



Keys to larval and juvenile stages of coarse fishes from fresh waters in the British Isles

The Freshwater Biological Association (FBA) has published a set of identification keys to the early stages of British coarse fishes as the result of a collaborative research project, jointly funded and carried out by scientists from CEH, Dorset and the Environment Agency. The new keys allow scientists to identify coarse fish much earlier in the life cycle than was previously possible. The keys can be used to identify fish that are less than a month old, to species level. The difficulty of such identification, and the lack of good identification keys, has previously hampered the management and conservation of coarse fisheries.

Until now, very young coarse fish have been difficult to tell apart, even for ichthyologists. In the first month after hatching, these fish not only look similar, but also change a lot in both shape and markings. As a result, there has been considerable neglect of the early life stages of fish in the aquatic biology literature, even though recruitment to the next generation is one of the most important factors in the study and management of wildlife populations. The effects of young fish numbers on other species, such as their predators and competitors, are also under-studied.

A number of identification keys to young fish already existed, but they were incomplete, poorly illustrated or misleading because they were limited to a particular developmental stage. The most useful existing keys were written in Russian and have never been published in English.

The new keys cover 26 species of British coarse fish, including the sunbleak, *Leucaspis delineatus*, recently introduced into southern England. The keys exclude a small number of species with very localised distributions, and marine species that spawn in the lower reaches of some rivers. The author hopes to include the missing fish species in a later publication.

Pure-bred stock: The keys were devised using young fish specially reared for the purpose, at CEH, Dorset or at the Environment Agency's hatchery at Calverton, Nottinghamshire. This method avoids the risk of

including hybrids in the reference material. Once written, the keys were thoroughly tested using wild caught fish.

The key divides fish development into five easily distinguishable stages, and provides a separate key for each stage. This avoids confusion arising from developmental changes, for example when spots turn into stripes as a fish grows. In the first, embryonic stage, when the yolk sac is still present, 13 of the 26 species can be reliably separated. Once the yolk sac is lost, at least 23 species can be identified using these keys. By stage 5, when all the fins are fully developed, all 26 species are distinguishable.

Methods of sampling and examination: The book describes sampling methods for young fish. It outlines a standard protocol for preserving specimens and offers advice on how to examine them. In most cases, a microscope is needed for identification. Some of the characters used to identify fish are difficult to see and may require practise, such as the numbers of pre- and post-anal muscle bands (myomeres), or the patterns of internal pigmentation. The book provides very clear pictures, both line drawings and photographs, interspersed with the text for ease of use.

The Environment Agency hopes the keys will stimulate research into the ecology of fish populations, as well as helping its own staff to monitor and conserve precious freshwater communities.

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