



# Weed Seed Contamination of Cereal Grain Seedlots — A Drillbox Survey

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Weeds cost Idaho citizens more than \$500 million annually. According to recent (1984) figures published by the Weed Science Society of America, weeds reduce annual wheat and barley production in Idaho by 13 and 12 percent respectively. This costs Idaho small grain producers as much as \$78.2 million in lost revenue.

Surveys show that for years an alarming number of Idaho growers have been planting and spreading the very weeds that reduce yields and increase production costs. For example, a drillbox survey conducted in 1968 found 37 percent of Idaho growers planting grain contaminated with wild oats. Some drillboxes contained as many as 99 wild oat seeds per pound of grain.

An eastern Idaho drillbox survey conducted by a seed laboratory during the early 1970s showed wheat and barley seed infested with as many as 125 wild oat seeds per pound. In that survey, 10 percent of wheat samples and 29 percent of barley samples contained wild oats. A 1976 seed laboratory survey of drillbox samples from throughout Idaho indicated that 8 percent of wheat and 15 percent of barley seed was contaminated with 1 to 400 wild oat seeds per pound. The practice of planting weed-contaminated seed has certainly contributed to weed problems in grain.

## Recent Survey Results

Drillbox surveys were conducted in 1982 and 1983 to investigate more thoroughly the nature and magnitude of weed seed contamination problems in small grains. A total of 335 (108 spring wheat, 166 winter wheat and 61 spring barley) seed samples were collected from counties throughout Idaho, and each sample was analyzed for numbers and species of weed seeds. The most common contaminant of seedlot samples from drillboxes was seed from another crop. Barley seed was found in half of all spring wheat seed samples and one-third of all winter wheat seed samples. Wheat seed was found in 42 percent of all barley seed samples. Overall, 37 percent of all samples were contaminated with seed of another crop, with an average of 1,418 seeds per 100 pounds of grain.

Results of the survey showed that the practice of planting weed contaminated grain is still common among Idaho growers. Nearly one-third of all samples contained weed seeds (Table 1). Weed seed numbers ranged from 0 to 234,515 per 100 pounds of grain, with an average of 5,186 weed seeds per 100 pounds of infested grain. Seeds of 35 different weed species were found in the survey. Wild oat seed was present in 13 percent of all samples and was the most common weed contaminant found in the survey. Infested samples contained an average of 462 wild oat seeds per 100 pounds of grain. Wild oat contamination was more prevalent in barley (24% of samples) than in winter (13%) or

spring wheat (8%). Other weeds common in the survey included downy brome (7% of samples), wild buckwheat (6%) and common lambsquarters (5%) (Table 1).

Planting weed contaminated seed can result in serious weed problems within one to two growing seasons. For example, planting 60 pounds of grain per acre contaminated with 277 (462 seeds per 100 pounds of grain) wild oat seeds is equivalent to sowing 1 wild oat seed per 20 square yards. Each wild oat seed that germinates soon after planting can produce about 225 seeds when growing in a small grain field. Thus, more than 30,000 wild oat seeds per acre (6 per square yard) could be produced during the first growing season if only half of the initial 227 seeds germinated. Left uncontrolled during the next crop year, more than 3.5 million wild oat seeds per acre (81 per square foot) could be produced.

## Solutions

Using clean seed makes sense. Some simple ways to ensure cleaner seed are:

1. **Always plant cleaned seed** — Results of the 1982 and 1983 drillbox surveys showed that 85 percent of all uncleaned grain contained weed seeds (Table 2), while only 26 percent of cleaned seed was weed contaminated. Even though some cleaned samples still contained weed seeds, the average level of contamination (663 weed seeds per 100 pounds of grain) was almost 38 times lower than for uncleaned grain (25,077 per 100 pounds of grain). Cleaning method was also a factor. The three methods compared in the survey differed in their degree of cleaning effectiveness. Seed cleaned by a seedhouse was superior compared to self-cleaned or portable cleaner methods.

Table 1. Weed seeds present in small grain seedlots from drillbox samples.

Contaminant	Samples infested	Average infestation <sup>1</sup>
	(%)	(Seeds/100 lb of grain)
Wild oat	13.4	462
Downy brome	7.2	1,861
Wild buckwheat	5.7	739
Lambsquarters	5.1	17,872
Field pennycress	3.9	1,032
Pigweed	3.3	988
Prickly lettuce	3.0	1,974
Wild mustard	3.0	197
Sunflower	2.7	344
Foxtail	2.4	1,861
Flixweed	2.1	1,036
Barnyardgrass	1.8	287
All weed species	29.9	5,186

<sup>1</sup>Infested samples only.

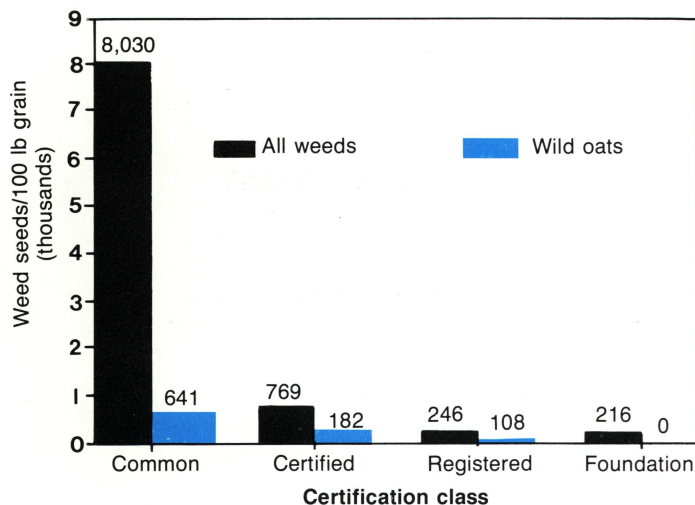


Fig. 1. Weed seeds per 100 pounds of grain in infested drillbox samples.

Table 2. Effect of seed cleaning method on weed seed contamination of small grain seedlots.

Contaminant	Cleaning method			
	Uncleaned	Self-cleaned	Portable cleaner	Seedhouse cleaner
-----(% infested)-----				
All weed species	85	78	46	21
Wild oats	45	28	31	7
----- (Weed seeds/100 lb of grain) -----				
All weed species	25,077	3,043	759	508
Wild oats	953	372	732	208

Table 3. Effect of certification class on weed seed contamination of small grain seedlots.

Contaminant	Certification class			
	Common	Certified (Blue tag)	Registered (White tag)	Foundation (Purple tag)
-----(% infested)-----				
All weed species	37	22	6	-
Wild oats	17	12	3	-

**2. Use certified or registered seed** — Use of this seed will greatly reduce weed seed contamination in your grain. Common, non-certified seed samples averaged more than 8,000 weed seeds per 100 pounds of grain in the survey (Fig. 1), and 37 percent of all common seed was weed infested (Table 3). A smaller percentage of certified (22%), registered (6%) and foundation (0%) seed contained weed seeds, and average infestation levels were much lower than for common seed. For example, 94 percent of all registered seed was completely weed free; and those samples that were infested contained only 246 weed seeds per 100 pounds of grain. Most certified and registered seed samples were entirely free of wild oats, and those samples that were infested contained far fewer wild oats than did common seed.

**CAUTION** — When buying certified or registered seed, be sure it has appropriate crop improvement tags indicating certification class.



Fig. 2. One pound of wheat seed contaminated with 5 wild oat, 8 buckwheat, 19 downy brome and 179 common lambsquarters seeds. This represents the average infestations of five commonly found weed seeds in infested grain samples.

**3. Always check your seed before planting** — Take 1 or 2 pounds of grain, spread it out on white paper, and sort through it. You may not be able to identify all the species of weed seeds, but you will be able to determine the total number present (Fig. 2). If you need further help in identifying a weed seed, you can take the sample to your Extension county agent, Extension weed specialist or send a sample to a seed testing laboratory. It is always a good idea to save a few pounds of seed in case further testing is necessary.

**4. If in doubt, have seed tested** — If you have any doubts about the weed content of your seed or its compliance with purity standards, you should send a sample to a seed testing laboratory for analysis and verification. The cost of testing for weed seed content is minimal and is certainly worth the investment. Contact the State Seed Lab in Boise (208/334-2368) for further information regarding seed testing.

**5. Avoid seed contamination** — Remember to clean your drill before filling it with good seed. More than one grower in the survey put certified seed into a weed contaminated drillbox and was more than a little disappointed with the results.

Finally, remember that using clean seed is only one small part of an effective weed control program. You must also use good crop production practices for a healthy competitive crop. Keep roadsides and borders free of weeds, use herbicides when necessary, and don't overlook the value of hand-roguing scattered weeds. Be mindful that weed seeds can enter your fields many ways; then work to prevent or minimize their spread. The easiest place to control weed spread is in your own drillbox.

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