

Systematics Comparisons: Bears, Giant Panda, Raccoon, and Red Panda

Hypothesis A: The American Brown Bear is the closest relative of the modern-day Polar Bear.

Hypothesis B: The Panda should not be considered part of the bear group.

C)

Hypothesis A: The American Brown Bear is the closest relative of the modern-day Polar Bear.

Conclusion: Supported

As shown on the Clustal Distance Matrix (Fig.1), the degree of difference is smallest between the American Brown Bear and the Polar Bear. The Phylogenetic Tree (Fig.2) shows that the Polar Bear and the American Brown Bear are sister taxa. Both of these diagrams provide support for the hypothesis. The closest relative of the modern-day Polar Bear is the American Brown Bear.

D)

The American Black Bear and the American Brown Bear are distantly related. The Clustal Distance Matrix (Fig.1) shows that both bears have more in common with the Malaysian Sun Bear than they do with each other. The Phylogenetic Tree (Fig.2) shows that the closest common ancestor between the American Brown Bear and the American Black Bear is likely the common ancestor of the entire bear group.

E)

Hypothesis B: The Panda should not be considered part of the bear group.

Conclusion: Not supported

The Clustal Distance Matrix (Fig.1) shows that the degree of difference between the Giant Panda is higher when compared to the Raccoon and the Red Panda, versus when compared to all the bears in the matrix. The Phylogenetic Tree (Fig.2) also shows that the common ancestor of the Raccoon and the Red Panda may have descended from a common ancestor shared with the Giant Panda. However, the Giant Panda is more closely related to the Spectacled Bear. The hypothesis is not supported by the data. The panda should be considered part of the bear group.

F)

As seen in The Phylogenetic Tree (Fig.2), there have been three separate migrations to the Americas from Asia. In node A, one group produced the Asiatic Black Bear. A second group migrated to the Americas and became the common ancestor of the Polar Bear and the American Brown Bear. In node B, a common ancestor split into two groups. The group that stayed in Asia became the Malaysian Sun Bear and the group that migrated to the Americas became the American Black Bear. In node C, the Spectacled Bear descended from the group that migrated to the Americas, while the group that produced the ancestor of the Giant Panda remained in Asia.