LIZARD EVOLUTION VIRTUAL LAB

Answer the following questions as you finish each module of the virtual lab or as a final assessment after completing the entire virtual lab.

Module 1: Ecomorphs

1. **At the beginning of the virtual lab, you were asked to sort eight lizards into categories. What criteria did you initially use to make your groups? Did you revise your criteria later? Why?**

First, I sorted the lizards by colour and then I compared leg length. I revise my criteria later because my initial observations of lines are incorrect. also, I revised according to habitat.

2. **An adaptation is a structure or function that is common in a population because it enhances the ability to survive and reproduce in a particular environment. Provide one example and an explanation of one adaptation in the *Anolis* lizards.**

An adaption in the lizards are their legs. The tree lizards have longer legs because they are used for jumping from tree to tree and the lizards that live in the lower levels have shorter legs for running.

3. **Provide one evolutionary explanation for why lizards living in the same part of the habitat (i.e., grass) would have similar characteristics.**

Lizards living in the same part of a habitat would have the same characteristics because it is what they need in order to survive. For example, in a grass habitat the lizards maybe green in order to blend with their surroundings.

4. **What is an ecomorph? Provide one example from the virtual lab.**

Ecomurphs habitat specialists. They have the same morphology and live in similar habitats. Yet they are subspecies.

5. **How is an ecomorph different from a species?**

An ecomorph is a group within species that is called subspecies

6. **Explain how a particular body feature of one of the lizard ecomorphs from the virtual lab is an adaptation to their particular niche.**

A particular body feature is the toepads on the annual larger toepads make tree climbing easier.

Module 2: Phylogeny

1. **In module 1, you identified which species of lizards were most similar to one another based on relative limb length and toe pad size. In this module, you determined which lizards are more similar to one another based on what type of information?**

   We determined the similarity based on ancestors rather than physical traits

2. Are the species of lizard that are more similar to one another according to body type also more closely related based on the results obtained in this module? Explain your answer.

No, They are not more closely related according to the results from this module

3. The figures below show two phylogenetic trees similar to the one you constructed in the virtual lab but with more lizards. The trees below show the evolutionary relationships among species from four ecomorphs from the four largest Caribbean islands.

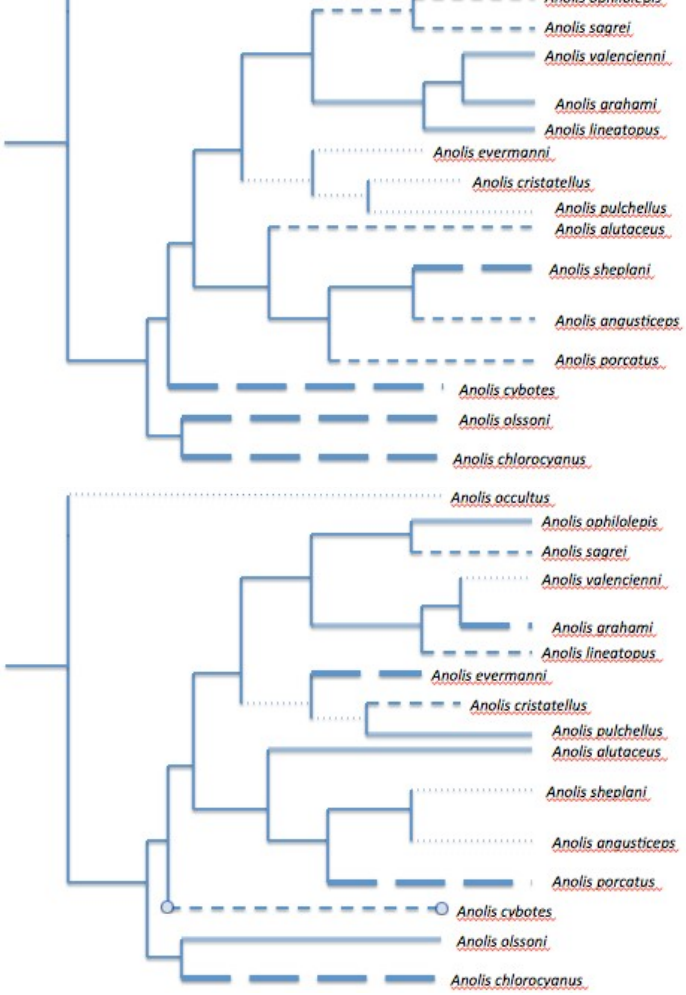

Figure 1. Phylogeny of anole lizards on four of the major Caribbean islands color-coded according to geographical distribution. Light dotted line, Puerto Rico; small dashed line, Cuba; large dashed line, Hispaniola; and solid line, Jamaica.

Figure 2. Phylogeny of anole lizards in the four major Caribbean islands colored in according to ecomorph. Light dotted line, twig; small dashed line, trunk-ground; large dashed line, trunk-crown; solid line, grassbus.

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What conclusion can you draw about the evolution of the *Anolis* lizards based on these figures?

The conclusion I can draw about the evolution of the Anolis lizards is based on ecological niches on an island rather than the entire island itself. Two anoles on different islands can have similar traits as long as their ecological niches are similar.

4. **What is convergent evolution? Use evidence from the trees to explain how the *Anolis* lizards are an example of this concept.**

Convergent evolution is where organisms that aren't closely related, independently evolve and have similar traits due to similar environments or ecological niches. The phylogenetic trees show this type of evolution because similar traits are based on environments, and not location/species type. For example, anolis cybotes and anolis sagrei both are trunk ground anoles, but live on different islands.

Module 3: Experimental Data

1. **In Dr. Losos's experiment, why was it important that the experimental islands lacked lizards?**

It was important that the islands lacked lizards so that the lizards placed on the experimental islands would adapt to the habitat without any competition from other lizards in this way

2. **Dr. Losos's data suggest that after only a few generations, the lizards on the experimental islands have shorter legs on average than the lizards on the larger island. Explain how the data you collected either supports or does not support this claim.**

The data I collected from this model supports the scheme because after comparing the similar sample means it is obvious that the lizards have shorter legs on the experimental island

3. Based on what you know about the experimental islands and the lizards that were placed on these islands, explain how and why the average leg length of the population might change over time. Include the concept of natural selection in your discussion.

The average leg length of the population will change over time because a species needs to adapt to its environment in order to survive. If a species cannot survive because its legs are too short, then the species with longer legs will survive and multiply

4. If the population from one of the experimental islands were reintroduced on the original island, do you predict that lizards from the two populations would still mate and reproduce? Justify your answer with scientific arguments.

I believe that they will not mate and reproduce due to the fact that now they are separate subspecies. Lizards from the experimental islands will have a

difficult time trying to survive on the original island due to their lack size which will for the more complicate reproduction

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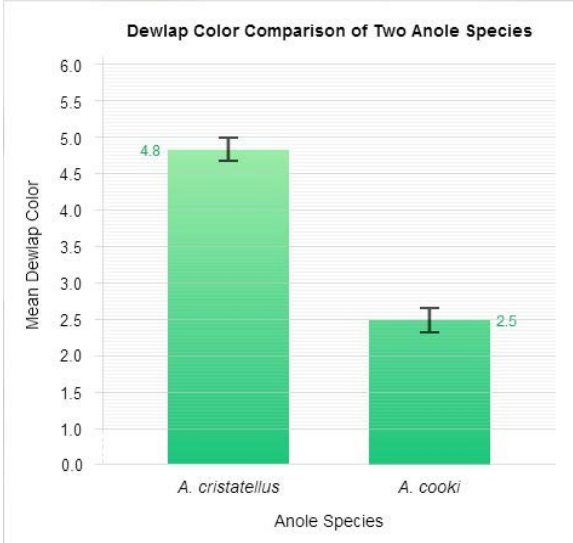
Module 4: Dewlap Colors

1. ***Anolis cristatellus* and *A. cooki* are both trunk-ground anoles that live on Puerto Rico. *A.***
   ***cristatellus* lives in a shady, forest environment, while *A. cooki* lives in an open, sunny environment. What is an adaptive explanation for why the dewlap of one species evolved to be brighter and that of another species darker**?

Anolis cristatellus and *A. cooki* are both trunk-ground anoles that live on Puerto Rico. *A.*
cristatellus lives in a shady, forest environment, while *A. cooki* lives in an open, sunny environment. What is an adaptive explanation for why the dewlap of one species evolved to be brighter and that of another species darker?

2. **From the bar graph generated in the virtual lab (see below), how do the dewlap colors of the two species compare?**



ANSWER: The A. cristatellus has a brighter dewlap by +2.3 and the A. cooki has a darker dewlap by -2.3.

3. **How would you determine whether the difference between the two populations is statistically significant?**

There is a difference because their bars in the graph have different lengths.

4. **If a species of anoles with dark dewlaps colonized a heavily forested island, predict what would happen over time to the color of the dewlap. Using your knowledge of natural selection and genetics, explain your prediction.**

The dewlaps would eventually begin to become lighter shades due to natural selection in finding a mate

Extension Questions

1. **To minimize interspecific competition, organisms often divide the limited available resources in an area, a concept called "resource partitioning." As an example of this concept, the figure below illustrates how different species of warblers utilize different portions of an individual tree.**

The anoles display resource partitioning because each species is separated into several different niches based on their body characteristics. For example, the longer legged anoles were on the ground because their long legs make it easier for the anoles to navigate the ground and large trunks.

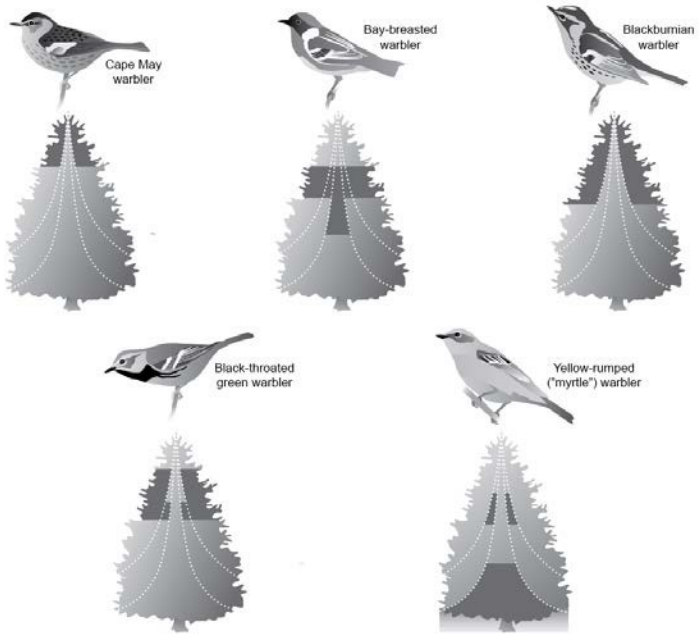


Figure 3. Different species of North American warblers live in different parts of the same trees. The shaded areas indicate the habitats each warbler species occupies.

Explain how the different species of anoles on an island demonstrate "resource partitioning" similar to the warblers in the figure.

The anoles spereate and inhabit separate areas of their environment similar to the way the warblers divided up sections of the tree based on where the organisms will survive best.

2. Explain how resource partitioning can promote long-term coexistence of competing species, thus increasing biodiversity.

Resource partitioning makes it easier for species to coexist because there is little to no competition between the species when they are divided so all organisms have their own separate resources that don't need to be shared.

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