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Weed dispersal in wheat fields by sheep stubble grazing

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The aim of this study was to investigate the potential of weed contamination in wheat fields by seasonal sheep grazing under Mediterranean semi-arid conditions. During the winter-spring season sheep graze in marginal lands and are turned to cereal fields after the harvest at the beginning of summer, when natural pasture dry out. Farmers frequently claim that this management practice results in a large input of weed seeds to the soil seed-bank through the faeces and fleece. We tested this assumption by analyzing changes in: a) the size and composition of the weed seed-bank and vegetation in a wheat crop system in rotation with garden pea, with or without sheep stubble grazing during the summer, and b) in seed content of faeces and fleece of sheep grazing in marginal land during the spring and summer. The potential for weed contamination from marginal land through sheep faeces and fleece was very low during the summer, since the sheep were turned to the fields after plants dry out and shed seeds. However, stubble grazing increased the seed-bank by 142%, mainly due to greater seed density of small grasses, the most abundant species in the germinable seed-bank (90-95%). The increase in the seed bank of small grasses under stubble grazing was probably due to direct effects of sheep activity in the grazed plots, such as stubble removal and soil compaction. The larger amount of small grasses in the weed vegetation did not affect wheat yield since they are weak competitors compared to wheat. Total seed density of annual forbs and the relative proportion of forbs in the seed-bank were small and not affected by grazing. One-year rotation with garden pea strongly reduced the total seed bank. Risk of weed contamination of wheat fields by sheep can be prevented or greatly alleviated by delaying stubble grazing into the summer and by shearing the sheep before turning them into the fields, and by rotation with broad leaf crops.