

1. Nov/2021/Paper_41/No.8

California salamanders are terrestrial amphibians.

An original population of California salamanders occupied an area of forest in northern California. Approximately 10 million years ago, two separate populations, **A** and **B**, started to migrate from the original population.

- Population **A** travelled along the coast of California, to the west of the Great Central Valley.
- Population **B** travelled east of the Great Central Valley.

The two populations now live close to each other in southern California.

Fig. 8.1 outlines the migratory routes of populations **A** and **B**.

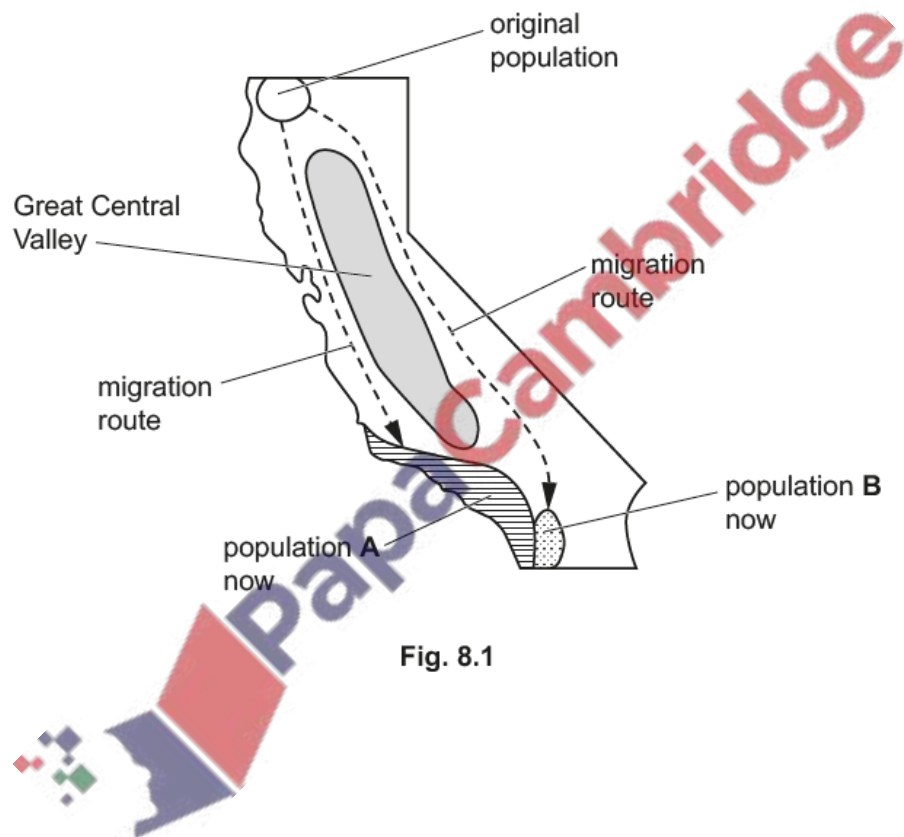


Fig. 8.1

Salamanders from population **A** rarely interbreed with salamanders of population **B**. If they do interbreed, the offspring are infertile.

Suggest **and** explain the sequence of events that have resulted in these two populations becoming reproductively isolated from each other.

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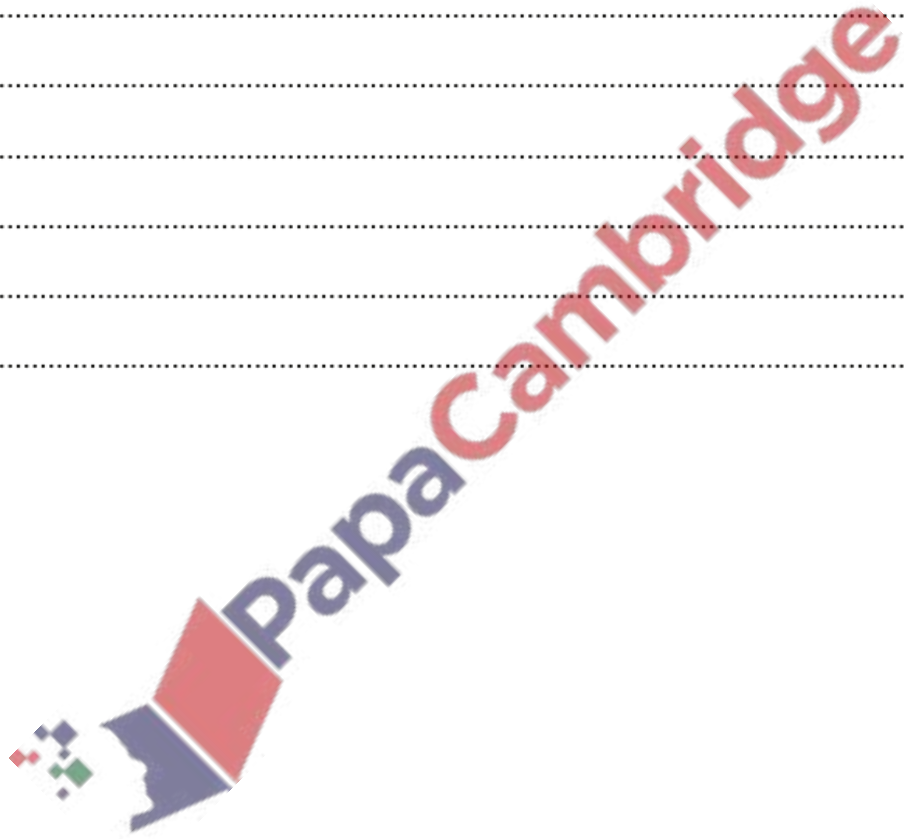
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2. Nov/2021/Paper_42/No.8

Twenty million years ago, an ocean covered the area where the country of Panama is now located. There was a gap between the continents of North America and South America through which the waters of the Atlantic and Pacific Oceans flowed freely.

The porkfish, *Anisotremus sp*, lived in this area between North America and South America.

Fig. 8.1 shows a porkfish.

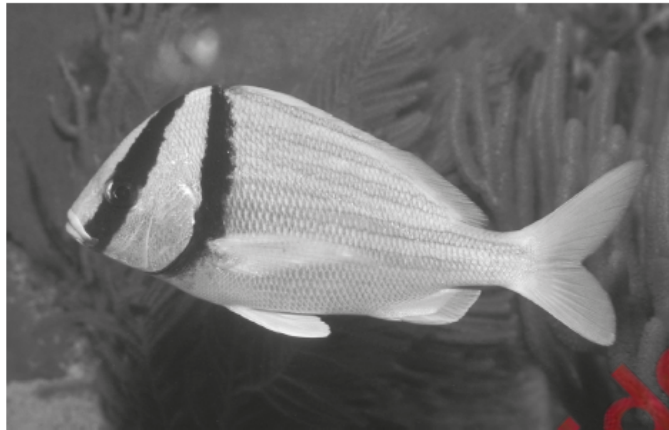


Fig. 8.1

About 3 million years ago, volcanic activity and sedimentation formed a narrow strip of land, Panama, joining North America and South America.

Fig. 8.2 shows the area 20 million years ago and now.

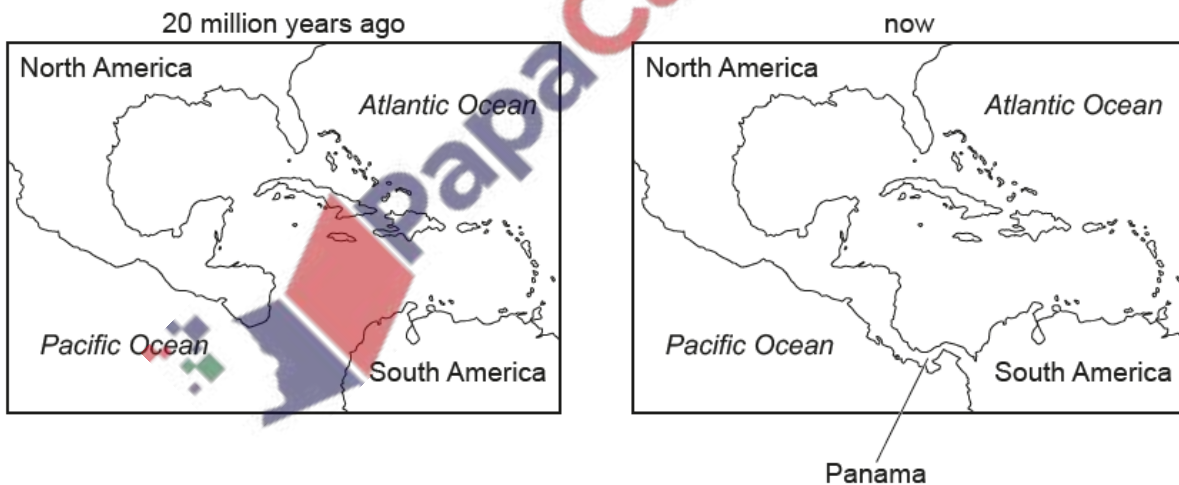


Fig. 8.2

Twenty million years ago, porkfish in the Atlantic and Pacific Oceans were able to breed successfully and produce fertile offspring.

Explain why Atlantic porkfish and Pacific porkfish are now **not** able to breed successfully to produce fertile offspring.

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