September 22, 1980.

1. Guenther, E., In *The Essential Oils*, D. Van Nostrand Co., New York, 1949, p. 552.
2. Morel, G. and Martin, C., *Compt. Rend.*, 1952, **235**, 1324.
3. Hollings, M., *Annu. Rev. Phytopathol.*, 1965, **3**, 367.
4. Paulian, N., *Tidsskrift for Planteavl.*, 1971, **75**, 387.
5. Murashige, T. and Skoog, F., *Physiologia Pl.*, 1962, **15**, 473.
6. Gamborg, O. L., Miller, R. A. and Ojima, K., *Expt. Cell Res.*, 1968, **50**, 151.
7. Eriksson, T., *Physiol. Plant.*, 1955, **18**, 976.
8. Halperin, W., *Am. J. Bot.*, 1966, **53**, 443.
9. White, P. R., *The Cultivation of Animal and Plant Cell*, Ronald Press, New York, 1963.
10. Pillai, S. K. and Hildebrandt, A. C., *Am. J. Bot.*, 1969, **56**, 56.
11. Ronald, G., *Parasitica*, 1950, **6**, 8.
12. Steward, F. C., In *Growth and Organisation in Plants*, Addison-Wesley, London, 1968, p. 447.

CHROMOSOME NUMBERS IN THE GENUS *PIPER*

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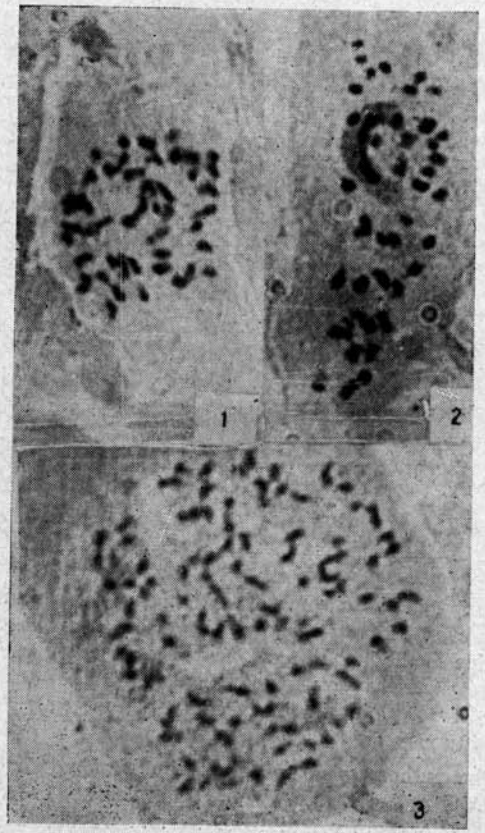
The genus *Piper* includes several economically important species like *P. nigrum*, *P. betle*, *P. longum*, etc. Despite this, cytological information available on the genus is confined to reports of chromosome numbers in *P. betle*, *P. nigrum*, *P. longum*, *P. geniculatum*[1–4] and the chromosome numbers and morphology of a few cultivated and wild varieties of *P. nigrum*, *P. longum*, *P. betle* and an undetermined species[6,9].

From an island wide collection of 69 accessions of germplasm of *Piper* maintained at the Minor Export Crops Research Station, Matale, 30 collections were studied for their chromosome number using root tip squashes in acetoorcein. The results are reported here.

The data given in Table I presents interesting discussion. Chromosome numbers $2n = 26$, 39 and 65 (Figs. 1–3) are reported for the first time in the genus *Piper*. The $2n$ chromosome numbers of *P. nigrum* (52) has been confirmed. The chromosome numbers of *P. zeylanicum*, *P. argyrophyllum*, *P. attenuatum*, *P. thwaitseii*, *P. chuvya*, *P. sylvestre* and *P. trineuron* are the first reports for these species. The $2n$ numbers of 26 and 52 presently observed for *P. longum* and *P. betle*, respectively, are at variance with the earlier reports of $2n = 52$ and 78 for these two species.

Based on the earlier reports of the lowest haploid number of 26 for this genus, it had been hypothesised that the 52 chromosomed *P. nigrum* are diploids, *P. betle* ($2n = 78$) triploid and the unidentified species of *Piper* with $2n = 104$ tetraploid[6]. The $2n = 26$, 39, 52, 65 and 78 reported in the present study clearly demonstrates that the basic number of the genus *Piper* is $x = 13$. In the light of this, 52 chromosomed *P. nigrum* is tetraploid. However, considering the $2n$ number 24, 43, 64 and 96 (Table I) reported earlier, the possibility of another basic number $x = 12$ existing in the genus through dysploid changes cannot be ruled out[7]. The chromosome numbers of 26 and 52 for *P. longum*, 39 and 65 for *P. thwaitseii*, 52 and 78 for *P. betle*, and 52, 78 and 104 for *P. nigrum* reported so far appear to suggest the presence of polyploid races or cytotypes at the intraspecific level[8]. The



Figs. 1–3. Mitosis in three species of *Piper*. Fig. 1. *P. argyrophyllum*, $2n = 26$; Fig. 2. *P. zeylanicum*, $2n = 39$; Fig. 3. *P. thwaitseii*, $2n = 65$. × 3,000.

TABLE I

Chromosome numbers of the genus Piper

Sl. No.	Accession No.	Species	2*n* Somatic number		
			Normal	Variation	Earlier report
1.	16	*Piper nigrum* (wild)	65		48; 52; 78; 104
2.	25	*Piper nigrum* (wild)	52	78 (10%)	
3.	39	*Piper nigrum* (wild)	52		
4.	60	*Piper nigrum* (wild)	52		
5.	62	*Piper nigrum* (wild)	52		
6.	66	*Piper nigrum* (cultivated)	52		
7.	67	*Piper nigrum* (cultivated)	52		
8.	3	*Piper longum*	26		24; 48; 96; 52
9.	6	*Piper betle*	52		32; 64; 78
10.	12	*Piper betle*	26		
11.	59	*Piper betle*	26		
12.	24	*Piper chuvya*	52		
13.	1	*Piper attenuatum*	39		
14.	32	*Piper attenuatum*	26		
15.	2	*Piper sylvestre*	26		
16.	4	*Piper sylvestre*	26		
17.	26	*Piper sylvestre*	26		
18.	54	*Piper sylvestre*	39		
19.	9	*Piper thwaitseii*	39		
20.	15	*Piper thwaitseii*	65		
21.	7	*Piper argyrophyllum*	39		
22.	13	*Piper argyrophyllum*	26		
23.	18	*Piper argyrophyllum*	26	39 (10%)	
24.	29	*Piper argyrophyllum*	26	39 (10%)	
25.	40	*Piper argyrophyllum*	26		
26.	42	*Piper argyrophyllum*	39		
27.	43	*Piper argyrophyllum*	26		
28	58	*Piper argyrophyllum*	26		
29.	34	*Piper zeylanicum*	39		
30.	24	*Piper trineuron*	26		

variation in the chromosome numbers of the somatic cells even of the same root tip (Table I) appears to be due to the inconsistency observed in such materials of vegetatively propagated plants[5]. Studies on the role of polyploidy in the evolution of the genus *Piper* are in progress.

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1. Johnson, D. S., *J. exp. Zool.*, 1910, **9**, 715.
2. Darlington, C. D. and Janaki Ammal, E. K., George Allen and Unwin, London, 1945.
3. Tijio, J. H., *Hereditas*, 1948, **34**, 135.
4. Maugini, E., *Caryologia*, 1951, **3**, 235.
5. Sharma, A. K. and Sharma, A., *Nature*, 1956, **177**, 335.
6. Mathew, P. M., *J. Indian Bot. Soc.*, 1958, **37**, 155.
7. Ehrendorfer, F. *et al.*, *Taxon*, 1968, **17**, 337.
8. Stebbins, G. L., Edward Arnold, London, 1971.
9. Mathew, P. M., *J. Plant Crops*, 1973, **1** Suppl. 15.