Weed Control – That Everlasting Nemesis

By: Mark Bredehoeft and Dr. Jeff Stachler

Weed control is a never ending production problem even with an effective tool like glyphosate. Six glyphosate formulations are currently labeled for Roundup Ready Sugarbeet. Each formulation has a different acid equivalent (a.e.) concentration or amount of glyphosate. Always be aware of the a.e. and not the active ingredient (a.i.) concentration of any glyphosate formulation being used.

Effective weed control in each crop of the rotation is very important. Glyphosate-based weed control programs are most commonly used today. ***One very important option to consider is the use of Ignite 280 herbicide with Liberty Link corn or soybean varieties.*** The use of alternate herbicide sites (modes) of action within the cropping rotation is extremely critical for proper stewardship of herbicides. When using Ignite 280, include preemergence and/or postemergence herbicides for improved weed control.

With the third year of commercial production of Roundup Ready sugarbeet and the continued use of Roundup Ready corn and soybean, proper rotation of effective herbicides to control key weeds in all crops is important. Including herbicides with alternate sites of action in sequence or in mixture with glyphosate should improve control of several key weeds. Tables 1 and 4 represent the effectiveness of most preemergence and postemergence herbicides available in corn and soybean, respectively to control common and giant ragweed, waterhemp, lambsquarters, and kochia. Tables 2 and 3 represent the effectiveness of only those preemergence and postemergence herbicides applied to corn the year prior to sugarbeet and two years prior to sugarbeet, respectively. Tables 5 and 6 represent the effectiveness of only those preemergence and postemergence herbicides applied to soybean the year prior to sugarbeet and two years prior to sugarbeet, respectively. Control of additional weeds can be found in the 2010 North Dakota Weed Control Guide (http://www.ndsu.edu/weeds/weed_control_guides/2009_weed_control_guide/). Tables 2, 3, 5, and 6 also indicate which herbicides will be ineffective if the weed population contains multiple-resistant biotypes.

Many corn and soybean herbicides can persist in the soil for multiple years and injure sugarbeet and other crops in the rotation. Following proper crop rotation intervals is important to maximizing sugarbeet yield and quality and prohibiting destruction of the crop due to illegal herbicide residues. Tables 7 and 8 shows the crop rotation interval of corn and soybean herbicides, respectively for dry bean, pea, potato, wheat, sugarbeet, and corn or soybean.

The tables in this document were authored by Dr. Jeff Gunsolus with the University of Minnesota and Dr. Jeff Stachler with the University of Minnesota/North Dakota State University. If you have any questions regarding this article please forward your inquiries to Jeff Stachler (jeff.stachler@ndsu.edu).

Table 1. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Corn

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University — University of Minnesota Extension

SOA #	PRE as part of sequential with glyphosate	Cost $/unit	Common ragweed	Giant ragweed	Lambsquarters	Kochia	Waterhemp
	Herbicides to Complement Glyphosate						
5	Atrazine (0.38 lb ai/A)	4.50/lb	**G**	F	**G/E**	**G**	**G/E**
27	Balance Flex ***(ND only)***	4.50/fl oz	**G/E**	F/G	**E**	**E**	**G**
4	Banvel / Clarity (dicamba)	~110.00/gal	**G**	F	**G**	**G**	**G**
27	Callisto	630.00/gal	**G/E**	**G**	**G/E**	P	**G/E**
15,27	Camix	65.00/gal	**G**	**G**	**G/E**	F	**E**
15	Harness / Surpass (acetochlor)	~100.00/gal	F	P	F/G	F	**G/E**
15	Other Acetamides (Dual, Lasso, Outlook)	~175.00/gal	P	P	P/F	N/P	**G**
2,4	Hornet	4.50/oz	**G/E**	F/G	**G**	F	P/F
14,15	Integrity	190.00/gal	**G/E**	**G**	**G/E**	**G/E**	**G/E**
5,15,27	Lumax	65.00/gal	**G/E**	**G**	**G/E**	**G/E**	**E**
2,27	Prequel ***(ND only)***	7.00/oz	**G/E**	F/G	**E**	**E**	**G**
2,4,15	SureStart	88.00/gal	**G/E**	F/G	**E**	F/G	**G**
	POST as part of tank mix with glyphosate						
14	Aim	210.00/qt	P	P	F/G	F/G	F/G
5	Atrazine (0.38 lb ai/A)	4.50/lb	**G/E**	**G**	**E**	**E**	**G**
4	Banvel / Clarity (dicamba)	~100.00/gal	**G/E**	**G**	**G**	**G/E**	**G**
6	Buctril	72.00/gal	**G/E**	F/G	**G**	**G/E**	F
14	Cadet	320.00/qt	P	P	F	P/F	F
28	Callisto	630.00/gal	F	**G**	**G/E**	P/F	**E**
2,27	Capreno	Not Avail.	**G**	**G**	**G/E**	**E**	**G/E**
2,4	Hornet	4.50/oz	**G/E**	**G/E**	P/F	F/G	P/F
27	Impact	21.00/fl oz	**G**	**G**	**G/E**	**E**	**G/E**
27	Laudis	5.00/fl oz	**G**	**G**	**G/E**	**E**	**G/E**
2	Option	10.50/oz	P/G	P	F/G	P/G	P
2	Permit	20.00/oz	P/G	P/G	P	P/G	P/G
2,4	Resolve Q	7.50/oz	P	P	F	P/E	P/G
14	Resource	200.00/gal	F	P	F	P	F
4,19	Status / Distinct	~2.80/oz	**G/E**	**G/E**	**G/E**	**E**	**G**
	Alternative Technologies						
10	Ignite 280 in LL Corn	70.00/gal	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No Control

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Table 2. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Corn
(Corn Planted Year Prior to Sugarbeet)

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University
University of Minnesota Extension

	Herbicides to Complement Glyphosate					
SOA #	**PRE as part of sequential with glyphosate**	**Common ragweed**	**Giant ragweed**	**Lambsquarters**	**Kochia**	**Waterhemp**
5	Atrazine (0.38 lb ai/A)	**G**	F	**G/E**	**G**	**G/E**
4	Banvel / Clarity (dicamba)	**G**	F	**G**	**G**	**G**
15	Harness / Surpass (acetochlor)	F	P	F/G	F	**G/E**
15	Other Acetamides (Dual, Lasso, Outlook)	P	P	P/F	N/P	**G**
14,15	Integrity	**G/E**	**G**	**G/E**	**G/E**	**G/E**
	POST as part of tank mix with glyphosate					
14	Aim	P	P	F/G	F/G	F/G
5	Atrazine (0.38 lb ai/A)	**G/E**	**G**	**E**	**E**	**G**
4	Banvel / Clarity (dicamba)	**G/E**	**G**	**G**	**G/E**	**G**
6	Buctril	**G/E**	F/G	**G**	**G/E**	F
14	Cadet	P	P	F	P/F	F
2	Option	P/G**	P**	F/G**	P/G**	P**
14	Resource	F	P	F	P	F
4,19	Status / Distinct	**G/E**	**G/E**	**G/E**	**E**	**G**
	Alternative Technologies					
10	Ignite 280 in LL Corn	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No Control

SOA = Site of action and is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Glyphosate plus ALS-inhibitor resistant common and giant ragweed and waterhemp are highly suspected in MN!

****Weeds resistant to ALS-inhibitors and glyphosate will not be controlled.**

Table 3. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Corn
(Corn Planted 2 Years Prior to Sugarbeet)

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University
University of Minnesota Extension

	Herbicides to Complement Glyphosate					
SOA #	PRE as part of sequential with glyphosate	Common ragweed	Giant ragweed	Lambsquarters	Kochia	Waterhemp
5	Atrazine (0.38 lb ai/A)	**G**	F	**G/E**	**G**	**G/E**
27	Balance Flex ***(ND only)***	**G/E**	F/G	**E**	**E**	**G**
4	Banvel / Clarity (dicamba)	**G**	F	**G**	**G**	**G**
27	Callisto	**G/E**	**G**	**G/E**	P	**G/E**
15,27	Camix	**G**	**G**	**G/E**	F	**E**
15	Harness / Surpass (acetochlor)	F	P	F/G	F	**G/E**
15	Other Acetamides (Dual, Lasso, Outlook)	P	P	P/F	N/P	**G**
14,15	Integrity	**G/E**	**G**	**G/E**	**G/E**	**G/E**
5,15,27	Lumax	**G/E**	**G**	**G/E**	**G/E**	**E**
2,27	Prequel ***(ND only)***	**G/E**	F/G	**E**	**E**	**G**
	POST as part of tank mix with glyphosate					
14	Aim	P	P	F/G	F/G	F/G
5	Atrazine (0.38 lb ai/A)	**G/E**	**G**	**E**	**E**	**G**
4	Banvel / Clarity (dicamba)	**G/E**	**G**	**G**	**G/E**	**G**
6	Buctril	**G/E**	F/G	**G**	**G/E**	F
14	Cadet	P	P	F	P/F	F
28	Callisto	F	**G**	**G/E**	P/F	**E**
27	Impact	**G**	**G**	**G/E**	**E**	**G/E**
27	Laudis	**G**	**G**	**G/E**	**E**	**G/E**
2	Option	P/G**	P**	F/G**	P/G**	P**
2,4	Resolve Q	P**	P**	F**	P/E**	P/G**
14	Resource	F	P	F	P	F
4,19	Status / Distinct	**G/E**	**G/E**	**G/E**	**E**	**G**
	Alternative Technologies					
10	Ignite 280 in LL Corn	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No Control

SOA = Site of action and is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Glyphosate plus ALS-inhibitor resistant common and giant ragweed and waterhemp are highly suspected in MN!

****Weeds resistant to ALS-inhibitors and glyphosate will not be controlled.**

Table 4. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Soybean

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University | University of Minnesota Extension

SOA #	Herbicides to Complement Glyphosate PRE as part of sequential with glyphosate	Cost $/unit	Common ragweed	Giant ragweed	Lambsquarters	Kochia	Waterhemp
15	Alachlor (IntRRo)	25.00/gal	P	P	P/F	P	F
15	Other Acetamides (Dual, Oulook)	~175.00/gal	P	P	P/F	N/P	F/G
2,14	Authority Assist	2.35/fl oz	F	P	**E**	**E**	**G/E**
2,14	Authority First / Sonic	4.40/oz	**G/E**	**G**	**G/E**	**G/E**	**G/E**
5,14	Authority MTZ	19.00/lb	**G**	P/F	**G**	**G/E**	**G/E**
5,15	Boundary	88.00/gal	**G**	P/F	**G**	P	**G/E**
2,2,14	Enlite ***(MN Only)***	5.00/oz	**G**	F	**G/E**	**G**	**G/E**
2	FirstRate	35.00/oz	**G/E**	**G**	**G**	F	P
2,14	Gangster	680.00/cont	**G/E**	**G**	**G/E**	**G**	**G**
2,14	Optill	Not Avail.	**G**	F/G	**G/E**	**G**	**G**
14,15	Prefix ***(E. of I-29 and S. of I-94 Only)***	55.00/gal	**G**	F	**G**	F	**G**
3	Prowl	~45.00/gal	P	P	**G**	P	F/G
5	Sencor	~20.00/lb	G	P	P/F	F/G	**G**
14	Sharpen (1 oz/A)	575.00/gal	**G**	F	**G/E**	**G**	**G**
14	Spartan	550.00/gal	P	P	**E**	**E**	**G**
3	Treflan	~26.00/gal	P	P	**G/E**	P	**G/E**
14	Valor	5.25/oz	F/G	N/P	**G/E**	**G**	**G**
	POST as part of tank mix with glyphosate						
14	Cadet	320/qt	P	P	F	P/F	F
2	Classic ***(MN Only)***	15.00/oz	**G**	F/G	P	P	P
14	Cobra / Phoenix	160.00/gal	**G/E**	**G**	P	P/F	**G/E**
2	FirstRate	35.00/oz	**E**	**E**	P	P	P
14	Flexstar	125.00/gal	**G/E**	**G**	P/F	**G**	**G/E**
2	Harmony GT	31.00/oz	P/F	P	**G/E**	F/G	P/G
2	Pursuit	625.00/gal	P	P	P/F	P/G	P/E
2	Raptor	625.00/gal	P	P	F	P/E	P/E
14	Resource	200.00/gal	F	P	F	P	F
2	Synchrony XP ***(MN Only)***	Not Avail.	**G**	F/G	**G/E**	P/E	P/G
14	Ultra Blazer	75.00/gal	**G**	F	F	P/F	**G**
	Alternative Technologies						
10	Ignite 280 in LL Soybean	70.00/gal	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No control

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Table 5. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Soybean
(Soybean Planted Year Prior to Sugarbeet)

Authored by Jeff Gunsolus and adapted by Jeff Stachler

SOA #	Herbicides to Complement Glyphosate PRE as part of sequential with glyphosate	Common ragweed	Giant ragweed	Lambsquarters	Kochia	Waterhemp
15	Alachlor (IntRRo)	P	P	P/F	P	F
15	Other Acetamides (Dual, Oulook)	P	P	P/F	N/P	F/G
14	Sharpen (1 oz/A)	**G**	F	**G/E**	**G**	**G**
14	Valor	F/G	N/P	**G/E**	**G**	**G**
	POST as part of tank mix with glyphosate					
14	Cadet	P**	P**	F	P/F	F**
14	Cobra / Phoenix	**G/E****	**G****	P	P/F	**G/E****
2	Harmony GT	P/F**	P**	**G/E**	F/G**	P/G**
14	Resource	F**	P**	F	P	F**
14	Ultra Blazer	**G****	F**	F	P/F	**G****
	Alternative Technologies					
10	Ignite 280 in LL Soybean	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No control

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Glyphosate plus ALS-inhibitor resistant common and giant ragweed and waterhemp are highly suspected in MN!

A Glyphosate plus ALS-inhibitor plus PPO-inhibitor resistant common and giant ragweed biotype may exist in MN!

****Weeds resistant to ALS-inhibitors and/or PPO-inhibitors will not be controlled.**

Table 6. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Soybean
(Soybean Planted 2 Years Prior to Sugarbeet)

Authored by Jeff Gunsolus and adapted by Jeff Stachler

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	Herbicides to Complement Glyphosate					
SOA #	**PRE as part of sequential with glyphosate**	**Common ragweed**	**Giant ragweed**	**Lambsquarters**	**Kochia**	**Waterhemp**
15	Alachlor (IntRRo)	P	P	P/F	P	F
15	Other Acetamides (Dual, Oulook)	P	P	P/F	N/P	F/G
5,15	Boundary	**G**	P/F	**G**	P	**G/E**
14,15	Prefix ***(E. of I-29 and S. of I-94 Only)***	**G**	F	**G**	F	**G**
3	Prowl	P	P	**G**	P	F/G
5	Sencor	G	P	P/F	F/G	**G**
14	Sharpen (1 oz/A)	**G**	F	**G/E**	**G**	**G**
3	Treflan	P	P	**G/E**	P	**G/E**
14	Valor	F/G	N/P	**G/E**	**G**	**G**
	POST as part of tank mix with glyphosate					
14	Cadet	P**	P**	F	P/F	F**
14	Cobra / Phoenix	**G/E****	**G****	P	P/F	**G/E****
14	Flexstar	**G/E****	**G****	P/F	**G**	**G/E****
2	Harmony GT	P/F**	P**	**G/E**	F/G**	P/G**
14	Resource	F**	P**	F	P	F**
14	Ultra Blazer	**G****	F**	F	P/F	**G****
	Alternative Technologies					
10	Ignite 280 in LL Soybean	**G/E**	**G/E**	F	**E**	**G**

E = Excellent Control G = Good Control F = Fair Control P = Poor Control N = No control

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

Note: strengths and weakness and PRO's and CON's of PRE's such as crop injury potential under cool/wet conditions

Note: problems with timing, crop injury potential, and vol. crops of POST herbicides

Note: problems with timing, crop injury potential, and off-target injury of tank mixtures

Glyphosate plus ALS-inhibitor resistant common and giant ragweed and waterhemp are highly suspected in MN!

A Glyphosate plus ALS-inhibitor plus PPO-inhibitor resistant common and giant ragweed biotype may exist in MN!

****Weeds resistant to ALS-inhibitors and/or PPO-inhibitors will not be controlled.**

Table 7. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Corn - Crop Rotation

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University | University of Minnesota Extension

	Herbicides to Complement Glyphosate						
		Herbicide Crop Rotation Interval (Months)					
SOA #	**PRE as part of sequential with glyphosate**	**Dry bean**	**Pea**	**Potato**	**Soybean**	**Sugarbeet**	**Wheat**
5	Atrazine (0.38 lb ai/A)	NCS	NCS	NCS	12	NCS b	NCS
27	Balance Flex ***(ND Only)***	18	18	6	6	18	6
4	Banvel / Clarity (dicamba)	4	4	4	4	4	0
27	Callisto	18	18	10	10	18	4
15, 27	Camix	18	18	NCS	NCS	18	NCS
15	Harness / Surpass (acetochlor)	NCS	NCS	NCS	NCS	NCS	4
15	Other Acetamides (Dual, Lasso, Outlook)	0	NCS	0	0	NCS	4 to 4.5
2,4	Hornet	10.5	10.5	18	10.5	26 b	4
14,15	Integrity	NCS	NCS	NCS	NCS	NCS	4
5,15,27	Lumax	18	18	18	NCS	18	NCS
2,27	Prequel ***(ND only)***	18	18	6	10	18	4(Fall)/9(Sp)
2,4,15	SureStart	18	NCS	18	NCS	26 b	4
	POST as part of tank mix with glyphosate						
14	Aim	0	0	0	0	0	0
5	Atrazine (0.38 lb ai/A)	NCS	NCS	NCS	12	NCS b	2CS
4	Banvel / Clarity (dicamba)	4	4	4	4	4	4
6	Buctril	1	1	1	1	1	1
14	Cadet	NCS	NCS	NCS	0	NCS	NCS
27	Callisto	18	18	10	10	18	4
2,27	Capreno	18 [see label]	18 [see label]	18 [see label]	10	(24) [see label]	4
2,4	Hornet	10.5	10.5	18	10.5	26 b	4
27	Impact	18 / 9 [0.5oz/A]	9	9	9	9 [0.5 fl oz/A] / (18)	3
27	Laudis	9 to 18 [see label]	10	10	8	10 [20" rain] / (18)	4
2	Option	3	3	3	0.5	3	3
2	Permit	9	9	9	9	36	2
2,4	Resolve Q	10	18	0	10	10/18 [see label]	9
14	Resource	1	1	1	0	1	1
4,19	Status / Distinct	4	4	4	1 to 4	4	1 to 4
	Alternative Technologies						
10	Ignite 280 in LL Corn	6	6	2.33	0	0	2.33

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

NCS = Next Cropping Season

2CS = 2 Cropping Seasons

( ) = Recommended interval

Shading = Herbicides requiring ≥2 years before planting sugarbeets

b = including a successful bioassay

Table 8. PRE and POST Herbicide Diversification Options for Glyphosate-Resistant Soybean - Crop Rotation

Authored by Jeff Gunsolus and adapted by Jeff Stachler

NDSU Extension Service, North Dakota State University | University of Minnesota Extension

	Herbicides to Complement Glyphosate						
		Herbicide Crop Rotation Interval (Months)					
SOA #	**PRE as part of sequential with glyphosate**	**Corn**	**Dry bean**	**Pea**	**Potato**	**Sugarbeet**	**Wheat**
15	Alachlor (IntRRo)	0	NCS	NCS	NCS	NCS	NCS
15	Other Acetanalides (Dual, Outlook)	0	0	NCS	0	NCS	4 to 4.5
2,14	Authority Assist	10	4	4	26	40 b	4
2,14	Authority First / Sonic	10	12	12	18	30 b	4
5,14	Authority MTZ	10	12	18	12	36	4
5,15	Boundary	8	12	8	0	18	8
2,2,14	Enlite ***(MN Only)***	9	9	9	30	30	4
2	FirstRate	9	9	9	18	30 b	3
2,14	Gangster	9	9	9	18	30 b	3
2,14	Optill	8.5	4	4	26	40 b	4
14,15	Prefix ***(E. of I-29 and S. of I-94 Only)***	10	0	10	18	18	4.5
3	Prowl	0	0	0	0	12 (2CS)	NCS
5	Sencor	4	12	8	4	18	8
14	Sharpen (1 oz/A)	0	4	0	4	4	0
14	Spartan	10	0	0	12	36	4
3	Treflan	NCS	0	0	0	12 (2CS)	NCS
14	Valor	0.5 to1	3 to 4	3 to 4	4 to12	4 to 10	1 to 2
	POST as part of tank mix with glyphosate						
14	Cadet	0	NCS	NCS	NCS	NCS	NCS
2	Classic ***(MN Only)***	10	12	12	30	30	3
14	Cobra / Phoenix	0	0	0	0	0	0
2	FirstRate	9	9	9	18	30 b	3
14	Flexstar	10	10	10	18	18	4
2	Harmony GT	0	45 days	45 days	45 days	45 days	0
2	Pursuit	8.5	4	4	26	40 b	4
2	Raptor	8.5	0	9	9 to 18	18 to 26	3
14	Resource	0	1	1	1	1	1
2	Synchrony XP ***(MN Only)***	9	9	9	30	30	3
14	Ultra Blazer	100 days	100 days	100 days	100 days	100 days	40 days
	Alternative Technologies						
10	Ignite 280 in LL Soybean	0	6	6	2.33	0	2.33

SOA = Site of action is defined as the biochemical site at which the herbicide binds to control a plant

NCS = Next Cropping Season

2CS = 2 Cropping Seasons

( ) = Recommended interval

Shading = Herbicides requiring ≥2 years before planting sugarbeets

b = Including a successful bioassay