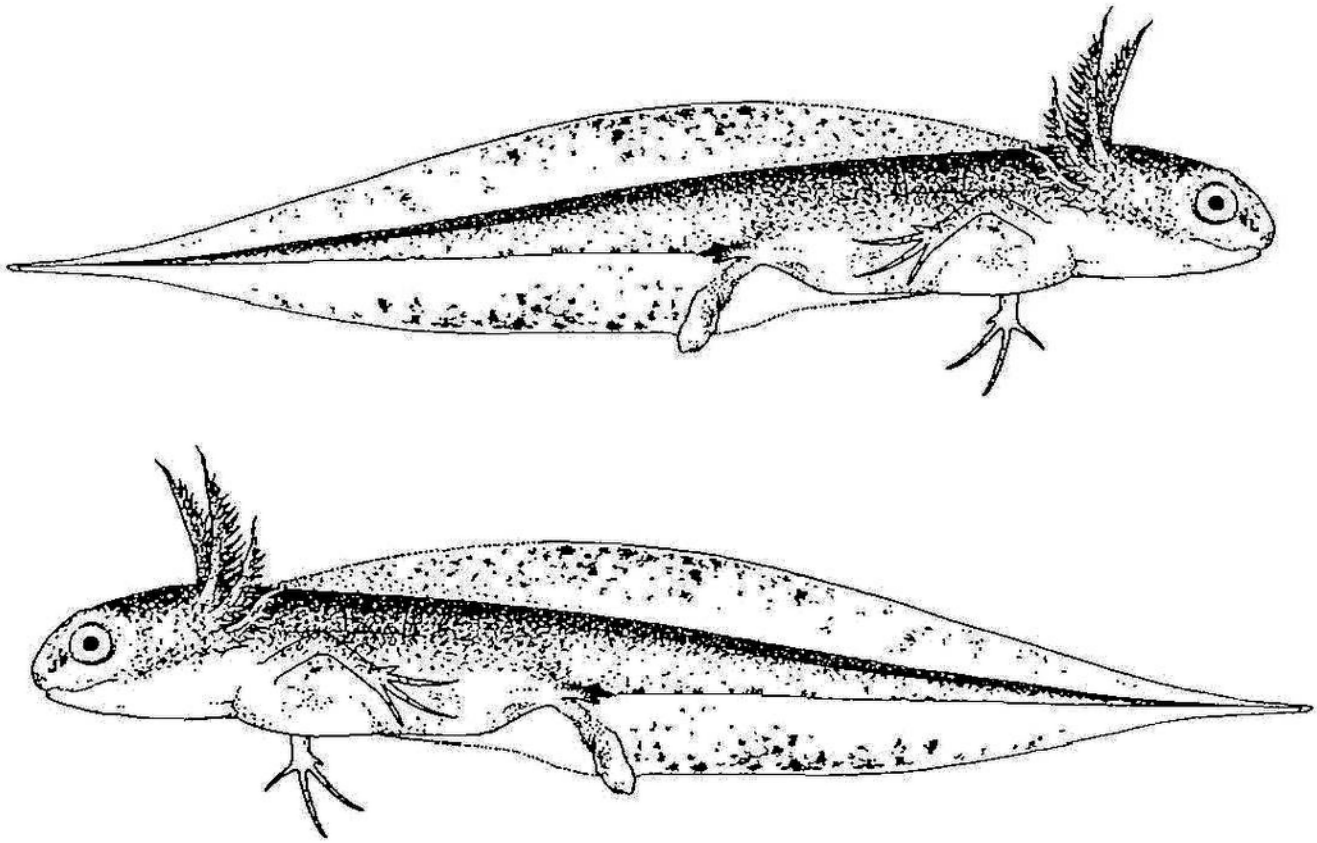
Dave Green's
Notes on the Rearing of
Great Crested Newts



Written and drawn by
Dave Green in 1984.
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NOTES ON THE BREEDING OF GREAT CRESTED NEWTS

Due to the alarming decline of great crested newts, an indoor breeding programme was carried out over a period of 5 years. Of the 1,220 eggs collected directly from my own ponds for the purpose, 363 newt larvae were reared to an age of 10 weeks and introduced into ponds with small great crested populations in the Darlington area, so as to act as 'boosters'.

Laid on water-cress (Nasturtium officinale), the egg-leaves were checked over thoroughly and all invertebrates removed, the commonest of these being flatworms (Dugesia) and Hydra. The latter were the worst menace in the breeding tanks for, if unnoticed, they multiplied at an astonishing rate and successfully competed with the newt larvae for their food. They are both difficult to see and remove, needing to be pushed or scraped from their anchorage and then siphoned. Natural enemies are few, though the great pond snail (Lymnaea stagnalis) will eat them and several were placed in Hydra-suspected tanks. As this species is carnivorous it was only introduced when the newt larvae became good swimmers. If Hydra were present in large numbers the tank was emptied and meticulously cleaned.

Experiments using various combinations of factors were tried in the egg tanks to see which produced the highest hatch rates. The following information was thus achieved-

factor	average % of hatch	% of factor in highest hatches (over 55%)	% of factor in lowest hatches (under 50%)
Methylene Blue ($2\frac{1}{2}$ capfuls per 3' tank).	51%	50%	$14\frac{1}{2}$%
No Methylene Blue.....	48%	50%	$85\frac{1}{2}$%
Egg leaves clipped.....	$51\frac{1}{2}$%	100%	$43\frac{1}{2}$%
Egg leaves left on plants.....	45%	0%	$56\frac{1}{2}$%
Oxygenating plants (Elodea) present.....	$42\frac{1}{2}$%	25%	58%
Oxygenating plants absent.....	52%	75%	42%
Warm water tanks (17°C).....	53%	50%	29%
Cooler water tanks (<15°C).....	$45\frac{1}{2}$%	50%	71%

It would therefore appear that warm water tanks containing clipped egg-leaves and Methylene Blue are the most successful combination. In the case of the latter, hatched larvae need to be netted and placed in a clear water tank, for their prey items cannot survive under such conditions. Good aeration is a necessity during the egg phase and with this considered, the tanks were left reasonably shallow, approximately 15cms. Other factors, such as the use of pond water to mature tap water, and egg numbers per tank seemed unimportant to the hatch, though as a matter of practise as few eggs were placed in the tanks as possible. The tanks were left free, apart from the egg-leaves and air pump tubes (with air-stones) so as to make the task of siphoning debris, Hydra and infertile eggs an easy matter.

Infertile eggs (usually with little or no vitellus) averaged 18% in the breeding programme and quickly became heavily infected by the fungus Saprolegnia, which showed as a bundle of thin white threads emerging through the leaf, from the egg. It is indeed fortunate that this fungus does not spread from infertile to fertile eggs. After this initial loss the larvae generally develop well upto the 12 day or late tail-bud stage, when a mass death occurs. Recent research by Macgregor and Horner(1980) on crested newt chromosomes suggests that the species has a substantial genetic load, with the result that 49% of larvae which reach this stage have no chance of developing further. My figures agree exactly with theirs.

Abnormal larvae form but a small percentage of the hatch, averaging 8%, and often die within a fortnight. The two commonest conditions witnessed were larvae with bent tails, either to the side or downwards, and those with bloated bellies, a condition comparable to fish with diseased swim-bladders. The survivors were those in which the deformities were not sufficiently acute to disrupt their hunting activities. Rarer abnormalities included deformed heads, poorly formed upper fins and gills, and in one older larvae the failure of the left hind-limb to develop, and in two others the failing of the fore-limbs 5th digit.

On account of the enormous appetites of the larvae, their tanks always contained sufficient live food- Copepods and Cladocerans (water-fleas) during their first three weeks, and these plus 'bloodworm', mosquito larvae, Tubifex and small earthworms when older. The larval tanks, like the egg tanks, were left with a clear base so that siphoning was made easy. Aeration, although still important was reduced. Due to the nervous nature of the larvae the screening of non-viewing sides of the tank was necessary. Smooth stones and plants were also introduced and arranged so as to act as hiding areas. The plants were always obtained from aquarists, so as not to introduce harmful invertebrates. They were weighted down with lead or allowed to float freely. The water depth was kept the same as for the egg tanks, though it was lowered to 10cms, and a land area provided, when advanced larvae needed to be reared to the eft stage.

One of the main problems with rearing larvae is overcrowding. It is the single major cause of fighting, the results of which occasionally proved to be fatal, as some bullying occurs. Conflicts usually arose, however, when two larvae swam together, often head-on, and snapped at one another as they turned away. Wounds caused by fighting first showed in the breeding tanks during the 5th Week and only had a tendency to decrease after the 10th Week. Areas in which amputations occurred were the gills, upper tail-fin, tail-filament, limbs and digits, and whilst the larvae regenerated their limbs and digits quickly- often within a fortnight, other areas such as the gills only grew relatively and never attained full size. Therefore never more than thirty advanced larvae, of approximately the same size, were kept in a 3' tank during the breeding programme.

During three of the five years of breeding a virulent disease developed in the tanks, the effects of which was the loss in one year of over 80% of the total hatch. The symptoms of the disease were the development on the head, body and/or tail-fins of one or more relatively large white cysts, possibly of the sporozoan Glugea. Infected larvae showed a slight darkening of colouration and loss of activity, death often occurring within a couple of days, Larvae were most prone between the ages of 4-6 Weeks. Except for some success on individuals using Aquarian Fungus Cure, I was unable to find a cure, and hope that this may be worthy of research for someone in the future.

Note added in 2012

Rearing GCN efts in this way, and releasing them into the wild, was legal in 1984, but of course nowadays you would need a license and a good explanation of why you were doing it. Dave's account is reproduced here because of its scientific interest.