USING REMOTE SENSING TO DETECT WEED INFESTATIONS IN MINT. Mary S. Gumz and Stephen C. Weller, Graduate Research Assistant and Professor, Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN 47907.

Peppermint and spearmint ("mint") are important horticultural crops in Indiana, Wisconsin, and Michigan and the Northwestern U.S. states of Oregon, Washington, Idaho, Montana and California. However, mint is a crop at risk due to competition from foreign produced mint oils and synthetic flavorings and rising production costs. Surveys of mint growers have shown that weed control is their highest input cost. Precision agriculture technology such as multispectral remote sensing and GPS-based weed mapping that allows growers to better monitor weed infestations in mint fields and develop site specific weed management techniques such as precision spraying would decrease weed control costs and increase overall weed management and profitability for this crop.

The evaluation of multispectral remote sensing in our studies has shown great potential for usefulness in site specific weed management in mint. Aerial multispectral images showing reflectance in the green, red, and near-infrared bands were compared to weed maps developed through GPS-based ground scouting. Several characteristics of mint such as a low growth habit, patchiness of weed infestations, changes in canopy architecture at the site of weed infestations, and differences in color between mint and key weed species allowed the use of remote sensing for weed detection, crop growth assessment and identification of field areas with possible production limitations due to a variety of factors. Supervised classification of multispectral images of peppermint and spearmint fields, based on ground-scouting observations, resulted in development of highly accurate maps of weed infestations. Weed patches of white cockle, giant foxtail, and mixed *Amaranthus* species were accurately identified over 90% of the time. Patches of weed free peppermint and spearmint were also identified with greater than 90% accuracy as were bare soil areas in fields where no crop or weeds were present due to low fertility, poor soil type or low water holding capacity. GIS based analysis of weed infestation locations combined with other field variables such as soil fertility and crop health will allow development of a site specific crop management system for mint. Such a system will optimize production inputs, minimize excessive applications of pesticide, reduce in-field human scouting requirements and provide growers with an efficient platform to maximize yields.

2004 North Central Weed Science Proceedings 59:157.