ESA Annual Meetings, Spokane, Washington, August 8-12, 1999

Symposium 11, Tuesday, August 10, 1999, 8 AM to Noon:

Ecological Processes in Agricultural Landscapes

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This symposium will demonstrate the utility of ecological science as a guide to sustainable agroecosystem design and management. A diverse group of ecologists will present work on the relevance of the understanding of ecological processes in agricultural landscapes. These processes include biogeochemistry, population dynamics, and community interactions. Speakers will present research approaches that demonstrate: 1) How ecological processes support agroecosystem services, 2) If the sustainability of specific practices, inputs, and management decisions is a function of ecological processes, 3) Ways ecologists can become more involved in managing agricultural landscapes and their interface with natural ecosystems.

See http://www.agroecology.org/conferences/esa99.html *for more details.*

SPEAKER SCHEDULE

0800 GLIESSMAN, STEPHEN R. Ecological indicators of agroecosystem sustainability

0845 ELLIS, ERLE C. Biogeochemical processes in agroecosystem management

0930 NEHER, DEBORAH. Ecological indicators of soil health

1015. ROSEMEYER*, MARTHA, A. MACGUIDWIN, D. HOGG, D. YOUNG, T. MCGLYNN, C. REESE, J.LODA, and J. POSNER. Biodiversity in low and high input agroecosystems: A tropical and temperate comparison.

1100 ALTIERI, MIGUEL. Ecologically-based management of arthropod communities in agroecosystems

ABSTRACTS

GLIESSMAN, STEPHEN R. Center for Agroecology, University of California, Santa Cruz, CA 95064. **Ecological indicators of agroecosystem sustainability**.

Preserving the productivity of agricultural land over the long term requires sustainable food production. Sustainability is achieved through agricultural practices informed by in-depth knowledge of the ecological processes occurring in farm fields and the larger landscapes of which they are a part. From this foundation, we can move towards the social and economic changes that promote sustainability of all sectors of the food system. Sustainability has important ecological foundations. Examples are presented from research designed to measure ecological components of sustainability. The connection between specific ecosystem characteristics and sustainable agroecosystem function is explored.

ELLIS, ERLE C. Center for Agroecology, University of California, Santa Cruz, CA 95064. **Biogeochemical processes in agroecosystem management**.

Ecologically sustainable management of agroecosystems enhances their productivity without depleting nutrient resources or increasing nutrient loss to the environment. Under real-world management conditions, the biogeochemical processes that control yields, nutrient depletion, and environmental health are highly heterogeneous across agricultural landscapes. Field- and plot-scale data are therefore insufficient for assessing the ecological sustainability of agricultural practices at larger scales. We illustrate landscape-scale tools for integrating real-world management data to estimate large-scale biogeochemical impacts of agricultural practices using a case study of village-scale nitrogen management in China. These tools can be used by farmers, ecologists, and land use planners to identify sources of environmental problems and to indicate viable pathways toward their solution.

NEHER, DEBORAH A. University of Toledo, Toledo, OH 43606 **Ecological indicators of soil health**.

Nematode and microarthropod communities have potential to serve as indicators of ecological function in agricultural soils. Micro-invertebrates consume microbes involved directly with decomposition and, thereby, regulate ecological processes such as decomposition and nutrient cycling in soil. Active microbial grazing generates a balance between nutrient mineralization and immobilization that moderates nutrient availability to

crops in a more sustainable manner. Although management practices usually represent a confounded mixture of physical and chemical attributes, canonical correspondence analysis can be used as a tool to narrow the extensive list of organisms in soil to a few key taxa that define relative soil health.

ROSEMEYER*, MARTHA, A. MACGUIDWIN, D. HOGG, D. YOUNG, T. MCGLYNN, C. REESE, J.LODA, and J. POSNER. University of Wisconsin, Madison, WI 53706.
Biodiversity in low and high input agroecosystems: A tropical and temperate comparison.

Low-input cropping systems are believed to contain higher species abundance and diversity than high-input systems. Soil biodiversity in nematodes and soil arthropods was assessed in years 6 - 8 of a Midwestern cropping systems experiment and soil nematode family diversity (number of families) was found to be greater in rotationally-grazed than in other cash grain and forage cropping systems, while soil insects were not more consistently diverse in any system. In preliminary studies in Costa Rica, Shannon diversity of soil arthropods was greater after 6 years in mulched and alleycropped treatments (low input) than in unmulched (higher input) treatments, while nematode diversity and abundance were greater in unmulched plots. These results show that changes in diversity of one group do not necessarily indicate changes in diversity of other groups in both tropical and temperate agroecosystems. Though some groups show a tendency to decrease in diversity with increasing inputs, results from our agroecosystems do not generally support this hypothesis.

ALTIERI, MIGUEL A. ESPM-Division of Insect Biology, University of California, Berkeley, CA 94720-3112. **Ecologically-based management of arthropod communities in agroecosystems**.

Managed interactions between plants, insect herbivores, and their natural enemies provide ecologically sound strategies for pest management in agroecosystems. In particular, agroecosystem management practices that restore habitat complexity can enhance beneficial biodiversity and regulate arthropod pest populations. We combine methodologies from agroecology, entomology, agronomy and socioeconomic analysis to assess the impacts of biodiversification on agroecosystem performance. Field experiments demonstrate that diversification of vineyards with corridors and cover crops and the intercropping of vegetable crops can enhance agroecosystem productivity. These ecological approaches to pest management cut pesticide use and facilitate the conversion of large scale, high-input monoculture systems to sustainable low-input agroecosystems.