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A quantitative literature analysis of global invertebrate responses to agricultural intensification.

Declines in biological diversity due to the expansion and intensification of agriculture have generated considerable debate regarding specific cause of declines, implications for system function and options for reducing negative impacts. The effects of modern agriculture on invertebrates are of particular significance, given the roles these organisms play in driving fundamental ecosystem functions such as nutrient cycling, pest control and soil structure maintenance. To test for a universal response of invertebrate assemblages to various aspects of agricultural land use, I undertook a quantitative literature analysis, combining and analysing data from studies that addressed invertebrate assemblages in agricultural landscapes. The literature examined covered invertebrate taxonomic assemblage and functional group responses between three broad land uses - native vegetation, pasture and cropping. Assemblages were also compared between conventional cropping systems and reduced-input systems, in order to investigate the impacts of management activities such as tillage and pesticide application. These categories were considered to represent a gradient of increasing agricultural intensity/disturbance, with native vegetation representing the least intensive disturbance regime and conventional cropping the highest. The results indicated a significant decline in taxonomic richness as land use and management disturbance increased, and a significant decline in predator richness and abundance with increasing disturbance. Overall invertebrate abundance decreased significantly with increased management in cropping systems,

but displayed no clear pattern across different land uses. These results have important implications for ecosystem function and service delivery and the role that low-disturbance and refugial habitats may play in maintaining invertebrate diversity in intensive systems.