

GLOBAL STABILITY ANALYSIS OF A GENERAL SCALAR
DIFFERENCE EQUATION

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Abstract

We consider a general first order scalar difference equation with and without Allee effect. The model without Allee effect represents asexual reproduction of a species while the model including Allee effect represents sexual reproduction. We analyze global stabilities of both models analytically and compare the results obtained. Numerical simulations are included to support the analytical results. We conclude that Allee effect decreases global stability of a nonnegative fixed point of the model. This result is different from the local stability behavior of the same fixed point of the model.

Keywords: Allee effect, discrete-time models, global stability

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