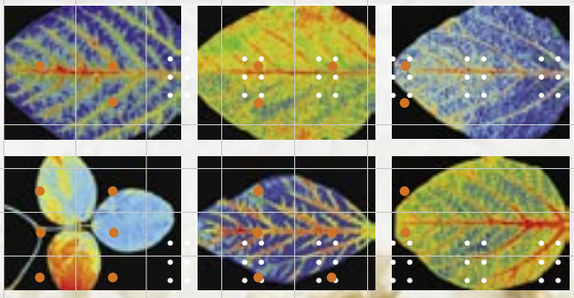

GENOMIC ECOLOGY OF GLOBAL CHANGE

PROBLEM

How will ecosystems — complex ecological communities and their environments — respond to rapid changes in climate? Human activities are altering the composition of the atmosphere (increasing carbon dioxide and ozone), affecting the Earth's climate system (elevated temperature and water deficits), and introducing invasive species. Naturally, such changes alter the capacity of native and agro-ecosystems to provide critical goods and services, including food, fiber, fuel, clean air, and water.

RESEARCH

The Genomic Ecology of Global Change Research Theme is composed of a team of molecular and ecological scientists examining:

- how changes in single genes or coordinated networks of genes affect ecosystem metabolism when challenged by major elements of global change, such as elevated levels of atmospheric carbon dioxide and ozone, increased intensity of drought, and biotic stress, including insect herbivory and susceptibility to pathogens
- how information obtained from genomes and proteomes may be used to predict the effect of environmental changes on the structure and function of ecosystems
- how this information fits into an overarching framework of mathematical modeling and informatics

The University of Illinois at Urbana-Champaign has established the only facility in the world for studying the simultaneous effects of drought and rising levels of carbon dioxide and ozone on plants under completely natural open-air conditions. With that program as a foundation, IGB researchers are in a unique position to examine the effects of global atmospheric change on the transcriptome and proteome of agro-ecosystems.

BENEFITS

Theme research will focus on agro-ecosystems with significant economic impact and could potentially lead to the development of biorational products for agricultural and forest pest management, and disease treatment. Further benefits may include improved quality of ecosystem health, as well as a better understanding of the environmental implications of various energy supply options.

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