

Weed Management Strategies for Wheat

A healthy wheat crop competes well with weeds, especially when production techniques result in an initial uniform stand and when loss of stand due to winter injury is minimal. Effective weed control and prevention of weed seed production in prior crops will reduce the risk of weed problems in wheat. Some wheat fields can benefit greatly from herbicide application, and failure to scout fields and take the appropriate measure can result in yield loss and harvesting problems in these fields. The weeds that appear above the wheat canopy late in the season, such as ragweeds and Canada thistle, can often be easily controlled with a spring herbicide treatment. The most common weed problems in wheat include:

- winter annual weeds, such as common chickweed, purple deadnettle, shepherd's-purse, and field pennycress. These weeds become established in the fall along with the wheat, and can interfere with the early development of wheat in spring. Dense populations of winter annual weeds should be controlled in late fall or early spring to minimize interference with wheat growth. Many of these weeds have emerged by the time of no-till wheat planting, and can be controlled with glyphosate before wheat emerges.
- wild garlic, due to the contamination of harvested grain with its bulblets. Several herbicides are effective if applied in the spring after garlic has several inches of new growth.
- Canada thistle, which can greatly suppress wheat growth due to its tendency to occur in dense patches. Most wheat herbicides have some activity on thistle, and can suppress it adequately if not applied too early in spring.
- dandelion, which can interfere with wheat establishment in the fall and wheat growth in the spring. Emerged dandelion should be controlled prior to wheat planting with tillage or glyphosate.
- summer annual broadleaf weeds, such as common and giant ragweed, which can begin to emerge in late March. A healthy wheat crop can adequately suppress these weeds but herbicide application is occasionally warranted.

It is essential to apply herbicides at the correct stage of wheat growth to avoid crop injury. When wheat has not yet reached the jointing stage, any herbicide labeled can be safely applied. As wheat growth stage advances past jointing and approaches the boot stage, herbicide choices become much more limited. Most herbicides can be applied in nitrogen fertilizer solution when the wheat is top-dressed. This may increase crop injury somewhat, and some labels recommend adjusting surfactant rates to minimize injury.

Table 17. Weed Response to Herbicides in Small Grains

This table compares the relative effectiveness of herbicides on individual weeds. Ratings are based on labeled application rate and weed size or growth stage. Performance may vary due to weather and soil conditions, or other variables.

Weed control rating:

9 = 90% to 100%; 8 = 80% to 90%; 7 = 70% to 80%; 6 = 60% to 70%; 5 = 50% to 60%; 0 = less than 50% control.

N = No Information.

| Weed | 2,4-D | Aim | MCPA | Dicamba | Buctril | Curtail | Harmony Extra | Express | Starane | Stinger | Peak | WideMatch |
|---------------------------|-------|-----|------|---------|---------|---------|------------------|---------|---------|---------|------|-----------|
| Mode of Action | G | D | G | G | P | G | A | A | G | G | A | G |
| Winter Annual | | | | | | | | | | | | |
| Buckwheat, Wild | 5 | 6 | 8 | 9 | 9 | 9 | 8 | 8 | 7 | 9 | 8 | 9 |
| Chickweed, Common | 5 | 0 | 5 | 6 | 6 | 5 | 9 | 9 | 0 | 0 | 7 | 0 |
| Deadnettle, Purple or Red | 5 | 0 | 5 | 0 | N | 5 | 8 | 9 | 0 | 0 | 7 | 0 |
| Henbit | 5 | 0 | 5 | 6 | 8 | 5 | 9 | 9 | 0 | 0 | 7 | 0 |
| Lettuce, Wild | 9 | 0 | 9 | 8 | 6 | 9 | 8 | 9 | N | 8 | 8 | 8 |
| Marestail | 8 | 0 | 8 | 9 | 6 | 8 | 7 | 5 | N | 9 | 5 | 9 |
| Mustard spp. | 9 | 6 | 9 | 6 | 9 | 9 | 9 | 9 | 7 | 0 | 9 | 7 |
| Pennycress, Field | 9 | 7 | 9 | 6 | 8 | 9 | 9 | 9 | N | 0 | 9 | N |
| Shepherd's purse | 9 | 6 | 9 | 8 | 8 | 9 | 9 | 8 | N | 0 | 8 | N |
| Summer Annual | | | | | | | | | | | | |
| Lambsquarters, Common | 9 | 7 | 9 | 9 | 9 | 9 | 9 | 9 | 0 | 0 | 7 | 0 |
| Nightshade, Black | 8 | 8 | 8 | 9 | 9 | 9 | 0 | 0 | 7 | 9 | 5 | 7 |
| Pigweed spp. | 9 | 8 | 9 | 9 | 7+ | 9 | 9 | 8 | 0 | 0 | 9 | 0 |
| Ragweed, Common | 9 | 6 | 9 | 9 | 9 | 9 | 0 | 0 | 9 | 9 | 9 | 9 |
| Ragweed, Giant | 9 | 3 | 9 | 9 | 8 | 9 | 0 | 0 | 9 | 9 | 7 | 9 |
| Smartweed | 6 | 5 | 7 | 9 | 9 | 8 | 9 | 8 | 7 | 8 | 7 | 7 |
| Velvetleaf | 9 | 9 | 9 | 8 | 9 | 8 | 8+ | 0 | 8 | 0 | 8 | 8 |
| Perennial | | | | | | | | | | | | |
| Dandelion | 9 | 3 | 8 | 8 | 0 | 9 | 6 | 5 | 6 | 9 | N | 8 |
| Garlic, Wild | 7 | 0 | 5 | 5 | 0 | 0 | 9 | 6 | 0 | 0 | 8 | 0 |
| Thistle, Canada | 7 | 2 | 5 | 7+ | 6 | 9 | 7 | 8 | 0 | 9 | 6 | 8 |

Mode of action: G = Growth regulator; P = Photosynthesis inhibitor; A = ALS inhibitor; D = cell membrane disruptor

Note: See text for Olympus, Osprey, and Maverick for information on control of winter annual grasses.

Small Grains

Small Grains: Wheat Only — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-----------|-------------|--------------------|
|-----------|-------------|--------------------|

| | | |
|---------|-------|---------------|
| Curtail | 2.38L | 1 - 2 2/3 pts |
|---------|-------|---------------|

- Curtail is a premix of clopyralid (Stinger) plus 2,4-D amine that controls many annual weeds in wheat, including ragweeds, lambsquarters, mustard species, field pennycress, and shepherd's-purse.
- Curtail controls Canada thistle, but will be less effective than Stinger for long-term thistle control. For best thistle control, apply after the majority of the weed's basal leaves have emerged from the soil, but before bud stage. Other perennials controlled or suppressed include sowthistle, dandelion, and curly dock.
- Mode of action: growth regulator.
- Apply in the spring to actively growing wheat after 4 leaves have unfolded on the main stem. Maximum rates based on wheat growth stage and weed size are as follows: 2 2/3 pints - before jointing, weeds up to 12 inches tall; 1.5 pints - before boot stage, weeds up to 10 inches tall; and 1 pint - before boot stage, weeds less than 6 inches tall.
- Apply in a spray volume of at least 10 gpa and increase volume where the weed/crop canopy is dense.
- Curtail can be applied in nitrogen fertilizer solutions.
- Allow 6 to 8 hours between application and rainfall.
- Do not apply Curtail where double-crop soybeans will be planted after wheat harvest or a legume will be seeded into standing wheat.
- Do not harvest hay from treated fields.
- Crop rotation restrictions: grasses - 30 days after application; alfalfa, soybeans - 10 1/2 months; clovers - 18 months.

| Herbicide | Formulation | Product Rate Range |
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| Express | 75DF | 1/6 - 1/3 oz |
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- Express (tribenuron methyl) is a translocated sulfonylurea herbicide that controls annual broadleaf weeds, including common chickweed, lambsquarters, and field pennycress, and provides partial control of Canada thistle, shepherd's-purse, and other mustard species. Express is less effective on wild garlic than Harmony Extra, but more effective on Canada thistle.
- Mode of action: ALS inhibitor. Does not control ALS-resistant weeds.
- May be tank-mixed with Buctril, 2,4-D or MCPA for improved control of Canada thistle, ragweeds, and other broadleaf weeds. Ester formulations have provided better results than amines. Tank-mixes with dicamba may result in reduced control of some broadleaf weeds.
- Apply after wheat is in the 2-leaf stage but before the flag leaf is visible. Apply when annual weeds are less than 4 inches tall or wide (rosettes). Allow 45 days between application and harvest.
- To reduce the risk of crop injury, mix Express with 2,4-D and apply after crop has reached the tillering stage of growth.
- To control or suppress Canada thistle, apply 1/3 oz to actively growing thistle plants that are 4 to 8 inches tall with 2 to 6 inches of new growth.
- When applying in water, add 0.06 to 0.50% v/v nonionic surfactant (1/2 to 4 pints per 100 gallons of water). When applying in liquid fertilizer, add 0.06 to 0.25% nonionic surfactant. Temporary crop yellowing and stunting may occur when Express is applied in liquid fertilizer. This injury is occasionally severe, and risk of severe injury may increase under saturated soil conditions.
- For flat-fan nozzles, apply in a spray volume of at least 5 gallons per acre. For flood nozzles on spacings of 30, 40, or 60 inches, maintain minimum spray volumes of 10, 13, or 20 gallons per acre, respectively.
- Forage legumes, grasses, and soybeans may be planted 45 days after application.
- Do not graze or feed forage or hay from treated areas to livestock. Dry-harvested straw may be used for bedding and feed.

Small Grains: Wheat Only — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-----------|-------------|--------------------|
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| Maverick | 75DF | 2/3 oz |
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- Maverick (sulfosulfuron) is a translocated sulfonylurea herbicide that can be applied in the fall to emerged wheat to suppress or control grass weeds.
- Mode of action: ALS inhibitor.
- OSU has not conducted research with Maverick and the information provided here is from the manufacturer. Maverick is a long-residual herbicide and can injure crops planted after wheat, especially double-crop soybeans.
- Maverick will suppress or control downy brome and cheat, which are winter annual grasses. Most effective application timing is postemergence in the fall when these grasses are in the 2 to 3-leaf stage. This treatment will also suppress quackgrass. Maverick provides residual control of some winter annual broadleaf weeds, but may not adequately control emerged broadleaf weeds.
- Apply with nonionic surfactant (2 qts/100 gallons).
- The optimum pH of the spray solution is 6.0 to 8.0 when using Maverick.
- OSU recommends the use of an STS soybean variety where double-crop soybeans will be planted after wheat harvest. The label specifies the following with regard to rotation to soybean: 1) STS soybeans can be planted 3 months after application where soil pH is less than 6.5 and at least 30 inches of rain has occurred between application and soybean planting; 2) non-STS soybeans can be planted 5 months after application where soil pH is less than 6.5 and at least 30 inches of rain has occurred; and 3) non-STS soybeans can be planted 12 months after application where soil pH is less than 7.5 and at least 24 inches of rain has occurred.
- Any crop other than soybeans or wheat should be planted no sooner than 3 months after Maverick application and only after the completion of a successful field bioassay.

| Herbicide | Formulation | Product Rate Range |
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| Olympus | 70WDG | 0.6 - 0.9 oz |
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- Olympus (propoxycarbazone-sodium) is a translocated herbicide that controls downy brome, cheat, and mustard species. Olympus should be mixed with other herbicide(s) to control a broader spectrum of broadleaf weeds.
- Mode of action: ALS inhibitor
- Apply in the fall after the majority of the wheat plants have emerged, or in the spring before jointing.
- Apply with nonionic surfactant (0.25 to 0.5% v/v). When applied using nitrogen fertilizer solution as the carrier, the nonionic surfactant rate is 0.25% v/v. Temporary crop injury, including reduced growth, discoloration, and leaf burn, may occur when fertilizer is the carrier. Do not use adjuvants that result in a spray solution pH of less than 5.
- Do not rotate to other crops within 18 months following application of Olympus.

| Herbicide | Formulation | Product Rate Range |
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| Osprey | 4.5WDG | 4.75 oz |
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- Osprey (mesosulfuron-methyl + safener) is a translocated herbicide that controls annual bluegrass and annual ryegrass. Osprey should be mixed with other herbicide(s) to control broadleaf weeds.
- Mode of action: ALS inhibitor
- Apply in the fall after wheat plants emergence, or in the spring before jointing. Grass weeds should be in the 1-leaf to 2-tiller stage at the time of application.
- Apply with methylated seed oil (1.5 pts/A) a formulated combination of nonionic surfactant or methylated seed oil plus a nitrogen source (0.8 - 1.6 pts/A). When the tank-mix partner precludes use of methylated seed oil, apply with nonionic surfactant (0.5% v/v) plus ammonium sulfate (1.5 - 3 lbs/A) or 28% UAN (1 - 2 qts/A). Osprey should be applied using water as the spray carrier, but up to 15% of the spray solution can be nitrogen fertilizer solution.
- Do not plant soybeans within 90 days after Osprey application. Corn can be planted 12 months after application.

Small Grains: Wheat Only — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-----------|-------------|--------------------|
| Sencor | 75DF | 0.75 - 2 oz |

- Sencor (metribuzin) can be applied in the fall to emerged wheat to help control winter annual weeds.
- Wheat should be in the 2-leaf to 2-tiller stage and actively growing at the time of application. Rate varies with soil type.
- Wheat varieties vary in their tolerance to Sencor. Consult the label for a list of varieties that are approved for use with Sencor.
- Can be applied with other herbicides labeled for fall application, including Harmony Extra. Consult labels for all precautions before application of any herbicide combination.
- Do not apply with fertilizer solution.
- Crop injury may occur if Sencor is applied: 1) when the crop is under stress from frost damage, drought, or excessive moisture; 2) to soils with pH greater than 7.7, or 3) to fields where wheat is planted less than 1 inch deep.

| Herbicide | Formulation | Product Rate Range |
|------------------|-------------|--------------------|
| Weedmaster/Brash | 3.87L | 0.5 - 1 pt |

- Weedmaster/Brash is a premix of 2,4-D amine plus dicamba for control of broadleaf weeds in wheat.
- Mode of action: growth regulator.
- Apply 0.5 to 1 pint per acre in the spring after tillering and prior to the joint stage.
- Rates up to 1 1/3 pints per acre can be applied in the fall after wheat begins to tiller for suppression of perennial weeds such as dandelion. Apply following a frost but before a killing freeze. Periods of extended stress such as cold and wet weather may increase the risk of crop injury. Do not apply in the fall unless the user is willing to accept the risk of crop injury.
- Apply in a spray volume of at least 5 gpa, and increase spray volume in dense or tall vegetation.

Small Grains: Oats and Wheat — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-------------|-------------|--------------------|
| 2,4-D Amine | Various | 0.25 - 1 lb ai/A |
| 2,4-D Ester | | |
| MCPA Amine | | |
| MCPA Ester | | |
| | 4 lb/gal | 1/2 - 2 pt |
| | | 1/2 - 1 1/2 pt |

- Mode of action: growth regulator.
- Apply in the spring after full tiller. Labels vary with regard to the wheat stage when 2,4-D should no longer be applied. Weedar and Weedone labels specify application before wheat is forming joints in the stem. Labels of some other 2,4-D products allow application after jointing but before early boot. The risk of injury and yield loss increases when applied after jointing. Amine formulations are less likely to injure the crop than ester formulations, and use of fertilizer solution as the spray carrier may increase the risk of injury. To minimize the risk of injury after jointing, use water as the carrier and do not apply more than 0.25 lb ai/A of ester or 0.5 lb ai/A of amine.
- Application prior to wheat emergence can cause crop injury and stand loss.
- MCPA is less likely than 2,4-D to injure oats. Do not apply 2,4-D ester to oats.
- 2,4-D and MCPA are translocated herbicides that control many winter and summer annual weeds, but are weak on chickweed, henbit, and purple deadnettle. Expect some suppression of early-emerging perennial broadleaf weeds.
- 2,4-D may provide some suppression of wild garlic, especially the ester formulation. Apply 0.75 lb ai/A of 2,4-D ester when wild garlic plants are small.
- In wheat, 2,4-D or MCPA may be applied with 1/4 pint of dicamba (4 lb/gallon formulations) for improved control of some weeds.
- To control problem weeds at harvest, apply 0.5 to 1.0 lb ai/A per acre of 2,4-D during the hard dough stage.
- Do not forage or graze within 7 days (MCPA) or 2 weeks (2,4-D) of treatment. Do not feed treated straw to livestock when 2,4-D is applied as a preharvest treatment.

| Herbicide | Formulation | Product Rate Range |
|-----------|-------------|--------------------|
| AimEW | 1.9L | 0.5 - 1.9 oz |

- Aim (carfentrazone-ethyl) is a contact herbicide that controls a limited number of small summer and winter annual weeds. Aim is not effective on biennial or perennial weeds.
- Mode of action: cell membrane disruptor.
- Apply in the fall or spring before jointing when weeds are less than 4 inches tall and rosettes are less than 3 inches across.
- Apply with nonionic surfactant (0.25% v/v). UAN (2 to 4 gallons/100 gallons) or ammonium sulfate (2 to 4 lbs/A) can be added if recommended for use with other herbicides in a mix with Aim.
- Apply in a spray volume of 10 to 20 gpa with a pressure of 20 to 40 psi. Flat fan nozzles are recommended for adequate spray coverage.
- Add Aim to the spray tank before adding other products.

| Herbicide | Formulation | Product Rate Range |
|------------|-------------|--------------------|
| Bromoxynil | 2S | 1 - 2 pt |

- Bromoxynil is a contact herbicide that controls annual broadleaf weeds. Product names include Buctril, Moxy, Broclean, and Bronate.
- Mode of action: photosynthesis inhibitor.
- In fall-seeded small grains, apply in the fall or spring, but before the boot stage.
- In spring-seeded oats, apply from emergence up to the boot stage.
- For best results, apply before weeds are in the 4-leaf stage or are 2 inches tall, or before rosettes exceed 1 inch in diameter.
- Very safe on small grains, but slight leaf burn may occur occasionally.
- May be applied with dicamba, 2,4-D, MCPA, Express, or Harmony Extra. Maximum growth stage at the time of application and spray additive recommendations vary with the tank-mix partner. Follow label directions to avoid injury to the crop.
- Nitrogen fertilizer solution may be used as the spray carrier early in the spring, but this will increase leaf burn. Do not use fertilizer as the carrier after jointing.
- Do not graze treated fields for 30 days after application.

Small Grains: Oats and Wheat — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|------------|-------------|--------------------|
| Dicamba | 4L | 2 - 4 oz |
| Banvel SGF | 2L | |

- Dicamba is sold under various trade names, including Banvel, Oracle, Sterling, and Banvel SGF. Dicamba is a translocated herbicide that controls annual and winter annual broadleaf weeds, and helps suppress perennial broadleaf weeds.
- Mode of action: growth regulator.
- Can be applied in the fall or spring after emergence of fall-seeded wheat, but before jointing. Application prior to wheat emergence can cause crop injury and stand loss. Can be applied prior to planting, but allow 10 days between application and planting for each 0.25 lb active ingredient dicamba applied.
- In spring oats, apply a maximum of 0.12 lb ai/A before oats exceed the 5-leaf stage.
- For best results, apply when weeds are small and actively growing.
- Dicamba is more effective on Canada thistle and smartweed than 2,4-D or MCPA. For better control of some weeds, Banvel may be tank-mixed with up to 2 pints of 2,4-D amine or 1 1/2 pints of 2,4-D ester.
- Do not graze or harvest for dairy feed before ensilage (milk) stage.

| Herbicide | Formulation | Product Rate Range |
|---------------|-------------|---|
| Harmony Extra | 75DF | Wheat 0.3 - 0.6 oz Oats 0.3 - 0.4 oz |

- Harmony Extra is a premix of thifensulfuron (Harmony GT) plus tribenuron methyl (Express) that controls wild garlic and annual broadleaf weeds, including common lambsquarters, mustard species, Pennsylvania smartweed, field pennycress, shepherd's purse, common chickweed, purple deadnettle, and henbit.
- Mode of action: ALS inhibitor.
- Does not control ragweeds. May be tank-mixed with Buctril, 2,4-D or MCPA for improved control of Canada thistle, ragweeds, and some other weeds. Ester formulations have provided better results than amines. Tank-mixes with dicamba may result in reduced control of some broadleaf weeds.
- Apply in fall or spring after wheat is in the 2-leaf stage, but before the flag leaf is visible. Annual broadleaf weeds should be past the cotyledon stage, actively growing, and less than 4 inches tall or across at the time of application.
- Apply when spring oats are in at least the 3-leaf stage, and before jointing. Do not apply to oats more than once per season. Do not use on Ogle, Premier, or Porter varieties.
- To control wild garlic, apply 0.5 to 0.6 ounce when garlic plants are less than 12 inches tall with 2 to 4 inches of new growth. Control will be better if applied during warm weather (60 F or more) to actively growing garlic plants.
- To suppress Canada thistle, apply 0.6 ounce when all thistles have emerged, are actively growing, and are 4 to 8 inches tall with 2 to 6 inches of new growth. Application with 2,4-D will improve thistle control.
- If water is the spray carrier, apply with 0.25 to 0.5% v/v nonionic surfactant (1 to 2 quarts per 100 gallons). If the spray solution contains consists of no more than 50% nitrogen fertilizer solution (and the other 50% is water), apply with 0.06 to 0.25% v/v surfactant (1/2 to 2 pints per 100 gallons). If the spray solution consists of more than 50% nitrogen fertilizer, consult dealer or Dupont representative before adding an adjuvant. Temporary crop injury may occur when applied with surfactant using fertilizer as the carrier. This injury is occasionally severe, and risk of severe injury may increase under saturated soil conditions.
- May be applied with flat fan or low-volume flood nozzles. Minimum spray volume is dependent upon nozzle type and size. See label for additional information.
- Most other crops can be planted 45 days after application of Harmony Extra.
- Do not graze or feed forage or hay from treated areas to livestock.

Small Grains: Oats and Wheat — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
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|------|------|-------------------------------|
| Peak | 57DF | 1/2 oz (1 packet per 6 acres) |
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- Peak (prosulfuron) is a translocated sulfonylurea herbicide that controls annual broadleaf weeds in wheat, oats, rye, and some other small grains. Weeds controlled include chickweed, wild garlic, mustard species, and common ragweed (except ALS-resistant biotypes). Peak will suppress Canada thistle.
- Mode of action: ALS inhibitor.
- May be tank-mixed with 2,4-D, dicamba, Buctril, or MCPA to improve control of Canada thistle, giant ragweed, lambsquarters and other broadleaf weeds. Follow restrictions on all labels with regard to growth stage and adjuvants when tankmixing.
- Apply in fall or spring after crop emergence and before the second node is detectable in stem elongation (Feeke's Growth Stage 7). Weeds should be 1 to 3 inches tall and actively growing for best results.
- Crop oil concentrate (1 to 4 pints/A) is the preferred adjuvant when Peak is applied alone using water as the carrier. Apply with nonionic surfactant (1 to 2 quarts per 100 gallons of spray) if fluid fertilizer is used as the spray carrier, or if tank-mixing with any other herbicide.
- Apply in a spray volume of at least 10 gpa. Increasing the spray volume may improve control where the crop and weed canopy is dense.
- Do not apply when the crop is under stress due to drought, cold weather, or other factors, or if cold, wet conditions are expected within one week after application.
- Allow 4 hours between application and rainfall.
- Do not graze or feed treated crops to livestock until 30 days after application.
- Crop rotation restrictions: soybeans - 10 months; forage grasses, alfalfa, clovers - 22 months.

| Herbicide | Formulation | Product Rate Range |
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| Starane | 1.5L | 1/2 - 2/3 pt |
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- Starane (fluroxypyr) is a translocated herbicide that controls hemp dogbane, common ragweed and a few other broadleaf weeds. Due to a relatively narrow spectrum of activity, Starane should generally be mixed with other herbicides to improve control of specific problem weeds.
- Mode of action: growth regulator.
- Apply from the 2-leaf growth stage of wheat or oats up to and including flag leaf emergence, and when weeds are less than 4 (1/2 pt/A) to 8 (2/3 pt/A) inches tall.
- Do not plant soybeans within 4 months following Starane application.

| Herbicide | Formulation | Product Rate Range |
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|---------|----|--------------|
| Stinger | 3L | 1/4 - 1/3 pt |
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- Stinger (clopyralid) is a translocated herbicide that controls ragweeds, wild buckwheat, and Canada thistle, and suppresses sowthistle and dandelion.
- Mode of action: growth regulator.
- Apply from the 3-leaf stage up to early-boot stage of oat or wheat growth. Annual broadleaf weeds should have no more than 5 leaves at the time of application.
- For Canada thistle control, apply 1/3 pint when thistle plants are in the rosette (at least 4 inches tall or across) to prebud stage.
- Can be tank-mixed with most other wheat herbicides for improved control of broadleaf weeds. See label for more information.
- Do not harvest hay from treated fields.
- Crop rotation restrictions: grasses - anytime; alfalfa, soybeans - 10 1/2 months after application; clovers - 18 months.

Small Grains: Oats and Wheat — Not Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-----------|-------------|--------------------|
| WideMatch | 1.5L | 1.0 - 1.3 pts |

- WideMatch is a premix of clopyralid (Stinger) plus fluroxypyr (Starane) for control of broadleaf weeds, including hemp dogbane, ragweeds, Canada thistle, maretail, and cocklebur. WideMatch should be mixed with other wheat herbicide(s) for control of most winter annual weeds.
- Mode of action: growth regulator.
- Apply from the 3-leaf growth stage of wheat or oats up to and including flag leaf emergence, and before weeds are 4 inches tall.
- For most effective Canada thistle control, apply after the majority of the basal leaves have emerged and before bud stage.

Oats and Wheat — Underseeded With Legumes

| Herbicide | Formulation | Product Rate Range |
|-------------|-------------|--------------------|
| 2,4-D Amine | 4 lb/gal | 1/4 - 1/2 pt |
| MCPA Amine | 4 lb/gal | 1/2 pt |

- Mode of action: growth regulator.
- Use low pressure (30 psi or less), and apply before jointing, but after the small grain and weeds have formed a canopy over the legumes. Do not apply 2,4-D until the grain is 8 inches tall.
- Controls most annual broadleaf weeds.
- For best results, apply when weeds are small and actively growing.
- MCPA is less likely to injure the legumes than 2,4-D, but both will cause some injury and stand loss. Red and ladino clovers are more tolerant than other legumes. Do not apply MCPA to vetch or sweet clover. Do not apply 2,4-D to sweet clover or alfalfa unless the weed infestation is severe and crop injury can be tolerated.
- To minimize injury, do not use more than 6 gallons of water per acre when applying MCPA amine.
- Do not forage or graze for 7 days (MCPA) or 14 days (2,4-D) after treatment.

| Herbicide | Formulation | Product Rate Range |
|------------|-------------|--------------------|
| Bromoxynil | 2S | 1 - 1 1/2 pt |

- Can be applied to wheat, oats, barley, rye, and triticale underseeded with alfalfa only.
- Mode of action: photosynthesis inhibitor.
- Apply to small grains from emergence up to boot stage and when seedling alfalfa has 2 to 4 trifoliate leaves.
- Apply when weeds have less than 4 leaves or are less than 2 inches tall, or before rosettes are 1 inch in diameter.
- Apply in a minimum spray volume of 20 gpa with a minimum pressure of 30 psi.
- Some crop leaf burn can result from application, especially under warm, humid conditions. Do not apply when temperatures will exceed 70 F the day of and for 3 days following application. Do not apply when alfalfa is under stress by moisture, temperature, insect, or disease.
- Do not graze or harvest for 30 days following treatment.

Wheat: Harvest Aids

| Herbicide | Formulation | Product Rate Range |
|-------------|-------------|--------------------|
| 2,4-D Amine | Various | 1.5 lbs ai/A |
| 2,4-D Ester | | 0.5 - 1.0 lb ai/A |

- Various formulations of 2,4-D can be applied with aerial or ground equipment after wheat has reached the hard dough stage.
- Mode of action: growth regulator. See product labels for more information.
- The Weedar 64 label advises that crop injury can occur, and spot treatment is recommended to minimize the extent of injury.
- Do not feed wheat straw to livestock if a harvest-aid treatment of 2,4-D has been applied.
- Take precautions to reduce spray drift. Corn, soybeans and other sensitive crops are likely to be growing in areas surrounding treated wheat fields. Amine formulations of 2,4-D have less potential than ester formulations to move off-target through volatilization and injure other plants.

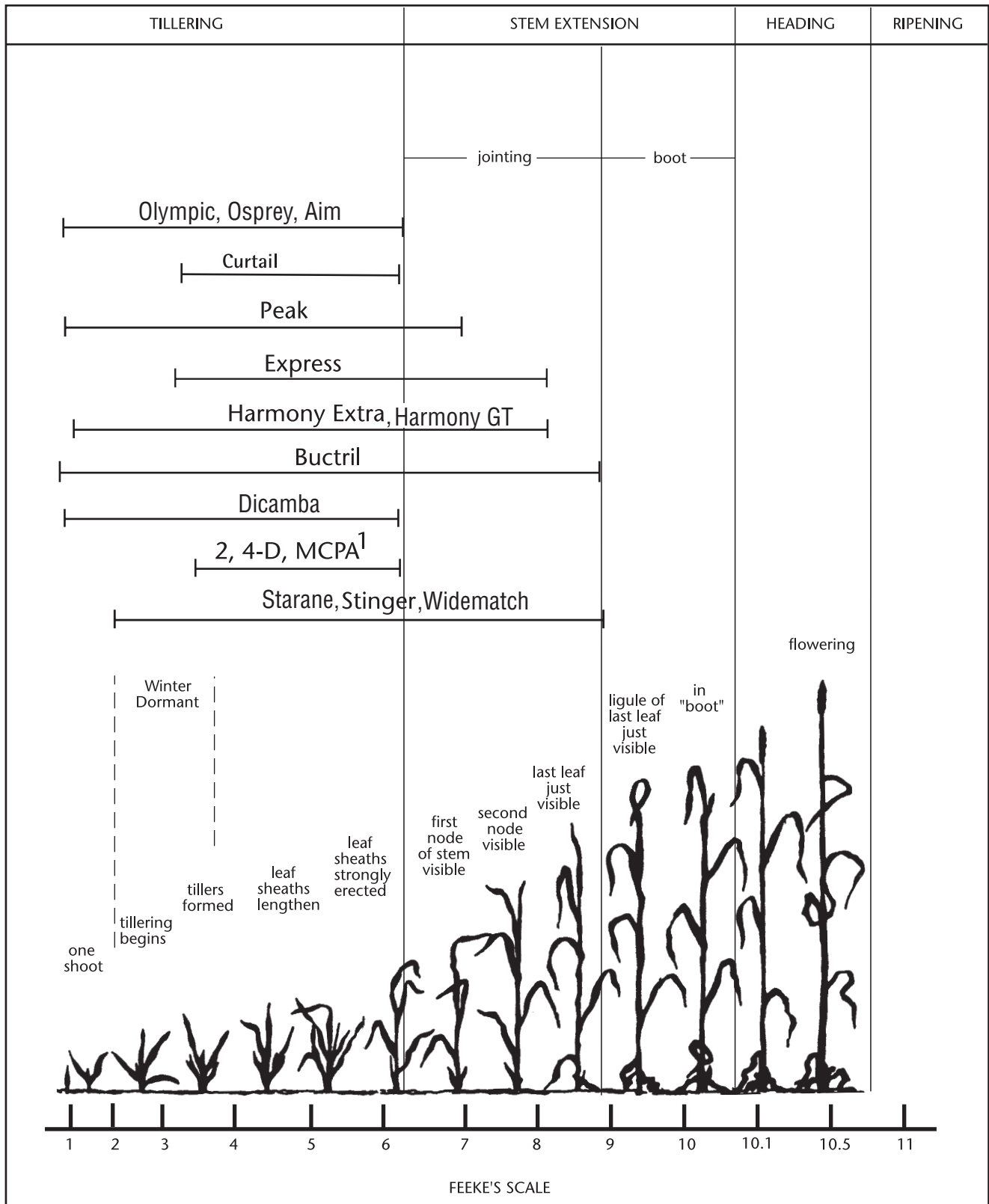
| Herbicide | Formulation | Product Rate Range |
|------------|-------------|--------------------|
| Glyphosate | Various | 0.75 lb acid/A |

- Glyphosate can be applied as a preharvest treatment in wheat to control annual and perennial weeds. Table 20 contains a list of currently available glyphosate products. See labels for specific information on preharvest application.
- Mode of action: EPSP synthase inhibitor.
- Apply after the hard dough stage when grain moisture is 30% or less, and at least 7 days prior to harvest.
- Some of these products can be tank-mixed with 2,4-D (0.5 to 1.0 lb ai/A) to broaden the spectrum of control.
- Apply with ground or aerial application equipment using a spray volume of 3 to 10 gpa.
- Wheat grown for seed should not be treated with glyphosate as reduction of germination and vigor may occur.
- Take precautions to reduce spray drift. Corn, soybeans and other sensitive crops are likely to be growing in areas surrounding treated wheat fields.

| Herbicide | Formulation | Product Rate Range |
|------------------|-------------|--------------------|
| Weedmaster/Brash | 3.87L | 2 pints |

- Weedmaster/Brash is a premix of 2,4-D amine plus dicamba that can be applied to control weeds that may interfere with wheat harvest.
- Apply when wheat is in the hard dough stage and the green color has disappeared from the nodes of the wheat stem. Apply at least 7 days before harvest.
- Can be tank-mixed with glyphosate products registered for this use.
- Do not use treated wheat for seed unless a germination test is performed on the seed.

Figure 1. Wheat Growth stages and Herbicide application.



¹ Labels of some 2, 4-D products allow application after jointing but before early boot. (See text for more information)