OBSERVATIONS ON THE DEFENSIVE BEHAVIOUR OF THE CRESTED NEWT *(TRITURUS CRISTATUS CARNIFEX)*

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In 1984 I started a program of study on population dynamics and behavioural ecology of the Crested newt *(Triturus cristatus carnifex)* in a pond near Turin (North-western Italy), and in order to follow the migrations of the animals, I built a Drift-fence with several pit-fall traps, as described by many herpetologists (Harrison & others 1983; Van Gelder, 1973).

I don't want to deal with the results of this research, but instead to mention a particular behaviour observed in newts in terrestrial phase.

When I picked them up from the traps, they assumed a particular position with the tail all rolled up, the head turned on one side of the body, and the eyes closed, emitting in the meantime a sharp smell, and, if they were excited further, secreted a whitish exudate, obviously venemous.

It is clear that this is a defensive posture, observed in several species of salamanders and newts by Brodie (1977), and he associated this behaviour with the aposematic belly coloration of these animals. I have pointed out that the Crested newts usually don't make visible their belly when they are touched, and so I don't think that the coloration of this part of the body is useful in defending themselves from terrestrial predators.

I suppose that defensive behaviours may be divided in two different phases: the first consists of the mentioned posture, that makes evident a small yellow spot at the junction of the tail in the males, and a yellow stripe in the females.

In my opinion these are the real aposematic signals, directed towards small terrestrial enemies, such as Shrews (Brodie, 1979). The tail becomes the more evident part of the body, and therefore it is often eaten, and in fact I have found many newts partially eaten or without the tail in the traps, perhaps plundered by Shrews or other small mammals.

The Shrews are small enough to remain caught by the defensive behaviour of the newts and by their sharp smell, and after having found the tail disgusting and inedible they go away.

The yellow spot in the tail of the males may have another function in the courtship parade, when it becomes a signal of attraction for the female, but the two meanings may co-exist.

When the enemy is a greater animal we can observe the second phase of the defensive behaviour, since a simple exhibition of the small spot as described above is useless.

At this point the newts may make visible the yellow-orange belly, with a new aposematic significance, making the animal associate the bad taste of the newt with the coloration. Another observed behaviour is the attempt of the newts, especially the females to bite the aggressor, when they are squeezed in the back of the body.

I don't know if this is a defensive behaviour; or a reaction to the pain, considering that only on rare occasions the animals are able to reach the enemy who attacks them.

It is interesting to observe that the newts lose their rigid position when they touch the water and swim away. A defensive position in the water is described by Sparreboom & (1984) in genera *Paramesotriton* and *Allomesotriton,* where the males are very territorial.

The position of the animals in the water is very similar to the one assumed by terrestrial Crested newts, with the body curled sidewards around the head of the attacker, the eyes closed till the attacker loosens its grip.

The belly coloration could have a significance also in the water, i.e. against the attack of fishes or other aquatic animals, and in fact the dorsal coloration is well camouflaged, and defends the newts from attacks coming from above, while the belly coloration defends them when the newts must go to the surface to breathe.

Summing up, the defensive behaviours of the Crested newt are:

1) TERRESTRIAL PHASE
   — Defensive rigid posture, with the exhibition of yellow spot under the tail, with extrusion of venemous material.
   — Exhibition of belly coloration against greater attackers.

2) AQUATIC PHASE
   — Rapid flight
   — Attempt to bite the enemy, (behaviour observed also in terrestrial phase).
   — Camouflage coloration, exhibition of the belly against fish attacks.

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