



# Be a Good Neighbor: Control Your Volunteer Wheat

Robert L. Bowden, Plant Pathology  
H. Leroy Brooks, Entomology  
Dallas E. Peterson, Agronomy, Weed Science  
James P. Shroyer, Agronomy, Crop Production

Departments of Plant Pathology, Entomology and Agronomy

**V**olunteer wheat is a fact of life in wheat production. Since no combine is perfect, there is always plenty of grain left on the ground to produce volunteer. If you are unlucky and get some shattering or hail just before harvest, even more volunteer is produced.

Some people don't think this is a problem. They look at volunteer wheat and see potential pasture. Others see a good ground cover to keep their land from blowing. Some farmers may think that they don't have time to control their volunteer. Still others don't want to pay the cost of volunteer destruction, which may run \$10 or more per acre.

The truth is that volunteer wheat is the source of some severe problems and may actually cost *much more* if not controlled. The cost of *not* controlling volunteer may hurt you and it may also hurt your neighbors.

## What Are the Risks from Volunteer Wheat?

### *Wheat Streak Mosaic Virus*

The most important threat from volunteer wheat is wheat streak mosaic

virus. It causes stunting and yellow streaking on the leaves. This devastating disease can occur anywhere in the state, but is most prevalent in central and western Kansas. On average, Kansas farmers lose 10 million bushels per year to this disease. Many fields are completely destroyed. In most cases, infection can be traced to a nearby field of volunteer wheat. Volunteer wheat is important because it is the main reservoir of wheat streak mosaic virus during the summer and early fall. Control of volunteer is the main defense against wheat streak mosaic.

### *Wheat Curl Mite*

Wheat streak mosaic virus is carried from volunteer to newly planted wheat by the wheat curl mite. These tiny, white, cigar-shaped mites are too small to be seen with the naked eye. The curl mite uses the wind to carry it to new hosts and can travel up to half a mile from volunteer wheat. In addition to

carrying wheat streak mosaic, it also causes curling of leaf margins and head trapping.

### *Hessian Fly*

This insect often causes significant damage, especially in the eastern two-thirds of the state. Hessian fly larvae attack young wheat plants near the soil line. Tillers may be stunted and later may lodge. In heavy infestations, the whole stand may be lost. The Hessian fly normally has a spring brood and a fall brood. If volunteer is allowed to grow, it often enables the fly to produce a summer brood, especially in wet summers. This allows it to carry on to the new fall wheat crop in greater numbers.

### *Russian Wheat Aphid*

The Russian wheat aphid has been found in most of the counties west of U.S. Highway 81. However, the greatest concern has been in the last two tiers of counties in the western part of the state. Symptoms are usually in the form of alternating white, pink, or green longitudinal stripes which may

run almost the entire length of the leaf. Infested leaves may also begin to roll together from the edges, giving the entire leaf a tube-like appearance. Heads are often trapped and plants may die prematurely.

Even though a number of grass hosts are suitable as alternative hosts, the aphid appears to have difficulty surviving the summer unless early-emerging volunteer is present. While this insect has wings and can be wind borne for hundreds of miles, the vast majority of fall infestations in Kansas appear to originate from nearby infested volunteer.

### ***Take-all***

Take-all is a serious fungal root rot disease in continuous wheat. Take-all causes premature plant death and can be recognized by the typical white heads and blackened roots. It can be controlled by crop rotation, but rotation is not a good option for many producers. Take-all's weakness is that it has trouble surviving through the summer. Volunteer provides a "green bridge" between the old crop and the new crop and allows the take-all fungus to survive and reproduce during the summer.

### ***Leaf Rust and Stem Rust***

Rusts cause orange, powdery pustules on leaves, stems or heads of wheat. Volunteer wheat is the primary summer reservoir for leaf rust and stem rust in Kansas. Although both of these can be carried long distances by wind, nearby volunteer increases the risk of serious fall infestations of these diseases in the new wheat crop. This subsequently increases the risk that they will successfully overwinter on the new crop to cause trouble in the spring.

### ***Barley Yellow Dwarf Virus***

Barley yellow dwarf virus attacks wheat, oats, and barley and causes

stunting, yellow or purple leaf tips, and low yields. Volunteer wheat is a host of barley yellow dwarf virus and the greenbugs and oat birdcherry aphids which carry it.

### ***Other Insects***

A number of other insects are also associated with the presence of volunteer wheat. In some cases this is of little consequence, but in others it may increase the risk of damage either to the fall planted wheat or perhaps to other crops.

An example in western Kansas is the Banks grass mite. During some years, infestations become established during late summer and early fall on volunteer wheat. Later, as the quality of the volunteer deteriorates, mites move from the volunteer into adjacent fields of planted wheat or other small grains. Occasionally mites will survive the winter and continue to spread into the planted wheat following greenup in the spring.

A concern in the eastern part of the state is the chinch bug. Occasionally, adult bugs will fly from maturing sorghum fields in late summer to nearby fields where volunteer wheat is growing. Where infested volunteer is allowed to grow right up until seedbed preparation just prior to planting, early planted continuous wheat is likely to become infested. Similarly, volunteer that is allowed to grow through the fall and into the following spring may also serve as an attractive chinch bug host. Adult bugs that are coming out of overwintering appear to favor thin stands of wheat (either planted or volunteer) as a site for first brood development.

### ***Moisture Loss***

Volunteer and other weeds use up large amounts of soil moisture. When water storage is important, such as in summer fallow, volunteer must be destroyed.

## **How Can Volunteer Wheat Be Controlled?**

Depending on the weather, there may be several flushes of volunteer wheat during the summer. Producers sometimes question whether early flushes of volunteer need to be controlled. Volunteer which emerges soon after harvest (as occurs when heads are shattered by hail) is actually a more serious threat than later emerging volunteer. That's because it permits pests to move directly from maturing wheat to the new volunteer. Moisture loss is also greatest with early volunteer. Therefore, early destruction of volunteer is often beneficial.

In any case, it is critical that all volunteer within ½ mile be **completely dead** at least two weeks prior to planting. Destroying volunteer after the new wheat emerges is too late. Give yourself enough time to have a second chance if control is incomplete.

Tillage and herbicides are the two options available for volunteer control. Tillage and herbicides are often combined for an effective control program that leaves much of the stubble in place. Grazing out the volunteer is not an effective option since it does not provide complete control. This allows diseases and insects to survive and infest the new crop. The best approach will depend on available crop residue levels, conservation compliance plans, presence of other weeds, crop rotations, costs, available equipment, etc.

Tillage is a relatively inexpensive method (\$4.50 per acre custom rate), but each pass reduces ground cover and depletes soil moisture. Disks, field cultivators, or V-blade sweeps all can be used to control volunteer, but with different effects on residue retention. Tillage usually works best when plants are small and conditions are relatively dry.

Tillage soon after wheat harvest may be helpful to manage heavy straw and control large weeds present after wheat harvest. It may also incorporate seed and stimulate more uniform germination of volunteer. Early tillage may be especially helpful in continuous wheat. However, in summer fallow, tillage immediately after harvest generally is not needed if weeds are not present.

Chemical burndown of volunteer wheat with a herbicide is more expensive (about \$10 per acre with application) than tillage, but it leaves the crop residue undisturbed and conserves soil moisture. Herbicide options depend on cropping systems and rotations. Burndown herbicides such as the glyphosate products (Roundup, Roundup RT, Landmaster II, Landmaster BW, and Fallow Master) or paraquat (Gramoxone or Cyclone) can be used to control emerged volunteer wheat and other weeds in any cropping system. However, these herbicides have no residual activity and will not control later germinating volunteer wheat or weeds.

Paraquat is a contact herbicide and destroys the vegetation very quickly, while the glyphosate herbicides are systemic and require about a week to 10 days for the plants to completely die. If glyphosate is used too close to planting time, volunteer may survive long enough to transmit diseases and insects to the new crop. The optimum time to treat with a burndown herbicide is when most of the volunteer has emerged, but prior to tillering. The glyphosate herbicides tend to be more effective than paraquat on larger, or tillered volunteer wheat.

Residual herbicides are an additional option for volunteer wheat control in summer fallow or rotation to corn or sorghum. Atrazine is a relatively inexpensive treatment for volunteer wheat control that can be applied anytime in the summer or fall

following wheat harvest. However, early summer (July through mid-August) atrazine treatments are inconsistent and very dependent on rainfall for activity. In the September to October time period, tank-mixing atrazine with paraquat or glyphosate is effective if rotating to sorghum or corn. The paraquat or glyphosate controls existing volunteer, and the atrazine controls later emerging volunteer wheat and other weeds through the sorghum or corn crop. Atrazine rates need to be adjusted to soil type and pH and may not be appropriate for all areas.

Command (clomazone) and atrazine can be used in summer fallow the first summer following wheat harvest, but rates need to be adjusted according to soil pH and local climatic conditions to avoid carryover damage to the next wheat crop. Atrazine or Command cannot be used in continuous wheat.

### **Neighbor Cooperation Is the Key**

Even if you control your volunteer, diseases and insects from your neighbor's volunteer may still attack your wheat. Like the old saying goes, one bad apple can spoil the whole barrel. That's why neighbor cooperation in volunteer control is the key to success. If certain neighbors don't have time to control their volunteer, perhaps they would be willing to let you do it and cover your fuel bill.

Neighbors also need to cooperate in locating "hidden" volunteer. The obvious place to look is in wheat stubble. However, you often miss some along field edges, waterways, behind hedge rows, or in double-crop ground. Since insects and diseases can be carried by the wind, scouting must be done for at least one-half mile around the new field. Be especially sure to look in the direction of the prevailing wind.

**Remember, Good Neighbors Control Their Volunteer Wheat!**

### **For More Information See the Following:**

*Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland*, 1991. Kansas Agricultural Experiment Station Report of Progress 612

*Wheat Diseases*, 1984. Publication S-23, Kansas State University Cooperative Extension Service.

*Wheat Production Handbook*. Publication C-529. Kansas State University Cooperative Extension Service.

### **Read the Label**

Each herbicide used on raw agricultural products must be registered and must have a residue tolerance established by the Registration Division, Environmental Protection Agency. Check the label and select only herbicides that may be used legally. Mention of specific products does not constitute an endorsement over other similar products.

## A Dozen Reasons to Control Volunteer Wheat

- Wheat streak mosaic virus
- Wheat curl mite
- Hessian fly
- Russian wheat aphid
- Take-all
- Leaf rust
- Stem rust
- Barley yellow dwarf virus
- Greenbugs and oat birdcherry aphids
- Banks grass mite
- Chinch bug
- Moisture loss

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Publications from Kansas State University are available on the World Wide Web at: <http://www.oznet.ksu.edu>

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Robert L. Bowden, H. Leroy Brooks, Dallas E. Peterson, and James P. Shroyer, *Be a Good Neighbor: Control Your Volunteer Wheat*, Kansas State University, August 1991.