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Susmita Sadhu* (susmita.sadhu@gcsu.edu). *Mixed mode oscillations in a singular perturbed three-species model.*

We consider a three dimensional singularly perturbed predator-prey model with two predators competing directly for the same prey under Holling Type II predator functional response. As the predating efficiency of one of the predators is varied, the system exhibits relaxation oscillations, as well as complex dynamics such as mixed mode oscillations (which feature alternating short amplitude oscillations and relaxation oscillations). Relaxation oscillations reflect the presence of boom and bust of population of the species, whereas mixed mode oscillations delay the time intervals between two consecutive outbreaks/crashes, and are thus ecologically significant. Using the standard singular perturbation theory, existence of stable relaxation oscillations can be explained. On the other hand, mixed mode oscillations in the system arise due to canards and singular Hopf mechanisms. Canards exist due to presence of a folded node singularity which allows trajectories entering a special region called the “funnel” to pass through it from the attractive to the repelling slow manifold. As the input parameter reaches a critical value, the mixed mode oscillations are influenced by the interaction of both canard and singular Hopf mechanisms. (Received February 02, 2015)