Reassessing Lujanian (Pleistocene) paleoecology from a food web theoretical standpoint

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Food webs are complex networks composed by species and their predator - prey interactions. Both time averaging and fossil record incompleteness were always seen as insurmountable issues that made the task of compilation and analysis of paleo-food webs, impossible. Recently, some authors managed to partially elude these problems by defining appropriate geographical and temporal scales to work within. In a previous work, we analyzed a partial food web for Lujanian mammal megafauna compiled by other researchers. We found that it was structurally prone to suffer trophic cascades. We therefore stated that a large-scale trophic cascade, probably triggered by climate change, interference competition or human arrival, could have been the process that led to the disparate extinction pattern among Lujanian mammals that is observed in the fossil record. In this work, we analyzed the faunistic assemblage defined for Luján, Paso Otero and Quequén Salado - Indio Rico (Buenos Aires Province, Argentina). Primary producers were added by using Raunkiaer life forms. The results yielded some intriguing conclusions. For instance, the food web had structural properties similar to those of modern food webs. Furthermore, and contrary to current thoughts, we found that top species were more abundant than expected for modern food webs. Finally, one of the most relevant structural differences between modern and Lujanian food webs was the number of strong interactors in the web, which was found to be higher in Lujanian megafauna. In conclusion, these results claim for new approaches mixing both energetical and structural processes and properties in order to correctly assess the extent of Pleistocene Lujanian megafauna ecological singularities.

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