

## **Oki Salamander: Q & A**

### **Q: What is an Oki salamander?**

The Oki salamander (*Hynobius okiensis*) is an endemic species, meaning that it can only be found on the Oki Islands. Along with frogs, newts, caecilians, and sirens, salamanders make up the class of animals called “amphibians,” which spend part of their lives in water and part on land. Young Oki salamanders live in fast-flowing island streams, and adults can be found in the forests and at the summits of the surrounding mountains.

Oki salamanders are distinguished from their closest relatives by an unusual combination of physical traits. Generally speaking, Asiatic salamanders have evolved as either pond-dwelling (lentic) species or river-dwelling (lotic) species. Normally, lotic species exhibit one particular set of characteristics, and lentic species exhibit a different set of characteristics. The Oki salamander, however, has features of both: Oki salamander babies, or nymphs, live in swift mountain streams and have stout bodies, which is typical of lotic species. As they reach maturity, their bodies slim down, they develop proportionately wider tails, and their larval claws fail to develop—traits associated with lentic salamanders.

The Oki salamander is currently listed as critically endangered by the International Union for Conservation of Nature (IUCN), and listed as vulnerable by the Japanese Ministry of the Environment. As it lives only on the Oki Islands, an area of less than 80 square kilometers, it is particularly vulnerable to habitat loss. In 2010, the Oki salamander was designated a Natural National Monument by the town of Okinoshima.

### **Q: How does it change as it grows?**

Young Oki salamanders differ from the adults in size, shape, pattern, and habitat. Newly hatched salamanders appear in May near the headwaters of Dōgo’s streams. They have disproportionately large heads and torsos, making them look less like salamanders and more like fish when seen from above. This is the source of their nickname, “goby with legs” (*ashigozu*). Oki salamander larvae feed on aquatic insects and tiny, shrimplike crustaceans.

After spending four to five years in the river, young salamanders leave the water in late August or September. After leaving the water, the salamanders will live the rest of their lives in the forest, and their bodies adapt accordingly. The feather-like gills on the sides of their heads disappear, and they begin using their lungs. The fins on their

tails also vanish, and their arms and legs grow larger and stronger. Soon after young salamanders emerge on land, their skin temporarily darkens, almost becoming black, but once they reach full maturity, it lightens again to become reddish-brown with scattered yellow spots.

Oki salamander adults typically measure 12 to 13 centimeters in the wild, and some reach lengths of almost 15 centimeters. They feed on insects, spiders, and worms.

**Q: How did Oki salamanders evolve?**

Oki salamanders are believed to have descended from Iwami salamanders (*Hynobius iwami*), which migrated from the western coast of Shimane during a glacial period approximately six million years ago. At that time, sea levels were much lower, and the Oki islands were connected to the mainland by a land bridge. Eventually, the climate warmed, sea levels rose, and Oki salamanders were cut off from the mainland. It is believed that the species diverged approximately 1.3 million years ago.

This evolutionary process may account for the Oki salamander's mix of river-dwelling and pond-dwelling features. Some researchers believe their ancestors were likely lotic river dwellers, but as the sea levels fell, they evolved into multiple lentic species that inhabit mainland ponds and marshes. When the sea levels rose again, these species became isolated on the islands and began to inhabit mountain streams. Some researchers interpret this to mean that Oki salamanders have partially returned to an earlier evolutionary stage.

There are 52 species in the *Hynobius* genus, the group known as Asiatic salamanders. However, this genus does not include Japan's best-known amphibian, the Japanese giant salamander. Salamanders in the *Hynobius* genus are part of the suborder Salamandroidea, or "advanced salamanders." The Japanese giant salamander, however, is in the suborder Cryptobranchoidea, or "primitive salamanders." Advanced salamanders typically spend their adult phase on land, but primitive salamanders remain aquatic throughout their lives.