



WEED MANAGEMENT SOLUTIONS IN SOYBEAN - NORTH

What You'll Learn...

- A comprehensive weed management plan includes preplant burndown, pre-emergence, and in-crop herbicide applications using herbicide products with multiple sites of action in the plant.
- Weeds should be removed to eliminate competition before any yield potential is lost.

Factors for All Weed Management Solutions

Timely Weed Removal. Managing weeds when they are small can help protect soybean yield potential. For every inch of weed height greater than 4 inches, a 2 to 3% yield loss has been observed.⁴ Weeds can often grow 1 inch in 3 to 4 days.⁴

Residual Herbicides. These should be used pre-emergence (PRE) and/or post-emergence (POST) to help manage weed resistance and protect yield potential.

Germplasm. Soybean product selection is a critical component of a weed management plan. Products should be chosen based on yield potential, disease tolerances, and other characteristics, not solely on their tolerance to herbicides.

Herbicide Comparison

Genuity® Roundup Ready 2 Yield® Soybeans.

Roundup® brand glyphosate-only agricultural herbicides, with the active ingredient glyphosate, are the key herbicides used with Genuity Roundup Ready 2 Yield soybeans. Once glyphosate is absorbed by the weed, it is translocated to the growing points in the weed.¹ Following glyphosate absorption and translocation, amino acid production is inhibited, which usually results in plant death. Specific residual herbicides are recommended for PRE and/or POST applications, especially if glyphosate-resistant weeds are suspected (Table 1). Additionally, a POST application of a contact herbicide such as lactofen (Cobra®) is recommended to manage emerged glyphosate-resistant weeds.

LibertyLink® Soybeans. Liberty® Herbicide, with the active ingredient glufosinate, is the key herbicide used in LibertyLink® soybeans. Translocation of glufosinate is limited, which makes good coverage critical for weed management. Glufosinate inhibits the activity of an

Table 1. Soybean herbicide recommendations.

Application timing	Tank mix options with Roundup PowerMAX® herbicide or Roundup WeatherMAX® herbicide
Burndown	Dicamba or 2,4-D, + residual as needed
Preplant/PRE	Warrant® Herbicide, Rowel® Herbicide, Rowel® FX Herbicide, Fierce®, Valor® EZ, Valor® XLT, Gangster®, Authority® Assist, Authority® First, Authority® MTZ, or Authority® XL
POST 1	Warrant® Ultra Herbicide or Warrant® Herbicide
POST 2	Warrant® Ultra Herbicide or Warrant® Herbicide plus Cobra®. If PPO resistant weeds have emerged, substitute Harmony® or FirstRate® for Cobra® based on emerged weeds.

Table 2. Labeled weed heights for potential in-crop applications of various herbicide solutions in geographies with glyphosate resistance.

	Roundup PowerMAX® herbicide or Roundup WeatherMAX® herbicide at 32 fl oz/acre plus	Liberty® herbicide (fl oz/acre)	
	Cobra® at 12.5 fl oz/acre	22 oz	29 oz
Fall panicum	4-12"	3"	5"
Velvetleaf	4-12"	3"	4"
Kochia	4-12"	4"	6"
Glyphosate-resistant Biotypes			
Palmer amaranth	6 leaf	NR	4"
Waterhemp	6 leaf	NR	5"

enzyme critical for the conversion of ammonia to other nitrogen compounds.¹ A build up of ammonia and other effects of amino acid inhibition are often the cause(s) of plant injury or death.

Weed Management

Weed Size. For both herbicide trait systems, it is recommended to manage weeds when they are small to help optimize weed control and limit weed competition with the crop; however, at times, weeds can get larger than preferred. For management of large or tough-to-control weeds, carefully read Roundup® brand glyphosate-only agricultural herbicide labels or the Liberty® herbicide label to select an appropriate rate and/or tank mixture for a weed problem (Table 2).

If environmental conditions prevent a timely application of Liberty® herbicide, a single application of 36 oz/acre of Liberty® herbicide can be applied to LibertyLink® soybeans, followed by a sequential application at a maximum rate of 29 fl oz/acre.



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Table 3. Comparison of Genuity® Roundup Ready 2 Yield® Soybeans with LibertyLink® Soybeans.

	Roundup WeatherMAX® Herbicide + Warrant® Ultra Herbicide in Genuity® Roundup Ready 2 Yield® Soybeans	Roundup WeatherMAX® Herbicide + POST tank mix with Cobra® in Genuity Roundup Ready 2 Yield Soybeans	Roundup WeatherMAX® Herbicide + POST tank mix of Warrant® Herbicide + Cobra® in Genuity Roundup Ready 2 Yield Soybeans	Liberty® Herbicide in LibertyLink® Soybeans
Active Ingredient	Glyphosate + acetochlor/fomesafen	Lactofen (Cobra®)	Warrant® Herbicide - acetochlor + Cobra® - lactofen	glufosinate
Amount of Translocation¹	Glyphosate translocated; acetochlor is residual, fomesafen is contact	Glyphosate is translocated. Cobra® is a contact.	Glyphosate is translocated; Warrant Herbicide is a residual; Cobra is a contact.	Limited translocation
Weed Spectrum	~240 and glyphosate-resistant broadleaves	~240 and glyphosate-resistant broadleaves	~240 and glyphosate-resistant broadleaves	~140
Carrier Volume	15 to 20 GPA	Cobra® 20 to 30 GPA	Warrant® Herbicide - 10 GPA or more Cobra® - 20 to 30 GPA	Minimum - 15 GPA; Dense Canopies - 20 to 40 GPA
In-crop Application	Cracking through R1	Cracking through R2 (bloom)	Cracking through R2 (bloom)	Emergence up to bloom.
Maximum In-crop Rate	Roundup WeatherMAX® herbicide 44 fl oz/acre (64 fl oz/acre total); Warrant® Ultra Herbicide 48 to 60 fl oz/acre	see labels	see labels	36 fl oz/acre (65 fl oz/acre total)
Maximum Rate/Year	Roundup WeatherMAX® herbicide 169.6 fl oz/acre; Warrant® Ultra Herbicide 48 to 60 fl oz/acre	Cobra® 25 fl oz/acre	Cobra® - 25 fl oz/acre; Warrant® Herbicide - 4 quarts/acre	65 fl oz/acre Burndown up to bloom
Pre-harvest Interval	45 days Warrant® Ultra Herbicide; 14 days Roundup WeatherMAX® herbicide	Cobra® 45 days	Cobra® - 45 days	70 days
Rainfast	1 hour Warrant® Ultra Herbicide; 30 minutes Roundup WeatherMAX® herbicide	Cobra® 30 minutes	Cobra® - 30 minutes	4 hours

In-crop Application Window. Roundup® brand glyphosate-only agricultural herbicides can be applied to Genuity® Roundup Ready 2 Yield® soybeans from emergence through flowering (the R2 stage). R2 stage soybean ends when a pod 5 mm (3/16-inch) long appears at one of the 4 uppermost nodes on the main stem with a fully developed leaf (R3).³ Liberty® herbicide can be applied from emergence to bloom, but not including bloom (Table 3).

Environmental Conditions. Making applications to actively growing weeds is beneficial for the efficacy of glyphosate and glufosinate. Application of Liberty® herbicide to soybeans showing injury from prior herbicide applications or environmental conditions is not allowed by the Liberty® herbicide label.

Rainfast. Roundup WeatherMAX® herbicide is rainfast in 30 minutes. Liberty herbicide is rainfast after 4 hours. Cobra® has a 30 minute rain-free period (Table 3).

Tank Cleaning. Cleaning the tank is critical to help minimize crop injury when switching herbicides in different herbicide-tolerant trait systems. Consult individual product labels for detailed instructions.

Multiple factors interact to influence herbicide efficacy. Rate, temperature, and weed height are the most significant factors influencing glyphosate and glufosinate efficacy.⁶ Time of day application is a more significant factor for glufosinate than glyphosate.⁶ Tough-to-control weeds and weeds under stress require the use of the highest label rates, herbicide tank mixtures, recommended adjuvants, and application adjustments to maintain a high level of efficacy.

Sources: ¹ Peterson, D.E., Curtis, T.R., Shoup, D.E., and Olson, B.L. 2010. Herbicide mode of action. Kansas State University Extension. C-715. ² Summary of herbicide mechanism of action according to the Weed Science Society of America (WSSA). (Revised June 10, 2011) <http://www.wssa.net>. ³ Pedersen, P. 2004. Soybean growth and development. Iowa State University Extension. PM 1945. ⁴ Kamienski, C. 2003. Masters thesis: Effect of postemergence glyphosate application timing on weed control and grain yield in glyphosate-resistant soybean. University of Illinois. ⁵ Owen, M.D.K. 2011. 2011 herbicide guide for Iowa corn and soybean production. Iowa State University Extension. WC-94. ⁶ Martinson, K.B., Durgan, B.R., Gunsolus, J.L., and Sothorn, R.B. 2005. Time of day application effect on glyphosate and glufosinate efficacy. Online. Plant Management Network. Web sources verified 03/11/17. 130307013209

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