chromosome number was observed as 2n=32 and this is a new count in *P. longum*, not reported by earlier workers.

Somatic chromosome number of *P. nigrum* has been reported differently by various workers in the past. 2n=128 (Janakiammal, 1945), 2n=48 (Sharma and Bhattacharya, 1959), 2n=36 and 60 (Dasgupta and Datta, 1976) and 2n=104 (Jose and Sharma, 1984) were the numbers thus reported. However, most of the workers agreed with the number 2n=52 (Mathew, 1958; Mathew, 1972; Samuel and Bavappa, 1981; Jose and Sharma, 1983 and 1984; Rahiman and Nair, 1986 and Nair *et al.*, 1993). The results of the present study is in agreement with the majority's view that in cultivated *P. nigrum*, 2n number is 52.

Two diploid chromosome numbers have been reported in wild accessions of *P. nigrum* by Mathew (1958 and 1972). They were 2n=52 and 104, suggesting a role of polyploidy in the evolution of *piper*. The accessions used in the current study showed 2n number as 52 which is a number earlier reported by Mathew in wild *P. nigrum*.

Lack of uniformity in the reports of chromosome number by different workers indicate the existence of many cytotypes in *P. nigrum* and other species of *Piper* as suggested by Ravindran and Babu (1994). Occurrence of different cytotypes in *P. nigrum* and other species of the genus suggested a probable role of polyploidy in the evolution of species of the genus. These cytotypes are being maintained in the population by predominant vegetative propagation. In the present study, chromosome numbers of 2n=24, 26, 32, 36 and 52 have been observed in different *Piper* spp. Apart from the South American species, all other species studied possessed chromosome numbers which were multiples of four suggesting a basic chromosome number of four for Indian *Piper*. However, more detailed and exhaustive studies are required before arriving at a definite conclusion.

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