GENETICAL CONSEQUENCES OF THE CHROMOSOMAL 
BEHAVIOR IN ORCHARD GRASS, DACTYLIS GLOMERATA L.1

W. M. MYERS2

RECENTLY several perennial grass species have been found to behave cytologically as autopolyploids. Among these are Dactylis glomerata L. according to Muntzing (14, 15), and Myers and Hill (19, 20, 21); the tetraploid race of Agropyron cristatum (L.) Beauv., according to Myers and Hill (19, 20); Arrhenatherum elatius (L.) Mert. & Koch., according to Kattermann (7), and Myers and Hill (19, 20); Anthoxanthum odoratum L., according to Kattermann (7), and Hordeum bulbosum L., according to von Berg (2). It is possible that critical cytological studies of more perennial grass species may reveal additional cases of autopolyploidy, or at least cases in which the chromosomal behavior indicates a constitution intermediate between auto- and allopolyploidy. Hexaploid Phleum pratense L. already has been placed in this latter category by the work of Nordenskiöld (22), Muntzing and Prakken (16), and Myers (18).

Theoretically, these autopolyploid species will show a polysomic type of inheritance. Few genetical data are available as yet for any of these grass species. In studies of the first inbred generation of plants of orchard grass from open-pollinated populations, Stapledon (25) found a striking deficiency in the recessive class in lines segregating for characters which he supposed were conditioned by a single factor pair. Using similar material of orchard grass, the writer found a few progenies showing ratios approaching 3:1 and also other progenies in which the deficiency in the recessive class was too great to be attributed to random sampling. Such deviations from the theoretical 3:1 ratio might have been due to inviability of the recessive types, to duplicate or triplicate factors conditioning the character, or to tetrasomic inheritance. The latter conclusion is fully in accord with the known meiotic behavior of orchard grass. Studies of segregation in the second inbred generation (I2) from which the genotypes of the plants of the first inbred generation (I1) can be determined should bring critical evidence to bear upon which hypothesis is correct.

Myers (17) has published the results of preliminary studies of I2 progenies, which supported the hypothesis of tetrasomic inheritance. To obtain more extensive data on this question, plants of orchard grass were selected which were known from preliminary I1 and I2 tests to be heterozygous for factors conditioning albino seedlings, yellow seedlings, or both. Additional I1 and I2 progenies from each plant were grown and classified.

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2Geneticist.
3Figures in parenthesis refer to “Literature Cited”, p. 900.