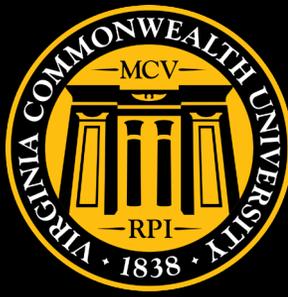


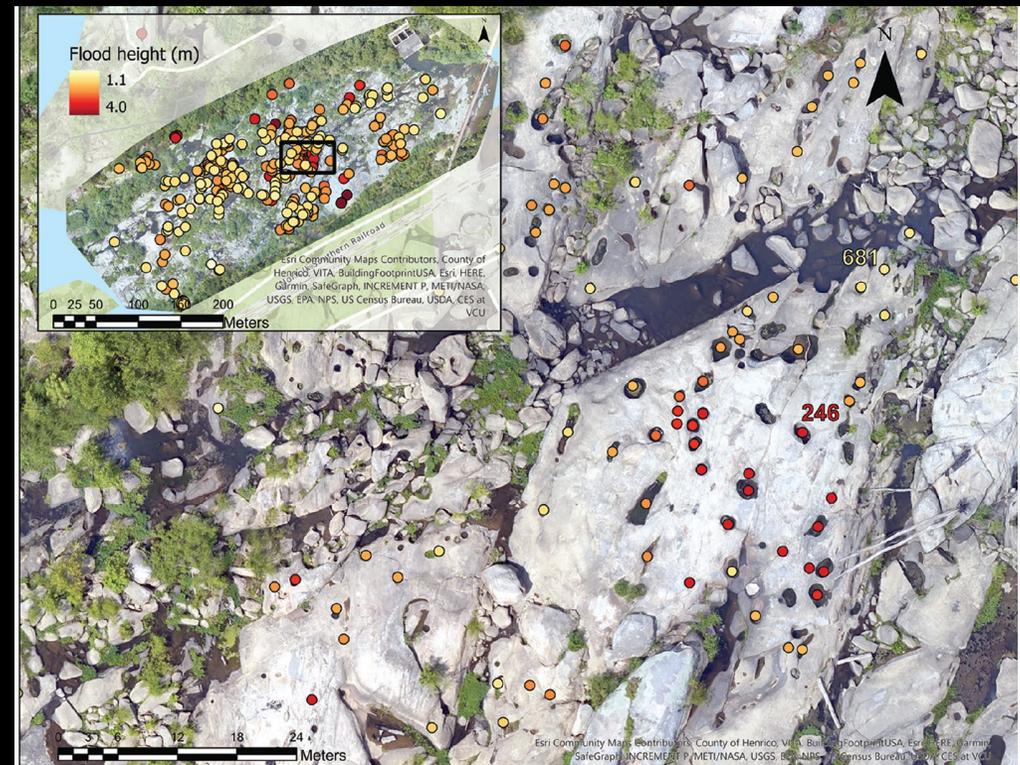


Predator Biocontrol of the Rock Pool Mosquito, *Aedes atropalpus*



Andrew T. Davidson, VCU-ILS
Elizabeth Hamman, Tulane University
Mike McCoy, Florida Atlantic University
James R. Vonesh, VCU-CES

Some Background Info



Ae. atropalpus, the rock pool mosquito



A convenient “model organism”, due to its autogenous development

Ae. japonicus – an invasive competitor?



Larval competition between *Aedes japonicus* and *Aedes atropalpus* (Diptera: Culicidae) in simulated rock pools

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Journal of Vector Ecology

June 2019

Aquatic thermal conditions predict the presence of native and invasive rock pool *Aedes* (Diptera: Culicidae) in the southern Appalachians, U.S.A.

Brian D. Byrd¹✉, Charlie B. Sither¹, J. Alan Goggins¹, Samantha Kunze-Garcia¹, Kendra N. Pesko², Dulce M. Bustamante², John M. Sither¹, James R. Vonesh³, and George F. O'Meara²

How will warming affect mosquito populations?

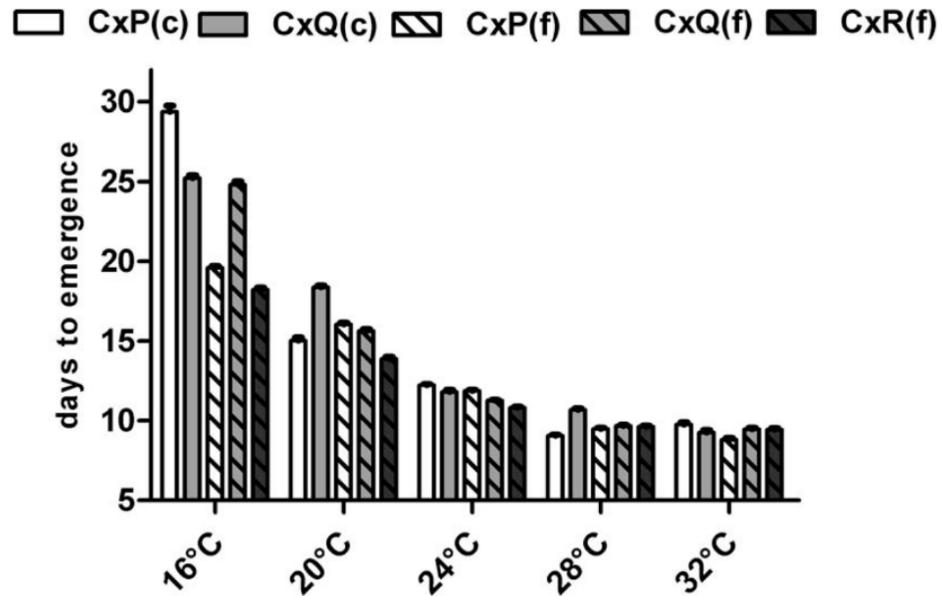
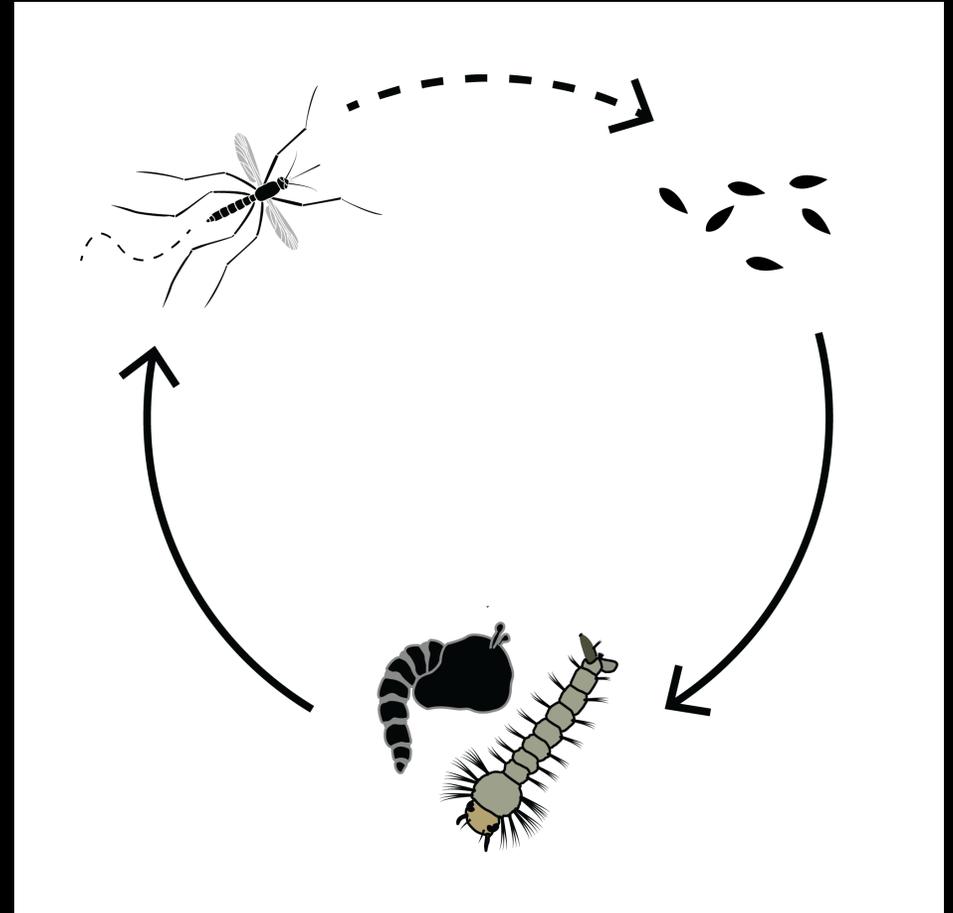


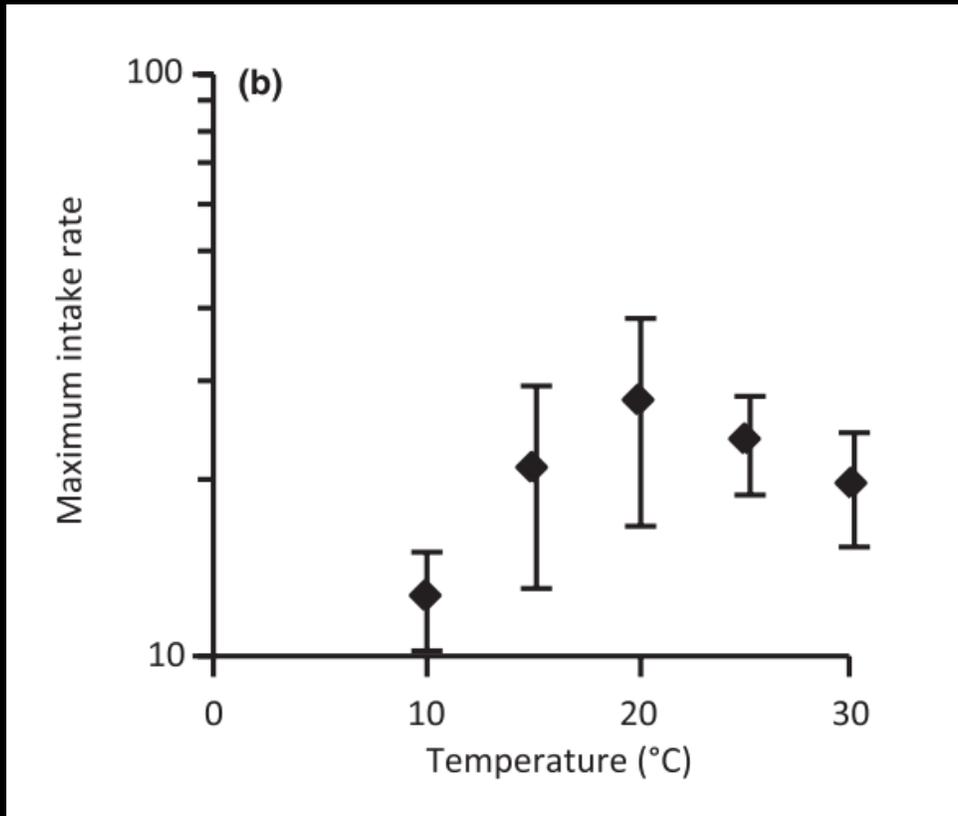
Fig. 1. Development time in mean days to emergence \pm SEM of field (f) and colony (c) *Cx. pipiens* (CxP), *Cx. quinquefasciatus* (CxQ), and *Cx. restuans* (CxR) at various temperatures.

Ciota et al. 2014 (Journ Med Ent)



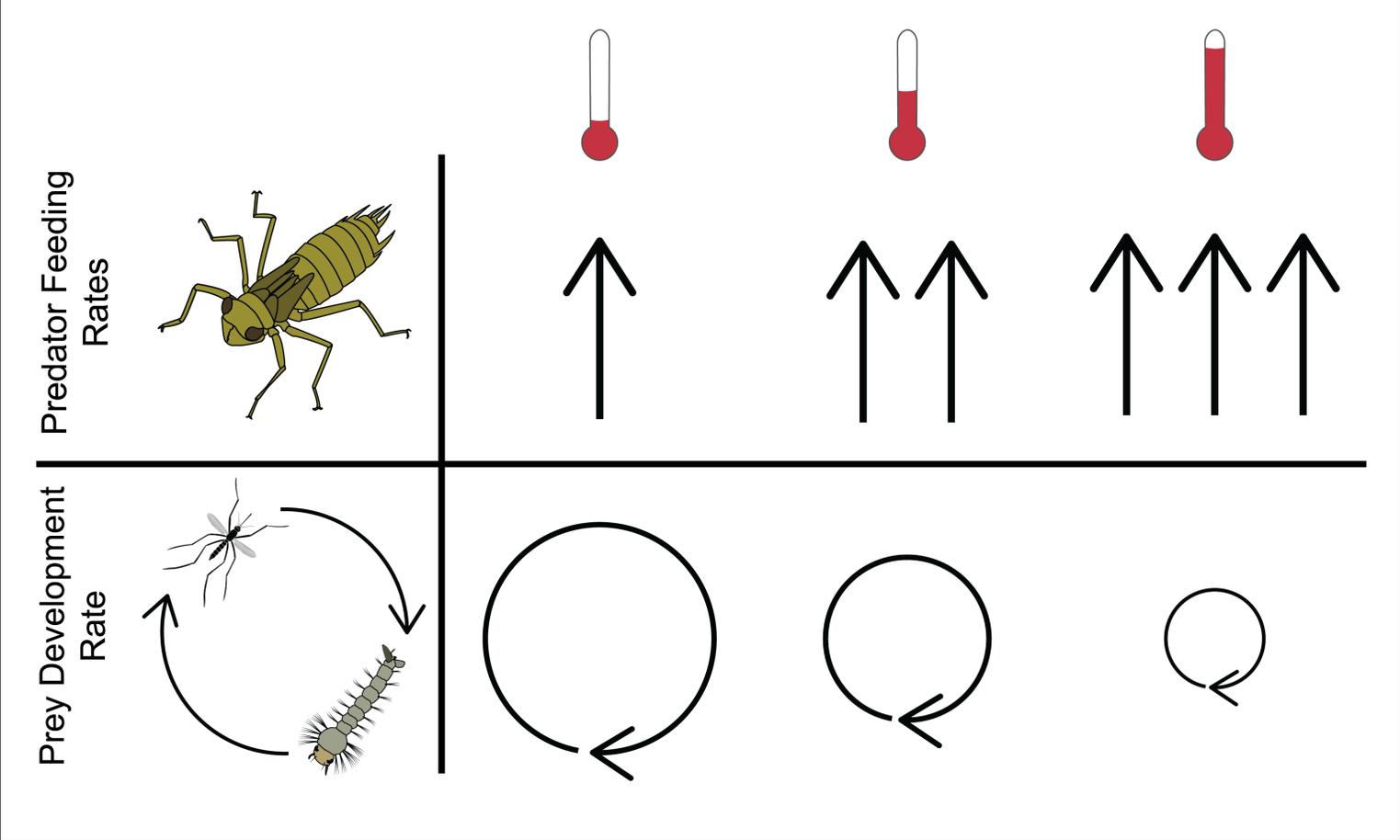
Faster life cycle = more mosquitoes?

Temperature affects other species, too



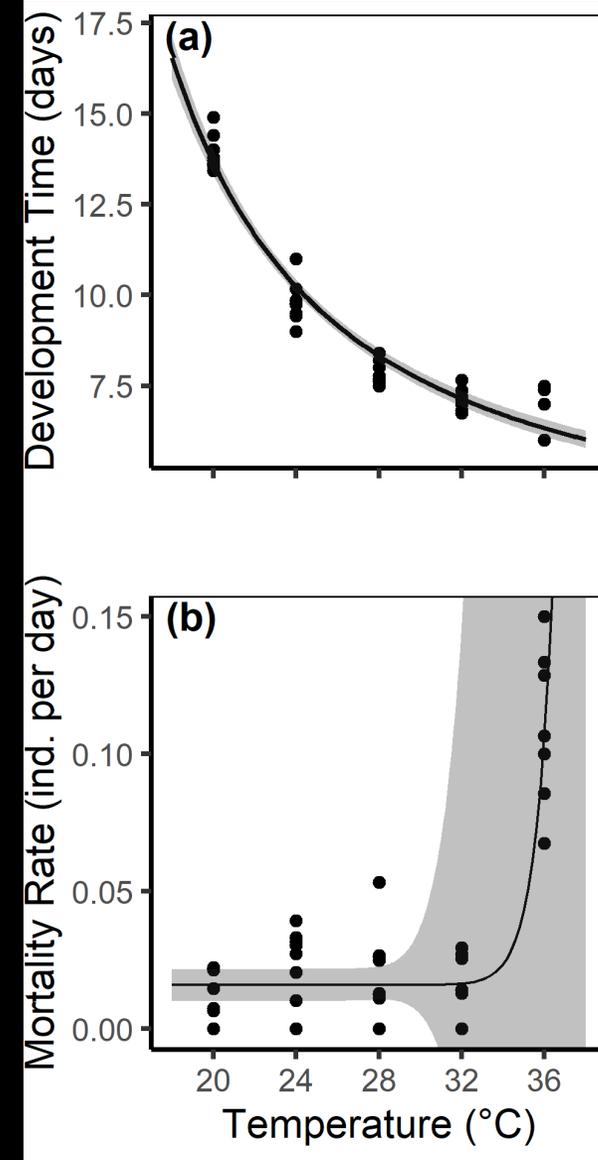
Warmer predators are hungrier

Predators are eating faster, but prey outgrow them faster, too



So who wins, predator or prey?

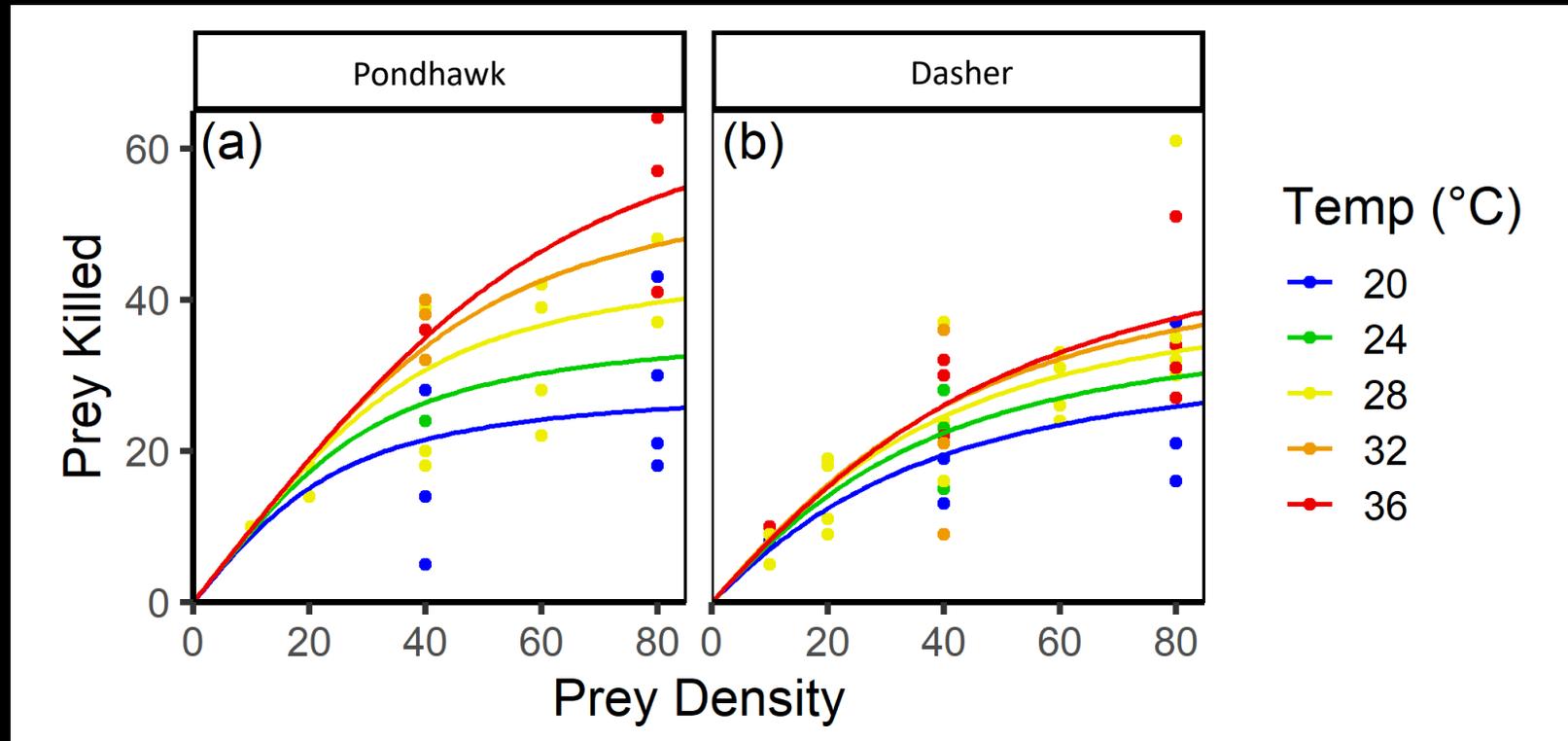
Warming and *Ae. atropalpus*



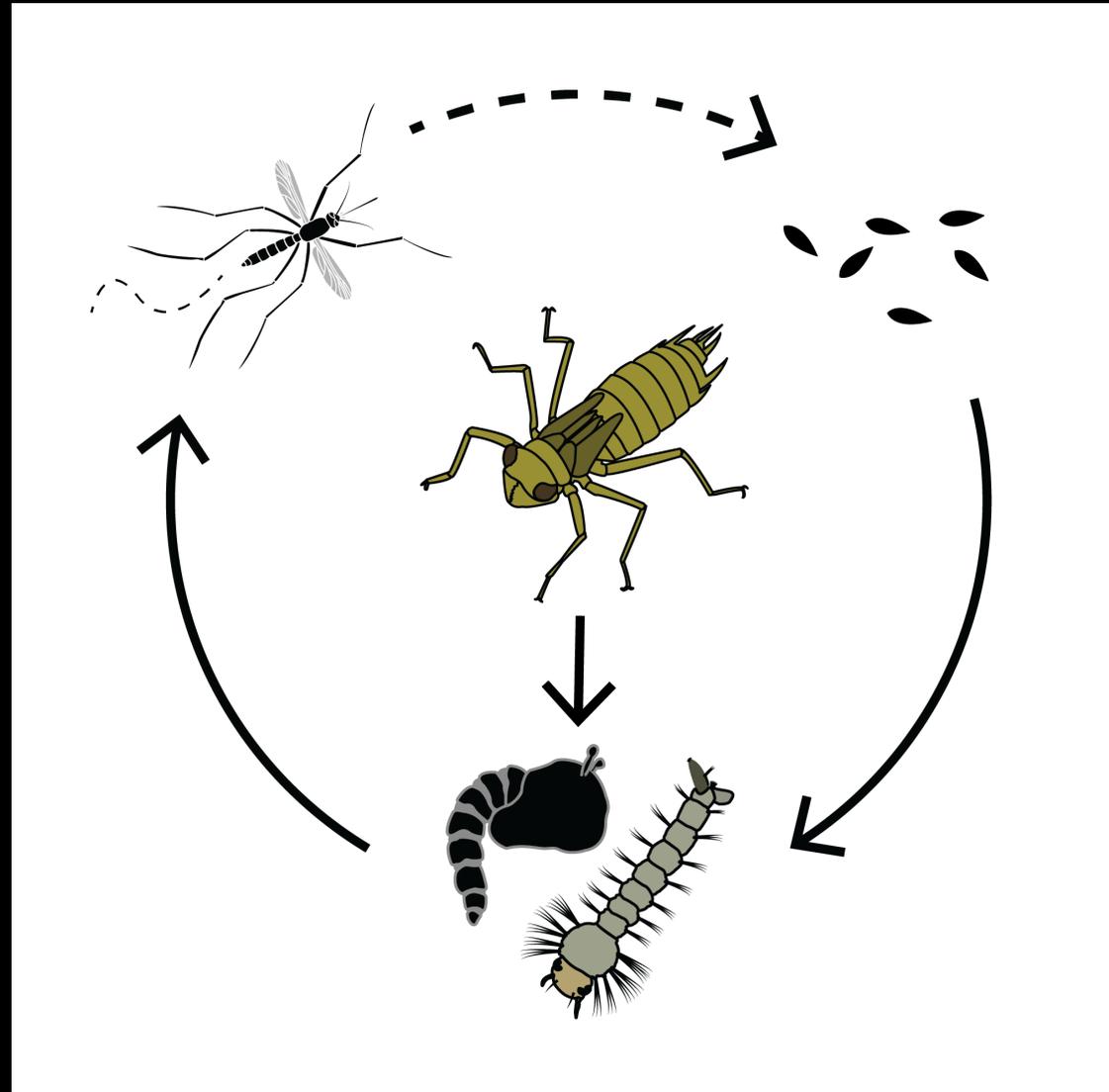


Eastern pondhawk (left) and blue dasher (right)
Two common mosquito predators

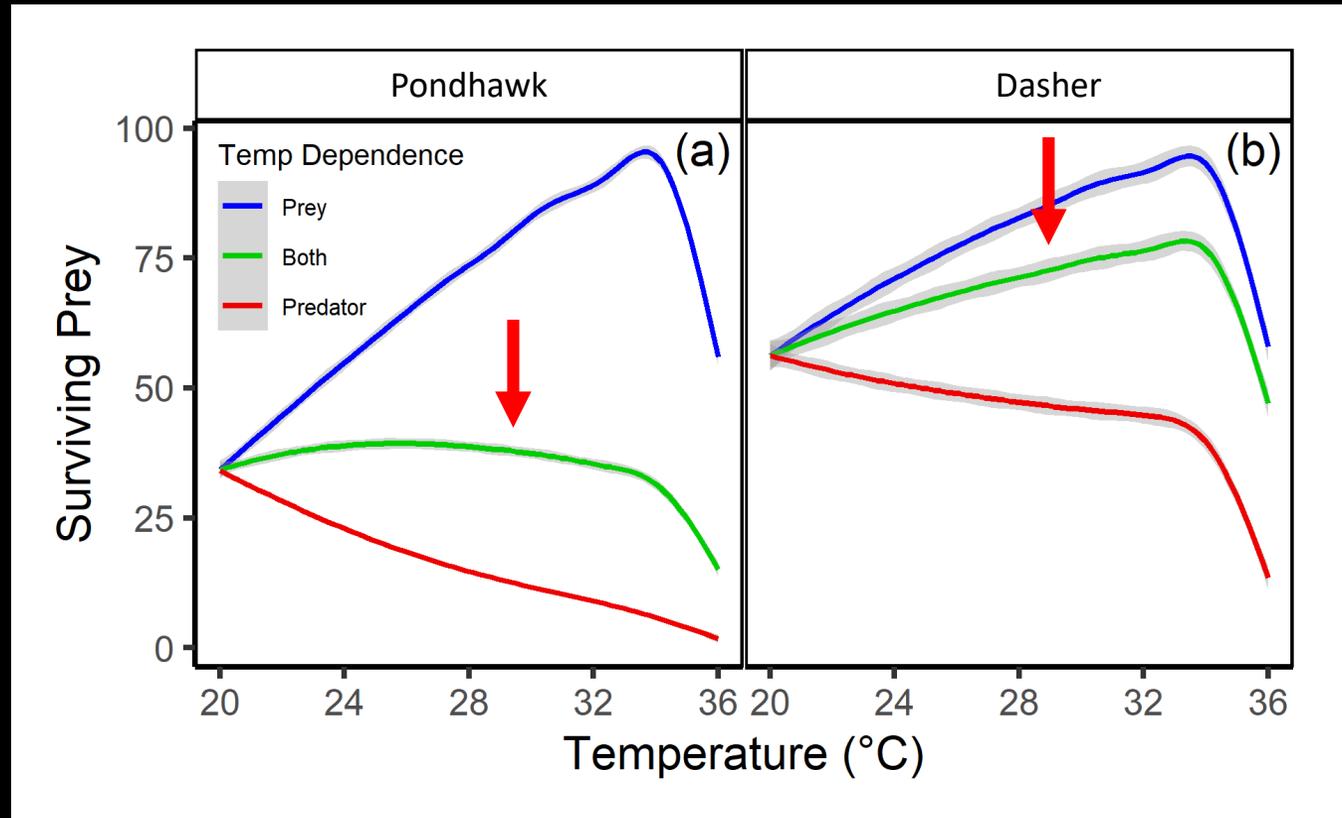
Warming increases dragonfly nymph feeding rates



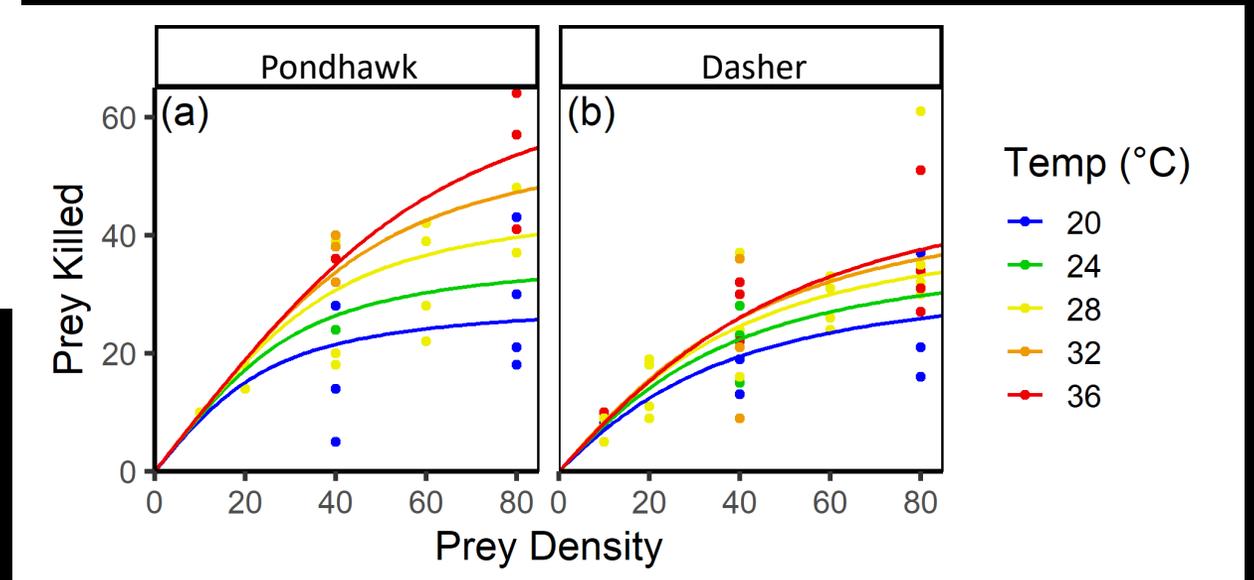
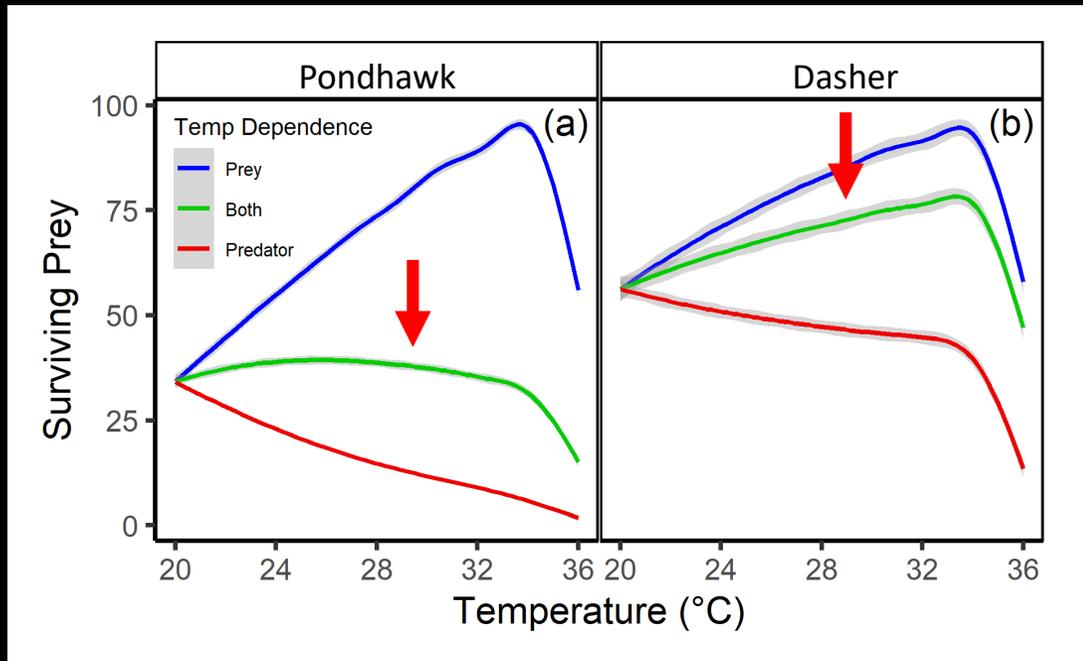
Combining both predator and prey responses to warming



Model Predictions



Model Predictions



Some predators become less effective at warmer temperatures, others are not affected

Conclusions – Should we be worried?



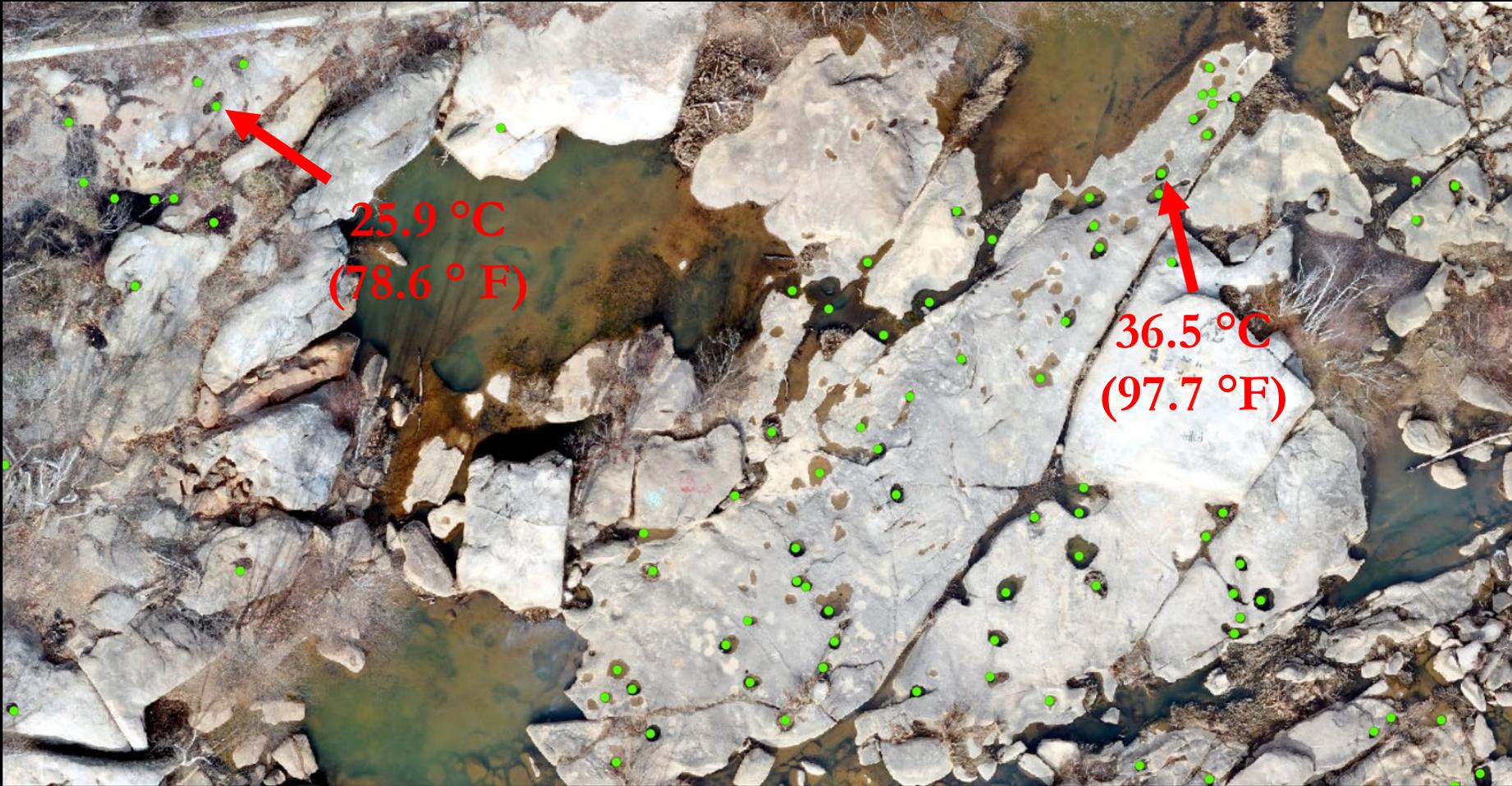
Eastern pondhawk



Blue dasher

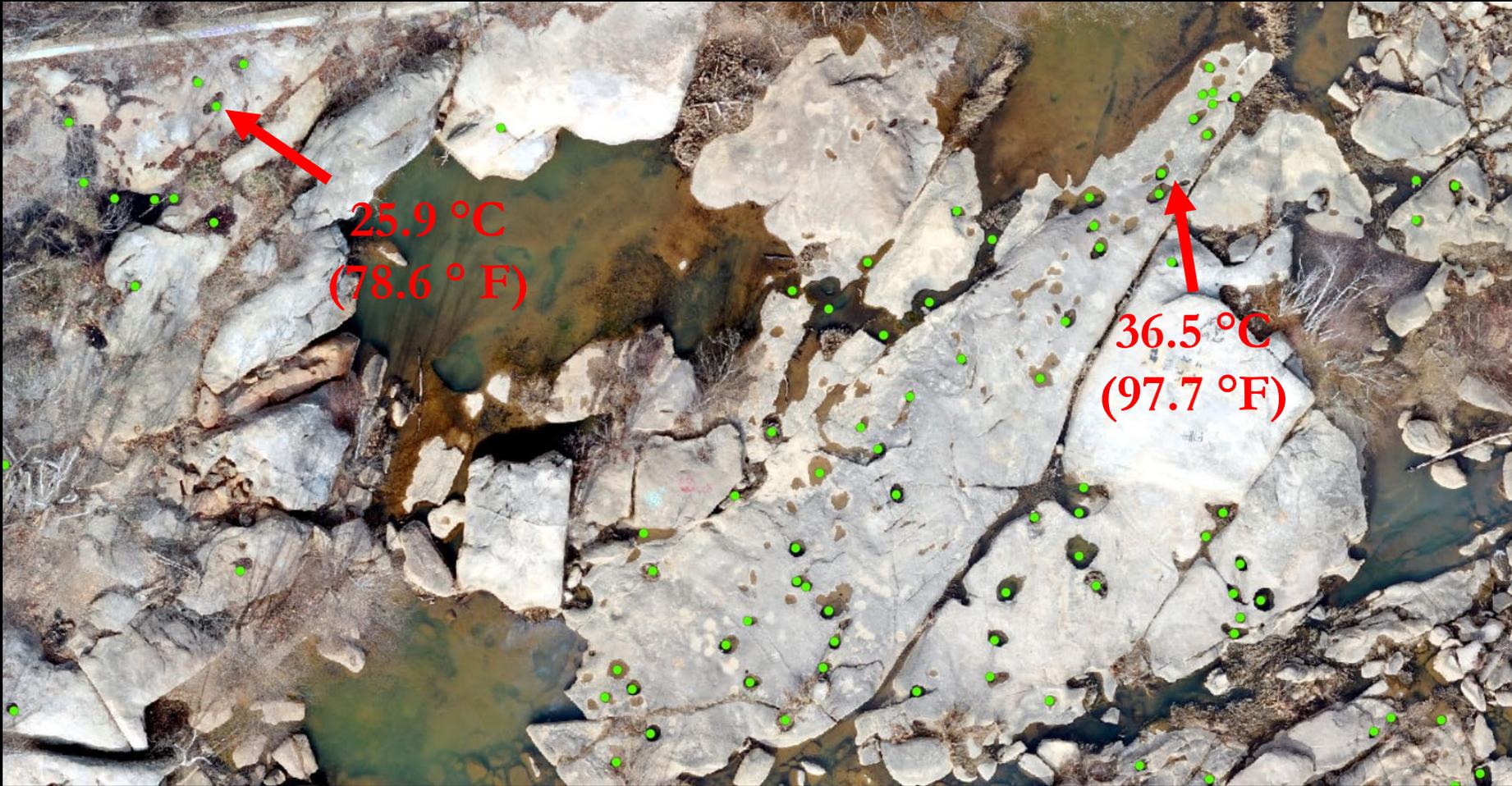
Predator biocontrol improves or remains the same for some predator species, worsens for others

Future Research: What can we learn from natural rock pools?



Lots of natural temperature variation across our pools,
these pools are only 50m (~165ft) apart

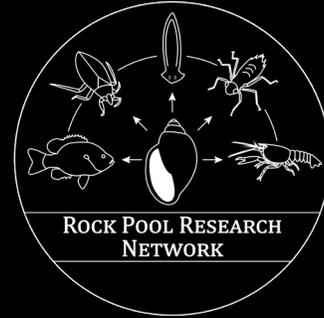
Future Research: What can we learn from natural rock pools?



I.e., rather than wait for warming to happen, can we validate our model predictions now?

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- Dr. Sal Agosta, VCU
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- Jenn Davidson, wife
- And the rest of Team Rock Pool and our NSF crew!



Questions?