

Progress in Biobanking Amphibian Species Worldwide for Conservation

By Craig Hassapakis & Howard O. Clark, Jr.

There is no question that cells preserved from endangered animals (somatic and reproductive) will play an ever increasing role in the future of species conservation through proper cryopreservation; as well as providing and documenting species diversity for future generations (1,2). The movement and assembly of these vital resources within collections worldwide are urgently needed. Efforts are under way to initiate programs to collect the world's amphibian species which are threatened with extinction (see Amphibian Survival Alliance and Amphibian Specialist Group, Genome Resources Working Group, Target Areas, Bioinformatics of amphibian genomes and biodiversity preservation of tissues representing all amphibian species: <http://www.amphibians.org/asg/workinggroups/genome-resources/>). The goal is to create a historically permanent record and resource (publicly accessible in sustainable repositories) of bioinformatics and tissue for amphibian species conservation and research. Although research continues in the development of cryopreservation protocols in various laboratories worldwide (3,4) there still is no coordinated effort (5), between research institutions and governing bodies, to undertake the massive task of bringing together plant, animal tissue and cell bio banks at a global scale. A current and excellent review of the state of the world's amphibians can be found here (6) and an accomplished review of current practices, programmatic development and future

directions for cryopreservation of gametes, embryos and larvae of aquatic species can be found here (7).

One developing advancement in biobanking animals is the effort to collect an entire class of vertebrate species. *Amphibia Bank*, is planned to be a network of cell culture and tissue repositories with the goal of collecting cell samples (blood, cell cultures, tissues, spermatozoa, eggs and embryos) representing every amphibian species on earth. An initial pilot project of this effort is the collection of all North American salamander species. Other strategies are being considered for reptiles as well (8).

It is hoped that the scientific community will come together to make these collection efforts a reality and a permanent record of life on earth used for the future benefit of all. It is envisioned that collection and deposition of cell samples worldwide will become routine among researchers, particularly herpetologists, and those with access to specimens (especially those working in the field).

The ambitious task of collecting amphibian genetic material in various forms is finally becoming a priority for the biobanking community. Collection coordinators will need to be assigned to all countries, geographic areas and species groups. If you would like to be involved with these collection efforts or are a leader in biobanking amphibians, please contact us at: genome.resources@gmail.com.



Hydromantes platycephalus. Photo: Howard O. Clark, Jr.



Pseudacris sierra. Photo: Howard O. Clark, Jr.

Acknowledgments

We would like to thank Natalie Calatayud and Chester Figiel who contributed to our message.

References

1. A. J. Kouba *et al.* *Biological Conservation* 164: 10–21 (2013).
2. J. Clulow, V. L. Trudeau, A. J. Kouba. In: W. V. Holt, J. L. Brown, P. Comizzoli (Editors). *Reproductive Sciences in Animal Conservation: Progress and Prospects* [Advances in Experimental Medicine and Biology]. Springer Science+Business Media, New York, New York, USA. 533 p. (Chapter 12: 275–308, 2014).
3. B. Lawson, S. Clulow S, M. J. Mahony, J. Clulow. *PLoS One* 8(4): e60760 (2013).
4. V. K. Uteshev, N. V. Shishov, A. S. Kaurova. *Russian Journal of Herpetology* 20(2): 105–109 (2013).
5. C. Hassapakis. *FrogLog* 22(1): 19 (2014).
6. A. Catenazzi. *Annual Review of Environment and Resources* 40: 91–119 (2015).
7. T. R. Tiersch, C. C. Green (Editors). 2011. *Cryopreservation in Aquatic Species*. 2nd Edition. World Aquaculture Society, Baton Rouge, Louisiana, USA. 1,003 p.
8. N. B. Ananjeva, V. K. Uteshev, N. L. Orlov, E. N. Gakhova. *Biology Bulletin* 42(5): 432–439 (2015).