



## Weed Management in Wheat

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**E**ffective weed management is essential for successful winter wheat production. Inadequate weed control can lead to significant yield loss and harvesting difficulty. Cultural and chemical control practices are often combined to achieve adequate weed control.

There are four times during the production season when weed control practices can be employed: before planting, at planting, in the spring and after harvest.

### Weed Control Before Planting

Serious infestations of quackgrass must be controlled before planting wheat. There are currently no herbicides that can be used in wheat to control quackgrass, even partially. Fall applications of glyphosate (Roundup) are very effective on quackgrass. Fall treatments made in sites harvested for corn silage are ideal for quackgrass control. Quackgrass in cornfields harvested for grain may be covered with corn stover, which can intercept the spray and reduce quackgrass coverage. In harvested soybean fields, the quackgrass may have been shortened by the harvester—this increases risk of poor control. (Further details on quackgrass control are available in IPM Fact Sheet E-2251.)

### Weed Control at Planting

The planting operation is the most critical step for weed control in wheat. A healthy, vigorous wheat stand is extremely competitive with weeds and is the single most important component of a weed control strategy in this crop. Production practices (seeding rate, fertility, etc.) that increase wheat vigor and yield reduce weed problems. In many cases, weedy areas in a field are the result of a poor stand, low soil pH or some other production problem. It is not uncommon for vigorous stands to have no need for

chemical control. (Recommended seeding and fertility practices for wheat in Michigan are available in Wheat Facts E-2518 and E-2526.)

*No-tillage wheat.* No-tillage establishment of wheat generally presents no major weed control problems. If no weeds are present at planting time, the field can be planted without special weed control measures. However, any winter annual weeds that have emerged should be treated with Roundup or Gramoxone Extra before planting. Spring-germinating annuals are not a problem—very little emergence of these species occurs in the fall and any plants that do emerge will be killed by freezing temperatures. One weed that has become a problem in some no-till wheat fields is dandelion. Established dandelions are very difficult to control in emerged wheat and therefore should be controlled before planting. Options for dandelion control before wheat planting include the use of Roundup Ultra (with ammonium sulfate) or tillage. 2,4-D is not labelled for application shortly before planting wheat and may cause wheat injury. Dandelions are generally easily killed with tillage.

### Weed Control in Spring

#### Cultural practices

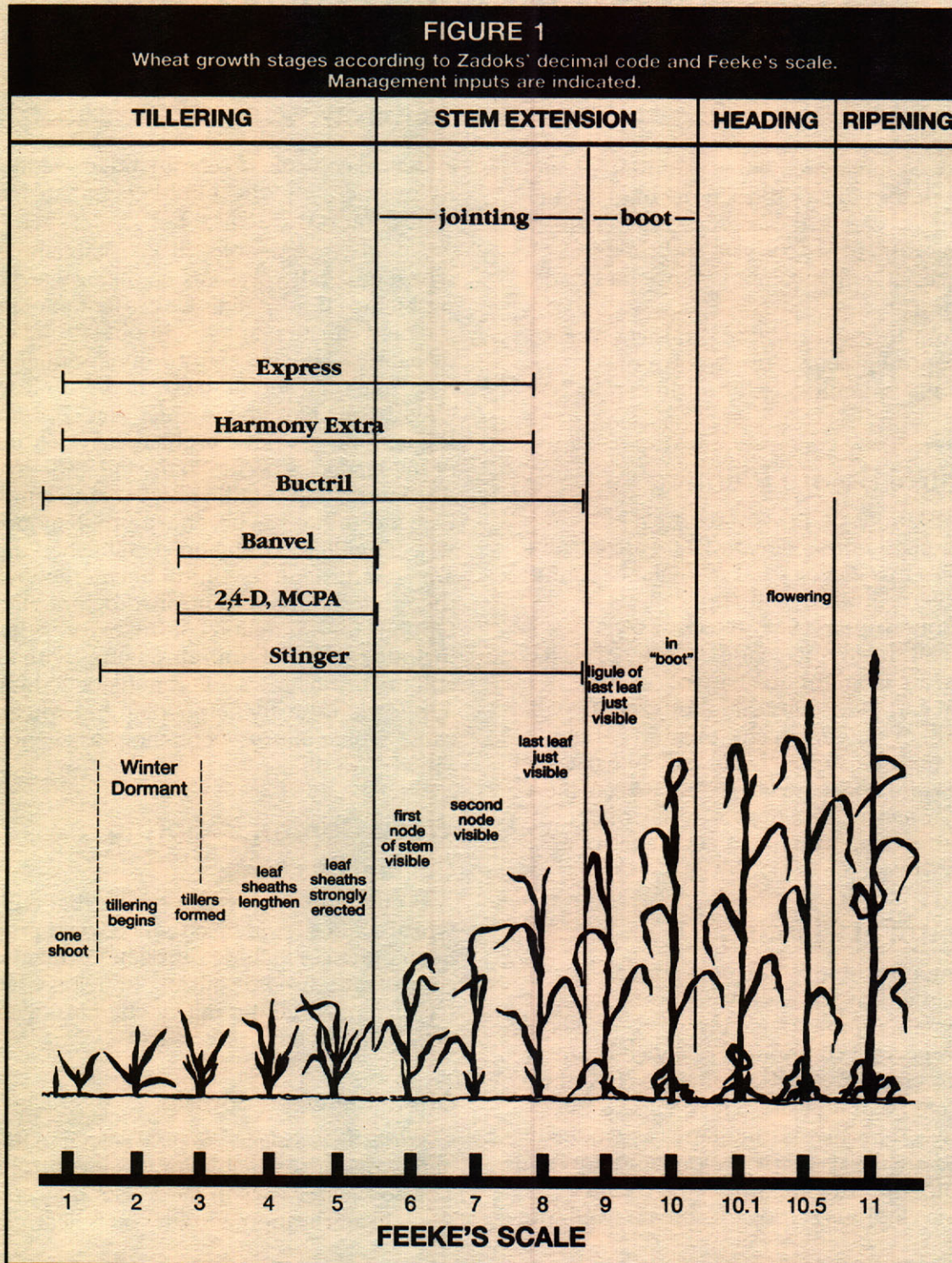
Production practices in spring that will improve wheat yield should also reduce weed problems. Such practices include nitrogen fertilization, insect control and disease control. In fields where wheat has sustained winter injury, chemical weed control may be more important.

#### Chemical weed control

*Wheat seeded alone.* Several selective foliar-applied herbicides are available for weed control in wheat. The herbicides vary in the weeds they control and in the safe application window on wheat. Table 1 lists

the effectiveness of wheat herbicides on weeds commonly found in wheat. Figure 1 shows the safe application timing of wheat herbicides, based on crop growth stage. Note that the safe application period varies greatly among the herbicides. Some

herbicides can safely be applied in the fall (e.g., Harmony Extra and Buctril), while others should be applied only in spring. All of the herbicides commonly used on wheat can be safely applied between Feeke's stage 3 and 6.



Decisions on the need for a herbicide start with close monitoring of the field. This includes timely identification of weed species in the field. Herbicide selection involves several considerations, including weed species, weed size, wheat growth stage and herbicide cost.

The earlier a weed emerges, the more competitive it likely will be. Tall winter annual weeds will usually be more competitive with wheat than spring-germinating weeds and therefore must be treated early to minimize impact on the crop. Annual grass species are generally not a problem in Michigan winter wheat production.

*Wheat seeded with a legume.* Very few herbicide options exist for weed control in wheat underseeded with a legume. MCPA can be applied with any legume other than sweet clover. Application should be made at 5 to 6 gallons per acre (gpa) to minimize penetration of the spray down to the legume. This treatment relies on the wheat and weed canopy as a barrier against direct exposure of the legume to the spray.

Buctril can be used for weed control in wheat underseeded with alfalfa. To avoid alfalfa injury, do not treat when air temperatures are expected to exceed 70 degrees F within 3 days following application. Do not apply to wheat seeded with legumes other than alfalfa. Buctril can also be applied in the fall before seeding a legume into the wheat in the spring.

*Herbicide application with liquid nitrogen fertilizer.* Combining herbicide and nitrogen into a "weed and feed" strategy reduces the number of trips over the field. However, this practice has two major limitations: the optimum timing of herbicide and nitrogen often do not overlap, and risk of crop injury.

Herbicides are often applied to wheat between Feeke's stage 5 and 6. The ideal time for a single spring nitrogen application is early in the spring prior to green-up. Therefore, application of all the spring nitrogen at Feeke's stage 5-6 represents a major delay that can reduce wheat yield. Earlier applications for control of winter annual weeds will minimize the delay in nitrogen timing but may be too early for spring-germinating weeds. One solution to this problem is to split the spring nitrogen application with half to three-fourths applied in early spring and the remaining nitrogen applied as the herbicide carrier.

Liquid urea-ammonium nitrate fertilizer (28 percent N) is a common carrier for herbicides in wheat.

The most common herbicide to be used in this manner is 2,4-D ester (2,4-D amine is difficult to mix in 28 percent N). Application of herbicide in 28 percent liquid nitrogen can cause leaf burn from the nitrogen, especially under hot, humid conditions. This risk increases with later wheat growth stages because more leaf area is exposed to the treatment and recovery time is shorter. In addition, the use of surfactant (required with herbicides such as Harmony Extra) greatly increases leaf burn potential. MSU research has demonstrated that excessive leaf burn from high nitrogen rates combined with surfactant can reduce wheat yield. To minimize this risk:

1. Do not apply more than 20 lbs of nitrogen per acre in the form of 28 percent N when using a surfactant with herbicide.

2. Do not apply more than 40 lbs of nitrogen per acre in the form of 28 percent N when no surfactant is used.

3. Avoid high-temperature, high-humidity days. Late afternoon applications carry less risk of leaf burn.

*Herbicide sensitivity among wheat varieties.*

Extreme sensitivity to a specific herbicide has been documented on certain wheat varieties in the past. Most recently, extreme sensitivity to Banvel herbicide has been observed on Wakefield wheat. Application of Banvel to this wheat (and probably Madison) often causes no immediate injury symptoms; however, seed set is often reduced to zero. Wakefield yield was reduced by more than 90 percent by application of Banvel at a typical use rate in a 1995 MSU research trial. Injury from Banvel occurred only in Wakefield wheat. This variety did not appear unusually sensitive to other common wheat herbicides.

MSU is screening new wheat varieties to be released from its breeding program and public releases from other universities that will be marketed in Michigan. Farmers and agribusiness personnel should check with their seed supplier or MSU Extension agent for current information on wheat variety sensitivity to herbicides.

*Harvest aids.* Roundup and 2,4-D ester are labeled as harvest aids in wheat. These herbicides can desiccate weeds to minimize harvesting difficulty. These treatments will not improve wheat yield or greatly reduce weed seed production. Roundup applied as a harvest aid is unlikely to control quackgrass effectively because the plants are not actively growing at the time of wheat harvest.

## Weed Control after Harvest

One of the benefits of producing wheat is that the midsummer harvest time provides an ideal opportunity for perennial weed control in the fall. Following wheat harvest, perennial weeds have ample time to regrow before herbicide application in the fall. For maximum effectiveness, herbicides should be applied when the weeds are as large as possible (ideally in the flower bud stage), green and actively growing with good soil moisture. Treatments must be made before the weeds are damaged by frost. For quackgrass, which can tolerate light frosts without damage, application can be made from early September to mid-October or later. Species that are more sensitive to frost or that drop their leaves in fall should be treated earlier. With these weeds, the key is to treat before the first frost and before the leaves turn yellow.

Fall application of Roundup after wheat harvest is very effective on many common perennial weeds, including quackgrass, Canada thistle, hemp dogbane, milkweed and field bindweed. (Detailed recommendations on herbicides, rates, additives and

timing of applications to control these and other common perennial weeds are available in Extension bulletins E2244-E2257.)

Farmers often leave patches of perennial weeds (such as Canada thistle) unharvested. These patches should be mowed shortly after wheat harvest and then treated in the fall. If left unmowed, the weeds will be too mature at treatment time in the fall. Herbicide application to perennial weeds in July and August is generally less effective than fall applications because of the typically hot, dry conditions during those months.

Annual broadleaves, especially common ragweed, can become a problem in wheat stubble. If left uncontrolled, they produce large numbers of seed, which will increase weed numbers in future years. Common ragweed seed production can be minimized in wheat stubble fields by mowing, tillage or herbicide use. If perennial weeds exist in patches, it is possible to control the common ragweed in late summer but leave the patches of perennial weeds undisturbed. Then the perennial weeds can be treated with a herbicide in the fall.

**Table 1. Weed Response to Herbicides in Small Grains\***

	Annual Broadleaves												Annual Grasses	Perennials							
	Cocklebur	Jimsonweed	Lambsquarters	Nightshade (Black)	Pigweed (Redroot)	Ragweed	Smartweed	Velvetleaf	Wild Mustard	Hoary Alyssum	Yellow Rocket	Chickweed (Common)		Mayweed (Dogfennel)	Bindweed (Field)	Canada Thistle	Sowthistle	Quackgrass	Yellow Nutsedge	Wild Garlic	Wild Onion
Banvel	G	G	G	G	G	G	E	G	F	G	G	F	F	N	F	F	P	N	N	F	F
Buctril	G	G	E	G	F	G	G	G	F	F	F	P	F	N	P	P	N	N	N	N	N
Express	F	-	E	P	F	P	F	P	E	-	G	G	E	N	P	F	F	N	N	F	P
Harmony Extra	G	-	E	P	E	F	E	G	E	-	G	G	E	N	P	F	F	N	N	G	F
MCPA	F	F	G	G	G	G	P	F	G	G	G	P	P	N	P	P	P	N	N	P	P
Stinger	E	G	P	P	P	G	F	P	P	P	P	P	G	N	P	G	F	N	N	N	N
2,4-D amine	F	F	G	G	G	G	P	F	G	G	G	P	P	N	P	P	P	N	N	P	P
2,4-D ester	F	F	G	G	G	G	P	G	G	G	G	P	P	N	F	F	P	N	N	F	F

P = Poor; F = Fair; G = Good; E = Excellent; N = None; - = Not enough information to rate

\*The above ratings are a relative comparison of herbicide effectiveness. Weather conditions greatly influence the herbicide's effectiveness and weed control may be better under favorable conditions or poorer under unfavorable conditions.

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