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JOHN W. DUFFIELD: **Polyploidy in Acer rubrum L.:-** *Acer rubrum* L. is a highly polymorphic species occupying a range which includes almost all of the United States east of the prairies, southeastern Canada, and a portion of Newfoundland. The range of habitats occupied is equally impressive. Cytological study of this species was first undertaken by MOTTIER in 1893, but the first indication of intraspecific polyploidy was furnished by TAYLOR (Contrib. Bot. Lab. Univ. Penna. 5: 111, 1920), who reported finding in this species three different gametic chromosome numbers which approximated 36, 54, and 72, but was unable to relocate the trees from which his material was collected. All the other species of *Acer* studied by TAYLOR had chromosome numbers which were multiples of 13. Subsequent investigations by FOSTER (Jour. Arnold Arboretum 14: 386, 1933), and others have confirmed 13 as the basic number for the genus. FOSTER's only count for *Acer rubrum* was n=52, the largest number (octoploid) which he found for the genus.

Recently the writer made counts in root tips of seedlings derived from trees in the Upper Peninsula of Michigan, the Gulf Coast of Mississippi, and New Haven, Connecticut. These counts, together with data on stomata, are listed in Table I.

The octoploid Connecticut material agrees with FOSTER's determination, n = 52 for *Acer rubrum*, and the Michigan and Mississippi hexaploid material presumably corresponds to TAYLOR's n = ca. 36 type. TAYLOR interpreted his series as diploid (n = 36), triploid (n = 54), and tetraploid (n = 72), thereby implying 18 as the basic number. An alternative interpretation of this series may be made, using 13 as a basic number. This is in agreement with the counts by FOSTER and the present writer and the count of n = 26 made by TAYLOR for *A. saccharinum* L., a very closely related species. The 2n = 78 could then be considered hexaploid and the 2n = 104 octoploid. The type corresponding to TAYLOR's n = ca. 72 count may prove, when found, to be either a decaploid (n = 65) or a dodecaploid (n = 78).

TABLE I, *Chromosome Number in Acer rubrum* L.:-

Locality	2n Chromosome number	Stomata mm²	Stomatal length micra
Michigan			
(tree no. 1)	ca. 78	638	14.5
(tree no. 2)	ca. 78	730	12.9
Mississippi	ca. 78	862	14.7
Connecticut	ca. 104	696	13.7

The data on stomatal length and number in Table I were obtained from collodion peels taken from the lower epidermis of mature leaf specimens. Analysis of variance applied to the measurements of stomatal length reveals more highly significant differences among the three hexaploids than between the octoploid and any of the hexaploids. Inspection of the stomata number data reveal no relation to chromosome number. Genic and environmental factors may have masked the usual effects of polyploidy on stomata.

The data in Table I may explain the inconclusive results of a reconnaissance of herbarium material which the writer made before seed was available for cytological study. Through the kindness of Drs. H. A. GLEASON and W. H. CAMP the writer was permitted to make collodion peels from a large number of *Acer rubrum* specimens collected throughout the range of the species and deposited in the herbarium of The New York Botanical Garden. In order to eliminate immature leaves only specimens collected after July 1 were studied. Stomatal length and number per unit area of each specimen were plotted on maps, but in spite of considerable variability in these characteristics neither of them showed any consistent geographic or physiographic distribution.

The results of these two investigations suggest that size and distribution of stomata are not reliable indices of naturally-occurring polyploidy in *Acer rubrum*. Possibly a different situation might be encountered with artificially induced polyploids in this species.

The polyploid series in *Acer rubrum*, two members of which are being grown by the Forest Genetics project at this station, is of interest not only in relation to the distributional and evolutionary significance of polyploidy, but for the light it may shed on the relation between chromosome number and wood quality. It has been suggested that amphidiploid hybrids may be of value in the genetical improvement of forest trees because desirable combinations may be fixed in one generation. This suggestion has raised the question of the effect of chromosome multiplication on wood quality, since larger cells are characteristic of many polyploids. Comparison of the wood of naturally-occurring red maples with different chromosome numbers may yield some evidence. However, conclusive evidence will not be obtained until trees with different chromosome numbers are grown together under the same environmental conditions. *Acer rubrum* is well suited for a study of this type since it develops rather rapidly as compared with many of our forest trees. It is, of course, possible that the size of xylem elements in the members of a naturally-occurring polyploid series may show as little relation to chromosome number as appears to be the case with stomata. In this event artificially induced polyploids will have to be used for comparative studies.

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