LET THEM GET ON WITH IT

Stripping wild broodstock and rearing the resultant fry is no guarantee of maintaining a healthy trout population, says Paul Gaskell of the Wild Trout Trust.

In most instances the fish really do know best...

April fry from a streamside incubator, or “eggbox”. Early mortality rates can be high in such systems.

A RURAL scene as winter proper sets in after Christmas: the faithful keeper of the stream diligently catching and stripping ripe wild fish of their eggs and milt; the little orange eggs placed lovingly in the incubation box, the black ribbons of baby fish entering the trout stream in March – destined to come to the fly of a lucky angler in the years to come.

Lovely images and, at first sight, seemingly the ideal way to boost the opportunity to fish for the trout (or, dare I say, salmon?) derived from your stream. Surprising, then, that in many cases the fishing may not improve much as a result of such efforts. How can this possibly be? Especially after all that work!

In fact, there is a long list of opportunities for this process to go astray. Just a small selection of pitfalls is considered here. The very first hurdle is apparent when we ask: “What would have happened if the broodstock were left to breed in the stream?”

The simplest account would be to say that they would obey their breeding urges as they came into full condition to mate. This involves making their way to the spawning grounds and selecting their ideal site and the ideal fish to pair up with. Each fish is genetically predisposed to choose the mate and breeding spot that gives the best chances for their offspring to thrive.

It is amazing to learn that fish actively choose their mates on the basis of all kinds of obscure characteristics – including those invisible to humans (such as smell and even the underlying compatibility of their genes). Even more amazing, those choices have been measured to result in increases in resistance to disease and increased survival in their offspring. The result is a generation of fish that are well equipped to survive and thrive in the stream of their birth.

What changes with human intervention? One of the most practically demanding problems is that when you capture broodfish, they are not all ready to breed at the same time. Therefore, fish must be kept in captivity until they are ripe. Most wild fish fare very poorly in captivity and the mortality rate is high. Death of broodstock also means losing the breeding contribution that those fish would have made if left in the stream. The surviving fish will be artificially selected as the ones that cope well with captivity – whilst breeding lines that are well adapted to “living wild” are lost.

To compound this, the element of choice exercised by the fish in the stream is also removed because the eggs and milt are combined by human hand. Scientists know some of the...
cases used by fish to choose their optimal mate to produce the best offspring, not that of compatibility (e.g., complementary immune systems) can currently be assessed or used to guide artificial breeding practices. As a result, genetic studies on fish from all wild brook trout on the River Douch showed that first generation offspring of wild brook trout were clearly genetically different from any of the broodstock that was present in the river system. In fact, studies find that even when every effort is made to ensure complete random mating in captivity, humans are not capable of avoiding biasing the results. We can’t make the optimum choices that the fish make themselves based on assessing their potential partner’s genetic compatibility. Moreover, the sheer number of brook trout that would be required to prevent inbreeding is a substantial loss to the trout production where wild fish are preserved.

Okay, but surely more eggs will hatch in captivity and more fry will be produced, right? Well, yes, but the conditions can be maintained (a lab-our-intensive task); the hatching rate will be much higher than that achieved in stream. But this rate is not guaranteed. Furthermore, in wild brook brook trout’s habitats, they nest in gravel or fine substrates. Differences in the gravel in the hatchers can influence the hatch rate. The biggest problem, though, comes from assuming that more fry equals more adult fish in the following years. Where this has been measured, the survival of fry in the stream depends on eggs can be poor and make little contribution to anglers’ catch. Studies on trout and salmon have shown that the artificial selection, and early rearing process can significantly hamper our potential to use these fish effectively and efficiently. The problem is that the fry produced in artificial streams have been reared in these streams and have not had the opportunity to learn to forage or adapt. These effects can occur with most of the fry produced in artificial streams. In other words, fry produced in captivity from wild parents are likely to be at a disadvantage compared to stream reared fish.

Fry have a lower survival rate in the stream because they have not learned to forage effectively. However, if the fry are stocked in the stream, they may have a better chance of survival. The fry are then more likely to adapt to their environment and become successful in the stream. This is why it is important to understand the fry’s needs and provide the appropriate conditions for their survival and growth. The fry’s success will depend on several factors, including water quality, temperature, and food availability. Proper management of these factors can increase the fry’s survival rate and contribute to the success of the fishery.

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