Yield improvements over the past few decades have been attributed to increasing optimum plant population and not the increase of grain produced per plant. A goal in precision agriculture is to identify seeding rates that optimize yield, but that also minimize competition. Competition occurs when plants of the same species compete for vital resources needed for plant growth and fruit development. The objective of this research is to examine corn development and physiological responses across the growing season of multiple hybrids at a range of seeding rates. We implemented a measurement protocol in a field-scale strip-trial design at multiple locations in the Central Claypan Areas of Northeast Missouri Study 1. A randomized complete block design study planted at Bradford Research and Extension center in Columbia MO Study 2. The design of the experiments on Study 1 included four different hybrids at three different seeding rates: 74,000, 84,000, and 94,000 seeds ha\(^{-1}\). Hybrids were chosen with maturity dates ranging from 103-112 days to maturity. For Study 2 an additional four seeding rates were planted at 44,000, 54,000, 64,000, and 104,000 seed ha\(^{-1}\). In sub plots an intensive set of physiological and morphological measurements were taken throughout the season. Competition can lead to greater per-plant variability for different responses some playing a vital role in grain yield, biomass, and harvest index. With greater understanding of how corn hybrids respond to increased intra-specific competition, better seeding rate recommendations can be made to optimize grain yield on varying soils in Mid-Missouri.