

# Mosquitoes: Finding a Meaning To Life

By Jay Kiser

# The Questions We Have All Heard

- “So, I have a question?”
  - “Why do mosquitoes exist?”
  - “What is the purpose of mosquitoes?”
  - “If all mosquitoes died, would the world really miss them?”

# What “Benefits” Do Mosquitoes Provide?

- Prey
  - Pollinators
  - Symbiotic relationships
  - Diversity
  - Alter behaviors of animals
  - Vector for diseases
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- Fang, Janet. (2010) *Ecology: A world without mosquitoes*. Nature. 466, 432-434.

# Predator Prey Relationships

- House Martins (like purple martins) are said to eat mosquitoes, but even more so they eat the spiders and dragonflies that eat mosquitoes
- A Poulin study in France looked at House Martin's foraging behaviors in areas with different mosquitoes numbers
  - Control sites with no pesticides
  - Areas treated with larvacide
  - Clutch sizes dropped 33% in areas of low mosquito numbers
- Not a direct effect, but effects up the food chain



Poulin, B., Lefebvre, G., and Paz, L. (2010) *Red flag for green spray: adverse trophic effects of Bti on breeding birds*. *Journal of Applied Ecology*. 47, 884-889.

# Predator Prey Relationships

- During summer months in Arctic tundra
- Mosquito populations and biomass are higher than anywhere on earth
- Huge amount of prey

What if they were gone...

- It is estimated that 50% of migratory birds in the tundra could be lost- Dr. Bruce Harrison
  - Direct and indirect predators

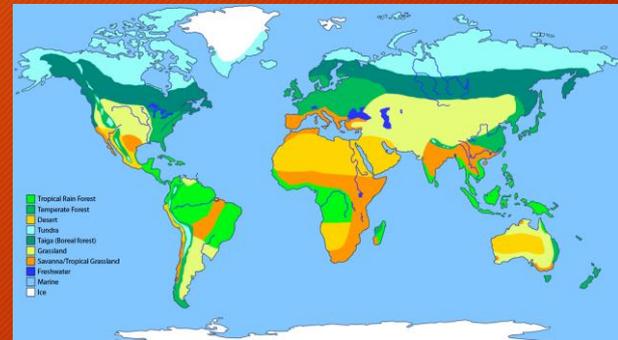


Photo by Jesse Krause National Geographic

# Mosquitoes as Pollinators

- Many mosquitoes are secondary pollinators for thousands of species of plants around the world
- Some mosquitoes are primary pollinators for particular plants
  - Multiple species of North America Orchids rely on mosquitoes
  - The orchid *Platanthera obtusata* actually mimics the smells of blood hosts to attract mosquitoes



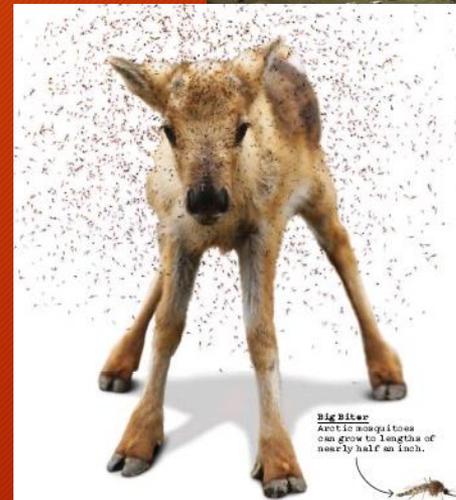
# Symbiotic Relationships

- Relationship between the purple pitcher plant and *Wyeomyia smithii*
  - The plant provides a predator free niche for the mosquito with a constant flow of food
  - The mosquito breaks down and digests insect remains and microorganisms to give the plant micronutrients; such as nitrogen that it needs



# Alteration of Behaviors

- In the Arctic tundra, mosquitoes can be so abundant that they alter the migration patterns of caribou and some birds
  - Mosquitoes can feed on up to 300mL of blood a day from each individual caribou in the herd
  - Herds are known to migrate against the wind in order to get some relief
  - Migration patterns of large populations can alter many aspects of ecosystem



# Vectors for Diseases

- Probably the biggest impact mosquitoes have on the ecosystems around them.
  - Foremost reason we control
- Mosquitoes can spread diseases caused by viruses, bacteria, and eukaryotic organisms
  - But not all affect humans
  - Over 170 species of plasmodia that cause malaria
  - Only 4 or 5 of them infect humans
- 3,500 mosquito species in the world
  - Only a few hundred feed on humans

