= Long @-@ toed salamander =

The long @-@ toed salamander (Ambystoma macrodactylum , Baird 1849) is a mole salamander in the family Ambystomatidae . This species , typically 4 @.@ 1 ? 8 @.@ 9 cm (1 @.@ 6 ? 3 @.@ 5 in) long when mature , is characterized by its mottled black , brown , and yellow pigmentation , and its long outer fourth toe on the hind limbs . Analysis of fossil records , genetics , and biogeography suggest A. macrodactylum and A. laterale are descended from a common ancestor that gained access to the western Cordillera with the loss of the mid @-@ continental seaway toward the Paleocene .

The distribution of the long @-@ toed salamander is primarily in the Pacific Northwest , with an altitudinal range of up to 2 @,@ 800 m (9 @,@ 200 ft) . It lives in a variety of habitats , including temperate rainforests , coniferous forests , montane riparian zones , sagebrush plains , red fir forests , semiarid sagebrush , cheatgrass plains , and alpine meadows along the rocky shores of mountain lakes . It lives in slow @-@ moving streams , ponds , and lakes during its aquatic breeding phase . The long @-@ toed salamander hibernates during the cold winter months , surviving on energy reserves stored in the skin and tail .

The five subspecies have different genetic and ecological histories , phenotypically expressed in a range of color and skin patterns . Although the long @-@ toed salamander is classified as a species of Least Concern by the IUCN , many forms of land development threaten and negatively affect the salamander 's habitat .

= = Taxonomy = =

A. macrodactylum is a member of the Ambystomatidae , also known as the mole salamanders . The Ambystomatidae originated approximately 81 million years ago (late Cretaceous) from its sister taxon Dicamptodontidae . The Ambystomatidae are also members of suborder Salamandroidea , which includes all the salamanders capable of internal fertilization . The sister species to A. macrodactylum is A. laterale , distributed in eastern North America . However , the species @-@ level phylogeny for Ambystomatidae is tentative and in need of further testing .

= = Description = =

The body of the long @-@ toed salamander is dusky black with a dorsal stripe of tan , yellow , or olive @-@ green . This stripe can also be broken up into a series of spots . The sides of the body can have fine white or pale blue flecks . The belly is dark @-@ brown or sooty in color with white flecks . Root tubercles are present , but they are not quite as developed as other species , such as the tiger salamander .

The eggs of this species look similar to those of the related northwestern salamander (A. gracile) and tiger salamander (A. tigrinum) . Like many amphibians , the eggs of the long @-@ toed salamander are surrounded by a gelatinous capsule . This capsule is transparent , making the embryo visible during development . Unlike A. gracile eggs , there are no visible signs of green algae , which makes egg jellies green in color . When in its egg , the long @-@ toed salamander embryo is darker on top and whiter below compared to a tiger salamander embryo that is light brown to grey above and cream @-@ colored on the bottom . The eggs are about 2 mm (0 @.@ 08 in) or greater in diameter with a wide outer jelly layer . Prior to hatching ? both in the egg and as newborn larvae ? they have balancers , which are thin skin protrusions sticking out the sides and supporting the head . The balancers eventually fall off and their external gills grow larger . Once the balancers are lost the larvae are distinguished by the sharply pointed flaring of the gills . As the larvae mature and metamorphose , their limbs with digits become visible and the gills are resorbed .

The skin of a larva is mottled with black , brown , and yellow pigmentation . Skin color changes as the larvae develop and pigment cells migrate and concentrate in different regions of the body . The pigment cells , called chromatophores , are derived from the neural crest . The three types of pigment chromatophores in salamanders include yellow xanthophores , black melanophores , and

silvery iridiophores (or guanophores) . As the larvae mature , the melanophores concentrate along the body and provide the darker background . The yellow xanthophores arrange along the spine and on top of the limbs . The rest of the body is flecked with reflective iridiophores along the sides and underneath .