USING SPECTRAL VEGETATION INDICES FOR WEED DETECTION 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 are grown as high value essential oil crops in the Midwestern U.S. (IN, MI, and WI) and the Pacific Northwest (OR, WA, MT, and ID). Remote sensing-based site-specific weed management offers great potential to decrease weed control costs by simplifying weed detection and producing site specific herbicide application maps. In order to automate the process of turning a remotely sensed image into an herbicide application map, some type of spectral identifier is needed that can be used to differentiate weed-free pixels from weedy pixels. Our past research has developed spectral vegetation indices (SVIs) for differentiating mint and key weed species. Our objective in these studies was to apply SVIs calculated from handheld spectroradiometer reflectance data to reflectance data calculated from airborne hyperspectral images to determine which method had the highest accuracy for differentiating between mint and weeds in the image. Airborne imagery is the fastest and most economical method to obtain reflectance data for production fields, but absolute reflectance can vary between images. SVI calculations were made from experimental field plots of peppermint, spearmint, giant foxtail, white cockle, tall waterhemp, Powell amaranth, common lambsquarter, and velvetleaf. SVIs based on simple ratios of reflectance values in the near infrared and green portions of the spectra accurately differentiated between peppermint and weed species, while simple ratios of near infrared and red reflectance values accurately differentiated between spearmint and weed species. The ratio of mint to weed SVI values was approximately 2 to 1 in both instances even though the absolute values of SVIs varied between spectroradiometer and image calculations. The 2X difference in SVI values can be used to identify weedy areas of a mint field in a hyperspectral image and allow accurate targeting of postemergence herbicide applications which would reduce costs and increase efficiency of weed management for growers.

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