Four types of interference competition and their impacts on the ecology and evolution of size-structured populations and communities - DTU Orbit (06/11/2018)

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We investigate how four types of interference competition - which alternatively affect foraging, metabolism, survival, and reproduction - impact the ecology and evolution of size-structured populations. Even though all four types of interference competition reduce population biomass, interference competition at intermediate intensity sometimes significantly increases the abundance of adult individuals and the population’s reproduction rate. We find that foraging and metabolic interference evolutionarily favor smaller maturation size when interference is weak and larger maturation size when interference is strong. The evolutionary response to survival interference and reproductive interference is always larger maturation size. We also investigate how the four types of interference competition impact the evolutionary dynamics and resultant diversity and trophic structure of size-structured communities. Like other types of trait-mediated competition, all four types of interference competition can induce disruptive selection and thus promote initial diversification. Even though foraging interference and reproductive interference are more potent in promoting initial diversification, they catalyze the formation of diverse communities with complex trophic structure only at high levels of interference intensity. By contrast, survival interference does so already at intermediate levels, while reproductive interference can only support relatively smaller communities with simpler trophic structure. Taken together, our results show how the type and intensity of interference competition jointly affect coexistence patterns in structured population models.

General information
State: Published
Organisations: Department of Applied Mathematics and Computer Science, National Institute of Aquatic Resources, Centre for Ocean Life, Umeå University, International Institute for Applied Systems Analysis
Contributors: Zhang, L., Andersen, K. H., Dieckmann, U., Brännström, Å. K.
Pages: 280-290
Publication date: 2015
Peer-reviewed: Yes

Publication information
Journal: Journal of Theoretical Biology
Volume: 380
ISSN (Print): 0022-5193
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 1.93 SJR 0.746 SNIP 0.83
Web of Science (2017): Impact factor 1.833
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.16 SJR 0.934 SNIP 0.915
Web of Science (2016): Impact factor 2.113
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.21 SJR 1.072 SNIP 0.989
Web of Science (2015): Impact factor 2.049
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.25 SJR 1.076 SNIP 1.035
Web of Science (2014): Impact factor 2.116
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.44 SJR 1.044 SNIP 1.039
Web of Science (2013): Impact factor 2.303
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.5 SJR 0.947 SNIP 1.032
Web of Science (2012): Impact factor 2.351