

FACTORS INFLUENCING AXOLOTL SPAWNINGS AT DEVELOPMENTAL
BIOLOGY CENTER, UNIVERSITY OF CALIFORNIA, IRVINE, CA.

Warren F. Fox

Maintenance conditions for our colony: First it may be useful to note that our breeding colony is currently housed in a converted cargo container. Although the container is airconditioned, the unit cannot cope with our summer and fall hot weather and the water temperature may reach 27°C. The room is on a light-interval timer, which is adjusted to approximately the prevailing external conditions for our latitude, but there is a window in the door which allows natural light to enter. We have in the past maintained our breeders in glass bowls and have fed them liver and beef heart, but we have found this method too time consuming and the animals did not always come into breeding condition well. We now house them in 10 to 20 gallon aquariums either as pairs or groups of three or four. They are fed twice a week with Lumbri- culus (an aquatic worm similar to Tubifex) and occasionally with Daphnia and tadpoles. One-fourth to one-half of the water is replaced with conditioned tap water weekly.

Season and Frequency of spawnings: Our spawning season in good years has ranged from October/November to May/June. The frequency of spawning varies both between males and females and between one animal and another. The average male can spawn every three to four weeks throughout the season, while the average female will spawn two to three times per season at intervals of about one month. Only 50% of our animals which appear to be good breeders actually spawn, and in the albino strain, most homozygous males appear to be infertile.

Factors which may affect breeding:

1. Temperature. Prolonged temperatures in the range of 12 to 18°C bring our animals into breeding condition best, while temperature over 20°C are unfavorable.
2. Health. Animals in poor health do not spawn well. In the 1982-83 breeding season, our adult axolotl colony came down with epidermal ridge disease. Although the external effects of the disease appeared to be very mild, and apparently no animals were lost as a result, we had a very low number of successful spawnings. Most of the animals did not appear to reach breeding condition.
3. Feeding. Heavy feedings produce animals the best breeding condition.
4. Lighting. Although it is hard to separate changes in the light cycle from temperature effects due to our housing unit, it

appears that an initial shortening of the light period stimulates entry into the breeding cycle. Once the breeding cycle has commenced, we find that our largest concentration of spawnings is stimulated by lengthening the the light period. A light period of 24 hours a day is inhibitory to spawnings.

5. Length of time animals are paired. When a pair in good breeding condition is first placed in an aquarium, the male often drops spermatophores, but there are seldom any eggs produced. However, the same pair will usually spawn successfully one to four weeks later if left in the tank together. Animals which are paired before they reach breeding condition, often breed successfully the first time spermatophores are dropped.

Factors which seem not to have an effect:

1. Icing. This has not produced any noticeable increase in successful matings although it does cause the male to drop spermatophores.

2. Keeping pairs in total darkness at night. Light from street light, other rooms, or the moon, entering through the window in the door does not seem to affect animals.

3. Barometer pressure-storms. We have noted no consistent effect and have had many spawning during periods of high pressure.

4. Fresh water changes. Since we do this continually we have not analysed this.

Induced and artificial matings:

1. Induced matings. We have attempted inducing with LH and FSH and have had a number of spawnings. However, in most cases no spawning occurred and in those that did only a small number of fertile eggs were produced. In one case only five developed out of 490 eggs.

2. Artificial matings. We have also attempted artificial mating utilizing techniques supplied by the Indiana University Axolotl Colony. When performed in our normal breeding season with animals in good breeding condition, normally developing eggs were produced in a number of cases. The number of eggs produced was approximately one-third as many as would be produced with a normal mating. However, when we have performed artificial matings out of season (usually mid-summer) when our animals are in poor breeding condition, few normal embryos have resulted and it has often been hard to even find a male with any number of viable sperm. We now feel that most animals who can produce viable young, will do so by natural matings if they are presented with the proper conditions.