Analysis of the effects of Cannibalism on the Trojan Y-Chromosome eradication strategy for invasive species

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The Trojan Y-Chromosome (TYC) strategy is a biological control used to cause the extinction of invasive fish populations by manipulating the populations sex ratio. This is done by introducing YY super males into the invasive population, which guarantees male progeny upon mating with the YY males. This leads to a decline of wild type females in the population and eventually leads to extinction of the population. Cannibalism, which is the killing and eating of conspecifics, has been observed rampantly in many fish populations. In this work, we investigate the effects of the wild type males cannibalizing the supermales. We analyze and discuss the effects of this cannibalism on the success of the TYC eradication strategy. We investigate both the ODE and the spatial models, and support our work with numerical simulations.

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