

# Multiple stable states in a model based on predator-induced defenses

González-Olivares, Eduardo

González-Yañez, Betsabé

Becerra-Klix, Ruth

Ramos-Jiliberto, Rodrigo

© 2017 Elsevier B.V. A large variety of antipredator defenses are exhibited by plants, animals and microbes in nature. A deep understanding of the dynamic consequences of prey responses to predation risk is essential for building a comprehensive theory of food webs. Here we present a simple classification of prey defenses based on the sensitivity of prey immunity to predation respect to abundances of prey and predators. Only three out of six defense types have been analytically studied in the context of predator-prey dynamics, which reveals a serious gap in our current knowledge of ecological interactions. In this study we present a mathematical analysis on a widely occurring type of prey defense whose behavior has not been established in exact terms. The study model considers prey whose average immunity to predators is enhanced by predator abundance. This case, known as inducible defenses, has been reported for a wide array of species. Our results reveal a rich dynamic behavior, in wh