Discrete time exploitative competition model of different stage-specific predators

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Considered is a discrete time competition model between two predator populations for the common prey, which is expressed by a system of three recurrence relations for them. We focus on the invasion success of an alien predator in the system of native predator and prey populations, where the targets of predation by native and alien predators are different from each other: one to the juvenile stage and the other to the adult stage. We investigate which stage-specific alien predator would be more successful according to the invasion in the native system with a different stage-specific predator, and show that the juvenile-specific predation would be more advantageous to make successful the invasion in the native system with an adult-specific predator population. While we can show some analytical results for a generic model, we construct a specific model with a Beverton-Holt type of density effect and a Nicholson-Bailey type of predation factor in the prey population dynamics, and use it to give some deeper analytical results on how the invadability depends on the stage-specific predation.