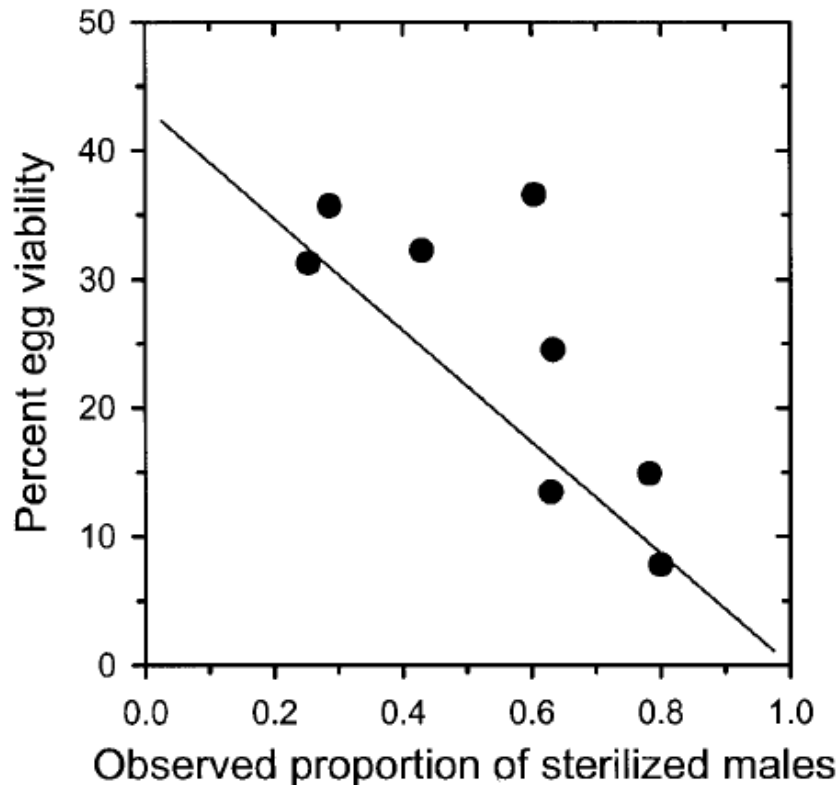
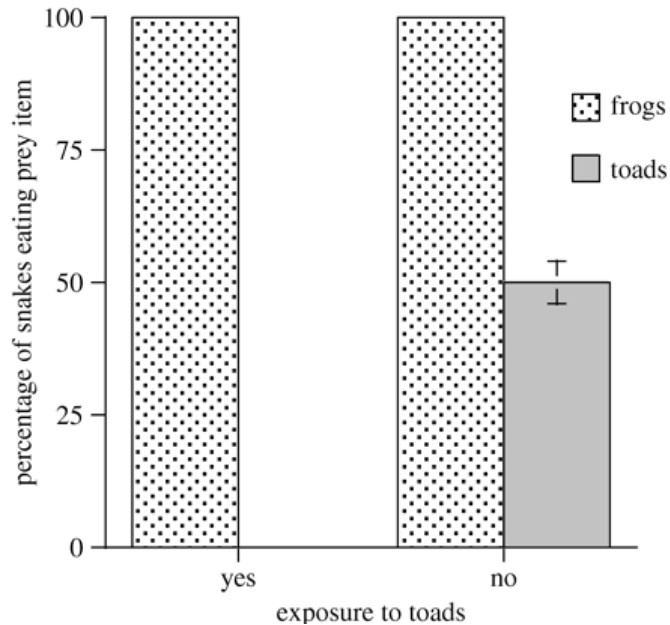


Sterilization of male sea lampreys is one method being used to try to reduce their populations. Sterile male lampreys still mate normally with females, causing the females to waste their eggs. The graph below shows how the chance of an egg hatching (Y-axis) changes depending on how many sterile males (X-axis) were seen at the nest site.



1. Based on this graph, what effect does sterilization have on egg hatching success?
 - a. **Sterilization causes a decrease in number of eggs hatching**
2. If half of the male lampreys in a population are sterilized, *about* what percent of the eggs in that population would hatch?
 - a. **Answers may vary. Between 20-35%.**
3. What are the chances that lamprey eggs will hatch when humans aren't sterilizing any males in the population?
 - a. **Approximately 40%**
4. What are the chances that eggs will hatch when all of the males are sterilized?
 - a. **0%**

The Australian black snake feeds on native frogs. After the introduction of the invasive cane toad, Australian black snake populations suffered, because the cane toad is lethally toxic. Some black snake populations have never been exposed to cane toads. Scientists compared feeding behavior between snakes from populations that had been exposed to cane toads, and snakes from populations that were never exposed to cane toads. Snakes from each group were offered meals of native frogs and cane toads. The data below show the percent of time that snakes from each group ate frogs vs. toads.



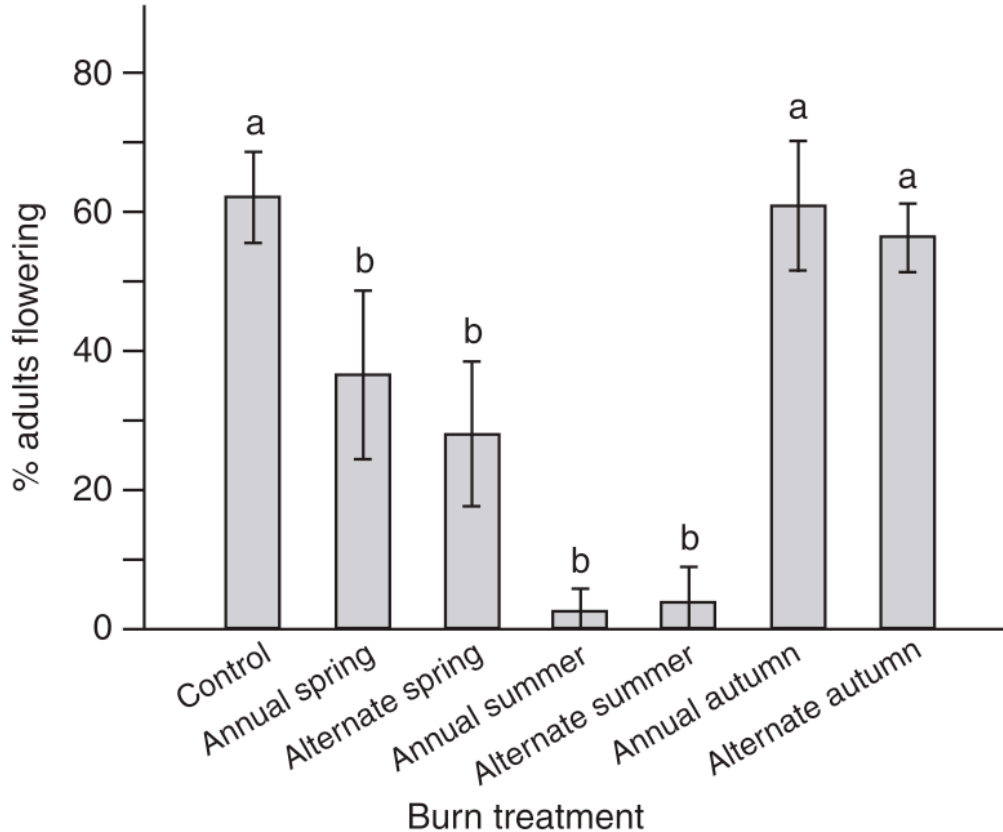
5. What effect does exposure to cane toads have on feeding preferences in Australian black snake populations?
 - a. **Exposure to cane toads causes Australian black snakes to develop an aversion and not eat cane toads.**

6. How many of the snakes that were from toad-exposed populations ate the cane toads?
 - a. **0%**

7. If a snake has never been exposed to cane toads, what are the chances that it would eat one, if offered?
 - a. **About 50%**

8. What process might have caused the toad-exposed snakes to avoid eating cane toads
 - a. **Answers may vary. Students may say it was a learned aversion. More advanced students may say the population evolved to include only toad-avoiding snakes (Remember that the cane toad is lethal).**

Burning is one method that has been used to control spotted knapweed, an invasive in Michigan's prairie ecosystem. The data below show the effects of burning every year (annual) and every 2 years (alternate) at different times of the year. Scientists measured the percentage of adults flowering as an indicator of how successful the knapweed was after a burning treatment.



9. Based on this graph, if you had to choose just one season to burn knapweed populations, which season would you choose?
 - a. **Summer. Burning during summer has the strongest effect on reducing flowering success.**

10. Do you think there is any difference between burning every year (annually) versus burning every 2 years (alternately)?
 - a. **Answers may vary. Within seasons, there is not a huge difference between annual vs. alternate burnings, and in some cases, alternate burnings seemed to have a stronger effect than annual burnings, so it would make the most sense to just burn every other year.**
 - b. **This may be a good opportunity to discuss statistical significance with more advanced students. Error bars show 95% confidence that the true value for % flowering falls within that range, so when error bars overlap, there is no significant difference between the two values.**