African Clawed Frog *Xenopus laevis*

Ward's Science Visual Teacher Guide

Safety Considerations

Always wash your hands thoroughly after handling this organism.

Wearing gloves can minimize the risk of spreading secretions from the frog's skin to the eyes and other mucous membranes. This also protects the frogs' skin from lotions and chemicals that may be present on the students' hands.

Do not use hand sanitizer on hands before handling frogs. It will damage the frog's skin.

How Will Animals Arrive and Immediate Requirements

Adults: The frogs can be wild type (greenish/brown) or albino (creamy white). Adult frogs are about 7-12 cm in length, but can vary due to availability. As soon as possible upon receipt, take the bag out of the box and float it for 30-60 minutes in the aquarium in which the frog is to be housed. This allows the frog to acclimate to the temperature of the aquarium. If your frog is cold when you receive it, its movement will be very slow or nonexistent. This does not indicate poor health; the frog will behave normally once it adjusts to a higher temperature. Once the frog is acclimated, carefully cut open the bag and release the frog into the aquarium.

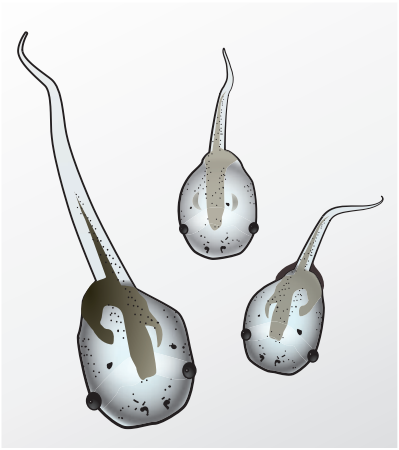
Tadpoles: Early and late stage tadpoles are shipped in a deli container filled with freshwater and oxygen. Tadpoles are very small (about 1 cm) and are quite fragile. Tadpoles and eggs can stay in their original shipping container for about a week if the water is changed regularly.

Wild Habitat

Xenopus is native to African grassland ponds, streams, and lakes in both arid and semi-arid climates. *Xenopus* are now found in many parts of the world with appropriate climate and are considered to be an invasive species. *Xenopus* spend most of their time in the water and swim much more than they jump. They can become dormant in a mud burrow to survive a drought. In the wild, the frogs will eat almost anything including insects, dead animals, worms, small fish and *Xenopus* tadpoles. Tadpoles are filter feeders, and eat mostly algae.

Illustrated by Leah Hofgesang

Tadpole Habitat



- Set up a clean aquarium with pond, spring, or dechlorinated tap water (74 °F). We recommend a minimum of 5 gallons for 12 tadpoles. Tap water can be dechlorinated by letting it sit out for 48 hours or by adding a dechlorinating solution such as Stress coat (Ward's 212338).
- You may use aquarium gravel (Ward's 211800) as substrate, and you can decorate the aquarium with plants for hiding. (Live plants can also serve as a natural food source.) As the tadpoles grow, be sure to increase the size of the gravel so it is not smaller than the tadpoles' mouths, or it will be ingested.
- It is highly recommended that you aerate the habitat. You can aerate with a pump (Ward's 212982), air stone (Ward's 6021600) and air line tubing (Ward's 212910) to improve oxygen and water circulation.

Tadpole Care

- When feeding your tadpoles, be aware they will consume anything smaller than their mouth. Fish flakes (Ward's 217451) or tadpole pellets (Ward's 886535) are recommended.
- Feed every day, but only as much as the tadpoles can consume in five minutes. Do not overfeed, as the water will quickly become fouled.
- A partial water change is recommended three times a week if there is no aeration, and once a week if aeration is present, even if the water does not appear cloudy. Remove about 15-25% of the waste-containing water and replace it with clean dechlorinated water. Add dechlorinated water gently to avoid sloshing the tadpoles roughly; their skin is delicate.

Xenopus Frog Habitat

- Set up a clean aquarium with pond, spring, or dechlorinated tap water (70 °F). We recommend about 10 gallons for 2 sexually mature frogs or 12 young froglets.
- Do not use a gravel substrate that can be easily ingested. Use a medium sized rock or a piece of slate instead. Live plants will be uprooted.
- A secure screen top is recommended, as frogs like to jump. An air stone and filter are recommended, but not necessary.

Xenopus Frog Care

- *Xenopus* frogs will consume pellets (Ward's 886538), crickets (Ward's 876100), red worms (Ward's 874630) and cut up earthworms (Ward's 874660). Make sure to feed the frogs a little at a time so they do not gorge themselves, which causes them to excrete large amounts of waste that, in turn, could cause death. Only feed each adult frog an amount that can be consumed within a few minutes.
- Feed no more than 3 times a week.
- A 30% water change should occur weekly in which the dirty water is replaced with clean dechlorinated water.
- Do not overcrowd your *Xenopus* since adults do not hesitate to eat their own kind. Once your frogs are large enough to sex, you should isolate the males from the females if you plan on attempting to breed them.

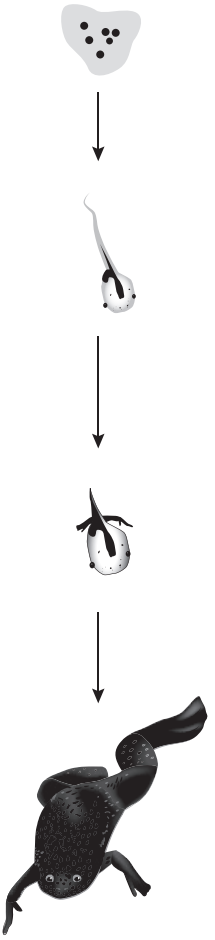
Life Cycle

Egg The eggs are very tiny, only about 2 mm in diameter. Development of the fertilized egg takes approximately 40 hours at 22 °C and can be accelerated at temperatures as high as 30 °C. Temperatures as low as 11 °C will slow the development.

Tadpole Early stage *Xenopus* tadpoles have very little pigmentation and are almost clear in color except for the internal body parts, which appear dark. They are generally between 7-10 mm in length. Late stage tadpoles are between 10 to 15 mm in length and have started to grow hind legs.

Froglet Froglets have started their metamorphoses into frogs. Their heads have taken the shape of the adult frog and their limbs have grown. They reabsorb their tails into their abdomen. At this stage, the *Xenopus* have changed into their wild type (greenish-brown) color and are approximately 2 to 5 cm in length. They complete metamorphosis to a frog within about 8 weeks of hatching.

Adult Frogs reach sexual maturity about a year after hatching. Adult frogs are 5 to 12 cm and have been known to live up to 20 years in captivity.



Method of Reproduction: Sexual.

Egg laying can occur at all times of the year, but is common in spring. Breeding can take place up to 4 times a year. *Xenopus* reproduction mainly occurs during nighttime since they are nocturnal animals. Reproduction occurs more rapidly if the water temperature and the water level are raised. Reproduction can be influenced by gonadotropin. Commercially available Human Chorionic Gonadotropin (HCG) is used in both male and female *Xenopus* to induce mating behavior year round while in captivity. It increases ovulation and egg production in females.

Determining Sex

Males - When sexually mature, frogs display a black, sticky nuptial pad on their forearms.

Females - About twice as large as males; pear-shaped with visible papillae at the cloaca.

Disposition

- We do not recommend releasing any laboratory animal into the wild. As a laboratory animal, it has not encountered or learned wild survival skills and is therefore likely to come to an inhumane end.

  Adoption is the preferred disposition for a vertebrate. The animal may be rendered to your local humane society.

- If the animal must be euthanized, we recommend consulting the AVMA guidelines on euthanasia (American Veterinary Medical Association, http://www.avma.org/issues/animal_welfare/euthanasia.pdf). According to these guidelines, acceptable methods of euthanasia for an amphibian include exposure to CO_2 at >60% or treatment with tricaine methane sulfonate (also known as TMS, MS-222 and Bio-Calm 470302-958). TMS is an anesthetizing agent that will cause fish and amphibian death due to central nervous system depression and hypoxia with overexposure. Wear personal protective equipment (gloves, safety glasses, lab coat) when handling this substance. The fish or amphibian is placed in a solution of 5 g per 5 gallons of water for 30 minutes or until all motion has ceased. To make sure the animal is dead, check for reflexive movement when the eye is touched. If movement occurs, replace the animal in the TMS solution for another 30 minutes.

- A deceased specimen should be disposed of as soon as possible. Consult your school's recommended procedures for disposal. In general, a dead vertebrate should be handled with gloves, and wrapped in an absorbent material (e.g., newspaper), wrapped again in an opaque plastic bag, then placed inside an opaque plastic bag that is sealed (tied tightly) before being placed in a general garbage container away from students.

Contact the **Ward's Science** Plus Us team
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