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A parasitism-mutualism-predation model consisting of crows, cuckoos and cats with stage-structure and maturation delays on crows and cuckoos

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Highlights

- Proposed a parasitism-mutualism-predation model with stage-structure and maturation time delays.
- Studied the existence of the positive equilibrium of three subsystems.
- Established the criteria for the global stability of the trivial equilibrium.
- Obtained the threshold dynamics for the coexistence and weak persistence.
- Studied the effect of maturation time delays on dynamics of crows and cuckoos.

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