

chemical industries suggest that the dose of IST's offered to seed companies will provide sufficient control of the common pest populations in field corn and soybean. Although IST's are applied as preventative applications at the time of planting grain crops, the value of these specific treatments should not be underestimated as environmentally acceptable components of integrated pest management systems.

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## ► SOYBEAN PRESENTATIONS

### ► Late Fall/Early Winter Herbicide Application: A New Approach To Managing Winter Weeds In Louisiana

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Many row crops in Louisiana are produced utilizing some type of conservation tillage system. Regardless of the system used, fields are allowed to remain undisturbed through the winter and spring until planting. In the absence of spring tillage, herbicide programs are required to successfully manage native winter vegetation prior to planting.

Control of weeds in the spring prior to planting has most often relied on programs including glyphosate or paraquat as the primary herbicide with tank mix partners such as 2,4-D, Goal, or Harmony Extra, among others, included to increase the spectrum of weeds controlled or to prevent future weed germination. In addition, paraquat applications at planting are often made following a glyphosate tank mix treatment to ensure weed free conditions for the emerging crop.

Although not directly related to herbicide effects or competition, winter weeds present in spring prior to planting may negatively affect crops by having the capacity to serve as possible hosts for insect and disease organisms.

The LSU AgCenter recommends that herbicides be applied 6 to 8 weeks prior to planting to remove winter vegetation eliminate problems with insects migrating from weeds to emerging crops. However, rain and wind often make it difficult to achieve this interval. Delays in spring herbicide applications not only lead to increased insect problems, but lead to reduced herbicide efficacy due to larger weeds and/or weed growth stages that decrease herbicide susceptibility.

Over reliance on widely used herbicides, such as glyphosate, has lead to increased incidence of weed resistance in other states. In Louisiana, weeds such as marestalk, henbit, and ryegrass often require tank mixture of as many as 3 different herbicides once optimum herbicide application timing is missed. Even then these weeds are not always adequately controlled and cost is definitely increased. Furthermore, previous research by LSU AgCenter weed scientists has shown winter weeds to be very competitive in corn if not adequately controlled prior to planting.

Off-target drift is another problem with spring herbicide applications. Herbicides applied later in the spring on cotton and soybean fields can lead to situations of off-tar-

get drift that can negatively affect emerged crops that are planted earlier, such as corn and wheat, or home owner gardens or flower beds. Due in part to these concerns, interest has increased with respect to application of herbicides with soil activity in the late fall/early winter to eliminate or reduce the amount of weeds that germinate in winter and are present in the spring prior to planting. In addition, there is an opportunity to use herbicides with different modes of action than glyphosate or paraquat, which will aid in resistance management.

Research conducted with late fall/early winter herbicide applications by LSU AgCenter weed scientists has primarily focused on weed control efficacy with the herbicides Valor, Goal, Reflex, Dual Magnum, Envoke, Resolve, Python, Firstrate, and Grasp. Herbicide applications have been evaluated in late November to late December in most trials but earlier applications in September or early November have been evaluated on a limited basis. In general, soil activity during winter months following herbicide application has been very good (85 to 100% control) on some of the more common winter weeds including henbit, chickweed, shepherds' purse, annual bluegrass, swinecress, and cutleaf eveningprimrose. Research conducted in neighboring states has also observed excellent control of the glyphosate-resistant weed marestail with Valor and Envoke. On some occasions, research plots have remained weed free until planting, with no additional spring herbicide application necessary. On other occasions, a follow-up spring herbicide application would be necessary, however, weeds are generally smaller at lower populations that are more easily controlled in spring. On occasion where research plots have broken (ie weed germination occurring), this interval has usually been observed approximately 120 days after herbicide application. Limited research in 2008 indicated that herbicide applications in September or early November are less effective than applications made in late November or December, possibly due to the herbicides being acted on by soil microorganisms still remaining highly active prior to onset of colder temperatures.

The majority of the herbicides being researched either have strictly soil activity or exhibit primarily broadleaf activity when applied to emerged weeds, with limited control of emerged grass species. In cases where winter grasses have emerged prior to application, addition of paraquat or glyphosate has enhanced control. One concern regarding fall/winter herbicide applications is the fact that with native winter vegetation removed, soil is left bare to be exposed to rainfall during winter months, which may affect row integrity for planting in spring. In addition, conservation programs may require a certain amount of vegetation be present to avoid erosion on certain soils. As a majority of the herbicides evaluated have little or no activity on winter grass species once emerged, future research will concentrate on identifying programs that remove common broadleaf winter weeds but maintain some winter vegetation, primarily annual bluegrass, which are easier to control in the spring.

Conclusions to this research are that to obtain maximum effectiveness of fall/winter herbicide programs applications should be timed to emergence of winter weeds preferably once temperatures have cooled in late November or December. Producers are cautioned that, although effective through winter months, these programs may not eliminate the need for a follow-up treatment prior to or at planting. Therefore economic consideration should be made in considering the utilization of these programs. In addition, producers should always confirm whether the use of fall/winter programs and removal of winter vegetation would affect their compliance with participating conservation programs.

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