Biology from Hawaii Name

2014

**Classification**

**Introduction**

*Hyposmocoma* caterpillars are amazing animals. There are over 400 species, and each one is unique to a single environment. There is a lichen grazer from Waianae volcano, a wood eater from Waianae volcano, a different lichen grazer from Haleakala volcano, a bark crawler from Haleakala volcano, a snail hunter from Haleakala volcano... And these species have evocative, descriptive names: *Hyposmocoma saccophora* (carries a bag), *H. lignivora* (eats wood), *H. waikamoi* (from Waikamoi forest), *H. papaiili* (crab-bark), *H. pupumoehewa* (snail nightmare).

Every species of *Hyposmocoma* caterpillar is **endemic**to the Hawaiian Islands, meaning they are found here and nowhere else on Earth. 15 million years ago, a few adult moths arrived in Hawaii. They started to reproduce; the population grew then expanded into new habitat and onto new islands. With each new expansion, a fragment of the population could get separated and **evolve into a new species**. Then some of the new species expanded into new habitat or onto new islands and evolved into even newer species. This must have happened a lot because by now, there are more than 400 different species! And because every *Hyposmocoma* caterpillar/moth evolved in Hawaii, they are endemic to these islands.

Uncover the mystery of *Hyposmocoma* evolution. What unique powers did each species evolve? Which ancient species are the ancestors of each modern one?

**Procedure**

1. Read the description of 3 *Hyposmocoma* species (on back).

2. Decide, as a group, which 2 species are close relatives to each other.

3. Draw a family tree.

4. List the ways 2 relatives are similar and the other is different.

5. Rank the list by importance (which similarity/difference is most important, etc.)

6. Your teacher will provide more species to add to your family tree.

|  |  |  |
| --- | --- | --- |
| **Grading** | points worth | points earned |
| **Participation**contribute to lab group debate over related species  | **3** |  |
| **Results**clearly ranked list of at least 4 characteristicsfamily tree clearly shows close vs. distantly related speciesnew, additional species added to the family tree | **4** |  |
| **Discussion**thoughtful answers use vocabulary from class/reading | **3** |  |
| **Total** | **10** |  |

**Hyposmocoma saccophora**

*(sacco =* bag*, phora* = to carry)

case type: cone

habitat: lives on exposed rocks, Wai‘anae volcano, O‘ahu island

diet: lichen and fungi

length: 10mm

case description: embedded with sand and pebbles, dark and rough on top, sliver and smooth underneath, has a hinged door

notes: pebbles along the top of the case resemble *Stegosaurus* plates

**Hyposmocoma aumakuawai**

*(aumakua =* ancestor spirit*, wai* = water)

case type: burrito

habitat: lives in and near streams of east Kauai island

diet: algae

length: 7mm

case description: dark brown/gray, embedded with sand and pebbles, has a hinged door

notes: amphibious caterpillar that can breathe both water and air

**Hyposmocoma papaiili**

*(papa‘i =* crab*, ili* = bark)

case type: crab

habitat: lives on tree bark, Haleakala volcano, Maui island

diet: lichen

length: 10mm

case description: brown color with lines that resemble wood grain, entrance at both ends

notes: very well camouflaged

**Results** draw your family tree here

**Results (continued)**

Closely related species (list them here) Distantly related species

Ranked list of similarities Differences

**Discussion**

1. What does it mean to be **closely related** versus **distantly related**? You may use the analogy of a family tree.

2. What knowledge do humans gain by knowing their own ancestry (knowing about your grandparents and great-grandparents, etc.)?

3. What knowledge do humans gain by knowing the ancestry of *Hyposmocoma* caterpillars?