Mycogen Facts

MANAGING HERBICIDE RESISTANT CROPS

Herbicide resistant crops (HRCs) are one of the latest and most effective tools in weed control management. Through advanced breeding techniques, these crops are developed to express a herbicide-resistant trait that, when managed properly, give growers several options and advantages over conventional crops.

Growers can purchase herbicide resistant corn and soybeans through Mycogen. But before using a herbicide resistant cropping system, there are several management decisions and special considerations that growers should review.

The HRC Advantage

HRCs have proven to be a valuable asset to many growers. The benefits of using HRCs are evident in the following management advantages:

- Additional weed control options and rescue treatments.
- Ability to spray a specific herbicide directly over the crop without crop damage.
- Simplicity of using a single product in some situations.
- Excellent weed control from the herbicides applied to HRCs.
- Cost of total program is often lower.
- Fewer carryover concerns than some conventional programs.
- Less crop injury.
- A wider herbicide application window in some cases.
- Conventional herbicide programs can still be effectively utilized on HRCs.

The key advantage to using HRCs over conventional crops is the several options that growers are given. When an HRC program is properly managed, these options not only lead to the above advantages, but also can positively affect a grower's bottom line.

Available HRCs

Mycogen currently offers growers the following HRCs:

- IMI-CORN[1]
- Roundup Ready[2] soybeans
- STS[3] soybeans

IMI-CORN

IMI resistance has been introduced into some of the most popular Mycogen high-yielding corn hybrids. Growers can use Lightning[1], Contour[1] or Resolve[1] herbicides on this HRC for effective broad-spectrum weed control of both grasses and broadleaf weed species in an early post-emergence program.

Special Considerations:

- Lightning gives growers residual control on weeds.
- There is no technology fee for using the Mycogen IMI-CORN program.
- The IMI-CORN herbicide system provides improved resistance to crop injury from some carryover herbicides.

Roundup Ready soybeans

The Roundup Ready soybean program delivers broad-spectrum annual and perennial weed control. This post-emergent weed program is both effective and easy to use.

Special considerations:

- This program gives growers the flexibility of a wide application window, from emergence to flowering.
- Roundup Ultra[2] herbicide is easy to handle and has no carryover concerns.
- There is a technology fee and seed prices are usually higher, but the total program cost is generally equal to or lower than conventional programs.
- Roundup Ultra does not provide residual weed control.
- Drift or misapplication to non-Roundup Ready crops can cause substantial crop damage.
- Growers cannot replant produced seeds from purchased Roundup Ready varieties.

STS soybeans

The STS soybean program provides good annual weed control. This HRC is specifically bred for added protection against sulfonylurea herbicides, such as Synchrony[3] and Reliance[3].

Special considerations:

- This program is very economical and does not charge a technology fee.
- Growers get residual weed control when using the STS herbicide system.
- The STS system offers additional crop safety from many ALS herbicides that may have carried over from the previous year.

Managing An HRC Program

All HRC programs must be properly managed to assure their success and profitability. Growers should follow these important management procedures when using an HRC program:

- **Clearly mark fields.** Severe crop damage can result from applying the wrong herbicide to an HRC or a non-resistant crop. It's extremely important to know where and what type of program is being used in each field.

Traditionally, most seed and herbicide companies have not provided signs to mark HRC fields. However, many growers have found success by accurately marking their fields with ribbons, stakes, colored flags or other geographical markers.

- **Keep accurate records.** Detailed records allow growers to track their HRC program from one season to the next. This provides helpful information on which crop and program can be planted in the following year.

Mycogen has a pocket notebook available for growers to keep records on crop data, planting and spraying dates, weather conditions, weed populations and other important information.

- **Start with a clean planter.** Mixing HRC seed with conventional seed can have detrimental effects on the conventional seed at the time of herbicide application. Growers can prevent this problem by completely cleaning the conventional seed out of their planters before planting HRC seed.
- **Rotate HRC programs.** In order to prevent weed resistance, growers should rotate their HRC programs. For example, applying herbicides from the same general chemical family in consecutive seasons may cause some weeds to develop resistance. Mixing herbicide modes of action over time should help prevent these resistance concerns.
- **Check seed bag tags.** It's important for growers to check the tags on their seed bags to prevent planting mistakes. To help differentiate HRC seed from conventional seed, Mycogen packages Roundup Ready soybeans in different colored bags, IMI-CORN has a special seed tag and STS, Roundup Ready and IMI are included as part of the product name.

Summary

After reviewing all of the management considerations, growers may be ready to purchase HRC seed. As always, it is very important to match the hybrid or variety to specific field needs. Growers should carefully compare yields of HRC corn hybrids and soybean varieties just as they would when selecting conventional hybrids and varieties. Selection should first be based on an HRCs yield potential and then for its accompanying herbicide package. Mycogen can help growers decide which HRC system and corn hybrids and soybean varieties are best for them. Growers should contact their local Mycogen Seeds representative for more information regarding HRCs.

Weed Resistance Management

Growers need to carefully manage weed resistance when using HRCs. Weeds may develop a resistance when the same herbicide is continually applied or herbicides with the same modes of action are used. The cost and timeframe it takes to reverse weed resistance is not practical, so preventing this problem is critical.

Weed resistance can occur at a compounding rate that is often difficult or impossible to predict. The following chart exhibits how rapidly the weed control in a field can move from excellent to failure because of this compounding effect.

Treatment year	% Resistant weeds in total population	Weed control
0	.0001	Excellent
1st application	.00143	Excellent
2nd application	.0205	Excellent
3rd application	.294	Excellent
4th application	4.22	Excellent
5th application	60.5	Failure

Source: Martin, A.U. of Nebraska (Hypothetical model data. The actual time to occurrence depends on many factors.)

Growers should follow these management guidelines to help prevent the development of herbicide-resistant weeds:
- Scout fields to make sure a herbicide application is needed.
- Rotate crops and avoid using herbicides with the same mode of action on the same field in consecutive years.
- Limit multiple applications of the same herbicide or herbicides with the same mode of action in a single season.
- Tank mix herbicides with different modes of action to control specific weeds.
- Watch for shifts in weed populations.

Mycogen SEEDS

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