



Abstract

Analysis of Bycatches of Two Related Anadromous Shad Species in Fisheries along the Galician Atlantic Coast (NW Iberian Peninsula, Southwest Europe) [†]

David José Nachón ^{1,*}, Alejandro Pico ¹, Rufino Vieira-Lanero ¹, Sandra Barca ¹, María del Carmen Cobo ² and Fernando Cobo ¹

¹ Departamento de Zooloxía, Xenética e Antropoloxía Física, Facultade de Bioloxía, Universidade de Santiago de Compostela, 15782 Santiago de Compostela, Spain; alejandro.pico.calvo@rai.usc.es (A.P.); rufino.vieira@usc.es (R.V.-L.); sandra.barca@usc.es (S.B.); fernando.cobo@usc.es (F.C.)

² Department of Biological Sciences, University of Alabama, Tuscaloosa, AL 35487, USA; mariadelcarmen.cobo@usc.es

* Correspondence: davidjose.nachon@usc.es

[†] Presented at the IX Iberian Congress of Ichthyology, Porto, Portugal, 20–23 June 2022.

[‡] Presenting author (Oral communication).

Abstract: Allis shad, *Alosa alosa* (Linnaeus, 1758) and Twaite shad, *Alosa fallax* (Lacépède, 1803) are two anadromous Clupeidae species that spend most of their life cycle in the marine environment, where they have a coastal distribution, entering the rivers only during the spawning migration. There is no commercial shad fishery at sea; however, due to their gregarious, shoal-forming behaviour close to the shore, they are frequently caught as “bycatch” along with the “intentional catches”. In fact, both species have been arriving at Galician fish markets (NW Iberian Peninsula) for several decades. Hence, it was necessary to conduct a study in order to gain a deeper understanding of the extent of this phenomenon. To this end, we analysed the statistics on first-sale fishing in the Galician Fishing Platform. In addition, specimens of the genus *Alosa* ($N = 345$, sold in first sales not as *A. alosa*) were acquired at the A Guarda, Malpica and Coruña fish markets, from January to March 2021, in order to determine their specific identity. Finally, additional information regarding the capture of the specimens (precise location of capture, bathymetry, fishing method, target species, etc.) was requested from fishermen. There are records of catches of specimens of the genus *Alosa* in 14 Galician fish markets, from 1997 to 2020. Catches of *A. alosa* were regular throughout the period 1997–2020, amounting to a total of 23,956 kg. Regarding *A. fallax*, it is surprising to note the virtual absence of records throughout the period studied and the high pulses in certain years, with truly exceptional catches (5950 kilos in 1998 or 7320 kilos in 2018). Examination of the number of gill rakers, showed that 59% ($N = 203$) of the acquired specimens were not *A. alosa*. Of these 203 misidentified specimens, 81% ($N = 164$) were *A. fallax* and 19% ($N = 39$) were hybrids. Most of the shads were caught in the midst of flatfish, hake or sea bass fisheries, with driftnets being the main fishing gear, and the fishing vessels involved were of different sizes (from large vessels to traditional boats).

Keywords: bycatch; anadromous species; European shads; hybridization; artisanal fisheries; fisheries statistics; administrative areas; NW Iberian Peninsula



Citation: Nachón, D.J.; Pico, A.; Vieira-Lanero, R.; Barca, S.; Cobo, M.d.C.; Cobo, F. Analysis of Bycatches of Two Related Anadromous Shad Species in Fisheries along the Galician Atlantic Coast (NW Iberian Peninsula, Southwest Europe). *Biol. Life Sci. Forum* **2022**, *13*, 57. <https://doi.org/10.3390/blsf2022013057>

Academic Editor: Alberto Teodorico Correia

Published: 7 June 2022

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Author Contributions: Conceptualization, D.J.N., R.V.-L. and F.C.; methodology, D.J.N. and A.P.; software, D.J.N. and A.P.; validation, D.J.N., A.P., R.V.-L. and F.C.; formal analysis, A.P. and D.J.N.; investigation, D.J.N., A.P., R.V.-L. and F.C.; resources D.J.N., A.P., R.V.-L. and F.C.; data curation, A.P. and D.J.N.; writing—original draft preparation, D.J.N.; writing—review and editing, D.J.N., A.P., R.V.-L., S.B., M.d.C.C. and F.C.; visualization, D.J.N. and A.P.; supervision, F.C. and R.V.-L.; project administration, F.C., R.V.-L. and D.J.N.; funding acquisition, F.C., R.V.-L. and D.J.N. All authors have read and agreed to the published version of the manuscript.

Funding: This work has been carried out within the framework of the project “Evaluación de las ‘capturas incidentales’ de *Alosa alosa* y *Alosa fallax* por la flota costera de Galicia: análisis del problema, sensibilización y proposición de medidas de gestión y protección (1MARDEALOSAS)”, which has the collaboration of the Biodiversity Foundation of the Ministry for Ecological Transition and the Demographic Challenge, through the Pleamar Programme, co-financed by the FEMP.

Institutional Review Board Statement: Protocols used in this study conform to the ethical laws of the country and have been reviewed by the ethics committee of the University of Santiago de Compostela and the regional government (Xunta de Galicia).

Informed Consent Statement: Not applicable.

Data Availability Statement: Data from this research are available from the corresponding authors upon reasonable request.

Conflicts of Interest: The authors declare no conflict of interest.