



Green Lands
Blue Waters

Voices From Our Network

The Civic Scientists

The next generation of continuous living cover (CLC) researchers reflect on the current moment in history and reimagine the future.

Huong Nguyen

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I am a Ph.D. Candidate in Sustainable Agriculture at Iowa State University, originally from Vietnam. My research topic is integrated weed management. In Vietnam, weeds (or wild plants) are widely used as additional animal feedstock, homeopathic remedies for common illnesses, and in traditional beauty products. Seeing how weeds are conventionally managed in the United States was shocking when I first came to graduate school. My research focuses on the effects of cropping system diversification on common waterhemp control in an integrated pest management context. Common waterhemp is a noxious weed species found throughout Midwestern croplands that thrives, competes with crops, produces many seeds, and maintains a

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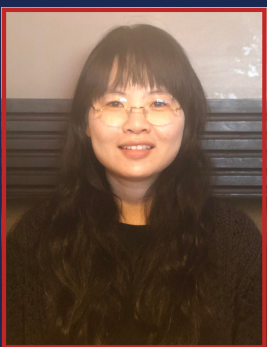
persistent soil seedbank that insures recurring infestations. My primary goal is to identify sustainable sets of practices to deplete

waterhemp's soil seedbank while not compromising crop yields and environment quality. One cropping system in our experiment is a four-year rotation that is in the following sequence: corn-soybean-oat interseeded with alfalfa – alfalfa. The alfalfa that is interseeded with oat in the third year is maintained over winter to the fourth year of the rotation. The weed management and cropping system diversification strategies are ecologically driven, considering natural resource availability and potential markets for the added crops. Oat and alfalfa exude allelopathic chemicals against weed seedlings. Interseeding alfalfa with oat in the third year of the rotation reduces the soil disturbance frequency, and the alfalfa hosts beneficial insects over winter. My preliminary model suggested that the waterhemp seedbank density is declining the fastest in one of the diversified cropping systems while using 60% less herbicide than in the conventional system. Crop yields in the more diverse rotations were higher than those in the baseline system. The 4-year system's sustainability is improved as the total amount of herbicide's active ingredient is reduced by 96%, significantly reducing freshwater toxicity load and greenhouse gas emissions. Higher

weed seedbank diversity and richness in the 4-year rotation are coincident with improved cropping system sustainability. In my relevant experience, COVID-19 has shown the importance of locally available resources, and how logistically challenging, and sometimes hazardous, transportation can be. My research has, fortunately, been almost unaffected thanks to the support system that I have. Our research group decided to have one person in a room or a car at a time, and we are continually watching out for each other. At this writing, I am in home quarantine after exposure to someone that has tested positive, and I thank my coworkers who are lending a hand to continue my field data collection. My personal life has been inconvenienced with less freedom as to where and how to unwind. I now appreciate the carefree time we had when normal activities were not prone to contagion. This time has been challenging, but it gives me hope as I see more home gardens started and how much close-knitted groups can do for one another and society. I think local food production will improve local food subsistence and build a stronger community

as the relationship between eaters and growers in food systems is increasingly encouraged. I would expect to see more understanding of the challenges that food production systems face and how rewarding it can be once eaters and growers are compassionate toward each other.

As a young scientist, my role is to develop solutions from locally available resources using system-thinking frameworks to lessen the current pressure on the local food production systems. I would like to integrate social science into my trained discipline of integrated weed management to thoroughly understand and stimulate the factors that drive the adoption of sustainable farming practices. In my dream world, I would like to see more diversity and perennality across all landscapes, such as prairies replacing lawns for ecological services, more fruit and nut trees along the streets to offer supplementary foods to anyone in need, and more home and community gardens for personalized diet preference accommodation and community building.



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Huong Nguyen is a Ph.D. candidate in Sustainable Agriculture at Iowa State University with Dr. Matt Liebman. Her doctoral research uses empirical experiments and periodic matrix models to study plant population dynamics for integrated weed management. She is also concerned about accelerating the adoption of sustainable agricultural practices via social and natural sciences integration. Outside of schoolwork and on-campus extra-curriculum activities, Nguyen is a volunteer integrated pest management specialist for a Red Dao community in Ta Phin, Lao Cai, Vietnam.