

บทความ Dynamical analysis of a delayed food chain model with additive Allee effect ถูกอ้างอิงใน วารสารที่อยู่ในฐานข้อมูลที่ กพอ  
ยอมรับ 1 ครั้ง (Dec 2023)



Your publication has 3 new citations

## Dynamical analysis of a delayed food chain model with additive Allee effect

... Significantly, the examination of pattern-forming instabilities in reaction-diffusion systems is now emerging as a significant and interesting area of study [39]. With the help of important recent work [16,21,36], the researchers may modify this model using delay differential equation for a more realistic model, as well as modify this model using fractional operators as part of future work. ...

### Dynamics of an eco-epidemic model with Allee effect in prey and disease in predator

Article December 2023 · 80 Reads

Computational and Mathematical Biophysics

 Bipin Kumar

[View](#)





Open Access Published by De Gruyter Open Access December 29, 2023

# Dynamics of an eco-epidemic model with Allee effect in prey and disease in predator

Bipin Kumar  and Rajesh Kumar Sinha

From the journal *Computational and Mathematical Biophysics*

<https://doi.org/10.1515/cmb-2023-0108>

Cite this

Share this

## Abstract

In this work, the dynamics of a food chain model with disease in the predator and the Allee effect in the prey have been investigated. The model also incorporates a Holling type-III functional response, accounting for both disease transmission and predation. The existence of equilibria and their stability in the model have also been investigated. The primary objective of this research is to examine the effects of the Allee parameter. Hopf bifurcations are explored about the interior and disease-free equilibrium point, where the Allee is taken as a bifurcation point. In numerical simulation, phase portraits have been used to look into the existence of equilibrium points and their stability. The bifurcation diagrams that have been drawn clearly demonstrate the presence of significant local bifurcations, including Hopf, transcritical, and saddle-node bifurcations. Through the phase portrait, limit cycle, and time series, the stability and oscillatory behaviour of the equilibrium point of the model are investigated. The numerical simulation has been done using MATLAB and Matcont.

Keywords: [eco-epidemic model](#); [equilibrium point](#); [stability analysis](#); [Hopf bifurcation](#); [transcritical bifurcation](#)

MSC 2010: [34D20](#); [92B05](#); [92D25](#); [34C23](#); [37Gxx](#)

[36] Vinoth, S., Sivasamy, R., Sathiyathan, K., Rajchakit, G., [Hammachukiattikul](#), P., Vadivel, R., & Gunasekaran, N. (2021). Dynamical analysis of a delayed food chain model with additive Allee effect. *Advances in Difference Equations*, 2021(1), 1–20.

[10.1186/s13662-021-03216-z](https://doi.org/10.1186/s13662-021-03216-z)

[Search in Google Scholar](#)