Introductions, & the study of how plants can coexist

Simon Stump
• My name is Simon Stump.
• 5th year student in Ecology & Evolutionary Biology.
• Grew up in AZ.
• Undergrad degree at Harvey Mudd College (CA).
• Majored in Mathematical-Biology.
• Didn’t like math going into college.
• I converted because:
  – Math teachers that made it seem fun.
  – Math, biology, & physics teachers made it useful.
• Career goal: Professor.
Threatened & Endangered Species


http://www.southwestclimatechange.org/figures/buffelgrass
Invasive Species

Artificial Environments

Photo Credit: Shimada, K., commons.wikimedia.org

http://museum.wa.gov

http://www.southwestclimatechange.org/figures/buffelgrass
For my dissertation, I study how plants can coexist, and how herbivores, parasites, and variation in the physical environment effect coexistence.
U_t + 1 = P_t + s(1 - G(t)) + P_t G(t) - C(t) - A(t)(1) H(t + 1) = eY(t) P_t G(t) - C(t) - A(t) (2)
\[ P(t + 1) = P(t) s(1 - G(t)) + \frac{P(t) G(t) Y}{C(t) A(t)} \]

\[ H(t + 1) = \frac{c P(t) G(t) Y}{C(t)} \left( 1 - \frac{1}{A(t)} \right) + s_H H(t) \]
Old Conclusion: If an herbivore attacks everything equally, it generally will not help the plants it eats to coexist. (Holt 1984, Chesson & Kuang 2008)

New Conclusion: If plants do well in different areas, and herbivores respond to this, this can help plants to coexist. (Chesson & Stump, unpublished)

Next project: What happens if plants do well in different areas, and the herbivores/parasites do not eat everything equally?

\[
H(t + 1) = \frac{cP(t)G(t)Y}{C(t)} \left( 1 - \frac{1}{A(t)} \right) + s_HH(t)
\]
Questions?