

---

**XIAOYING WANG**, Trent University

*Studying the fear effect in a predator-prey system with apparent competition*

Recent experimental evidence shows that the mere presence of predators may largely reduce the reproduction success of prey. The loss of prey's reproduction rate is attributed to the cost of anti-predator defense of prey when the prey perceives predation risks. We propose a predator-prey model where the prey shares a common enemy that leads to apparent competition between the prey and also the cost of anti-predator defense. Analytical results give the persistence conditions for the population densities of the prey and the predator. Numerical simulations demonstrate rich dynamics, such as the bi-stability of an equilibrium and a limit cycle. Results also reveal how the prey and the predator may coexist when the anti-predator defense level varies in prey. A relatively strong anti-predator defense in the prey may drive the population density of the prey to extinction and change the original coexistence of all the prey and the predator where the population densities oscillate periodically. Alternatively, strong anti-predator defense in the prey may facilitate the coexistence of the prey and the predator at a steady state.