MUSTARDS AS BIOFUMIGANTS: CURRENT STATUS AND FUTURE PROSPECTS. Daniel Anderson, John B. Masiunas, Stephen Bossu, and Mosbah Kushad, Research Associate, Associate Professor, Undergraduate Research Assistant and Associate Professor, Department of Natural Resources and Environmental Sciences, University of Illinois at Urbana-Champaign, 1201 West Gregory Drive, Urbana, IL 61801.

Mustards (*Brassica* sp.) are being recommended as biofumigants for control of nematodes and some soil borne diseases. Mustard residues also suppress weeds, although their effectiveness varies depending on factors such as biomass, residue placement, maceration, environment, species, and cultivar. The primary mechanism for pest suppression by mustard residues is hydrolysis by myrosinase of glucosinolates to D-glucose, sulfates, and a number of active allelochemicals such as isothiocyanates (ITCs), nitriles, and thiocyanates. In living Brassica tissues, myrosinase is held in myrosin cells, separated from glucosinolates, but when cells are damaged, myrosinase is released, causing the breakdown of different glucosinolates into their corresponding bioactive forms. Our research objective is to determine the factors influencing activity of the glucosinolate – myrosinase – ITC system on weeds. In research with "Tilney" yellow (white) mustard (*Sinapis alba* syn. *Brassica hirta*) and "Florida Broadleaf" brown (Indian) mustard (*B. juncea*) we found that weed suppression was greater on a sandy soil than a silty clay loam but varied depending on weed species. For examples, in a sandy soil both species reduced longspine sandbur (*Cenchrus longispinus*) and large crabgrass (*Digitaria sanguinalis*) populations more than pigweed (*Amaranthus* spp) and eastern black nightshade (*Solanum ptycanthum*). Complete maceration of mustard shoot tissue and placement of residues in the upper 1.5 cm of soil where the majority of weeds emerge is critical for maximum activity. We are currently evaluating the mustard germplasm for their glucosinolate profile, myrosinase activity, and weed suppression. Further research will provide a biorational approach for including mustard biofumigants crops in sustainable weed management systems.

2008 North Central Weed Science Society Proc. 63:172.