



Ercole Ottaviano (1937-1991)

Ercole Ottaviano

by Mirella Sari-Gorla - *Maydica* 39 (1994): 79-82

This issue is dedicated to Ercole Ottaviano, Professor of Genetics at the University of Milan, who died suddenly on 7 June 1991. He was born at Vasto (Italy) in 1937 and began his studies in Agricultural Sciences at the Bologna University. His subsequent life and career were decisively influenced, at the end of the 1950s, by the start of an important project, supported by Felice Ippolito, Secretary of CNEN (National Committee for Nuclear Energy, currently named ENEA), which provided funds to the Italian Institutes of Genetics for the study of the effects of ionizing radiations. This led to the arrival at the Institute of Genetics of Milan University, directed by Professor Claudio Barigozzi, of Angelo Bianchi, at that time the leading maize geneticist in Italy, coming from Pavia University. In the context of this research project, some fellowships for undergraduate students were created, one of which was awarded to Ercole Ottaviano, who came to Milan to carry out his thesis work on the genetic effects of X-ray in maize under the guidance of Bianchi, and graduated in Agronomy in 1960.

In 1964, during a period of post-graduate study under Kenneth Mather at the University of Birmingham, his interest extended to the field of biometrics and quantitative genetics and, on his return to Milan, he was appointed professor of Statistics in the Faculty of Science, a teaching activity that, after 1975, when he became Full Professor of Genetics, was continued by members of his group: Mirella Sari Gorla and, later, Alessandro Camussi. This was the starting-point for the development of a succession of researches of methodological character in the field of quantitative genetics for crop improvement: analysis of genotype-environment interaction, hybrid performance prediction, use of multivariate methods for the genetic analysis of complex traits, estimation of genetic distances. His expertise as a quantitative plant geneticist has been decisive in the planning and realization of the first project specifically devoted to maize improvement in Italy, sponsored by the Ministero dell'Agricoltura e delle Foreste in the person of Giovanni Marcora, Minister of

Agriculture at the end of the seventies, and coordinated by Francesco Salamini, Director of the Experimental Institute of Cereal Crops at Bergamo.

A fruitful scientific collaboration in the field of quantitative genetics developed between Prof. Ottaviano's group and a group of Polish biometrics: in 1972 Tadeusz Calinski, Professor of Mathematical and Statistical Methods at the Academy of Agriculture of Poznan, was invited by Ettore Marubini, Director of the Institute of Biometry and Medical Statistics of Milan University, to give a course on multivariate analysis. During this first meeting Cahnski and Ottaviano established the basis of their collaboration, with the co-operation also of Zygmunt Kaczmarek, of the Institute of Plant Genetics of Polish Academy of Sciences. This collaboration is still in course in the framework of a cooperative program of the CNR and the Polish Academy of Science, and has led to the production of numerous important joint papers, as the one published in *Genetics* (1985).

Experiences in the field of biometrical genetics were influential in determining the character of Prof. Ottaviano's research group: in those years the use of the statistical methodology for the study of biological problems was uncommon in Italy, in spite of the pioneering work in this field made by Cavalli-Sforza, and, above all, extraneous to the mentality of most of the biologists. The credit for being the first to convey the importance of a rigorous treatment of experimental data and a correct planning of experiments is undoubtedly due to Giulio Maccacaro, who dedicated his attention to the medical fields, while Ottaviano, not without a great personal commitment, achieved a perhaps even greater success in getting these principles accepted and applied in the area of biological and agronomical sciences. His group thus came to play an important didactic role in this regard, with the organization of courses for researchers on behalf of the Biometrical Society (Italian Region), of which Ottaviano was a member of the committee and president for the Italian Region, and other scientific societies.

The 1960s saw the institution of the School of Applied Genetics at Milan University, in which Ottaviano played a major part; many Italian researchers now active in plant genetics and breeding in Italy came from that School, as well as young researchers from abroad, Latin America and Albania in particular, who came to the Milan School to complete their training in this field.

In the 1970s Ottaviano began to be interested in the genetics of pollen: expression and molecular analysis of pollen-specific genes, detection of genes expressed in both pollen and plant by isozyme analysis, methods of gametophytic selection and their application for genetic improvement of crops. Since until a few years earlier the pollen of higher plants had been considered genetically silent, these studies led to major changes in this field, suggesting new formulations for population genetic models of higher plants and offering unexpected possibilities for the use of pollen as a particularly powerful tool for genetic manipulation. In this research area Ottaviano produced many important papers, confirmed by the quality of the journals in which they were published, such as *Science* (1980) and *Advances in Genetics* (1989). The two works cited above were the result of a scientific collaboration with David Mulcahy, of the University of Massachusetts (USA), which began in 1975, when Mulcahy came to the Institute of Genetics of Milan for his Sabbatical year, and soon developed into a lasting friendship. Together with Mulcahy, Ottaviano established the practice of organizing periodical international meetings dedicated to these research topics, which were attended by increasing numbers of researchers.

Since the first International Symposium organized in 1975 and dedicated to "Gamete competition in Plants and Animals", this plant research area and the number of scientists involved has greatly expanded, as is testified by the frequency of the international meetings on this subject, by the intensive courses organized on the various topics, such as the EEC courses organized in the context of the EEC BRIDGE program by Mauro Cresti at Siena University, and by the publication of international journals specifically dedicated to this field, such as *Sexual Plant Reproduction*, founded by Linskens in 1989. Its editor-in-chief is currently Joseph Mascarenhas,

perhaps the most competent of pollen molecular biologist, to whom Ottaviano sent young researchers of his group to complete their preparation in this field.

More recently, another area of research that received Ottaviano's attention concerned the adaptability of plants to environmental stresses and the use of molecular markers for the analysis of the structure of the genome and for the localization of useful genes. Indeed, crop improvement for yield stability under stress conditions, particularly with regard to the possibility of colonizing marginal lands, has become in recent years a priority breeding target. In addition to the researches on tolerance to high temperature, chemicals and pathogens in maize, the starting point for the studies on sorghum species was the establishment of a collaborative program, still operating, with ICRISAT (International Crop Research Institute for Semi-Arid Tropics) at Patancheru, India, which Ottaviano visited many times.

To these purposes, a powerful tool for the identification and the chromosome localization of single genes, but in particular QTLs (quantitative trait loci), emerged in the eighties; with the idea of utilizing this methodology, based on molecular markers, and of promoting its diffusion among Italian plant geneticists, Ottaviano invited Ben Burr, who had published a fundamental paper on this subject in *Genetics* (1988), to the XXXII annual Meeting of the Italian Society of Agricultural Genetics (SIGA), of which he was President at that time, to give the opening lecture on gene mapping with recombinant inbreds in maize. After this, Ben Burr generously gave Ottaviano a particularly useful material: a population of recombinant inbred lines, constructed and typed for about 200 molecular markers (RFLP) by the Burr's group. Unfortunately, he had time to carry out only one work on this material, published in *Theoretical and Applied Genetics* in 1991, but in the following years many good papers based on this material have been published by the members of his group.

The last topic with which Ottaviano concerned himself only a short time before his death was the study of the genetic structure of, and environmental stress effects on forest tree populations, by means of molecular markers. The first phases of the work consisted in solving the technical problems of RFLP typing in this material, and setting up a new class of molecular markers, RAPD, proposed by the Scott Tingey group of Dupont in 1990, with whom later collaboration was developed. Unfortunately, Ottaviano did not live to see the paper on the first linkage map of molecular markers of spruce (*Picea abies*), to be published in *Theoretical and Applied Genetics*.

Ottaviano's scientific activity gave rise to over 100 papers, some of which have become classics in their particular sector, and to a number of books. He was also a member of the Italian Genetic Association (AGI) and of EUCARPIA, where he was councilor of the "Statistics and Plant Breeding" section.

Last but not least, mention should be made of his passionate dedication to teaching: in all his intense didactic activity (Statistics, General Genetics, Plant Genetics, Breeding Methods) his aim was always to make a proper cultural contribution, providing a wide and up-to-date view of the subject in all its aspects. And he was with his students, in the lecture hall, when he died, during the final lesson of his course of Genetics, leaving a void in the lives of all who knew him.

References

BINELLI G., G. BUCCI, 1994 A genetic linkage map of *Picea abies* Karst. based on RAPD markers as a tool in population genetics. *Theor. Appl. Genet.* (In press). CAMUSSI A., E. OTTAVIANO, T. CALINSKI, Z. KACZMAREK Z., 1985 Genet is distances based on quantitative traits. *Genetics* 111: 945-962. OTTAVIANO E., D.L. MULCAHY, 1989 Genetics of angiosperm pollen. *Adv. Genet.* 26: 1-64. OTTAVIANO E., M. SARI-GORLA, D.L. MULCAHY, 1980 Pollen tube growth rate in *Zea mays* Implications for genetic improvement of crops. *Science* 210: 437-438. OTTAVIANO E., M. SARI-GORLA, M.E. PE, C. FROVA, 1991 Molecular markers (RFLPs and HSPs) for genetic dissection of thermotolerance in maize. *Theor. Appl. Genet.* 81: 713-719.