*Reprinted from X International Congress of Genetics, Proceedings, Vol. II*

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The 21 chromosomes of *Triticum aestivum* can be placed in 7 homoeologous groups of 3 according to the ability of tetrasomes to compensate for particular nullisomes. Within these groups all the 42 possible tetrasomic-nullisomic combinations are nearer normal than the nullisomics themselves. Between the groups nearly 50 different combinations have been tested, without any of them showing compensation. The high degree of compensation exhibited in most of the combinations within groups indicates that almost every chromosome is very similar to its two homoeologues in gene content. The homoeologous chromosomes show little tendency to pair, however, for the bivalent frequency in haploids normally averages only about one.

That the pairing in haploids usually involves homoeologous chromosomes has been shown by analysis of translocations recovered from haploids, where each translocation is presumably the result of haploid pairing and crossing over. Of the 13 translocations analysed, 9 involved homoeologous chromosomes: VI–XIX (4 occurrences), II–XX (2), XI–XXI (2), and XII–XVI. The other 4 were: II–VIII, IV–XII, VI–XVIII, and IX–XI.

The virtual failure of homoeologous chromosomes to pair appears to be due to suppression of pairing by chromosome V. When chromosome V is missing, hybrids of hexaploid wheat (genomic formula AABBDD) with amphidiploid *T. aegilopoides* × *Aegilops squarrosa* (AADD) show many microsporocytes with the equivalent of the expected 14 bivalents (average over 12), but only rarely have as many as 13 bivalents (average about 8) when V is present. Hybrids of AABBDD with AA, which normally have only 2 to 7 pairs, have the equivalent of 5 to 13 pairs (average about 10) when chromosome V is missing. It seems likely that the acquisition of a mutation on chromosome V which decreases pairing intensity is the means by which hexaploid wheat has achieved diploid pairing. As demanded by this hypothesis, pairing is definitely less intense in hexaploid than in diploid wheat.

PRINTED IN CANADA