Adaptive Radiation of the Common Pipistrelle Bat

**My organism is \_\_Common Pipistrelle Bat\_\_\_ it lives \_\_\_\_\_United Kingdom \_.**

**Habitat/Niche 1 \_\_\_\_\_Mexico\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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|  | **Source for my Organism** |
| **Food/Nutrients** | **nectar of flowers** |
| **Water** | **Lakes and ponds** |
| **Shelter** | **Caves and hollows of trees** |
| **Space** | **Desert, caves and trees** |
| **Climate** | **Hot and dry** |

**Habitat/Niche 2 \_\_\_\_\_\_\_\_California\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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|  | **Source for my Organism** |
| **Food/Nutrients** | **-fish and insects** |
| **Water** | **Ponds, streams, estuaries, lagoons** |
| **Shelter** | **-caves, deep sea caves, buildings, under bridges,** |
| **Space** | **Ponds, streams, estuaries, costal lagoons, caves, buildings, bridges** |
| **Climate** | **Warm dry summers and mild wet winters** |

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|  | **Source for my Organism** |
| **Food/Nutrients** | **Insects (mostly small flies and aquatic midges and mosquitoes)- caught and eaten in mid-air, up to 3000 insects per night** |
| **Water** | **Pond, lake** |
| **Shelter** | **Caves, trees, mines, tunnels** |
| **Space** | **Trees, caves, bridges, barns, houses, woodland, farmland** |
| **Climate** | **Temperate ranges- rarely extreme** |

**Animal Traits**

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| **Head (eyes, neck, nose, beak, ears?)** | **Small faces** | **Short and triangular ears with rounded tip** | **Ears and muzzles darker than fur** |
| **Hands/Feet (claws, size, function?)** | **Special tendons in legs and feet to grip footholds even when asleep** | **Forelimbs form webbed wings** | **Wing membranes are opaque**  **-narrow wings** |
| **Chest (lungs, back, ribs?)** | **Short tail** |  |  |
| **Skin (smooth, rough, fur, colour?)** | **Fur- pale brown to almost black, but usually red-brown fur** |  |  |
| **Behaviours** | **Hibernate in winter to save energy when food sources are low** | **Fast and jerky in flight as they dodge and pursue small insects** | **Nocturnal- active at twilight**  **Use echolocation** |

**Note how each variation of the trait is beneficial in the environment.**

**Discussion Questions:**

1. Explain the process that led to the adaptive radiation of your organism (choose something realistic).

The bats were brought both to Mexico and California to aid in removing insects from residential gardens; however, when food sources became limited, they had to adapt to the **food sources** available in each location. Each colony adapted in **isolation** of one another preventing interbreeding from occurring as adaptations took place.

1. Explain how natural selection occurred differently in each environment (explain at least one trait for each environment).

In the hot and dry climate of Mexico not enough insects were available for food once the bats began reproducing. Some bats began trying to drink nectar from plants for energy. Some had **short muzzles and short tongues** while others had slightly **longer muzzles and longer tongues**. Those with longer muzzles were able **to eat more nectar** providing them with more energy for survival and reproduction. The trait for a longer muzzle was **genetic**; therefore, this trait was passed on and **became more common as more individuals with the trait would survive and pass on the trait.**

As the trait for a longer tongue became more prominent, some bats found that it was more efficient to get water by licking it off of their fur after skimming the water. This trait was taught to offspring and has now become present even in bats that are separated from their parents indicating that this trait is hereditary.

The bats in California were able to get a good share of insects during the warm season, however, when temperatures dropped, food sources declined. Some bats tried to eat other foods as they were skimming the water, as they usually do for insects. Some bats had **slightly larger legs and feet along with longer and thinner claws**. These traits aided them at hunting for fish near the surface. Bats with these traits were **more successful at catching fish** leading to them becoming stronger, larger and more successful in both survival and reproduction than their relatives. These traits were **genetic**. As a result, these **traits became more common** in the bat population of California.

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| **Trait** | **Variation for Environment 1**  **-Mexico** | **Variation for Environment 2 -rocky coast in Gulf Islands of California** |
| **Head** | * **Long muzzles, long extensible tongues covered in fine bristles that aid them in feeding on particular flowers and plants \*** | **Small face** |
| **Feet** |  | **-enlarged, feet and legs - long thin claws to reduce drag on water\*** |
| **Wings** | **-long and narrow** | **-long and large wings for controlled slow flight over open water\*** |
| **Behvaviour** | **To get water- gently skim the water’s surface, then land nearby to lick water from chest fur\*** | **-bring meal to feeding roost and consume fish caught\*** |
| **Fur** | **Reddish to dark brown** | **Mostly dark brown on top with lighter fur on stomach\*** |
| **Tail** | **-little to no tail** |  |