Peer-graded Assignment: Imaginary Species on an Imaginary Island

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Imaginary Species Derived from Black Tern (Chlidonias niger)

Submitted on April 9, 2024

PROMPT

Tell us about the species itself.

- What type of organism is it (eg. animal, plant, fungi, bacteria)?
- Give further specification of the type of species. (eg. If it is an animal, is it an insect? A reptile? A mammal? If it's a plant, is it a tree? A grass? etc.) Be creative!

Species of seabirds such as the Black Tern (Chlidonias niger), which originally migrated across the Pacific, have become established and adapted to mangrove forests.
Derived from :

Eukaryota, Animalia, Chordata, Vertebrata, Gnathostomata, Osteichthyes, Sarcopterygii, Tetrapoda, Amniota, Diapsida, Archosauromorpha, Archosauria, Ornithodira, Dinosauria, Saurischia, Theropoda, Neotheropoda, Tetanurae, Avetheropoda, Coelurosauria, Maniraptora, Paraves, Avialae, Pygostylia, Ornithoraces, Ornithuromorpha, Ornithurae, Aves, Neognathae, Charadriiformes, Laridae, **Black Tern (*Chlidonias niger*)**

Picture Credit: Arthur Morris © 2024 Getty Images.

PROMPT

Describe how this imaginary species came to be on this island:

- Where did the population come from? Did it speciate on the island? Did the population come from somewhere else?
- Whatever your previous answer, describe how this occurred. If the organism speciated on the island, what factor caused the speciation event? If the population came from somewhere else, how did it ger there? Did it fly to the island? Float? Swim?
- Describe a trait of the species that contributed to its origin/arrival on the island.

- **Where did the population come from? / How did it ger there?** :

  Black Terns migrate across the Pacific Ocean, with breeding sites in Europe to western Asia and central North America, and wintering sites on the western African coast, coassts of central America and northern South America. Eventually, a population emerged that settled on this imaginary island, which is warm throughout the year without migrating to overwinter.
- **Factor caused the speciation event**

  Black Terns populations that established on the island migrated and ceased to interbreed with breeding populations in Europe to western Asia and central North America, resulting in allopatric speciation.
- **Trait of the species that contributed to its origin**

  Before speciation, the original Black Terns Habitat was adapted to mangrove forests because it fed on insects, small frogs and fish in inland waters with rich plant growth.

PROMPT

Now we are going to dig deeper into the organism's traits. Tell us about **three** evolutionary traits of the species other than the one you just described and why they evolved or are suited to this island.

- **Gigantization (island rule)**

  Black Terns were originally small (23 cm/65 g), but the species that speciated on the island actually became huge, as occurs in island rule, because predation pressure was reduced by fewer predators and there were no competing species.
- **Elonged beak and neck**

  Beak and neck elongated because of its advantage in feeding on crustaceans and fish that live in the water of mangrove forests.
- **Wing shrinkage**

  Wing shrinkage due to reduced predation pressure and cessation of migration.

(a)

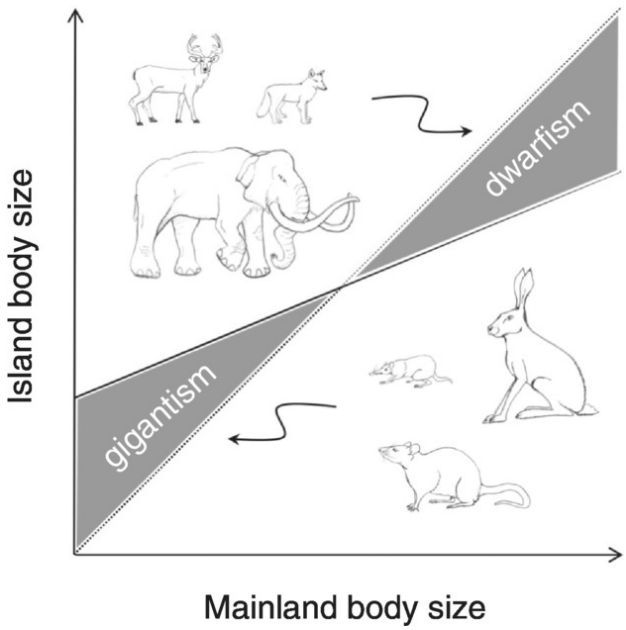

Figure of island rule from

Burns, K. C. (2019). Introduction: Emblematic Island Animals. In *Evolution in Isolation: The Search for an Island Syndrome in Plants* (pp. 1–42). chapter, Cambridge: Cambridge University Press.

PROMPT

Now tell us about the population of this organism.

- How many individuals are there? Is it a large or small population?
- What is the generation time of the organism?
- How genetically diverse is the population?

- **Number of individuals** : more than 1000 (this fulfils Minimum Viable Population)
- **Generation time** : 1 year
- **Genetically diverse :**

  It is diverse to some extent, as there was a period of continuous influx of migratory individuals for some time after settling on the island.

PROMPT

Now we are going to present some scenarios about potential changes in the island environment. For each, describe how the population of your organism would change based on your previous answers, and describe why that change would occur based on your knowledge of evolution. Be sure to think about any changes in selection, population size, genetic diversity, trait identity, etc. that would occur.

- Monsoons occur annually on the island, but one year, there is an extremely large monsoon that causes a significant amount of flooding throughout the island.
    a. How might your species respond to this?
    b. Why?
- Another year, there is a drought. Plant mortality increases under the dry conditions, and trees produce less flowers and fruits.
    a. How might your species respond to this?
    b. Why?

- A group of humans arrive on the island for the first time and begin exploiting the island for resources.
    a. How might your species respond to this?
    b. Why?

- **Extremely Large Monsoons**

  Individuals with longer beaks, necks and legs have a survival advantage due to the greater depth at which they feed on crustaceans and fish. There may also be fewer individuals along with suitable spawning sites.
- **Drought**

  This species is declining along with the crustaceans and fish of the mangrove forests on which it feeds. Smaller individuals with smaller body sizes that can survive on less energy may be favoured and larger individuals may be eliminated. Individuals that feed on flying insects may also emerge, and such individuals may evolve to resemble ancestral black terns, as the ability to fly is more advantageous.
- **Exploiting**

  Population size may rapidly decline due to human development, which may reduce feeding and spawning areas and habitat fragmentation. Populations may fall below the Minimum Viable Population and the species may become extinct due to loss of the Allee effect, inbreeding depression and environmental changes such as the extremely large monsoons and drought mentioned above.

Start new attempt

Comments

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