BREEDING GREAT CRESTED NEWTS *TRITURUS CRISTATUS CRISTATUS* IN AN OUTDOOR ENCLOSURE

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The Great Crested Newt is now recognised to be the second rarest amphibian in Great Britain, and is apparently absent from extensive areas of the north and west, as well as from the whole of Ireland. It is regarded as a predominantly lowland species, which explains its absence from the more mountainous parts of Wales, Scotland, northern England and Cornwall. The breaching by the sea of the landbridge between what is now the United Kingdom, and Ireland presumably took place after the last Ice Age, and before *Triturus cristatus* could reach and cross it, thus preventing colonisation of the latter land-mass.

In Suffolk, the terrain is comparatively low-lying and flat and, over most of the county, the soils are predominantly clay-based. The landscape was, until fairly recently, a mixture of arable and livestock agriculture, with smaller areas of deciduous woodland, marshes and fens. This did not apply to the Brecklands of the north-west, or the coastal "Sandlings" belt, which consist mainly of sand-based soils, and have their own distinctive range of habitats.

It is likely that, prior to the agricultural revolution which began during the last war, and which continues to accelerate, *Triturus cristatus* was a comparatively abundant species in Suffolk, using the many field and village ponds, farmhouse moats, and dykes as breeding sites. A survey which I am presently conducting to determine the distribution of the county's herpetofauna, suggests that *T. cristatus* is still extensively if somewhat locally distributed across the clay soils, although it is strangely absent from the light sandy soils of the northwest and east. Even today some colonies are quite large, possibly consisting of several hundred individuals. It is reasonable to suppose that, given suitable breeding sites and terrestrial conditions, ailing colonies could be revitalised and new ones established, for example in large garden ponds, or ponds in disused gravel pits.

Although *T. cristatus* is not generally considered to be as adaptable in its choice of breeding sites as *Triturus vulgaris* (which is widespread over most of Suffolk including urban areas, the Brecklands and the Sandlings), I have occasionally encountered it breeding in apparently unsuitable and unlikely surroundings, e.g. in semi-subterranean concrete drainage tunnels alongside the main East Suffolk railway line. In view of the declining status of the species in Suffolk and of possible future opportunities for introductions or re-introductions, particularly in my local area, I have been carrying out a captive-breeding project since 1981.

The original nucleus of my present breeding colony was collected during the autumn of 1980, mainly from a site on a common in Norfolk where the sole remaining pond, in an old marl-pit, had been drying out progressively earlier in the summer for some years. This had a correspondingly disastrous effect on recruitment. A series of personal visits to the sites made between 1976, when I first became aware of it, and 1980 revealed findings which suggested that juvenile newts were rare or absent, with only large adult specimens being encountered, often only after extensive searching. Therefore, when I decided to set up the project, I felt justified in collecting my breeding stock from this apparently declining site.

In the spring of 1981 I had a large outdoor enclosure built to my own design, and specifically intended for the native amphibians of our local area. The soil in my garden is reasonably well-drained, except during prolonged periods of heavy rainfall when it becomes water-logged, and is heavy and clay-based. This has ensured that the enclosure has been eminently suitable for amphibians from a terrestrial aspect. The overall dimensions are 14' × 7' with a wall height of 2 feet, the walls being constructed of 18" × 9" × 4" solid concrete blocks. The enclosure is located in a sheltered but sunny and largely unshaded position. This last consideration is particularly important as, although newts in their terrestrial phase are not at all fond of exposure to sunlight, their breeding-pool needs to receive as much as possible during the spring and summer. I should

add that the walls of my entire reptiliary complex, which comprises three separate enclosures adjoining each other, are all capped with roofing "pin" tiles cemented on crossways, which gives a 3" overhang on each side of every wall. This not only effectively prevents the occupants from climbing out but, in conjunction with nylon fruit netting stretched across the entire complex, helps to prevent access by predators such as cats, rodents and birds.

After the builder had completed the basic structure, I was left with an interior consisting of stamped down, impacted soil, liberally sprinkled with pieces of mortar from the wall construction. The next logical stage was the installation of the pond and, because of the restricted area of the enclosure, and a shortage of time in which to get the project under way, I opted for a pre-moulded fibreglass type (Lotus "Mallard"). By the standards of natural Crested Newt colonies, which are generally considered to favour larger, deeper ponds (Steward, 1969; Smith, 1973) this was tiny, with a length of about 6 feet, a maximum depth of 18 inches and a capacity of 75 gallons. In fact it did turn out to be unsatisfactory, but for a different reason. The terrain around the pond was then planted with a mixture of low-quality turves which were allowed to grow "rough", interspersed with a wide selection of ground-covering plants. The latter included *Pulmonaria sp.;* ornamental dead-nettles; ivies; hardy ferns; *Primula sp.;* phoxes; and *Rubus tricolour,* a rapidly growing thornless bramble originating from Western Asia. Piles of dead bark and a number of pieces of rotten wood placed in the vegetation provided additional refuges, giving damp conditions and shelter from sunlight.

The pond was originally planted with a variety of oxygenating, floating and marginal plants, including a water-lily but, following its subsequent replacement, its successor was planted more selectively.

Ten adult newts (6♀♀; 4♂♂) released into the enclosure pond in mid April 1981, settled in readily and bred successfully. In early August, to ease overcrowding, I collected over 20 well-grown larvae and released them at a local site. At the end of September another 6 metamorphosed juveniles were released at the same site, and during the following year yet another 6 from this first generation.

The severe winter weather of December 1981 left the terrestrially hibernating newts unscathed; by this time I had constructed a brick-built hibernation chamber in the southwest corner of the enclosure and, packed with moss and insulated with hessian sacking draped over the asbestos roof, it was not penetrated by frost. Even so, most newts, in company with frogs, toads and salamanders then occupying the enclosure, chose to hibernate under the larger pieces of wood lying in the vegetation.

The newts which chose to return to the pond to hibernate were less fortunate, and all four died under the thick ice; together with several adult Common Frogs *Rana temporaria.* This aspect of captive *T. cristatus* behaviour interests me because, each winter, a proportion of the colony returns to the pond, and this often includes several juveniles in addition to perhaps 50% of the adults. During mild spells it is noticeable that the males are developing their breeding attire and courtship normally begins in late February when the terrestrial adults also begin to appear in the pool. Adult palmate newts *Triturus helveticus,* recently introduced into the same enclosure, have displayed similar tendencies, but *T. vulgaris* has never been seen to overwinter in either the enclosure pond, or any of my garden ponds.

During 1982, the juvenile Crested Newts retained from the 1981 season grew rapidly, and I decided to release some of the original breeding adults at an existing site. By the spring of 1983 these first generation captive bred newts were sexually mature and were breeding.

The original pond had meanwhile proved to be less than ideal, mainly due to its comparatively small surface area in relation to its depth. Combined with the shading effect of the enclosure walls during early spring, this factor resulted in a pool which maintained low water temperatures until well into the season. Even during the summer the deeper part of the pond was always decidedly cold, and the metamorphosis rate of newt larvae was correspondingly retarded, with some juveniles emerging as late as September or October. In the summer of 1983 I removed this pond and substituted a semi-rigid pvc shape (Remanoid "Tynedale") which although only having a capacity of about 60 gallons and a maximum depth of 15 inches, possessed a proportionately greater surface area. This has proved to be a worthwhile modification, and 1984

was a particularly successful season. Other beneficial changes have been the more rigorous selection and control of water plants, resulting in more open areas in the pond (which Crested Newts seem to prefer), and a strict control on the number of adults in the colony at any given time. The latter consideration is of particular importance when breeding *T. cristatus* in a confined area. A "top-heavy" population of this species in such a small pond will result in heavy predation of their own larvae and will prove to be counterproductive. In the case of an enclosure such as my own, no more than 6-8 adults are necessary or desirable during the breeding season. The sex ratio should be about evenly balanced. Under these conditions it should be quite feasible to have 20-30 fully metamorphosed juveniles to spare at the end of each season, and to be able to release a similar number of larvae at earlier stages in their development, which will also alleviate overcrowding.

Feeding an outdoor colony of newts presents few problems whilst they are in their terrestrial phase; earthworms are abundant in our heavy soil and come to the surface on damp nights, when the newts are most likely to be foraging. However, once the newts have gathered in the water additional food will be necessary, in the form of earthworms, tadpoles, etc. I also provide food, in the form of *Daphnia* and *Cyclops* for the newt larvae during the later stages of their development.

As previously mentioned, plant life in the pond is rigorously controlled and is now limited to oxygenators in the form of Canadian pondweed *Elodea canadensis;* Hornwort *Ceratophyllum demersum;* Water soldier *Stratiotes aloides;* and a foreign variety of water milfoil which I have been unable to identify. All of these species have proved popular as egglaying sites as has the blanketweed *Spyrogyra* which I did not deliberately introduce, but which provides excellent cover for newt larvae.

This artificial environment has also been suitable for Common Newts which have bred alongside their larger relatives in considerable numbers until recently when I began weeding them out and relocating them in the garden ponds in order to make room for a thriving colony of Palmate Newts, moved in from another enclosure. Although Common and, latterly, Palmate Newt larvae have provided additional food for both adult and larval Crested Newts, there is little doubt that the situation is reciprocal, and that adults of the smaller species attack *T. cristatus* larvae.

In conclusion, it seems that, although *T. cristatus* is localised, scarce or even absent in many parts of the country, it is a species which can be bred under captive conditions in an outdoor enclosure. However, it does need a reasonable amount of room, and previous experience with this species in captivity has led me to consider that it is difficult or impossible to breed in the aquarium or in a very small outdoor enclosure. Once the species does establish iteself, it seems to do well and produces significant quantities of offspring. Subspecies such as *Triturus cristatus carnifex* appear to be less fussy in captivity and can be bred in tanks.

Finally, it should be stressed that this species is now protected under the Wildlife and Countryside Act 1981, and a licence is necessary before specimens can be taken from the wild. In most cases it is preferable to obtain captive bred specimens, or those from sites threatened by destruction.

REFERENCES

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