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To the Editorial Board of *Ecology Letters*,

We are pleased to submit our manuscript “*The function-dominance correlation drives the direction and strength of biodiversity-ecosystem functioning relationships*” to *Ecology Letters*. In this manuscript, we show that variation in biodiversity and ecosystem functioning (BEF) relationships across systems can be explained by the relationship between species’ dominance in mixture and their baseline contribution to functioning.

To do this, we used six independently derived, previously published models of community dynamics to simulate a shared set of scenarios, designed to mimic the most common aspects of empirical BEF experiments. We then analysed the relationship between total mixture biomass and realized diversity both across and within planted species richness treatments. We find that a positive correlation between species’ functioning in monoculture vs. their dominance in mixture (the “function-dominance correlation”) generates positive BEF relationships across levels of species richness, but negative BEF relationships within levels of species richness (a “counter-gradient”). A weak function-dominance correlation weakens BEF relationships, while a negative function-dominance correlation reverses the described pattern.

*This work is novel because:*

1) We find that an emergent property of multispecies communities (the function-dominance correlation) drives variation in BEF relationships across a wide range of systems.

2) While the counter-gradient (positive BEF relationship across, negative BEF relationship within species richness levels) has been shown empirically in the Jena Experiment (Rychteca et al. 2014), the generality of this pattern – and its underlying mechanisms – have never before been tested.

3) We apply a unified set of tests across six independently-derived models, allowing for the direct comparison of their results and predictions. Moreover, these simulations correspond to applied experimental treatments, linking our results to a wide swath of BEF literature.

4) Finally, because we focus on simulated systems, we can directly test the effects of external seed dispersal and can exclude the effect of weeding, both frequently criticised aspects of empirical BEF research.

*This work is different from our previously published work because:*

1) Our study synthesizes results from across six independently-developed plant community models, which have not been applied to the same problem previously.

2) We examine the effects of realized diversity on ecosystem functioning both within and across communities that differ in their initial species richness levels. Our previous work has generally focused on trends across initial species richness levels.

*This work is of interest to a broad audience because:*

1) Our study incorporates three models representing grassland systems, two representing forest systems, and one representing succulent communities, spanning a uniquely wide range of community types.

2) We demonstrate that a common underlying mechanism drives large-scale variation in biodiversity and ecosystem functioning, despite large differences in the individual models.

3) The function-dominance correlation is easily calculable and is therefore potentially applicable to empirical, naturally assembled systems where diversity is not manipulated.

Taken together, this manuscript leverages the intercomparison of multiple published, structurally realistic, models to reveal a common mechanism that drives variation in BEF relationships across systems.

Thank you very much for your consideration,

Dr. Michael S. Crawford and Dr. Kathryn E. Barry, on behalf of all authors

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