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SS-AGR-07

Weed Management in Small Grains Harvested for Grain[1]

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Successful weed control in small grains involves using good management practices in all phases of production. In Florida, winter weeds compete with small grains for moisture, nutrients, and light, with the greatest amount of competition occurring during the first six to eight weeks after planting. Weeds also cause harvest problems the following spring when the small grain is mature.

Crop Competition

Crop competition is one of the most important considerations for weed control, but it is often overlooked in practice. A good small grain stand that emerges rapidly and shades the soil surface is helpful in reducing weed competition.

Utilizing good management practices is necessary to produce maximum small grain yields. Use of these practices also aids in weed control. The plant that emerges first and grows most rapidly is usually the plant that will have the competitive advantage; therefore, everything should be done to ensure that the small grain, not the weed, has this competitive advantage. For optimum management practices, follow UF/IFAS Extension recommendations.

Know Your Weeds

Know your weeds and choose the herbicide that is effective for your specific weed problem (Table 2). In Florida, small grains are infested with several species of winter weeds, most of which can be controlled by the phenoxy herbicides, namely 2,4-D or dicamba. However, phenoxy herbicides may not control some species that inhabit Florida small grain fields. Proper identification is crucial for control of wild radish (*Raphanus raphanistrum*), which is often confused with wild mustard (*Brassica kaber*). Wild radish is ubiquitous throughout Florida and is not easily controlled with 2,4-D or dicamba after it is established. Wild mustard occurs sparsely within the Florida small grain growing region and can easily be controlled with applications of 2,4-D. Most producers refer to both species as "wild mustard," therefore compounding the identification problem. If wild radish is misidentified, the degree of weed control given by 2,4-D or dicamba applications may be inadequate. 2,4-D does have activity on wild radish, but the restriction of 2,4-D applications tied to small grain size usually allows the wild radish to get too large to be controlled. Wild radish can be controlled by 2,4-D up to 6 inches or the 3-leaf stage. The confusion of wild mustard and wild radish is the

1. This document is SS-AGR-07, one of a series of the Agronomy Department, UF/IFAS Extension. Original publication date January 2000. Revised May 2020. Visit the EDIS website at https://edis.ifas.ufl.edu for the currently supported version of this publication.

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most notable instance where a misidentification can cause substandard weed control in small grains. More information on wild radish identification can be found in EDIS publication SS-AGR-236, *Wild Radish—Biology and Control* (https://edis.ifas.ufl.edu/wg215).

Chemical Control

Proper herbicide and rate selection is extremely important for weed control in small grains (Table 1). Postemergence herbicides combined with the previously discussed management practices are important for ensuring that the small grain crop has the initial competitive advantage over weeds. Herbicide applications should be made to small weeds unless specifically stated by the label or recommendations.

The most widely used herbicide in small grains is 2,4-D. Small grains vary in their tolerance to 2,4-D, depending on the growth stage when the herbicide is applied, and the particular crop planted (Table 1). Generally, wheat varieties are the most tolerant. Barley is intermediate, and oats are least tolerant to 2,4-D. Rye is intermediate between wheat and barley. As a general rule, the least injury to the grain crop with the use of 2,4-D can be expected when it is applied from the 3–4 tiller to full tiller stage. Applications made after jointing will result in grain head injury and possible reduction in seed fill.

Most herbicides labeled for weed control in small grains belong to or are similar to the organo-auxin herbicide group and have potential for off-target injury to sensitive crops. Care should be taken to avoid spray drift to sensitive crops. Furthermore, Florida has restrictions and prohibitions on organo-auxin herbicides used within the state. Refer to EDIS fact sheet SS-AGR-12, *Florida's Organo-Auxin Herbicide Rule—2018* (https://edis.ifas.ufl.edu/wg051), for information regarding this rule.

The herbicides suggested are those that have performed well in UF/IFAS research. Read and follow all label instructions and precautions. Accurate sprayer calibration is extremely important because rates too low may not provide adequate weed control and rates too high may injure the crop. Herbicides, like any pesticide, should be handled with care. Store herbicides behind locked doors in the original containers with the labels intact, and keep them separated from seed, fertilizers, and other pesticides.

Table 1. Weed control in small grains.

Herbicide Active Ingredient (Trade/Product Names)	Mode of Action Group (MoA)	Application Rate per Acre (Total per A/Season or Year), Common Name, and Rate of Active Ingredient per Acre	Reentry Interval (REI)	Comments
flufenacet + metribuzin (Axiom DF)	15 + 5	4–8 oz	12 hrs	For wheat and fall-seeded triticale only. Plant seed at least 1 in deep. Apply Axiom between spiking and the 2-leaf stage. Preemergence applications will be highly injurious. Controls ryegrass, wild radish, and other broadleaf weeds. For sand soils, rates should not exceed 6 oz/A.
2,4-D (2,4-D[1] and several brands)	4	(0.5–2.0 pt of 4 lb/gal amine or low-volatile ester formulation) Or 0.25–1.0 lb acid equivalent	12 hrs	For control of winter annual broadleaf weeds and suppression of wild garlic and onion. Apply after small grain has produced 3–4 tillers or has fully tillered, but prior to jointing. In most years, this occurs in February. Weed control will be best if temperatures are 60°F or higher at application. See label for grazing restrictions. Only amine or low-volatile ester formulations are legal for application in Florida. Yield reduction will often result if 2,4-D is applied during jointing stage of wheat. If mixing with liquid fertilizer, amine must be dissolved in water; make a slurry before adding in the spray tank; strong agitation is required.
dicamba (Banvel[1] or Clarity, others)	4	4–8 fl oz or 0.125–0.25 lb ae	24 hrs	Controls many annual broadleaf weeds and provides suppression of wild garlic and onion. Apply after winter dormancy but before small grain begins to joint. Apply when weeds are in 2- to 3-leaf stage and rosettes are less than 2 in across. Check label for grazing restrictions. **Yield reduction will occur when treatment is applied to jointing wheat.**
dicamba (Banvel[1]) + 2,4-D (2,4-D)	4 + 4	0.25 pt or 0.125 lb ae + 0.5 pt or 0.25 lb ae	24 hrs	Combination controls a broader spectrum of weeds than dicamba or 2,4-D alone. Apply after winter dormancy but before grain begins to joint. This combination may cause some crop injury. Check label for grazing restrictions.
bromoxynil Buctril 4EC	6	0.75–1 pt (1 pt/A)	24 hrs	For control of wild radish and many other small, annual broadleaf weeds. Apply after small grain emerges, but before weeds are in the 3- to 4-leaf stage. Do not apply to small grain during or after boot stage. Do not graze treated fields for 30 days after application. May be tank-mixed with Hoelon. See label for tank-mixing instructions.
thifensulfuron + tribenuron (Harmony Extra 75 DF) **or**	2	0.3–0.6 oz (1.5 oz for wheat, barley, triticale) (0.6 oz for oat)	12 hrs	For control of broadleaf weeds postemergence in wheat. Beneficial in Florida for the control of wild radish. Application should be made to rosettes with a diameter less than 6 in. Application must be made no later than 30 days after weed emergence, with fall application made before plants harden off. Always use a nonionic surfactant (80% active at 0.25–0.50% v/v) and carefully read label directions for spray tank clean-out. For increased control of severe wild radish infestations or for wild radish 30 days and older, apply either herbicide in combination with MCPA at 0.25 lb active ingredient per acre.
tribenuron-methyl (Express)	2	0.16–0.33 oz (0.5 oz)	12 hrs	
bromoxynil + pyrasulfotole (Huskie)	6 + 27	11–15 fl oz/A (15 fl oz/A)	24 hrs	For broadleaf weed control in wheat, rye, and triticale. Apply Huskie from 1-leaf stage until flag leaf. Add ammonium sulfate for more consistent activity. Do not graze for 25 days after application.
MCPA (MCPA Several brands)	4	0.5–1.0 pt of 4 lb/gal or 0.24–0.5 lb ae (1.6 pt or 0.75 lb ae)	48 hrs	For use in wheat, rye, oats, and barley. Apply after two tillers but before jointing. Apply when weeds are less than 2 inches in height or less than 2 inches in diameter. May be tank-mixed with several materials; Express + MCPA is very effective on several weeds.

Herbicide Active Ingredient (Trade/Product Names)	Mode of Action Group (MoA)	Application Rate per Acre (Total per A/Season or Year), Common Name, and Rate of Active Ingredient per Acre	Reentry Interval (REI)	Comments
metribuzin (Metribuzin various)	5	(2–8 oz)	12 hrs	For control of henbit, chickweed, ryegrass, and other winter annuals. Apply after 2-leaf stage, but before jointing. Application rate is dependent on plant size. See product label for specific information. Use only on label-recommended varieties or **severe** crop injury may result. For barley and wheat only.
pendimethalin (Prowl H_2O)	3	1.5–2 pt/A	24 hrs	For wheat and triticale. Plant seed 0.5–1 in deep. Prowl H_2O can be applied from first leaf until flag leaf is visible.

[1]See fact sheet SS-AGR-12, *Florida's Organo-Auxin Herbicide Rule—2018* (https://edis.ifas.ufl.edu/wg051), for state rules pertaining to application of organo-auxin herbicides in Florida. **READ and FOLLOW all label instructions and precautions when applying any pesticide.**
[2]Restricted Use Pesticide

Table 2. Estimated effectiveness of herbicides on common weeds in Florida small grains.[1]

Weeds	Herbicides						
	2,4-D	Banvel	Buctril	MCPA	Sencor	Harmony Extra	Express
Wild mustard	G	E	G	G	G–E	E	E
Wild radish	G	G	F–G	G	G	E	E
Henbit	F–G	G	F–G	P–F	E	G	-
Evening primrose	G	G	G	E	G	E	F
Shepherd's purse	G	G	E	G–E	E	E	-
Wild garlic	F	G	P	P	-	G–E	P
Common ragweed	G	G–E	E	F–G	G	P–F	-
Pigweeds	E	E	E	G–E	G	E	-
Thistles	G	G	G	G	-	F–G	-
Dandelion	E	E	E	E	-	-	-
Plantains	E	E	E	E	-	E	-
Curly dock	E	E	F–G	P	-	E	G
Dogfennel	G	E	E	F	-	E	-
Horsenettle	F	G	F	G	-	-	-
Horseweed	F	F	P	F	-	G	-
Goldenrod	F	F	P	G	-	-	-
Annual ryegrass	P	P	P	P	F–G	P	P

[1]Estimated effectiveness based on herbicide rates recommended in this report. Effectiveness may vary depending on factors such as herbicide time of application, soil type, and weather conditions.
Weed Control Symbols: E = 90–100% control; G = 80–89% control; F = 60–79% control; P = Less than 60% control; - = insufficient observations.