AQUATIC FROG HOUSING

Table of Contents

Background

Aquatic frogs (*Xenopus laevis* and *Xenopus tropicalis*) may be acquired as adults directly from pre-approved vendors (e.g., NASCO) or other institutions, as approved by a veterinarian in the Office of Laboratory Animal Care (OLAC). Frogs may also be bred within the animal facility in accordance with an approved Animal Use Protocol (AUP).

Frogs must be housed in a variety of tank-sizes, depending on age, species, size, and investigator need using established standards. The *Guide for Care and Use of Laboratory Animals* specifies that “acceptable primary enclosures allow for the normal physiological and behavioral needs of the animals,” including “normal movement and postural adjustments”, and “conspecific social interactions.” As a general guideline, there must be enough room for all frogs in any container to rest on the floor simultaneously and water clarity must be maintained to allow ready examination of individual frogs. The recommended volume of water varies depending on age and species (see below).

Definitions

Metamorphs – A life stage/age identified by a long tail and undeveloped front and rear feet. Metamorphs must be sustained on liquid diets.

Froglets – A life stage/age identified by developed front and rear feet with a short tail. Froglets are capable of eating solid food.

Flow Through Tank – An aquatic system in which water is continuously flowing through the system and leaves through a drain, not allowing for re-circulation of water.

Recirculating Tank – An aquatic system designed to exchange a specific volume of water per unit time and periodically introduce fresh water into the system. These systems often include biological, mechanical, and chemical filters that filter water prior to returning the water to tanks.

Static Tank – An aquatic systems varying from small tanks to large in-ground ponds that may or may not have mechanical devices to move and aerate water. Static tanks require frequent complete change out of water to maintain good water quality.

Xenopus laevis

- Adult frogs should have at least 2 liters of water per adult frog (NRC, 2011).
- Juvenile frogs (froglets) should have at least 1 liter of water per frog.
- Floor space must be taken into account and water depth for adult frogs must be at least 15 cm of water, although 30-50 cm is preferred (Tinsley, 2010).

Tank (floor space inches)	Volume	Maximum Number of Frogs per Tank
Mouse-cage sized tank (approximately 10.5” x 6.5”x7”)	3 liters	30 tadpoles 1 adult
Rat-cage sized tank (approximately 17”x8.25”)	15 liters	30 metamorphs 15 juveniles (froglets) 5 adults
Medium Tubs (18-29” X 28-42”)	100-120 liters	40 adults
Large tubs (73” X 29”)	250-300 liters	100 adults

Xenopus tropicalis

- Adult frogs should have at least 0.7-1 liter of water.
- Juvenile (froglets) should have at least 0.25 liter of water.
- Floor space must be taken into account and water depth for adult frogs must be at least 15 cm of water (Tinsley, 2010).

Tank (floor space inches)	Volume	Maximum Number of Frogs per Tank
Recirculating tank (approximately 8.5” x 2.5”)	1.4 liters	2 adults
Recirculating tank (approximately 8.75” x 4.5”)	3 liters	12 juveniles (froglets) 4 adults
Mouse-cage sized (static) tank (approximately 10.5 x 6.5”x7”)	3 liters	150 small tadpoles 50 large (~2 cm length) tadpoles 12 juveniles (froglets) 3 adults
Rat-cage sized tank (approximately 17”x8.25”)	15 liters	15 adults

Exceptions

Exceptions to these guidelines may be granted under the following conditions:

- Any deviations from the housing density guidelines provided above, including single housing, must be reviewed and approved by ACUC in the AUP.
- However, single housing may be approved via veterinary exception for health or welfare concerns.

References

- Wu, M., & Gerhart, J. (1991). Raising Xenopus in the laboratory. *Methods in Cell Biology*, 36, 3-18.
- Hilken, G., Dimigen, J., & Iglauer, F. (1995). Growth of Xenopus laevis under different rearing conditions. *Laboratory Animals*, 29, 152-62.
- Reed, B.T. (2005). Guidance on the housing and care of the African clawed frog Xenopus laevis. *RSPCA-Research Animals Department Publication*, pp. 67.
- Hayes, T.B., Khoury, V., Narayan, A., Nazir, M., Park, A., Brown, T., Gallipeau, S. (2010). Atrazine induces complete feminization and chemical castration in male African clawed frogs (Xenopus laevis). *Proceedings of the National Academy of Sciences*, 107(10), 4612-7.
- Harland, H. (2005). Harland *Xenopus tropicalis* Site. Retrieved from http://tropicalis.berkeley.edu/home O'Rourke, D.P. and Rosenbaum, M.D. 2015. Biology and Diseases of Amphibians. In J. Fox, L. Anderson, G. Otto, K Pritchett-Corning, & M. Whary (Eds). *Laboratory Animal Medicine* (pp 931-965). Cambridge: Academic Press.
- The National Research Council. 2011. The Guide for the Care and Use of Laboratory Animals (8th Edition). Washington D.C.: National Academic Press.
- Green, S. 2009. The Laboratory Xenopus sp. Boca Raton, Florida: *CRC Press, Taylor & Francis Group.*
- Tinsley, R. (2010). Amphibians with Special Reference to Xenopus In Kirkwood, J & Hubrecht R (Ed), *The UFAW Handbook on the Care and Management of Laboratory and Other Research Animals, Eight Edition.* West Sussex, UK: Wiley Blackwell.