1. TITLE SLIDE
   1. Hello! Thank you for being here. My name is Renata Diaz, and I’ll be talking to you today about energetic compensation and how it changes and breaks down over time in a desert rodent community.
2. SLIDE 2
   1. First, an overview of what energetic compensation is. Energetic compensation is a phenomenon that occurs when species in an assemblage fluctuate In abundance such that the total amount of energy being used by the whole assemblage remains relatively stable, even though the species composition of the assemblage is changing. That is, declines in the abundance of some species are offset by increases in abundance from others.
   2. We look specifically at the total amount of *energy* being used by the assemblage, rather than the total number of individual organisms. The total amount of energy being used is a direct metric of ecological function, in terms of the amount of resources being processed by the assemblage and potentially being made available to other trophic levels.
   3. Here we have an illustration of a hypothetical energetic compensation scenario. On the left, we have a “complete” assemblage of 2 species. In the middle, we have a scenario where one of those species has gone extinct or been removed from the assemblage. In this scenario, the remaining species has increased in abundance to exploit the resources that are left over now that the other species is absent.
3. ~~SLIDE 3~~
   1. ~~In particular, note that the second species has increased in abundance~~ *~~so much~~* ~~that it is using 100% of the energy that would otherwise be being used by the first species. We refer to this as 100% compensation.~~
   2. ~~When we have complete compensation, this also means that the assemblage missing the first species is using 100% of the energy being used by the complete assemblage.~~
4. SLIDE 4
   1. When we see energetic compensation, it has a couple of implications for the types of processes affecting community structure and how we think about the resilience of community-level attributes to species’ fluctuations.
   2. Energetic compensation is consistent with a zero-sum competitive dynamic, in which species are in tight competition for limited resources, and any increases in abundance from one species come at the expense of others.
   3. It also by definition means that community function, in terms of energy use, is resilient to changes in species composition.
5. SLIDE 5
   1. For energetic to be possible in an assemblage, different species need to be able to exploit the same resources under the same environmental conditions. This might be because some or all the species are identical – which could be consistent with a neutral dynamic – or because subsets of species in the assemblage differ along some niche axes, but share overlapping traits related to resource use and their fitness under the local environmental conditions.
6. SLIDE 6
   1. When compensation is happening within this kind of a niche structure, it becomes important to look at it from a specifically temporal perspective.
7. ~~SLIDE 7~~
   1. ~~One example of this is, if an assemblage doesn’t contain a species that overlaps enough with another species to compensate for that species going extinct – but a species with the right traits exists somewhere in the broader metacommunity – compensation may not occur until that species disperses to the local community. So dispersal limitation can introduce long time lags in compensation occurring at all.~~
8. SLIDE 8
   1. ~~Another important~~ **~~temporal~~** ~~consideration is that,~~ as we know, fluctuating environmental conditions often impact different competitors in different ways. Species that perform similarly under some conditions may have a very different competitive dynamic under other conditions.
9. SLIDE 9
   1. This is the angle that we’re going to dig into further in this talk.
10. SLIDE 12
    1. Specifically, we’re looking at the question of how changes in environmental conditions over time affect the energetic compensation we observe in empirical assemblages.
11. SLIDE 13
    1. We’ll use the Portal Project. The Portal Project is a long-running experiment that – among other things – has taught us a lot about competition, and specifically energetic compensation, in natural assemblages.
    2. The Portal Project uses experimental exclosures to study the rodent community in the Chiricahuan Desert in southeastern Arizona.
    3. There are three major groups of players in this system. First we have kangaroo rats, which are the largest species in the system and are competitively and behaviorally dominant. Since 1977, we have maintained experimental exclosure plots where kangaroo rats are removed, to study how the rest of the system responds to the loss of kangaroo rats.
    4. Second, we have Bailey’s pocket mouse. This mouse is similar in size to kangaroo rats, but is able to access the exclosure plots.
    5. Last, we have the remaining small granivores. These are smaller rodents, who also have access to the exclosure plots. They are mostly desert pocket mice.
12. SLIDE 14
13. SLIDE 15
14. SLIDE 16
15. SLIDE 17
16. SLIDE 18
17. SLIDE 19
18. SLIDE 20
19. SLIDE 21
20. SLIDE 22
21. SLIDE 23
22. SLIDE 24