Exploring lethal and nonlethal effects of the aquatic predator *Toxorhynchites rutilus* on the dengue and yellow fever mosquito, *Aedes aegypti*

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Predation is a major selective force that shapes prey traits and has strong ecological effects on prey population dynamics and community composition. Predators negatively affect prey via direct physical harm and mortality, and indirect alteration of prey behavior to reduce exposure to predation risk. Under certain circumstances predators can also benefit prey fitness or population growth. When a prey population is strongly regulated by density-dependent mortality (e.g. from limited food resources), predator mortality could replace the stronger effect of starvation mortality from intraspecific competition, resulting in the same number of prey surviving (compensatory mortality), or potentially even increased prey survivorship (overcompensatory mortality). Prey also benefit from reduced intraspecific competition which increases per capita resource availability, potentially resulting in higher quality females with increased size, longevity, and fecundity, all factors that could increase disease transmission risk by mosquitoes. The ecological conditions under which the aquatic predator *Toxorhynchites rutilus* could cause compensatory effects in the dengue and yellow fever mosquito, *Aedes aegypti*, are explored using an individual-based model.