**Shared Trends in Body Mass Distribution Between Large Mammalian Herbivore and Carnivore Guilds Throughout the North American Cenozoic**

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Body mass is deeply incorporated within an organism’s physiology, life history, and evolutionary dynamics. Accordingly, this extends to the “arms race” between predator and prey where larger body masses are often suggested to offer selective advantages for predators of large herbivores. Previous studies indicate that both large herbivore and carnivore body masses show persistent increases through the Cenozoic, with carnivore body mass evolution being more iterative by comparison. Despite these recognized trends, few studies approach the fossil record in a quantitative manner that is also not taxonomically and temporally limited in scope.

Within this study we statistically detect shifts between intervals of stasis (i.e., statistically indistinguishable distributions) in body mass distributions for the large herbivore (Artiodactyla, “Condylarthra”, and Perissodactyla) and predator (Carnivora and Creodonta) guilds throughout the Cenozoic (65 to 1 Ma). Ungulate (n=876) body masses are regressed using the lengths and widths of upper and lower dentitions. Predator (n=362) body masses are regressed using linear measurement of the lower carnassial (m1).

Our results corroborate previous findings in regard to the persistent increase in of the median body masses of both guilds throughout much of the Cenozoic. Ungulates exhibit a relatively stable upper bound between 2500 and 5000 kg but a persistently increasing lower bound through time. Predator guild shows persistent increasing of the upper bound through the Paleogene until reaching relative stability in the early Neogene between 100 and 300 kg. The lower bound of the predator guild is more variable in that it initially demonstrates a persistent increase through the Paleogene but subsequent decrease through the Neogene. We find five shifts in body mass distribution in the predator guild with two of those being coincident with the 8 shifts in the body mass distribution of the ungulates. Coincident shifts in the body mass between large herbivore and predator guilds throughout the late Oligocene to early Miocene are of particular interest. These shifts are characterized by expansion of antelope (25-150kg kg) and horse (150 – 500kg) size categories while the predator guild transitions to a greater concertation of taxa over 20kg and the first occurrence of taxa of 100 kg or more. These results point to a functional response from the predator guild to their prey in the late Oligocene to early Miocene.

* + Important in regard to predation for both the predator and prey.
    - Arms race
  + Predator and presumed prey body mass relationships
  + Previous studies have indicated that an ecomorphological component such as body mass is needed \_\_\_\_
  + Body mass intrinsic to life history of organisms
* Question
* Data
  + See if shifts correlate between the guilds
  + Work in how it near exhaustive
* Results
  + General trends
  + Focus on overlapping in regime changes that similar

For future

* Subsampled ungulate same no as predators
  + Where ungulate breaks if subsampled same level as predators
  + Smooth things out?
  + Taxa most likely remain are biggest
    - Shift what we see
* Subsampled runs begin with

Always cautious not overinterpret

* Best result with these regime breaks tella bout interaction carnivore snad ungulates

If relate one to another

* Look at 2nd email with actual changed with eco groups
* See 100+ and large categories in 25 and 21 breaks
* Best case
  + Certain spot changing in a
  + Shift consistent with time
    - Not sure what coincident be
  + If Bayesian framework
    - 2 shifts that shit coincident vs indep shifts
    - Hypo 1) interact but carnivo evo quickly
      * Or two 3rd thing other thing happens affect both
    - Not sure manner but just a shift
* Look for times at which body mass distribution same time
  + Reps with bm shift here
  + Not say bm shift there but in the range
    - How ungulates change
      * Prop larger things
      * Decline smaller
    - Do carnivores change similar way
  + Enough for gsa
  + Taxonomy = check like null
    - Immigration can greatly shift distributions

Keep simple shift had and make reasonable biological story

Shift in ungulate some shifts in both guilds

=both bm and taxon in carnivore

Submit to future leader paleo thing

Focus specific time periods in informed way

=pull out taxa see what look like

=see how significant break is

Go back to previous work

=do we validate those papers

Don’t make it too complex

=2nd email was enough…

Not sure if someone gone through morpho dist of mammal carnivores

=GSA worthy

These particularly times plausible community/guild shift carnivores and these do not=narrow time interval researching

That there is 12 min talk

Have good abstract have not be groundbreaking

Mark-climate

Christiane-predator traits

Try have our talks lead into one another—like I go at end as the cap to how trait lead to ungulate interactions