

# Differential responses to red clover residue and ammonium nitrate by common bean and wild mustard

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Legume green manures have been used for millennia as sources of N for succeeding crops, but they are also sources of phytotoxic compounds that may selectively influence the performance of crop and weed species. To determine whether substitution of legume green manure for synthetic N fertilizer could enhance crop yield while suppressing weed growth, we conducted a field experiment in which common bean and wild mustard were sown in monocultures and mixtures. Three soil management treatments were employed: red clover residue, ammonium nitrate fertilizer (84 kg N ha<sup>-1</sup>), and a control that received neither red clover nor ammonium nitrate. In the absence of wild mustard, bean seed yield was equivalent in the red clover and ammonium nitrate treatments, where yields were 11 to 26% greater, respectively, than in the control. When bean grew in competition with wild mustard, its seed yield was as high (1995 and 1996) or higher (1994) with red clover residue than with ammonium nitrate. Averaged over bean competition treatments, wild mustard biomass production was 37% lower with red clover residue than with ammonium nitrate in 1994, 53% lower in 1995, and equivalent in these two treatments in 1996. Bean seed yield and wild mustard biomass production were strongly correlated with wholeplant N content and more weakly correlated with leaf area duration. Of the variation observed in wild mustard seed production, 89 to 93% was predicted by the variation in wild mustard biomass. The results of this study indicate that substitution of red clover green manure for ammonium nitrate fertilizer can be compatible with bean production goals and can contribute to the management of wild mustard.