CHROMOSOME NUMBERS AND OBSERVATIONS IN THE GENUS *SILPHIUM*[1]

T. RICHARD FISHER AND ROBERT C. CRUDEN

Department of Botany and Plant Pathology, The Ohio State University, Columbus 10

Except for three species, a detailed report on the chromosome numbers in the genus *Silphium* has never been published. During the present study chromosome counts have been made on over one-half of the species in midwestern and southern United States (table 1). Counts and observations were made from microsporocytes or root tips smeared in acetocarmine. Voucher specimens are deposited in the herbarium of The Ohio State University.

Merrell (1900) reported a chromosome number of $n=8$, and $2n=16$ in *S. perfoliatum* L., although there are uncertainties in his figure 54, which is cited as evidence. Land (1900) merely cited Merrell and reported that 16 appeared to be the number in the embryo sac and 24 in the cells of the endosperm. Taylor (1926), in a more detailed study of the root tips of the same species, consistently found the 2n complement of 14 and was able to show six definite classes of chromosomes. The present investigation confirms the report of Taylor and refutes the findings of Merrell and Land. Fisher (1959), in a study describing natural hybridization between *S. terebinthinaceum* Jacqs. and *S. laciniatum* L., reported $n=7$ in the parents as well as in the occasional hybrid.

CYTOLOGICAL OBSERVATIONS

The six classes of chromosomes as reported by Taylor (1926) are easily identified in root-tip preparations and often during meiosis I (diplotene through diakinesis) according to the relative length, position of kinetochore, and the presence or lack of a satellite. The six classes are:

1. length nearly twice as long as the other chromosomes, submedian kinetochore
2. length slightly over half that of the next longest chromosome, submedian kinetochore
3. medium length, short arm two-thirds the length of the long arm
4. medium length, short arm one-fourth as long as long arm
5. medium length, subterminal kinetochore; represented by two pairs
6. medium length, subterminal kinetochore with small satellite.

All collections examined have $n=7$ rather large chromosomes with the exception of one collection of *S. trifoliatum* L. from Rutherford County, North Carolina. This collection of buds and fruits was made and returned to the research garden at The Ohio State University in 1957. Some plants of the collection clearly show an extra unpaired chromosome during meiosis. This situation is indicated in table 1 as $n=7$ or $n=7+1$.

---

[1]Publication 654, Department of Botany and Plant Pathology. This project supported, in part, by National Science Foundation grant (NSF-G18714) to the senior author.

TABLE 1

Documented chromosome numbers of species of Silphium

Species	Location and source of voucher material	n	2n
S. asperrimum Hook.	Claremore, Oklahoma C. B. Heiser 4106	7	
S. brachiatum Gatt.	Jackson County, Alabama T. R. Fisher 1776	7	
S. compositum Michx.	Dinwiddie Co., Va. R. Alston s.n.	7	
	Jackson Co., N.C. T. R. Fisher 1701	7	
S. connatum L.	Fayette Co., W. Va. Hicks & Bartley s.n.	7	
	Giles Co., Va. R. Cruden s.n.	7	
S. dentatum Ell.	DeKalb Co., Ga. T. R. Fisher 1759	7	
S. gatesii Mohr.	Pickens Co., N. C. T. R. Fisher 1759	7	
S. integrifolium Michx.	Martin Co., Ind. R. Cruden 648	7	
	Coles Co., Ill. T. R. Fisher 650	7	
S. laciniatum L.	Greene Co., Ind. T. R. Fisher 610	7	14
	Coles Co., Ill. T. R. Fisher 654	7	
S. perfoliatum L.	Cuyahoga Co., Ohio R. Cruden 611	7	
	Lawrence Co., Ohio R. Cruden 575	7	14
S. pinnatifidum Ell.	Coffee Co., Tenn. T. R. Fisher 2033	7	
S. reverchonii Bush	Harrison Co., Tex. L. Shinners 24159	7	
S. simpsonii Greene	Jefferson Davis Par., La. L. Shinners 21444	7	
S. speciosum Nutt.	Lyon Co., Kansas McGregor 14170	7	
S. terebinthinaceum Jacqs.	Jasper Co., Ill. R. Cruden 656	7	
	Greene Co., Ind. T. R. Fisher 611	7	
S. trifoliatum L.	Madison Co., Ohio T. R. Fisher 1690	7	
	Rutherford Co., N.C. T. R. Fisher S134	7+1	
	Fayette Co., W. Va. R. Cruden 602	7	

LITERATURE CITED

Fisher, T. R. 1959. Natural hybridization between *Silphium laciniatum* and *S. terebinthinaceum*. Brittonia 11: 250–254.

Land, W. J. G. 1900. Double fertilization in Compositae. Bot. Gaz. 30: 252–261.

Merrell, W. D. 1900. A contribution to the life history of *Silphium*. Bot. Gaz. 29: 99–133.

Taylor, W. R. 1926. Chromosome morphology in *Fritillaria*, *Alstroemeria*, *Silphium*, and other genera. Am. J. Bot. 13: 179–193.