

## SEEDING RATE AND PLANTING CONFIGURATION AFFECT THE INTERSPECIFIC FUNCTION OF A WHEAT-PEA COVER CROP

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### ABSTRACT

The ability of grass-legume cover crop mixtures to provide an appreciable N credit in semi-arid cropping systems is often limited by excessive competition and dominance of the grass. Inclusion of grass in the mixture is cost efficient and beneficial to the physical functions of cover crop residue and can facilitate greater legume N contribution by immobilizing available N, however there is a critical need to balance this function with the risk of over-competition. Field experiments were coordinated in the winter of 2024-2025 at Wall and San Angelo, TX to evaluate the effects of wheat seeding rate and alternative planting configurations on ultimate grass vs. legume biomass and N content in a wheat-Austrian winter pea cover crop mixture. Treatments comprised a 2 × 4 factorial with two planting configurations: species segregated (alternating) by drill row vs. combined (bulk) planted, and four wheat seeding rates: 150, 300, 450, and 600 thousand seed ac<sup>-1</sup> all planted with a constant rate of Austrian winter peas (110,000 seed ac<sup>-1</sup>). Segregating species by drill row did not affect wheat biomass, but did increase pea biomass and N contribution each by ~65%. Pea biomass also increased with decreasing wheat seeding rate, and a wheat seeding rate of 300,000 seed ac<sup>-1</sup> optimized biomass accumulation of both species. These findings demonstrate potential to refine relative seeding rates and planting arrangements within cover crop mixtures, specifically within the semi-arid context of the Great Plains. A limitation of this work was that the wheat variety selected ('SY Razor') is extremely early-maturing, which increased spring competition with the legume, accelerated the timeline for termination, and ultimately restricted the peas potential for maximum biomass accumulation. This has informed ongoing work on varying maturities of winter cereals in cover crop mixtures, and should be considered with future efforts in this research area.