Foreword

Otoliths are widely used as indicators of fish age due to their rhythmic growth properties that reflect fish age at daily and seasonal levels (Hickling, 1933; Pannella, 1971). More than 1 million otoliths are aged annually for stock evaluation purposes in fishery management (Campana and Thorrold, 2001). In addition, recent developments in the tools used for determining otolith's micro constituents, which are laid down in relation to the water mass the fish inhabits, have opened up possibilities of studying migrations and stock identity as well as using isotopes to reconstruct past water mass temperatures and fish's diets (Radtke, 1984; Mulligan, 1986; Campana and Zwanenburg, 1990; Campana *et al.*, 1994; Thorrold *et al.*, 1997; Campana and Thorrold, 2001; Swan *et al.*, 2003; Morales-Nin *et al.*, 2005). These properties have led to otoliths being called a fish's "black box".

Although otoliths were first used to determine fish age in the 19th century and chemical analyses were first carried out in the 1980s, other otolith features, such as form and size, have been widely used since ancient times (Hecht and Appelbaum, 1982; Campana, 1993; Torres *et al.*, 2000). As the Atlas' authors explain in the historical perspective, otoliths have been considered to have magical and medicinal properties as well as being used as ornaments. Charms have been made with large otoliths, like those of the Sciaenid, which are still used today. Spanish tradition envisaged an image of the Virgin Mary on otoliths, probably in relation to the notch on the dorsal side and the halo created by the growth increments.

Otolith form is species specific; the genetic controls of otolith development and shape are now under study (Whitfield *et al.*, 2002; Sumanas *et al.*, 2003; Sollner *et al.*, 2003; Anken *et al.*, 2004). This characteristic offers a useful tool for identifying species and systematic studies. Another interesting characteristic of fish otoliths is their durability (mainly the sagitta) due to their compact crystalline structure, which allows them to survive in soil and even for some time in acidic environments such as stomachs. This characteristic has enabled otoliths to be used to reconstruct past fauna from fossil remains, and diet and trophic chains from stomach contents of fish predators, such as marine mammals and birds (Hecht and Appelbaum, 1982; Smeenk and Gaemers, 1987).

In this context, the present Atlas is a very useful tool that covers the sagitta otoliths of 348 species, belonging to 99 families and 22 orders of marine teleostean fishes, from the north and central eastern Atlantic and western Mediterranean. It is therefore an extensive guide of morphological and morphometric descriptors. There is a careful description for each species, with excellent sagitta images and numerical descriptors, so that this Atlas goes a step further than previous ones.

The Atlas is the fruitful result of the collaboration between three scientists from different institutions and geographical areas, who started working independently and have combined their efforts to obtain a finished result that is more than the sum of its parts. Collecting otoliths from a wide range of species has required a long period of time; moreover, the Atlas has taken more than four years of work to write. I am personally very pleased to see the completed Atlas, which I hope has been in part a result of scientific discussions with the second author, who has successfully developed an old idea of mine. Nowadays, with the pressure to publish extensively in SCI journals, it is uncommon that scientists would dedicate the time, patience and loving care necessary to carry out such a detailed study.

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