

## Reproduction technology

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Reproduction technologies not only provide a convenient method for reproducing amphibians. They are essential for the reproduction of many threatened species, and in combination with biobanking greatly facilitate the maintenance of genetic variation. Conservation breeding programs for the flagship species, the Wyoming toad (*Bufo baxteri*), Boreal toad (*Bufo boreas boreas*), Puerto Rican crested toad (*Peltophryne lemur*), and Chinese giant salamander (*Andrias davidianus*) are either completely or significantly dependent on hormonal induction.

[Amphibian hormonal induction](#) - This method is used for a wide variety of amphibians in both commercial and conservation programs. Hormonal induction is the use of various hormones to bring the amphibians into breeding condition- called priming - and then to induce spawning and spermiation. Hormonal induction is a valuable technique; however, it is somewhat dependent on the [Reproduction conditioning](#) of the amphibians particularly females. The use of hormonal induction should also be viewed in light of the [Amphibian hormone cycle](#).

[In vitro fertilisation](#) - the fertilisation of eggs using sampled sperm and oocytes. This method enables the; 1) fertilisation of one female by many males, 2) the use of sperm and eggs from amphibian based in different location, 3) where sperm or eggs are of poor quality, and when the males and females produce gametes at different times. The viable nuclei from sperm or cells can also be used to fertilise oocytes using nuclear transfer (see

In vitro fertilisation in combination with the short term storage of sperm and oocytes is a powerful technique to increase the genetic variation of offspring..

[Oocyte gel removal](#) – the manipulation and fertilisation of oocytes, eggs and embryos often requires the removal of the gel coat.

[Handling and injecting amphibians](#) – good handling methods for amphibians are essential for their well being and health. They also enable the efficient and relaxed administration of medicines, hormones, and markings and tags.



Above: Improving the hormonal induction of the *Fowler toad* (*Bufo fowleri*) developed methods now used for the reproduction of the critically endangered *Wyoming toad* (*Bufo baxteri*). Image Robert Browne.



Above. The development of a suite of reproduction technologies for *tomato frogs* *Dyscophus antongilli* will enable efficient management and breeding of this and other amphibians from Madagascar. Image Robert Browne.

*Right. Red-eyed green tree frog *Agalychnis callidryas* eggs about 20hrs after fertilisation in their 4<sup>th</sup> division with 16 cells. Image Fotografie Artman.*



Glossary:

*In vitro* – directly translated as in glass, means in a container.

Gamete – the male or female genetic component as a sperm or oocyte

Spermiation – the production of sperm and movement from the testes.

Spawning – the laying of oocytes.

Ovulation – the production of oocytes from the ovaries.

Oocyte – the unfertilised egg.

Egg – fertilised oocyte before the first division into two cells.

Zygote – the egg after first division into two cells.

Blastocyst – the developing egg before it starts to form organs.

Gene banking – the long term storage of amphibian sperm or other cells to perpetuate a species genetic variation.