

Agricultural Research and Development Programs



Developing and Infusing Emergent Technologies in Agricultural System

- Developing robotic platforms to improve irrigation scheduling in raspberry production systems using onboard soil moisture and spectral sensors.

Sustaining Plant and Animal Systems

- Developing specialty starch hybrids through corn breeding programs that can be planted, managed, harvested, stored, and transported without the need for additional technologies available to existing corn producers
- Analyzing specialty crops for phytochemicals, especially antioxidants and metabolomics, and nutrient density associated with public health
- Improving the adaptability of sweet potato in Ohio agriculture
- Conducting hemp variety trials, breeding new hemp varieties, developing fiber-based products, building processing machinery to create new foods and modification of cannabinoids
- Quantifying biomolecule Interactions and potential Impacts on health from the use of hemp products

Securing Natural Resources and Environmental Systems

- Identifying novel brain genes responsible for variations in honeybee grooming behavior and glyphosate effects on grooming behavior
- Measuring the contribution of honeybee ventral nerve cord to mite resistance behavior
- Quantifying climate change impacts on socially disadvantaged farmers, landowners, and communities of color
- Targeted implementation of agricultural best management practices using advanced laboratory, geospatial, and artificial intelligence techniques for improved soil health and water quality in Great and Little Miami watersheds in Ohio
- Minimizing nutrient loading into the Great Miami River, Ohio, from Dayton's wastewater treatment plant by minimizing excess infiltration and inflows (I&I) using smart sensors strategically deployed across the network of sewer pipes

Enhancing Food Nutrition and Health Systems

- Quantifying the effects of plants and natural herbs (red sanders, cinnamon, fenugreek, and bitter melon) in controlling and managing Type II diabetes
- Identifying and quantification of antimicrobial, insecticidal, and anticancer activities of natural molecules from turmeric, garlic, ginkgo, yellow ironweed, and New England aster.
- Creating a new standard in complete segmental body composition analysis using
- Bioelectric Impedance Assessment (BIA) technology.
- Identifying linkages between myocardial NO bioavailability and H₂S bioavailability resulting in cardioprotection in ischemia induced heart failure
- Identifying common Salmonella species, Escherichia coli, and Listeria species presence and persistence on produce microenvironment in aquaponic and retail systems and the development of rapid microbiological detection methods in food systems.

Funding Agency: NIFA

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