Introduction

In the past, weed information has been collected in a casual way with little attention given to weed species, densities, or distributions. This is due to time and labor constraints for rigorous scouting, the complexity of the scouting information when sampled rigorously, the assumption that weeds are constant and uniform throughout a field, and the lack of equipment to easily manage weed variability even if it was noticed. Generally, a single recommendation (whether a single herbicide, formulation mix, tank-mix combination, or preemergence/postemergence split) for weed management was given for a field. The basis for the recommendation could have been based on past years’ weed problems, scouting field edges, or driving a W or Z pattern across the field in the spring or fall. These approaches have been successful in managing weeds and improving profits. The questions are: (1) Do weeds vary enough in a field to manage them with precision techniques using different methods or herbicides? (2) Can we take advantage of technology (GPS, variable rate sprayers, direct injection controllers, etc.) to further improve weed management and profitability? This guide discusses different approaches and concepts for obtaining information about weed diversity in the field.

In most cases, weeds are highly aggregated in a field (3,4,8). For example in a 120-acre field, Canada thistle (Cirsium arvense) and foxtails (Setaria sp.) [mixtures of green and yellow foxtail (S. virdis and S. pumila, respectively)] were not uniformly distributed and occurred in different areas of the field (Fig. 1). Drainage, topography, soil type, microclimate, and other factors play important roles in where weeds will be located and how successful and competitive they will be at a specific site (11). The first step in developing effective site-specific weed management strategies is to obtain accurate and reliable data on the location of weed species and densities. The next step is to match the weed management solution to the problem in a site-specific manner. Spray equipment has been developed that allows for different chemical treatments and rates to be targeted to weed infested areas of the field (6). Using information about weed distribution and variability, equipment that matches the correct chemical with the weed(s) present has been shown to result in better weed control, lower herbicide costs, and increased net return (2,5,9).

With these concepts in mind, you can then formulate your own, detailed, step-by-step plan that works best for your scouting needs. Clearly, the most effective data collection strategy depends on how the data is going to be used and in what time frame.