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Guidelines for Managing Winter Vegetation in Northeast Louisiana

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Common dandelion

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Introduction

Conservation tillage systems, whether no-till or stale seedbed, require herbicide programs that control native winter vegetation or planted cover crops successfully before planting. Elimination of competing vegetation helps to assure crop stand establishment, rapid early-season crop growth and efficient fertilizer use. Winter vegetation common to Northeast Louisiana ranges from easy-to-control weeds, such as annual bluegrass and common chickweed, to difficult-to-control species, such as curly dock and ryegrass. Cover crops may include wheat or legumes (vetch and winter peas). Consequently, proper weed identification and herbicide selection are keys to a successful preplant burndown weed control program.

Cutleaf eveningprimrose

More than 20 winter weeds are commonly found in fields throughout Northeast Louisiana; however, only a few key species dictate selection of the most effective herbicide program. Glyphosate[1] and paraquat continue to be the backbone of most burndown herbicide programs. Each product exhibits specific strengths and weaknesses. Tank mixtures with other materials broaden the spectrum of control and provide residual control until planting. Glyphosate provides slow systemic control of weeds, and paraquat results in fast contact control requiring thorough weed coverage for maximum effectiveness. Adding ammonium sulfate to glyphosate spray solution has not been beneficial in most cases and should not be used except where hard water (water containing mineral salts, including iron, calcium and magnesium) is used as the carrier.

Henbit

Glyphosate provides good to excellent control of annual bluegrass, Carolina foxtail, little barley, buttercup species (spp.), chickweed spp., dandelion, marestail, shepherdspurse, bittercress and Virginia pepperweed (Table 1). Control of geranium spp., curly dock, henbit, cutleaf eveningprimrose, smartweed spp. and legume cover crops has been poor to fair. Tank mixing Goal 2XL/Delta Goal or Valor with glyphosate improves geranium spp., henbit, smartweed spp. and legume cover crop control over glyphosate alone. Tank mixing Harmony Extra with glyphosate improves geranium spp., curly dock, cutleaf eveningprimrose, henbit, smartweed spp. and legume cover crop control. Including Clarity or 2,4-D as a tank-mix partner can help control Carolina geranium, curly dock, cutleaf eveningprimrose, smartweed spp. and legume cover crops. Clarity is more active on smartweed spp. than 2,4-D, whereas 2,4-D is more active on cutleaf eveningprimrose and geranium spp. There is no tank-mix partner that substantially improves ryegrass control more than glyphosate alone. Multiple applications of glyphosate are generally required to control ryegrass, unless applications are made before five leaves.

Cutleaf eveningprimrose

Paraquat provides good to excellent control of annual bluegrass, little barley, buttercup spp., geranium spp., chickweed spp., henbit and shepherdspurse. Control of ryegrass, curly dock, cutleaf eveningprimrose, marestail, smartweed spp., swinecress, legume cover crops and Virginia pepperweed has been poor. Including Goal 2XL as a tank-mix partner helps to control cutleaf eveningprimrose, marestail, smartweed spp., legume cover crops and Virginia pepperweed. Control of curly dock, cutleaf eveningprimrose, marestail, smartweed spp., swinecress, legume cover crops and Virginia pepperweed is increased by adding Harmony Extra. Some materials, when tank-mixed with paraquat, increase ryegrass control but not to an acceptable level. Consequently, paraquat is not recommended when ryegrass is the main target weed.

White clover

Shepherdspurse

[1]Glyphosate and paraquat are sold under various trade names and formulations. Observations in this publication are based primarily on field experiments with glyphosate formulations Roundup Ultra and Roundup D-Pak,Touchdown 5 (sulfosate) and Gramoxone Extra (paraquat).New Touchdown IQ (trimesium glyphosate) and Gramoxone Extra (Gramoxone Max) formulations are available in 2001.Preliminary research indicates speed of activity and weed spectrum controlled with Touchdown IQ are similar to Roundup Ultra.

Table 1. Effectiveness of selected herbicides and/or herbicide combinations for controlling winter vegetation[2]. For more specific examples, rates, and updates, refer to the burndown section for each commodity in the Louisiana Suggested Chemical Weed Control Guide[3].

	Paraquat[4]	Paraquat/Goal 2XL	Paraquat/Harmony Extra	Paraquat/Clarity	Paraquat/2,4-D	Glyphosate	Glyphosate/ Harmony Extra	Glyphosate/Goal 2XL/ Delta Goal	Glyphosate /Clarity	Glyphosate /2,4-D	Clarity	2,4-D	Glyphosate + Valor	Ignite[5]
Annual bluegrass (2-6")	90	90	90	90	90	90	90	90	90	90	0	0	90	90
Ryegrass[5] (6-10")	40	50	50	40	40	70	70	70	70	70	0	0	70	60
Carolina foxtail (2-6")	80	90	80	80	80	90	90	90	80	90	0	0	90	90
Little barley (2-6")	90	90	90	90	90	90	90	90	90	90	0	0	90	90
Buttercups[6] (2-6")	90	90	90	90	90	90	90	90	90	90	-	90	90	90
Geranium spp.[6] (2-6")	90	90	90	90	90	50	60	80	70	80	50	60	60	90
Chickweeds[6] (2-4")	90	90	90	90	90	90	90	90	90	90	30	30	90	90
Curly dock (6-8")	40	50	70	70	70	60	70	90	80	90	80	70	80	80
Cutleaf eveningprimrose (6-10")	40	70	80	80	90	40	60	70	80	90	80	90	60	80
Cutleaf eveningprimrose (2-5")	40	70	80	80	90	50	80	70	80	90	80	90	80	90
Clovers/medics[5] (2-6")	60	80	90	80	80	50	70	80	90	90	90	90	-	90
Dandelion (4-6")	80	90	90	90	90	90	90	90	90	90	90	90	90	90
Groundsel (2-4")	70	90	90	90	90	90	90	90	90	90	-	90	90	90
Henbit (6-8")	80	90	90	80	80	70	90	90	80	80	60	50	90	90
Marestail (4-10")	50	70	70	60	60	90	90	90	90	90	-	60	90	90
Smartweed spp.[6] (2-6")	40	70	90	80	60	70	80	90	90	80	80	60	90	90
Purslane speedwell (2-4")	70	80	90	80	80	90	90	90	90	90	-	50	90	-
Shepherd's purse (6-10")	90	90	90	90	90	90	90	90	90	90	90	90	90	80
Smallflower bittercress (6-10")	90	90	90	90	90	90	90	90	90	90	70	70	90	-
Swinecress (2-4")	20	30	70	60	60	70	80	90	80	80	70	60	80	90
Legume cover crops (6-8") (vetch and winter peas)	60	80	90	90	90	50	70	80	90	90	90	90	70	90
Virginia pepperweed (4-6")	20	70	70	90	90	90	90	90	90	90	-	30	90	-
Wheat (8-12")	70	80	70	60	60	90	90	90	80	90	0	0	90	70

[2] Ratings reflect control 28 days after treatment in mid-March. The average range for weed sizes is listed in parentheses following each weed. Consult labels for optimum rates and weed sizes.

[3] The "Louisiana Suggested Chemical Weed Control Guide" is updated annually and available online at www.lsuagcenter.com.

[4] Paraquat at 0.47-0.63 lb ai/A (1.5-2 pts/A Gramoxone Extra/Boa, 1.3-1.7 pt/A Gramoxone Max), glyphosate at 0.75-1.0 lb ai/A (1.5-2 pts/A Roundup Ultra, Touchdown IQ, 1.2-1.6 pts/A Touchdown 5, Roundup Ultra Max, 22oz/A Roundup WeatherMax), Goal 2XL/Delta Goal at 0.2-0.25 lb ai/A (0.8-1.0 pts/A), Harmony Extra at 0.014-0.023 lb ai/A (0.3-0.5 oz/A), Clarity at 0.25-0.5 lb ai/A (0.5-1 pt/A), Valor (1 - 2 oz/A) and 2,4-D at 0.75-1.0 lb ai/A (0.5-1 pt/A).

[5] Ignite at 32 oz/A + ammonium sulfate.

[6] This group of weeds has two or more species found in Louisiana; only the species in the following photographs have been evaluated in Louisiana.

Table 2. Plant-back restrictions (days before planting) for commonly used burndown herbicides.

	Cotton	Corn	Soybeans	Rice	Grain sorghum
Harmony Extra	45	45	45	45	45
Goal	8	*	8	*	*
Clarity	21**	Before emergence	14/8oz*	*	15
Valor	30	30	0	30	30
Aim	0	0	0	0	0
2,4-D	30*	Before emergence	15-30	30	15
Ignite	0	0	0	120	70

*Consult label.
**An accumulation of 1 inch of rainfall or irrigation is required.

Ignite is a relatively new herbicide to Louisiana growers. With the introduction of Liberty Link technology (crops tolerant to glufosinate, the active ingredient in Ignite/Liberty), growers will become more familiar with this herbicide. Ignite is very effective on numerous winter weeds found in Louisiana (Table 1). Adding 2,4-D or clarity to Ignite in a burndown program is sometimes needed but not always advantageous. Because a phenoxy herbicide is not always needed to control cutleaf evening primrose and geranium, it may have an advantage in phenoxy-sensitive areas; however, ammonium sulfate must be used according to label directions. This product also has an attractive replant interval for several crops (Table 2).


White clover

Timing of vegetation removal is another critical factor for implementing reduced tillage programs successfully. Conservation tillage practices provide an environment favorable to insect pest populations, primarily cutworms. Cutworm larvae feed on existing winter vegetation until it is removed or decomposed to a point no longer adequate as a food source. If present at planting, cutworm larvae may threaten stands of emerging crops. Research has shown that destroying winter vegetation at least three to four weeks before planting cotton is critical (Figure 1). Cutworms are able to feed on decaying vegetation, so a herbicide application six to eight weeks before planting is preferable. Pyrethroid insecticides can be used in combination with a burndown herbicide or at-planting[7] when the potential for cutworm infestation is high. If any living vegetation remains on the seed-bed at planting, insecticide should be used to manage cutworms.

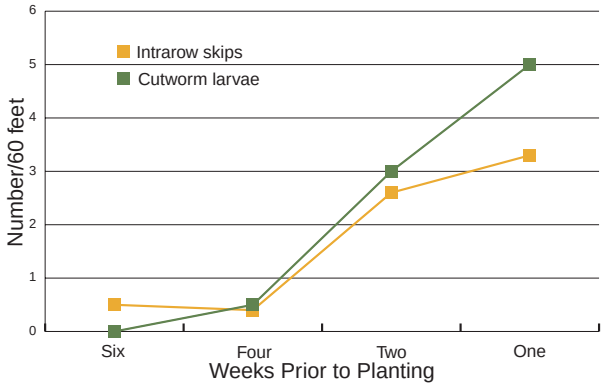
Weeds may regrow from initial burndown application or new weeds may germinate when herbicides are applied six to eight weeks before planting. In these situations, use of residual herbicides such as Goal 2XL/Delta Goal, Valor, direx or atrazine (in corn/sorghum) can be beneficial. Sequential applications of glyphosate or paraquat are also effective, and they often eliminate the need for tank mixes. Glyphosate applied six weeks before planting followed by paraquat at planting is an excellent weed control program.

Glyphosate-resistant Marestail

Although glyphosate-resistant marestail (horseweed), *Conyza canadensis*, has been confirmed in states surrounding Louisiana (Arkansas, Tennessee, Mississippi and others), it has not been officially verified in Louisiana. At the time of this printing, most identified populations exhibit an eightfold to thirteenfold level of resistance, meaning that these resistant biotypes can survive a glyphosate application 13 times the rate that controls a non-glyphosate resistant marestail. In Louisiana, few


Marestail

Figure 1. Effect of burndown timing on cutworm population and cotton stand.



[7]Infurrow application is the least effective method for controlling cutworms.

acres receive a burndown herbicide composed strictly of glyphosate, because we have weeds that are difficult to control with glyphosate alone. These, of course, include Carolina geranium, curly dock and cutleaf eveningprimrose, to name a few. Since most of our treated acreage will include a tank-mix herbicide such as 2,4-D or dicamba (Banvel/Clarity), most of the marestail present will be controlled by the phenoxy herbicide if glyphosate resistance is present; thus, these plants will not go to seed. Through vigilance and tank-mixes with herbicides that will control marestail, Louisiana producers should not have great difficulty dealing with glyphosate-resistant marestail. Ignite is another choice for controlling marestail and is a means for inserting another mode of action into a burndown program. Ignite is effective on marestail and numerous other weeds found in Louisiana fields. Consult Table 1 for specific levels of control of selected weeds.

Fall Burndown

Recently, some interest has arisen in using fall herbicide applications to control vegetation throughout the winter, resulting in a weed-free seedbed at planting time. Two of the more popular choices for this type application are Goal/DeltaGoal or Valor. Either product will control winter vegetation if applied shortly after emergence of the vegetation. Valor may be applied at 2 to 3 ounces an acre in combination with glyphosate and/or 2,4-D. Applications in Louisiana should not be made before November 15. Goal/Delta Goal may be applied at 1 to 2 pints an acre. Goal may be tank mixed with glyphosate to control emerged weeds. In most cases, the herbicide must be disturbed before planting. Be certain to check the product label for specific recommendations.

Although these treatments will result in a relatively weed-free seedbed at planting time, the soil will be exposed to weathering if no vegetation is present. Therefore, these treatments should not be used on highly erodible or sloping soils. Be certain to consult with your local FSA or NRCS office to determine if you can use these treatments without conflicting with your conservation plan.

Summary

Burndown herbicide decisions should be based on activity of glyphosate, paraquat or Ignite on the most difficult-to-control weed species present. Appropriate tank mixtures should be considered based on their ability to enhance control with glyphosate or paraquat and to provide residual activity. Guidelines for choosing appropriate burndown programs follow.

Guidelines for Choosing a Burndown Program

1. Vegetation should be destroyed at least three to four weeks before planting, preferably six to eight weeks.
2. Choice of herbicide program depends on the most difficult-to-control weed species present.
3. Use glyphosate if annual ryegrass, marestail, swinecress, speedwell, groundsel, Virginia pepperweed or wheat is the target vegetation. Use paraquat if geranium spp. or henbit is the primary weed present.
4. Carolina geranium, curly dock, cutleaf eveningprimrose, clover spp., henbit, smartweed, swinecress and legume cover crop control can be increased when glyphosate is tank-mixed with other herbicides.
5. Carolina foxtail, curly dock, cutleaf eveningprimrose, clover spp., dandelion, groundsel, henbit, marestail, smartweed, speedwell, swinecress, Virginia pepperweed and legume cover crop control can be increased when paraquat is tank-mixed with other herbicides.
6. Consider using an insecticide program that controls cutworms if any live vegetation is present at planting.

Selected References

Listed below are additional LSU AgCenter publications relating to conservation tillage systems:

Conservation Tillage Systems for Energy Reduction: Preplant Weed Control in Cotton. Pub. 8909.

Conservation Tillage Systems for Energy Reduction: Soil Fertility. Pub. 8910.

Conservation Tillage Systems for Energy Reduction: Tillage Equipment. Pub. 8908.

Conservation Tillage Systems for Energy Reduction: Cotton Stand Establishment. Pub. 8906.

Conservation Tillage Systems for Energy Reduction: Insect Pest Management. Pub. 8907.

GRASSES

Annual bluegrass, *Poa annua*

Annual grass with shallow, fibrous root system and bunch type growth habit. Leaf tips resemble the keel of a boat. Very noticeable when seedheads begin to form. Easily controlled with paraquat or glyphosate.

Carolina foxtail, *Alopecurus carolinianus*

Annual grass with a shallow, fibrous root system. Stems are usually erect, but occasionally are bent and rooting at lower nodes. Its most distinctive feature is the narrow, dense, fuzzy seedhead. Easily controlled with glyphosate. Paraquat plus Goal also provides control.

Little barley, *Hordeum pusillum*

Annual grass with a shallow, fibrous root system. Stems are hairless and slightly bent at the nodes. Its most distinctive feature is the dense, cylindrical seedhead, which resembles rye. Easily controlled with paraquat or glyphosate.

Ryegrass, *Lolium* spp.

Easily identified by its shiny leaves. Annual ryegrass is the most common ryegrass species found in Northeast Louisiana. It is suspected that perennial ryegrass may be increasing, but this has not been confirmed. Ryegrass is best controlled with multiple applications of glyphosate. Single applications have controlled small ryegrass (four to five leaves). Glyphosate applied four to six weeks before planting followed by paraquat at planting has also been a good program for controlling ryegrass.

BROADLEAF WEEDS

Buttercups, *Ranunculus* spp.

Corn buttercup (*R. arvensis*) and hairy buttercup (*R. sardus*) are the two most common buttercup species found in Northeast Louisiana. Both species usually have shiny, deeply clefted leaves and prominent yellow flowers. Hairy buttercup can be distinguished from corn buttercup by its hairy stems and leaves. Both species are easily controlled with paraquat or glyphosate.

Chickweed spp.

Common chickweed (*Stellaria media*), left, and mouseear chickweed (*Cerastium vulgatum*), right, are two of the most common winter annuals in Northeast Louisiana. Fortunately, both species are easily controlled by paraquat or glyphosate. Both species have a trailing growth habit. Common chickweed is hairless, whereas mouseear chickweed is covered with fine, dense hairs.

Clovers/medics

White clover (*Trifolium repens*), left, and burclovers (*Medicago* spp.), upper right, are some of the more common clover/medic species in Northeast Louisiana. Crimson clover (*Trifolim incarnatum*), lower right, may volunteer in fields previously in pastures. Clovers and medics are best controlled with 2,4-D, Clarity, or paraquat plus Harmony Extra. Multiple applications may be required with heavy infestations.

Common dandelion, *Taraxacum officinale*

Leaf margins are deeply lobed with lobes pointed toward the base of the leaf. The plant has a large, fleshy taproot, and bright yellow flowers on a single, hollow stem. Dandelion is easily controlled by glyphosate, paraquat combinations, 2,4-D or Clarity.

Cressleaf Groundsel (yellow top), *Senecio glabellus*

Annual, with a fibrous root system. Hollow stems, reaching up to 36 inches, with alternate leaves that diminish upwards. Basal and lower leaves are usually purplish, petioled and irregularly lobed or pinnately parted. Flowers are typically bright yellow. Best controlled with glyphosate or paraquat combinations when small. Use glyphosate plus 2,4-D on large plants.

Curly dock, *Rumex crispus*

A robust plant growing from a thick taproot. Curly dock is very difficult to control with single applications of glyphosate, and near impossible to control with paraquat. The most consistent control has been obtained with glyphosate plus Harmony Extra, 2,4 -D or Clarity. Multiple applications of glyphosate or glyphosate followed by paraquat at planting also are effective.

Cutleaf eveningprimrose, *Oenothera laciniata*

Rosette growth habit at first with a trailing growth habit thereafter. Leaves have prominent white midveins. Stems are red in cross-section (upper right). Primrose is very competitive, and more prevalent in Northeast Louisiana due to widespread use of glyphosate for burndown. Primrose is not easily controlled with glyphosate or paraquat. Glyphosate plus 2,4-D has been the most effective program for controlling primrose.

Geraniums, *Geranium* spp.

Carolina geranium (*G. carolinianum*), right, and cutleaf geranium (*G. dissectum*), below, are the two most common species of geranium found in Northeast Louisiana, with Carolina geranium being the most common. Both species grow from a main tap root. Leaves are deeply clefted with long petioles. Cutleaf geranium's leaves are more deeply clefted than Carolina geranium. Stems generally have a reddish tinge. Both leaves and stems are hairy. Flowers vary in color, but are usually pinkish. Geraniums are best controlled with paraquat, although multiple applications may be required.

Henbit, *Lamium amplexicaule*

Member of the mint family. Has a square stem and leaves are attached directly to and surround the stem. Very visible lavender to purple flowers from January to April. Purple deadnettle (*Lamium purpureum*) is similar to henbit in appearance (upper right hand corner) and common in Northeast Louisiana. Henbit and purple deadnettle control is better with paraquat than glyphosate when applied alone. Tank-mixes with Goal or Harmony Extra improve control.

Marestail, *Conyza canadensis*

One plant can form single or multiple stems. Stems and leaves have very fine hairs with a “fuzzy” texture. Very susceptible to glyphosate.

Purslane speedwell, *Veronica peregrina*

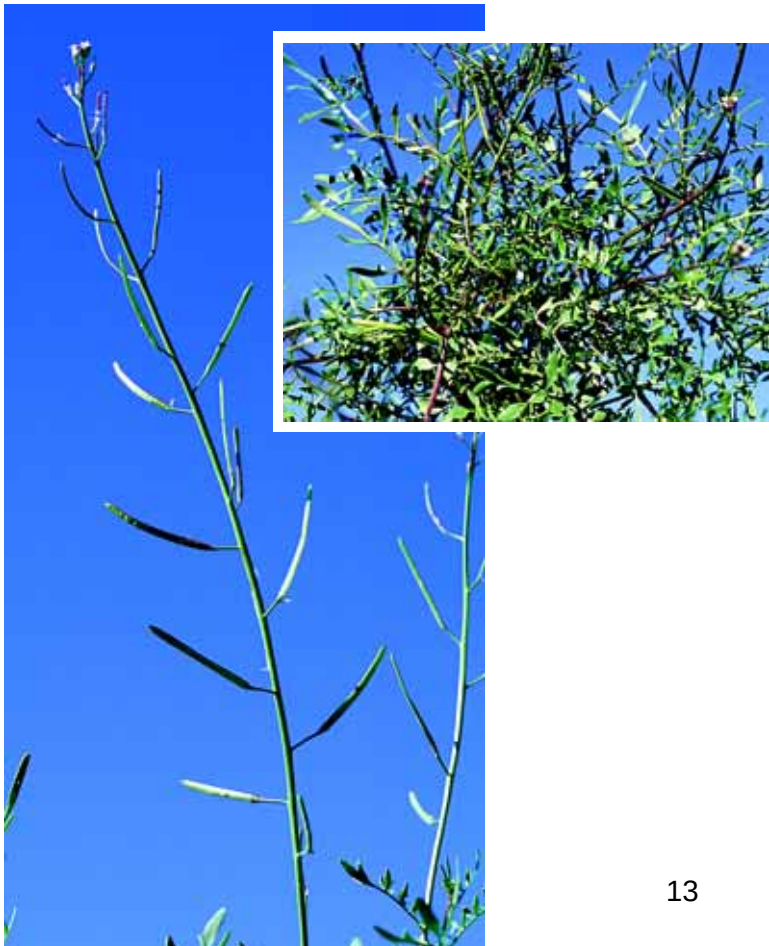
Winter annual with a fibrous root system. Stems are usually numerous, smooth, erect and branch from the base. Inconspicuous, small, white flowers are found in the axis of upper leaves. Best controlled with glyphosate or paraquat plus Harmony Extra.

Shepherdspurse, *Capsella bursa-pastoris*

Leaves are deeply cut resembling dandelion and form a rosette. Flowers are small and white, forming heart-shaped fruits. Easily controlled with paraquat or glyphosate.

Smallflower bittercress, *Cardamine parviflora*

Basal rosette leaves are smooth, divided into three to six leaflets, with a rounded terminal leaflet. Flowers are small, white, and have four petals. Easily controlled with paraquat or glyphosate.



Smartweed spp., *Polygonum* spp.

Pennsylvania smartweed (*P. pensylvanicum*) and ladysthumb *(P. persicaria*) are two of the most common smartweed species found in Northeast Louisiana. Smartweeds belong to the polygonacea family, which is characterized by the paperlike sheath (ocrea), indicated by the circles in the photo top right, at the base of each leaf. The ocrea of ladysthumb is fringed near the top, unlike Pennsylvania smartweed. Leaves are lanceolate and often have a purple watermark. Flowers are pink to white. Control is best with glyphosate plus Clarity or Harmony Extra and paraquat plus Harmony Extra.

Swinecress, *Coronopus didymus*

Prostrate, aromatic annual growing from a taproot. Initially forms a rosette, later becoming highly branched and spreading. Leaves are attached with a short petiole, with five to eight segments terminating with a tri-lobed leaflet. Flowers are small, inconspicuous and white. Its most distinctive feature is the fruit, which consist of two side-by-side wrinkled, oval pods attached with a short peduncle. This weed is very difficult to control, and, despite its small stature, can cause substantial yield loss. Glyphosate combinations have been the most consistent programs for controlling swinecress. If vegetation is thick, swinecress may be missed with the first herbicide application and require a second application.

Virginia pepperweed, *Lepidium virginicum*

As the plant matures, it becomes highly branched and loses basal rosette leaves. Leaves on the upper stem lack petioles and margins may be toothed or entire. Flowers are small, greenish-white and have four petals. Seedpods are egg-shaped, winged and emit a pepper-like odor when crushed. Best control is obtained with glyphosate.

COVER CROPS

Legumes

Vetch, left, often planted as a cover crop, may volunteer in fields previously in pasture or cover crop. Vetch is easily identified by numerous leaflets, tendrils (allow it to climb) and distinctive purple flowers. Winter pea, right, is another legume increasing in popularity as a cover crop. Legume cover crops are best controlled with multiple applications of paraquat or glyphosate plus 2,4-D or Clarity.

Wheat, *Triticum aestivum*

A popular cover crop distinguished from ryegrass by a dull green leaf. Best control is obtained with glyphosate. Multiple applications may be required at the beginning of jointing, boot and heading growth stages.

White clover

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