

Interactive comment on “Linking plant ecophysiology to the dynamics of diverse communities” by K. Bohn et al.

Anonymous Referee #2

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This is an interesting paper in that it takes a more process-orientated approach to describing the effects of competition and ecosystem perturbations on population dynamics. I like the use of the plant population strategies, building on the work of Kleidon and Mooney (2000), that removes us from species-specific characterisation and towards more general principals. Therefore this study provides a good test of concept paper into using physiological traits as the basis for describing community dynamics. However, before being accepted for publication the manuscript requires work, particularly in the presentation.

The writing is not very clear, and presentation of the model needs to be improved. For example, it was not immediately clear to me the links between the output of JeDi and the input for DIVE, and I initially thought the ‘derived’ parameters in Table 1 were

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derived from DIVE.

There are by necessity a number of simplifications and assumptions in the model, but some of these could be quite important, and the comparison with real world situations is a bit lacking. One obvious discrepancy is the fact that although these simulations were done for a tropical environment, the importance of size in competitively excluding smaller PPSs does not agree with the fact that a climax system will contain plants of all sizes (many of the simulations presented contain only 1 or 2 PPSs at climax).

The DIVE inputs are taken from JeDi, which is run in the absence of competition. These are then used as constant inputs in DIVE. Surely plant strategies change in the face of competition, so wouldn’t these values also change? Maybe with the intensity of competition? I think here the relationship between the characteristics of the different PPSs is important (i.e. the trade-offs with investment in different traits), are PPSs that are successful in competition-free conditions the same as those in competitive environments?

Specific points:

Pg 8221 ln 2: f_{npp} is the productivity of a seedling. Why a seedling, and what happens when the plant is an adult? Note that in table 1 this is defined as seed productivity.

Eqn 5: specific growth rate is defined as productivity per biomass. This implies that all productivity goes into growth. Shouldn’t there be a term accounting for respiration in here?

Eqn 7: specific mortality is defined from respiration and litter C losses as a fraction of total biomass. Should there not be a term accounting for productivity here i.e. C losses through respiration and litter might be high but if this is balanced by high productivity mortality is low. Or is this implicitly included in the C_{mort} parameter? If so, then why is C_{mort} an ecosystem parameter and not a PPS parameter? Is there a functionally tangible meaning to the values of C_{mort} ?

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Pg 8217 In 11-12: sentence structure. Pg 8217 In 27: 'understands'? or derives? Pg 8221 In 18-19: sentence structure. Pg. 8223 In 25: described as follows Pg 8224 In 7: use a word other than express Pg 8224 In 8-9: if $A_{bare} = 1$ shouldn't $A_i = 0$? Pg 8224 In 21: we varied Pg 8226 In 25-26: ...seed competition only partly affects steady state diversity,... Pg 8227 In 16: highly abundant Pg 8227 In 24: sentence structure Pg 8228 In 16: remove comma after concluded Pg 8228 In 23-26: use past tense Pg 8228 In 26: obtained the same Pg 8229 In 7: remove comma after obtained Pg 8229 In 10: under given climatic conditions Pg 8229 In 22: information Pg 8230 In 3: exclude Pg 8230 In 28-29: check sentence Pg 8231 In 11-13: The model...could be found. Rewrite. Pg 8232 In 2: suggests that

Table 2: is this number of decimal places necessary? Table caption is too brief.

Table 3: caption: If non of ...?

Fig. 2: Characteristics are normalised. Against what?

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