



**RegenPGC Graduate
Education Community**

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How far is far enough? Optimal crop zone for corn in a perennial ground cover system

Abstract Perennial groundcover (PGC) systems integrate perennial grasses with annual crops such as corn (*Zea mays* L.) to maintain continuous soil cover and enhance soil health. However, competition between corn and the groundcover can induce the Shade Avoidance Response (SAR) a physiological adaptation that alters plant architecture and may reduce yield. Understanding the distance at which SAR is triggered and how management practices influence it is essential for PGC system optimization.

This study was conducted in a growth chamber at the Seed Science Center, Iowa State University, to (1) identify the distance at which SAR occurs in corn and (2) determine whether Thiamethoxam seed treatment mitigates SAR expression. The experiment followed a Randomized Complete Block Design with four replications across three periods. Treatments included two corn hybrids, two seed treatments (untreated and Thiamethoxam 0.25 mg seed⁻¹), and four perennial ryegrass (*Lolium perenne* L.) distances (0, 6, 25 cm, and control).

Corn plants positioned 6 cm from ryegrass exhibited significant stalk and height elongation beginning at 8 days after planting (DAP), continuing to 12 DAP, and declining by 14 DAP, confirming an early SAR response. Plants at 0 cm grew more slowly, while Thiamethoxam treatment did not reduce SAR expression. SAR had no significant effect on root or shoot biomass, suggesting elongation occurred without major biomass reallocation. A decrease in the Far-Red:Red light ratio near ryegrass confirmed that light quality was the primary SAR trigger

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