



Diversifying cropping systems through cover crops and targeted grazing: impacts on plant-microbe-insect interactions, yield, and economic returns

MS and PhD Opportunities in Agroecology

Location: Montana State University. Bozeman, MT.

Project summary. The semi-arid section of the Northern Great Plains is one of the largest expanses of small grain agriculture and low-intensity livestock production. However, extreme landscape simplification, excessive reliance on off-farms inputs, and warmer and drier conditions hinder its agricultural sustainability. This project evaluates the potential of diversifying this region through the integration of cover crops and targeted grazing. We will complement field and greenhouse studies to appraise the impact of system diversity, temperature, and precipitation on key multi-trophic interactions, yields, and economic outputs. Specifically, we will 1) Assess ecological drivers as well as agronomic and economic consequences of integrating cover crops and livestock grazing in semi-arid systems, 2) Evaluate how climate variability modify the impacts of cover crops and livestock grazing on agricultural outputs. Specifically, we will 2.1) Compare the effect of increased temperature and reduced moisture on agronomic and economic performance of simplified and diversified systems, 2.2.) Assess the impact of climate and system diversity on associated biodiversity (weeds, insect, and soil microbial communities) and above- and belowground volatile organic (VOC) compound emissions, and 2.3) Evaluate how changes in microbially induced VOCs influence multitrophic plant-insect interactions.

Successful candidates will be members of a vibrant, interdisciplinary team of researchers on agro ecology. Candidates must hold a BS or MS degree in ecology, agroecology, entomology, weed science, plant science, or related field, depending on the position. Excellent work ethic, team player, and proficiency in English language (written and oral) are required.

Submit 1) Letter of application describing educational background, research experience, career goals, and professional interests, 2) Resume, 3) transcripts, and 4) Names, addresses, phone numbers and email addresses of three references. GRE and TOEFL scores (if required) are mandatory.

Electronic applications are accepted. Applications should be sent to: Dr. Fabian Menalled. menalled@montana.edu. (406) 994-4783

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