CHROMOSOME COUNTS IN PRIMITIVE ANGIOSPERMS: II

J. A. RATTER & C. MILNE

ABSTRACT. Chromosome counts are given for members of the primitive angiosperm families Monimiaceae, Schisandraceae, Illiciaceae, Hamamelidaceae, Cercidiphyllaceae and Tetracentraceae.

This note follows on from our previous work on primitive angiosperms in cultivation at the Royal Botanic Garden, Edinburgh (Ratter & Milne, 1973). Chromosome counts were made in propionocarmine squashes of anthers, vegetative buds and root tips. The counts are listed in the table, illustrated (fig. 1) and discussed.

MONIMIACEAE. *Atherosperma moschatum* belongs to the primitive subfamily Atherospermoideae. The only previous counts available in this subfamily are for *Doryphora sassafras* Engl. (2n = ±82, Ehrendorfer et al. 1968; n = c. 40, Endress 1972), *Daphnandra repandula* F. v. Muell. (2n = 44,

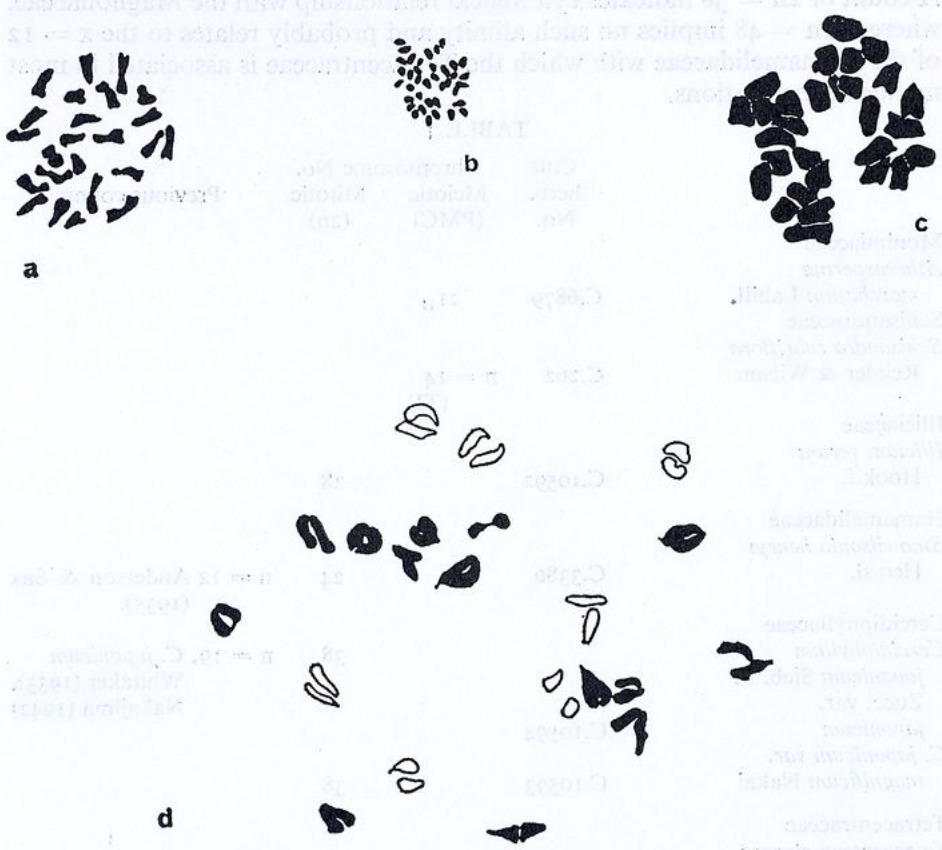

FIG. 1. a–d, camera lucida drawings or squash preparations, × 1200, of: a, *Sinowilsonia henryi*, veg. bud, 2n = 24; b, *Cercidiphyllum japonicum* var. *japonicum*, veg. bud, 2n = 38; c, *Schisandra rubriflora*, P.M.C., TI, n = 14; d, *Atherosperma moschatum*, P.M.C., MI, $2I_{II}$, inked-in photograph (bivalents already completely dissociated drawn in outline).

Ehrendorfer et al. 1968) and *Laurelia novae-zealandiae* A. Cunn. (n = 22, Hair & Beuzenberg 1959). The count of n = 21 in *Atherosperma moschatum* therefore gives a new basic number which appears to be related in dysploid series to the n = 22 of *Daphnandra* and *Laurelia*.

ILLICIACEAE. The count of 2n = 28 for *Illicium verum* corresponds to those made by Ratter & Milne (1973) in *I. cauliflorum* Merr. and *I. henryi* Diels, and by Stone & Freeman (1968) in *I. parviflorum* Michx. ex Vent. The mitotic figures obtained were not good enough for detailed karyotypic study but showed that, as in all *Illicium* species so far studied, at least two pairs of telocentric chromosomes were present.

CERCIDIPHYLLACEAE. The counts of 2n = 38 for *Cercidiphyllum japonicum* confirm those made by Whitaker (1933) and Nakajima (1942) and indicate cytological affinity with other woody Magnoliales. The stocks counted belonged to both var. *japonicum* and var. *magnificum*.

TETRACENTRACEAE. A definite count of 2n = 48 has now been made and confirms the ± 48 reported by Ratter & Milne (1973). As commented upon in our previous work, this count differs from the 2n = 38 recorded by Whitaker (1933) and is of some theoretical importance to schemes of classification. A count of 2n = 38 indicates cytological relationship with the Magnoliaceae, whereas 2n = 48 implies no such affinity and probably relates to the x = 12 of the Hamamelidaceae with which the Tetracentraceae is associated in most modern classifications.

TABLE 1

	Cult herb. No.	Chromosome No. Meiotic (PMC)	Mitotic (2n)	Previous counts
Monimiaceae				
Atherosperma moschatum Labill.	C.6879	21_{II}		
Schisandraceae				
Schisandra rubriflora Rehder & Wilson	C.262	n = 14 (TI)		
Illiciaceae				
Illicium verum Hook.f.	C.10592		28	
Hamamelidaceae				
Sinowilsonia henryi Hemsl.	C.3380		24	n = 12 Anderson & Sax (1935).
Cercidiphyllaceae				
Cercidiphyllum japonicum Sieb. & Zucc. var. *japonicum*	C.10594		38	n = 19, *C. japonicum* Whitaker (1933), Nakajima (1942)
C. japonicum var. magnificum Nakai	C.10593		38	
Tetracentraceae				
Tetracentron sinense Oliv.	C.9346		48	2n = 38, Whitaker (1933) 2n = ±48, Ratter & Milne (1973)

References

ANDERSON, E., & SAX, K. (1935). Chromosome numbers in the Hamamelidaceae and their phylogenetic significance. *Journ. Arn. Arb.* 16:210–225.

EHRENDORFER, F., KRENDL, F., MABELER, E., & SAUER, W. (1968). Chromosome numbers and evolution in primitive angiosperms. *Taxon* 17:337–353.

ENDRESS, P. K. (1972). Zur vergleichenden Entwicklungsmorphologie, Embryologie, und Systematik bei Laurales. *Bot. Jahrb.* 92:331–428.

HAIR, J. B., & BEUZENBERG, J. (1959). Contributions to a chromosome atlas of the New Zealand flora 2. *N.Z. Journ. Sci.* 2:148–156.

NAKAJIMA, G. (1942). Cytological studies in some flowering dioecious plants, with special reference to the sex chromosomes. *Cytologia* 12:262–270.

RATTER, J. A. & MILNE, C. (1973). Chromosome numbers of some primitive angiosperms. *Notes R.B.G. Edinb.* 32:423–428.

STONE, D. E. & FREEMAN, J. L. (1968). Cytotaxonomy of Illicium floridanum and I. parviflorum (Illiciaceae). *Journ. Arn. Arb.* 49:41–51.

WHITAKER, T. W. (1933). Chromosome number and relationship in the Magnoliales. *l.c.* 14:376–385.