

SOLARIA PROVIDE PREPLANT INFORMATION ON WEED DENSITIES, DISTRIBUTIONS, AND MANAGEMENT. Juan J. Eyherabide, Dean Peterson, and Frank Forcella, Professor, Universidad de Mar del Plata, Balcarce, Argentina, and Agricultural Science Technician and Research Agronomist, USDA-Agricultural Research Service, Morris, MN 56267.

Solaria are transparent plastic films that are used to cover the soil surface in early spring to stimulate precocious emergence of weeds. The densities and distributions of these precociously emerged weeds can be used in bio-economic models to aid decisions on weed control well before normal planting times. Sixteen 1-m² solaria were placed randomly in a small field in April of 2003 in west central Minnesota. The locations of all solaria were geo-referenced. Prior to planting glyphosate-tolerant (GT) soybean, emerged weeds were identified and counted within each solarium, as well as in adjacent naturally exposed soils. The species and density information, which presumably represented potential in-crop weed infestations, were used in two bio-economic models, WeedSoft and GWM, to generate management recommendations. Two top recommendations from each model were implemented (treatments 1-4). These treatments were expected to provide good weed control and generate high net economic returns. Additionally, there were five other treatments: 5) a standard treatment that might be chosen by local farmers in the absence of GT soybean, 6) a researcher chosen treatment that integrated expected weed control, cost and anticipated net return in the absence of GT soybean, 7) a treatment that purposefully resulted in poor weed control (i.e., a poor management decision, but within the realm of reason), 8) a treatment that might result in excellent weed control, but would be costly and possibly lower economic returns, and 9) a weedy check.

Abundant and easily identified seedlings of several weed species had emerged under solaria by the time of soybean planting in May, which preceded appreciable weed emergence in adjacent ambient soils. Costs of chemical weed control ranged across treatments from \$41 to \$108 per hectare. Four treatments had net returns > \$400/ha. These treatments were: (1) Glyphosate + AMS post, which was recommended by both WeedSoft and GWM, and represented what typical soybean growers use nowadays. A single but timely application provided adequate control of all weed species. (2) Imazamox + UAN + COC post, which was recommended by WeedSoft. It provided adequate weed control, but some common lambsquarters escaped. (6) Flumetsulam pre, which was chosen by the researchers. As expected, it did not control green and yellow foxtail very well, but it did provide adequate control of all other weed species, and it was inexpensive. (8) Quisqualop + COC post followed by imaxamox + UAN + COC post. Some common lambsquarters escaped this treatment, but other species were controlled well. The greater cost of this treatment was compensated by high soybean yields. The second treatment recommended by GWM was flumioxazin pre followed by glyphosate + AMS post. This was an expensive treatment, it did not control wild proso millet and, consequently, its net return was below \$400/ha. We concluded the following: First, precociously emerged seedlings under solaria provide sufficiently early and detailed information to make reasonable pre and post weed management decisions. Second, bio-economic models, like WeedSoft, when initialized by solarium-derived data can aid the decision-making process by generating information not only on net returns for the current year but also on the likely abundance of weed escapes that affect management in future years.