

1-19-1998

Effective management of postemergence programs

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Recommended Citation

Hartzler, Robert G. and Owen, Micheal D., "Effective management of postemergence programs" (1998). *Integrated Crop Management News*. 2292.

<http://lib.dr.iastate.edu/cropnews/2292>

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Effective management of postemergence programs

Abstract

Total postemergence weed management programs are not new, but the introduction of herbicide-resistant crops has increased the interest in this strategy. The broad-spectrum activity and ability to kill large weeds with products such as Liberty, Lightning, Roundup, and others provide growers with greater flexibility in application timing than was previously available. This flexibility has raised questions whether one-pass, total postemergence programs are a reasonable weed management goal for corn and soybean production.

Keywords

Agronomy

Disciplines

Agricultural Science | Agriculture | Agronomy and Crop Sciences | Weed Science



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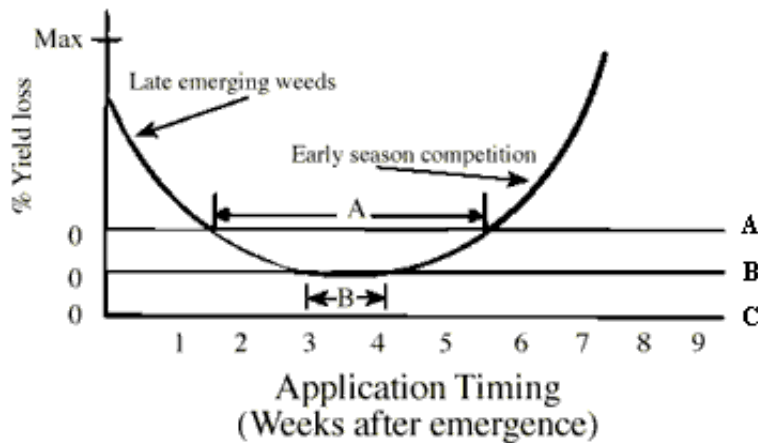
Total postemergence weed management programs are not new, but the introduction of herbicide-resistant crops has increased the interest in this strategy. The broad-spectrum activity and ability to kill large weeds with products such as Liberty, Lightning, Roundup, and others provide growers with greater flexibility in application timing than was previously available. This flexibility has raised questions whether one-pass, total postemergence programs are a reasonable weed management goal for corn and soybean production.

Relying on total postemergence programs requires considerable management skill and an understanding of the relationships between weeds and crops. Because weeds emerge throughout the early part of the growing season, rather than only soon after planting, application timing is critical. If the herbicide is applied too soon after planting, late-emerging weeds may create problems. If the post application is delayed to minimize problems with late-emerging weeds, yields may be reduced by weeds that emerge shortly after planting. To develop effective postemergence programs, growers must consider the impacts of weeds that not only emerge with the crop but also those that emerge later in the season.

Weeds that grow with the crop for the entire growing season cause the greatest yield loss. As the duration of competition is shortened, the resulting yield losses are reduced. At some point in time, the period of competition is too short to result in significant crop yield losses. The critical period of competition defines the time period weeds can grow with the crop without impacting yields.

Several factors influence the length of the critical period, but rules of thumbs can be used to guide weed management decisions. In soybeans, weeds emerging with the crop typically will not begin to impact yields until three to four weeks after crop emergence. Corn is more susceptible to early-season competition than soybeans; thus, corn has a shorter critical period of two to three weeks after crop emergence. Weeds that emerge more than four to five weeks after the crop are typically at a competitive disadvantage and usually will not impact yields. The critical period may vary from one to three weeks depending upon specific conditions encountered in a field.

Figure 1. Influence of critical periods on window of opportunities for one-pass postemergence weed control.



The interactions among early and late-season weeds create problems for single-tactic postemergence programs. Figure 1 illustrates how these two weed cohorts influence the postemergence application window for protecting crop yields. The left portion of the curve represents yield losses from weeds emerging after control strategies are implemented. Yield losses from these weeds increase if the herbicide is applied shortly after planting, thereby allowing weeds that emerge after application to impact yields. The right portion of the curve represents losses due to weeds that emerge with the crop--as application is delayed, yield losses increase. In the center of the curve there can be additive losses from both groups of weeds.

Timing of postemergence application is represented by the X-axis. The three X-axes represent different scenarios that influence the critical periods of competition. The X-axis labeled A represents a situation with approximately a 4-week window where weeds could be controlled without experiencing yield losses. Under this scenario a total postemergence program is relatively low risk. The X-axis labeled B also represents a situation where it is possible to obtain optimum yields with a single-pass; however, the application window is only one week. This situation represents a moderate risk because if the grower miscalculates when this window occurs or is kept out of the field by weather conditions, significant yield losses can occur. The X-axis labeled C represents a high-risk situation because there is no single-application timing that will produce optimum yields. All three of these situations occur, but unfortunately our ability to predict which situation exists in a specific field is limited. Table 1 lists some simple guidelines that can be used to classify fields according to their risk for total post programs, but other factors also influence the critical periods of competition. Our inability to predict which scenario occurs in specific fields creates risks in using single-pass postemergence programs.

Knowledge concerning the risk level for a specific field is needed when developing weed management programs. In fields with high risk, multiple weed control tactics will be required to obtain both optimum yields and weed control. This can be achieved either by using a combination of preemergence products with postemergence herbicides, sequential postemergence applications, or a combination of herbicides and mechanical strategies. The preemergence herbicides will reduce early-season competition, thereby providing greater flexibility in application timing for the post product. With sequential post applications, the first treatment should usually be applied when weeds reach two to three inches in height. The second application is made two to three weeks later, if needed, to control late-emerging weeds. In many situations, row cultivation could be substituted for a postemergence treatment.

Fields with a moderate risk provide somewhat greater flexibility for weed management programs. Some growers may decide that they are willing to risk yield to minimize trips across the field for weed control. However, one-pass programs in these fields could result in significant yield losses under certain conditions. In the long run, the multiple-tactic programs described above likely will be more profitable.

In conclusion, the new technology available today has provided growers more flexibility in weed management. However, these new tools still require good management to optimize both weed control and crop yields. Growers must consider the impacts of weeds throughout the growing season to develop effective weed management programs.

Table 1. Factors influencing risk associated with one-pass postemergence programs.

Risk	Criteria
Low	Soybeans - narrow rows, low to moderate weed infestations
Moderate	Soybeans - moderate to high weed infestations
	Corn - low weed populations
High	Corn - moderate to high weed populations

This article originally appeared on pages 4-5 of the IC-480 (1) -- January 19, 1998 issue.

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