PERIOD THRESHOLD WEED MANAGEMENT EFFECTS ON SOIL WEED SEED BANK DYNAMICS IN A TOMATO ROTATION. Carlos D. Mayén and Stephen C. Weller, Graduate Research Assistant and Professor, Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN 47906.

A 3 year field experiment was established in Lafayette in the spring of 2001 to investigate the influence of various weed control techniques on the weed soil seed bank in a fresh market tomato and a Roundup Ready soybean rotation. Soil management techniques studied were conventional tillage, no till and winter rye cover crop. Weed management involved either a threshold based program or a zero threshold program (no weed seed production). The seed bank composition was determined each year through the greenhouse germination method of soil sampled early in the spring. After 2 years of cropping, several patterns were observed in the soil seed bank. Crop had a major effect on the amount of giant foxtail and prickly sida seeds in the soil. Generally, seed banks increased following a tomato cropping season and tended to decrease following a soybean cropping season. An exception occurred in 2002 when soybeans were planted to rye cover crop mulch. Canopy closure was never attained and there was high foxtail seed production that enriched the seed bank. The effect of weed control intensity on the seed bank depended on the crop. For both crops, adoption of the zero threshold program resulted in an exponential decay of the seed bank. When period thresholds were adopted for weed control, the seed bank increased after following tomatoes or decreased after following a soybean crop. Regarding yields in the plots, after 1 rotation, an increase in soil weed seed bank did not affect yield in a competitive crop (soybean versus tomato).

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