

Respecting the Underground Ecosystem and Gut Microbiome

In his talk at Beyond Pesticides' 35th National Pesticide Forum in April, David Montgomery, PhD captures the essence of the conversations that are critically needed in all our communities and action that must be taken for a sustainable future. In many ways, the talk, published in this issue, is a personal story of revelation, rethinking of scholastic thinking, understanding relationships in nature, and an appreciation of the power and fragility of the natural world. (View the presentation at *Healthy Hives, Healthy Lives, Healthy Land: Ecological and Organic Strategies for Regeneration* on Beyond Pesticides' YouTube channel.)

Underground ecosystem

Dr. Montgomery, a professor of geology at University of Washington, MacArthur Fellow, and author of three books on soil health, human health, and taking action, explains the steps that his co-author, biologist, and wife, Anne Biklé, took to convert their garden soil, which contained a mere one percent organic matter, to a healthy ecosystem. He said, "We were cycling organic matter into this underground ecosystem in ways that led us to learn things that frankly quite surprised us and started us on this view of a completely different relationship of the natural world to human societies."

He clearly explains the contribution that soil microbes bring to soil and plant health and the effect that the management of the land has on our bodies and particularly our gut biome. In this issue, we also hear from Don Huber, PhD, professor emeritus of plant pathology at Purdue University, who gives us a complete picture of the adverse impact that pesticides have on the ecosystem and our health. (See Dr. Huber's talk on our YouTube channel.)

We hold our national conference every year to keep ourselves updated on the underlying science that must drive change, to share strategies from around the country on transitioning to organic practices that respond to our increasing scientific understanding, and to bring back to the policy debate in our communities appropriate land and building management practices that protect and nurture life. Bring Drs. Montgomery's and Huber's words to your campaign to align community practices with sustained health. As Dr. Montgomery says, "[W]e need to think about our microbial crew, or the microbiomes of plants and people, in terms of protecting, restoring, and cultivating the beneficial microorganisms that are key elements of those communities."

Respecting complexity

Rachel Carson warned us in her book *Silent Spring* in 1962 that when we use pesticides we are adversely affecting complex biological communities. And people understood the

value of the microbial community (sometimes referred to as ecosystem services) when Sir Albert Howard constructed the definition of organic in *The Soil and Health: The Study of Organic Agriculture* (1940), and *An Agricultural Testament* (1947).

After building the case for nurturing the underground ecosystem, Dr. Montgomery concludes, "[I]f we use a broad spectrum biocide [pesticide], we are taking out all the beneficial organisms. . . ."

Holistic solutions

There is a tendency to try to simplify problems and then look for simple solutions. In truth the problems of environmental degradation and health threats induced by toxic chemical exposure require holistic solutions with changes in systems that establish our much-ignored relationship with nature.

Indiscriminate effects to microbiota

We must remember that when the U.S. Environmental Protection Agency (EPA) registered the neonicotinoid insecticides, which are clearly tied to elevated rates of decline in bee and pollinator populations, it did not have a field study to evaluate the chemicals' overall impact on ecosystem health, let alone impacts on individual species. Whether we are talking about the soil or aquatic food web, the agency did not do the analysis. But, it really is not difficult to see that systemic pesticides that enter the vascular system of a plant and express themselves through pollen, nectar, and guttation droplets are going to have a wide range of non-target effects.

Same is true for plants that are genetically engineered to contain a pesticide gene. What is the overall impact on the soil microbiota when growing a plant in the ground that exudes pesticides indiscriminately? And, with an eye to economic impact, indiscriminate pesticide use is causing insect and weed resistance, which adversely affects productivity and keeps those on the pesticide treadmill looking for the next best chemistry to throw at the ecosystem.

We celebrate the victories in communities across the country that have adopted and are working to adopt organic land management, with practices that build soil health. It is critical that we enrich our understanding and effectiveness to meet the challenges ahead in our communities and states. This issue and Beyond Pesticides' program is intended to do just that. Let us know how we can support your efforts.



Jay Feldman, executive director of Beyond Pesticides