PRECOCIOUS NEWTS

EDITH ELEBERT

112 Bradford Road, Farnworth, Bolton BL4 0JG
(LTNC Great Crested Newt Group, Cuerden Park Wildlife Centre, Shady Lane, Bamber Bridge, Preston PR3).

INTRODUCTION

A method has been developed for captive rearing Great Crested Newts *(Triturus cristatus)* which resulted in attainment of sexual maturity at 12 months. Great Crested Newts in the wild have been reported to mature at 3-5 years age (Frazer 1983, Oldham 1986, Wisniewski 1989). The Great Crested Newt is now protected under the provisions of The Wildlife and Countryside Act 1981. Despite this legislation breeding sites continue to be lost. It was felt that the development of a practical method for the captive rearing of *T. cristatus* would form an essential element of a successful conservation programme.

The limited published literature on the captive rearing of *T. cristatus* advocates release, into the wild, of larvae which have grown to a appreciable size in late summer (BHS 1983).

The objective of the programme was to rear *T. cristatus* from egg to mature adult with subsequent release of breeding pairs. The inherent advantages of adult release were considered to be:

1. Adults are less vulnerable to predation.
2. Overwintering losses of adults are relatively few compared to juveniles.
3. It is thought that the newly metamorphosed newts are the main colonizers of new ponds. Hence it was thought that sexually mature newts would be more likely to remain in the pond they were introduced to.
4. Most importantly, juveniles may take 3-4 years from release date to achieve maturity; during this time they are susceptible to many mortality factors.

METHOD

Sterilized aquarium gravel was placed in two identical tanks, of dimensions 0.45m x 0.3m x 0.6m, to a depth of 4cm. Twenty Twisted Vallis *(Vallisneria spiralis* form *tortifolia)* plants were rooted at equal spacing in each tank. This plant has the advantage of being both a good oxygenator and a favoured substrate for oviposition. Each tank was filled with tap water and left to equilibrate for 14 days. Then four breeding pairs were introduced into tank (a) and oviposition followed for a period of 10 days. From this approximately 20 *T. cristatus* eggs were placed in tank (b) with their respective plant host. Further plant hosts were removed from tank (a) so that approximately 100 *T. cristatus* eggs remained in tank (a).

After approximately 14 days the first eggs hatched. Of the 100 eggs in tank (a) 51 successfully hatched. Nine of the 20 eggs in tank (b) successfully hatched.

FEEDING REGIME

In both cases the range of food was identical. Initially Daphnia and White Worm were supplied but later the diet was widened to include Common Earthworm. However the volume of food introduced into tank (b) was maximum possible allowing for tank hygiene, where-as in tank (a) the feeding regime was significantly less.

METAMORPHOSIS

For the purposes of comparisons the newts were considered to have metamorphosed on leaving the water. To facilitate this two-storeyed polystyrene rafts were added. It was considered that

the moist humid conditions provided by this structure would prevent desiccation by providing the necessary humid terrestrial conditions.

In addition it proved necessary to roof over the tanks with tightly fitting glass, with any gaps plugged with plasticine in order to prevent newt escape. Feeding was achieved by means of a 8cm diameter hole cut in the centre of the glass. Not only did it successfully prevent escape but humidity was also sustained by this method.

RESULTS

The larvae in tank (a), as expected, took 12 weeks to metamorphose. In contrast the larvae in tank (b) successfully metamorphosed after only 8 weeks. However very little difference was apparent in the relative sizes of the young newts immediately after metamorphosis.

Interestingly, incidents of larval aggression and cannibalism (tail nibbling) were not observed in tank (b) unlike tank (a) where extensive damage of limbs and tails was routinely observed.

Surprisingly the sustained high volume feeding regime of tank (b) resulted in markedly accelerated growth rates of the juveniles.

By Spring, 36 weeks from egg hatch, the newts in tank (a) had achieved a mean length of 9cm with a maximum length of 9.5cm. By this time the newts in tank (b) had grown substantially to a remarkable mean size of 12.7cm with a maximum length of 13.5cm. Moreover the newts in tank (b) were exhibiting characteristics associated with sexual maturity: Appearance of crests, development of breeding colouration and courtship behaviour was observed.

Captive newts not allowed to hibernate do not come into breeding condition (P. Wisniewski 1989). It was felt that in view of the sexual behaviour exhibited by the captive reared newts in tank (b) external stimuli would promote further maturation. Therefore on the 14th May 1989 2 females and 4 male newts from tank (b) were released into a purposely selected garden pond. The pond was previously surveyed to confirm both the absence of Great Crested Newts in this pond and neighbouring ponds. Previous survey data revealed the nearest Great Grested Newt colony was some 3.5 kilometres distant.

To assist newt recognition distinctive belly patterns were photographed and morphological dimensions recorded.

On the 8th June 1989, some 3½ weeks after release, Great Crested Newt eggs were detected on Water Forget-me-not *(Myosotis scorpioides)*; these were confirmed by Rick Parker of the LTNC Great Crested Newt Group. The following day a male newt was recaptured and identified as being one of the tank (b) specimens using the belly pattern photographs. On examination the newt was found to have a crest of 1.2cm in height. A female was observed laying eggs on Water Forget-me-not *(Myosotis scorpioides)* on 20th June 1989, recaptured and confirmed as an individual from tank (b) from her belly pattern.

Water Forget-me-not *(Myosotis scorpioides)* containing Great Crested Newt eggs was transferred to an indoor tank. To confirm viability of eggs these were reared as previously described.

DISCUSSION

These remarkable observations have obvious implications for Great Crested Newt conservation. Using the techniques described it is possible to minimize the many mortality factors Great Crested Newts experience in developing from egg to adult, which in natural conditions would otherwise take 3-5 years.

The application of these techniques on a national basis would ensure the rapid establishment of new Great Crested Newt colonies. Thus it is possible to introduce Great Crested Newts into areas that current distribution maps clearly show to be deficient in this species. However a thorough assessment of both the proposed introduction pond and the surrounding terrestrial

habitat should be made to ensure the conditions are suitable for Great Crested Newts. It is thus theoretically possible to connect areas of high pond density (which are preferred by Great Crested Newt) through the use of 'Pond-ways' that are occupied by Great Crested Newt. Such a scenario enables continuity between populations facilitating genetic exchange.

ACKNOWLEDGEMENTS

The successful completion of this paper bears witness to the assistance of Robin Grayson, Andrew Mullaney and Rick Parker (members of LTNC Great Crested Newt Group).

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