

ASPB Member Wurtzel Contributes to Research with Global Health Significance

Professor Eleanore T. Wurtzel of Lehman College in New York is part of a team of researchers working in seven laboratories in the United States and Mexico that has developed tools for breeding new lines of maize rich in provitamin A, which could dramatically improve the health of millions of people around the world. Their research was published on January 18, 2008, in the journal *Science* under the title “Natural Genetic Variation in Lycopene Epsilon Cyclase Can Enhance Provitamin A Biofortification of Maize.”



Eleanore Wurtzel

Each year, vitamin A deficiency is the cause of eye disease in approximately 40 million children and places hundreds of millions at risk for other health disorders. Maize is the most common crop grown in much of sub-Saharan Africa and the Americas, where substantial numbers of children have vitamin A deficiency. Plant breeders currently use visual markers to select and produce the most nutritious crops possible. As a result of this research, breeders now will be able to develop breeding programs using DNA-based indicators. These indicators will track plants that carry a genotype needed to produce the highest levels of provitamin A.

The research, Wurtzel noted, capitalizes on new knowledge about how plant genes influence nutritional traits. “This discovery,” she said, “came about through molecular analysis of maize from around the world. Breeders will be able to develop new

lines of maize by using the DNA diversity that already exists in these collections.”

Wurtzel’s work in the project focused on identifying critical enzymes in the biosynthetic pathway that help to accumulate carotenoids. Carotenoids are nutritionally important compounds that are manufactured in plants and

needed by humans for development and as a source of vitamin A. Wurtzel’s laboratory investigates gene regulation in crop plants to understand how carotenoid content and composition are controlled.

“It was through this multi-institutional collaboration,” Wurtzel added, “that such basic research could be translated to develop useful tools for plant breeders.”

In addition to Wurtzel, who is also on the faculty of the City University of New York (CUNY) Graduate Center, contributors include researchers from Cornell University, the University of Illinois, the Boyce Thompson Institute, the University of North Carolina, USDA, the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, and DuPont Crop Genetics Research. Wurtzel’s lab, the only one based in New York City, is located at Lehman College, which houses the CUNY doctoral program in plant sciences. ASPB members Tom Brutnell and Ed Buckler have been collaborating with Wurtzel on this research.

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Montréal, Canada
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Canadian Society of Plant
Physiologists/Société
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President's Letter

A Model Citizen

In my high school years in the late 1960s, I do not think I ever aspired to be a “model citizen” of the society I saw around me. As a matter of fact, I think being a model citizen would have been anathema to me, rather akin to the “goody two-shoes” term of derision of my younger years. It was the time of the antihero, whether Donald Sutherland and Elliot Gould in *MASH*, Faye Dunaway and Warren Beatty in *Bonnie and Clyde*, Peter Fonda and Dennis Hopper in *Easy Rider*, Paul Newman and Robert Redford in *Butch Cassidy and the Sundance Kid*, or Jack Nicholson in *Five Easy Pieces*. I played in a rock 'n' roll band—what can a poor boy do? (1).

The '60s were complex, however, and there was much more in the air than simple rebellion. The '60s counterculture attempted to articulate many things, including a respect for the planet that many of us felt was lacking. I remember robins staggering and dying on my lawn from ingesting the incredible neurotoxic pesticides being applied around my suburban home, named Applewood for its orchards. DDT was killing loons, ospreys, and eagles. The bioaccumulation of DDT inspired a stunning poster of a woman's breast, with a caption indicating that milk from such containers may be unfit for human consumption.

I made a trip to Sudbury, Ontario, and saw the stunted vegetation from the downwind plume of sulfur dioxide released from the huge smokestack (the Inco nickel mine is considered to be the single largest point source of acid rain, causing emissions on the



Rob McClung

entire continent). All these events evoked a visceral, emotional response—“they” (the older generation) were killing the planet—that resonated perfectly with the normal rebellion of adolescence.

In my college years, I was much influenced by *Limits to Growth* (2), which mathematically modeled the consequences of a rapidly growing world population given finite resources. That analysis was controversial and has been

criticized for the limitations of the data sets considered, but the premise was influential, and the basic message, to me, remains fundamentally sound. Exponential growth (in population, resource utilization, and waste generation) will eventually become incompatible with a world that offers finite resources.

In college, the villain remained “they”—the older generation in power. The concepts of sustainability and stewardship seemed obvious yet were apparently absent from government policy and foreign to anyone over 30. Unfortunately (well, fortunately, actually), one of life's inevitable progressions is that one becomes one of “them” almost before one notices. Here I am, 40 or so years on. I heat my home in winter (granted, I do use a wood stove quite a bit), and I drive a car (but a Mini Cooper with 37 mpg, not an SUV), and I recently flew to Mérida, Mexico, for Plant Biology 2008. Certainly, I have become a citizen of the society of which I was (and remain) quite critical.

One of my life's unexpected ironies and privileges has been that at Dartmouth, I had the opportunity to

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