COMPARING WEED COMMUNITIES ON ORGANIC AND CONVENTIONAL TOMATO FARMS ACROSS OHIO. Annette L. Wszelaki and Douglas J. Doohan, Postdoctoral Researcher and Associate Professor, Department of Horticulture and Crop Science, The Ohio State University, Ohio Agricultural Research and Development Center, 1680 Madison Ave., Wooster, OH 44691

Organic farmers contend that their greatest challenge is managing weeds. Accurate data has not been available on the specific weed problems experienced by organic farmers in Ohio. Moreover, there is little evidence in the scientific literature documenting the weed species and composition that organic farmers are trying to control versus their conventional counterparts. In the summer of 2002 and 2003 and fall of 2002, a survey comparing the weed communities found in organic and conventional farms was conducted across Ohio to fill in this knowledge gap.

The survey consisted of 40 farms (20 organic farms, paired with 20 neighboring conventional farms) and encompassed 24 counties around the state. Tomato fields were located and mapped using a GPS system. In 2002, an initial weed survey was conducted in July and a second survey was conducted in late September- early October. In 2003, the survey was continued in late July-mid-August. In each field, emerged weeds were sampled in twenty 0.25 m^2 sampling areas located along an inverted 'W' pattern throughout the field. Weeds were identified, counted, and mapped according to their occurrence and related landscape features.

The data were summarized using several quantitative measurements, including frequency, field uniformity, and density. Combining all three of these measurements, a single value, the relative abundance of the species, was calculated: Relative abundance = (frequency of a particular species/sum of frequency values for all species) + (uniformity of a particular species/sum of uniformity values for all species) + (density of a particular species/sum of density values for all species). This measurement was used to rank the species, according to their overall occurrence.

Seventy-five different weed species were found in this survey. Regardless of season or farm type, purslane had the highest relative abundance of surveyed species. However, pigweed appeared most frequently, occurring on 34 out of the 40 farms. Purslane was also the most uniform of the weeds overall, while quackgrass had the highest density of all the weeds (> 10 shoots/m^2). On the organic farms, in the summer, quackgrass had the highest relative abundance, while in the fall, quackgrass and foxtail had the highest relative abundance. However, barnyardgrass appeared most frequently (18 out of the 20 organic farms) and was the most uniform species in the summer, while foxtail was the most frequently occurring and uniform species in the fall. On the conventional farms in the summer, purslane had the highest relative abundance. Barnyardgrass and pigweed were the most frequently appearing weeds, occurring on 14 out of the 20 conventional farms. In the fall, purslane again had the highest relative abundance among the weeds on the conventional farms, followed by lambsquarters and chickweed.

In general, the weed communities were more diverse on the organic farms than on the conventional farms. Both farm types had more species in the summer than the fall. Thirty-two weed species were common to all seasons and farm types. The organic farms had 24 species of weeds that did not appear on the conventional farms, though only 8 of these appeared on more than one farm. Ten species found on the conventional farms were not found on the organic farms, although 40% of these were found on more than one farm. The results of this survey confirm that grasses tend to be more of a problem on organic farms, with the top two weeds being grasses in both the summer and fall, while broadleaves are more problematic on conventional farms, as only one grass made the top five weeds in each season on the conventional farms.

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