

Clase

Efecto del clima sobre las comunidades de peces



Nicolas Vidal

Ictiología Neotropical



Contenido de la presentación:

Cambio global (clima)

Predicciones y abordajes

Efecto sobre las comunidades de peces

Distribución

Tallas (TSR, TCH), Reproducción

Match y mismatch

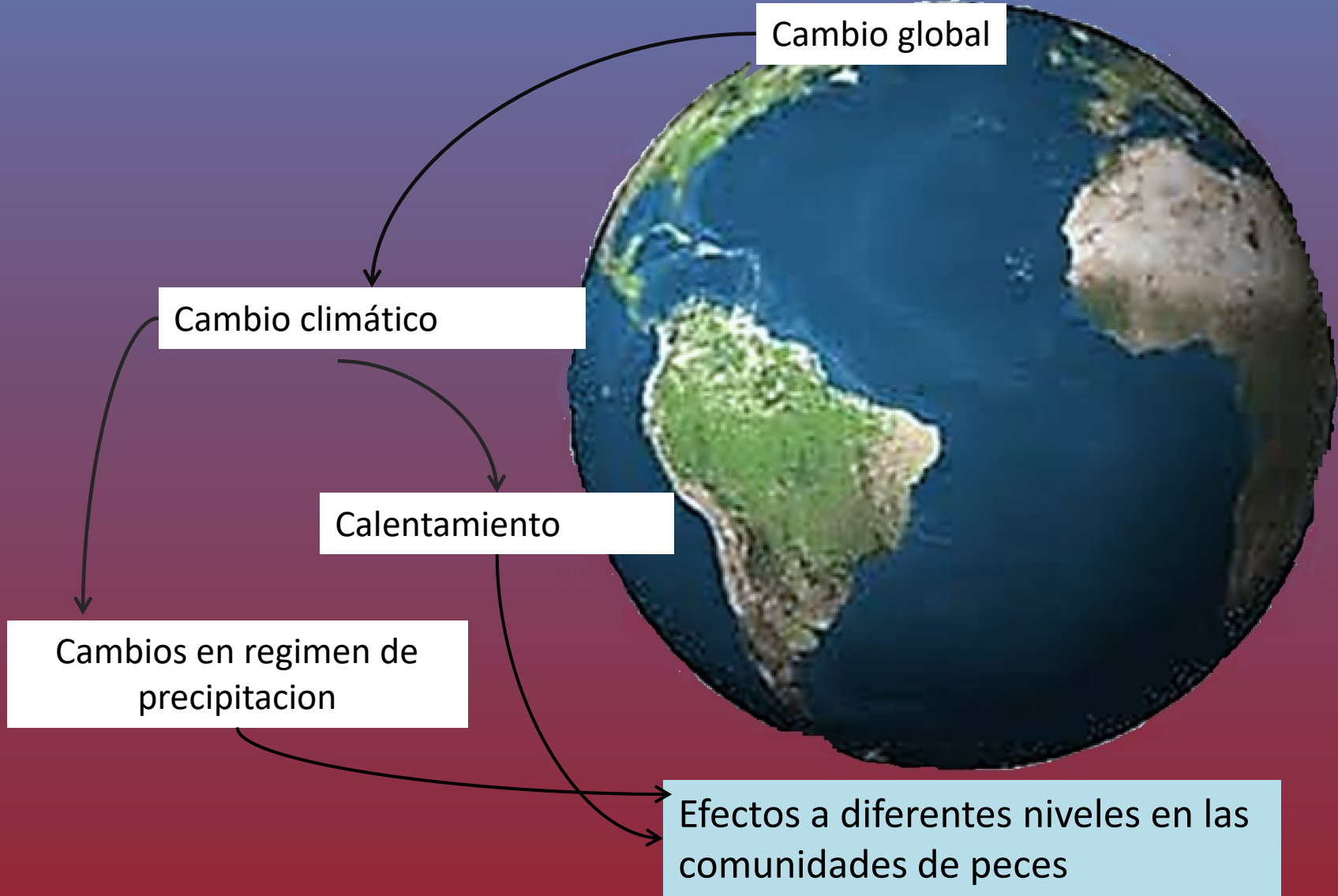


*“**Cambio global** se refiere al conjunto de cambios ambientales que se derivan de las actividades humanas sobre el planeta, particularmente cambios en los procesos que determinan el funcionamiento del sistema tierra”.*



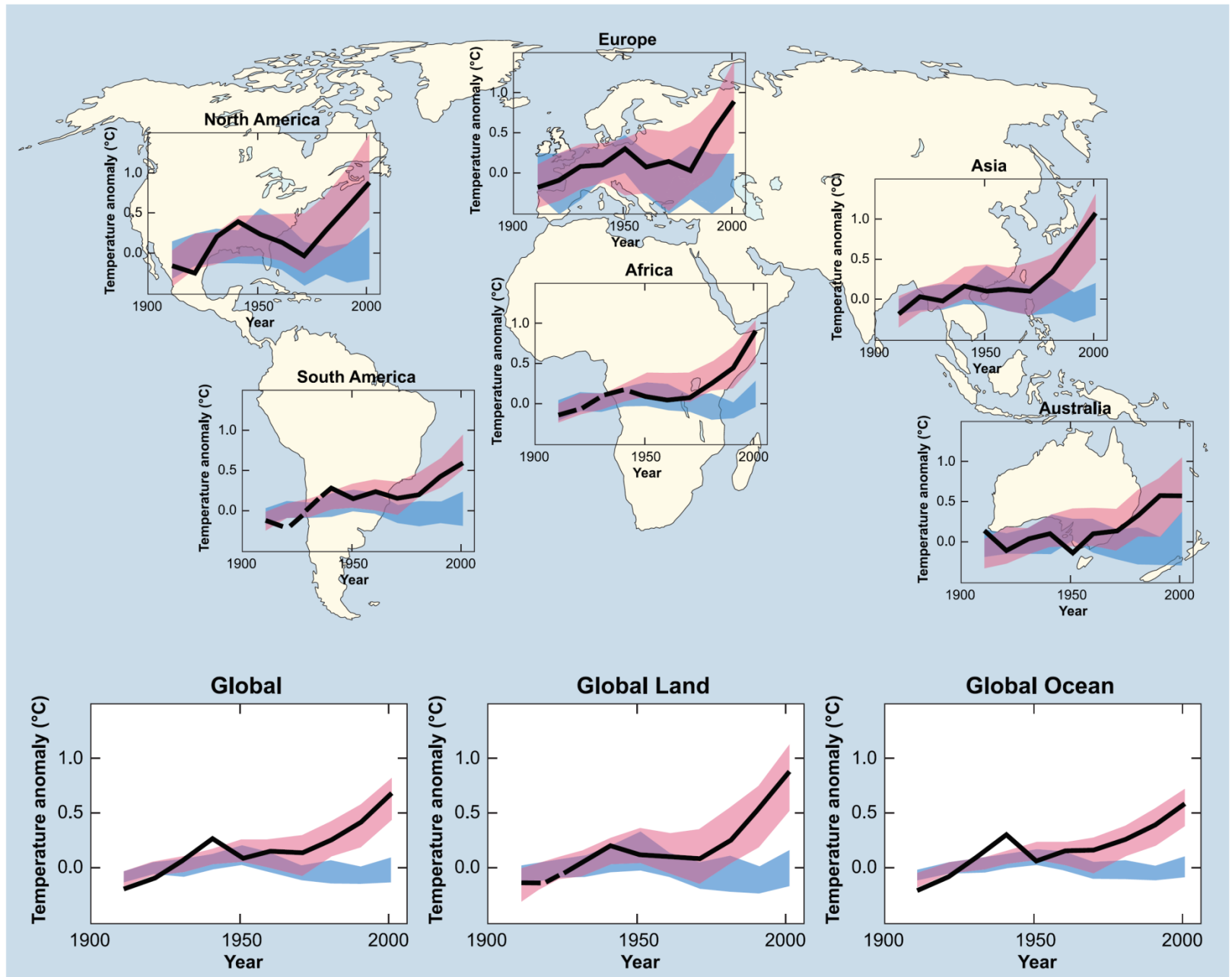
(Poff et al. 2002; Parmesan 2006; Rahel 2007)

Cambios en las comunidades de peces en el contexto del cambio global:



(Chu, et al. 2005; Milly 2005)

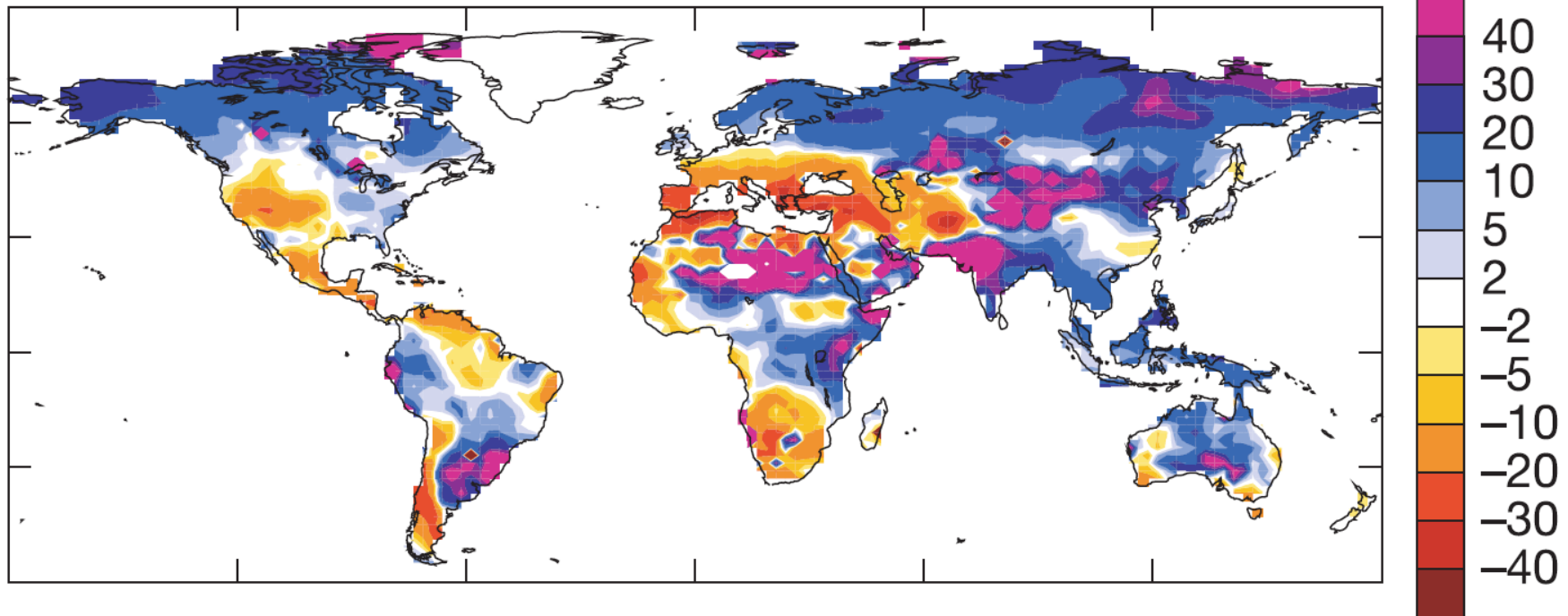
Predicciones: Incremento de la temperatura (IPCC 2007)



Global pattern of trends in streamflow and water availability in a changing climate

P. C. D. Milly¹, K. A. Dunne¹ & A. V. Vecchia²

a

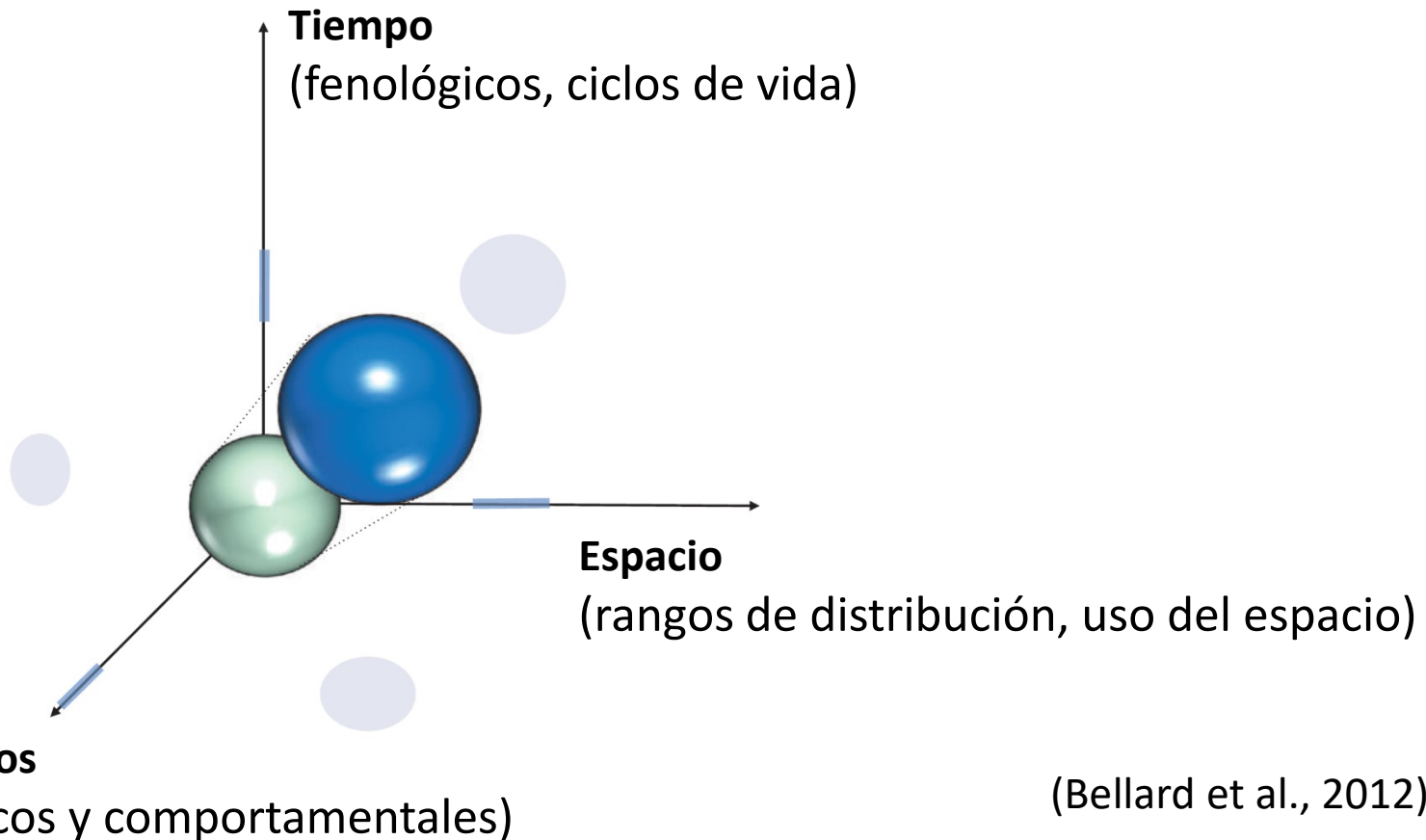


Tab.1. Strengths and weaknesses of different approaches to elucidate climate change effects on lakes.

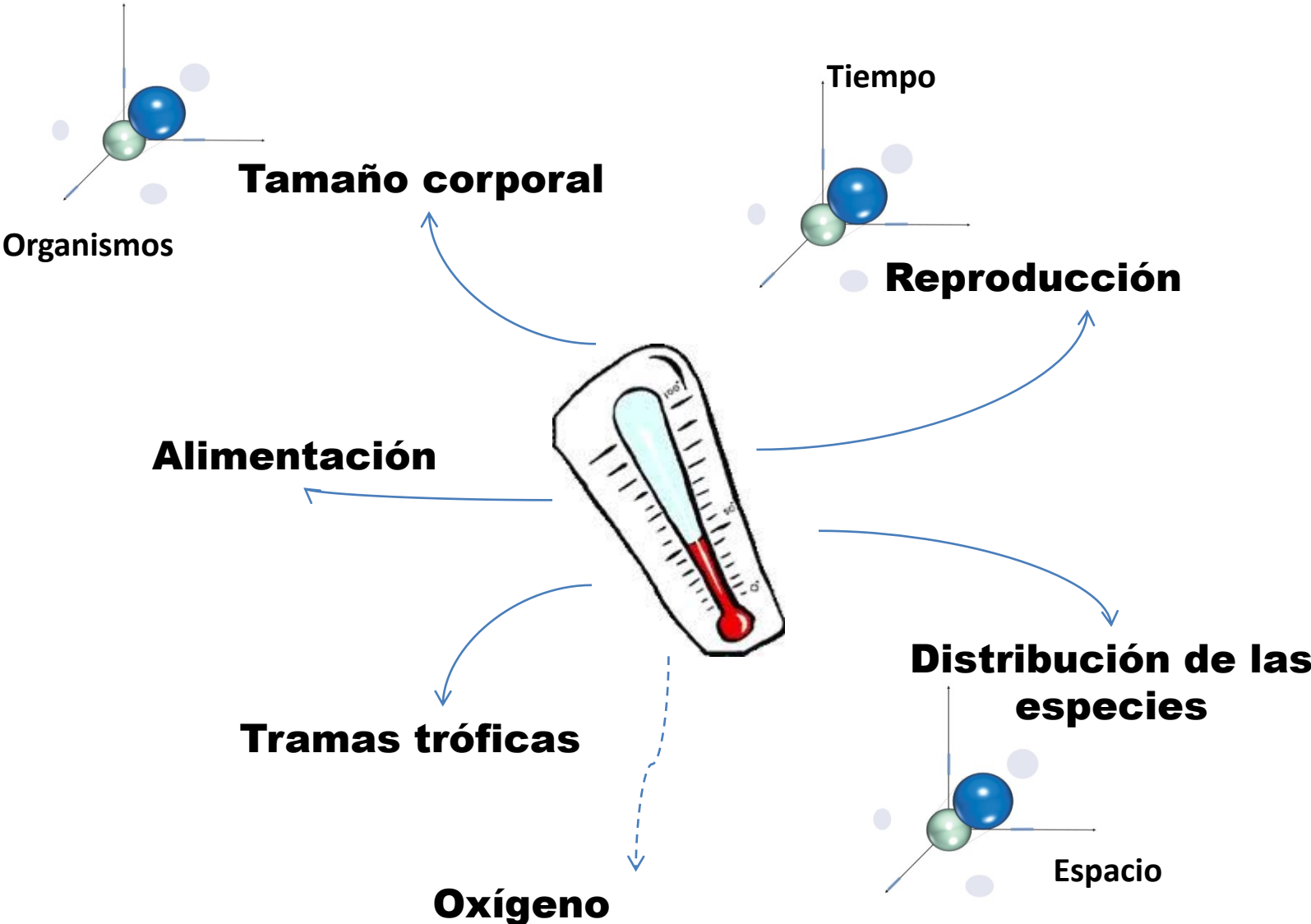
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REVIEW AND SYNTHESIS

Impacts of climate change on the future of biodiversity

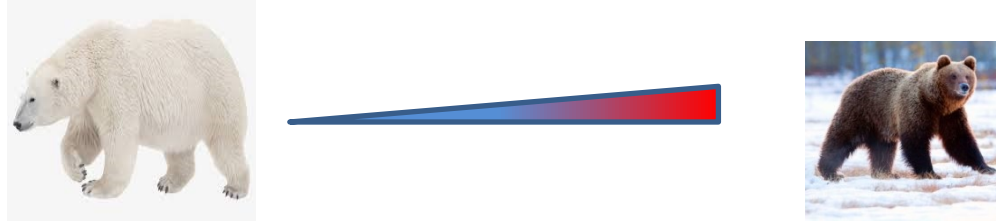


Efectos del Incremento de la temperatura sobre los peces

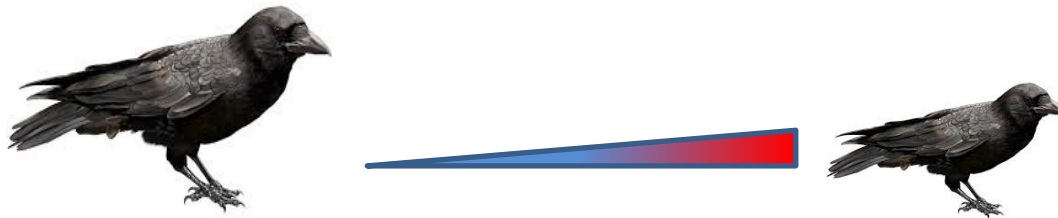


Historicamente el estudio del efecto del clima -> tamaño corporal

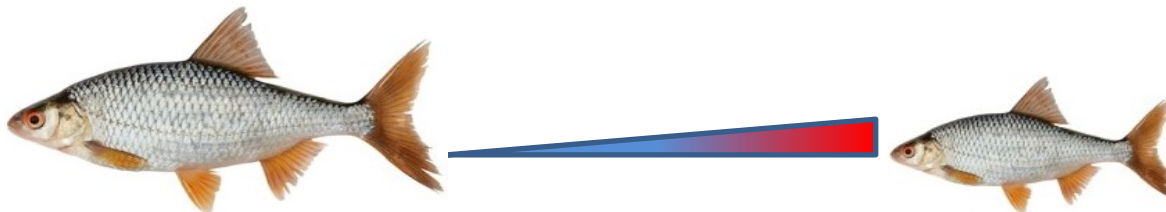
Bergmann's rule (Bergmann C, 1847)



James' rule (James F, 1970)



Temperature-size rule (TSR) (Atkinson D, 1994)

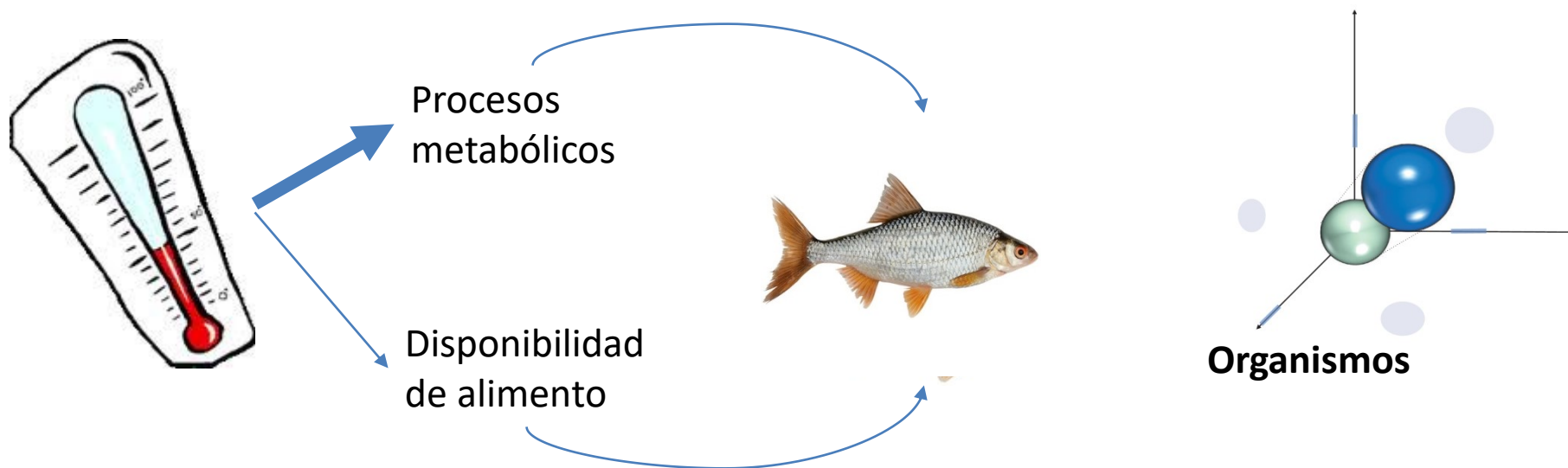


Global warming benefits the small in aquatic ecosystems

Martin Daufresne^{a,b,1}, Kathrin Lengfellner^a, and Ulrich Sommer^a

^aFB3–Marine Ökologie, Leibniz-Institut für Meereswissenschaften (IFM-GEOMAR), 24105 Kiel, Germany; and ^bHYAX–Lake Ecosystems Laboratory, Cemagref, 13182 Aix-en-Provence, France

Edited by Stephen R. Carpenter, University of Wisconsin, Madison, WI, and approved June 3, 2009 (received for review February 25, 2009)



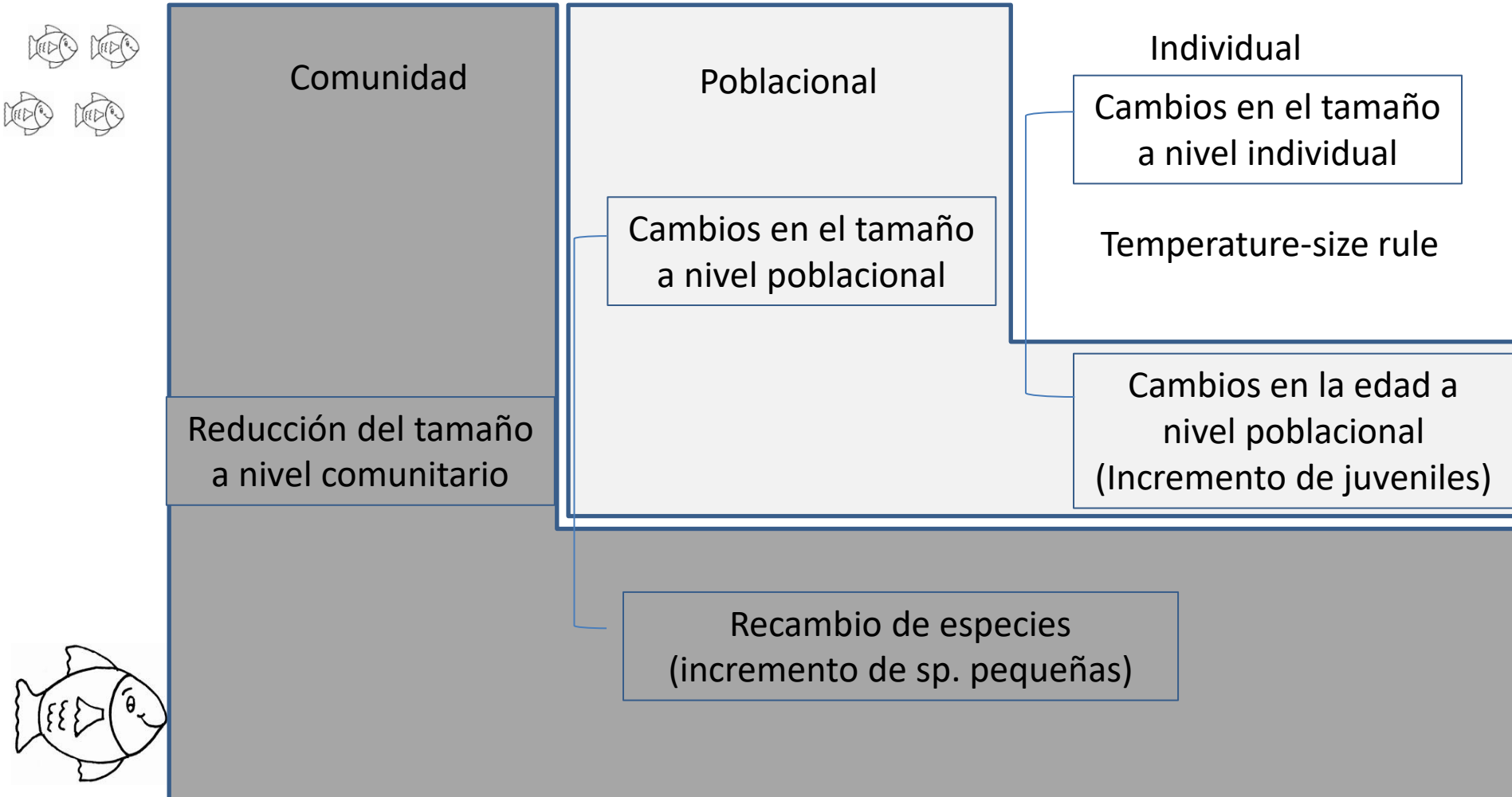
(Brett, 1979; Elliott, 1994)

Global warming benefits the small in aquatic ecosystems

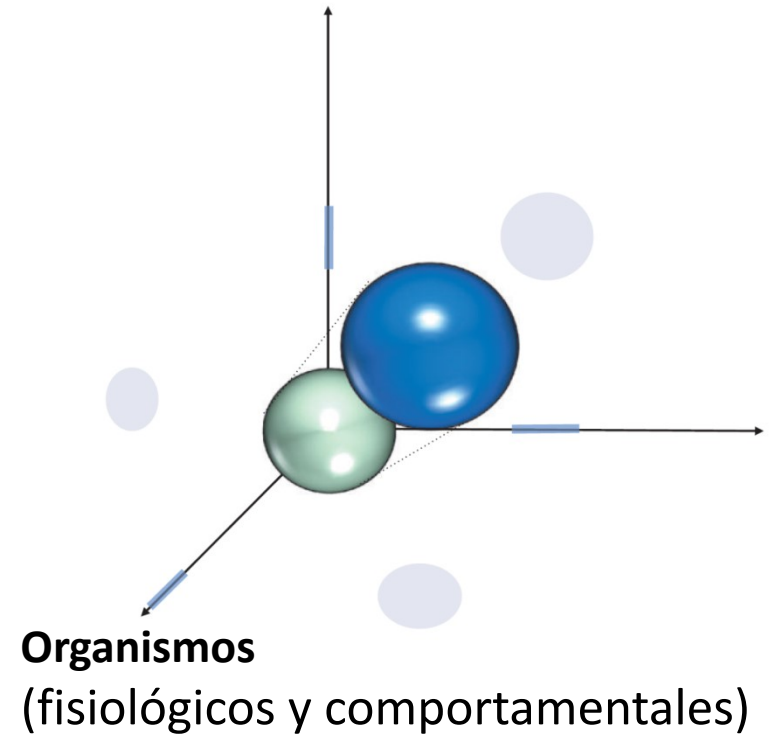
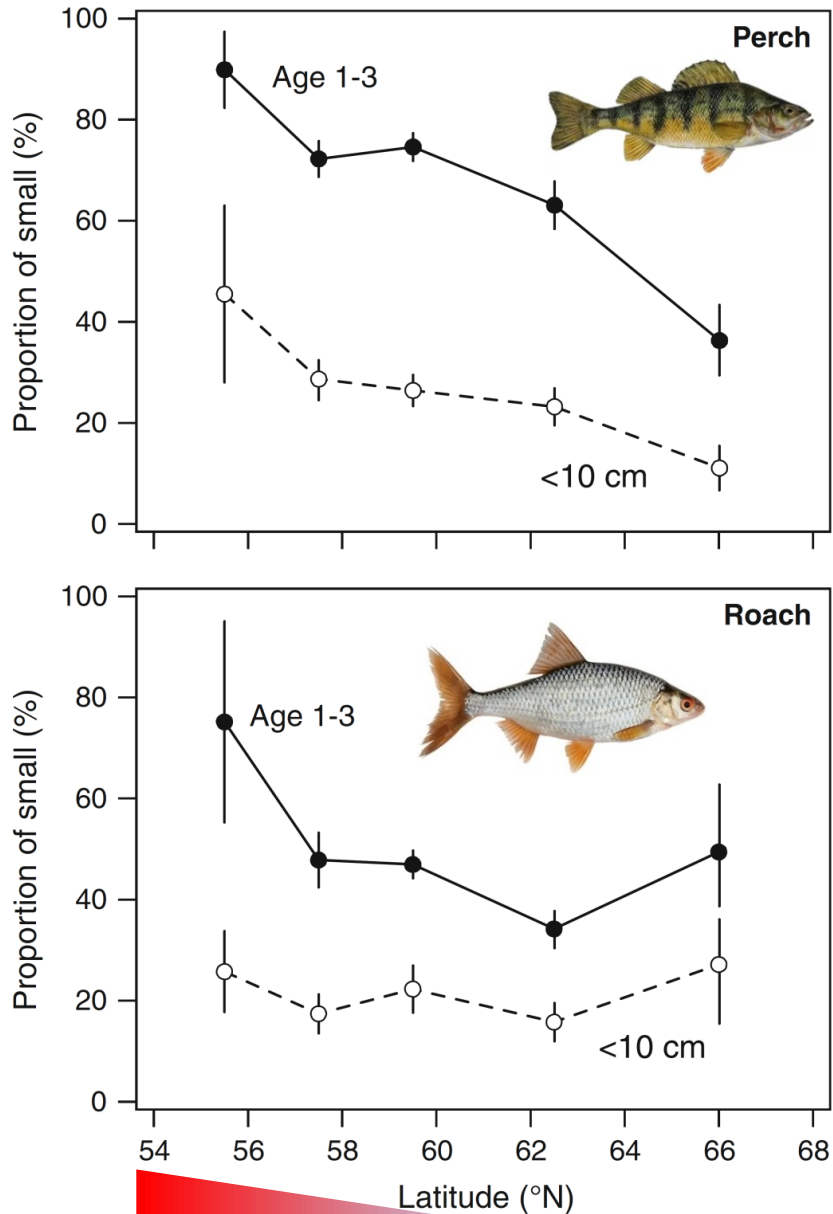
Martin Daufresne^{a,b,1}, Kathrin Lengfellner^a, and Ulrich Sommer^a

^aFB3–Marine Ökologie, Leibniz-Institut für Meereswissenschaften (IFM-GEOMAR), 24105 Kiel, Germany; and ^bHYAX–Lake Ecosystems Laboratory, Cemagref, 13182 Aix-en-Provence, France

Edited by Stephen R. Carpenter, University of Wisconsin, Madison, WI, and approved June 3, 2009 (received for review February 25, 2009)



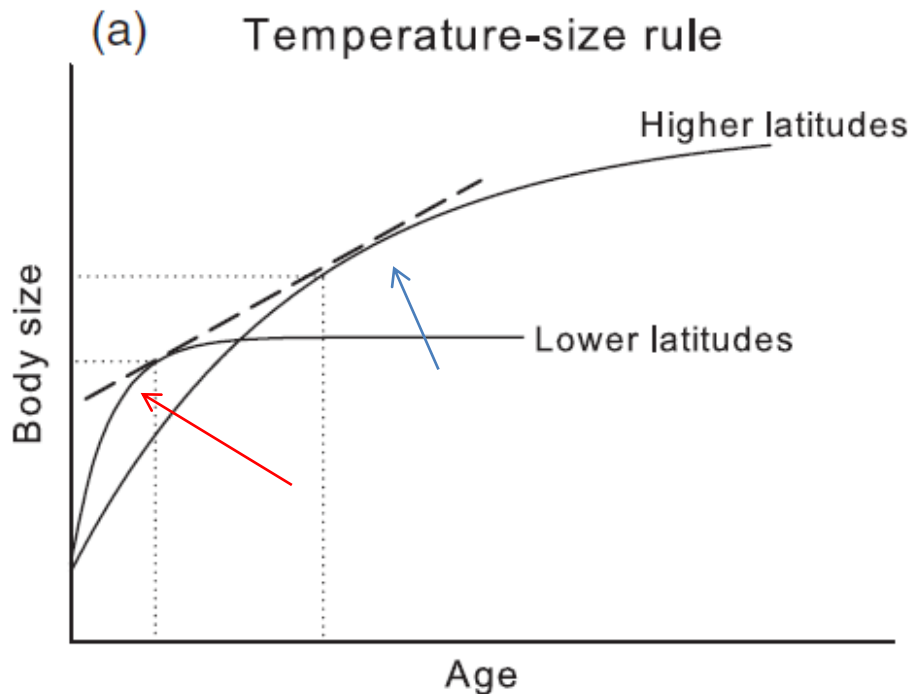
Tamaño corporal: Ejemplos de efectos de la temperatura



(Jeppesen et al., 2010).

Temperature-related variation in growth rate, size, maturation and life span in a marine herbivorous fish over a latitudinal gradient

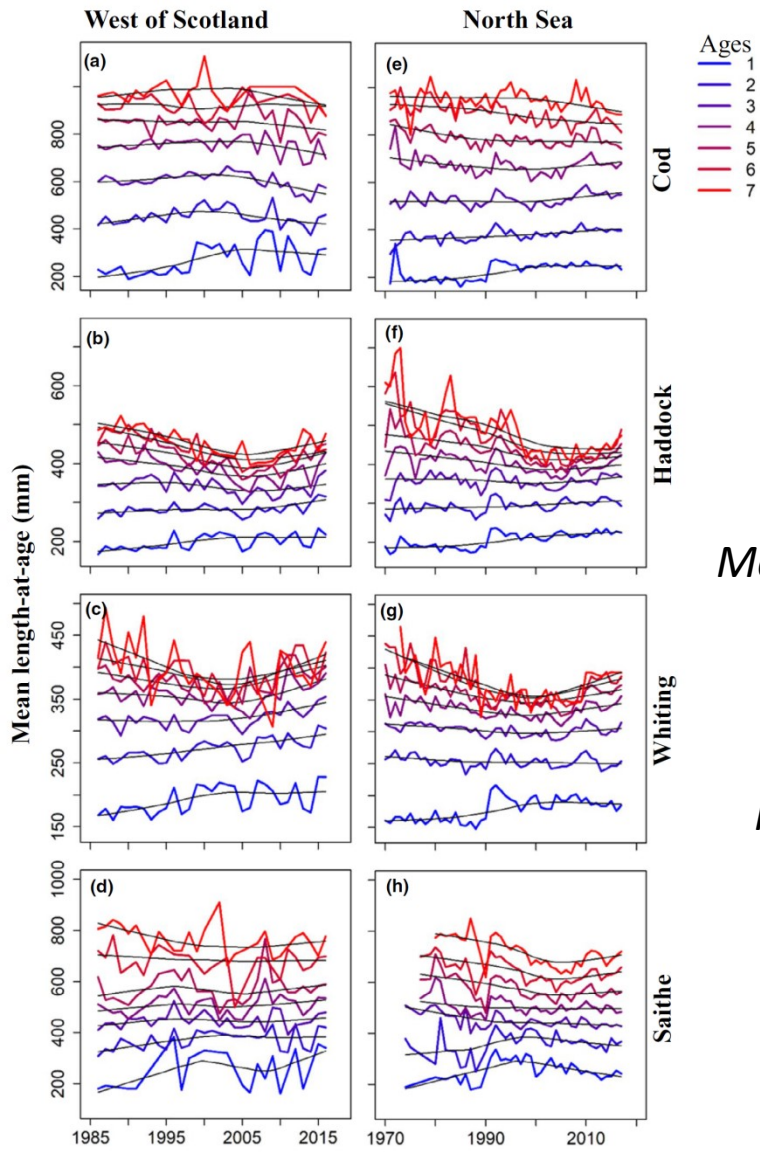
Elizabeth D. L. Trip^{1*†}, Kendall D. Clements¹, David Raubenheimer² and J. Howard Choat³



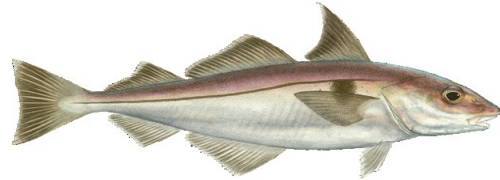
Evidencia a favor de la TSR

Bigger juveniles and smaller adults: Changes in fish size correlate with warming seas

Idongesit E. Ikpewe  | Alan R. Baudron



Gadus morhua



Melanogrammus aeglefinus



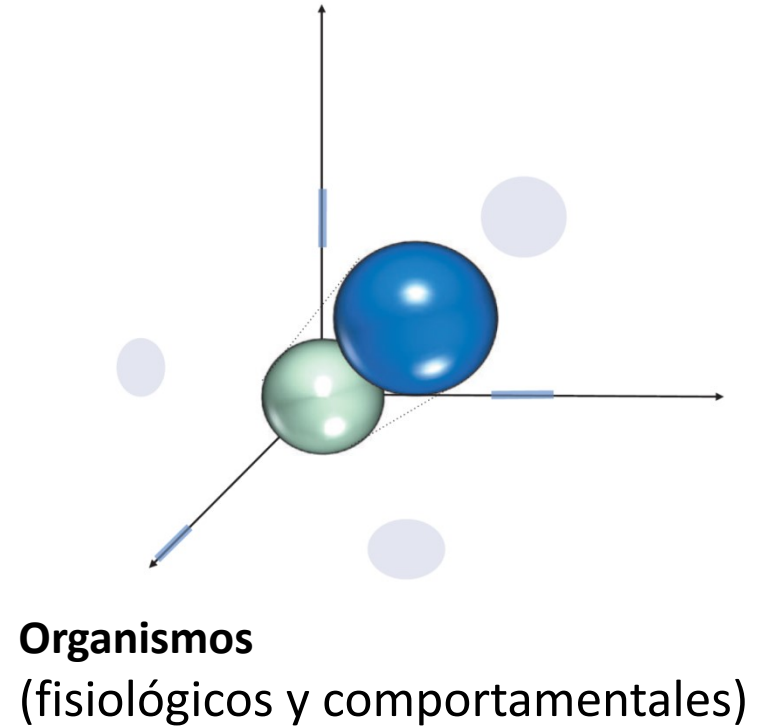
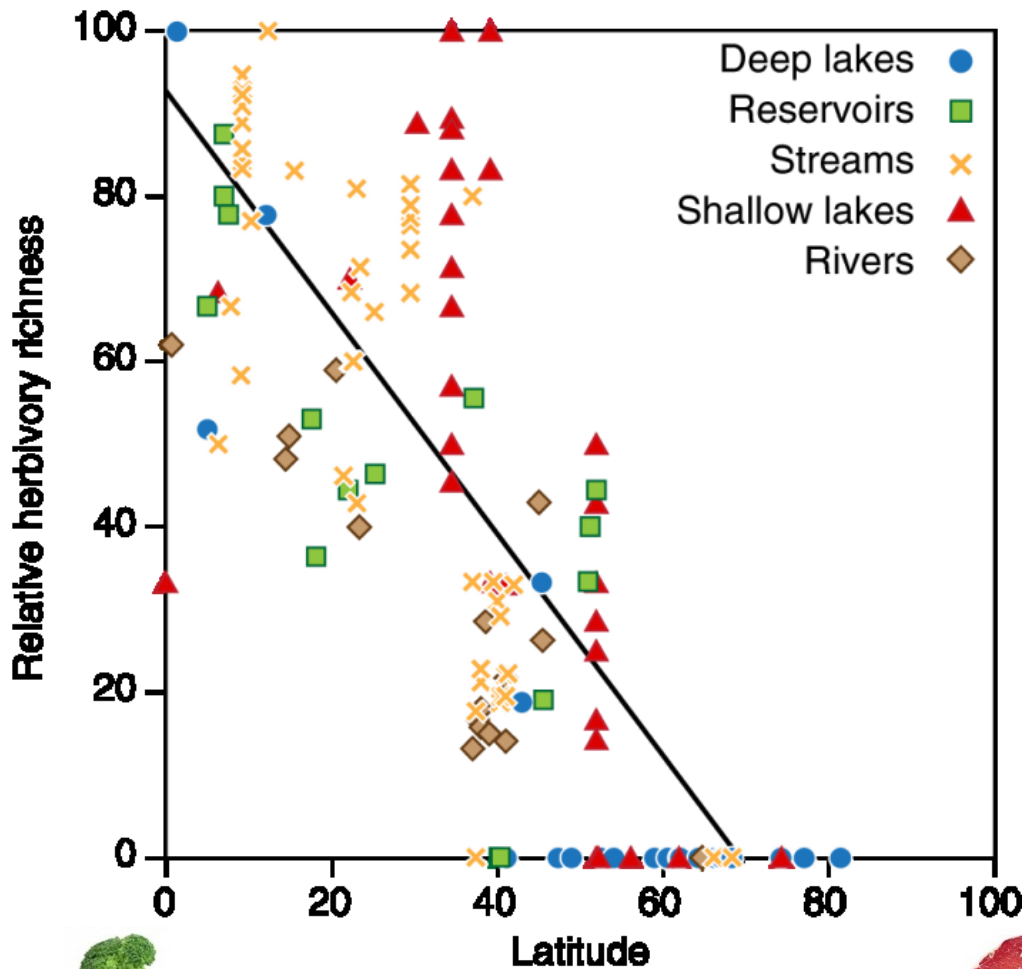
Merlangius merlangus



Pollachius virens

Efecto del calentamiento: aumento de herbivoría

Mayor % de especies de peces herbívoros en latitudes mas bajas

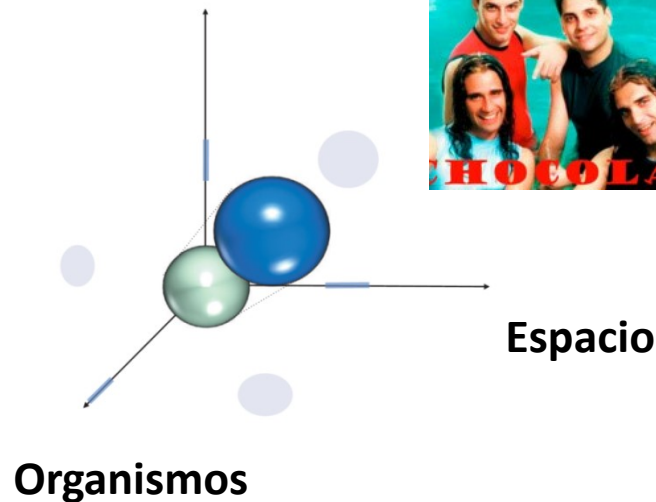
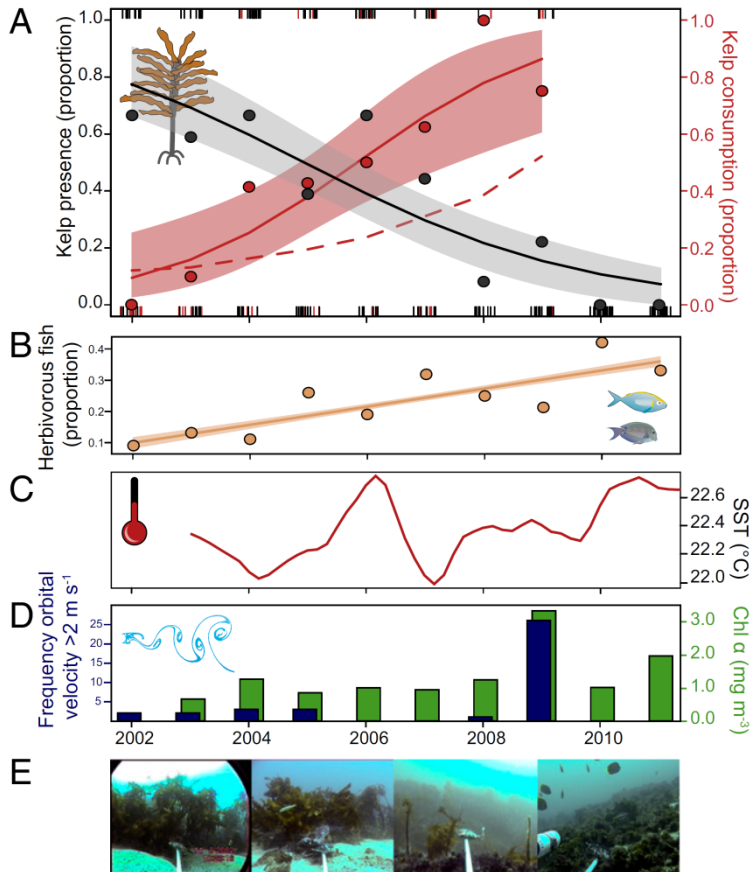


Evidencia a favor de la TCH

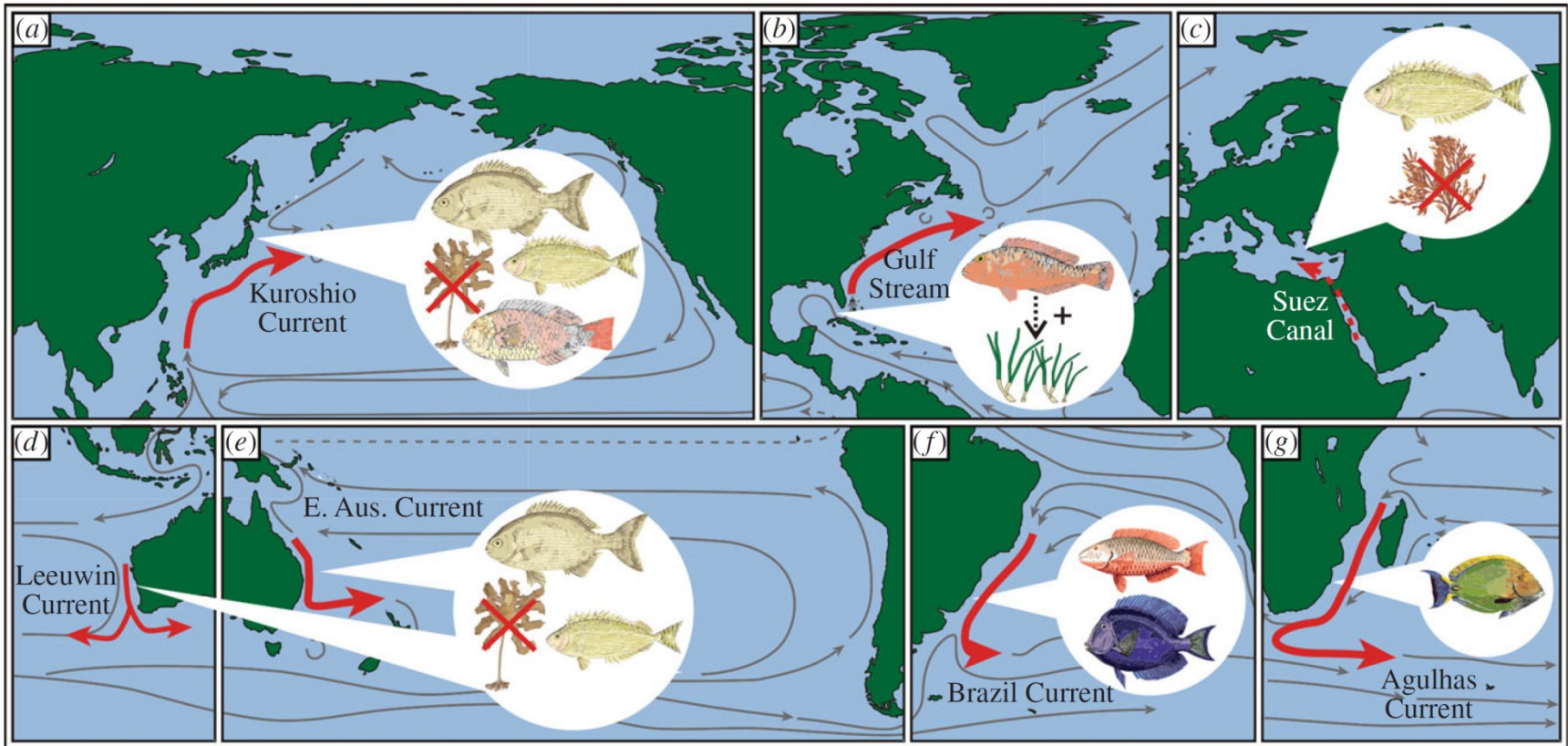
Long-term empirical evidence of ocean warming leading to tropicalization of fish communities, increased herbivory, and loss of kelp

Adriana Vergés^{a,b,c,1}, Christopher Doropoulos^{a,d,e}, Hamish A. Malcolm^f, Mathew Skye^{a,b}, Marina Garcia-Pizá^{a,b}, Ezequiel M. Marzinelli^{a,b,c,g}, Alexandra H. Campbell^{a,b,c}, Enric Ballesteros^h, Andrew S. Hoeyⁱ, Ana Vila-Concejo^j, Yves-Marie Bozec^{e,i}, and Peter D. Steinberg^{a,c,g}

^aCentre for Marine Bio-Innovation, School of Biological, Earth, and Environmental Sciences, University of New South Wales, Sydney, NSW 2052, Australia;



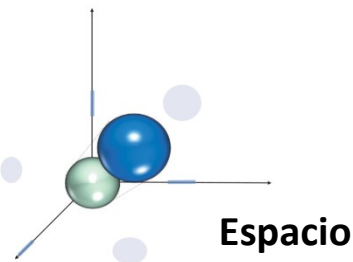
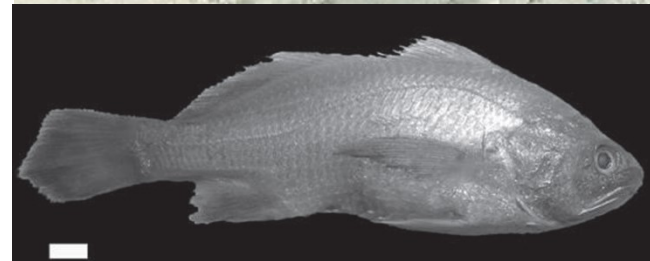
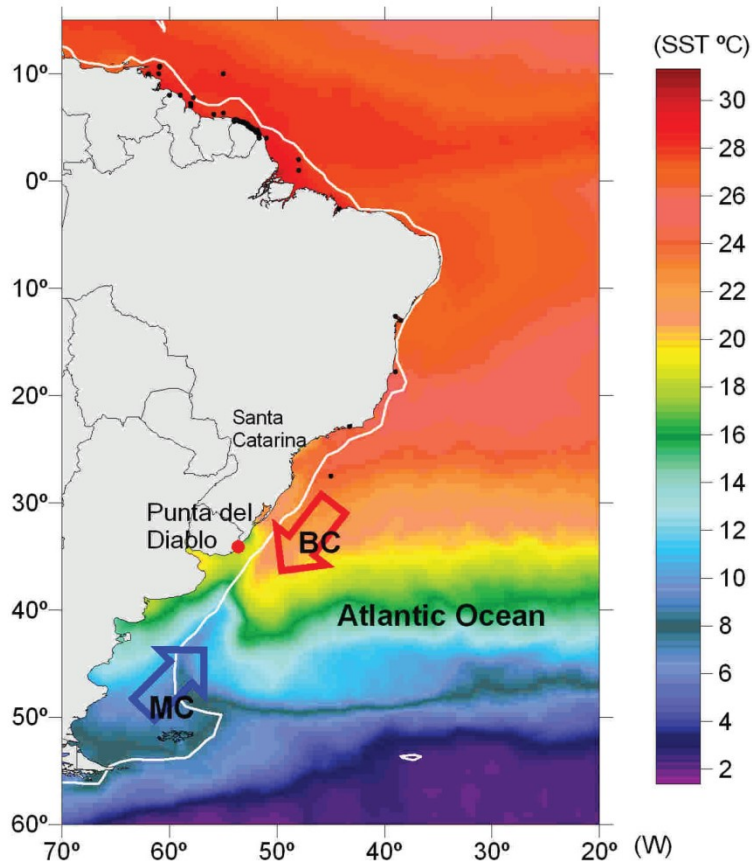
The tropicalization of temperate marine ecosystems: climate-mediated changes in herbivory and community phase shifts



Cambios en la distribución de las especies

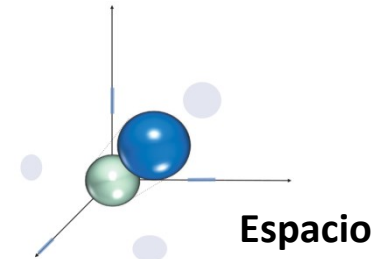
Stellifer rastrifer (Pisces: Sciaenidae): first Uruguayan records and a 1200 km range extension

A.M. Segura^{*§}, A. Carranza[†], L.E. Rubio, L. Ortega[‡] and M. García[‡]



First record of *Eucinostomus melanopterus*, Bleeker 1863 (Perciformes, Gerreidae) from the Río de la Plata estuary

By A. Solari¹, M. L. Garcia¹ and J. A. Jaureguizar²



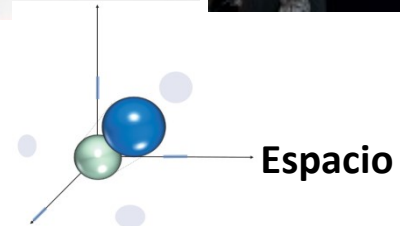
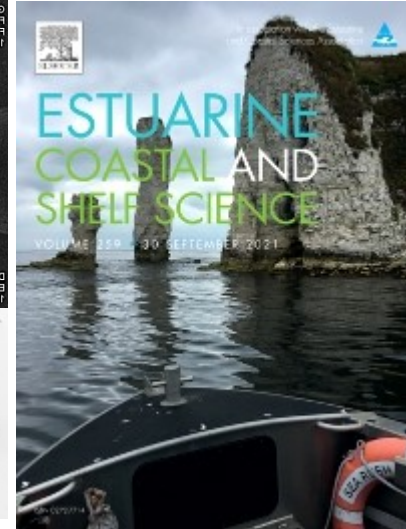
Eucinostomus melanopterus



Cambios en la distribución de las especies

Resident or visitor? Distribution expansion of a tropical fish species *Elops smithi* (Elopiformes: Elopidae) in the poorly explored South Western Atlantic Ocean.

Nicolas Vidal¹, Juan Manuel Caballero¹, Martín Laporta^{2,3}, Graciela Fabiano², Rodrigo Forselledo⁴ and Marcelo Loureiro¹.



Materiales y Métodos

Información de registros Uruguay: colecciones científicas (Facultad de Ciencias), DINARA (Montevideo, La Paloma), pescadores artesanales y deportivos.

Revisión bibliográfica: (> 0° latitud sur) (google scholar)

Mediciones de temperatura y salinidad en cada punto de registro

Serie temporal de mediciones de temperatura en un área :

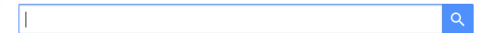
-55.983965° -53.983965° W

-36.380574° -35.380574° S

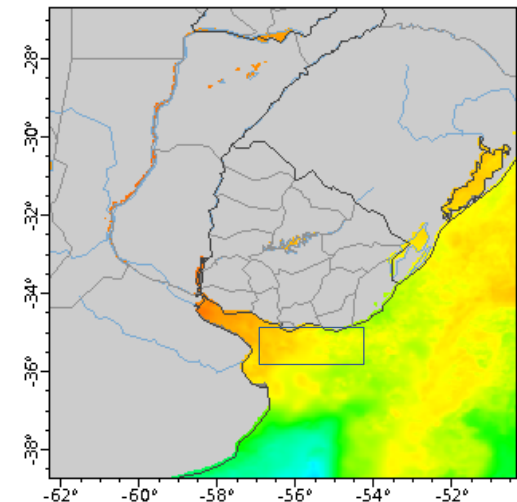
<https://coastwatch.pfeg.noaa.gov/erddap/griddap/jplMURSST41.htm>



Google Académico

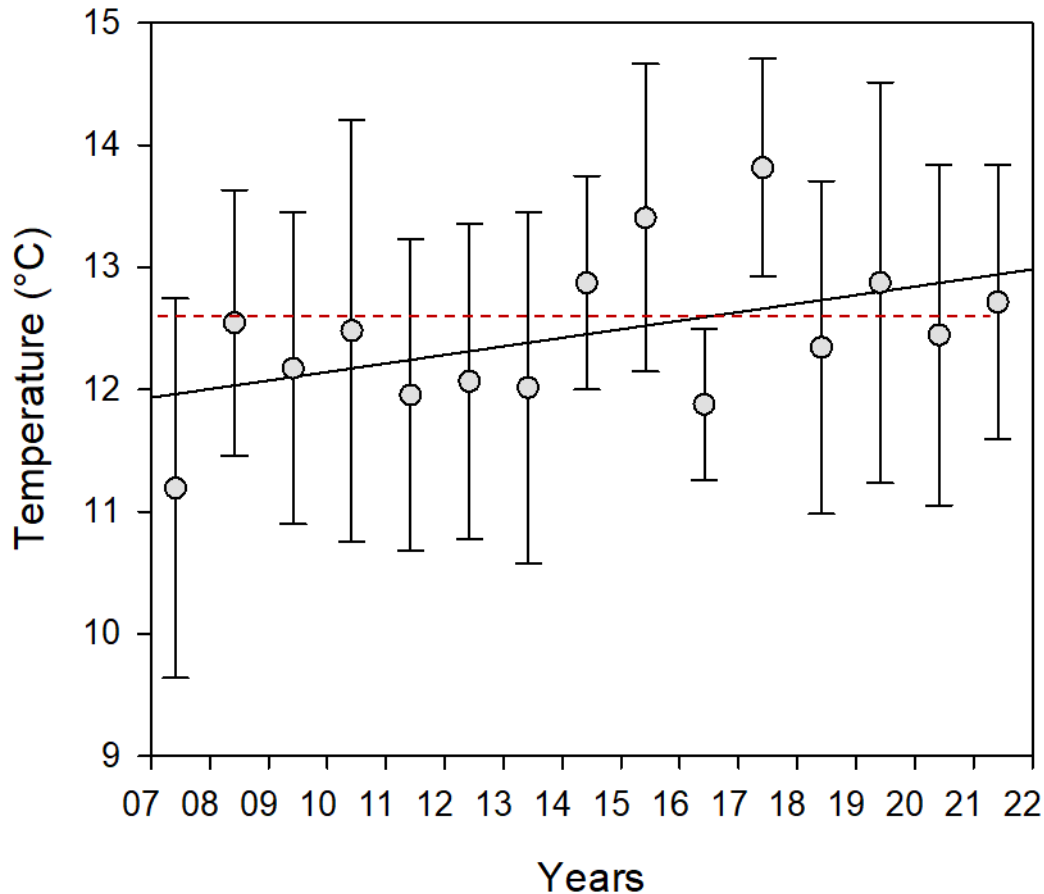


Cualquier idioma Buscar sólo páginas en español

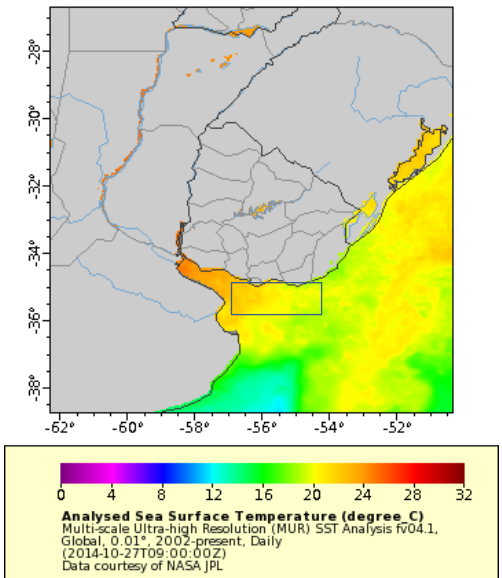


Analysed Sea Surface Temperature (degree C)
Multi-scale Ultra-high Resolution (MUR) SST Analysis v04.1,
Global, 0.01°, 2002-present, Daily
(2014-10-27T09:00:00Z)
Data courtesy of NASA JPL

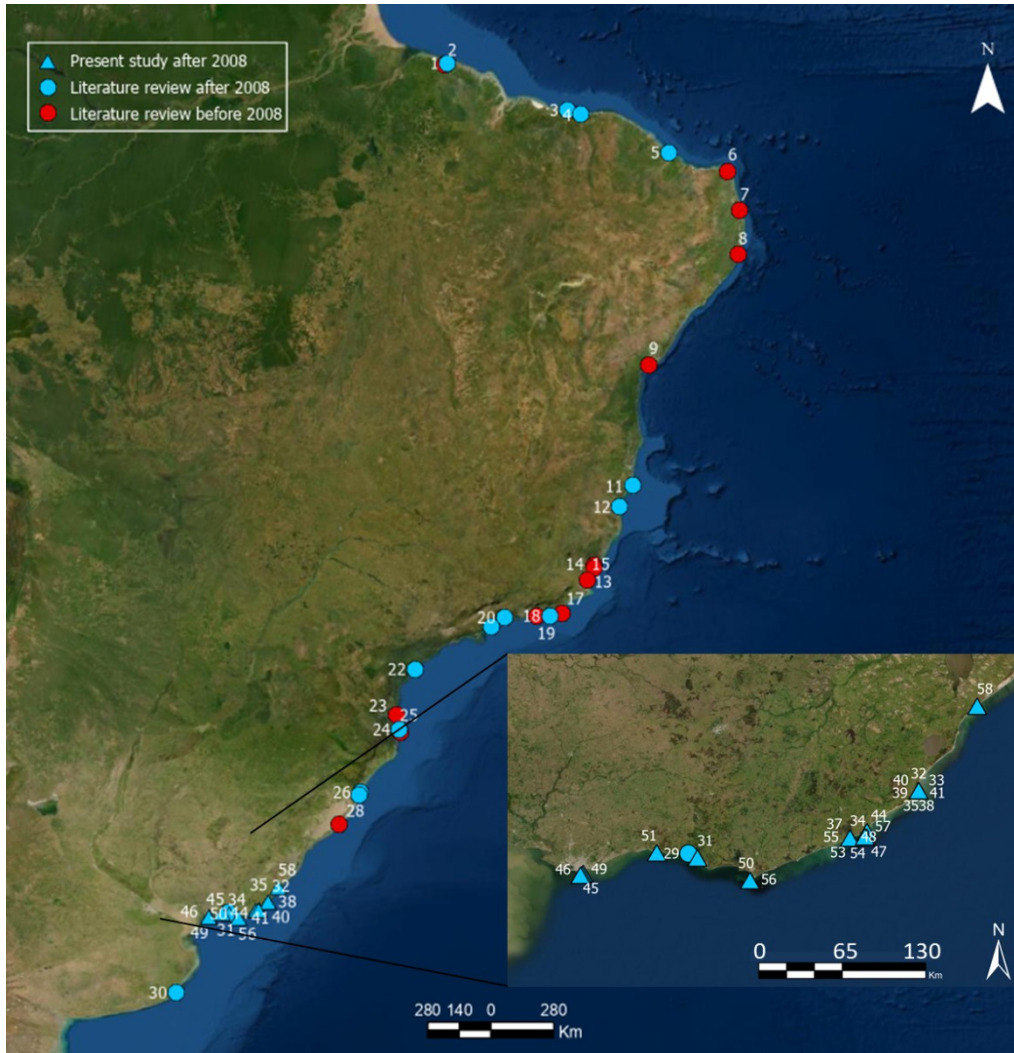
Tendencia temperatura superficial del mar (SST) medida en los meses de invierno (Junio, Julio y Agosto)



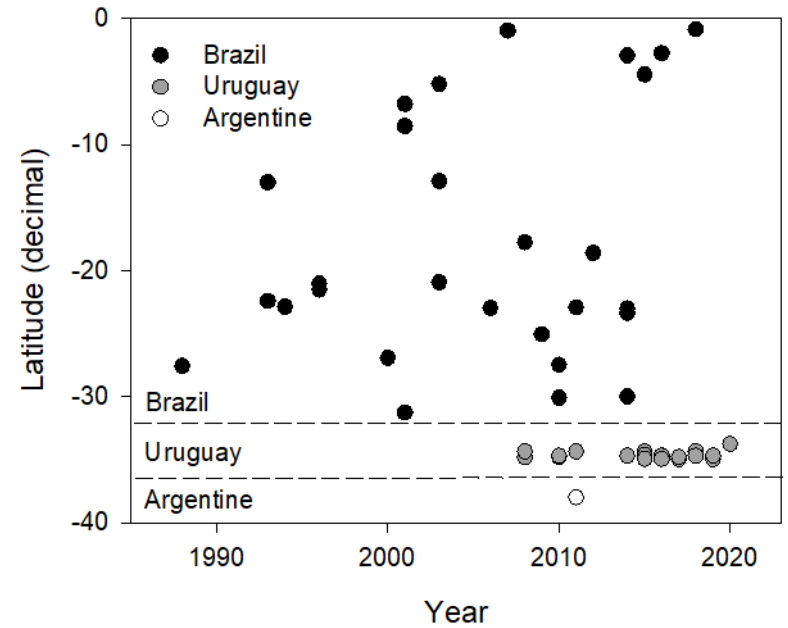
Promedio y desvío estándar de la temperatura de invierno



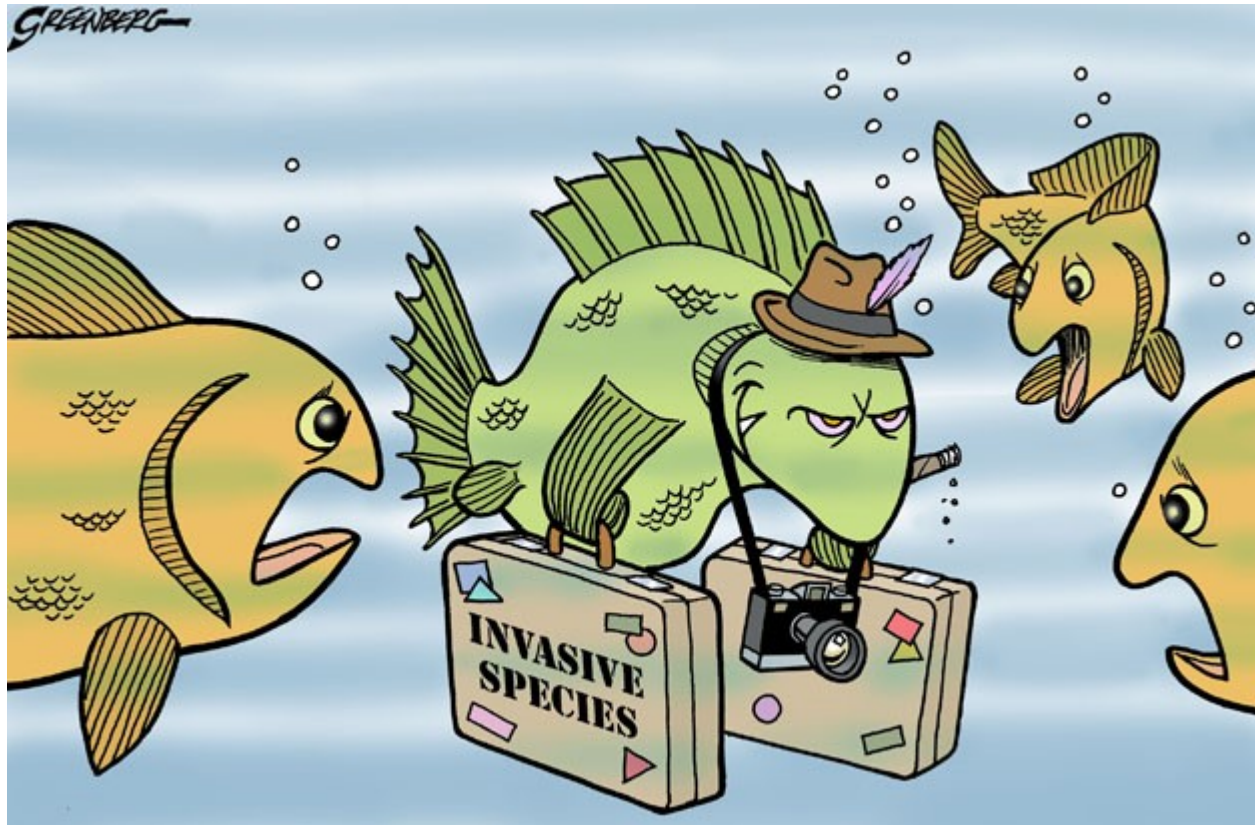
Resultados



- ▲ Este estudio después de 2008
- Revisión después de 2008
- Revisión antes de 2008

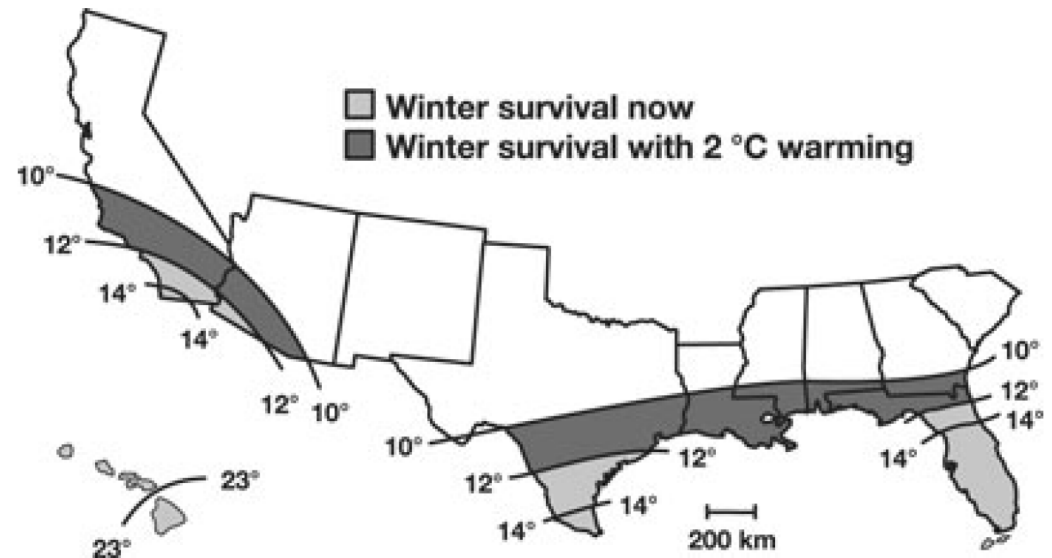
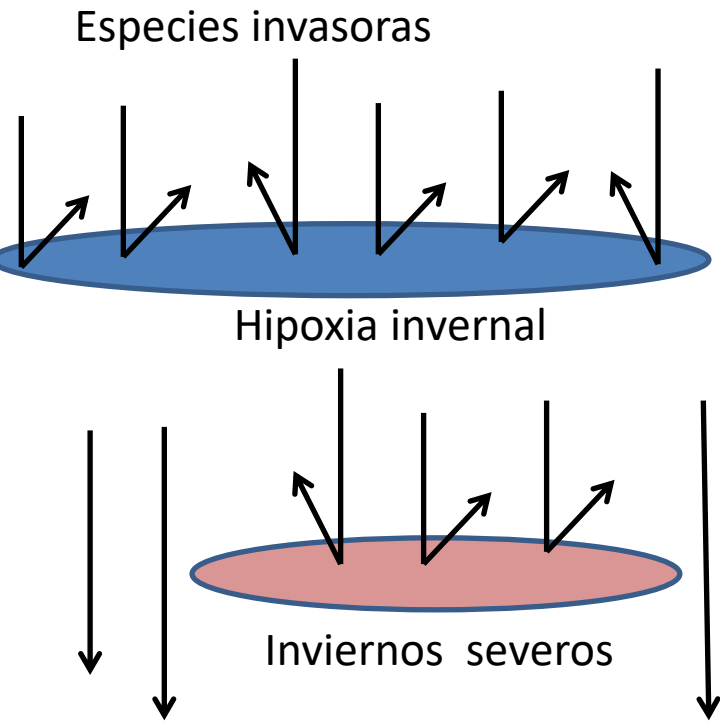


Interacción entre estresores (cambio climático y especies invasoras)



Assessing the Effects of Climate Change on Aquatic Invasive Species

FRANK J. RAHEL* AND JULIAN D. OLDEN†



Stable isotope evidence for the food web consequences of species invasions in lakes

M. Jake Vander Zanden^{*‡}, John M. Casselman[†]
& Joseph B. Rasmussen^{*}

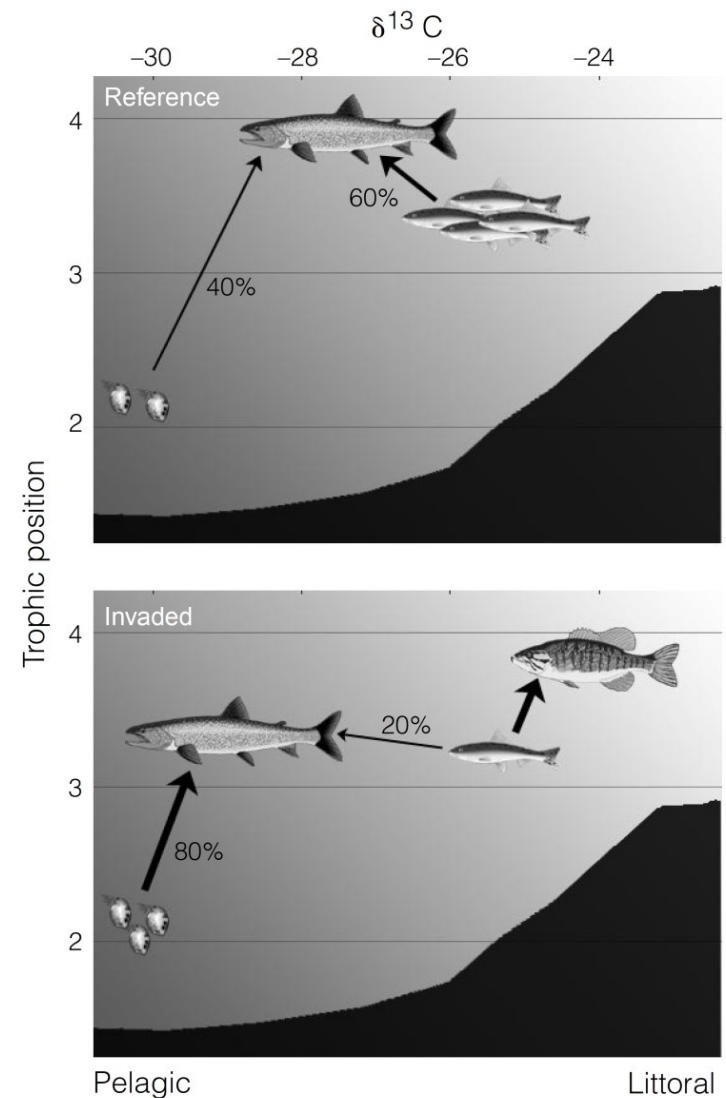
Salvelinus namaycush



Micropterus dolomieu



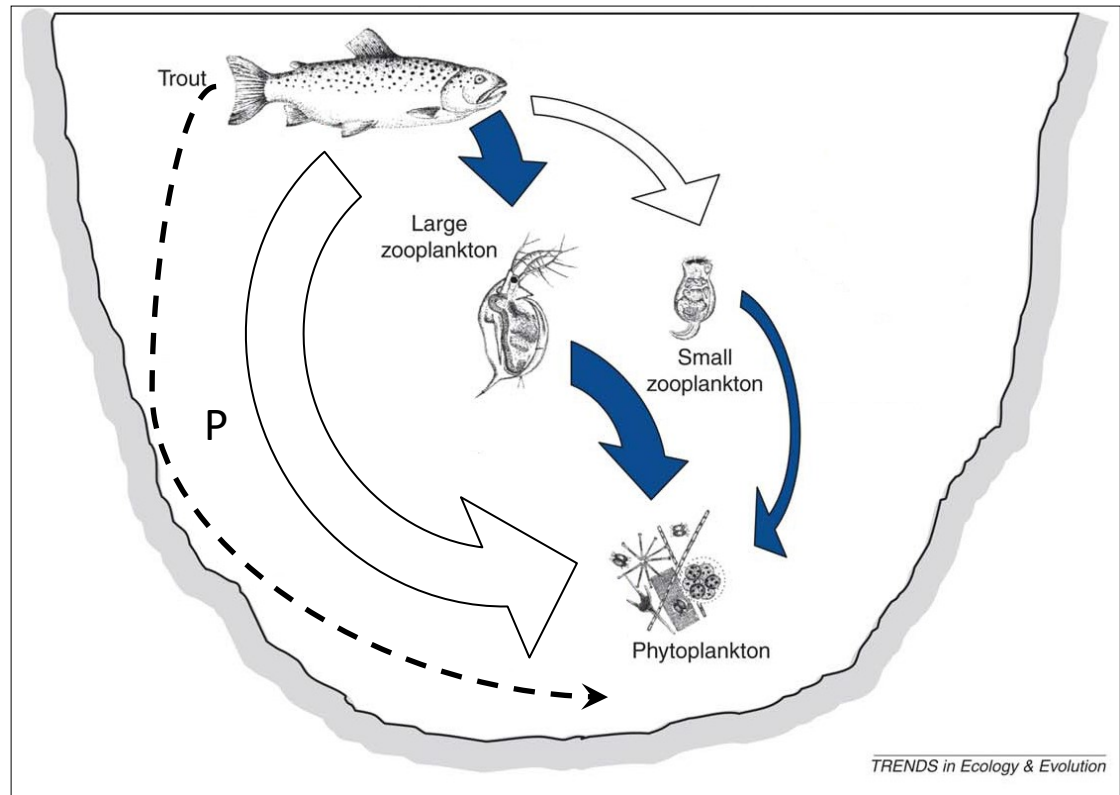
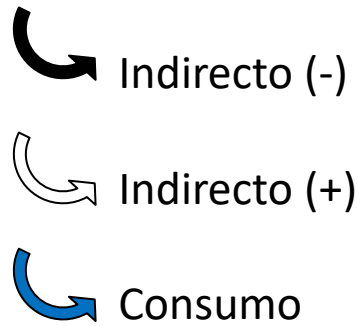
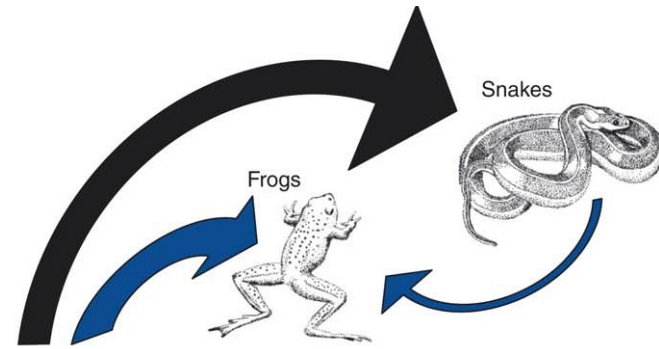
Ambloplites rupestris



Ejemplo de efectos directos e indirectos de la introducción de especies

Lagos de montaña sin peces

El efecto va a depender del rol trófico de la especie introducida



Examples of introduced species direct and indirect effects

Nonnative trout impact an alpine-nesting bird by altering aquatic-insect subsidies

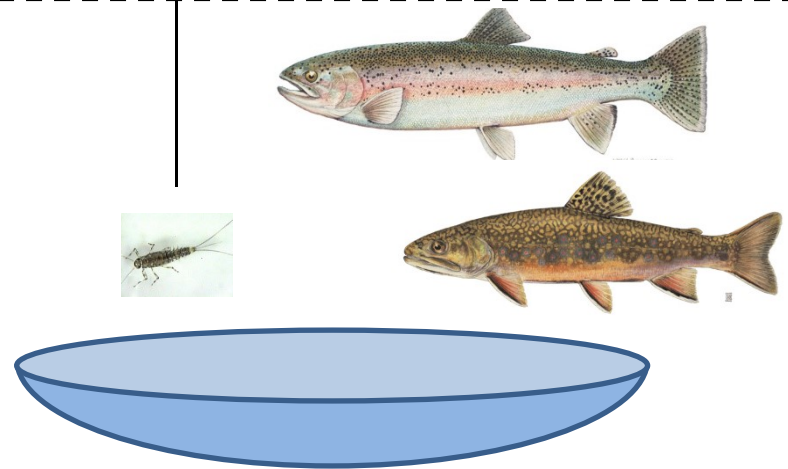
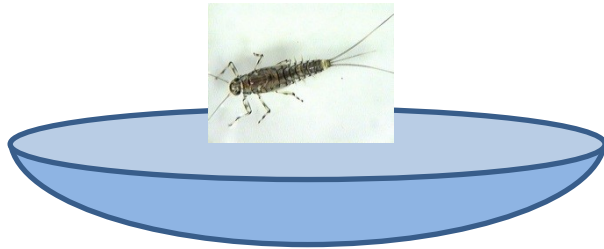
PETER N. EPANCHIN,^{1,3} ROLAND A. KNAPP,² AND SHARON P. LAWLER¹



Terrestre

Acuático

Emergencia de
insectos



Lagos de montaña sin peces










98% reducción de ninfas

Efecto de las especies exóticas sobre tramas tróficas

Interaction between non-native predatory fishes and native galaxiids (Galaxiidae) shapes food web structure in Tasmanian lakes

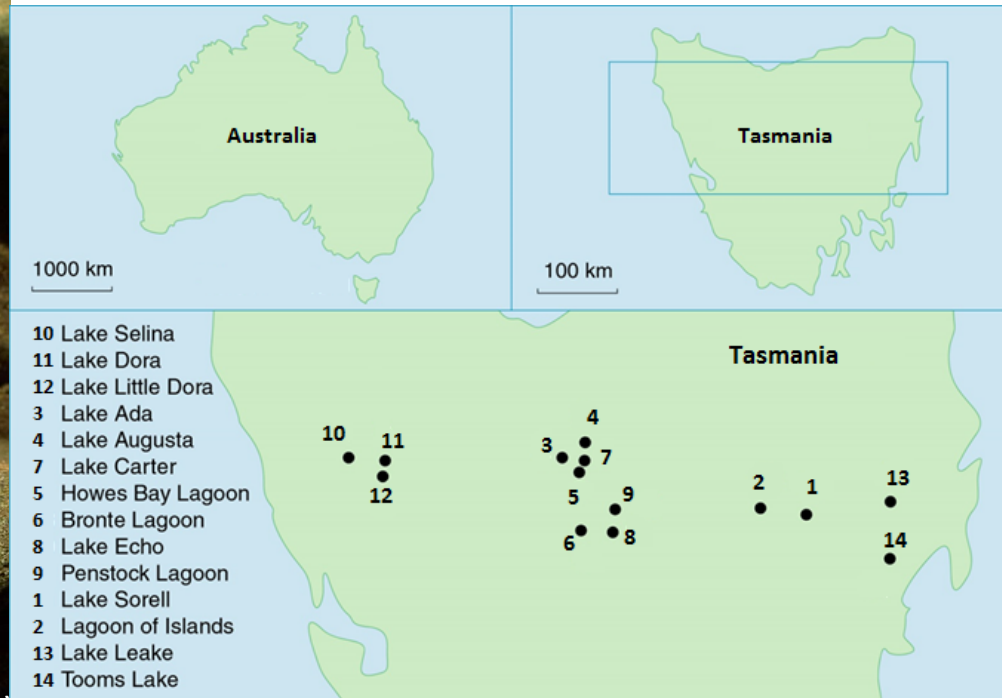


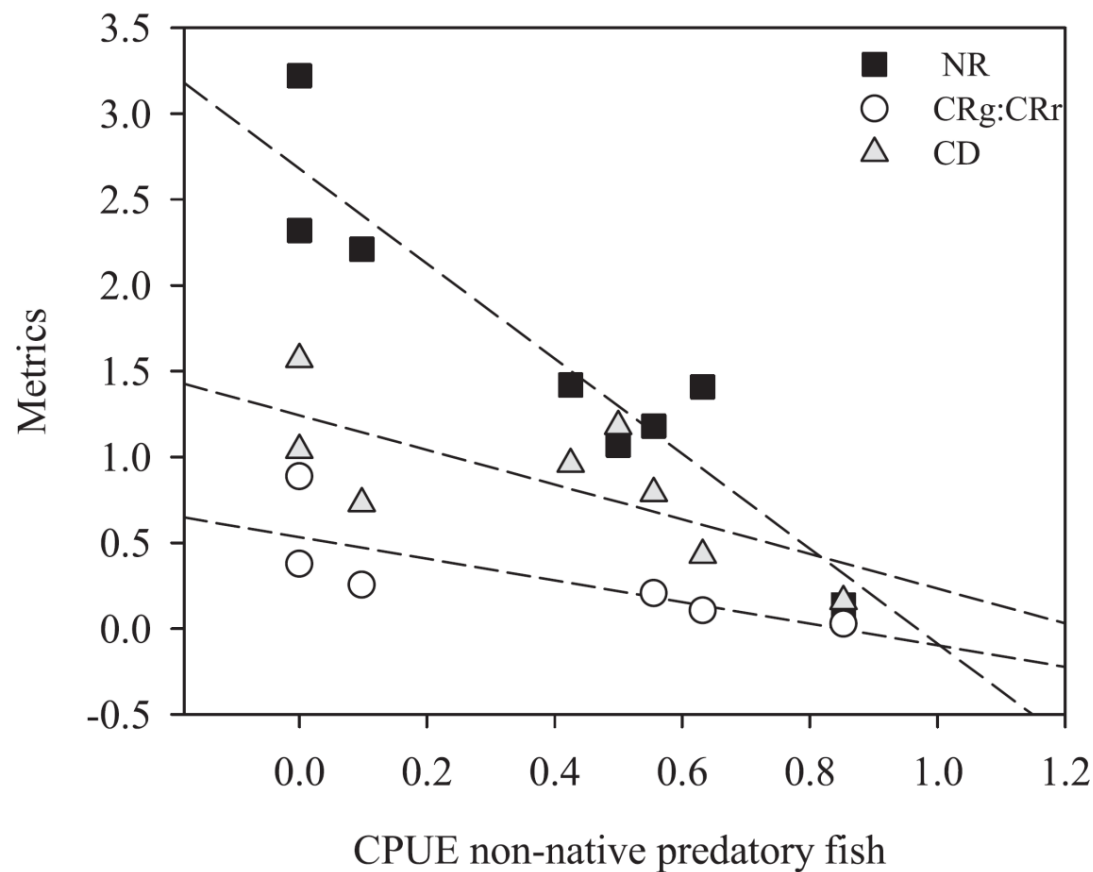
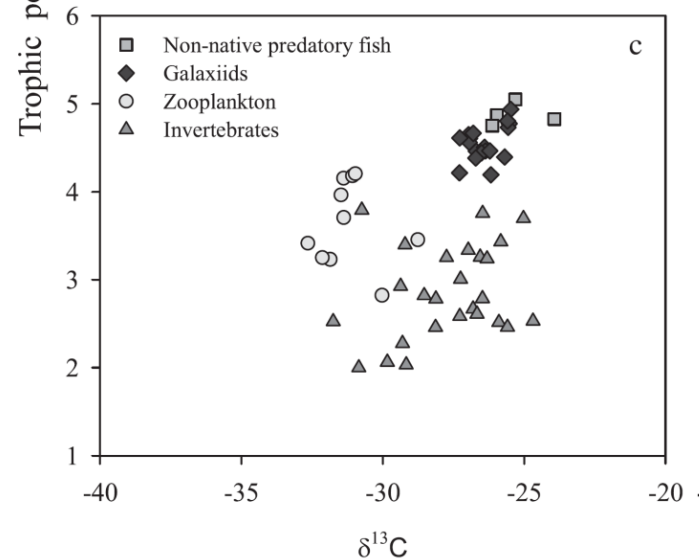
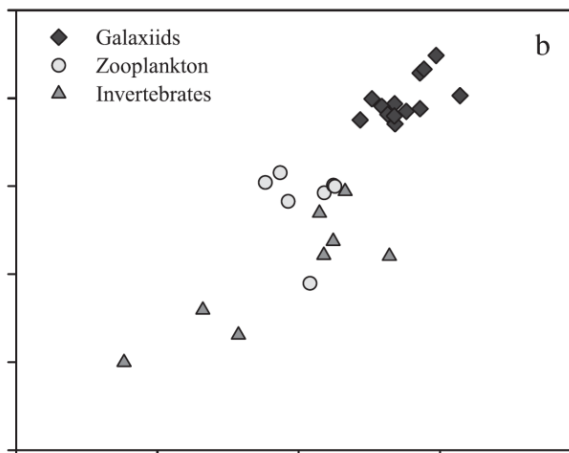
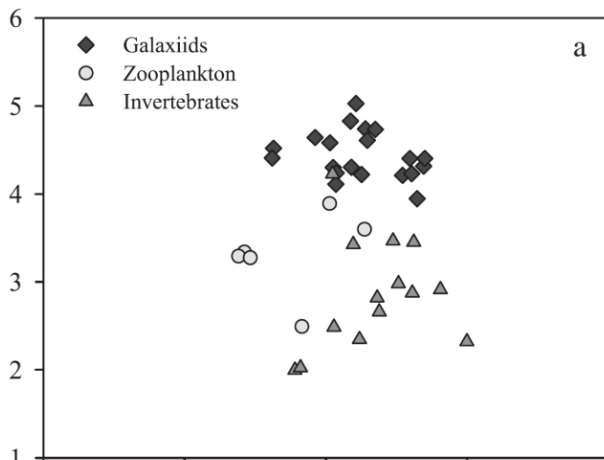
Nicolás Vidal ,^{a,b,g} Carolina Trochine ,^c Susanne L. Amsinck,^a Leon A. Barmuta ,^d Kirsten S. Christoffersen ,^e Marc Ventura ,^f Teresa Buchaca ,^f Frank Landkildehus,^a Scott A. Hardie,^d Mariana Meerhoff,^{a,g} and Erik Jeppesen ,^{a,b,h}

Predator avoidance behaviour



(photo: Ken Miller)

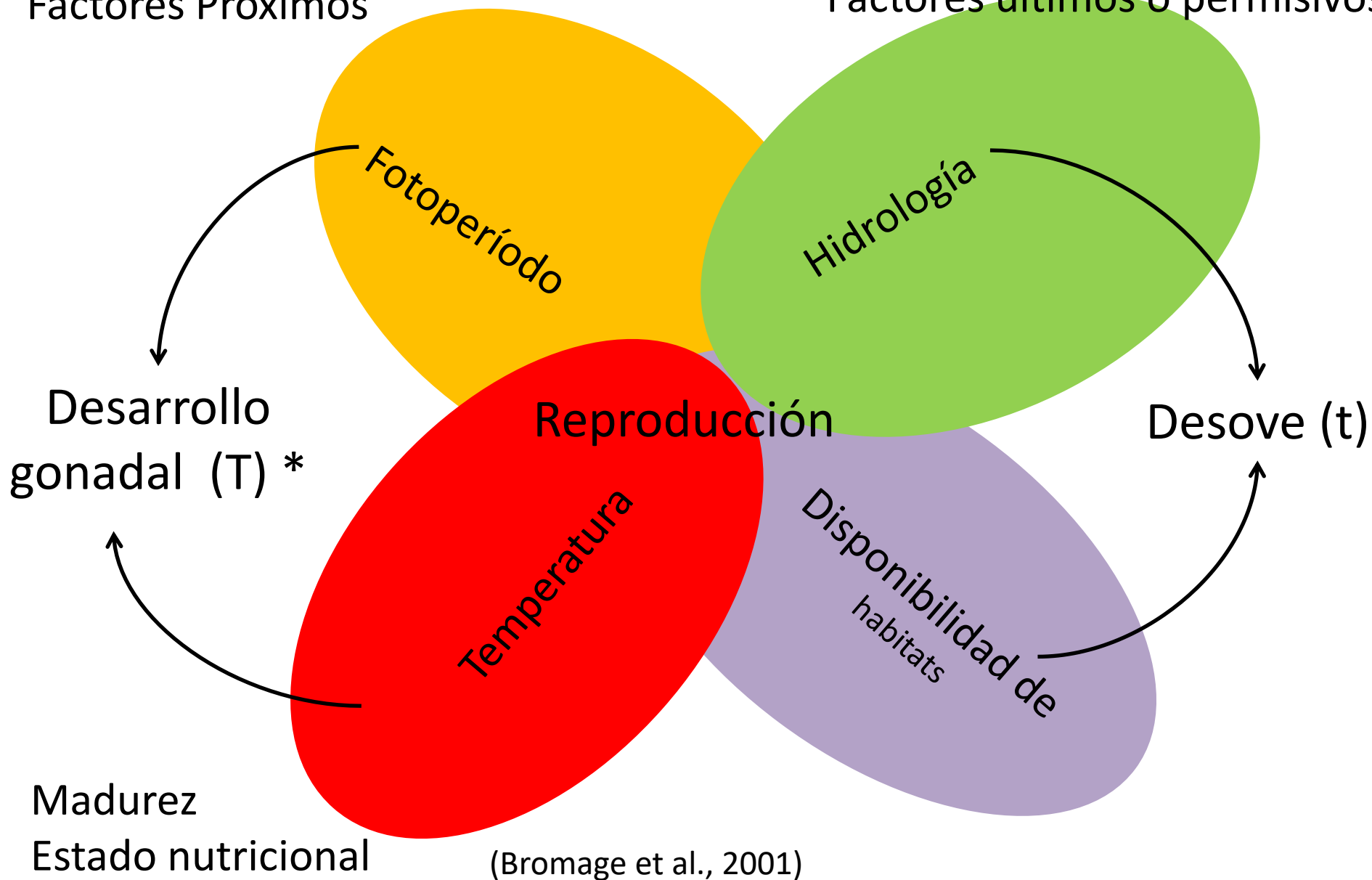




Factores determinantes de la reproducción en peces

Factores Próximos

Factores últimos o permisivos



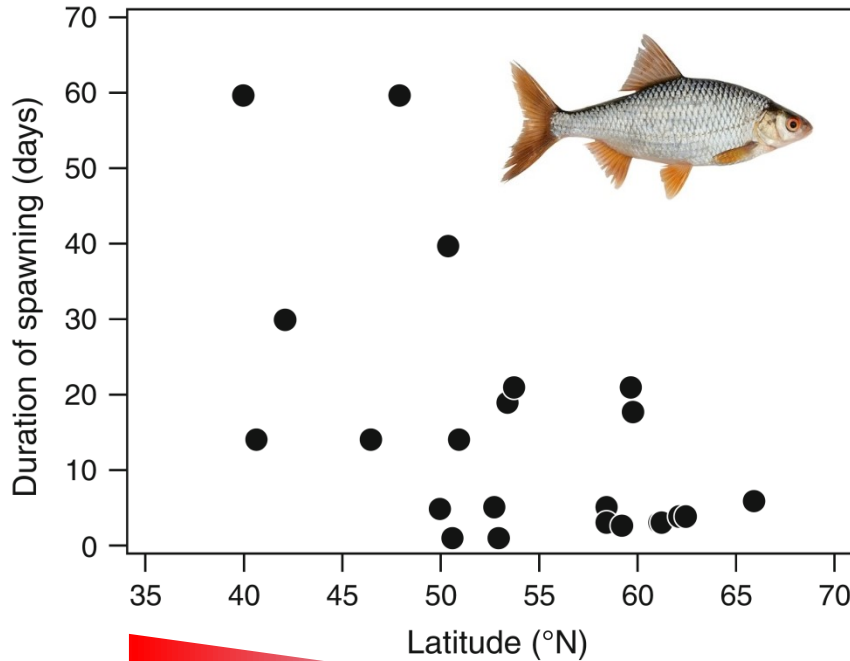
Efectos a nivel reproductivo

Latitudinal gradients in onset date, onset temperature and duration of spawning of roach

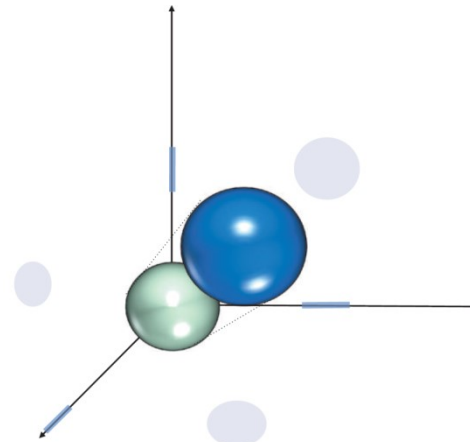
J. LAPPALAINEN*† AND A. S. TARKAN‡

*Department of Biological and Environmental Sciences, P. O. Box 65, FIN-00014 University of Helsinki, Finland and ‡Istanbul University, Faculty of Fisheries, Ordu Cad. No: 200, 34470, Laleli, Istanbul, Turkey

(Received 20 January 2006, Accepted 28 September 2006)



(Lappalainen & Tarkan 2007)



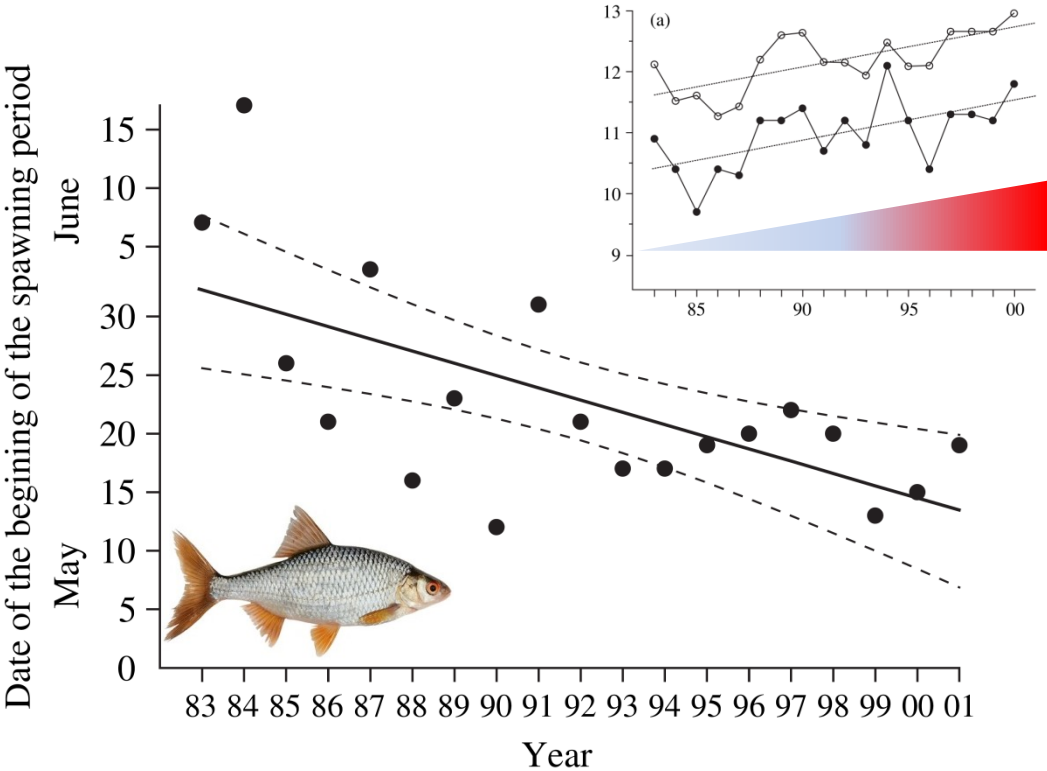
Tiempo
(fenológicos, ciclos de vida)

Effect of temperature changes on the reproductive cycle of roach in Lake Geneva from 1983 to 2001

C. GILLET* AND P. QUÉTIN

Station d'Hydrobiologie Lacustre, BP 511, F 74203 Thonon Cedex, France


(Received 3 May 2005, Accepted 25 February 2006)



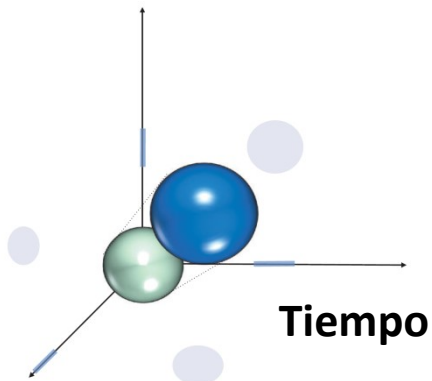
Gillet & Quetin 2006



Long-term study of the reproductive timing of the Neotropical catfish *Iheringichthys labrosus* (Lütken, 1874): Influence of temperature and river discharge

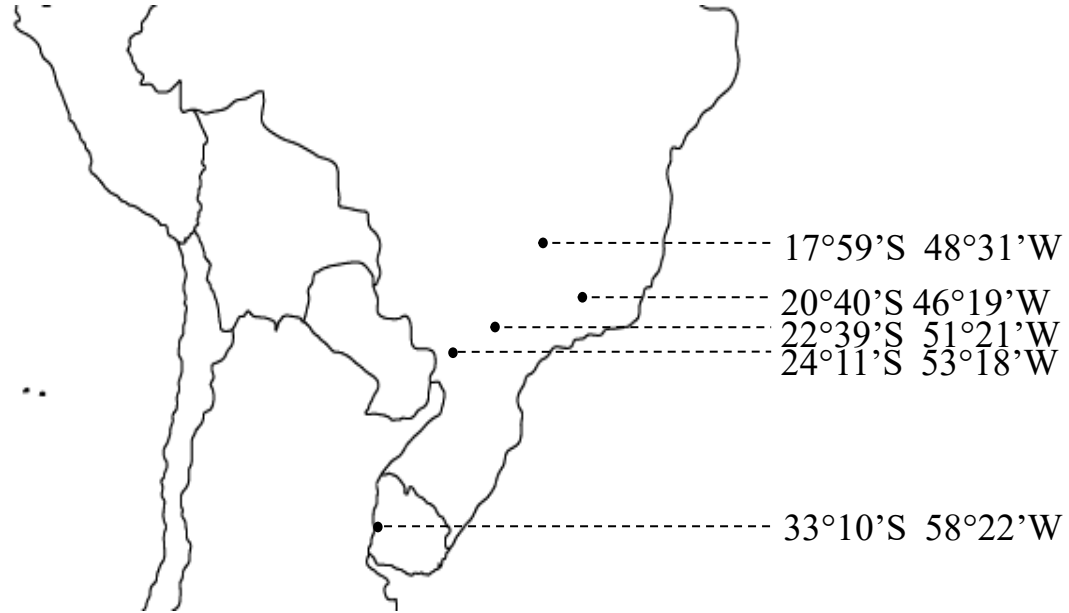
Nicolás Vidal^{1,2}  | Franco Teixeira de Mello² | Iván González-Bergonzoni^{3,4} |
Anahí López-Rodríguez^{1,2} | Giancarlo Tesitore² | Joaquín Pais^{3,4} | Samanta Stebniki² |
Ivana Silva^{3,4} | Alejandro D'Anatro¹

Iheringichthys labrosus

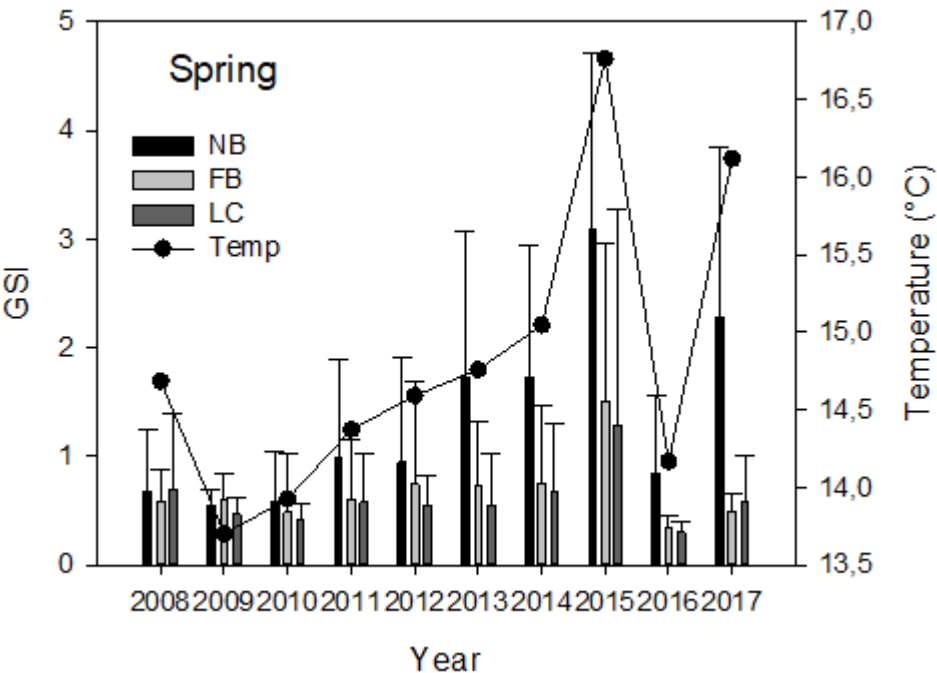




Sustitución de espacio por tiempo





Serie temporal (10 años)



Reproductive period	Reference
From August to December	de Santana et al., 2016
From September to December	Bazzoli et al., 1997
From November to December	Suzuki et al., 2013
From September to December	Holzbach et al., 2009
From December	this study

Río de la Plata voyagers: Deciphering the migration ecology of a vulnerable marine catfish (*Genidens barbatus*) in a large subtropical river (lower Uruguay River)

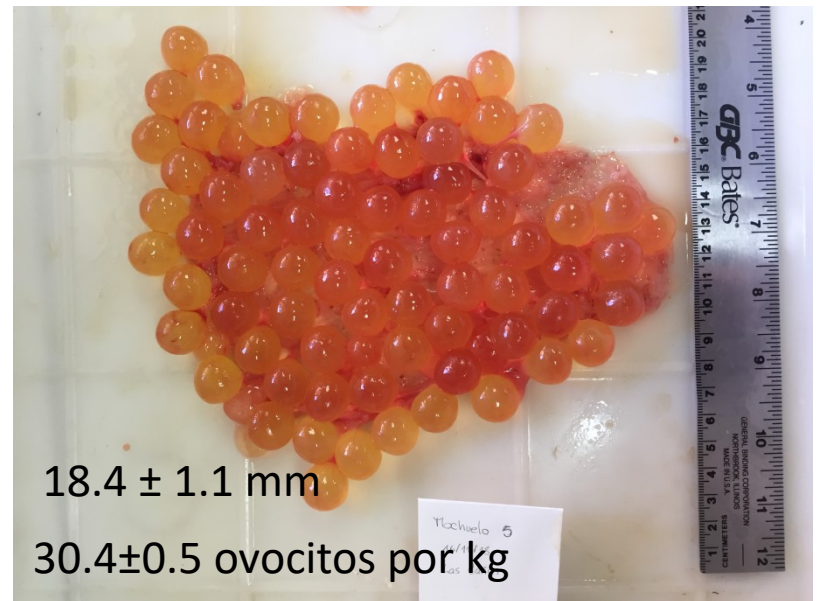
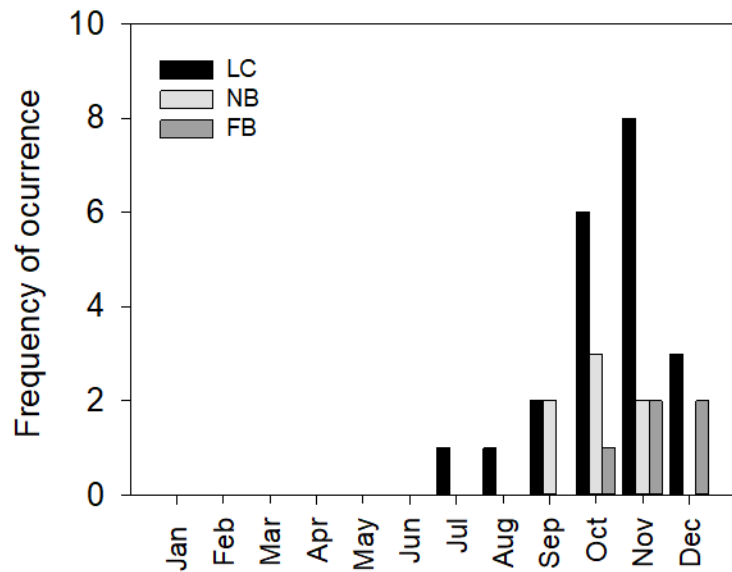
Nicolás Vidal¹  | Alejandro D'Anatro² | Iván González-Bergonzoni³ | Ivana Silva³ | Patricia Correa² | Joaquín País³ | Giancarlo Tesitore¹ | Franco Teixeira de Mello¹ 

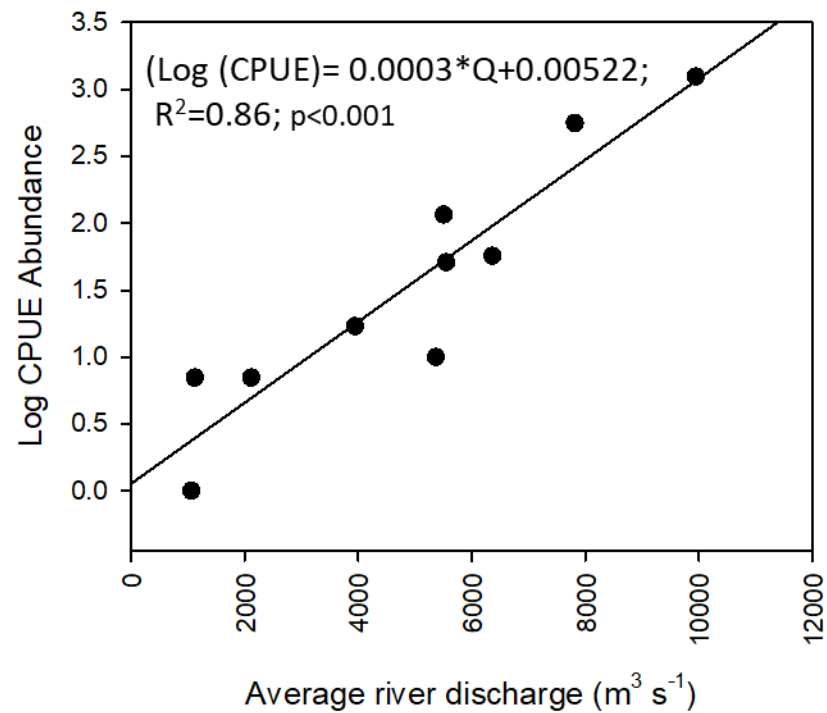
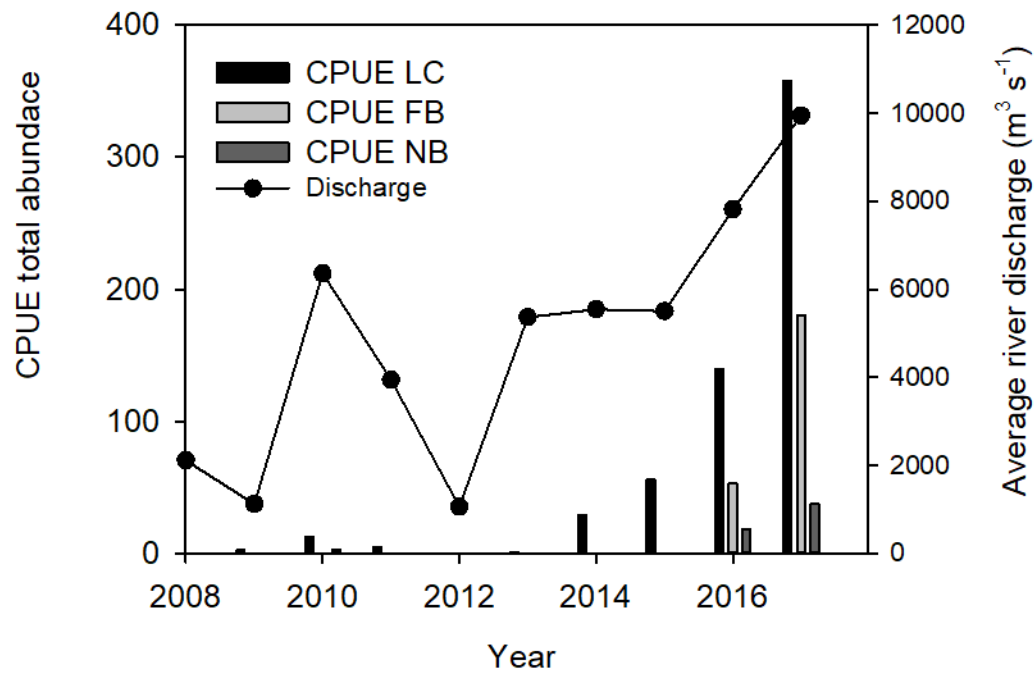


Genidens barbatus

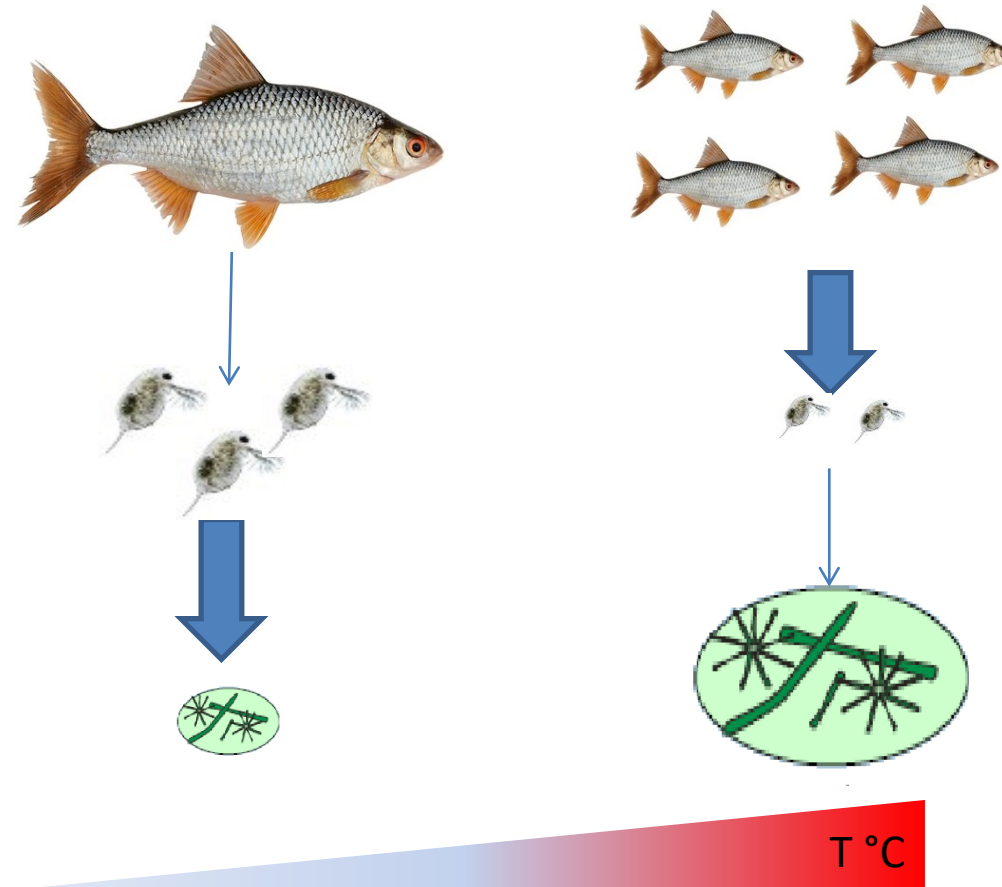


Vidal et al., 2021



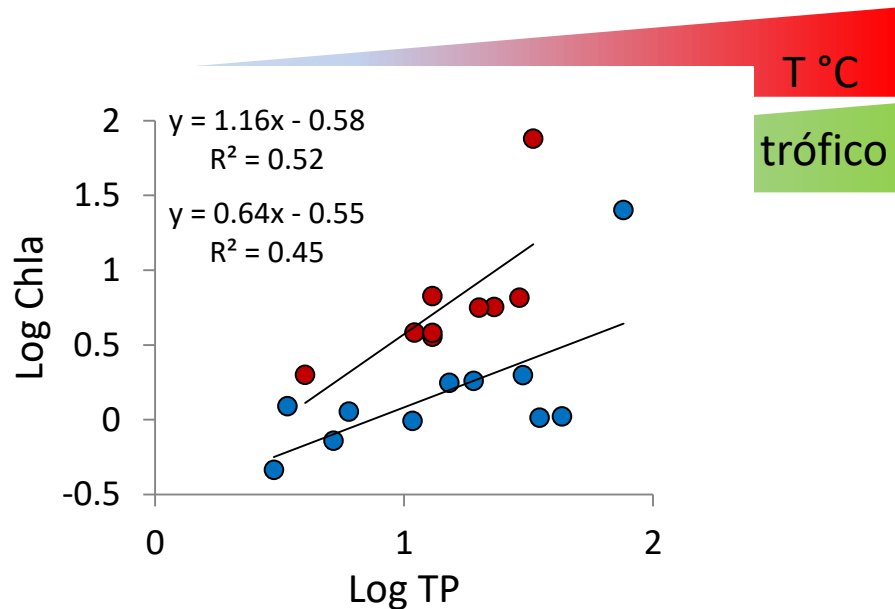
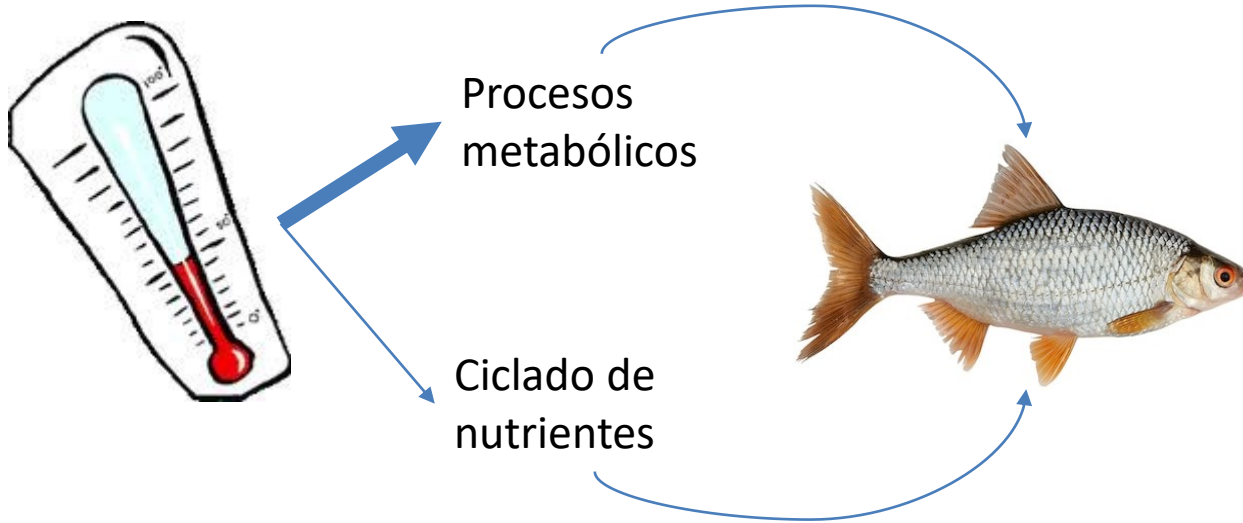


Cambios a nivel ecosistémico: Interacción con eutrofización

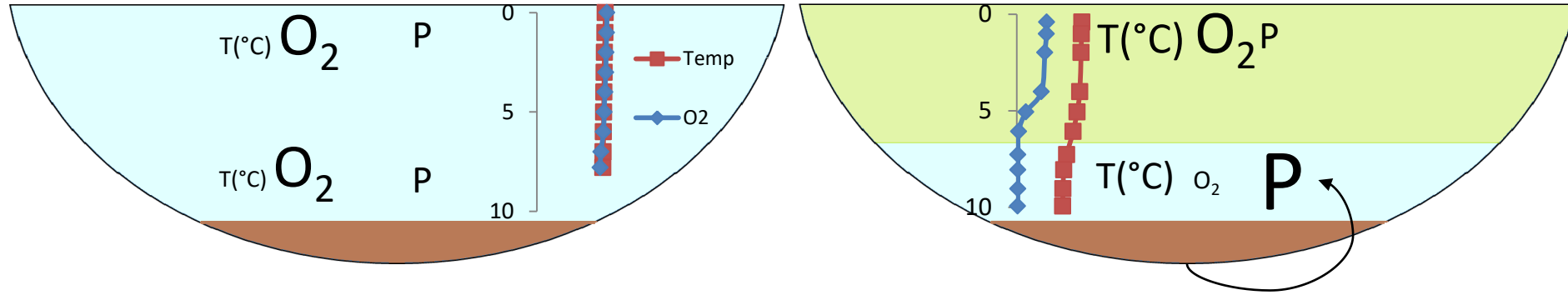


(Moss et al., 2011)

Sinergia entre eutrofización e incremento de la temperatura



Sinergia entre eutrofización e incremento de la temperatura

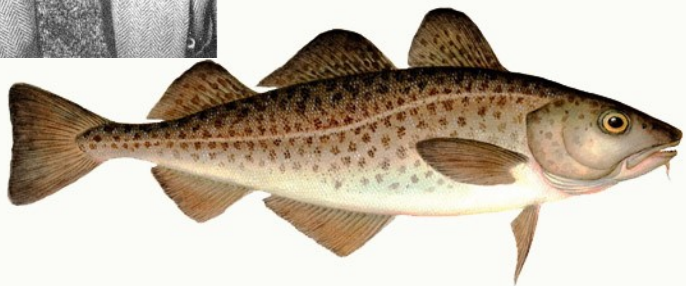
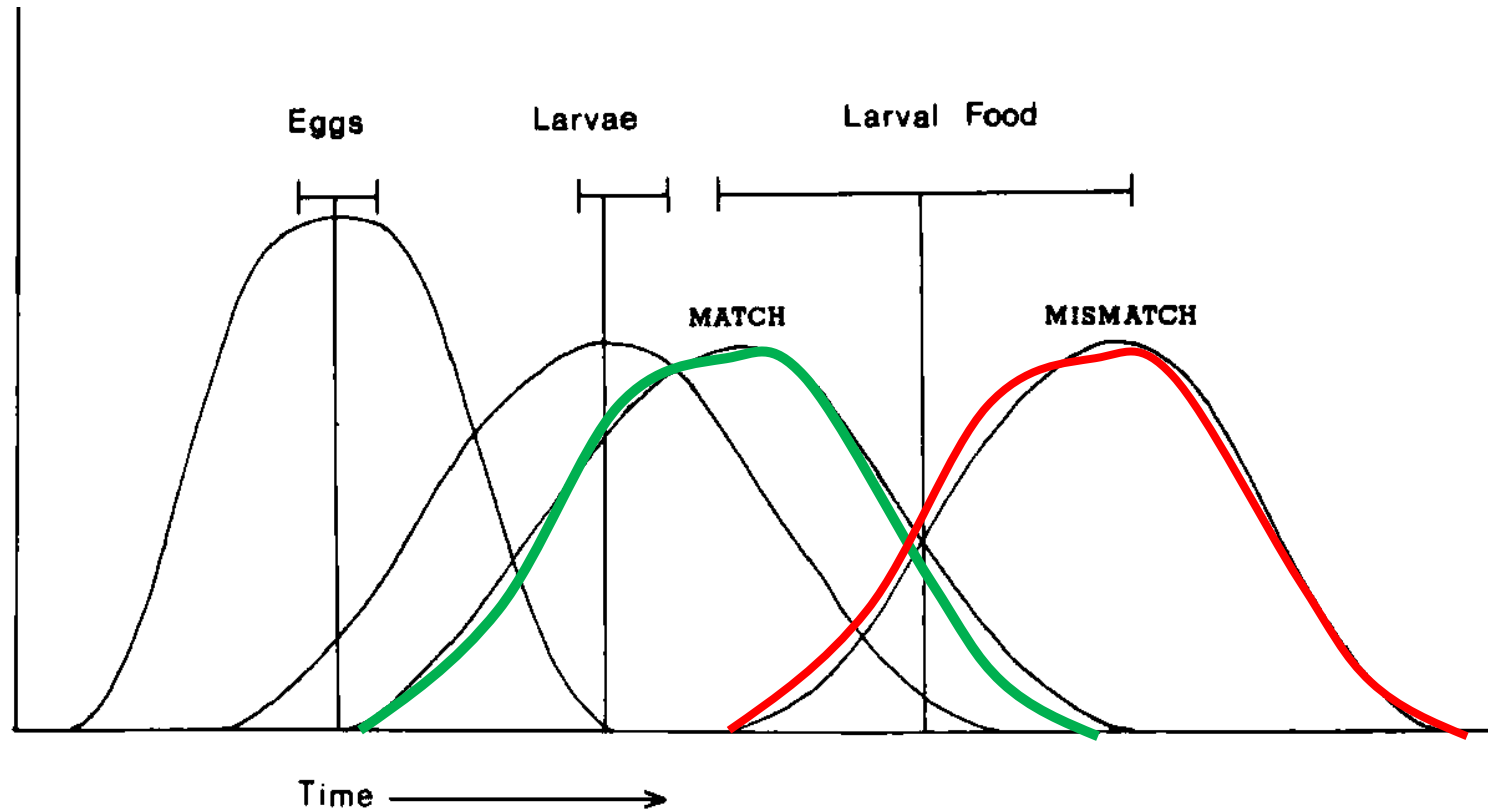


Efectos indirectos

Mortandades de peces

Matches vs mismatches y cambio climático

David Cushing
(1920–2008)

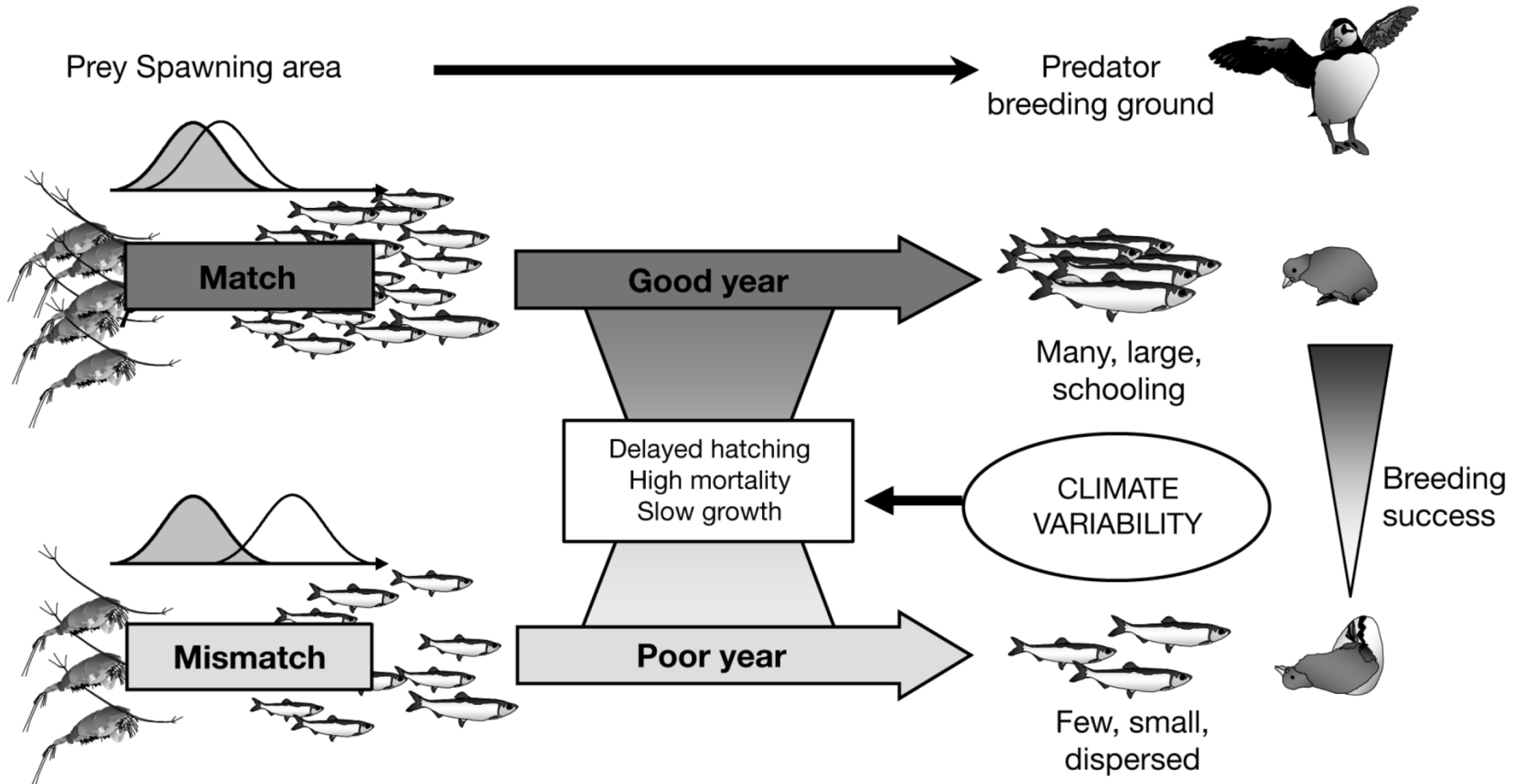


Cushing & Dickson 1977, Cushing 1990

Ejemplo de Match Mismatch que involucra peces

Climate and the match or mismatch between predator requirements and resource availability

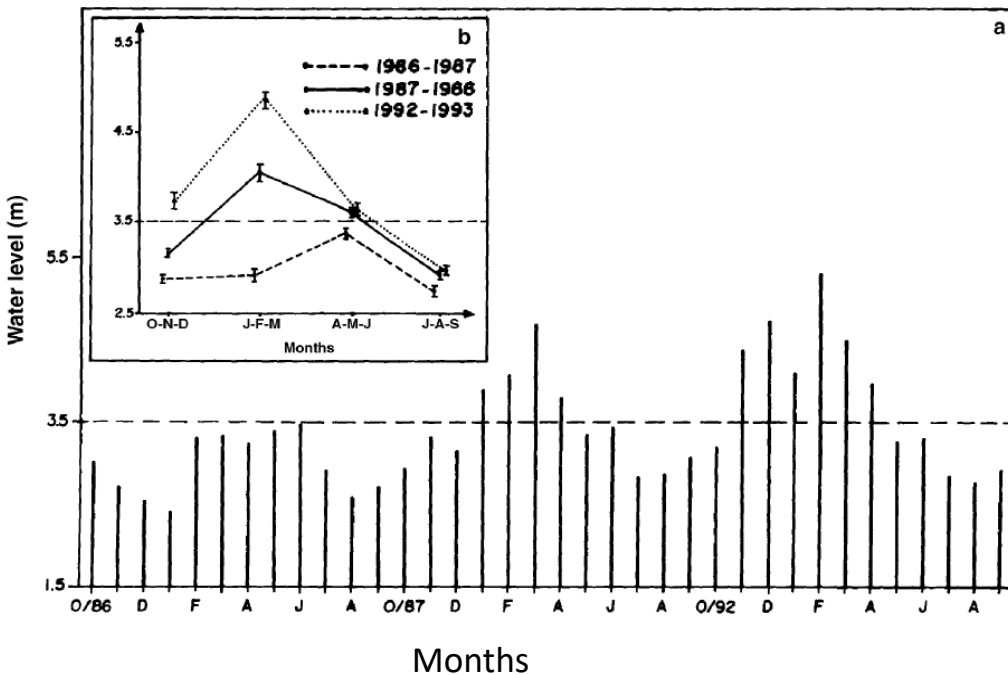
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Influence of the flooding regime on the nutritional state and juvenile recruitment of the curimba, *Prochilodus scrofa*, Steindachner, in upper Paraná River, Brazil

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Atraso del período de inundación en el Paraná tiene repercusiones negativas en el reclutamiento de las especies de peces migratorias,



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