

**Conservation
Tillage Series**

Tillage

Conservation

Weed Control in No-Tillage Systems

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Botany and Plant Pathology

A no-till planted field does not have to mean a field full of weeds. No-tillage systems use herbicide applications instead of cultivation for weed control. A greater reliance on herbicides requires attention to detail - types of weeds, weather trends, cropping patterns, soil type - in order to control weed populations without adversely affecting the environment. The first few years of no-tillage may require higher herbicide inputs. However, many long-term growers claim once no-till is established, herbicide costs generally decrease and become competitive with conventional systems.

Successful weed control in no-tillage requires:

- accurately identifying weeds
- proper timing of herbicide treatments
- scouting and monitoring fields for problem areas
- spot spraying herbaceous and woody perennials
- keeping fence rows and field borders free of aggressive weeds
- assuring even distribution of crop residue after harvest

Shift in Weed Species

Without deep tillage, weed seeds stay near the soil surface instead of being buried too deep for germination. Small-seeded broadleaf weeds and annual grasses can germinate under crop residue as shown in Figure 1. Large-seeded weeds, such as velvetleaf and common cocklebur, need deeper soil placement to germinate. With continued no-tillage, large-seeded weed populations tend to decline. Both simple

perennial and creeping perennial weeds multiply in a no-tillage system. Creeping perennials also tend to be a problem in conventional tillage systems, although tillage controls simple perennials. Table 1 lists the weeds commonly found in no-till planted fields (see page 2).

Weed Control Strategies in No-tillage

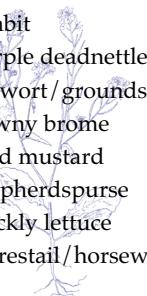
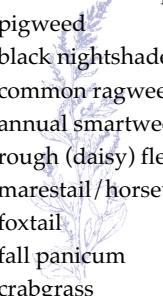
Early preplant

For the best results apply early preplant herbicide treatments before germination of summer annual weeds. The timing of these treatments range from ten to 45 days prior to planting of the crop, see



Figure 1. An uneven covering of residue can interfere with the effectiveness of herbicide applications. Large clumps of residue shield weeds and grasses from herbicides.

Table 1. Common Weeds in No-till Systems

Winter annuals	Summer annuals	Simple perennials (one main taproot)	Creeping perennials (underground creeping rootstocks, rhizomes, or tubers)
 common chickweed henbit purple deadnettle ragwort / groundsel downy brome wild mustard shepherdspurse prickly lettuce marestail/horseweed	 common lambsquarters pigweed black nightshade common ragweed annual smartweed rough (daisy) fleabane marestail/horseweed foxtail fall panicum crabgrass	 common pokeweed common dandelion wild four o'clock curly dock Biennials wild carrot common mullein poison hemlock common burdock	 Canada thistle hemp dogbane Jerusalem artichoke bindweed common milkweed honeyvine milkweed trumpet creeper bigroot morning glory horsetail ground cherry swamp smartweed yellow nutsedge johnsongrass quackgrass wirestem muhly

Tables 2 and 3. Applying herbicides early in the season, when rains are more frequent, insures activation of the herbicides. Early application also helps spread out the spring work load. With timely herbicide applications, the fields will be free of weeds at planting, eliminating the need for a burndown treatment. Early killing of weeds also discourages insects attracted to weedy fields, such as black cutworm moths.

Weeds in no-tilled fields tend to germinate throughout the season. Maintain season-long weed control with early pre-plant treatments of “full season” residual herbicides or split treatments of herbicides with medium longevity. Split applications often include applying 2/3 of the labeled herbicide rate early and the remaining 1/3 at planting. Many early preplant herbicides have burndown

activity on small weeds (1" to 3"). Adding a crop oil or surfactant to the herbicide mix improves their control. Weeds greater than 3", such as winter or early summer annuals, may be present at the time of early preplant applications. Abundant weed growth may require a burndown herbicide, such as glyphosate, paraquat, or 2,4-D.

Burndown

Burndown herbicides control emerged weeds before or just after planting, but prior to crop emergence. These herbicides can be combined with early preplant or preemergence treatments. Paraquat (e.g. Gramoxone Extra®) works well in combination with residual herbicides. A tank mix of glyphosate (e.g. Roundup Ultra® or Touchdown) and 2,4-D broadens the spectrum of weed control. The weed species present, size, life cycle, and herbicide efficacy determines what and how much herbicide to apply.

Preemergence

The success of preemergence herbicide treatments depends on rainfall to activate the herbicide soon after spraying. Without moisture, herbicide performance suffers. Herbicides that are soil-applied after planting are often preferred over treatment prior to planting. Planter row-cleaners or “trash-whippers” can move herbicide-treated soil from the row to the row middles, creating weed problems in the untreated zone.

Two types of preemergence herbicide programs are common in no-tillage:

a full season program - where herbicides control weeds throughout most of the growing season, or

a short residual program - where the crop shades out later germinating weeds. Postemergence treatments may be necessary for weed escapes.

Table 2. Early Preplant Herbicides for Corn

Herbicide	Days Before Planting
Atrazine®, Bicep®, Bicep II®*	30-45 (split ^a); less than 30 (split or single); less than 14 on coarse soil
Banvel®, Clarity®, Marksman®*	7-30??
Bladex®*	15-30
Dual®, Dual II®, Frontier®, Harness®, Micro-Tech®, Partner®	30-45 (split ^a); less than 30 (split or single)
Bullet®, Guardsman®, Harness Xtra®*	30-45 (split ^a); less than 30 (split or single)
Extrazine II®, Surpass®, Surpass 100®, TopNotch®	up to 30
Lariat®*	less than 30 (single); less than 45 (split)
Broadstrike + Dual®	30; less than 14 on coarse soil
Hornet®	30
Pursuit® (imi corn hybrids only)	May be applied EPP (number of days not mentioned in label)

* These herbicides will burndown small (1"-3") broadleaf weeds. Add crop oil or surfactant for improved control. If weeds are taller than 3" or one of the other early preplant (EPP) treatments are applied then add a burndown herbicide such as Gramoxone Extra®, Roundup Ultra®, Bronco®, 2,4-D ester, or Touchdown according to label directions.

^a Split applications = 2/3 rate EPP and 1/3 at planting;
single applications = total rate applied EPP

Postemergence

Postemergence treatments work well in a no-tillage system where no soil-applied treatments are planned and also in fields where perennial weeds, such as johnsongrass or Canada thistle are a problem. Soil type or the amount of crop residue present generally does not affect postemergence treatments. Postemergent application does depend on proper timing and correct identification of the target weeds. Successful total postemergence programs occur

in fields that are weed-free when planted.

No-tilling into sod

No-tilling into old hay fields, set-aside, or idle land presents a special challenge. To get a good kill of both grass and legume sods takes advanced planning. Generally, products like glyphosate (e.g. Roundup Ultra®) easily kill grass sod in the fall. Spring applications require higher rates of Roundup Ultra® than fall applications for better kill. Spring treatments of

Gramoxone plus atrazine can provide good control of a mixed stand of grass and legumes before planting corn. The sod needs to be actively growing with sufficient growth for translocative herbicides, such as glyphosate, dicamba (e.g. Banvel®) and 2,4-D to be effective. Sod must be at a certain height and environmental condition before it is sprayed. Research has shown that as the sod warms up to 60 degrees F or more, the effectiveness of Roundup Ultra also increases. The herbicide application may delay planting. Corn planted into a legume sod has more control options than for soybeans. Growth regulator herbicides, such as 2,4-D and dicamba, used postemergence in corn control escaped legumes, but not in soybeans.

Crop competition and mulches

Quick canopy closure provides shade and controls late germinating weeds. Poor crop stands, wide rows, and limited shoot growth result in weedy crops. Without cultivation crop competition becomes an important segment of weed control in no-tillage. Another form of weed control often utilized in no-tillage systems is the establishment of a cover crop prior to planting corn or soybeans. After killing the cover crop with nonselective herbicides the resulting dead mulch serves as a "barrier" to several kinds of small-seeded weeds. Rye and wheat seeded in the fall are the two most common types of cover crops (Figure 2). Not only does the dead rye or wheat straw help smother emerging weed seedlings, but many researchers report the presence of allelopathic chemicals leached from the straw suppress weeds.

Perennial Weeds in No-tillage

Both simple and creeping perennial weeds can become a problem in no-till systems. Simple perennials produce a shoot annually from a main taproot. Simple perennials rarely survive in full-till systems. Creeping perennials reproduce by underground vegetative structures that provide these weeds with both competitive and survival advantages. Creeping roots, rhizomes, and tubers store food and provide numerous buds capable of generating new plants. Creeping perennials can be a problem in both conventional tillage and no-till systems.

Perennial weeds, both grasses and broadleaves, can be difficult to control with herbicides in a cropping system. Herbicide rates used in corn and soybeans are not high enough to provide good control of the root system of most perennial broadleaf weeds. Translocated herbicides must be applied at the proper stage of weed growth for optimum control. Generally, perennials effectively move the herbicide into their root system



Figure 2. Cover crops are best known as a method of erosion control. Cover crops such as rye (pictured) and wheat also effectively control weeds in a no-till system. After burndown treatment, the dead crop serves as a mulch to smother out weeds.

Table 3. Early Preplant Herbicides for Soybeans

Herbicide	Days Before Planting
Command 3ME®	30 - 45
Canopy®*, Lorox Plus®*	up to 30
Dual®, Micro-Tech®, Partner®	30-45 (split ^a); less than 30 (split or single)
Prowl®	up to 45
Sencor®*, Lexone®*, Turbo®*	0-30
Pursuit®, Pursuit Plus®, Scepter®, Squadron®, Detail®, Steel®	up to 45
Broadstrike + Dual®	up to 30; less than 14 for coarse soils
Frontier 6.0®	may be applied EPP, label recommends adding 3-5 ounces more per acre for this application

* These herbicides will burndown small (1"-3") broadleaf weeds. Add crop oil or surfactant for improved control. If weeds are taller than 3" or one of the other EPP treatments are applied then add a burndown herbicide such as Gramoxone Extra®, Roundup Ultra®, Touchdown, Bronco®, or 2,4-D ester according to label directions.

^aSplit applications where 2/3 of labeled rate applied EPP and remaining 1/3 at planting.

when sprayed prior to full bloom in the spring or when new growth appears in the fall.

For broadleaf perennial control in corn, the use of growth regulator herbicides such as 2,4-D, dicamba, and clopyralid (e.g. Stinger®) give "top-kill" as well as provide some control of the root system. Some perennial grass species can be controlled with nicosulfuron (e.g. Accent®), and primisulfuron (e.g. Beacon®).

Increasing the crop competition to weeds by narrowing the rows and using a postemergence herbicide provide some control of broadleaf perennial weeds in soybeans. Several grass-specific herbicides labeled for soybeans work on perennial, weedy grass species. With any herbicide

program, complete control of an entire perennial root system is unlikely with one herbicide application. Follow-up applications the next season(s) are necessary to achieve the desired level of control. Controlling perennial weeds in no-till systems takes persistence.

Controlling perennial weeds with herbicides often calls for special application methods.

- Use wipe-on applicators to apply nonselective translocated herbicides, such as glyphosate (e.g. Roundup Ultra®), to weeds taller than the crop.
- Spot treat to control or suppress perennials prior to planting, in the crop, and at preharvest.

- Monitor fence rows, field borders, and other non-crop areas. Spray perennial weeds that can spread into fields.
- Remove by hand simple perennial weeds such as pokeweed and curly dock. A large portion of the root or crown must be removed.

Herbicide Tolerant Crops

Crops have now been developed that are resistant or highly tolerant to certain herbicides. Examples of herbicide tolerant crops include Pursuit tolerant (imi) corn, STS soybeans, Roundup Ready soybeans, Poast (SR) corn, and Liberty Link corn. These special crops may provide an option for controlling "hard-to-control" weeds in no-tillage systems. For example, Synchrony STS, a premix of Classic and Pinnacle, provides good top-kill of common milkweed. Roundup Ready soybeans allows the use of Roundup Ultra, a nonselective herbicide, to be applied postemergence to the crop and weeds. Higher labeled use rates and split applications of Roundup Ultra will help to control various perennial weeds in no-till soybeans that have been missed with standard herbicide programs. Contact a local seed dealer for more information.

Summary

Changes in tillage influence weed populations. Annual grasses, small-seeded broadleaves, and perennial weeds become more prevalent with no-tillage - while large-seeded broadleaves

decline over time. Correct identification of weeds and their life cycles are essential when selecting the proper herbicides for their control. Without tillage, dependency on herbicides to control weeds increases. Pre-plant herbicide treatments, with or without burndown herbicides, must provide a weed-free field at planting and several days beyond. Early weed control allows the crop to become established without weed competition. Control grass or legume sods in the fall before planting a crop the following spring. For optimum control, treat perennial weeds prior to flowering or when new growth shows in the fall.

For more information

The following table - Problem Weeds in No-till - recommends herbicide treatments to control specific weeds. For more information on weed control in cropping systems, refer to "Weed Control Guidelines for Indiana", WS-16 or the Purdue University "Herbicide Selector" computer program. Both can be obtained from your county Purdue Cooperative Extension office.

References

"Weeds of the North Central States," NCR-281. University of Illinois.

Problem Weeds in No-till

Weed	Crop	Herbicide	Remarks
Annuals - apply herbicide to weeds that are small and actively growing			
Horseweed (maretail)	Corn/Soybeans	Roundup Ultra (1 pt/a) +2,4-D (1 pt/a)	Apply as a burndown treatment before planting. Apply the Roundup Ultra® +2,4-D treatment in 10 gallons of water per acre when the weeds are 6" or less in height. For the 2,4-D (2 pt/a) treatment, wait at least 30 days before planting soybeans.
Corn	Banvel/Clarity®	Atrazine and/or Bladex® + 2,4-D or Banvel® (label rates)	Apply postemergence 1 pt/a on coarse soils and soils with less than 2% organic matter to weeds that are small and actively growing. See label for corn height restrictions.
Soybeans	Gramoxone® + Sencor/Lexone® (label rates)	Apply before planting as a burndown treatment when weeds are very small and actively growing.	
	Canopy® (label rates)	Apply before planting as a burndown treatment when weeds are less than 3" tall. Add a COC to the spray mix.	
	Classic®	Apply 0.75 oz/a plus a COC postemergence before the maretail plants are 6" tall.	
Ragwort (groundsel)	Roundup Ready Soybeans	Roundup Ultra® (postemergence in crop)	1 - 2 pt/a for control.
Prickly lettuce	Corn/Soybeans	Roundup Ultra® (1 pt/a) +2,4-D (1 pt/a) or 2,4-D ester (2 pt/a)	Apply as a burndown application before planting to weeds in the rosette stage. 2,4-D is not effective in controlling ragwort.
	Soybeans	Canopy®, Lorox Plus®, Sencor/Lexone®	Apply a full rate as a burndown application before planting to weeds in the rosette stage. Add a COC to improve control.
			Apply as a burndown treatment before planting. Apply the Roundup Ultra® +2,4-D treatment in 10 gallons of water per acre when the weeds are 6" or less in height. For the 2,4-D (2 pt/a) treatment, wait at least 30 days before planting soybeans.

Weed	Crop	Herbicide	Remarks
Prickly lettuce	Corn	Atrazine, atrazine + Bladex®, or Banvel® (label rates)	Apply as a burndown treatment before planting to weeds that are less than 2" tall. Add a COC with the atrazine treatments.
Soybeans		Canopy®, Lorox Plus®, Sencor /Lexone® (label rates)	Apply before planting as a burndown treatment when weeds are less than 3" tall. Add a COC to the spray mix.
Mustards	Corn/Soybeans	Roundup Ultra® (1 pt/a) + 2,4-D (1 pt/a or 2,4-D ester (2 pt/a)	Apply as burndown treatment before planting. Apply the Roundup Ultra® + 2,4-D treatment in 10 gallons of water per acre when the weeds are 6" or less in height. For the 2,4-D (2 pt/a) treatment wait at least 30 days before planting soybeans.
		Gramoxone Extra® 1.5 - 3 pt/a depending on size of weeds	Apply as a burndown treatment before planting. Add a nonionic surfactant or COC and apply in a minimum of 20 gallons of water per acre.
Corn		Atrazine and/or Bladex® (label rates)	Apply as a burndown treatment before planting to weeds that are less than 2" tall. Add a COC.
Soybeans		Canopy®, Lorox Plus®, Sencor /Lexone®(label rates)	Apply before planting as a burndown treatment when weeds are less than 3" tall. Add a COC to the spray mix.
Perennials - apply translocative herbicides to bloom and/or on fall regrowth			
Bindweed	Corn	2,4-D ester 0.5 - 0.75 pt/a or amine 1 pt/a	Apply postemergence when weeds are in bud to bloom stage or apply preharvest after dent stage in corn. The ester formulation is preferred. Use drop nozzles when corn is over 8" tall.
		Banvel®/Clarity® 0.5 - 1 pt/a	Use the 0.5 pt rate of Banvel® or Clarity® postemergence on sandy soils. On corn between 8" and 36" use Banvel® at 0.5 pt/a.
Soybeans		Blazer®, Cobra®, Basagran®, Reflex®, FlexStar® (label rates)	Vines may be suppressed by these postemergence applications. Control can be improved by adding 2 fluid ounces/a of 2,4-DB.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.

Weed	Crop	Herbicide	Remarks
Bigroot morningglory	Corn	2,4-D amine 1 pt/a or ester 0.5 - 0.75 pt/a	Use postemergence on actively growing weeds that have sufficient vine growth to absorb the herbicide (10" - 24").
Soybeans		Cobra® 12.5 oz/a	Postemergence. Suppression of vines mostly.
	Roundup Ready Soybeans	Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Canada thistle	Corn	Stinger® 0.33 - 0.67 pt/a	Control or suppression. Apply as a postemergence broadcast or spot treatment on Canada thistle shoots that are 6"-8" tall but before bud stage. Do not apply after the corn is 24" tall; do not apply more than 0.67 pt/a per year.
		Banvel/Clarity® 0.5 - 1 pt/a or 2,4-D amine 1 pt / a or ester 0.5 - 0.75 pt/a	Use the 0.5 pt rate of Banvel® or Clarity® postemergence on sandy soils. On corn between 8"-36", use Banvel® at 0.5 pt/a. Mostly suppression of shoots.
		Beacon® 0.76 oz/a or Exceed® 0.8 - 1 oz/a	Apply postemergence when corn height is between 4" - 20" tall (Beacon®) or 4" - 48" (Exceed®), and to Canada thistle plants between 2"- 9" tall (Beacon®) or 1"- 6" (Exceed®). Mostly shoot suppression.
		Laddok® S-12 at 2.33 pt/a	Shoot suppression only. Apply postemergence when Canada thistle is 8" - 10" tall. Use with 2 pt/a COC.
		Buctril® 1.5 pt/a or Buctril® / atrazine 2 - 3 pt/a	Shoot suppression only. Apply postemergence to weeds from 8" tall to the bud stage or up to tassel emergence on corn. Do not add spray additives.
Corn/Soybeans		Roundup Ultra® 2 - 3 qt/a	Spot treat in crop (will kill crop where treated). Or apply after harvesting corn or as a preharvest application in soybeans. Weeds should be actively growing.
Soybeans		Basagran®, Blazer®, Cobra®, Reflex®, FlexStar® (label rates)	Shoot suppression only. Apply postemergence. Most effective when used in conjunction with narrow rows, i.e., crop shading.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.

Weed	Crop	Herbicide	Remarks
Common milkweed and Hemp dogbane	Corn	2,4-D ester 0.5 - 0.75 pt/a or amine 1 - 1.5 pt/a 2,4-D amine 1 - 2 pt/a or ester 1 - 2 pt/a	Apply postemergence. Use drop nozzles when corn is taller than 8". Preharvest: apply after dent stage of corn and when weeds are actively growing and have adequate foliage.
		Banvel®/Clarity® 0.5 to 1 pt/a	See Canada thistle comments
		Beacon® 0.38 oz/a + 2,4-D or Banvel® (label rates) or Exceed® 0.8 oz/a + 2,4-D or Banvel®(label rates)	Apply postemergence to corn and to small milkweed/hemp dogbane plants. See label for corn height.
		Roundup Ultra® 33% solution	Apply with wiper applicator (rope-wick or sponge) only when there is a sufficient height differential between weed and crop.
		Roundup Ultra® 1 - 2% solution	Spot treat plants that are actively growing. Will kill crop where treated.
		Synchrony STS® 0.85 oz/a	For shoot suppression of common milkweed. Use only on STS soybean varieties. See label for rate of adjutants.
		Roundup Ready Soybeans	Roundup Ultra® (postemergence in crop) 2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Honeyvine milkweed	Corn	2,4-D ester 0.5 - 0.75 pt/a or 2,4-D amine 1 pt/a or Banvel® 0.5 - 1 pt/a or 2,4-D + Banvel® at half rates Beacon® 0.76 oz/a or Beacon® + 2,4-D or Banvel® (label rates)	Apply postemergence. The ester formulation of 2,4-D is preferred; however, a combination of 2,4-D and Banvel® may be better than 2,4-D used alone. Check Banvel® label for restrictions. Apply postemergence. Suppression of shoots only.
		Exceed® 0.8 - 1 oz/a + Beacon® or Marksman® (label rates)	

v/v = volume/volume
COC = crop oil concentrate

Weed	Crop	Herbicide	Remarks
Jerusalem artichoke	Corn	Banvel®/Clarity® 0.5 - 1 pt/a or Banvel® +2,4-D at half rate	Apply postemergence. Use the 0.5 pt rate of Banvel® or Clarity® on sandy soils. On corn between 8" - 36" use Banvel® at 0.5 pt/a (drop nozzles preferred).
		Stinger® 0.25 - 0.5 pt/a	Apply postemergence to weeds up to the 5-leaf stage. Do not apply more than 0.67 pt/a per year if retreatment is necessary. Do not apply to corn taller than 24".
		Beacon® 0.76 oz/a	Apply postemergence to 1" - 4" tall Jerusalem artichoke plants.
Soybeans		Pursuit® 4 fluid oz or 1.44 oz DF/a or Classic® 0.75 oz/a	Apply Pursuit® postemergence to weeds that are 6" - 8" tall and Classic® to weeds less than 8" tall. See label for rate of surfactants.
STS Soybeans		Synchrony STS® 0.85 oz/a	Apply postemergence to weeds that are 2" - 6" tall. Use only on STS soybean varieties. See label for rate of adjuvants.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment of surfactants.
Corn/ Soybeans		Roundup Ultra® 1 - 2% solution	Spot treat plants that are actively growing. Will kill crop where treated.
Swamp smart-weed	Corn	Banvel®/Clarity® 0.5 - 1 pt/a	Use the 0.5 pt rate of Banvel® or Clarity® postemergence on sandy soils. On corn between 8" - 36" use Banvel® at 0.5 pt/a (drop nozzles preferred).
Trumpetcreeper	Corn/ Soybeans	Roundup Ultra® 2 - 3 qt/a	Spot treat in crop (will kill crop where treated). Or apply after harvesting corn, or as a preharvest application in soybeans. Weeds should be actively growing.
Corn		Banvel®/Clarity® 1 pt/a	Apply as a postemergence treatment when corn is between spiking and 8" tall. Mostly suppression of vines.
Soybeans		Cobra®, Blazer®, Reflex®, FlexStar®	Apply postemergence. Top suppression only. Most effective when used in conjunction with narrow rows, i.e., crop shading.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a may suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.

Weed	Crop	Herbicide	Remarks
Pokeweed	Corn	Banvel®, Beacon®, Exceed®, or Permit® (label rates)	Apply as a postemergence treatment when weeds are small and actively growing. See label for weed height.
	Corn/Soybeans	Roundup Ultra® 1 - 2% solution	Spot treat weeds that are less than 24" tall. Will kill crop where treated.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt / a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
		Synchrony STS 0.85 oz / A	Suppression only. Apply postemergence to weeds that are 2 to 6" tall. Use only on STS soybean varieties. See label for rate of adjuvants.
STS Soybeans	Corn/Soybeans	2,4-D ester 1 - 2 pt / a	Apply before planting. For soybeans, do not apply less than 7 days before planting if using 1 pt / a and not less than 30 days if applying 1 - 2 pt / a. 2 suggested for best control.
			Control of dandelion with 2,4-D improves as air temperature increases and when 150 growing degree days (GDD) have accumulated by the time of the 2,4-D application.
Dandelion	Corn/Soybeans	2,4-D ester 0.75 pt / a	Apply as a broadcast postemergence treatment. See label for corn height restrictions.
		Synchrony STS 0.85 oz / A	Apply post emergence to weeds that are up to 8 inches in diameter. Use only on STS soybean varieties. See label for rate of adjuvants.
Corn	STS Soybeans	2,4-D ester 1 - 2 pt / a	Apply as a broadcast postemergence treatment. See label for corn height restrictions.
		Roundup Ultra® 2 - 3 qt / a	Apply before planting. For soybeans, do not apply less than 7 days before planting if using 1 pt / a and not less than 30 days if applying 1 - 2 pt / a.
Brambles	Corn/Soybeans	2,4-D ester 1 - 2 pt / a	Apply as a broadcast or spot treatment prior to planting. Also apply as spot treatment in crop (will kill crop where treated).
		Banvel® / Clarity® 2,4-D (label rates)	Mostly suppression of top growth. Apply as a broadcast postemergence treatment. See label for corn height restrictions.

Weed	Crop	Herbicide	Remarks
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a may suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Curly dock	Corn /Soybeans	Roundup Ultra® 2 - 3 qt/a	Apply as a broadcast or spot treatment prior to planting. Also apply as spot treatment in crop (will kill crop where treated).
	Corn	Banvel®/Clarity® 0.5 - 1 pt/a	Apply as a broadcast postemergence treatment.
Roundup Ready Soybeans		Roundup Ultra® (postemergence crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Yellow nutsedge	Corn	Laddok S-12 at 2.33 pt/a Permit® 1.33 oz/a	Apply postemergence. Suppression only. Add 2 pt/a COC. Apply postemergence to weeds that are 4" - 12" tall. Add a nonionic surfactant to the spray mix.
		Frontier®, Harness®, Surpass®, TopNotch®	Soil-applied treatment. Use higher rate for given soil type.
Corn / Soybeans		Lasso®, Dual®, Frontier®, Broadstrike + Dual® Basagran® 2 pt/a	Soil-applied treatment. Use higher rate for given soil type. Apply postemergence 1.5 - 2 pt/a when plants are 6"- 8" tall. Reapply 7-10 days later if needed. Add 2 pt/a COC with each application.
Soybeans		Classic® 0.5 to 0.75 oz/a	Apply postemergence. See label for adjuvant rates.
STS Soybeans		Synchrony STS® 0.85 oz/a	Apply postemergence. Use only on STS soybeans varieties. See label for adjuvant rates.
Rhizome or seedling johnsongrass	Corn	Accent® 0.67 oz/a	Apply postemergence to 4" - 12" tall seedling johnsongrass or apply up to 1.33 oz (in split application) on rhizome johnsongrass 8"-18" tall. Use a nonionic surfactant at 1 qt per 100 gallons of spray or COC at 4 qts per 100 gallons of spray. See label for restrictions.

Weed	Crop	Herbicide	Remarks
	Beacon® 0.76 oz / a as a single or split application		Apply postemergence to seedling johnsongrass when 4" - 12" tall and rhizome johnsongrass when 8" - 16" tall. Add nonionic surfactant at 1 qt per 100 gallons of spray of COC at 1 - 4 pts / a. See label for restrictions.
Soybeans	Assure II® 10 oz / a		Apply postemergence to johnsongrass when 10" - 24" tall. For regrowth apply additional 7 oz / a to regrowth 6" - 10" tall.
	Fusilade DX® 12 oz / a		Apply postemergence to 8" - 18" johnsongrass and retreat 6"-12" regrowth at 8 oz / a. Use COC or nonionic surfactant.
	Poast Plus® 1.5 pt / a		Apply postemergence to johnsongrass 15" - 25" tall. Use Dash or COC. Retreat regrowth with same rate.
Rhizome or seedling johnsongrass	Soybeans	Fusion® 10 -12 oz / a	Apply postemergence to seedling johnsongrass from 2" - 8" tall. Use COC or nonionic surfactant.
		Select® 8 oz / a	Apply postemergence to seedling johnsongrass 12" - 24" tall. Apply 6 oz / a to regrowth.
	Roundup Ready Soybeans	Roundup Ultra® (postemergence in crop)	2 - 4 pt / a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Johnsongrass	Corn / Soybeans	Roundup Ultra® 33% solution	Apply with wiper applicator (rope-wick or sponge) only when there is a sufficient height differential between weed and crop.
Quackgrass	Corn	Accent® 0.67 oz / a	Apply postemergence to 4" -10" tall quackgrass or apply up to 1.33 oz / a (in split application) on quackgrass up to 6" tall. Use a nonionic surfactant at 1 qt per 100 gallons of spray or COC at 4 qts per 100 gallons of spray. See label for restrictions.
		Beacon® 0.76 oz / a	Apply postemergence to quackgrass when 3" - 8" tall. Control of this species is not immediate and symptoms may take several days to develop. Add nonionic surfactant or COC.
		Exceed® 0.88 oz / a + Beacon® or Accent®(label rates)	See label for restrictions.

v/v = volume /volume
COC = crop oil concentrate

Weed	Crop	Herbicide	Remarks
Corn/ Soybeans		Roundup Ultra® 1 - 2 qt/a	Apply prior to planting in spring or after harvest in the fall. Weeds should be actively growing and greater than 8" tall.
Soybeans		Assure II® 10 oz/a Fusilade DX® 12 oz/a Poast Plus®, Prestige® 2.25 pt/a	Apply postemergence when quackgrass is 6"-10" tall. For regrowth apply 7 oz. when quackgrass is 4"-8" tall. Add COC. Apply postemergence to 6"-10" quackgrass and up to 10" tall regrowth at 8 oz/a. Use COC or nonionic surfactant. Apply postemergence to quackgrass 6"- 8" tall and retreat at 1.5 pt/a for regrowth. Use Dash or COC at 2 pt/a.
Quackgrass	Soybeans	Fusion® 12 oz/a Select® 8 oz/a	Apply postemergence to quackgrass 6"- 10" tall. Treat regrowth with 8 oz/a. Use COC. Apply postemergence to quackgrass 4"- 8" tall and repeat at same rate for regrowth. Add COC.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.
Wirestem muhly	Soybeans	Assure II® 8 oz/a Fusilade DX® 12 oz/a Poast Plus®, Prestige® 2.25 pt/a Select® 8 oz/a	Apply postemergence when wirestem muhly is 4"- 8" tall. For regrowth, apply 7 oz/a. Add COC. Apply postemergence to 4"- 12" wirestem muhly and apply to regrowth at same size and rate. Use COC or nonionic surfactant. Fusion® 8 oz/a See Fusilade DX comments. Use COC. Apply postemergence to wirestem muhly up to 6" tall and retreat at same rate for regrowth. Use Dash or COC. Apply postemergence to 4"- 8" wirestem muhly and retreat at same rate for regrowth. Add COC.
Roundup Ready Soybeans		Roundup Ultra® (postemergence in crop)	2 - 4 pt/a will control or suppress the weed. Apply from cracking through full flower stage of soybeans. Repeat application may be necessary. See label for sequential treatment rates.

Corn	Accent® 0.67 oz/a Beacon® 0.76 oz/a	See quackgrass comments. Apply postemergence. Suppression only.
Corn/Soybeans	Roundup Ultra® 1 - 2 qt/a	See quackgrass comments.
Small Grain Cover Crop		
Rye or Wheat	Corn/Soybeans	Roundup Ultra® 1 pt/a Apply prior to planting. Apply in 10 gallons of water per acre.
		Gramoxone Extra® 1.5 - 3 pt/a depending on the size or the rye or wheat apply in a minimum of 20 gallons of water per acre.
Corn	Atrazine or Bladex®+Gramoxone® (label rate)	Apply as a burndown treatment prior to planting. Add a non- ionic surfactant or COC.
Grass/legume Sods		
Orchardgrass or fescue sod	Corn/Soybeans	Roundup Ultra® 1 - 2 qt/a in fall; 2 - 3 qt/a in spring Grass sod is easier to control with Roundup Ultra® when applied in the fall before a killing frost. Higher rates of Roundup Ultra® are required to kill grass sod in the spring before planting.
Corn	Atrazine and / or Bladex®+ Gramoxone® (label rates)	Apply as a burndown treatment before planting. Add a COC. May require an additional treatment of atrazine or Bladex® postemergence if label allows.
Soybeans	Sencor/Lexone® + Gramoxone® (label rates)	Apply as a burndown treatment before planting. Add a COC. May require a postemergence treatment of Poast Plus® for control / suppression of regrowth.
Alfalfa sod	Corn/Soybeans	Roundup Ultra® 1 - 2 qt/a Apply as a broadcast treatment to actively growing alfalfa in the fall before a killing frost. For spring applications: apply 2.5 - 3 qt/a to alfalfa sod with sufficient growth.
Corn	Banvel® 0.5 pt/a and / or 2,4-D 1 - 2 pt/a, or Banvel® + atrazine (label rate)	Apply as a burndown in the spring before planting. Sufficient growth of the alfalfa is required for good control.

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Weed	Crop	Herbicide	Remarks
Soybeans		2,4-D ester 2 pt/ a	Apply as a burndown at least 30 days before planting. Control alfalfa <i>before</i> planting soybeans.
Clover sod	Corn/Soybeans	Roundup Ultra® 1 - 2 qt/ a + 2,4 D ester 1 pt/ a	Apply as a burndown before planting. For soybeans, apply not less than 7 days before planting. Control clover <i>before</i> planting soybeans.
Corn	Atrazine + Bladex® (label rate)	Banvel® 0.5 pt/ a and/ or 2,4-D 1 to 2 pt/ a,or Banvel® + atrazine (label rate)	Apply as a burndown treatment before planting. Add a COC. May require a follow-up, postemergence treatment of 2,4-D or Banvel®/Clarity®.
Soybeans		2,4-D ester 2 pt/ a	Apply as a burndown in the spring before planting. Control clover <i>before</i> planting soybeans.

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