Russian Thistle Skeletons Provide Residue in Wheat-Fallow Cropping Systems

ABSTRACT

Maintaining adequate residue to prevent wind and water erosion is often difficult in low-precipitation (<300 mm annual) wheat (*Triticum aestivum* L.)-fallow regions of the Pacific Northwest. This is especially true for spring-sown wheat, and for winter wheat in low-moisture conditions. In these situations, Russian thistle (*Salsola iberica*) can be a major weed and often produces more biomass than the crop it infests. In a 4-year study, we measured the effect of three tillage management treatments: *i* traditional (tillage only); *ii* minimum (herbicides and tillage), and *iii* delayed minimum (herbicides and delayed tillage), on retention of above-ground wheat residue and dead Russian thistle plants or "skeletons" during the fallow cycle. Russian thistle infestation occurred two of the four years when winter wheat failed and was replaced by spring wheat. Traditional post-harvest tillage caused most Russian thistle skeletons to be wind blown from plots by late fall, but plants remained anchored in the soil when herbicides were used for post-harvest thistle control. Traditional primary spring tillage with a field cultivator or tandem disc further reduced surface cover compared to minimum tillage treatments. During two fallow cycles where Russian thistle infested the previous spring wheat crop, thistle skeletons on the soil surface averaged 320 and 50 vs. 1370 and 270 kg/ha in late fall and end of fallow in traditional tillage compared to minimum tillage treatments, respectively. Traditional tillage also reduced surface wheat residue compared to minimum tillage plots on all sampling dates. Russian thistle skeletons can be retained in place using conservation tillage during fallow, where they become an important source of surface cover to combat erosion in years when crop residues are extremely low.