

What is Adaptive Radiation?

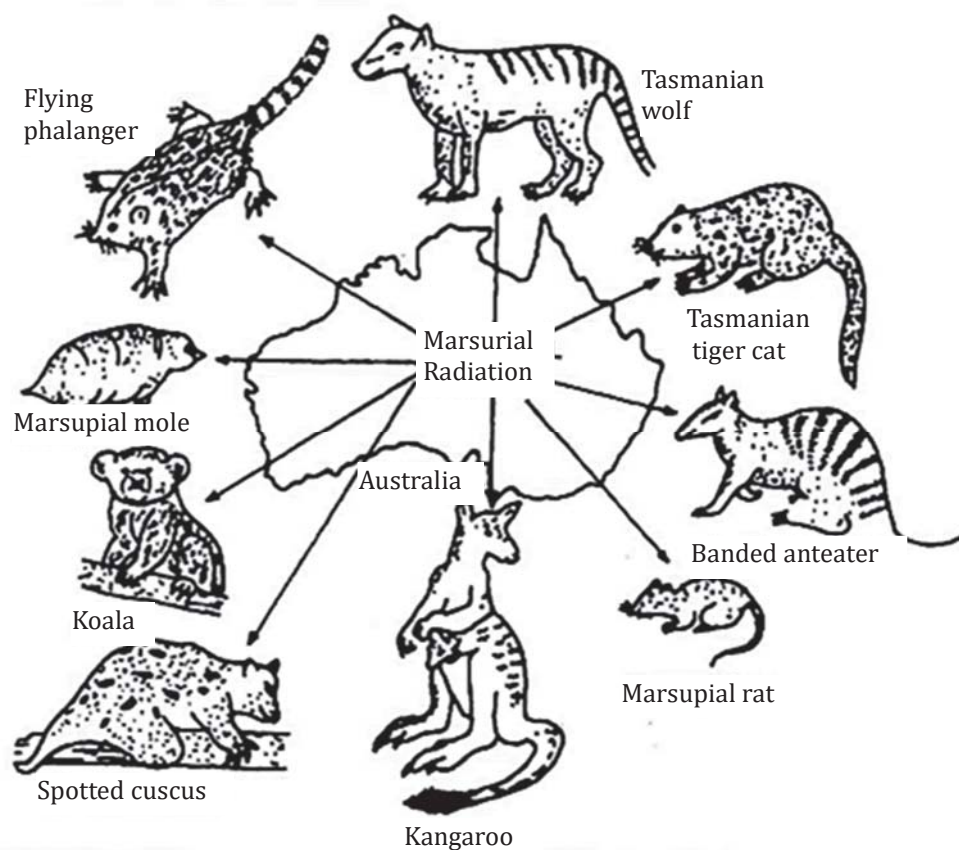
The phenomenon in which various species within a specific geographic region originate from a common ancestor and then spread outwards to inhabit different areas or habitats is termed adaptive radiation.

Alternatively, adaptive radiation occurs when a single ancestral species undergoes divergence into multiple species or forms, each adapted to occupy distinct habitats, owing to competition for food and living space.

Adaptive radiation is illustrated by the following examples:

1. Australian Marsupials

The diverse array of Australian marsupials further exemplifies the concept of adaptive radiation. As illustrated in the diagram, numerous marsupial species, such as the Koala, Kangaroo, and Wombat, have evolved from a common ancestor, all within the confines of the same island, Australia. Each of these marsupial varieties exhibits distinct morphological characteristics and other features, which have arisen as adaptations to different environmental conditions.

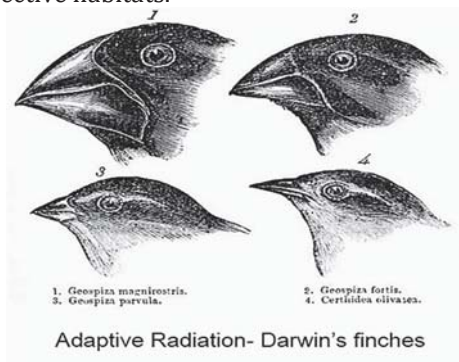


2. Darwin's Finches

During his exploration of the Galapagos Islands, a chain of islands situated off the western coast of South America, Darwin extensively studied the diverse flora and fauna. Among the remarkable array of creatures he encountered, he observed numerous variations of small black birds, distinguished primarily by differences in their beak shapes and feeding behaviors. These diverse variants of small black birds eventually became known as Darwin's Finches.

Upon closer examination, Darwin deduced that all these variations had evolved within the confines of the same island group and did not originate from separate regions. He postulated that these variations had descended from a common ancestor, a seed-eating bird native to South America. Some members of this ancestral population migrated to the Galapagos Islands, where, in response to the diverse environmental conditions, they gradually developed distinct beak shapes and feeding habits. While




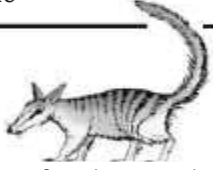






some adapted to an insect-based diet, others specialized in consuming fruits, cacti, and other food sources available in their respective habitats.



3. Placental Mammals

Adaptive radiation is not exclusive to marsupial mammals; placental mammals have also undergone this phenomenon, resulting in the emergence of various species.

Convergent Evolution: Interestingly, many placental mammals exhibit striking resemblances to marsupial mammals, not only in their physical structures but also in their lifestyles. These similarities between two distinct groups of mammals—marsupials and placentals—arise from their shared ecological niches. Consequently, these two groups of organisms have converged towards similarity, indicating the occurrence of convergent evolution. Alternatively, it can be stated that convergent evolution has led to the emergence of analogous members in both groups, such as the Placental wolf and the Tasmanian wolf (marsupial).

Placental mammals	Australian marsupials
 mole	 Marsupial mole
 Anteater	 Numbat (anteater)
 Mouse	 Marsupial mouse
 Lemur	 Spotted cuscus
 Flying squirrel	 Flying Phalanger

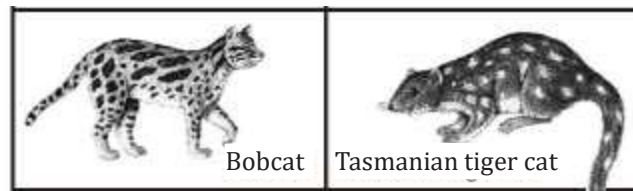


Fig.: Picture showing convergent evolution of Australian marsupials and Placental mammals