Trout Talk

NO SEX PLEASE, WE'RE TRIPLOIDS

Paul Gaskell, of the Wild Trout Trust, puts forward a compelling case for stocking with infertile fish – if indeed you need to stock at all

LAST MONTH WE suggested that the stocking policy of angling clubs on rivers should reflect how many adult fish their stream will physically retain. We also tossed out the radical suggestion that it may well be unnecessary to stock your river at all. In fact, given the broad improvements to river water quality over the past 20-30 years and the miles of perfectly suitable river habitat in the UK, it is a little surprising that supplementary stock-fish are generally assumed to be obligatory. It is, perhaps, to do with the fact that it has been done that way for so long already. So, to continue the theme from last month's question-and-answer session...why on earth would you go over to operating as a wild fishery?

For a great many anglers, sliding a wild fish over the lip of their landing net is simply that bit more satisfying and given the choice, few would prefer a stock-fish over a wild fish. When stocking is reduced or discontinued, your club will reduce its costs – and those funds could be put towards improving the fishery through modern habitat management (the bread and butter of the WTT through free consultancy services). Don't overlook the possibility that your catch returns might actually go up! For example, between 2000 and 2008, on the Cressbrook and Litton Fly Fishers' water on the Derbyshire Wye, daily rod average calculated at the end of each year actually increased as fewer stock-fish were added (stocking was reduced from approximately 2,000 fish in the year 2000 to approximately 500 fish in 2008).

But what is a wild fish, anyway? This is best defined in a functional manner and should include any stream-spawned fish populations that can thrive in the wild under their own steam. In fact the strength of wild fish is actually the complete opposite of the popular idea of some kind of pure-bred "Aryan super-race". Wild fish are mongrels in the best sense of the word, as we shall see...

Apart from the aesthetic considerations, they are much better than hatchery fish at surviving and reproducing in a stream. On average, hatchery fish typically achieve only ten per cent of the survival and reproduction rates of wild fish. Hybrids between hatchery and wild fish average only 50 per cent of the survival and reproduction of "wild x wild" fish mating.

In the UK, genetic variation in native trout populations is much, much greater than in heavily inbred hatchery fish. This is not to be disparaging of stocked fish, but is simply a necessary by-product of the domestication required to produce attractive fish and avoid excessive mortalities/distress under hatchery conditions. However, when it comes to life outside the hatchery, genetic variability equals adaptability – like holding 15-30 cards per hand when playing poker (compared to, say, five cards held by hatchery fish).

To take the card-playing analogy of the game of life even further, hatchery fish are good at growing fast in hatchery conditions (this is where they hold their aces). By stark contrast, hatchery fish are not very good at predator avoidance, holding station and feeding efficiently in-stream or successfully choosing mates and breeding (they have fewer high-value cards in these suits).

"You could easily be wasting two-thirds of the fish that you are stocking"

Clients of the WTT frequently say, "We've been stocking for years – surely there are no wild fish left in our river?"

Although on average we have already irreversibly lost around 25 per cent of wild trout genetic variation through fertile stock-fish introductions, there is still 75 per cent left – so long as we stop the rot. The relatively slow average rate of loss is due to the poor survival and reproduction of "hatchery x wild" breeding in comparison to "wild x wild" matings. This slows the rate at which offspring pick up hatchery genes and lose wild ones. However, it also reduces the total number of fish in the stream-bred population by sending a proportion of wild fish breeding efforts down a "blind alley". In some cases, this may, indeed, lead to the remaining wild fish population being too small to be self-sustaining. It goes without saying that it is worth avoiding this situation.

Stripping eggs from a ripe hen fish ready for fertilisation with milt. Fertilised eggs would be subjected to heat/pressure in order to produce sterile offspring.

A triploid stock-fish. Is a myth that they are less free-rising than diploids?

From 2015, a change in the law will mean that only sterile stock-fish may be introduced into water courses. Why, you may ask, is this necessary? Simply as the best available measure, where stocking is carried out, to protect the remaining 75 per cent of genetic variability in wild fish. This variation is not present, nor can it be recreated, in hatchery-fish populations.

The current best method of producing sterile fish from the existing fertile hatchery strains is to subject fertilised eggs to heat/pressure. The eggs are taken from a female broodstock fish as normal. The sperm used to fertilise the eggs is, remarkably, also produced by female broodstock that produce milt in response to a hormone dose.

The offspring that grow on from these eggs carry all the same genes as the normal female hatchery broodstock – but they are unable to produce viable eggs of their own. The reason is that, instead of having pairs of DNA strands or chromosomes (so called "diploidy"), the heat and pressure cause the chromosomes to occur in threes ("triploidy"). When triploid cells come to divide and form reproductive cells (eggs or sperm), the chromosomes don't physically separate in the same neat way that normal paired chromosomes do – and are consequently infertile.

No genetic material is added or taken away and we are certainly not dealing with "genetically modified organisms" (GMOs). Diploids and triploids of a particular hatchery bloodline have the same genetic code inside them. By contrast, GMOs have genes from completely separate species inserted into their cells using microbiological techniques.

The take-home message is that triploids are the infertile offspring of hatchery broodstock hen fish. It is also worth noting that both triploid and diploid stock-fish are a product of the fish farmer's skilful interventions under artificial conditions to the natural breeding process.

As we discovered last month, diploid stock-fish also compete with and potentially prey upon native fish stocks. Although triploids should potentially have better survival rates (due to conserving the energy normally used in reproductive efforts), in practice it has been observed that all stock-fish have really poor over-winter survival. This is true of both diploids and triploids.

Basically, if you have serious concerns about the competitive impact of introducing triploid stock-fish, you should be absolutely equally concerned with the impact that your diploid stock-fish are having. This is especially true when you consider the reproductive and genetic blind alley down which your fertile stock-fish are leading some of your wild fish.

It is a commonly held belief that triploids do not rise as readily as diploids do, but we have to be very careful of the power of suggestion here. We readily remember examples of what we expect to see and conveniently forget examples of what doesn't fit with expectation.

However, the soundbite of triploids being less free-rising has come from somewhere – and we must assume that some batches of triploids have behaved differently from batches of diploids in some fisheries. The real value here will be in the investigation into what may drive such a difference. For example, the propensity to rise could be equally due to feeding with floating pellets rather than sinking pellets.

Such learned behaviour has nothing to do with whether fish are triploid or diploid. It is also worth noting that there are many fish farms that can produce free-rising triploid fish – so the techniques and the suppliers do exist. The bottom line here is, if stocking is judged to be wrong or inappropriate, the effects can be reversed with triploids and this is simply not so with diploids. Similarly, if triploid stock-fish genuinely are not quite as satisfactory in an angling sense as diploids, then this may be a small price to pay to protect the remaining irreplaceable genetic material carried by the UK's native trout.

It may even be an argument for your club to cease stocking, switch to catch- and-release fishing and manage its river habitat for the native trout that live there.

● *Paul Gaskell works for the Wild Trout Trust and manages the Trout in the Town programme.*

Factfile

The Wild Trout Trust is always available to offer free advice on creating parr, spawning and adult habitat in your stream. Contact the Trust via its website at www.wildtrout.org or call 023 9257 0985.