

Symposium

Introduction to the symposium Beyond thresholds: applying multiple tactics within integrated weed management systems

More than 35 yr after integrated pest management was proposed as a research goal for plant protection specialists, integrated weed management (IWM) remains elusive in practice. Most definitions of IWM have two features in common: (1) the use of multiple control tactics and (2) the integration of knowledge of pest biology into the management system. Research by weed scientists on IWM has focused almost exclusively on the second half of the definition, to the detriment of truly IWM systems. Numerous detailed studies of early germination and growth, the genetics of herbicide resistance, herbicide dose–response, and management thresholds have been conducted with the goal of optimizing chemical weed control. However, investigations supporting the integration of multiple weed management tactics are rare and most often involve only chemical and physical methods, with only occasional combinations that include biological or cultural methods as well.

As a means of stimulating interest in multitactic management systems and assessing the current state of knowledge on this topic, the North Central Weed Science Society hosted the symposium “Beyond thresholds: applying multiple tactics in integrated weed management systems” at its 2003 annual meeting in Louisville, KY. The title of this symposium was intentionally chosen to be provocative, in hopes of increasing attendance and stimulating discussion.

The following articles demonstrate the wide variety of tools being considered for use in multitactic weed management systems. The keynote address, by Bo Melander of the Danish Institute for Agricultural Sciences, describes physical and cultural methods already in use, or being evaluated, in low-input and organic field crop production systems in Europe. Paula Westerman and her coauthors use empirical and modeling approaches to analyze overall cropping system effects on velvetleaf (*Abutilon theophrasti* Medicus) population dynamics in 2- and 4-yr crop rotations in Iowa. Ed Luschei and Randall Jackson argue for new statistical models as a

necessary alternative to enormous factorial experiments for assessing the potential success of integrated management systems. Finally, Steve Hallett’s critique of the bioherbicide literature makes a pointed case for an increased research focus on conservation biocontrol using soil microbes. An additional presentation at the 2003 NCWSS conference, not published here, was made by Frank Forcella “Decision support systems for integrated weed management.” This presentation demonstrated a powerful system, WheatScout, for integrating weed biology, weather, herbicide efficacy, and economic data. It also argued for the continuing importance of management thresholds.

These articles present cutting-edge research, yet also highlight how much work remains to make truly integrated systems for weed management a reality. It will be necessary to develop new management and analysis tools, use knowledge of weed biology and ecology to identify how new and old tactics may be combined most cost effectively, and finally, to evaluate the effect of integrated weed management on the long-term sustainability of farming operations and surrounding ecosystems. We hope these articles will help generate enthusiasm for additional work in this exciting area.

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