

From "New Genetical Approaches to Crop Improvement"  
Ed. by K.A. Siddiqui and A.M. Faruqi  
Atomic Energy Agricultural Research Centre  
Tandojam, Pakistan, 1986

H. F. Adnan

### A breeding system for hybrid wheat with the original *aestivum* cytoplasm

M. SASAKI, N. NAKATA AND Y. YASUMRO  
Faculty of Agriculture, Tottori University, Tottori 680,  
Japan

#### Abstract

From the results obtained on the pollen and selfed fertilities of ditelocentrics of Chinese Spring (CS) with each of the *Ae. ovata*, *Ae. speltoides*, *Ae. variabilis* cytoplasm, it is clear that some deduced major and a number of modifier genes located on certain chromosomes arms are controlling the fertility of CS against these alien cytoplasm.

Each of the following chromosome arms carry a major gene(s) for the fertility of CS: chromosome arms 5DS and 1BS against the cytoplasm of *Ae. ovata* 7BL to that of *Ae. speltoides*, 1DL to that of *Ae. squarrosa*. A number of modifier genes for the fertility were also located: five on each of the chromosome arms, 2BS, 3AL, 3BS, 4DS and 7BS, to the cytoplasm of *Ae. ovata*; six (2AL, 2BS, 4AB, 4DS, 6BL, 7AS) to that of *Ae. speltoides*, four (1BS, 1BL, 2BS, 4BS) to that of *Ae. variabilis*.

As shown above, the *Rf1* gene located on chromosome arm 5DS was active to the *Ae. ovata* cytoplasm but ineffective to the original, *Ae. speltoides* and *Ae. variabilis* cytoplasm whereas the *Rf1* gene on 7BL acting to the *Ae. speltoides* cytoplasm was not effective to the original, *Ae. squarrosa* and *Ae. variabilis* cytoplasm. Such a nucleo-cytoplasmic interaction on the gene expression for the fertility could be used for hybrid wheat breeding systems by searching an appropriate alien cytoplasm where genetic-male-sterile mutants found in the original cytoplasm would become fertile.

