

Wild Oat Control In Small Grains - 2002

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Good wild oat control with any herbicide requires proper timing of applications. Postemergence wild oat herbicides require application to wild oats and crops at precise leaf stages. Leaf number on wild oats is determined by counting the leaves on the main stem and disregarding the tillers. The youngest leaf is counted as a full leaf only when another leaf becomes visible. Lower leaves, which may have died from various stresses, such as frost or wind damage, should also be counted in the total leaf number. An accurate leaf count is important for optimum wild oat control.

There are a number of tradeoffs for the advantages any one wild oat herbicide might offer. Early wild oat control can result in better yields because the weed has less time to compete with the crop. However, when a herbicide treatment is applied early, odds are greater that a late flush of wild oats will require a second herbicide application, or that some wild oats might escape treatment. Uncontrolled wild oats can reduce yields, and will produce seed that contribute to next year's wild oat problem. In general, under heavy wild oat pressure (over 15 plants/square foot) research has shown that a herbicide treatment should be applied as soon as possible to prevent high yield losses.

Below is a summary of the wild oat herbicides currently labeled in Minnesota.

Preemergence Wild Oat Control:

Far-Go (trilalate):

Far-Go is labeled for preplant or preemergence incorporated application in the spring and fall for wild oat control in spring wheat, durum and barley. Apply Far-Go at 1.25 lb/A to spring wheat and durum and 1.25 to 1/5 lb/s to barley in the fall or spring. Far-Go may be applied preplant incorporated or preemergence incorporated in the spring. Fall applications generally give more consistent wild oat control in Minnesota. Far-Go is volatile and must be incorporated after application, except when applying the granule formulation in the fall. The granule formation will give greatest wild oat control in the fall, whereas the liquid formulation will give more consistent wild oat control in the spring.

Far-Go may be applied in combination with trifluralin (Treflan) at 0.5 to 0.75 lb/A for wild oat and foxtail control in spring wheat, durum, and barley in the spring after seeding. A combination of Far-Go and trifluralin is available as a package mix called Buckle. Buckle can be applied in the fall or spring to land that will be planted to barley or durum.

Far-Go has a different mode of action than the postemergence wild oat herbicides labeled in Minnesota. Therefore, the use of Far-Go should be considered as part of a herbicide resistance weed management program.

Postemergence Wild Oat Control:

Achieve (tralkoxydim):

Achieve is labeled for control of wild oats and other annual grass weeds in barley. **Due to crop injury potential, Achieve is NO LONGER labeled for use in spring wheat and durum in Minnesota.**

Apply Achieve to barley in the 2 to 6-leaf stage. Apply Achieve to 1 to 6-leaf wild oat. Achieve use rate is 0.44 to .60 lb/A. Use the high rate when soil is dry and weeds are large. Apply Achieve in at least 10 gpa by ground or 5 gpa by air. Always add Supercharge adjuvant to the spray solution at 4 pts/100 gals of water (0.5% v/v). Ammonium sulfate at 15 lbs/100 gals of water can also be added.

Numerous broadleaf herbicides can be tank-mixed with Achieve. Achieve can be tank-mixed with MCPA ester, Bronate, Buctil, Curtail M, and Stinger. Achieve can be tank mixed with 2, 4-D ester when ammonium surfactant is added. DO NOT tank mix with amine formulations of labeled herbicides. DO NOT tank mix with sulfonyleurea herbicides.

Achieve can cause barley injury under cool, wet conditions. DO NOT apply Achieve to barley that has a heavy dew.

Assert (imazethabenz):

Assert is labeled for wild oat control in spring wheat, durum, and barley. Assert will also control of plants in the mustard family, including wild mustard. Spring wheat, durum and barley have good tolerance to Assert.

The use rate of Assert is 1.0 to 1.2 pts/A. For best control, apply Assert when wild oats are in the 1 to 4-leaf stage. Good wild oat control has been obtained when the 1.0 pt/A rates have been applied to 1 to 3-leaf wild oats; however, for larger wild oats, the 1.2 pt/A rate should be used. **Assert must always be applied with a non-ionic surfactant at a rate of 2 pts of surfactant per 100 gallons of spray solution.** For control under adverse conditions, such as dry conditions or heavy wild oat pressure, Assert should be applied with a **crop oil concentrate at 2 pt/A in addition to the surfactant.** Do Not apply crop oil concentrate with 2,4-D ester because of the potential for crop injury.

Assert will also available as a 67% SG formulation. The use rate for the Assert SG is 7.5 to 11.2 oz/A. The 7.5 oz/A rates are equivalent to the 1 pt/A rate of the liquid and 9 oz/A is equivalent to the 1.2 pt/A of the liquid formulation. One container of Assert SG contains enough material for 24 acres at the 1 pt/A rate of the liquid formulation, or 20 acres at the 1.2 pt/A.

Adjuvant selection is very important when using Assert SG. Failure to use the proper adjuvant can result in unacceptable wild oat control (less than 50%). Assert SG should **ALWAYS** be applied with a good quality non-ionic surfactant with at least 80% active ingredient at a rate of 2 pints per 100 gallons of spray solution. For control under adverse conditions, such as dry conditions or heavy wild oat pressure, Assert should be applied with a **crop oil concentrate at 2 pt/A in addition to the surfactant.** SUN-IT II may be used instead of a non-ionic surfactant or instead of a non-ionic surfactant plus crop oil. The rate for SUN-IT II is 1.5 to 2 pt/A. When tank mixing Assert SG with 2,4-D ester **Do Not** add crop oil concentrate or SUNIT-II because of the potential for crop injury.

Assert and Assert SG can be tank mixed with 2,4-D ester, MCPA ester, Bronate (bromoxynil + MCPA ester), Harmony Extra (tribenuron + thifensulfuron). Do not tank mix with Banvel (dicamba), MCPA amine, or 2,4-D amine as reduced wild oat control will result.

Assert and Assert SG have soil activity, and may persist for more than one year in the soil; therefore, do not plant any crop other than barley, wheat, corn, sunflowers, soybeans or edible beans for at least 15 months after an Assert application. Do not plant sugarbeets for at least 20 months following an Assert application. Do Not plant oats, canola, or alfalfa for 15 months after an Assert application.

Avenge (difenzoquat):

Avenge can be used for wild oat control in spring wheat, durum and barley. Barley has good tolerance to Avenge, however, some spring wheat and durum varieties will be injured by Avenge. Many new hard red spring wheat varieties have been added to the Avenge, however there are still several newer varieties not listed. One variety in particular that is not on the regular Avenge label is "2375". However, there is a supplemental label that allows Avenge to be applied to "2375" at 2 1/2 to 3 pts/A. See the label for a complete list of hard red spring and durum wheat varieties that have tolerance to Avenge.

Avenge should be applied when the majority of wild oats are in the 3 to 5-leaf stage. In Minnesota research trials, Avenge gave the best control when wild oats were in the 4 to 5-leaf stage. Avenge should be applied at the highest labeled rate when applied to heavy infestations of 3-leaf wild oats, and should not be applied until the wild oats have reached the 3-leaf stage. Use rate for Avenge is 2.5 to 4 pts/A.

Avenge can be tank mixed with 2,4-D, MCPA, Harmony Extra (tribenuron + thifensulfuron), Express (tribenuron), Harmony GT (thifensulfuron), Buctril (bromoxynil), Curtail (clopyralid + 2,4-D amine), and Bronate (bromoxynil + MCPA ester) Bronate Advance (bromoxynil + MCPA ester). Do not tank mix Avenge with Banvel (dicamba).

Cheyenne (fenoxaprop + MCPA ester + thifensulfuron + tribenuron):

Cheyenne is labeled for postemergence control of foxtails and wild oats and most annual broadleaf weeds in hard red spring wheat. Cheyenne is **NOT** labeled for use in durum wheat, barley or oats. Apply Cheyenne to spring wheat from the 3-leaf stage to the end of tillering (6-leaf stage). **DO NOT** apply after jointing. Apply when grass weeds are 4 inches tall or less. **DO NOT** tank mix Cheyenne with any other herbicide, additive, or fertilizer.

See the label for mixing instructions. Research at the University of Minnesota has shown that Cheyenne will give good to excellent control of wild oats, foxtails, kochia, common lambsquarters, pigweed and several other annual broadleaf weeds. **Cheyenne can NOT be applied by air.**

Cheyenne can cause crop injury under cool, wet weather conditions and late applications. In most cases, the spring wheat will recover from this injury, and there was no yield loss. To decrease the crop injury potential, **DO NOT** apply Cheyenne after jointing stage or tank mix with un-labeled broadleaf herbicides. Read the label for additional restrictions or precautions.

Discover (clodinafop):

Discover is labeled for postemergence control of wild oat and other annual grass weed control in spring wheat and durum. Discover is **NOT** labeled for use in barley and winter wheat. Apply Discover from the 2 leaf-stage until the emergence of the 4th tiller of spring wheat and durum. Apply when wild oats are in the 1 to 6-leaf stage.

Discover is sold in a case that contains the herbicide and DSV adjuvant packaged in separate containers and treats 40 to 50 acres depending on the use rate. Discover must always be applied with the DSV adjuvant. **DO NOT** add any additional adjuvants. Apply Discover at 3.2 fl oz/A plus DSV adjuvant at 10.2 fl oz/A (treats 50 acres) for wild oat control.

Discover can be tank-mixed with most broadleaf herbicides. However, always follow the label of the tank-mix broadleaf herbicide. For wild oat control, Discover can be tank-mixed with most broadleaf herbicides including: Starane, Starane+Sword, Bronate, Bronate Advance, Buctril, Curtail, Curtail M, Harmony Extra, Harmony GT, Harmony GT + MCPA, 2,4-D amine, MCPA amine and ester, Stinger, Banvel, and Clarity. Apply Discover in a minimum spray volume of 5 gpa by ground and 3 gpa by air. Check label for additional broadleaf herbicide tank-mix options.

Wheat injury can occur when air temperatures are below 40 F during the period 48 hours before and after a Discover application. Do not graze livestock or feed forage or hay from treated areas for a minimum of 30 days following a Discover application. Do not apply Discover within 60 days of harvest.

University of Minnesota research has shown that spring wheat and durum tolerance to Discover is good to excellent. Discover has provide good to excellent wild oat control in research plots.

Everest (flucarbazone):

Everest is labeled for wild oat and other annual grass weed control in spring wheat and durum. Everest is **NOT** labeled for use in barley. Apply Everest from the 1 to 6-leaf stage of spring wheat and durum. Apply when wild oats are in the 1 to 6-leaf stage.

The use rate of Everest is 0.61 oz/A for wild oat control. Spring wheat and durum tolerance is fair to good. For optimum wild oat control and crop safety, Everest must be tank-mixed with a surfactant and a broadleaf

herbicide listed on the label. Apply a non-ionic surfactant at 1 qt/100 gallon or 0.25% v/v. Always tank-mix Everest with 2,4-D amine or ester, Buctril, Bronate, Bronate Advance, Curtail, Curtail M, Aim, Harmony Extra + 2,4-D amine or ester, Harmony GT + 2,4-D amine or ester, or MCPA amine. See label for rates and tank-mixing instructions. Do NOT tank-mix Everest with any broadleaf herbicide not list on the label.

Everest does have soil activity and recropping restrictions. Sugarbeets, barley, canola, and potatoes should not be planted until 9 months after application. Field peas can be planted 11 months after application. See label for additional recropping restrictions.

University of Minnesota research has shown that Everest will provide good wild oat control. Everest can cause wheat injury under adverse weather conditions.

Hoelon (diclofop):

Hoelon can be applied to all varieties of wheat, barley and durum. Hoelon should be applied when wild oats are in the 1 to 4-leaf stage. For best control, research has shown that Hoelon should be applied before the 3-leaf stage, especially when using the 2 pt/A rate. Hoelon can be applied at 2 to 3.3 pts/A (0.75 to 1.25 lb/A) in spring wheat and durum, and 2 to 2.67 pts/A (0.75 to 1.0 lb/A) in barley. Do not use over 2.67 pts/A in barley, as barley injury will result.

When using the 2 pt/A rate of Hoelon in spring wheat and durum, the addition of 1 qt/A of crop oil concentrate has been shown to increase wild oat control. DO NOT use crop oil concentrate on barley. When wild oat plants have reached the 3 to 4-leaf stage and/or plants are under moisture stress, the higher labeled rates should be used. Cool temperatures following application increase wild oat control with Hoelon.

Wild oat control with Hoelon will be reduced when wild oats are growing under moisture stress. Increasing the rate used can somewhat overcome this problem.

Hoelon has the potential to give severe barley injury under cool, wet conditions. The Hoelon label states not to apply Hoelon to barley if daily minimum temperatures reach 40°F or less for three consecutive days before application. Also to not apply when moisture content of the field is at field capacity. Hoelon should also be applied to barley before tillering.

It is important to carefully select the proper broadleaf herbicide to tank mix with Hoelon. Many broadleaf herbicides, when tank mixed with Hoelon, decrease the grass control of Hoelon. Hoelon can be tank mixed with Buctril (bromoxynil) or a low rate of MCPA ester (0.05 lb/A) plus Buctril. Do Not tank mix Hoelon with any other broadleaf herbicide. If a broadleaf herbicide is used, separate the Hoelon treatment and the broadleaf treatment by a minimum of 5 days.

The 2001 growing season will be the last season that Hoelon will be available, as Aventis will no longer be producing Hoelon.

Puma (fenoxaprop + safener):

Puma is labeled for control of wild oats and other annual grasses in spring wheat, durum, and barley. Crop tolerance to Puma is good to excellent, with spring wheat having greater tolerance than durum or barley.

Apply Puma to wheat and barley from the 2-leaf up to 6-leaf stage. Do not apply to barley after jointing. For greatest crop safety – do not apply to wheat after jointing. Puma will control susceptible grass weeds in the 2-leaf to 2-tiller stage. Puma use rate is 0.67 pt/A for wild oat control. Apply Puma in at least 10 gpa by ground and 5 gpa by air. Puma can be tank-mixed with numerous broadleaf herbicides, but it is important to follow label restrictions to avoid a reduction in grass control.

For control of wild oat, Puma at 0.67 pt/A can be tank mixed with Buctril, Bronate, Bronate Advance, Curtail M, Stinger, Starane, MCPA ester, Harmony Extra, Harmony GT, Peak, and Tordon. Puma can also be tank-mixed with Furadan, Sevin XLR Plus, Mancozeb, Tilt, or Benalate. DO NOT apply Puma to corn, tame oats, or rye. Do NOT apply Puma within 60 days of wheat harvest or 57 days of barley harvest.

Research at the University of Minnesota has shown that Puma will good to excellent control of wild oats with good crop safety.

Tiller (fenoxaprop + MCPA ester + 2,4-D ester):

Apply Tiller at 1.7 pts/A after the spring wheat and barley begins to tiller (3-4 leaf stage) but prior to jointing stage (6-leaf stage) for wild oat control. Tiller will also control larger foxtail (3-leaf to 2-tillers). In University of Minnesota research, Tiller has given good to excellent control of both yellow and green foxtail. **DO NOT** apply Tiller to durum wheat, oats or rye. **DO NOT** apply more than one application of Tiller per season, or apply within 70 days of harvest. Tiller can be applied by air.

Tiller at 1.7 pts/A is labeled for tank mixing with Stinger, Buctril and Tordon for wild oat control. Check the label for tank mixing restrictions.

There were several cases of hard red spring wheat injury due to Tiller applications in 2000. Spring wheat tolerance to Tiller is good to fair. Barley tolerance to Tiller is only fair. The injury was associated with cool, wet weather conditions and late applications. In most cases, the spring wheat recovered from this injury, and there was no yield loss. To decrease the crop injury potential, **DO NOT** apply Tiller after jointing stage. Read the label for additional restrictions or precautions.

Herbicide Resistant Wild Oat

Wild oats have developed resistance to several wild oat herbicides used in Minnesota. Herbicide resistance develops through the selections of naturally occurring weed biotypes that have an inherent ability to tolerate the herbicide. The term “biotype” refers to plants within a species that have a slightly different genetic makeup from the general population.

Selection for change in weed populations begins when a small number of plants (a biotype) within a weed species have a genetic makeup that enables them to survive a particular herbicide application. Where this difference in genetic makeup originated is not clear. However, herbicides are not known to directly cause the genetic change (i.e. mutation) that allows resistance. The resistant biotype, therefore, is present in low numbers in natural populations and when a herbicide is applied, most of the susceptible weeds die but the few resistant weeds survive, mature, and produce seed. If the same herbicide continues to be applied and, the resistant weeds reproduce, the percentage of the weed population that is resistant will increase.

It is difficult to predict exactly which weed species will have biotypes resistant to a given herbicide. However, we have learned from previous pesticide resistance problems that the occurrence of herbicide resistant weeds is linked directly to the herbicide program used, the weed species present, and the crop management practices employed.

Regardless of how weed resistance develops, it is important to know the herbicide mode of action to plan weed control programs that prevent the development and spread of resistant weeds. Table 1 list the commonly used wild oat herbicide, their herbicide families and mode of action.

Strategies for preventing and managing herbicide resistant weeds:

- Scout fields to identify weed species present
- Use herbicides only when necessary.
- Practice herbicide rotation using herbicides with different modes of actions and herbicides from different families.
- Control weed escapes and sanitize equipment to prevent the spread of resistant weeds.
- Integrate mechanical, cultural, and chemical weed control methods.