TEMPERATURE EFFECT ON HOMOEOLOGOUS PAIRING OF WHEAT-RYE HYBRIDS

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Both the long and short arms of the wheat chromosomes 5A, 5D, and the short arm of chromosome 5B have a gene(s) which influences the meiotic pairing by promoting the somatic association of both homologous and homoeologous chromosomes, while the long arm of 5B chromosome has a gene(s) which tends to suppress such association. Consequently, the genes involved are operative at a premeiotic stage. The result of the action of these genes is such that exclusively homologous pairing takes place at meiosis.

Apparently temperature also plays an important role in the complex expression of these genes during the premeiotic critical stages.

The present studies were undertaken to provide information about the meiotic behaviour of homoeologous chromosomes in F_1 of wheat-rye hybrids at 3 different levels of temperature.

Preliminary results suggest that rye has a polygenic system controlling chromosome behaviour very much similar in action to the one present in wheat chromosomes 5A, 5D and short arm of 5B. When these two systems are brought together, the results show continuous variation from complete suppression to no suppression at all of the 5B long arm gene(s), depending on the number of genes controlling chromosome behaviour contributed by the rye parent.

The mean pairing per cell at the three different temperature levels seems to indicate that these genes are also temperature sensitive, 70°F being the most favorable for their expression. Both higher and lower temperatures tend to reduce pairing.

REFERENCES

1. Feldman, M. 1966. The Effect of Chromosomes 5B, 5D and 5A on Chromosomal Pairing in _Triticum aestivum_. Proc. N.A.S. vol. 55(6):1447-1453.

2. .... and Mello-Sampayo T. 1967. Suppression of Homoeologous Pairing in Hybrids of Polyploid Wheats x _Triticum speltoides_. Can. wJ. Genet. Cytol. 9:307-313

3. Nakajima, G. and Zennyozi, A. 1966. Cytogenetics of Wheat and Rye Hybrids. Zeiken Ziho 18:39-48.

4. Rees, H. 1961. Genotype Control of Chromosome Form and Behaviour. The Bot. Review 27:288-318.

5. Riley, R. 1960. The diploidisation of Polyploid Wheat. Heredity 15:407-429.

6. ....1966. Genotype-Environmental Interaction Affecting Chiasma Frequency in _Triticum aestivum_. In Chromosomes Today Vol. 1:57-65 C.D. Darlington and K.R. Lewis Editors, London.

7. ....and Chapman, V. 1967. Effect of $5B^s$ in suppressing the Expression of Altered Dosage of $5B^L$ on Meiotic Chromosome Pairing in _Triticum aestivum_. Nature 216:60-62.

8. .... Chapman, V. and Kimber, G. 1959. Genetic Control of Chromosome Pairing in Intergeneric Hybrids with Wheat. Nature 183:1244-1246.

9. .... and Law, C.N. 1965. Genetic Variation in Chromosome Pairing. Adv. Genetics 13:57-114.

10. Upadhya, M.D. and Swaminathan, M.S. 1963. Chromosome Pairing and Morphological Characters in 27 and 28 Chromosome Hybrids Between Rye and Monosomic of Homoeologous Group V of Bread Wheat. Ind. J. of Genet. Plant Breed. 23:225-231.

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REFERENCES

1. [illegible]dman, M. 1966. The Effect of Chromosomes 5B, 5D and 5A on [illegible] Pairing in Triticum aestivum. Proc. N.A.S. Vol. 55(6) 1447-1453.

2. .... 1961. Suppression of Homoeologous Pairing in [illegible] Triticum aestivum. [illegible] 307-315

3. [illegible] 1966. Cytogenetics of Wheat and Rye Hybrids. [illegible]

4. [illegible] of Chromosome [illegible] and Behaviour. [illegible] 225-116.

5. [illegible], R. 1960. The [illegible] of Polyploid Wheat. [illegible] 15:407-429.

6. .... Chromosomal [illegible] Triticum aestivum [illegible] 1:57-65 [illegible] Editors

7. .... and Chapman, V. 1961. Effect of [illegible] the Homoeologous [illegible] Chromosome Pairing [illegible] Nature [illegible]

8. [illegible] and Kimber, G. 1959. [illegible] Chromosome Pairing in [illegible] Hybrids with Wheat. Nature 183:1244-1246.

9. .... and [illegible] 1965. Genetic Variation in Chromosome Pairing. [illegible]

10. [illegible] and [illegible] 1963. Chromosome Pairing and Morphological [illegible] 21 and 28 Chromosome Hybrids Between Rye and [illegible] Group 7 of Bread Wheat. Ind. J. of Genet. [illegible] 22 [illegible]