M. Feldman

General Scope of the Japan–U.S. Cooperative Science Program on "Chromosomal and Genic Differentiation in Wheat (September 1967–August 1970"

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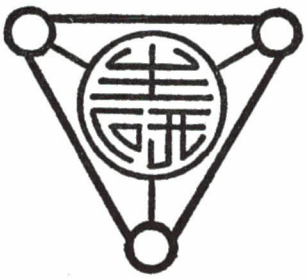

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Common wheat is known to have originated in Central Asia about eight thousand years ago from emmer wheat and *Aegilops squarrosa*. Since then, it has dispersed throughout the world. The western end of its dispersion is in the Americas, while Japan is located in its eastward terminal. If any phylogenetic differentiation took place during the dispersion of common wheat, we should get the clearest picture of it by comparing the common wheats of Japan to those of Americas. This is the central theme of the Japan-U.S. Cooperative Program, in which the genes and chromosomes of Japanese varieties were compared to varieties from the Americas. At the same time, aneuploid series of common and emmer wheats were produced to aid in critical and efficient analysis of the chromosomes and genes. The outline of research programs initially set up was as follows:

Research Programs on Chromosomal and Genic Differentiation in Wheat

Subject	Japanese side (Investigator)	U.S. side (Investigator)
Production of aneuploid series	(1) Production of monosomic and nullisomic series in two Japanese varieties, Norin 10 and Shinchu-naga (Mochizuki) (2) Production of telocentric series in emmer wheat (Nishikawa)	(1) Production of monosomic and nullisomic series in two U.S. varieties, Wichita and Cheyenne (Schmidt)
Differentiation of chromosomes	(3) Morphological analysis of chromosomes belonging to homoeologous group 5, using Japanese varieties (Sasaki) (4) Cytogenetical study of chromosomes belonging to homoeologous group 5 in species related to wheat (Muramatsu) (5) Genetic roles of individual chromosomes on economic characters (Sasaki) (6) Quantitative study of DNA in individual chromosomes of Japanese and American varieties (Nishikawa)	(2) Morphological analysis of chromosomes belonging to homoeologous group 5, using American and European varieties (Morris) (3) Intervarietal differences in cytological behavior of monosomic chromosomes (Morris)

Geographical distribution of genes	(7) Geographical distribution of the asynaptic gene (Okamoto) (8) Geographical distribution of necrosis and chlorosis genes (Tsunewaki)	(4) Gene analysis of sterility, etc. (Schmidt)

Cooperation between U.S. and Japanese wheat geneticists was not restricted merely to the comparison of wheat in these two countries. Speaking for the Japanese, we benefited indeed by receiving a large number of seed samples of western varieties, including those of the United States, from the World Collection of Small Grains, USDA, and by receiving original seed stocks of chromosome substitution lines of the variety Cheyenne from Dr. Schmidt, Nebraska, and those of monosomic and telocentric series of the variety Chinese Spring from Dr. Sears, Missouri.

At the end of the Cooperative Program, we planned a review meeting to summarize our results. This meeting was held in Tucson, Arizona from August 21–24, 1970, with generous support from the Japan Society for the Promotion of Science, Japan and from the National Science Foundation, USA. Besides members of the Cooperative Program, several observers from both countries also joined the meeting, and contributed some papers. The program of this review meeting was as follows:

Program of the Review Meeting Held at Tucson, Arizona, 1970

GENERAL SESSION (August 21)

Background and scope of the Cooperative Science Program ..... J. W. Schmidt and K. Tsunewaki

SESSION I (August 22, Morning)

Chairman K. Tsunewaki

CHROMOSOME DIFFERENTIATION AND OTHER TOPICS

Some problems on meiotic and premeiotic behavior of chromosomes ..... M. Okamoto

Discussion on measurement of chromosomes ..... G. Kimber

Morphology and meiotic behavior of univalent chromosomes of homoeologous group 5 ..... M. Sasaki, R. Morris, T. Taira and J. W. Schmidt

Proposed cytogenetic studies ..... E. G. Heyne

SESSION II (August 22, Afternoon)

Chairman J. W. Schmidt

NEW ANEUPLOID SERIES AND CHROMOSOME DIFFERENTIATION

Monosomic series of two Japanese common wheat varieties and 'Stewart'

durum ..... A. MOCHIZUKI
Telocentric series of *T. durum* cv. LD222..... K. NISHIKAWA
Influence of the genetic constitution of epidermal cells on resistance to stripe rust ..... R. J. METZGER
Effect of individual chromosomes of common wheat on its quantitative characters revealed by chromosome substitution ..... M. SASAKI
DNA content of individual chromosomes and genomes in wheat and its relatives ..... K. NISHIKAWA

SESSION III (August 23, Morning)
Chairman E. G. HEYNE
GENE DIFFERENTIATION AND OTHER TOPICS

Necrosis and chlorosis genes in common wheat and its ancestral species ..... K. TSUNEWAKI
Induced mutation research in wheat .....C. KONZAK
Homoancestral genes in relation to parallel variation in wheat and its relatives ..... K. TSUNEWAKI
Differentiation between the two Norin 10 semidwarf genes in a common genetic background .....R. E. ALLAN
Problems in the management of information on genetic resources ..... C. KONZAK

SESSION IV (August 23, Afternoon)
Chairman M. OKAMOTO
CYTOPLASM AND OTHER TOPICS

Considerations on the cytoplasmic relationship among the *Triticum* species ..... H. KIHARA
Intraspecific genome differentiation in *Aegilops caudata* .....H. KIHARA and Y. OHTA
Cytoplasmic male sterility and fertility restoration ..... J. W. SCHMIDT
Discussion on the future of the U.S.-Japan Cooperative Program ..... L. TRENT

SYMPOSIUM (August 24, Morning)
WHEAT GENETICS AND CYTOGENETICS SPONSORED BY NSF AND CROPS SCIENCE SOCIETY OF AMERICA

The review meeting was extremely fruitful thanks to the hospitality of the NSF and the University of Arizona, to whom we are indeed thankful. Abstracts of all papers contributed (except four) are printed in these proceedings. The printing cost was covered by the Kihara Institute for Biological Research and by the Japan Society for the Promotion of Science, to whom we express our deepest appreciation.