Theory and background lit to frame plant & invert responses to disturbance ms:

Major et al 2012: *Regional boreal biodiversity peaks at intermediate human disturbance*

* Intermediate disturbance hypothesis (IDH): richness of *native* sp peaks at intermediate disturbance in terrestrial boreal sites
  + Species richness of boreal vascular plants
* Evidence is slim for IDH with anthropogenic disturbance
* These results suggest that richness peaks *not* b/c of an influx of non-native species
* We expect to see peaked richness b/c these communities are composed of species adapted to both low and high disturbance
* Disturbance explained exotic sp richness better than native sp richness
* Native:Exotic proportion declined w/ increasing %HF, and

Fox 2013: *The intermediate disturbance hypothesis should be abandoned*

* IDH: diversity of competing species should be maximized at intermediate disturb frequencies or intensities
* There are subtle, empirical flaws
* Recent reviews found that this peak only occurs in <20% of studies
* Theoretically IDH based on three mechanisms (all flawed)
  + Disturbance reduces species densities, thereby weakening competition and preventing competitive exclusion; I think he says this is invalid b/c coexistence can be promoted in ways other than reduced competition
  + Periodic disturbances prevent system from reaching equilibrium
  + Fluctuating env conditions means that no one species can be competitively superior
* *Competition-colonization tradeoffs (sp at low dist are competitively superior; sp at high dist levels are they are superior colonizers)*

Tanentzap et al 2013: Niches drive peaked and positive relationships between diversity and disturbance in natural ecosystems

* Resilience sp (w/ high mortality and recruitment rates) are favored as disturbance intensity and frequency increase
* Diverse functional differences can give rise to IDH, such as resistance-resilience tradeoffs, competition-colonization tradeoffs.
* Here they found that shifts in community-level resistance and resilience drive diversity-disturbance patterns
* Deterministic disturbance events needed specific frequency and intensity characteristics to depict IDH

Yeboah and Chen 2016: Diversity–disturbance relationship in forest landscapes

* They found similar responses supporting IDH when logging vs fire disturbances were considered separately vs together

Huston 2014: Disturbance, productivity, and species diversity: empiricism vs. logic in ecological theory

* You must consider the IDH within the context of productivity: high productivity sites will have max diversity under high dist; low productivity sites will have max diversity under low dist
* The hump-shaped pattern is one of three (pos and neg linear) relationships between diversity and disturbance and is contingent on intermediate productivity levels

Cerabolini et al 2016:

* Discusses the presence of a unimodal biomass-richness relationship, and examines how functional diversity varies in association
* In the intro, they state that “the main implication is that in extreme environments, organisms must exhibit a high degree of adaptive/trait specialization in order to survive, thereby restricting potential species richness”
* They classify species “specialization” based on Grimes’s CSR classification; not sure if there are numerical values associated with each strategy?
  + Uses 19 tertiary CSR strategies quantified using LA, LDMC, and SLA
* Figure 4 overlays species richness onto the CSR triangle, which is a cool figure

Graham and Duda 2011

* Nice summary of the IDH

Patch mosaic dynamic hypothesis

Questions:

- If we see positive unimodal (concave) relationship between richness & dist, and convex relationship between “specialization” & dist, are richness and specialization related?

- maybe avoid saying IDH?

- ordination of sites at highest and lowest dist levels

- can we use variance in trait value as a proxy for functional specialization? i.e. low variation = high specialization