BRASSICA SPECIES: BIOCONTROL FOR SOILBORNE PATHOGENS IN GA VEGETABLE PLASTICULTURE

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Methyl bromide is a broad spectrum fumigant that is efficacious on fungi, nematodes, insects and weeds and has been extensively used for the past 50 years in plasticulture vegetable production. Unfortunately, methyl bromide was identified as a contributor to the depletion of the stratosphere ozone layer in 1992 and was scheduled for world-wide phase out by 2005. The phase out of methyl bromide has spawned cooperative research efforts to identify and evaluate potential chemical, biological, and/or cultural alternatives that give comparable control of the many fungal, nematode, insect, and weed pests producers are faced with on an annual basis. One potential biological alternative to methyl bromide for control of fungal and nematode pests is the use of green manure amendments prior to planting. One particular group of green manure amendments being evaluated in vegetables is *Brassica* species.

Multiple *Brassica* species commonly grown in Georgia were evaluated as a potential biofumigant alternative to methyl bromide for control of soilborne fungal pathogens in vegetables. *Brassica* species were grown as cover crops and incorporated as green manures prior to transplanting of vegetable crop. Soil disease assays were conducted at planting and/or harvest of cover crops and at plant and/or harvest of vegetable crops to determine fungicidal affects of the *Brassica* species on natural populations of *Pythium* and *Fusarium* species during each growing season. Percent survival studies were also conducted to determine the affects of *Brassicas* on *Pythium irregulare*, *Fusarium solani*, and *Rhizoctonia solani*.

Results of this study showed the release of isothiocynates from incorporated and decomposing *Brassica* species commonly grown in Georgia does reduce populations and viability of soilborne organisms including Pythium species, *Fusarium* species, and *Rhizoctonia solani*. Unfortunately, the level and consistency of fungal activity observed from the incorporated *Brassicas* varied between and within *Brassica* species as well as between growing seasons. Variations in the level of control observed among and within the *Brassica* species evaluated potentially indicate differing levels of glucosinolates production in each individual *Brassica* and variation in the sensitivity of various fungi to glucosinolates. Therefore, to achieve the maximum benefit from utilizing *Brassica* species as a green manure for control of soilborne pathogens a producer will need to choose a *Brassica* species with a high potential of glucosinolate production and also one that produces large quantities of biomass and is environmentally adapted to the region. Although *Brassica* species showed fungicidal activity on soilborne fungi in this study, the level of control achieved

by the *Brassica* species alone would not be considered acceptable by commercial producers in Georgia compared to methyl bromide. For success in Georgia, producers may need to combine the utilization *Brassica* species as green manures with other chemical and cultural control measures.