

## Biodiversity of Freshwater Fish in Spain (Appendix three)

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Spain is not home to a large number of freshwater fish. There are no more than one hundred different species. A low number compared to many European countries but the fish it does have exhibit a higher number of sub species than is generally found elsewhere in Western Europe.

The strong biodiversity (a definition is given in the insert box shown below) plays a pivotal role in the well-being of Spain's varied freshwater ecosystems; rivers, natural lakes and reservoirs that in turn make a fundamental contribution to the quality of human life.

Nase represent a noteworthy example of the wide genetic diversity found among Spain's freshwater fish fauna. Though small in stature and unfamiliar to many anglers; it occupies just as an important niche in Spain's diverse natural environment as many larger more recognisable fish species.

Distinct sub-species of nase have evolved independently over millennia in isolated river systems. A new sub-species is discovered here every few years. There are at least ten separate types that may be caught by anglers in Spain.

Many small, isolated nase populations are coming under pressure for a variety of reasons. At least seven sub-species are under serious threat of extinction. Loss through hybridisation can be caused by the construction of new channels linking separate river basins.

For instance a canal constructed in south east Spain connecting the Júcar and Tajo-Segura river basins has allowed Iberian Nase to enter and out compete with Júcar Nase. The latter is endemic to Spain, it is found nowhere else, and its population has declined by more than 80% in the decade preceding 1995.

Barbel occupy an equally important place in Spain's natural environment – they offer broader appeal to anglers. Anglers may fish for eight different sub-species. However their numbers have declined in many regions due to many different reasons. In some areas they face extinction altogether.

The Orange Barbel, known locally as *Barbo de cola roja* (*Barbus haasi*) or *colirrojo* is endemic to Spain. It is very scarce and possibly extinct. A *Medio Ambiente* (environment agency) report in 15th March 2000 claimed that the

proposed dam construction at Salto de Jánovas in Huesca province (Aragón) probably dealt the deathblow.

Destruction of habitat plays a major part in damaging and reducing the biodiversity of Spain's freshwater ecosystems and its wildlife. Andalusia's slow growing Gypsy Barbel (*Barbus sclateri*) tends to hold up in small isolated water holes, called dry season refuges, during summer months of drought.

Dry season refuges have been decimated by water extraction for irrigation, and agricultural pesticide run off has contaminated the water that's left (go the section on barbel for more information).

The problem is made worse by invasive fish; non-native species like the tiny perca sol, originally from Central America, whose aggressive juveniles out-muscle barbel fry for limited food resources. In 2008 roughly one quarter of fish species found in Spain were found to be invasive.

Just under half of Spain's freshwater fish are endemic this proportion is significantly greater than found in France and the United Kingdom. There is a strong chance that any fish species lost to Spain would also be lost to the world. So maintaining the wide genetic diversity of fresh water fauna found in Spain today represents such an important issue.

The glossary at the end of this book contains further examples of fish species experiencing a decline in Spain.

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**What is Biodiversity?** Biodiversity is crucial for solving environmental challenges for example, global warming. It is often defined by the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

**How do we measure biodiversity?** By identifying new species, taking D.N.A. samples of plants and measuring their genetic diversity. Some plants have 2'300 more genes than others; some plants have 50 times as much D.N.A. in one cell than humans in their entire body.

Biodiversity helps to explain how the fish anglers are likely to catch perform a vital function in maintaining Spain's natural world. It explains their distribution and abundance.

Genetic diversity is important for species to adapt, survive and evolve. For instance fish populations with wide genetic diversity have a higher level of fertility and maintain a stronger resistance to disease.

Those populations whose genetic diversity is threatened experience higher levels of infertility and disease that frequently lead to a decline in their overall numbers.