

A-134

Early high moisture wheat harvest improves wheat and double-crop soybean yield and quality

*Rasel Parvej**, Tidewater Agricultural Research, Virginia Tech, Virginia, USA

David Holshouser, Department of Crop and Soil Environmental Science, Virginia Tech, Virginia, USA

Robert Kratochvil, Department of Plant Science and Landscape Architecture, University of Maryland, Maryland, USA

Cory Whaley, College of Agriculture and Natural Resources, University of Delaware, Delaware, USA

Soybean [*Glycine max* (L.) Merr.] following winter wheat (*Triticum aestivum* L.) is the most prevalent double-cropping system in the United States. Double-cropping may increase profit, ensure global food security by increasing food production, and provide environmental benefits via continuous living land cover. However, soybean yields less in double-crop than single-crop production systems due to delayed planting. Harvesting wheat at high moisture, approximately 20%, may allow 7-10 days early soybean planting without affecting wheat yield and quality. We evaluated the effect of early high moisture wheat harvest on wheat and double-crop soybean yield and quality across five Mid-Atlantic States including Pennsylvania, Maryland, Delaware, Virginia, and North Carolina in 2015 and 2016. At each location, we harvested wheat five times at 4-7 days intervals beginning when grain moisture approached 20% and immediately planted six soybean cultivars of three relative maturities. Wheat harvesting dates explained 77% of the variation of wheat relative yield, which decreased quadratically from 100 to 25% with delaying harvesting. Wheat test weight decreased linearly at $4.4 \text{ g kg}^{-1} \text{ d}^{-1}$ and falling number decreased curvilinearly from 350 to 75 with delayed harvesting. Double-crop soybean yield decreased quadratically from 100 to 35% as planting was delayed from early-June to late-July. However, the degree of yield loss due to late planting varied with locations. Cultivar yield differences were more dependent on environment than relative maturity; however, late-maturing cultivars tended to yield more. Normalized difference vegetation index (NDVI) usually peaked at around R4 stage with the maximum value of 0.90. At the R3 stage, NDVI was highly correlated with relative soybean yield and explained 72% of the relative yield variation. Results suggest that harvesting wheat at high moisture can increase wheat yield by reducing test weight loss as well as double-crop soybean yield by allowing early planting; hence, increase overall double-crop enterprise income.