**Model results description: TROLL**

**Species biomass:**

In monoculture: Species that have the biggest stature (high dmax and high hmax), and, in a lower extent, the denser wood, are the species that achieve the highest biomass in monoculture. This is highly expected as wood density and tree size (height and diameter) are used to compute biomass at the tree level (1).

In mixture: When in mixture, species compete for light and empty sites. The former – competition for light -- is strongly mediated by a trade-off between the ability to tolerate shade (low light compensation) vs the productivity at high light (high maximal photosynthetic capacities), which are both determined by combinations of LMA and leaf nutrient concentrations. The latter – competition for empty sites -- strongly depends on species seed production, which, at the tree level, is triggered when a tree reaches a height threshold correlated to hmax (2).

Hence, **in absence of seed rain**, the disadvantage that represents a low hmax for biomass accumulation at the individual level or in absence of competition is counterbalanced by the advantage that a low hmax represents for seed production: the lower the hmax, the sooner a tree produces seed, the more it can occupy empty sites before other species become fertile. This effect leads to a negative relationship between species biomass in monoculture and in mixture.

**With seed rain**, however, the advantage of a low hmax for seed production and competition for empty sites disappear as the seed bank is fed uniformly across species by an external source. This result into a positive effect of hmax in explaining species biomass in mixture as in monoculture, and consequently into a positive relationship between species biomass in monoculture and in mixture.

In both case, as other traits also strongly impact the competitive outcome in mixture (e.g. LMA), there is however a large variation in species biomass in mixture for a given species, especially for species that can lead to a high total biomass when dominant.

**Shannon and species richness**:

Across planted-species richness treatments:

Low-diversity communities show the largest variation in terms of biomass and include the highest-biomass communities [as in PPA doc]. The higher the number of species, the higher the chance of including a competitive species (sampling effect), but the smaller the between-community variation. As, in absence of seed rain, competitive species typically have a low biomass in monoculture (low hmax), this leads to a negative relationship between the community diversity and total biomass across treatments.

Within planted-species richness treatments:

**In isolation**, at low initial species richness (Ninitial=2-4), there is a positive relationship between diversity and community biomass. At these low species richness, average fitness difference between species are often large, and when it is the case, as the most competitive species are typically the ones bearing low biomass in monoculture, this competitive exclusion leads to a lower community biomass (low diversity, low biomass). In contrast, communities without a competitively dominant species maintain higher richness and higher biomass. At higher initial species richness (Ninitial=8-32), the relationship between diversity and community biomass flattens: it is much more likely that the species combination includes several species able to coexist, precluding low richness-low biomass-communities to emerge.

**With seed rain**, there is a negative relationship between diversity and community biomass. As competitive species are also the ones with high biomass in monoculture, competitive exclusion or species gain in dominance leads to communities of lower richness and higher biomass.