

My View

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Organic farmers seek to employ biological and cultural control programs for disease and pest management that are based on biological diversity, taking great care to provide supplemental habitats for natural enemies of potential pests. Organic farming has emerged into prominence during the last decades: it has a more than 20% annual growth rate and a significant market effect, and it also has preserved and refined prechemical management methods and techniques and has demonstrated many new methods that have been adopted by conventional agriculture. IPM may be seen as being rooted in organic farming before it had any approval from conventional agriculture. When I first began to advocate organic and sustainable agricultural alternatives over 25 years ago, I experienced scorn for advocating some practices which today are standard recommendations.

It is important to understand that organic certification certifies a farming method—not product quality. Although consumers, in selecting organic products, may be largely motivated to avoid pesticide residues, they are buying a whole farming system.

Rapid growth of organic agriculture is propelled by new customers who bring diverse tastes and preferences, and it is attracting new business interests, investment competition, and many new producers. Farmers accustomed to the industrial approach to agriculture have a steep learning curve as they change over to organic farming, which operates on an ecological model. The organic approach strives for diversity, balance, and ecological complexity and is modeled after natural ecosystems. It is a challenge for people who have been schooled in industrial agriculture, which pursues ecological simplification, specialization, concentration, and standardization. Farmers new to organic methods go through a cognitive transition in stages, starting with piece-by-piece substitution of inputs and eventually synthesizing their personal version of agroecology. There is also a significant increase in new farmers in the organic business—people who are relatively new to farming and who would not farm any other way. Both groups are benefiting from the opportunity the organic market provides, and both are learning; they need research and reliable information support.

The organic movement can be seen as a marketplace revolution. The free market is where demand shapes the way food is produced, the way stewardship is exercised, and the way public policy adjusts to changing times and values.

The Organic Farming Research Foundation was founded 10 yr ago by organic farmers to raise funds and give research grants for projects designed to help organic farmers. To date, we have invested over \$600,000 in research through our competitive grants program, with \$150,000 budgeted for this year. We specialize in projects that are instigated by organic farmers or involve them directly to deal with problems of

organic farming. We support collaborations of farmers and researchers with grants up to \$10,000. I invite you to consider applying your scientific skills to help organic farmers, and I offer our modest resources. Guidelines for grant applications are available at <http://www.ofrf.org>.

It is a common but gross oversimplification to characterize organic weed control as cultivation and hoeing at best and negligence at worst. Effective organic weed management involves many interacting techniques. Crop rotations and cover crops play an important role, as do subtleties of timing, tillage, crop variety selection, employment of stale seed beds, flaming, tine weeding and harrowing, row cultivation, weeder geese, etc. These areas and their interactions provide fertile ground for research. Increasingly, organic producers are employing green manure cropping that smothers competing weeds and provides an opportunity to control weed seeds by tillage when they are immature. It offers more powerful and general benefits in inhibiting future weeds. I expect there is weed seed bank attrition during the biologically intense process of green manure decomposition. Opportunities to study nonchemical weed control may provide some extremely interesting ecological subject matter. Farmers know that under some circumstances, land after a green manure crop or a rotation of pasture or hay may be nearly devoid of weeds and they construct their cultural control system around such phenomena. Organic farmers may have a tolerant respect for weeds in some cases, seeking better understanding of their soil condition by reading weeds as biological indicators and recognizing them as important components of the ecosystem. Weeds shunt solar energy into the soil by contributing energy-rich exudates and organic matter, and this suggests the wisdom of growing green manure crops to fulfill the weeds' ecological function. Many growers practice relay planting of cover crops among row crops at lay-by to begin the next installment of cover and green manure. The phenomenon of the new land effect, whereby sound rotations and cropping practices continuously regenerate the highest level of soil health and provide relative freedom from weeds and soil-borne pathogens, is the constant goal of the organic farmer.

Organic farming's continued growth is attracting many new farmers to organic production. These new farmers need research, technology transfer, and educational support. Organic farmers list weed control as their number one research need. The quest for effective, profitable nonchemical weed control offers abundant opportunities for collaboration with soil biologists, plant breeders, entomologists, plant pathologists, etc. Complex ecological systems call for complex, integrated approaches. There are opportunities for weed scientists to devote more attention to nonchemical research with organic farmers, and it is likely there will be some financial support for such work.