

## 2021 Report to KSGGA

### Rye Breeding Program

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The 2020-2021 growing season for rye in Lexington was more favorable than the previous year, with minimal damage from late spring freezes this year. There was a light snowfall on April 21 causing some lodging but little freeze damage to plants or spikes.

**Increase:** We grew 30 populations of rye for increase and for selection of spikes with higher fertility at Spindletop Agronomy Research Farm in Lexington. These rye populations have been produced over the past several years, using a wide array of parents. Selection for improved fertility have been conducted for two generations in several populations now. Blocks of these populations have to be isolated from each other to reduce pollen transfer. Seed from these blocks is used to plant yield trials.

**Yield testing:** In Ela's rye variety yield trials in 2021, yields of some of the Kentucky-bred varieties are competitive with commercial non-hybrid varieties (but still 20-30 bu/ac less than hybrid varieties). Over 300 rye yield plots were harvested accidentally by a large combine on the research farm. However, yields from breeder blocks of rye populations were 25-30% better than two years ago.

**Crossing:** In addition to 12 populations used for selection for higher spike fertility, several new rye populations were generated over the winter in the greenhouse. We have identified sources of dwarfing genes to use in breeding, and will use these in crosses this winter.

**Speed breeding:** This process allows more generations of intermating and better pollen isolation than field breeder blocks. This technique was used for two of Ela's populations over the winter of 2020-2021 in the lab. We will compare speed breeding populations to their sister field populations to determine if this method can be used to accelerate progress in rye breeding.