

A mixed model for assessing spatial interactions among species in ecosystems

Jack McDonnell^{*1,2}, Thomas McKenna³, Kathryn Yurkonis³, Deirdre Hennessy²
and Caroline Brophy¹

¹Department of Mathematics and Statistics, Maynooth University, Ireland

²Teagasc Animal and Grassland Research and Innovation Centre, Ireland

³Department of Biology, University of North Dakota, Grand Forks, ND, USA

*Email: jack.mcdonnell.2011@mumail.ie

Abstract: Diversity-Interaction (DI) models have been used to model biological experiments that manipulate proportions of species, but have not previously accounted for spatial interactions between species. The weed biomass from a three year grassland plot experiment in North Dakota with sixteen species which included a spatial sowing pattern treatment was analysed by extending DI modelling methods to incorporate spatial effects. Species diversity suppressed weed biomass over time. Although spatial pattern did not appear to have an overall effect on weed biomass, it affected the performance of individual species in multispecies plots.