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Yiqiang Zheng* (zheng30@purdue.edu), Department of Mathematics, Purdue University, West Lafayette, IN 47907, and **Zhilan Feng**, Department of Mathematics, Purdue University, West Lafayette, IN 47907. *Dynamics of a seedling-herbivore model in presence of plant toxin defense.*

A simplified seedling-herbivore model with plant toxin defense is studied for mature forest systems. Chemical defense of plants plays an important role in the plant and herbivore interaction. Toxin-determined functional response models (TDFRM) have been studied to answer different ecological problems, including plants invasion, herbivore and wolf control and associated forest fire regime, etc. The seedlings of plants are main food resources for herbivores and are important in the regeneration of forests. The new system with explicit seedling class shows interesting bistability phenomenon and nonexistence of periodic solutions is proved, which is different from the previous research without explicit seedling class. However, the seasonal recruitment of seedlings is shown to result in the stable periodic solutions, which could be the source of oscillation of forest systems. (Received September 16, 2014)