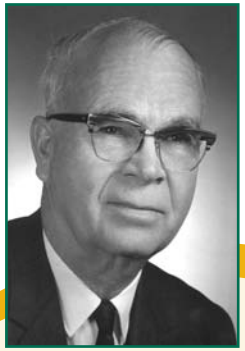
H. H. Flor, Scientist Exemplar, 1900–1991

I got to know Harold Flor when I was a graduate student at the University of Minnesota in the 1950s. Although he worked in Fargo, North Dakota, he traveled to St. Paul about every three months, mainly to talk to people. He usually sought out E. C. Stakman and W. Q. Loegering to explain what he had done, present the results of his research, and ask for opinions about his interpretations. He was commonly asked to give a presentation in the department seminar. He was willing to talk to me, a graduate student interested in plant pathology and genetics. My conversations with him were very interesting because he was someone who was willing to talk about data and ideas, even though some were inconsistent with standard dogma of host-pathogen interactions. He had done research under three different professors, and with his own research, he had developed a philosophy of research that was his own. His results indicated that the interactions between hosts and pathogens were dependent on the genes in both the host and the pathogen. Two lengthy articles by Flor, one on inheritance of resistance/susceptibility in flax and one on the inheritance of avirulence/virulence in the pathogen *Melampsora lini*, were published in 1946 and 1947. The views expressed in these publications differed from the accepted dogma.



Few authors cited his work. I know of only one publication, in 1950, in which Flor's work was cited, and the author, Brown, suggested that Flor's concepts may hold for the potato late blight disease.

Flor was very

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disappointed that so few persons had read his publications and cited his concepts of host-pathogen interactions. It had been suggested to him that he publish a simplified version of his results, and he did so in 1955 in *Phytopathology* and in 1958 in *Genetics*. A popularization published in 1955 was entitled "It's gene against gene when rust attacks flax…" Flor unfortunately adopted the "gene-for-gene" terminology, even though he knew the expression should not be interpreted literally, as most people did.

Flor converted his results to practical use to control the flax rust disease in North Dakota. Many flax breeders in neighboring states had difficulties in dealing with the concept of having to consider the genetics of two organisms together, and several breeders and pathologists questioned the validity of his results. And their breeding efforts were not as successful as Flor's.

Flor was a very interesting person with whom to have a discussion about biological research. He read widely about research with plants, microbes, and humans, with the approaches of biochemistry, plant breeding, developmental biology, genetics, and molecular biology. He was very critical in observations about what might be alternative interpretations of the data and how one might distinguish between the hypotheses. He was a most enjoyable person with whom to have a conversation about biology and science in general.

Flor received many honors for his contributions to biology. His contributions have become more and more important as research on host-parasite interactions has progressed. To state that a researcher's contributions have increased in importance with time is probably the highest compliment a scientist can receive.

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