biology and life sciences forum

MDPI

Abstract

Lepomis gibbosus European Invasion Process: Niche Differentiation and Future Climate Scenarios †

Angela Lambea-Camblor [1], Felipe Morcillo [2], Jesús Muñoz [3] and Anabel Perdices [1,*,‡]

[1] Museo Nacional de Ciencias Naturales-CSIC, 28006 Madrid, Spain; angela.lambea@gmail.com
[2] Departamento de Biodiversidad, Ecología y Evolución, Facultad de Ciencias Biológicas, Universidad Complutense de Madrid, 28040 Madrid, Spain; fmorcill@ucm.es
[3] Real Jardín Botánico-CSIC, 28014 Madrid, Spain; jmunoz@rjb.csic.es
* Correspondence: aperdices@mncn.csic.es
† Presented at the IX Iberian Congress of Ichthyology, Porto, Portugal, 20–23 June 2022.
‡ Presenting author (poster).

Abstract: In recent years, ecological studies have highlighted the importance of niche in the invasion of new habitats by invasive species, stating that introduction into a similar niche is critical for rapid expansion into the new habitat. In this study, we focus on *Lepomis gibbosus* or Pumpkinseed sunfish, a centrarchid native to eastern North America that is among the top 10 introduced freshwater fishes with the greatest ecological impact globally. We compared their native and introduced niches in Europe based on occurrence data from three time periods (1900–1959, 1960–1989 and 1990–2021) using niche identity and background similarity tests. In addition, through MaxEnt software, we modelled present and future potential distribution of Pumpkinseed sunfish under climate change conditions. Our results show that *L. gibbosus* has significantly modified its niche in the process of invasion through Europe, highlighting the great adaptability of this species to higher temperatures and irregular water regimes. This niche differentiation clearly distinguished the European niche occupied by the invasive populations from the North-American-native niche, supporting previous studies that suggested that European *L. gibbosus* populations would not be able to survive in its native area. Our modelling results based on different future climatic conditions pointed out that temperature and precipitation are the most influential variables that could facilitate the establishment of sunfish on almost all continents. Globally, it is expected that Pumpkinseed sunfish will soon colonize the African continent, where there are already species that cohabit with this centrarchid. This reinforces the need to develop new prevention measures before its presence becomes irreversible, taking into account the role that climate change will play in its establishment.

Keywords: aquatic systems; biological invasions; climate change; pumpkinseed sunfish; species distribution models

check for updates

Citation: Lambea-Camblor, A.; Morcillo, F.; Muñoz, J.; Perdices, A. *Lepomis gibbosus* European Invasion Process: Niche Differentiation and Future Climate Scenarios. *Biol. Life Sci. Forum* **2022**, *13*, 6. https://doi.org/10.3390/blsf2022013006

Academic Editor: Alberto Teodorico Correia

Published: 2 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, A.L.-C., F.M., J.M. and A.P.; methodology, A.L.-C., J.M. and A.P.; writing-review and editing, A.L.-C., F.M., J.M. and A.P.; supervision, F.M., J.M. and A.P. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

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