

IMPROVING DOUBLE CROP SOYBEAN PERFORMANCE WITH EARLIER HARVEST OF WHEAT

Dr. Robert Kratochvil - Extension Agronomist
Final Report

World demand for soybean meal and oil is increasing per greater demands for a higher protein diet. The United Soybean Board (2014) established a 2025 goal for 36% increase in U.S. soybean production; a 15 bushel/acre improvement across the U.S. in 10 years. Though challenging, this lofty goal may be possible with the development of new and innovative production technologies for soybean farmers to use.

During 2015, the Mid-Atlantic soybean agronomists established a research team with the goal of improving the double-crop (DC) system of wheat-soybean production. One objective this team identified was improving double-crop soybean yield with earlier wheat harvest, i.e. harvesting wheat at higher than normal moisture and drying the grain using an on-farm drying system. This early wheat harvest emphasis fits with an initiative by Perdue Agribusiness who responded to wheat industry demand for better wheat quality by offering incentives. Those incentives meshed well with the regional agronomist's research objective of evaluating earlier harvest of wheat. Two of the incentives were 1) a half-cent per 0.1 lb/bu increase in test weight over 58 lb/bu and 2) no penalty for wheat delivered to the elevator at 15% moisture content.

Winter wheat was planted at three sites (Poplar Hill, Wye, and Beltsville) during the falls of 2015 and 2016. Wheat best management practices were used at all sites prior to harvest. Five wheat harvest dates occurred at each site both years commencing when wheat attained ~20% moisture. Harvests continued every 5-7 days for a period of 3-4 weeks following the first harvest. Average first harvest date was June 24 (2016) and June 14 (2017). First harvest moisture content averaged 19% (2016) and 17% (2017). Average final harvest dates were July 16 and July 12, for the two years, respectively. Average yield for the three 2016 sites at first harvest date was 81 bu/acre, while for the first harvest date in 2017 it was 70 bu/acre. Wheat yield declined 39% during 2016 between first and last harvest dates. During 2017, wheat yield declined only 12% between those dates. Weather had a major influence on the change in yield over the harvest period during the two years; there was >3.5 inches rainfall (2016) while 2017 received <2.5 inches. There was nearly a 10% loss in yield between the first two harvest dates in 2016 while there was no change in yield until after the fourth harvest date in 2017. Test weight decline averaged 7 lb/bu (2016) and 6 lb/bu (2017) between first and last harvest dates with ~2 lb/bu of that loss occurring between the first two harvest dates.

Both years, double crop soybean was planted at all sites ASAP after each wheat harvest date (usually within 1 day). Six RR2 soybean varieties representing maturity between early MG 3 and late MG 4 (2016) and early MG 3 and early MG 5 (2017) were planted at Beltsville and Wye. Only two RR2 varieties were planted at Poplar Hill, a MG 3.5 and a MG 4.5. Not surprisingly, average soybean yield declined 20% (2016) and 30% (2017) as plant date progressed from early (June 24 in 2016 and June 14 for 2017) to late (July 18 in 2016 and July 12 for 2017). And, similar to the response I have observed for other maturity group research for double crop soybean, during 2016 yield was 9% greater for mid-late MG 4 varieties over early-mid MG 3 varieties. This yield improvement was even greater during 2017; 25% more yield for mid-late MG 4 varieties compared to early-mid MG 3 varieties.

Recommendations from this research for the wheat-double crop soybean, production system are quite simple. 1) To attain maximum yield and test weight for wheat, harvest ASAP at approximately 20% grain moisture. 2) To maximize double crop soybean production following wheat, plant a mid-late MG 4 soybean variety or varieties following early harvest of wheat.

Robert Kratochvil
Extension Agronomist

February 13, 2018