

Crop Production

Gauge herbicide effectiveness as crop gets going

By WILLIE VOGT

AS farmers finish up final planting this month, it's a good time to measure the performance of a tool many are returning to: residual herbicides. As part of a comprehensive weed-resistance management plan, growers are turning to soil-applied residual herbicides as the base for an effective weed control program.

In-field scouting of weed control performance at key times of the crop's life cycle can offer great information, but what constitutes a residual herbicide? "In my mind, it has to last at least three weeks before I invest money," says Bryan Young, weed specialist, Southern Illinois University. "Is that enough for corn and soybean production today? Compared to none at all, yes, but I would prefer four to five weeks of performance, or even full-season."

From Mark Loux's perspective, the measure of a preemergence program depends on the weed species. "You hope for four to eight weeks of control, but with some weeds like lambsquarters in soybeans, you can get full-season control," he notes. Loux, a weed scientist at Ohio State University, has done work evaluating the economic impact of weed control practices.

Loux looks at how farmers have changed their investment in a preemergence program as part of a glyphosate-use approach. "Before we had that technology, farmers were using a full rate of preemergence products, but now we cut back on the rate to stay in the \$10 to \$15 application range," he explains.

Loux says if you can get four weeks of coverage and then hit emerged weeds before they're 6 inches tall, post control

Key Points

- Residual herbicides that give longer control add value.
- Cutting weeds down when they are smaller boosts profit.
- Pile on modes of action to avoid weed resistance.

will be more effective. "And it's even better if you get 45 days from that pre-emergence product," he notes. Given that extra time, followed by a post shot of glyphosate, for example, you get two benefits. First, you're controlling smaller weeds with the post application. Second, you are applying the post closer to the time of crop canopy, when the crop is able to suppress late-emerging weeds.

Young adds that there is a growing cadre of preemergence herbicides on the market that can offer longer control, in normal conditions, for full-season performance. And he says in most cases, the soil-applied application is the best base, usually in corn with a little atrazine thrown in the tankmix for improved results. "You can get full-season control, especially in corn," he notes.

Young says a soil-applied program teamed with a post follow-up, whether it's glyphosate or glufosinate (depending on the crop), offers the best control.

"Starting clean with a soil-applied herbicide often provides the greatest return on investment for weed management," he says. "The frequency a grower uses glyphosate as their primary weed control tactic may provide additional justification for soil-applied herbicides."

Glyphosate reliance should be considered through this growing season to identify alternative control measures to



CLEAN AND GREEN: Keeping weeds under control until the crop canopies takes a one-two punch these days to avoid resistance worries. Starting with a residual preemergence program gets fields off to a strong start.

ward off resistance issues. The number of times a herbicide is used in a crop cycle, or over a rotation, can be a harbinger of resistance in a field. Changing up weed control products is cheap insurance against resistance.

Modes of action

The message is out there: Changing modes of action can enhance your weed control program while reducing the incidence or risk of weed resistance. Whether it's a hot early-post premix with three or four modes of action, or a preemergence program that includes different modes of action, you're spreading your risk.

SIU's Young notes this issue is growing in importance because populations of weeds are starting to show multiple resistance. "The University of Illinois has confirmed a field site in which the waterhemp is resistant to ALS inhibitors, triazines, PPO herbicides and glyphosate," he observes.

That scenario worries weed scientists, although there's some indication that even resistant biotypes of weeds are less resistant if controlled very early in their life cycle — either preemergence or when they are less than 6 inches tall.

Early control enhances payback anyway. A wide range of weed research shows that the smaller the weed at control, the better the return. While there can be environmental impacts that change up the results, over time scientists are seeing that improved return if you knock out weeds early.

For example, work at Ohio State earlier in the decade showed the impact of weed height on crop returns in corn (see table at left). In addition, Loux along with colleagues at Purdue have documented some significant returns.

In a compilation of research work, they showed that preemergence herbicide can result in a 10% yield advantage over post application when weeds are taller than 4 to 5 inches. In a 50-bushel-per-acre soybean yield environment, that's about a 3- to 5-bushel-per-acre yield advantage, or \$21 to \$35 added revenue per acre (based on a cash price of \$7). Deduct the cost of a preemergence herbicide at \$10 to \$15 per acre, and you can still see a boost of \$6 to \$20 per acre in net gain.

Test plots prove weeds steal N

CONTROLLING weeds early can have a payback, according to research from the University of Wisconsin. Work conducted by soil scientists and weed specialists at the university shows that weeds have a big impact on nitrogen availability to the corn crop.

Researchers measured nitrogen accumulation for weeds — giant foxtail and common lambsquarters were the predominant species — at 4 inches and 12 inches. They found that at a smaller size, the weeds accumulated 12 pounds of N per acre, which had minimal impact on corn. However, letting weeds get bigger had a measurable impact.

Weeds that climbed to a foot tall accumulated 25 pounds of N per acre, or twice the amount of the smaller weeds. This affected the amount of N accumulated by the corn crop in test plots. Corn in fields with smaller weeds accumulated 82 pounds of N per acre, but that fell to 70 pounds of N per acre when competing with those taller weeds.

The study showed that during 2006 and 2007, delayed postemergence glyphosate programs required up to two times more nitrogen to produce the same corn yield as plots treated with a preemergence herbicide or early postemergence programs.

Look at the value of nitrogen taken up by those weeds. If N is priced at \$1,000 per ton, about 50 cents per pound, those taller weeds are pulling \$12.50 of N per acre right out of your wallet. It's another measure to review when looking at the impact of weed size in your control program.

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Weed control and yield impact

Weed Height (inches)	Days Delayed (%)	Corn Yield (% of weed free)	Yield Lost (bu/a)	Dollars Lost (\$/a)
2	0	100	0	0
4	+5	97	4.5	9
6	+9	93	10.5	21
9	+13	92	13.5	27
12	+15	79	31.5	63

EARLY CONTROL PAYBACK: Corn yield is shown when weeds were controlled at the specified weed heights, and later-emerging weeds were also controlled. The number of days between application timings are estimates based on experience in Wisconsin. Corn yield and dollars lost are based on 150-bushel corn at \$2 per bushel for comparison purposes.