

1080-92-154

Colin E. Campbell* (campbell@phys.psu.edu), **Suann Yang**, **Katriona Shea** and **Reka Albert**. *Topological and dynamical analysis of the formation and stability of ecological communities.*

The ability to predict the collapse of ecological communities is of significant concern, in light of global declines in honeybee populations. Here, I will present a recent network-based model of the dynamic process by which mutualistic plant-pollinator communities form. The model replicates observed ecological behavior and gives rise to rich dynamic behavior. I will present a network-theory based analysis of the stability of these communities in the face of species extinctions, and show that some communities are vulnerable to total collapse after the loss of a single species. Existing and novel network measures will be applied to the networks to show that their dynamical behavior can be predicted from their topological properties. Notably, our novel network measures, which assess the abundance, length, and sign of paths between all node pairs, are applicable to any network consisting of positive and negative interactions (edges), and may therefore be applied to network models of a wide range of complex systems. (Received January 23, 2012)