

## Decline of the Native Crayfish

Of the 640 varieties of crayfish which exist globally only one is indigenous to Great Britain; the White-clawed Crayfish, *Austropotamobius pallipes*, the largest native fresh-water invertebrate in the country. It is possible that the White-clawed Crayfish is facing extinction in the UK in the next thirty years.

This was the central theme of a course I attended recently on the subject of Crayfish Ecology and Identification, run by Martin Pugh and Rebecca Banks of the Essex Wildlife Trust. My interest in the subject stems from living next to the River Roding and observing the inexorable spread on this river of the alien species *Pacifastacus leniusculus*; the Signal Crayfish, sometimes called the American Crayfish. Other alien introductions, such as the Turkish, Red Swamp and Spiny-cheek Crayfish are also now established in this country but the scale of infestation is much less widespread. For that reason, these notes are confined to the damage being done to our native stock by the Signal Crayfish. So far, no solution to the displacement of the native White-claw Crayfish by the alien Signal has been identified. This short article describes both types of crayfish and explains why the White-claw is so vulnerable to the effects of the Signal Crayfish, as well as outlining the steps being taken to try to buy time in the hope that an effective method of conservation can eventually be devised.

First, a note on terminology: For the purposes of describing crayfish, there are four principal anatomical parts. The main body of a crayfish is the Carapace. This is the hard shell covering of the body section which includes the eyes, and from under which the eight legs and two claws emerge. Next are the two claws, more accurately called the Chelipeds. The claws on both (and most other) species can regenerate if lost and it is common to find crayfish with claws of unequal size, the smaller one being a replacement limb. The tip of the crayfish is called the Rostrum. The standard method of sizing crayfish is to measure the dimension from the back of the Carapace to the tip of the Rostrum. Finally, the rear part of the crayfish body, which projects from the back of the Carapace and ends at the fan-like tail is the Telson.

White-clawed Crayfish grow to a maximum of 12cm. They have a pitted brown carapace, and a sharply triangular rostrum. The most reliable identifiers are a series of short, downward-pointing spines on the rear edge of each side of the carapace, which, even on a juvenile, can be felt by sliding a finger along the edge. Typically there are about three spines on each side. The other obvious feature of the White-claw is the colour of the underside of each claw, which varies between white and pale pink, thereby giving the species its common name.

By comparison, the Signal Crayfish is a monster, growing up to 30cm. The Carapace is smooth and the undersides of the claws are red. The rostrum exhibits a distinctive spiked "shoulder". The common name derives from white "signal" spots found in differing levels of prominence on the claw arms. Signal Crayfish were introduced into the UK in the 1970s for aquaculture. The would-be farmer needed only a pond which he seeded with juvenile crayfish supplied in a glass phial. The growing crayfish required little feeding or other attention and the farmer simply sat back and waited before eventually selling the maturing crayfish to restaurants. As with grey squirrels, Japanese knotweed and other deliberate introductions before them, the Signal Crayfish were not part of the balanced ecological chain which, undisturbed, prevents any one species from disproportionately dominating its environment. The first thing the Signal Crayfish did was to climb out of their breeding ponds and walk across land to other water courses.

Signal Crayfish have an arsenal of advantages over the native White-claw and total displacement by the dominant alien will generally be complete within 4 to 7 years. Their greater size is an obvious factor and this is made more significant by the highly aggressive behaviour they display in comparison with the more docile native. Signals can survive for extended periods out of water, allowing them to migrate long distances over land and also to tolerate prolonged drying out of their habitat. The diets of both species have much in common, placing them in direct competition with each other for food but, critically, that diet includes small invertebrates. This means that, adult for adult, the White-claw is prey to the Signal. Other factors which extend the dominance of the Signal include its prolific fecundity, the female carrying 200-plus eggs. It is also highly tolerant of water pollution, in direct contrast to the White-claw, which can be eliminated from more than a mile of river by as little as a spoonful of sheep dip leaching into the watercourse. However, even more damaging to the White-claw than these factors is the spread of crayfish plague. The disease was introduced to this country on Signal Crayfish, which are immune vectors of it, and White-claws have no defence against it. While infection through direct proximity of the two species clearly poses the greatest risk of transmitting plague to the White-claw, accidental infection through human activity is also possible. Few anglers moving from one fishing ground to another are likely to stop and consider whether they may be carrying plague with them, but if their first angling session is at a point where Signal crayfish are present, it is probable that their footwear will be contaminated, and will carry the disease to wherever they next settle down to fish, unless they first disinfect themselves, their clothing and all their equipment.

The conservation industry has yet to identify any effective method of controlling the spread of Signal crayfish, and crayfish plague, and the eventual total extinction by displacement of the White-claw, which is forecast to be complete within 30 years. Research into possible selective poisons targeted at Signals is unlikely to be successful because the White-claw appears to have no unique tolerance to anything which might be used which could be exploited to protect it, thereby ruling out use of this method in the relatively uncontrolled environment of flowing waters. Mass trapping of Signal crayfish cannot hope to eliminate them because of the impossibility of catching all the juveniles. Indeed, it is believed that trapping mature adult Signals may make matters worse because evidence suggests that when the largest breeding adults are removed from a Signal colony, the remaining population begin to breed at an earlier age.

What then of the future? Legislation offers only a token framework in which to tackle the unequal struggle for survival of the White-claw, in the form of two specific parts of the Wildlife & Countryside Act 1981 (as amended). Under the Act, crayfish may not be taken or sold without written permission of the Environment Agency and Signal crayfish may not be released or allowed to escape into the wild, which means that once they have been caught, legally or not, Signals must not be returned to the water. There is little evidence that either of these restrictions is generally understood, or enforced. The Essex Wildlife Trust and other conservation organisations are working to establish isolated colonies of White-claw in controlled areas of still water, where regular surveying confirms no presence of Signal crayfish. However, the mobility of the Signal means that this will only ever be a temporary measure. Research into possible solutions continues but, for the moment, this is a story without a happy ending.

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