

Italian ryegrass seed shatter in spring wheat

Mark Thorne, Marija Savic, Drew Lyon

Italian ryegrass (*Lolium multiflorum*) is a serious weedy threat to crop production in parts of the Pacific Northwest. In addition to high competitiveness with crops, it is now resistant to most herbicides that were once effective for its control. Another mechanism that has contributed to its persistence is the tendency for seeds to disarticulate (shatter) soon after seed maturity (Figure 1) and well before crop harvest. This presents a problem as only seeds left on the plant potentially could be captured in the combine grain tank, or better yet, managed with a harvest weed seed control system (See PNW730, Harvest Weed Seed Control: Applications for PNW Wheat Production Systems) such as an integrated impact mill system like the Seed Terminator or Harrington Seed Destructor

Italian ryegrass seed shatter in spring wheat - Pullman



Figure 1. Italian ryegrass in spring wheat.

We began monitoring Italian ryegrass seed shatter rates here on the Palouse in 2017 in winter wheat. The data presented below is from spring wheat grown in 2020. Seed shatter in winter wheat averaged about 60% at harvest. We wanted to see if seed shatter rates are different in spring wheat. In 2020, locations on the Fleener farm and the WSU Cook research farm near Pullman, WA were selected. At each location, sampling began when it was evident that most of the florets had finished anthesis (flowering and seed set) and were filling seeds. Ten Italian ryegrass plants were randomly collected from a northeast facing slope, a draw bottom, and a southwest facing slope. Sampling occurred weekly until the wheat crop was ripe, and harvest had begun. From each plant, the number of tillers and spikelets per tiller were counted. The spikelet

is the smallest seed containing unit on a grass plant. All seeds were hand-threshed, and the chaff and unfilled florets were removed. For each sample, seeds were weighed, sub-sampled, and counted to determine the average number of seeds remaining in the spikelets for each plant. In the first two weeks, a representative intact spikelet on each plant was removed from the stem and all florets counted to get an estimate of the potential number of seeds per spikelet if all florets filled; however, it was uncommon for all florets to fill. From all our collections, the total number of florets per spikelet consistently averaged around 12.

The 2020 sampling found that on July 15, most of the florets were not filled at each topographical position (Figure 2). Maximum fill did occur by July 27, but no statistical difference occurred between positions. By August 5, shatter was greatest on the southwest facing position and averaged 3.9 seeds per spikelet, which was a 49% shatter rate for that position. On August 12, seed shatter had significantly increased at all three positions with the southwest position having greater shatter than the northeast. By August 18, there was no statistical change in number of seeds per spikelet for each position, but the southwest position still had greater shatter (fewer seeds per spikelet) than the northwest position. By August 18, or harvest, the southwest position had a shatter rate of 75%, while the draw bottom and the northwest positions had shatter rates of 69 and 61%, respectively. If Italian ryegrass seed management is to be successful, strategies will be needed to collect or destroy the seed before a majority of the seed has shattered.

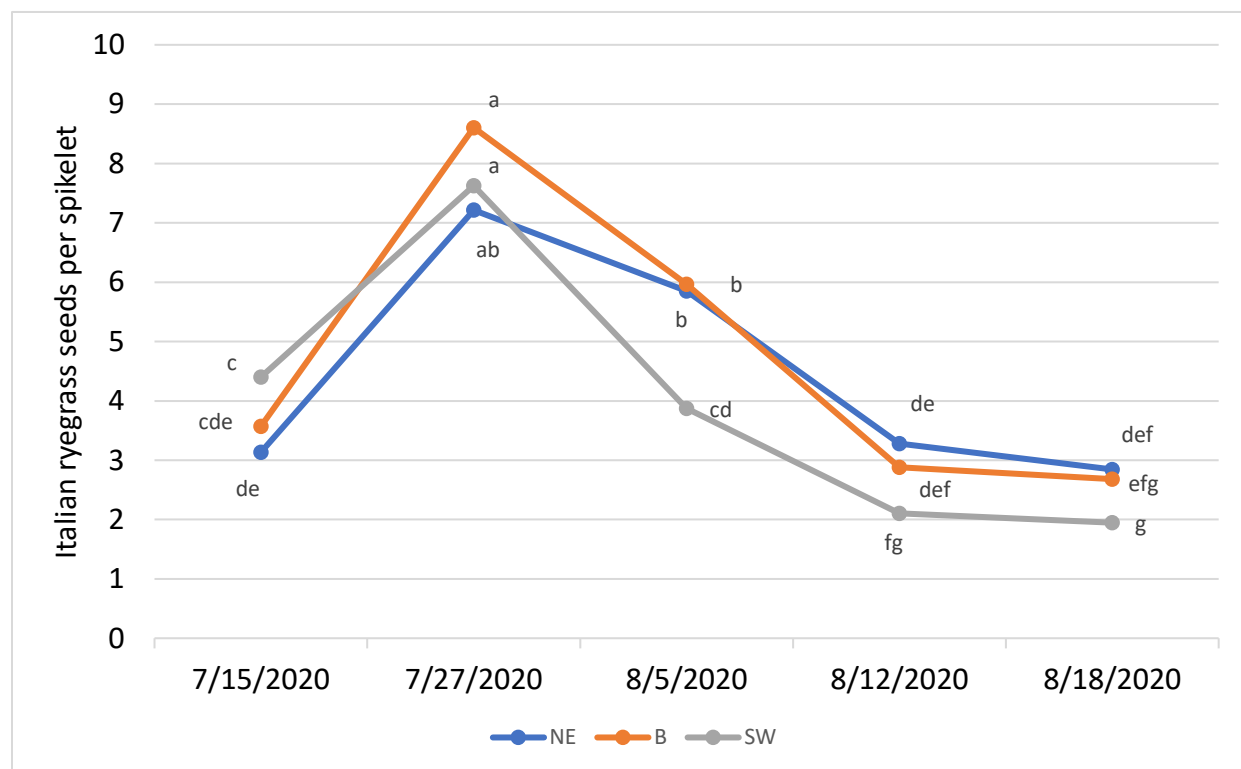


Figure 2. Italian ryegrass seed shatter from seed fill to spring wheat harvest at three different field positions: NE=northeast facing slope, B=draw bottom, SW=southwest facing slope. Data points with the same letter are not statistically different.