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Susmita Sadhu* (susmita.sadhu@gcsu.edu) and **Christian Kuehn**. *Noise induced mixed-mode oscillations in a predator-prey system with two time-scales near the onset of a limit cycle.*

We study the effect of stochasticity, in the form of Gaussian white noise, in a three-species predator-prey model with two distinct time-scales. The interactions between the three species is modeled by a system of slow-fast Itô stochastic differential equations. For a suitable parameter regime, the deterministic drift part of the model admits a folded node singularity and exhibits a singular Hopf bifurcation. We transform the stochastic model into its normal form near the folded node, which can be then used to understand the interplay between deterministic and stochastic small amplitude oscillations. The stochastic model admits several kinds of noise driven mixed-mode oscillations that capture the intermediate dynamics between two cycles of population outbreaks of the prey. We perform numerical simulations to study the distribution of the random number of small oscillations between two large oscillations, which can be related to the return time between the outbreaks. Depending on the noise intensity and the distance to the Hopf bifurcation, we find that the distributions of the small oscillations resemble the 1200 years record on the return times of larch budmoth outbreak events in the subalpine larch forests in the European Alps. (Received September 21, 2017)