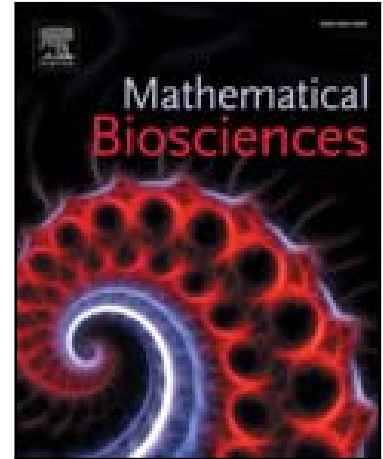


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Analysis of the interaction among rice, weeds, inorganic fertilizer, and a herbivore in a composite farming paddy ecosystem

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Highlights

- The paper puts forward a differential equation model to discover the interaction among rice, weed, inorganic fertilizer and herbivore in composite farming paddy ecosystem.
- Sufficient conditions are obtained for the existence and asymptotical stability of equilibria in the composite farming paddy ecosystem.
- Conditions for maximizing the yield of rice are also obtained by taking the relative mortality of rice as the variable.
- The system has the Hopf bifurcation phenomenon, and the critical value of Hopf bifurcation is given.
- The measures to avoid the stability of the two types of equilibrium points, or to avoid their existence, are put forward. Some measures to stabilize the equilibrium for weed extinction are also proposed.

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