Environmental Education: Accessible to All

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As articulated in the U.S. National Science Education Standards, there is a great need for teachers to understand the nature of science and to learn how to engage their students in authentic science activities both in and out of the classroom. The Wisconsin Fast Plants and Bottle Biology programs, www.fastplants.org, are both derivatives of my research and teaching at the University of Wisconsin which have come to be valued and widely adopted in science and environmental educational curricula across the United States.

Fast Plants, *Brassica rapa,* are small rapidly growing plants that I have bred to have a 40-day seed-to-seed cycle and are closely related to many Japanese and Asian brassica vegetable and oil seeds. Fast Plants can be easily grown in classrooms using accessible lowcost materials. Fast Plants are ideal: 1) for exploring all aspects of plant life cycles growth, development and reproduction; 2) for investigating how plants respond to the environment; and 3) for understanding the relationships among variation, adaptation, reproduction and inheritance. They are also widely used in research on genomics, plant physiology, ecology and evolutionary biology. A recent addition to Fast Plants is instructional materials for investigating many aspects of the life history of the cabbage white butterfly, *Pieris rapae,* a natural pest of brassicas.

Bottle Biology is an educational technology in which recycled packaging containers such as plastic bottles, food containers, film canisters, etc., are constructed as equipment for environmental and biological explorations in the field, at home or in the classroom. Bottle Biology fosters self-reliance and student ownership.

Accessible, low-cost Fast Plants and Bottle Biology materials centering on investigations of organisms and their environments provide a strong basis for a growing understanding of the natural world by teachers, students and their families.

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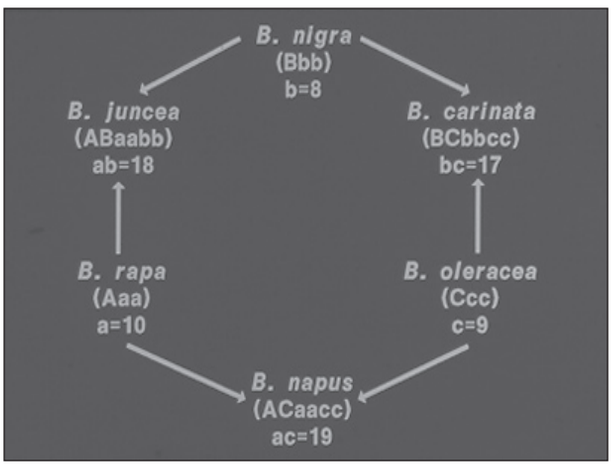

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SPECIES BASE POPULATIONS

CGC#	Species	Days to flower	Days for cycle	Cycles per yr.
1.	*B. rapa*	16	36	10
2.	*B. nigra*	18	38	9
3.	*B. oleracea*	29	59	6
4.	*B. juncea*	20	40	9
5.	*B. carinata*	28	58	6
6.	*B. napus*	26	56	6
7.	*R. sativus*	19	49	7

CGC = Crucifer Genetics Cooperative

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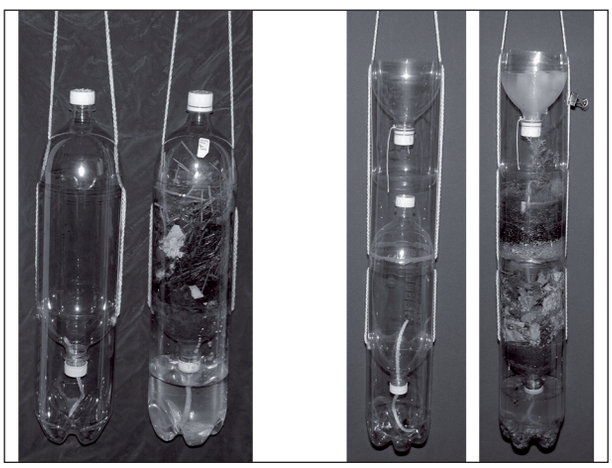

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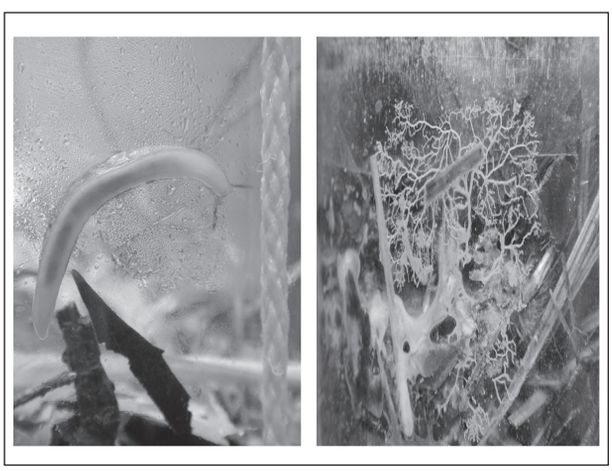

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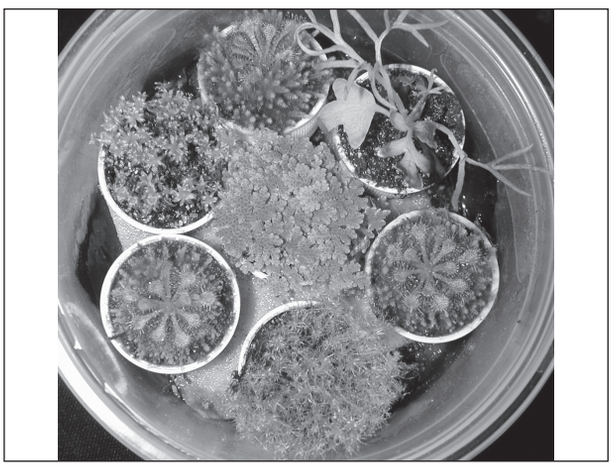

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