SEX PLEASE, WITH 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 tuned 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 pulse of perfectly suitable river habitat in the UK, it is a little surprising that supplementary stocking is generally assumed to be obligatory. Is it, 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 to the time and effort of operating as a wild fishery?

For many many anglers, sliding a wild fish over the lip of their landing net is simply that bit more satisfying and given the choice, you would prefer to stock a river with a wild fish. When stocking is reduced or discontinued, your club will reduce its costs — and those funds could be put towards improving the fisheries through more efficient habitat management (the brush and butter of the WTT through, for example, consultancy services). Don’t overlook the possibility that your catch returns might actually go up! For example, between 2000 and 2008, on the Greenbrook river in Pennsylvania, USA, overfishing winter steelhead (on the Derwentshire Wye, for example, a true wild fish) when catch rates averaged at the end of each year actually increased after stocking was reduced (from 4000 fish in the year 2000 to approximately 3000 fish in 2008). Fly-fishing for a wild fish, anyway? That’s best defined in a functional manner and should include any stream systems that sustain populations that can thrive in the wild under their own power. In fact, the strength of wild fish is actually the complete opposite of the popular idea of rearing kind of pure-bred ‘Ayrshire super’ fish. 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 averages 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 disparage stocking efforts, but is simply a necessary by-product of the domestication required to produce attractive fish and avoid excessive mortality/disease/tressure under hatchery conditions. However, when it comes to life outside the hatchery, genetic variability equals adaptability — like holding 35-50 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 much greener at growing fast in hatchery conditions (this is where they hold their own). By stark contrast, hatchery fish are not very good at predator avoidance, hiding, and feeding efficiently in stream or successfully choosing mates and breeding (they have fewer high-value cards in these suits).

A trialed stock fish is a myth that they are less free-rising than diploid.

reproduction of ‘hatchery x wild’ is breeding in comparison to ‘wild x wild’ mating. This down 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 bed population by speeding production of of the fish that you are stocking’.

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.

From 2013, a change in the law will mean that only sterile stock fish may be introduced into water courses. Why you ask, is this necessary? Simply as the best available measure where stocking is carried out to protect the remaining 35 per cent of genetic variability in wild fish. This variation is not present, nor can it be resurrected, in hatchery fish populations.

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

The ‘clumping’ 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 three (‘triploidy’). When triploid eggs come to divide and form reproductive cells (eggs or sperm), the chromosomes don’t physically separate in the same 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 line have the same genetic code inside them. But, contrary, 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 stock. Although triploids should potentially have better survival rates (due to conserving the enzymes normally used in reproductive effort), in practice it has been observed that all stockfish 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 stockfish, you should be absolutely equally concerned with the impact that your diploid stockfish are having. This is especially true if you consider the reproductive and genetic blind alley down which your live stockfish are proceeding, as we shall see.

It is a commonly held belief that triploids do not rise as readily as diploids, but we must assume that some hatch of triploids have behaved differently from batches of diploids in some fisheries. The real value here will be in the investigation of what drives such a difference. For example, the propensity to rise would be separately as 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 farmers that can produce triploids as well as diploids — so there are producers of suppliers do exist. The bottom line here is that stocking is judged to be wrong or inappropriate, the effects can be reversed with triploid and this is simply not so with diploid. Similarly, if triploid stock fish generally are not quite so reactive 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.

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