1046-92-1551 **Tamara E Awerbuch-Friedlander*** (Tamara@hsph.harvard.edu), Harvard School of Public Health, 665 Huntington ave, Boston, MA 02115. *"Trends and oscillations in the dynamics of linear vs. non-linear difference equation models describing populations".* Preliminary report.

Population dynamics of organisms with various developmental stages is complex in nature. Emerging populations can be described by a system of non-bounded delayed equations. The mathematical analysis of a linear model describing tick populations, resulted in a cubic characteristic equations, with three eigenvalues characterizing the pattern of growth; one dominant determining the main trend and two others, adding riding oscillations. Superimposed, we also found oscillations due to fluctuating environments which strongly affect the magnitude of these eigenvalues (Awerbuch and Sandberg 1995).However to account for long-term density dependence effects, the model was modified to capture seasonal transitions of the three developmental stages, with population regulation represented by an exponential inhibition of growth of one of the stages (Awerbuch-Friedlander, Levins, and Predescu. 2005); this resulted in a delay difference equation of order two:

y(n+1)=A*y(n-1)*exp(-y(n-1))+ B*y(n)

The analysis of the model revealed parameter regions of oscillatory behavior, the source being the non-linear component of the model. (Received September 16, 2008)