

Flat Residue Rearrangement and Loss by Wind under a Range of Crop Residue Conditions

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Abstract:

Flat residue within a field can help protect the soil surface from wind erosion, but only if it is not susceptible to movement or removal by wind. Flat residue is often not anchored to the soil surface, so soil erosion protection from the wind is usually provided from standing residue stalks still remaining in the original planted rows. If the combination of the standing stem residue row population density, stem height, stem diameter and row spacing provides too little stem area index (SAI), then the flat residue is susceptible to blowing and re-arrangement by wind. If sufficient flat residue is lost and/or is re-arranged in the field to expose additional bare soil surface area, the field will become more susceptible to wind erosion. This study conducted field and laboratory experiments using an outdoor portable wind tunnel on three crop residues: a) winter wheat (*Triticum aestivum*) at 6 and 10mm residue heights; b) soybeans (*Glycine max*) at 6 mm residue height, and c) grain sorghum (*Sorghum bicolor*) at 11 mm residue height, for free stream wind velocities of 4 to 6, 8, 10, 14, 17 and 19 m s⁻¹. The laboratory wind tunnel simulations included a range of artificial standing stem population densities for each crop residue. The results show that greater SAI values are better at maintaining the existing flat residue at the same above canopy wind speeds for each crop. These effects were especially significant at higher wind speeds.