

2015 Annual Interpretive Summary

Recent literature reviews have confirmed that modern hybrids continue accumulating N longer into the growing season, and therefore it may be beneficial to ensure soil mineral N availability by intentional supplemental, late-season (e.g., V12 to V14) N application. In 2014 we began a 3-year study to answer the questions: 1) Are modern hybrids more likely to respond to intentionally very late-vegetative N applications than hybrids of 20 years ago? and 2) What are the physiological reasons for these differences if the modern hybrids are more responsive? To this end, we compared four hybrids across six N rate and timing combinations. The hybrids included two modern (P1360 and P1498) and two varieties released in the early-mid 1990s (Pioneer hybrids 3335 and 3394). The N rates (0, 140, 180, and 220 lb N/A in addition to a starter N application of 25 lb N/A) were either applied only between growth stages V3-V4 or split between V3-V4 and a 40 lb/A application at the V13 stage. In 2015, we increased the intensity of whole-plant biomass harvests to better understand the impact of N rate and timing on crop dry matter and N accumulation during the critical period. Whole-plant samples were harvested two weeks before R1 growth stage, at R1, and two weeks after R1, and ears alone were sampled each week during the critical period. This data revealed that N concentrations (initially as high as 7.2% N) in the developing ears were highly conserved throughout the critical period. Rapid remobilization of N from the stems to the ears was already evident two weeks after silking and, across hybrids, stems in the late-split N treatments had the most delay in N remobilization after flowering. Another new initiative in 2015 was that we intensively monitored N₂O emissions from the soil following UAN applications to study potential environmental benefits of late-split N versus a single sidedress application.

The 2015 growing season had ample rainfall and warm temperatures resulting in high yields. Averaged across N rates, the variety P1360 yielded highest (247 bu/A) followed by P1498 (222 bu/A), while P3335 and P3394 both yielded 209 bu/A. The modern P1360 variety also had higher N fertilizer recovery efficiency (mean of 76%) than other hybrids. In contrast to 2014, there was no yield benefit for late split-N applications in 2015 presumably because there was no significant yield response above the 140 lb N rate for any old or new hybrid. We intend to add lower N rate treatments in 2016.