

DOCUMENTS OF THE GENERAL FACULTY

**REPORT OF THE MEMORIAL RESOLUTION COMMITTEE FOR
YUICHIRO HIRAIZUMI**

The special committee of the General Faculty to prepare a memorial resolution for Yuichiro Hiraizumi, professor emeritus, molecular genetics and microbiology, has filed with the secretary of the General Faculty the following report.

Sue Alexander Greninger, Secretary
The General Faculty

**IN MEMORIAM
YUICHIRO HIRAIZUMI**

Yuichiro Hiraizumi was born in Odate, Akita-Ken, Japan on April 10, 1927, the son of Sue and Katsuro Hiraizumi. He died in Austin on January 27, 2003. The path between these distant cities was traveled by a person of extraordinary intelligence, determination, and accomplishment. As a child, he contracted poliomyelitis, which left him unable to walk normally. This presented a problem when it became time to enroll in a university. At that time, Japanese universities required that students be physically fit, a requirement that was tested by completing a foot race within a specified time. This was a large challenge for Yuichiro. Although he failed to qualify several times, eventually his determination won out, and he was admitted, completing a bachelor of science degree at Hokkaido University (Sopporo) in 1952.

Following his B.S. degree, he entered the graduate program in genetics at Hokkaido, where he studied for four years. Three papers in plant genetics were published from this period. In 1956, he moved to the University of Wisconsin (Madison) to continue work toward a doctorate with James Crow. The original problem was a study of the fitness of chromosomes extracted from a wild population of *Drosophila melanogaster*. Within a few months, he had discovered a remarkable phenomenon, a gene that is not transmitted in Mendelian proportions. Fortunately, Larry Sandler came to Wisconsin the next year as a postdoctoral fellow, and the two of them became a remarkably productive team. Since the 1900 rediscovery of Mendel's work, it has been common knowledge that, in eukaryotes (including humans and fruit flies), genes on a pair of homologous chromosomes are distributed equally and randomly into germ cells. If the germ cells from two parents combine at random, the familiar Mendelian ratios are observed in the absence of differential survival of the various gene combinations. The process of separation of homologous genes during germ cell formation is called *segregation*. Hiraizumi and Sandler demonstrated that the aberrant transmission, which they called *segregation distortion*, or *meiotic drive*, occurs in the formation of germ cells. This heretical finding was reported in detail in a series of nine papers in major journals in 1959-1961 and became a major research topic in other laboratories in the years following. Variant segregation also became a major theme of Hiraizumi's later research, whether due to meiotic drive or to other mechanisms.

In 1960, Hiraizumi's Wisconsin research qualified him for the degree of doctor of science from Osaka University (Japan), a degree based on research accomplishments. That year he joined the staff of the National Institute of Genetics in Mishima, Japan, one of the outstanding centers for genetic research in the world. There he worked on *Drosophila*, on *Trillium* (which he had studied earlier), and on segregation of various genes in humans, particularly the ABO blood groups. In 1965, he was a visiting associate professor at the University of Hawaii in Honolulu, becoming a permanent faculty member in 1966. In 1967 while visiting Wisconsin he showed (with Hartl and Crow) that segregation distortion was due to nonfunctional sperm. In 1969 he moved to the Department of Zoology at The University of Texas at Austin, where he remained for the remainder of his professional life. This included promotion to professor in 1971. In 1987 he was named the T. S. Painter Centennial Professor of Genetics, and, at the time of his retirement in 1996, he was awarded the title of T. S. Painter Professor Emeritus.

A full description of Hiraizumi's research would be difficult to write and more so to read. He tackled experimentally demanding problems that required skilled analysis and meticulous attention to observational details. This combination of talents led to another unanticipated and significant discovery: recombination in *Drosophila* males. Although crossing over in males is the normal pattern for most species, it does not occur in *Drosophila*. Hiraizumi demonstrated, however, that it does occur as a rare event. Furthermore, he found a wild strain in south Texas in which it occurs with high frequency. With his customary sense of humor, he named the strain T-007, this at a time of great popularity of James Bond. The discovery that, under certain conditions, recombination can occur in *Drosophila* males was the beginning of studies relating this observation to the so-called P-M hybrid dysgenesis system involving the transposable element *P*. An account of some of Hiraizumi's many contributions was published on the fortieth anniversary of the discovery of segregation distortion (B. Ganetsky, "Yuichiro Hiraizumi and Forty Years of Segregation Distortion," *Genetics*, v. 152, pp. 1-4, 1999.)

A measure of the great respect in which Hiraizumi was regarded is his history of external grant support. When he came to UT Austin, he applied for and received a grant from the National Institutes of Health to support his studies of genetic segregation. Such applications are reviewed rigorously by peers from other institutions. His initial grant for three years was renewed, eventually becoming five-year grants, which continued under the same title until his retirement.

Hiraizumi was an outstanding teacher as well as a research investigator. Although his accent may have been an initial challenge to native Texans with modest exposure to Japanese, his undergraduate students soon realized his strong commitment to help them learn the sometimes confusing topic of genetics. He was always available to help them understand whatever problem presented a challenge. His effectiveness as a teacher for undergraduate students was recognized in 1986 with a College of Natural Sciences Teaching Excellence Award. He was also an excellent mentor for graduate students, having supervised seven Ph.D. and five M.A. degrees during his career.

Hiraizumi was a good colleague and citizen. He did his share of departmental and committee work, always with the thoroughness that characterized his other activities. In several instances, he became an unofficial mentor for graduate students who needed assistance with their research. He was generous in providing stocks, materials, and other support for undergraduate laboratories for which he had no formal responsibility.

Yuichiro and his wife, Mitsuko, had a son, Kazuo, and a daughter, Midori. Yuichiro's favorite form of relaxation was fishing in the Gulf of Mexico with his family. He added to that the performance of magic tricks for his children and later for his grandchildren, an activity in which he apparently was rather adept. Mitsuko was a talented artist who enjoyed introducing westerners to the cultural traditions of Japan. She preceded Yuichiro in death in 1993.

This memorial resolution was prepared by a special committee consisting of Professors H. Eldon Sutton (chair), James J. Bull, Hugh S. Forrest, and James F. Crow.

Publications of Yuichiro Hiraizumi

- 1955 Cucurbita – cross. VI. Relationship between pollen ages and the optimum conditions (saccharose concentrations and pH values) of the artificial media. *Jap. Jour. Breeding* 5:51-59. (with H. Hayase)
- 1956 Evolution and variation in Trillium. 1. Random genetic drift in natural populations of *Trillium kampschaticum* PALL. *Jap. Jour. Genetics* 31:33-48.
- Cucurbita – cross. X. The osmotic pressure of different parts of pistil during the period from the morning of the day before anthesis to the afternoon of flowering day. *Jap. Jour. Breeding* 6:15-18. (with H. Hayase)
- 1958 Studies on competition in plants and animals: in *Drosophila melanogaster*. *Evolution* 12:93-101. (with K. Sakai, T. Narise, and S. Iyama)
- 1959 Meiotic drive in natural populations of *Drosophila melanogaster*. II. Genetic variation at the Segregation-Distorter locus. *Proc. Nat'l Acad. Sci. U. S. A.* 45:1412-1422. (with L. Sandler)
- Meiotic drive in natural populations of *Drosophila melanogaster*. I. The cytogenetic basis of Segregation-Distortion. *Genetics* 44:233-250. (with L. Sandler and I. Sandler)
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- Meiotic drive in natural populations of *Drosophila melanogaster*. VIII. A heritable aging effect on the phenomenon of segregation-distortion. *Canad. J. Genet. Cytol.* 3:34-46. (with L. Sandler)
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- 1962 Distorted segregation and genetic load. *Jap. Jour. Genetics* 37:147-154
- Effect of radiation-induced mutations on fitness of *Drosophila melanogaster*. *Ann. Rep. National Inst. Genet.* 13.
- Prezygotic selection in ABO blood groups. *Science* 135:432-434. (with E. Matsunaga).
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- 1963 Distorted segregation ratio in female fertility of *Drosophila melanogaster* (preliminary report). *Jap. Jour. Genetics* 38:182. (with K. Nakazima).
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- 1975 Elements causing male crossing over in *Drosophila melanogaster*. *Genetics* 81:313-324. (with B. Slatko)
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- 1978 An analysis of male-recombination elements in a natural population of *Drosophila melanogaster* in south Texas. *Genetics* 88:81-91. (with K. A. Matthews)
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- 1985 Genetics of factors affecting the life history of *Drosophila melanogaster*. I. Female productivity. *Genetics* 110:453-464.
- 1989 A possible case of negative segregation distortion in the *SD* system of *Drosophila melanogaster*. *Genetics* 121:263-271.
- 1990 Negative segregation distortion in the *SD* system of *Drosophila melanogaster*: A challenge to the concept of differential sensitivity of *Rsp* alleles. *Genetics* 125:515-525.
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