Our study shows that meta-ecosystems of the same total size yet differing in local ecosystem size can differ in their biodiversity and function. Meta-ecosystem ecology shows that resource flows between ecosystems can impact biodiversity (e.g., Gounand et al., 2017; Gravel, Mouquet, et al., 2010; Marleau & Guichard, 2019; Peller et al., 2022) and ecosystem function (e.g., Gounand et al., 2014; Harvey et al., 2023; Marleau et al., 2010). For example, meta-ecosystem theory predicts resource flows can influence species persistence and competitors' coexistence (Gounand et al., 2017; Gravel, Mouquet, et al., 2010). Detritus flowing from productive ecosystems could, for instance, allow the persistence of species in unproductive ecosystems that would otherwise go extinct (Gravel, Mouquet, et al., 2010). Also, for example, resources exchanged between autotrophic and heterotrophic ecosystems can increase or decrease meta-ecosystem productivity according to whether resource stoichiometry exacerbates or relaxes their limiting nutrients (Pichon et al., 2023). However, meta-ecosystem theory and previous experiments have typically assumed the size of connected ecosystems to be the same (but see Harvey et al., 2018, 2020), thereby ignoring how differences in ecosystem size observed in natural systems (e.g., Fahrig, 2003) may modulate local and meta-ecosystem richness and function through flows of resources. Our results suggest that integrating ecosystem size into meta-ecosystem ecology would help us further understand how resource flows shape biodiversity. In particular, we suggest that resources flowing into large ecosystems should have a limited influence, whereas meta-ecosystem theory generally predicts effects on all ecosystems.