Recovery and Conservation project of Alishan salamander

Though the adult hynobiids are mainly terrestrial, they prefer habitats with high humidity and dense vegetation in the forest. In breeding season, they need clean stream waters for reproduction. In recent years, we choose suitable environment of running water. By restoration of vegetation and packing of rocks, we try to create a habitat suitable for Alishan salamanders. And the appearing of newly-landed juveniles imply our preliminary success. The result also encourage us in conserving Alishan salamanders. Please join us and take more care about them. Let Alishan salamanders live in here forever.

Classroom of Hynobiids Q&A

Q1 : How many species of hynobiids ever recorded in Taiwan?

A1 : There are five species of hynobiids in Taiwan.
Besides three species (Alishan salamander, Formosan salamander and Sonan's salamander) discovered by Japanese, there are also two more species (Glacial salamander and Taiwan lesser salamander) find by researcher in Taiwan.

Q2 : What's the difference between hynobiids and fishes?

A2 : Adult hynobiids have 4 feet. But fishes don't have any foot.
Different from the external gills in larval stage of hynobiids, the internal gills of fishes are covered by operculums.

The external gills in embryo of Formosan salamander are quite distinct

Q3 : How long can an Alishan salamander live?

A3 : According to research, The life span of Alishan salamander can reach 10 years.

Q4 : Which kind of hynobiid keep the record of highest elevation in distribution?

A4 : Alishan salamanders find in Yuan-feng of Yushan keep the record of highest elevation (3,650m) among all hynobiids in the world.

Q5 : What's difference between hynobiids and lizards?

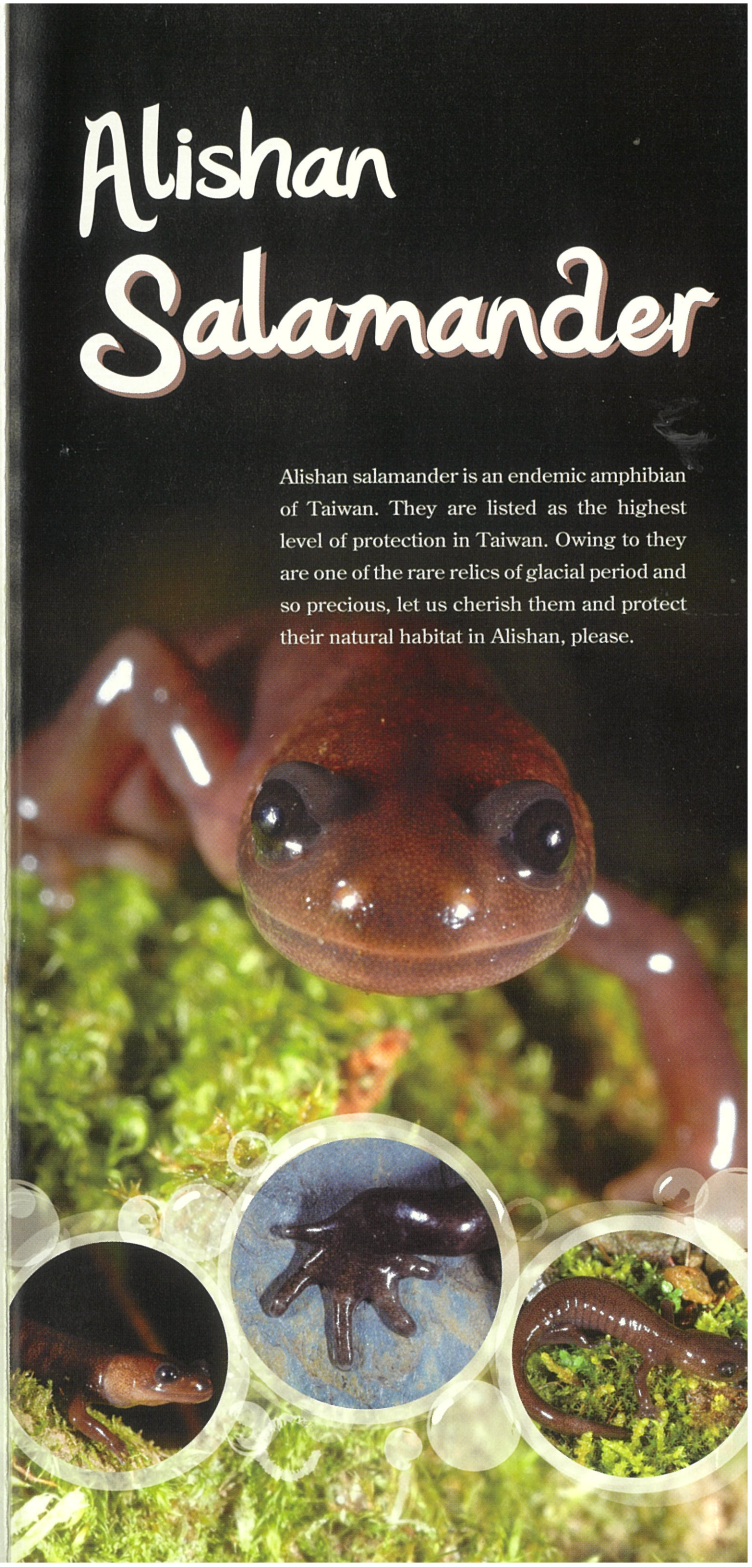
A5 : The skin of lizards are covered by keratinized scales . But the hynobiids do not have any scale in their moist skin.

Q6 : What's the difference between hynobiids and frogs?

A6 : Hynobiids bear a tail in their lifetime after hatching from the eggs. But frogs will lose their tails after the metamorphosis. Hence they got the name of "Anura" (Which means "without a tail"). As to salamanders, we use another term "Caudata" or "Tailed amphibians" to represent them.

Alishan Salamander

Alishan salamander is an endemic amphibian of Taiwan. They are listed as the highest level of protection in Taiwan. Owing to they are one of the rare relics of glacial period and so precious, let us cherish them and protect their natural habitat in Alishan, please.



The "pepper fish" is not a fish

Obviously, Alishan salamander is not a fish. Why did it get the name of "Shan-jiau-yu (山椒魚)" (it means "Pepper fish")? In fact, the term "fish" comes from the comprehensive name of aquatic animals by ancient people. Though the larvae of Alishan salamanders live in water, their adults are mainly terrestrial dwellers. As to the word "pepper", it was adopted from Japanese usage. Because they think the pepper fishes' skin can emit some kind of odor that resemble to peppers when they are stimulated by other creatures.

Asiatic salamanders spend their Larval stage in water (Taiwan lesser salamander)

White-spotted Alishan salamanders are quite rare.

Both of salamanders and frogs are amphibians
(Moltrecht's treefrog is a common amphibian in Alishan)

What Asiatic salamanders really are ?

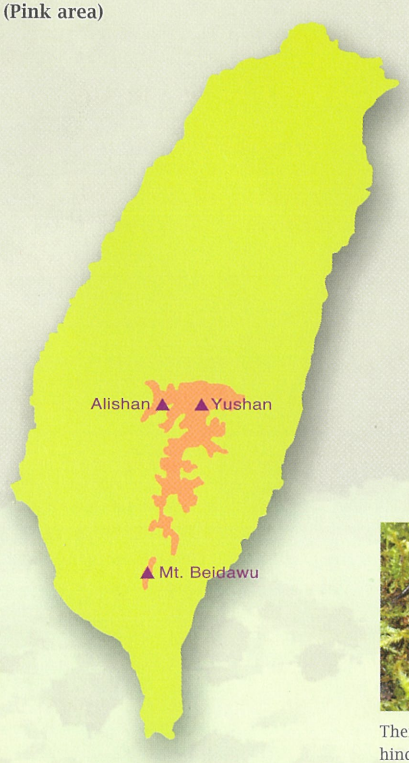
From the viewpoint of zoological classification, both of salamanders and frogs are amphibians. In frogs and toads, their tails will disappear after metamorphosis. Hence they got the name "Anura" (Which means "without a tail"). But in salamanders or newts, they bear a tail in their lifetime after they hatched from the eggs. And we use the term "Caudata" or "Tailed amphibians" to represent this group.

Hynobiidae is an endemic family only live in Asia. All of the members in this family got the common name of "Asiatic salamanders" or "hynobiids". In Mainland China, people used to call them "Shiao-Ni (小鯢)". There are 53 species belong to 10 genera in this family. In the genus Hynobius, 32 species have been recorded. The latest researches indicate this group is originated from Northeastern China in Cretaceous about 110 million years ago. Owing their well-adaptation to cooler climate, they mainly occur in temperate region. And the mountain region of Taiwan is the southern boundary of their distribution.

Owing to the isolation effect caused by mountainous topography, all the species recorded here are endemic to Taiwan. Among them, the Alishan salamander is the southernmost species. Their population is serious declined caused by habitat destruction. By the time of 2004, their living condition drew many attention and then was put in IUCN Red List of Threatened Species as the status of VU (Vulernable).

Then, in 2008, all of the 5 species was put into the newly announced "Schedule of Protected Species" by Council of Agriculture, Executive Yuan. By doing this, we hope that more people will realize their preciousness and go further to protect them.

Distribution of Alishan salamanders (Pink area)



There are only four toes in each of the hind legs of Formosan salamanders.

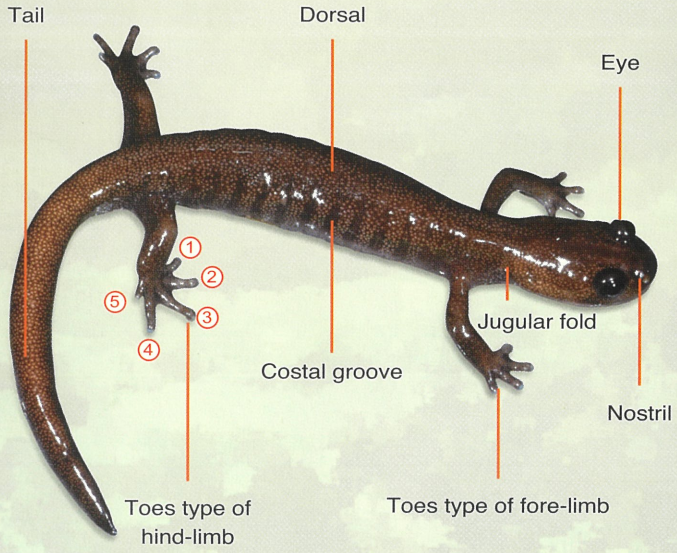
Adult Sonan's salamanders often bear more light-color region in their body.

Glacial Salamanders only live in the elevation above 3,600 meters.

Taiwan lesser salamanders are the northernmost species in Taiwan

What hynobiids look like ?

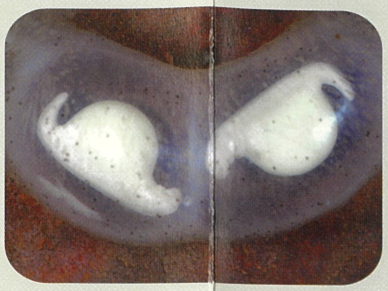
Slender body, long tail and four feet are all distinct characteristics of hynibiids. It's easy to find the difference between moist skin of a hynobiid and the scales of a lizard. Take a look in detail, you can find their tiny fore-feet bearing four toes. But in the hind-feet, the number of toes might be 4 or 5. It's varied from species to species. On the both side of their trunk, there are many costal grooves. Hynibiids do not own the ability of autotomy. And the injuries or scars (e.g. attacked by natural enemies) can to be seen on their tails.



Keratinized scales of lizards is quite different from the moist skin of hynobiids
(Taiwan alpine skinks are common in Alishan)

1 The egg sacs of hynobiids resemble the shape of ox horns

2 Head and tail of the embryo become prominent



3 Eyes become visible

● Fig. 1-Fig. 6 Taiwan lesser salamanders
Fig. 7 & Fig. 8 Alishan salamanders

4 The moment of hatching (Empty egg sacs turn white)

Life history of hynobiids

Like many frogs, hynobiids reproduce by external fertilization in water. Though the egg sacs of Alishan salamanders have never been found till now. Researchers speculate that their breeding season might lie between late winter and early spring. Stones or other coverings in running water are the probably sites where they lay eggs.

The fertilized eggs are enveloped by ox horn-shaped jelly sacs. The hatchlings will break through the egg sacs till their fore-limb buds are well-developed.

Newly-hatched larvae bear three pairs of external gills in the jugular region.

By using these feather-like structures, larvae of salamanders can breathe in water. Different from frogs or toads, we do not use the term “Tadpoles” to describe the larval stage of tailed amphibians. In the process of growing, The juvenile hynobiids will explore their terrestrial life after fully development of their four feet and the disappearing of external gills.

5 The limbs of newly-hatched larva are resemble to the fins of fishes

8 Comparison between a newly-landed juvenile and an adult Alishan salamander

7 The juveniles will explore their terrestrial life after the disappearing of external gills.

6 Color of larva’s skin become darker and all four limbs are fully-developed

What hynobiids eat ?

According to researches, hynobiids usually prey on small invertebrates, such as woodlice, ground beetles and earthworms.

Woodlouse

Earthworm

Ground beetle

Cherish them---Know them from your heart.

Guard them---Do not disturb.

Facts about Alishan salamanders

· Scientific name:

Hynobius arisanensis (Maki, 1922)

· Common name:

Alishan hynobiid, Alishan salamander

· Chinese name:

阿里山山椒魚、阿里山小鯢、阿里山土龍

· Peculiarity:

Highest elevation and southernmost distribution among genus of *Hynobius*.

· Discovery and etymology:

The Alishan salamander is named by Japanese zoologist Dr. M. Maki according to two specimens collected from Alishan. The meaning of specific epithet is “belong to Alishan”.

· Diagnostic features:

Measuring up to 12 cm in total length; reddish brown in dorsal; 4 toes in fore-limbs and 5 toes in hind-limbs.

· Distribution:

Mainly on the mountain region of Alishan and Yushan. The southern border can reach Mt.Beidawu Elevating from 1,800m to 3,650m.

Chiayi Forest District Office,
Forest Bureau, Council of Agriculture, Executive Yuan

The risks hynobiids face with

Though there are only two proofed cases about predators of hynobiids (Stejneger’s keelback and Kikuchi’s pit viper) in Taiwan. Owing to their small body size, salamanders are potential prey for many carnivorous animals .

As to the eggs and larvae, many aquatic carnivores, such as freshwater crabs and the larvae of dragonflies, are all possible predators for them. Furthermore, the overuse of insecticide or fertilizer by agricultural activities and other exploitation on high elevation of mountain region might cause serious problem, such as pollution and eutrophication of aquatic environment. All of these can be lethal to eggs, larvae, even adult of hynobiids

Freshwater crab

Mikado pheasant

Stejneger’s keelback

A leech suck on the head of an Alishan salamander

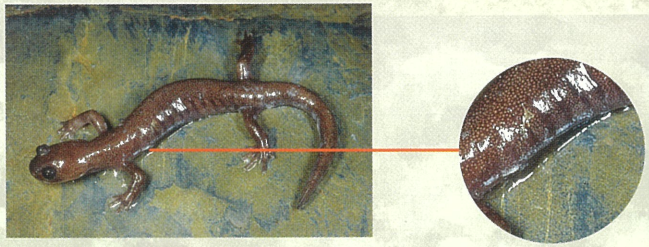
Parental care and defensive behavior of hynobiid

By observing the grouping condition of adults and juveniles, researchers speculate that adult Alishan salamanders might take care of their eggs sacs and larvae. By parental care, the embryos and larvae can be prevented from the threat of predators or the infection of harmful microorganisms.

Hynobiids often raise their tails and wave it from side to side, when facing the enemies. These behaviors can distract enemies from more important portion of their body, such as head and trunk with visceral.

An injury on the tails of Alishan salamander

By raising their tails, hynobiids can distract enemies from the important portion of their body. (Taiwan lesser salamander)



Hynobiids secrete mucous material when they are strongly stimulated by other creature