Assignment No.2 BT-101 Ecology, Biodiversity & Evolution I



By

Yasin Abbas Chaudhary



Solution:

Question Number.1

Conditions for Natural Selection:

There are three major conditions that must be exist to operate natural selection.

1.Existence of variations among individuals of a population:

Its the major factor for the natural selection to operate because natural selection can not operate if variation does not exist. Natural selection works by selecting one trait over other that are found in individuals of a population.

2. Variation must result in difference in number of off springs produced by individuals:

Due to the existence of different phenotypes or behavior some members are more successful to produce many off springs as compared to other. So the variation of traits operate to produce different number of offsprings in next generation.

3.Inheritance of variation:

One of the major requirement for natural selection is that variations must be transferred to next generations. Variations does not depend only genetic changes but it can also be happened by environments. So the phenotypic variations must have genetic basis so that inherited to off springs.

Question Number.2

Estimation of Fitness in context of Darwin's Theory:

Darwin's theory of natural selection states that the organism that are best adapted to their environment can only survive other will disappear. In other words survival of the fittest that it is to survive by adapting to the environmental conditions.

In this regard fitness is measured by reproductive success. Fitness of an organisms describes how many off springs are produced in next generation.

Components of Fitness

- Survival
- Mating success
- Number of offspring per mating
- Predicting fitness from a single component can be tricky.
- As traits favored for one component of fitness may be at a disadvantage for others

Example:

There two phenotypes of toads green and brown . Average of Green toad to produce offsprings is 4 and browns average is 2.5 offsprings so we can say the green toad is most fit as it produce more offsprings.

Question Number.3

Convergent evolution VS Divergent evolution:

Definition

Convergent Evolution: Convergent evolution is a process by which distantly related species develop similar structures as adaptations to the environment.

Divergent Evolution: Divergent evolution is a process by which an interbreeding species diverges into two or more descendant species.

Environment

Convergent Evolution: Both species live within the same environment.

Divergent Evolution: The two species live in different environments than their ancestor.

Significance

Convergent Evolution: Unrelated organisms evolve similarities while adapting to a common environment.

Divergent Evolution: The divergence of two different species results in two species becoming less like the common ancestor.

Developing Structures

Convergent Evolution: Convergent evolution occurs through developing analogous structures.

Divergent Evolution: Divergent evolution occurs through developing homologous structures.

Examples

Convergent Evolution: Ostriches, rheas, and emus are examples of convergent evolution.

Divergent Evolution: Dinosaurs, Darwin’s finches, and forelimb structures of vertebrates are examples of divergent evolution.

Question Number.4

Relationship between invasive species and endangered species:

An invasive species is an organism that causes ecological or economic harm in a new environment where it is not native. A species of animal or plant that is seriously at risk of extinction is called endangered species.

Invasive species are capable of causing extinctions of native endangered plants and animals species reducing biodiversity, competing with native organisms for limited resources, and altering habitats. This can result in huge economic impacts and fundamental disruptions of coastal and Great Lakes ecosystems.

So we can say that invasive species put huge impact on endangered species by eliminating them from there natural habitats, invasive species are strongly capable of out competing the native endangered plants ,animals etc species.

Regards:

VU Expert Zoologists