

## REPRODUCTION TWICE A YEAR OF THE CRESTED NEWT IN CAPTIVITY

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As with most temperate amphibians, the Crested Newt (*Triturus cristatus*) undergoes brief, annual periods of mating. Mating always takes place in spring and is accompanied by great morphological changes. During the breeding season the male develops a high dorsal crest and its colours become more vivid. The crest begins to grow, and the tail-stripe to intensify in colour just before the males go into hibernation, complete development taking place rapidly when the males enter the water in spring (Steward, 1969).

The gametogenetic cycles in newts are controlled by endogenous (hormonal) and environmental (temperature, moisture and photoperiod) factors. Temperature seems to be the major factor controlling gametogenesis in many salamanders, including newts (Duellman & Trueb, 1986).

In nature newts reproduce only once a year, during springtime when courtship, mating and oviposition take place. Simms (1968) reports a captive female of *Triturus cristatus* that mated twice (that is, during two different periods) and laid two clutches of eggs in one season.

There are two possible ways of stimulating the reproduction of newts outside their normal breeding season. One is by inducing breeding with pituitary extracts or human chorionic gonadotropin; the other one uses a low-temperature treatment (mentioned by Astier, 1975).

I succeeded in inducing captive newts to breed twice a year by maintaining them during the summer period at low temperatures (4-8°C). After the normal spring mating the appetite of the newts starts decreasing and they begin to manifest their desire to quit the water. This is correlated with the increasing temperatures at the beginning of summer. Normally the newts will pass to their terrestrial phase of life and will return to water only next spring (or sometimes in autumn for hibernation). By taking the newts at this moment and placing them in a clean plastic box filled with pieces of moist sponge, a box that can be easily kept in a refrigerator, one can speed up their normal life cycle. The box will be provided with sufficient holes so as to ensure good ventilation. Two major points are to be considered when placing the newts in the refrigerator, i.e. in choosing the shelf that offers a temperature around 6°C and in providing good ventilation. Death of animals might occur at this stage due to excessive moisture, because of a too low temperature, or because of a deficit in aeration. It is therefore advisable to check the box every week, and remove any dead animals.

It is necessary for the newts to be healthy and well fed. Very good results are obtained when 2-3 weeks before placing them in the refrigerator they are fed every other day with whiteworms and earthworms *ad libitum*. During the last 4-5 days feeding must be stopped, thus allowing the newts to eliminate the faeces.

It is quite difficult to establish the period required for keeping the newts at low temperature. The most important factor to be considered is the outside temperature. To remove the newts at outside temperatures of about 30°C will just spoil things, since the temperature needed for their reproduction is around 15-20°C. Anyway, the minimum period of time needed for keeping them in the refrigerator is about 30-40 days.

After taking the newts out from the refrigerator, care must be taken, as some newts might refuse to enter the water. A good method is to place them in shallow water and then raise the water level little by little; or, to place a small raft in the aquarium and release the newts on it; in less than an hour most of them will enter the water. If everything goes well the newts will start feeding the next day. At this stage any kind of live food will do. By now the animals will start developing sexual characters and in about a month from the induced hibernation courtship will start. It is not possible to obtain the same degree of fecundity and of courtship display in autumn as in spring. The first eggs deposited may be infertile but

the rest will develop well. If the females are kept without males they will deposit less than a dozen unfertilized eggs.

The last important point to be remembered is to ensure a temperature of about 20°C for the developing eggs and the hatched larvae.

This method may be applied to other species of newts as well. It can be applied all year long: for example, we can "store" the newts in October and take them out in January, so that by springtime we can have fully developed larvae.

The amount of eggs deposited by a female will not exceed one third of the number of eggs it deposited in the previous spring period of reproduction. This might be due to the so-called post-nuptial spermatogenesis, that results in the male having a limited sperm supply (Verrell, 1986), and, of course, to a limited amount of eggs available by the female.

It seems necessary to mention that if after the induced reproduction the newts are allowed to hibernate normally (outdoors or in a cold room), the forthcoming spring they will reproduce normally.

This method is easy to do and will provide you with year-long satisfaction in breeding newts.

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