Hypothesis. Prolonged use of Clearfield® winter wheat will increase the risk of transferring herbicide resistance from wheat to jointed goatgrass and increase selection pressure for resistance. 

Objectives. (1) Investigate the risk of moving imidazolinone herbicide resistance from winter wheat to jointed goatgrass and determine the rate of integration; (2) study jointed goatgrass-hybrid population dynamics; and (3) determine the effectiveness of coupling Best Management Practices (BMPs) and Clearfield® Production System for jointed goatgrass management in wheat.

We compared BMPs with conventional production practices in certified and saved Clearfield wheat vs. standard wheat and BMPs: 
- 50% higher seeding rate (90 vs. 60 lb/A) 
- Narrow row spacing (7.5” vs. 10”) 
- In-furrow starter fertilizer (10-30-0 vs. none) 
- Sized seed (~14/64 screen vs. non-sized) 
- Inversion tillage after 3rd crop versus surface tillage all years.

Key Findings

- 2 of 104,000 jointed goatgrass plants from plot borders survived repeated applications of imazamox at 1.5x and 3x normal use rates. Following vernalization, the two plants remained vegetative and did not produce reproductive spikes.
- 1,286 winter wheat-jointed goatgrass hybrid spikes collected in 4 of 6 years averaged 1% viable spikelets. Several plants survived high rates of imazamox but none produced viable seed (Fig. 2).
- Combining BMPs and imazamox herbicide use in Clearfield wheat dramatically reduced jointed goatgrass populations compared to standard wheat grown using BMPs (Fig. 3).
- Applying imazamox at lower-than-recommended rate and using saved (bin-run) Clearfield seed resulted in a trend of higher jointed goatgrass population (Fig. 3) and significantly lower wheat yield (Fig. 4).

**Figure 3.** In-crop jointed goatgrass density, St. John, 2002-2006.