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Supplement of

Early-life dispersal traits of coastal fishes: an extensive database combining observations and growth models

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S1. Supplementary description of the database

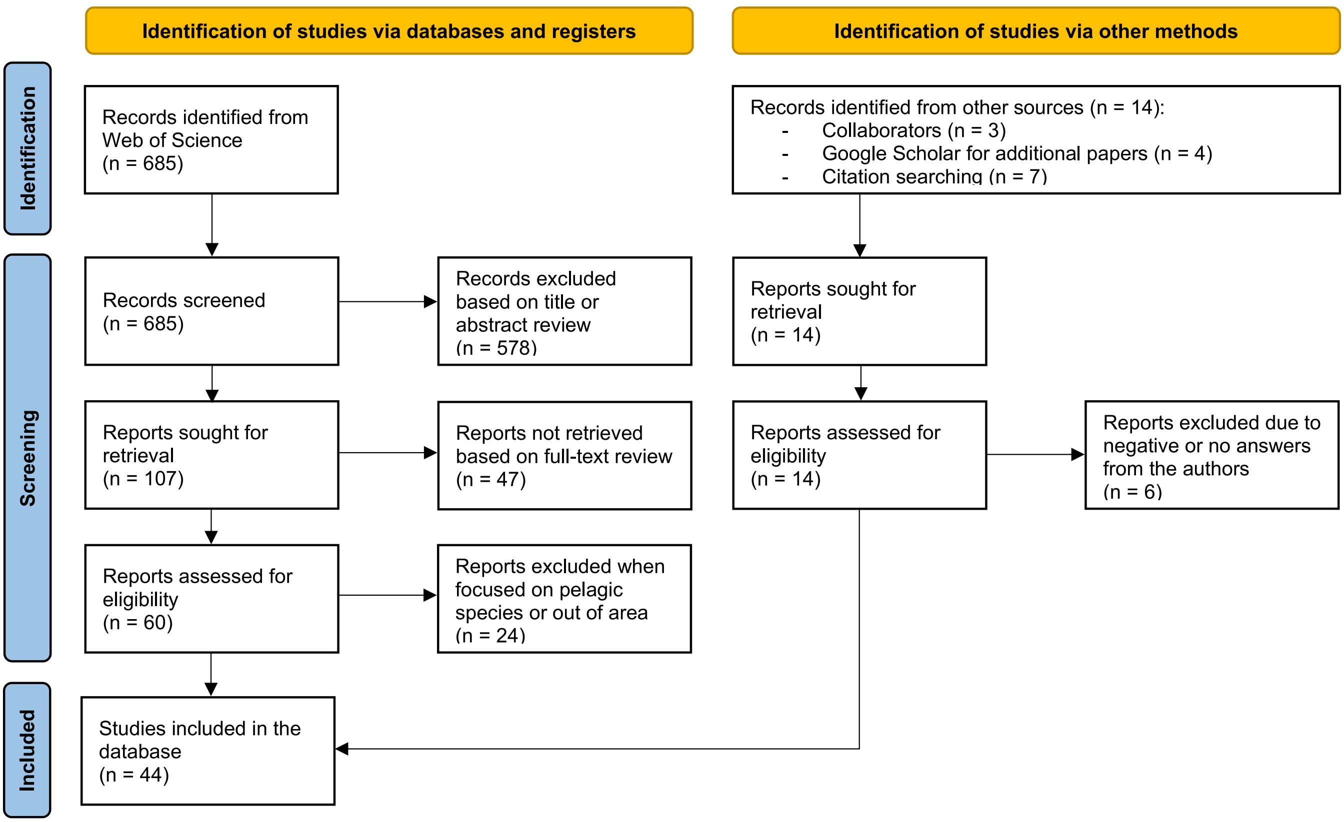

Figure S1. PRISMA 2020 flow diagram summarizing the systematic review realized for data compilation, including searches of databases, registers and other sources such as projects, websites or automated searching tools (Page et al. (2021), http://www.prisma-statement.org/).

The database gathers numerous datasets from different projects. First step consisted in finding and selecting all peer-reviewed articles and previous projects (excluding recent ones not yet finished) to keep only those matching our criteria. For that purpose, we used the methodology of PRISMA 2020 flow diagram for systematic reviews (Figure S1, Page et al. (2021)). In November 2021, semi-automated bibliographic searches were carried out to retrieve published papers using Web of Science with key words “fish eggs Mediterranean”, “fish larvae Mediterranean” and “fish juveniles Mediterranean”. We combined them with papers retrieved through other means (collaborations, references within primary literature, Google Scholar, etc) and with a few non-published data. All the filtering steps and number of papers are documented on Figure S1. After filtering, we end up with multiple datasets that are combined and harmonized into a final database. Table S1 specifies the name of each project from which raw data originate and authors’ involvement (the word "project" is used in the following to refer to peer-reviewed articles or research projects). A given author may thus participate into different projects. Table S2 documents different variables of the database and their associated categories / modalities. Table S3 records all the species, genus and family names that can be found in the database, with their scientific names based on World Register of Marine Species taxonomic database (WoRMS; Horton et al. (2017)). Since our work focuses on sedentary, benthic and demersal fishes, other orders (such as Mollusca) as well as both pelagic and mesopelagic fishes (e.g., Clupeidae, Engraulidae, Myctophidae, Scombridae, Stomiidae) are disregarded. We remove unidentified entries or those provided with only order level or higher (e.g., Anguilliformes).

The methodology employed to determine early-life traits for each entry of the database depends on the classification of spawning and settlement dates schematized in Figure S2. This classification is based upon the determination method as well

Table S1. Authors' association within each project (in alphabetical order) and the DOI of the articles (NA, Not Available, when the DOI does not exist.

Project	**DOI**	**Authors**
Alvarez et al. (2012)	10.1016/j.ecss.2011.11.029	Itziar Álvarez, Gotzon Basterretxea, Ignacio A. Catalán, Ana Sabatés
Alvarez et al. (2015)	10.1016/j.ecss.2015.10.015	Itziar Álvarez, Gotzon Basterretxea, Ignacio A. Catalán
Alvarez et al. (2021)	10.1016/j.ecss.2021.107410	Itziar Álvarez, Ignacio A. Catalán, Carlos Díaz-Gil
BABYCROS (Rouanet et al., 2020)	NA	Mireille Harmelin-Vivien, Laurence Le Diréach, Elodie Rouanet
Basterretxea et al. (2013)	10.1111/fog.12035	Itziar Álvarez, Gotzon Basterretxea, Ignacio A. Catalán, Ana Sabatés
BIOMEX (2005)	NA	Romain Crec'hriou, Mireille Harmelin-Vivien, Laurence Le Diréach, Ángel Pérez-Ruzafa, Serge Planes, Erwan Roussel, Ana Sabatès
Calò et al. (2016)	10.1016/j.fishres.2015.12.001	Antonio Calò, José Antonio García-Charton, Ángel Pérez-Ruzafa
CANOPé	NA	Laurence Le Diréach, Elodie Rouanet
Catalan et al. (2014)	10.12681/mms.539	Itziar Álvarez, Ignacio A. Catalán
Cheminee et al. (2017) (ECATE)	10.1016/j.marpolbul.2017.03.051	Adrien Cheminée, Romain Crec'hriou, Philippe Lenfant, Manon Mercader, Jérémy Pastor
Cuadros et al. (2017)	10.1016/j.rsma.2017.05.011	Adrien Cheminée, Amalia Cuadros, Joan Moranta
Cuadros et al. (2018)	10.1371/journal.pone.0190278	Gotzon Basterretxea, Adrien Cheminée, Amalia Cuadros, Manuel Hidalgo, Joan Moranta
Cuadros et al. (2019)	10.12681/mms.18857	Adrien Cheminée, Amalia Cuadros, Joan Moranta
Di Franco and Guidetti (2011)	10.1098/rsbl.2010.1149	Antonio Di Franco, Paolo Guidetti
Di Franco et al. (2011)	10.1080/11250003.2011.566227	Antonio Di Franco, Paolo Guidetti, Nuria Raventos
Di Franco et al. (2019)	10.1098/rsbl.2018.0662	Antonio Calò, Carlo Cattano, Antonio Di Franco, Marco Milazzo, Paolo Guidetti
Diaz-Gil et al. (2019)	10.12681/mms.19510	Ignacio A. Catalán, Carlos Díaz-Gil
ECONAUT (Le Direach et al., 2009)	NA	Patrick Astruch, Denis Bonhomme, Loïc Guilloux, Laurence Le Diréach, Sandrine Ruitton
Faillettaz et al. (2020)	10.3354/meps13191	Romain Crec'hriou, Robin Faillettaz, Jean-Olivier Irisson, Philippe Lenfant
Felix-Hackradt et al. (2013b) Felix-Hackradt et al. (2013a) Felix-Hackradt et al. (2014)	10.1007/s00227-013-2228-2 10.1016/j.ecss.2013.05.029 10.1016/j.seares.2013.12.018	Fabiana C. Félix-Hackradt, José Antonio García-Charton, Ángel Pérez-Ruzafa
Guidetti et al. (2002)	10.1017/S0025315402005775	Paolo Guidetti, Gabriele La Mesa
Hinz et al. (2019)	10.7717/peerj.6797	Hilmar Hinz, Joan Moranta
Macpherson and Raventos (2005)	10.1007/s00227-005-0059-5	Enrique Macpherson, Nuria Raventos
MAS1	NA	Pilar Olivar, Ana Sabatés
MAS2	NA	Pilar Olivar, Ana Sabatés
MedHab	NA	Adrien Cheminée, Tristan Estaque, Tiffany Monfort, Lucie Nunez, Justine Richaume
Mercader et al. (2018)	10.1016/j.marenvres.2018.02.030	Adrien Cheminée, Romain Crec'hriou, Philippe Lenfant, Manon Mercader, Jérémy Pastor
Montenegro - Katič	NA	Adrien Cheminée
Murenu & Muntoni	NA	Manuel Muntoni, Matteo Murenu
NUhAGE (Cheminee et al., 2021)	10.1038/s41598-021-93557-2	Patrick Astruch, Aurélie Blanfuné, Adrien Cheminée, Mireille Harmelin-Vivien, Laurence Le Diréach, Elodie Rouanet, Sandrine Ruitton, Thierry Thibaut
NurseFish - Sanja Dario	NA	Sanja Matić-Skoko, Dario Vrdoljak
Olivar et al. (2021) (IDEADOS)	10.1594/PANGAEA.927754	Pilar Olivar, Ana Sabatés
RadeICHTYO (Irisson et al., 2018)	10.17882/52943	Robin Faillettaz, Jean-Olivier Irisson
Raventos et al. (2021)	10.1111/1365-2656.13435	Enrique Macpherson, Nuria Raventos
RECRUES SARS-1 (Harmelin and Vigliola, 1996)	NA	Jean-Georges Harmelin, Mireille Harmelin-Vivien, Laurent Vigliola
RECRUES SARS-2 (Harmelin and Harmelin-Vivien, 1997)	NA	Jean-Georges Harmelin, Mireille Harmelin-Vivien, Laurent Vigliola
RECRUES SARS-3 (Ruitton et al., 2009)	NA	Jean-Georges Harmelin, Mireille Harmelin-Vivien, Laurent Vigliola
SETMORT	NA	Jean-Georges Harmelin, Mireille Harmelin-Vivien, Laurence Le Diréach, Enrique Macpherson, Laurent Vigliola
Ruitton (1999) (Thesis)	NA	Sandrine Ruitton
Ventura et al. (2015)	10.1111/maec.12198	Daniele Ventura, Giandomenico Ardizzone
Ventura et al. (2017)	10.1016/j.ecss.2017.04.014	Daniele Ventura, Giandomenico Ardizzone
Ventura et al. (2018)	10.1016/j.ecss.2018.05.020	Daniele Ventura, Giandomenico Ardizzone

as sampling techniques, life stages and measured lengths. Note that some datasets (such as otolithometry data) are directly supplied with spawning and settlement dates but are also included in the figure for comprehensiveness.

Figure S3 displays the number of entries per general sampling technique and per stage. The database is mainly composed of juvenile data ($\simeq 10.10^4$ entries) and Underwater Visual Census samples ($\simeq 8.10^4$ entries), which might be link to the high number of replicates for this method.

Table S2. Variables provided in the database (in order of appearance) and their associated categories (in alphabetical order). `Ecoregion` categories are based on Spalding et al. (2007). `Project`, `DOI` and taxon (`Family`, `Genus` and `Species`) categories are reported in Tables S1 and S3. NA (Not Available) category has been disregarded.

Variable name	**Variable categories**
Project	See Table S1
DOI	See Table S1
Ecoregion	Adriatic Sea, Alboran Sea, Ionian Sea, Western Mediterranean
Site	Names given by data providers
Latitude	$\in$ [36.7385, 44.3974]
Longitude	$\in$ [-3.7546, 18.9955]
CoordinatesType	Spawning coordinates, Settlement coordinates
GeneralSamplingTechnique	Beam trawl, Bongo net, Epibenthic trawl, Fixed plankton net, Hand net, Light trap, Multiple opening/closing plankton net, Neuston 3 nets, Ring net, Shore seine, Underwater visual census
SpecificSamplingTechnique	40 cm diameter Bongo net, 40 cm diameter Bongo net 335 μm mesh, 50 cm diameter per net (Neuston) 780 μm mesh, 57 cm diameter Bongo net 200 μm mesh, 57 cm diameter Bongo net 200 μm mesh and LHPR (Longhurst-hardy Plankton recorder), 60 cm diameter Bongo net, 60 cm diameter Bongo net 300 μm mesh, 80 cm diameter beam trawl, 80 cm diameter epibenthic trawl, 80 cm diameter ring net 1000 μm mesh, 90 cm diameter beam trawl, CARE light trap, Hand-made, MOCNESS 1 m2 1500 μm mesh (MOC1), MOCNESS 1 m2 300 μm mesh (MOC1), MultiNet HYDRO-BIOS 0.25 m2 300 μm mesh (MSN300), Quatrefoil light trap, Scuba diving, Snorkeling, TUBE light trap, Video transect
SamplingDepth	$\in$ [0, 500]
SiteMeasureValue	$\in$ [1, 2500]
SiteMeasureUnit	h, m2, m3, trap, trap.night-1
SamplingDate	$\in$ [1993-01-05, 2021-08-11]
Replicate	$\in$ [1, 25]
Family	See Table S3
Genus	See Table S3
Species	See Table S3
NumberOfIndividuals	$\in$ [1, 5782.2]
DensityValue	$\in$ [0.00041418, 1200]
DensityUnit	N.h-1, N.m-2, N.m-3, N.night.trap-1, N.trap-1
Comments	2nd settlement campaign of 1993, 2nd settlement campaign of 1994, $\geq$100 mm, $\geq$120 mm, $\geq$140 mm, $\geq$160 mm, $\geq$200 mm, $\geq$260 mm, Different from RADEICHTYO, From Failletaz et al 2020 missing in RADEICHTYO (Irisson et al 2018), From RADEICHTYO (Irisson et al 2018) missing in Failletaz et al 2020, From RADEICHTYO (Irisson et al 2018) missing in Failletaz et al 2020 - Parablennius pilicornis or rouxi, Length = 0mm, Second sampling in this station, Serranus scriba or cabrilla, Spicara smaris or Boops boops, Station measure value seems low, Surface, Surface - $\geq$140 mm, Surface - $\geq$200 mm, There was a length but no number of fish so we put 1 fish, campaign of 1993, campaign of 1994, campaign of 1995, median length class, no PLD (overpolished) so no settlement date, range size between 200-280 mm
SamplingLength	$\in$ [1, 1000]
Stage	Egg - Small larva, Juvenile, Larva, Settler
SpawningDate_mean	$\in$ [1985-11-24, 2021-07-22]
SpawningDate_std	$\in$ [0, 4433.1]
SpawningDetermination	Reconstruction genus-based, Reconstruction species-based, Otolithometry, Sampling date
PLD_mean	$\in$ [3.9144, 200.72]
PLD_std	$\in$ [0, 98.817]
SettlementDate_mean	$\in$ [1986-01-06, 2021-08-11]
SettlementDate_std	$\in$ [0, 4423.6]
SettlementDetermination	Reconstruction genus-based, Reconstruction species-based, Otolithometry, Sampling date

Table S3. Taxa available in the database (`Family`, `Genus` and `Species`).

Family	Genus	Species
Ammodytidae,	*Aidablennius, Anthias, Aphia,*	*Aidablennius sphynx, Anthias anthias, Aphia minuta, Apogon imberbis,*
Apogonidae,	*Apogon, Apterichtus,*	*Apterichtus caecus, Argentina leioglossa, Argentina sphyraena,*
Argentinidae,	*Argentina, Ariosoma,*	*Ariosoma balearicum, Arnoglossus kessleri, Arnoglossus laterna,*
Atherinidae,	*Arnoglossus, Atherina,*	*Arnoglossus thori, Atherina boyeri, Atherina hepsetus,*
Aulopidae,	*Aulopus, Blennius,*	*Aulopus filamentosus, Blennius ocellaris, Boops boops,*
Blenniidae,	*Boops, Bothus, Brama,*	*Bothus podas, Brama brama, Buglossidium luteum,*
Bothidae,	*Buglossidium, Callionymus,*	*Callionymus pusillus, Callionymus risso, Capros aper, Carapus acus,*
Bramidae,	*Capros, Carapus,*	*Centracanthus cirrus, Centrolophus niger, Cepola macrophthalma,*
Callionymidae,	*Centracanthus,*	*Cepola rubescens, Cheilopogon heterurus, Chelidonichthys lucerna,*
Caproidae,	*Centrolophus, Cepola,*	*Chelon auratus, Chelon labrosus, Chelon ramada, Chelon saliens,*
Carapidae,	*Cheilopogon, Chelidonichthys,*	*Chromis chromis, Citharus linguatula, Clinitrachus argentatus,*
Centracanthidae,	*Chelon, Chromis, Citharus,*	*Conger conger, Coris julis, Crystallogobius linearis, Ctenolabrus rupestris,*
Centrolophidae,	*Clinitrachus, Conger, Coris,*	*Dactylopterus volitans, Deltentosteus collonianus,*
Cepolidae,	*Crystallogobius, Ctenolabrus,*	*Deltentosteus quadrimaculatus, Dentex dentex, Dicentrarchus labrax,*
Citharidae,	*Dactylopterus,*	*Diplodus annularis, Diplodus cervinus, Diplodus puntazzo,*
Clinidae,	*Deltentosteus, Dentex,*	*Diplodus sargus, Diplodus vulgaris, Echiichthys vipera,*
Congridae,	*Dicentrarchus, Diplodus,*	*Epinephelus aeneus, Epinephelus caninus, Epinephelus costae,*
Cynoglossidae,	*Echiichthys, Echiodon,*	*Epinephelus marginatus, Exocoetus exiliens,*
Dactylopteridae,	*Epinephelus, Exocoetus,*	*Gaidropsarus mediterraneus, Glossanodon leioglossus, Gobius ater,*
Exocoetidae,	*Gaidropsarus, Glossanodon,*	*Gobius bucchichi, Gobius cobitis, Gobius couchi, Gobius cruentatus,*
Gadidae,	*Gobius, Gymnammodytes,*	*Gobius fallax, Gobius geniporus, Gobius niger, Gobius paganellus,*
Gobiesocidae,	*Helicolenus, Hippocampus,*	*Gymnammodytes cicerelus, Gymnammodytes semisquamatus,*
Gobiidae,	*Knipowitschia,*	*Helicolenus dactylopterus, Hippocampus guttulatus,*
Labridae,	*Labrus, Lebetus,*	*Hippocampus hippocampus,*
Lotidae,	*Lepadogaster, Lepidopus,*	*Knipowitschia panizzae, Labrus merula,*
Macroramphosidae,	*Lepidorhombus, Lepidotrigla,*	*Labrus viridis, Lebetus guilleti, Lepidopus caudatus,*
Merlucciidae,	*Lipophrys, Lithognathus,*	*Lepidorhombus boscii, Lepidotrigla cavillone, Lipophrys dalmatinus,*
Moronidae,	*Macroramphosus,*	*Lipophrys pavo, Lipophrys pholis, Lipophrys trigloides,*
Mugilidae,	*Merluccius, Micromesistius,*	*Lithognathus mormyrus, Macroramphosus scolopax,*
Mullidae,	*Monochirus, Mugil, Mullus,*	*Merluccius merluccius, Micromesistius poutassou, Monochirus hispidus,*
Muraenidae,	*Muraena, Mycteroperca,*	*Mullus barbatus, Mullus surmuletus, Muraena helena,*
Nemichthydae,	*Nerophis, Oblada,*	*Mycteroperca rubra, Nerophis maculatus,*
Ophichthidae,	*Odondebuenia, Oedalechilus,*	*Nerophis ophidion, Oblada melanura, Odondebuenia balearica,*
Ophidiidae,	*Ophidion, Pagellus, Pagrus,*	*Oedalechilus labeo, Ophidion barbatum, Pagellus acarne,*
Pomacentridae,	*Parablennius, Parophidion,*	*Pagellus bogaraveo, Pagellus erythrinus, Pagrus pagrus,*
Pomatomidae,	*Pegusa, Pomatomus,*	*Parablennius gattorugine, Parablennius incognitus, Parablennius ocellaris,*
Regalecidae,	*Pomatoschistus, Psetta,*	*Parablennius pilicornis, Parablennius rouxi, Parablennius sanguinolentus,*
Sciaenidae,	*Pseudaphya, Salaria, Sarpa,*	*Parablennius tentacularis, Parablennius zvonimiri, Parophidion vassali,*
Scomberesocidae,	*Sciaena, Scomberesox,*	*Pegusa lascaris, Pomatomus saltatrix,*
Scophthalmidae,	*Scophthalmus, Scorpaena,*	*Pomatoschistus bathi, Pomatoschistus marmoratus, Pseudaphya ferreri,*
Scorpaenidae,	*Serranus, Solea, Sparus,*	*Salaria pavo, Sarpa salpa, Sciaena umbra, Scomberesox saurus,*
Sebastidae,	*Sphyraena, Spicara,*	*Scophthalmus maximus, Scorpaena notata, Scorpaena porcus,*
Serranidae,	*Spondyliosoma, Symphodus,*	*Scorpaena scrofa, Serranus cabrilla, Serranus hepatus, Serranus scriba,*
Soleidae,	*Symphurus, Synapturichthys,*	*Solea senegalensis, Solea solea, Sparus aurata,*
Sparidae,	*Syngnathus, Synodus,*	*Sphyraena sphyraena, Spicara flexuosum, Spicara maena, Spicara smaris,*
Sphyraenidae,	*Thalassoma, Trachinus,*	*Spondyliosoma cantharus, Symphodus bailloni, Symphodus cinereus,*
Syngnathidae,	*Trigla, Trigloporus,*	*Symphodus doderleini, Symphodus mediterraneus,*
Synodontidae,	*Tripterygion, Uranoscopus,*	*Symphodus melanocercus, Symphodus melops, Symphodus ocellatus,*
Trachinidae,	*Zeus, Zosterisessor*	*Symphodus roissali, Symphodus rostratus, Symphodus tinca,*
Trachipteridae,		*Symphurus nigrescens, Synapturichthys kleinii, Syngnathus abaster,*
Trichiuridae,		*Syngnathus acus,*
Triglidae,		*Syngnathus phlegon, Syngnathus taenionotus, Syngnathus tenuirostris,*
Tripterygiidae,		*Syngnathus typhle, Synodus saurus, Thalassoma pavo, Trachinus araneus,*
Uranoscopidae,		*Trachinus draco, Trachinus radiatus, Trigla lyra,*
Zeidae		*Trigloporus lastoviza, Tripterygion delaisi, Tripterygion tripteronotum,*
		Uranoscopus scaber, Zeus faber,
		Zosterisessor ophiocephalus

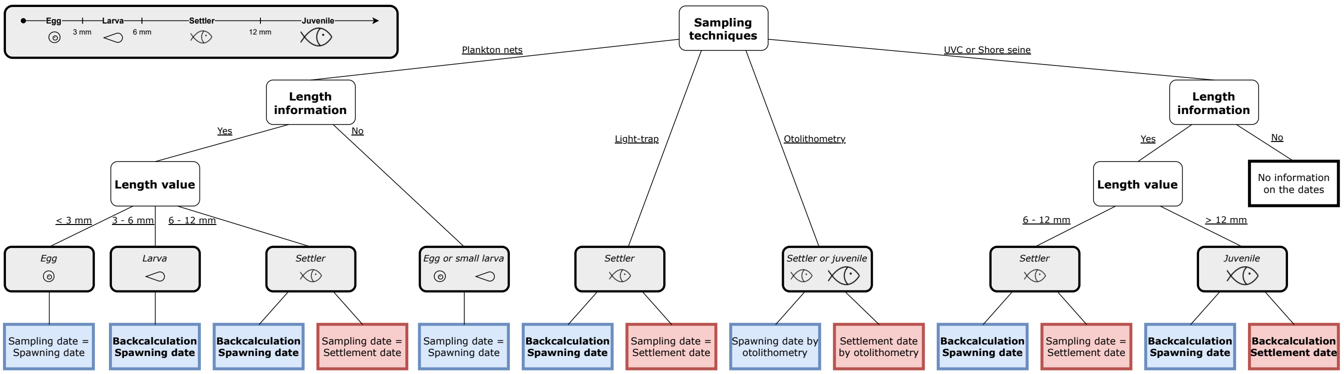

Figure S2. Classification used to determine spawning and settlement dates as a function of the sampling technique, the life stage (grey boxes) and the length information (white boxes). Blue boxes highlight the determination method of spawning dates. Red boxes concern the determination method of settlement dates. Bold letters emphasize reconstructed dates.

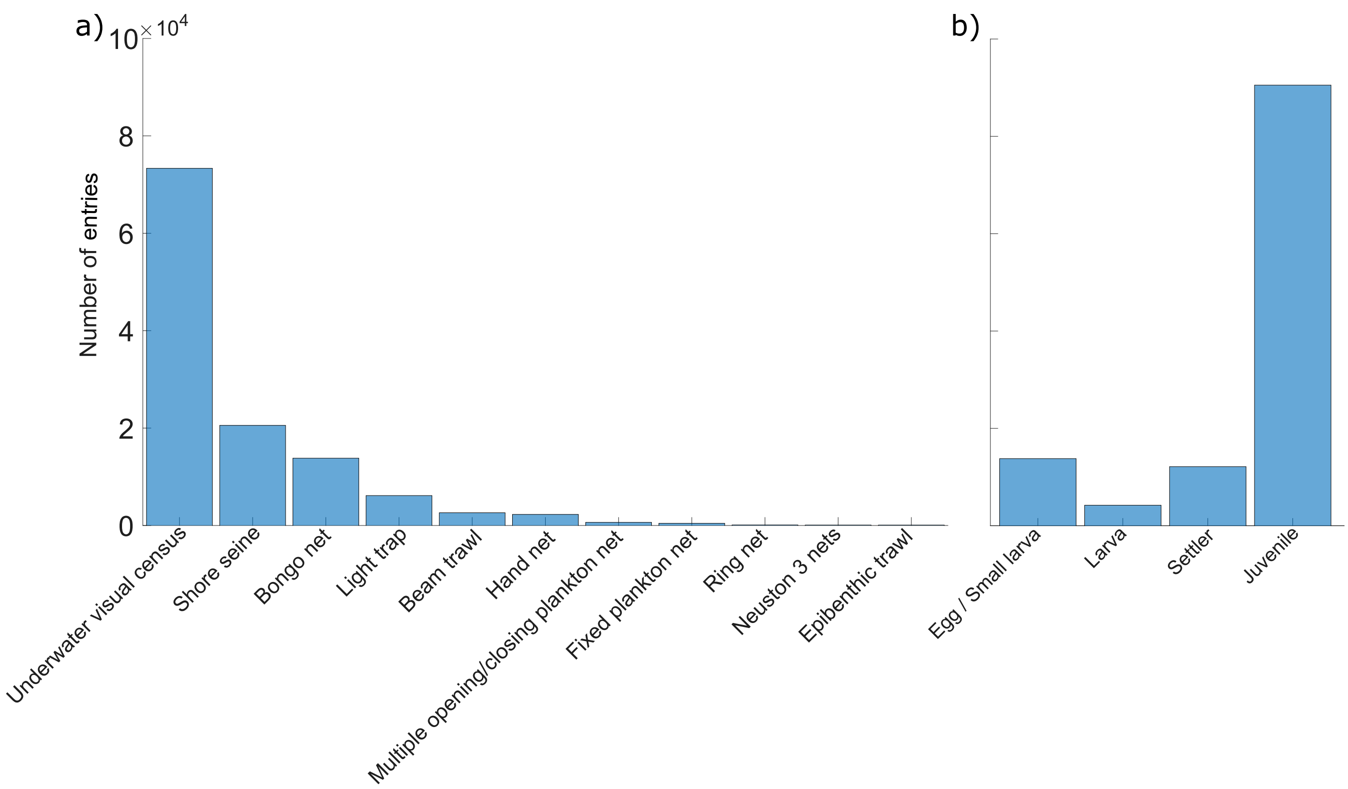

Figure S3. Number of entries per a) general sampling technique and b) life stage.

S2. Additional information on reconstruction process

Datasets of growth curve parameters and MATLAB codes are downloaded from each species-specific webpage of the AmP website (https://www.bio.vu.nl/thb/deb/deblab/add_my_pet/species_list.html). All datasets were downloaded before 11 July 2022. If multiple datasets were available for one fish species, the most recent one was kept. A copy of all AmP Matlab files used has been placed on the following GitHub repository (https://github.com/MarineDiStefano/AmP-Species-Information.git).

As pointed out in the manuscript, reconstructions are carried out only for some species and genus of the database since some growth curves are not available in AmP. All taxa contained in the database for which reconstruction is made are displayed in Table S4 with their full taxonomy (species, genus, family) according to two main categories of reconstruction.

For genus-based reconstruction, growth curves used for genus or unavailable species could rely on one similar species only or on several species from the same genus. Table S5 lists species for which genus-based reconstructions are made using the growth curve of only one species from the same genus available in AmP. Table S6 lists the species for which genus-based reconstructions are done using the mean growth curve of several species belonging to the same genus and available in AmP.

To test the validity of our general approach, we first evaluate the sensitivity of growth curves to small changes of AmP parameters. A Von Bertalanffy growth curve is fitted on observed length data of *Diplodus sargus* (as provided by AmP website and used as a reference here) and a confidence interval is computed based on the variability of L_i and r_B growth parameters (Figure S4). Parameter t_b is fixed and equal to zero and parameters are computed with a temperature of 20°C. As our study focuses on early-life stages, impact on a range of small sizes (i.e. 0 to 10 centimetres) is examined. When considering the variability of AmP parameters, differences on reconstructed dates or PLDs reach one to two days maximum, limiting their impacts on final estimates.

To better understand how environmental factors influence growth curves, we randomly draw values for temperature, food ingestion capability and length at settlement and examine the resulting variability on reconstructed traits. An example of the impact of temperature and food ingestion capability variability on *Diplodus sargus* growth curve is shown in Figure S5. From 1 to 50 reconstructions are tested and compared among them based on coefficients of variation ($CV = \sigma^2_{PLD}/\overline{PLD}$; Figure S6) and standard deviations of reconstructed PLDs (Figure S7). We thus realise 50 reconstructions for each entry to consider the variability of the environment in a more realistic and stabler way (Figure S6). 95% of the standard deviation falls between 2 and 30 days (horizontal boxplot in Figure S7a), with a peak around 7 days and a median at 11 days (Figure S7a). CVs seem to follow a Gaussian distribution centred around 0.35 (equal to the median) and spanning 0.1 to 0.7 (Figure S7b). Overall, CVs are low and clearly below one, indicating that reconstructions using 50 iterations are satisfactory. Reconstructed PLDs exhibit a variability of 7 days, that is about 35% (Figure S7b). This level of variability is higher than those reported by Victor (1986) and Macpherson and Raventos (2006) (around 10%). However, it is consistent with Bay et al. (2006) who document a PLD variability from 15 to 50%, depending on the species and location considered. Indeed, the low variability levels reported by Victor (1986) and Macpherson and Raventos (2006) could solely be explained by the sampling strategy, restricted to one species and a small coastal area. Overall, we realise 50 reconstructions for each entry as it appears to be sufficient to properly consider environmental variability while ensuring robustness and stability of our results (Figures S6 and S5).

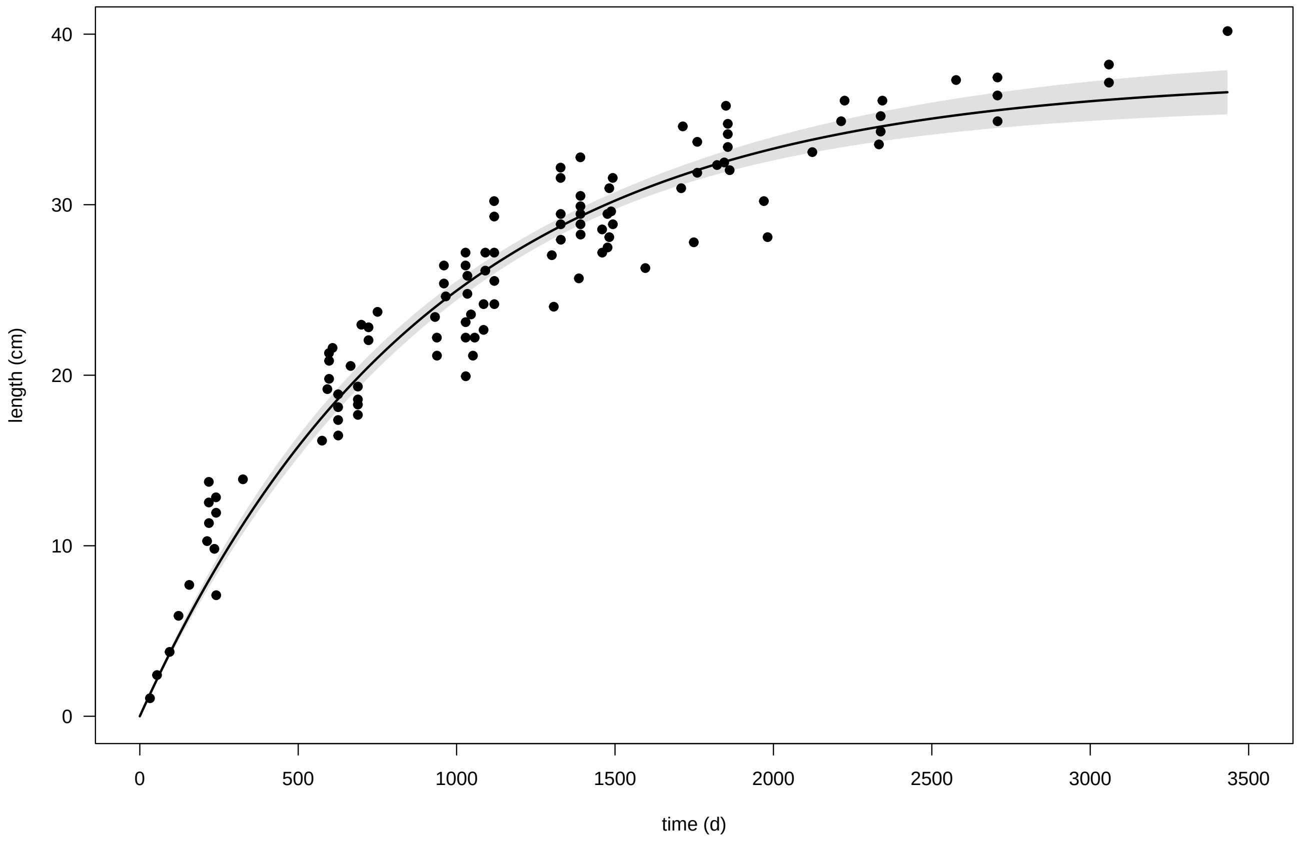

Figure S4. Observed lengths (in centimetres) of *Diplodus sargus* as a function of time (in days), from Gordoa and Moli (1997) retrieved on AmP website (black dots). Fitted Von Bertalanffy growth curve (`std` model, black line) with a confidence interval (grey shading) on the variability of L_i and r_B growth parameters ($t_b = 0$ and temperature = 20°C).

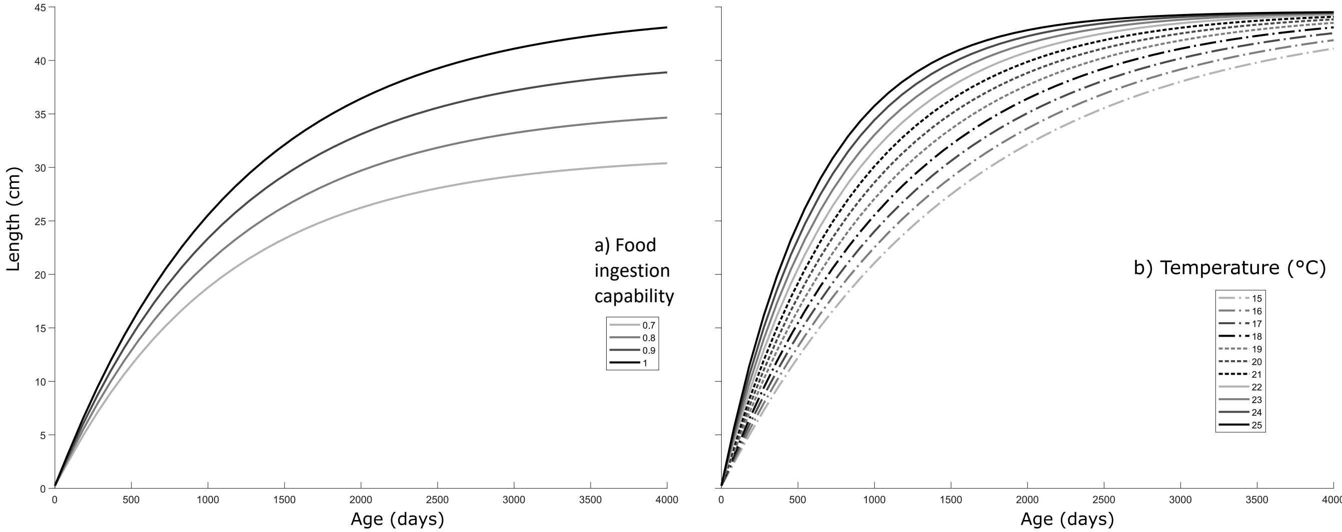

Figure S5. Effect of a) food ingestion capability (for a constant temperature of 18°C) and b) temperature (for a constant food ingestion capability of 1) on the growth curves (colored and/or dotted lines) of *Diplodus sargus*.

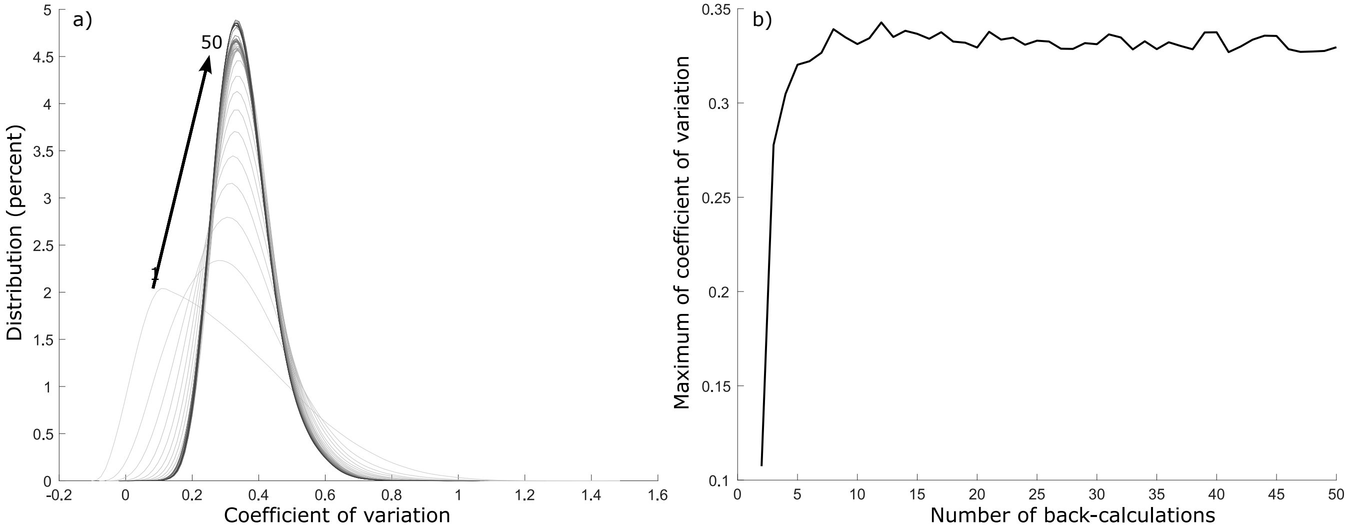

Figure S6. Convergence rate of the number of reconstructions required to reach stability: a) Kernel density estimates of CVs of PLDs, averaged over 1 to 50 reconstructions for each entry; b) Maximum of the kernel based on CVs as a function of the number of reconstructions.

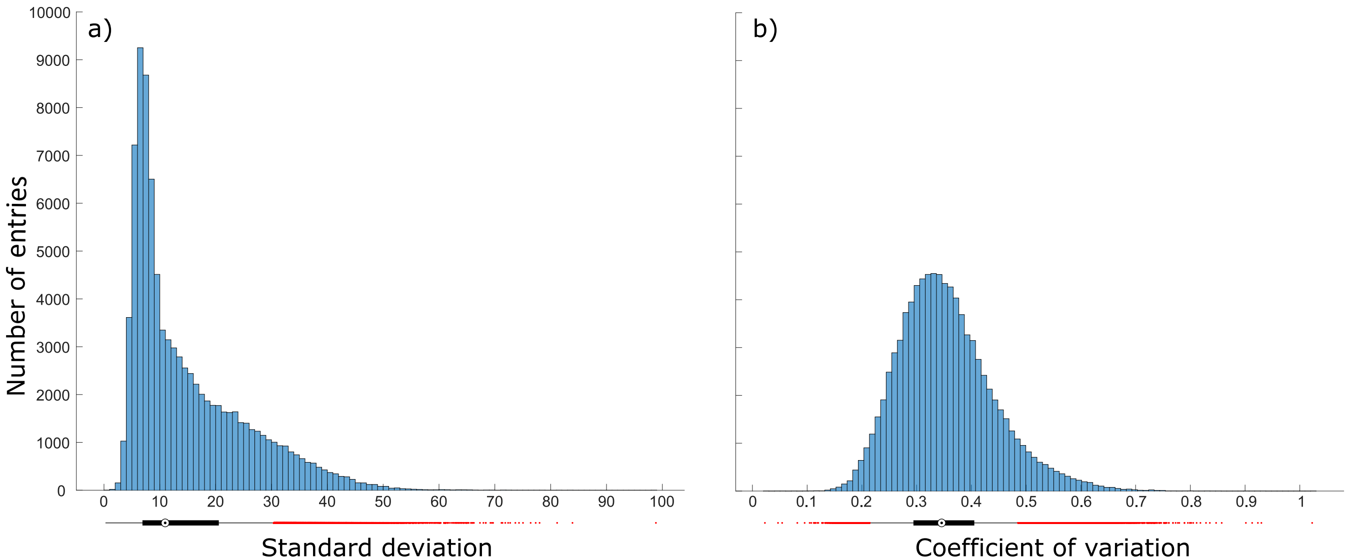

Figure S7. Histograms and boxplots of a) standard deviation (in days) and b) CVs of PLDs reconstructed 50 times (zeros are removed as they represent non-reconstructed data), in number of entries. The median is represented by a white dot in the horizontal boxplots. Boxplot whiskers represent 5& and 95% quantiles. Red dots are outliers.

Table S4. Taxa for which the reconstruction process is made following two categories: species-based and genus-based. Entries that have taxa information for which dates cannot be reconstructed are not displayed.

Species-based	**Genus-based**	
Complete species name	**Genus name only**	**Complete species name**
Arnoglossus laterna,	*Arnoglossus,*	*Argentina sphyraena,*
Arnoglossus thori,	*Atherina,*	*Arnoglossus kessleri,*
Atherina boyeri,	*Bothus,*	*Atherina hepsetus,*
Boops boops,	*Cepola,*	*Carapus acus,*
Bothus podas,	*Chelon,*	*Cepola rubescens,*
Brama brama,	*Chromis,*	*Chelon auratus,*
Buglossidium luteum,	*Diplodus,*	*Epinephelus aeneus,*
Capros aper,	*Gobius,*	*Epinephelus caninus,*
Centracanthus cirrus,	*Hippocampus,*	*Epinephelus costae,*
Chelidonichthys lucerna,	*Labrus,*	*Gaidropsarus mediterraneus,*
Chelon labrosus,	*Lepadogaster,*	*Gobius ater,*
Chelon ramada,	*Mugil,*	*Gobius bucchichi,*
Chelon saliens,	*Pagellus,*	*Gobius cobitis,*
Chromis chromis,	*Pagrus,*	*Gobius couchi,*
Coris julis,	*Parablennius,*	*Gobius cruentatus,*
Ctenolabrus rupestris,	*Pomatoschistus,*	*Gobius fallax,*
Dentex dentex,	*Scorpaena,*	*Gobius geniporus,*
Dicentrarchus labrax,	*Serranus,*	*Hippocampus hippocampus,*
Diplodus annularis,	*Solea,*	*Knipowitschia panizzae,*
Diplodus cervinus,	*Spicara,*	*Labrus viridis,*
Diplodus puntazzo,	*Symphodus*	*Lipophrys dalmatinus,*
Diplodus sargus,		*Lipophrys pavo,*
Diplodus vulgaris,		*Lipophrys trigloides,*
Epinephelus marginatus,		*Mycteroperca rubra,*
Gobius niger,		*Pagellus bogaraveo,*
Gobius paganellus,		*Pagrus pagrus,*
Hippocampus guttulatus,		*Parablennius gattorugine,*
Labrus merula,		*Parablennius incognitus,*
Lepidorhombus boscii,		*Parablennius ocellaris,*
Lipophrys pholis,		*Parablennius pilicornis,*
Lithognathus mormyrus,		*Parablennius rouxi,*
Merluccius merluccius,		*Parablennius sanguinolentus,*
Micromesistius poutassou,		*Parablennius tentacularis,*
Pagellus acarne,		*Parablennius zvonimiri,*
Pagellus erythrinus,		*Pomatoschistus bathi,*
Pomatomus saltatrix,		*Pomatoschistus marmoratus,*
Sarpa salpa,		*Scorpaena notata,*
Sciaena umbra,		*Scorpaena porcus,*
Serranus cabrilla,		*Scorpaena scrofa,*
Serranus scriba,		*Serranus hepatus,*
Solea senegalensis,		*Spicara flexuosum,*
Solea solea,		*Spicara maena,*
Sparus aurata,		*Symphodus bailloni,*
Spicara smaris,		*Symphodus cinereus,*
Symphodus melops,		*Symphodus doderleini,*
Symphodus roissali,		*Symphodus mediterraneus,*
Symphodus tinca,		*Symphodus melanocercus,*
Uranoscopus scaber,		*Symphodus ocellatus,*
Zeus faber		*Symphodus rostratus*

Table S5. Species used for genus-based reconstructions, when only one species of the same genus is available in AmP.

Species of database	**Genus**	**Species used for reconstruction**	**Number of species used**
Argentina sphyraena	*Argentina*	*Argentina silus*	1
Bothus sp.	*Bothus*	*Bothus podas*	1
Carapus acus	*Carapus*	*Carapus bermudensis*	1
Cepola sp., *Cepola rubescens*	*Cepola*	*Cepola macrophthalma*	1
Chromis sp.	*Chromis*	*Chromis chromis*	1
Gaidropsarus mediterraneus	*Gaidropsarus*	*Gaidropsarus guttatus*	1
Knipowitschia panizzae	*Knipowitschia*	*Knipowitschia caucasica*	1
Labrus sp., *Labrus viridis*	*Labrus*	*Labrus merula*	1
Lepadogaster sp.	*Lepadogaster*	*Lepadogaster lepadogaster*	1
Lipophrys dalmatinus, *Lipophrys pavo*, *Lipophrys trigloides*	*Lipophrys*	*Lipophrys pholis*	1
Mycteroperca rubra	*Mycteroperca*	*Mycteroperca microlepis*	1
Pagrus sp., *Pagrus pagrus*	*Pagrus*	*Pagrus auriga*	1
Parablennius sp., *Parablennius gattorugine*, *Parablennius incognitus*, *Parablennius rouxi*, *Parablennius ocellaris*, *Parablennius pilicornis*, *Parablennius sanguinolentus*, *Parablennius tentacularis*, *Parablennius zvonimiri*	*Parablennius*	*Parablennius ruber*	1
Pomatoschistus sp., *Pomatoschistus bathi*, *Pomatoschistus marmoratus*	*Pomatoschistus*	*Pomatoschistus minutus*	1
Scorpaena sp., *Scorpaena notata*, *Scorpaena porcus*, *Scorpaena scrofa*	*Scorpaena*	*Scorpaena maderensis*	1
Spicara sp., *Spicara flexuosum*, *Spicara maena*	*Spicara*	*Spicara smaris*	1

Table S6. Species used for genus-based reconstructions using several species of the same genus available in AmP. *In the case of *Hippocampus* genus, all AmP species are based on the `abj` growth model, except *Hippocampus whitei* that relies on the `std` growth model. For consistency, this species is removed when averaging, as parameters of the two models are not compatible.

Species of database	**Genus**	**Species used for reconstruction**	**Number of species used**
Arnoglossus sp., *Arnoglossus kessleri*	*Arnoglossus*	*Arnoglossus laterna*, *Arnoglossus thori*	2
Atherina sp., *Atherina hepsetus*	*Atherina*	*Atherina presbyter*, *Atherina boyeri*	2
Epinephelus aeneus, *Epinephelus caninus*, *Epinephelus costae*	*Epinephelus*	*Epinephelus marginatus*, *Epinephelus morio*	2
Gobius sp., *Gobius ater*, *Gobius bucchichi*, *Gobius cobitis*, *Gobius couchi*, *Gobius fallax*, *Gobius cruentatus*, *Gobius geniporus*	*Gobius*	*Gobius niger*, *Gobius paganellus*	2
Hippocampus sp., *Hippocampus hippocampus*	*Hippocampus*	*Hippocampus guttulatus*, *Hippocampus kuda*	2*
Pagellus sp., *Pagellus bogaraveo*	*Pagellus*	*Pagellus acarne*, *Pagellus erythrinus*	2
Serranus sp., *Serranus hepatus*	*Serranus*	*Serranus cabrilla*, *Serranus scriba*	2
Solea sp.	*Solea*	*Solea senegalensis*, *Solea solea*	2
Chelon sp., *Chelon auratus*	*Chelon*	*Chelon labrosus*, *Chelon ramada*, *Chelon saliens*	3
Mugil sp.	*Mugil*	*Mugil cephalus*, *Mugil curema*, *Mugil liza*	3
Symphodus sp., *Symphodus bailloni*, *Symphodus cinereus*, *Symphodus dodeleini*, *Symphodus mediterraneus*, *Symphodus melanocercus*, *Symphodus rostratus*, *Symphodus ocellatus*	*Symphodus*	*Symphodus melops*, *Symphodus roissali*, *Symphodus tinca*	3
Diplodus sp.	*Diplodus*	*Diplodus annularis*, *Diplodus sargus*, *Diplodus vulgaris*, *Diplodus cervinus*, *Diplodus puntazzo*	5

References

Alvarez, I., Catalan, I. A., Jordi, A., Palmer, M., Sabates, A., and Basterretxea, G.: Drivers of larval fish assemblage shift during the spring-summer transition in the coastal Mediterranean, Estuarine, Coastal and Shelf Science, 97, 127–135, https://doi.org/10.1016/j.ecss.2011.11.029, 2012.

Alvarez, I., Catalan, I. A., Jordi, A., Alemany, F., and Basterretxea, G.: Interaction between spawning habitat and coastally steered circulation regulate larval fish retention in a large shallow temperate bay, Estuarine, Coastal and Shelf Science, 167, 377–389, https://doi.org/10.1016/j.ecss.2015.10.015, 2015.

Alvarez, I., Font-Munoz, J., Hernandez-Carrasco, I., Diaz-Gil, C., Salgado-Hernanz, P., and Catalan, I.: Using self organizing maps to analyze larval fish assemblage vertical dynamics through environmental-ontogenetic gradients, Estuarine, Coastal and Shelf Science, 258, 107 410, https://doi.org/10.1016/j.ecss.2021.107410, 2021.

Basterretxea, G., Catalan, I. A., Jordi, A., Alvarez, I., Palmer, M., and Sabates, A.: Dynamic regulation of larval fish self-recruitment in a marine protected area, Fisheries Oceanography, 22, 477–495, https://doi.org/10.1111/fog.12035, 2013.

Bay, L. K., Buechler, K., Gagliano, M., and Caley, M. J.: Intraspecific variation in the pelagic larval duration of tropical reef fishes, Journal of Fish Biology, 68, 1206–1214, https://doi.org/10.1111/j.0022-1112.2006.01016.x, 2006.

BIOMEX: BIOMEX : Assessment of BIOMass Export from marine protected areas & its impacts on fisheries in the western Mediterranean Sea, Final report, 5th FW EC Program « Quality of Life & Management of Living Resources », 2005.

Calò, A., Munoz, I., Perez-Ruzafa, a., Vergara-Chen, C., and Garcia-Charton, J. A.: Spatial genetic structure in the saddled sea bream (Oblada melanura [Linnaeus, 1758]) suggests multi-scaled patterns of connectivity between protected and unprotected areas in the Western Mediterranean Sea, Fisheries Research, 176, 30–38, https://doi.org/10.1016/j.fishres.2015.12.001, 2016.

Catalan, I. A., Dunand, A., Alvarez, I., Alos, J., Colinas, N., and Nash, R. D.: An evaluation of sampling methodology for assessing settlement of temperate fish in seagrass meadows, Mediterranean Marine Science, 15, 338, https://doi.org/10.12681/mms.539, 2014.

Cheminee, A., Rider, M., Lenfant, P., Zawadzki, A., Merciere, A., Crec'hriou, R., Mercader, M., Saragoni, G., Neveu, R., Ternon, Q., and Pastor, J.: Shallow rocky nursery habitat for fish: Spatial variability of juvenile fishes among this poorly protected essential habitat, Marine Pollution Bulletin, 119, 245–254, https://doi.org/10.1016/j.marpolbul.2017.03.051, 2017.

Cheminee, A., Le Direach, L., Rouanet, E., Astruch, P., Goujard, A., Blanfune, A., Bonhomme, D., Chassaing, L., Jouvenel, J.-Y., Ruitton, S., Thibaut, T., and Harmelin-Vivien, M.: All shallow coastal habitats matter as nurseries for Mediterranean juvenile fish, Scientific Reports, 11, 14 631, https://doi.org/10.1038/s41598-021-93557-2, 2021.

Cuadros, A., Cheminee, A., Thiriet, P., Moranta, J., Vidal, E., Sintes, J., Sagrista, N., and Cardona, L.: The three-dimensional structure of *Cymodocea nodosa* meadows shapes juvenile fish assemblages at Fornells Bay (Minorca Island), Regional Studies in Marine Science, 14, 93–101, https://doi.org/10.1016/j.rsma.2017.05.011, 2017.

Cuadros, A., Basterretxea, G., Cardona, L., Cheminee, A., Hidalgo, M., and Moranta, J.: Settlement and post-settlement survival rates of the white seabream (*Diplodus sargus*) in the western Mediterranean Sea, PLOS ONE, 13, e0190 278, https://doi.org/10.1371/journal.pone.0190278, 2018.

Cuadros, A., Moranta, J., Cardona, L., Thiriet, P., Francour, P., Vidal, E., Sintes, J., and Cheminee, A.: Juvenile fish in Cystoseira forests: influence of habitat complexity and depth on fish behaviour and assemblage composition, Mediterranean Marine Science, 20, https://doi.org/10.12681/mms.18857, 2019.

Di Franco, A. and Guidetti, P.: Patterns of variability in early-life traits of fishes depend on spatial scale of analysis, Biology Letters, 7, 454–456, https://doi.org/10.1098/rsbl.2010.1149, 2011.

Di Franco, A., De Benedetto, G., De Rinaldis, G., Raventos, N., Sahyoun, R., and Guidetti, P.: Large scale-variability in otolith microstructure and microchemistry: The case study of *Diplodus sargus sargus* (Pisces: Sparidae) in the Mediterranean Sea, Italian Journal of Zoology, 78, 182–192, https://doi.org/10.1080/11250003.2011.566227, 2011.

Di Franco, A., Calò, A., Sdiri, K., Cattano, C., Milazzo, M., and Guidetti, P.: Ocean acidification affects somatic and otolith growth relationship in fish: evidence from an *in situ* study, Biology Letters, 15, 20180 662, https://doi.org/10.1098/rsbl.2018.0662, 2019.

Diaz-Gil, C., Grau, A., Grau, A. M., Palmer, M., Cabrera, R., Jordà, G., and Catalan, I. A.: Changes in the juvenile fish assemblage of a Mediterranean shallow Posidonia oceanica seagrass nursery area after half century, Mediterranean Marine Science, 20, 603, https://doi.org/10.12681/mms.19510, 2019.

Faillettaz, R., Voue, R., Crec'hriou, R., Garsi, L., Lecaillon, G., Agostini, S., Lenfant, P., and Irisson, J.: Spatio-temporal patterns of larval fish settlement in the northwestern Mediterranean Sea, Marine Ecology Progress Series, 650, 153–173, https://doi.org/10.3354/meps13191, 2020.

Felix-Hackradt, F., Hackradt, C., Trevino-Oton, J., Segovia-Viadero, M., Perez-Ruzafa, A., and Garcia-Charton, J.: Environmental determinants on fish post-larval distribution in coastal areas of south-western Mediterranean Sea, Estuarine, Coastal and Shelf Science, 129, 59–72, https://doi.org/10.1016/j.ecss.2013.05.029, 2013a.

Felix-Hackradt, F., Hackradt, C., Trevino-Oton, J., Perez-Ruzafa, A., and Garcia-Charton, J.: Habitat use and ontogenetic shifts of fish life stages at rocky reefs in South-western Mediterranean Sea, Journal of Sea Research, 88, 67–77, https://doi.org/10.1016/j.seares.2013.12.018, 2014.

Felix-Hackradt, F. C., Hackradt, C. W., Trevino-Oton, J., Perez-Ruzafa, A., and Garcia-Charton, J. A.: Temporal patterns of settlement, recruitment and post-settlement losses in a rocky reef fish assemblage in the South-Western Mediterranean Sea, Marine Biology, 160, 2337–2352, https://doi.org/10.1007/s00227-013-2228-2, 2013b.

Gordoa, A. and Moli, B.: Age and growth of the sparids *Diplodus vulgaris*, *D. sargus* and *D. annularis* in adult populations and the differences in their juvenile growth patterns in the north-western Mediterranean Sea, Fisheries Research, 33, 123–129, https://doi.org/10.1016/S0165-7836(97)00074-X, 1997.

Guidetti, P., Bianchi, C. N., La Mesa, G., Modena, M., Morri, C., Sara, G., and Vacchi, M.: Abundance and size structure of *Thalassoma pavo* (Pisces: Labridae) in the western Mediterranean Sea: variability at different spatial scales, Journal of the Marine Biological Association of the United Kingdom, 82, 495–500, https://doi.org/10.1017/S0025315402005775, 2002.

Harmelin, J.-G. and Harmelin-Vivien, M.: Renouvellement des populations de sars (Diplodus spp) du parc national de Port-Cros : evaluation du potentiel, Rapport final, Parc National de Port-Cros, 1997.

Harmelin, J.-G. and Vigliola, L.: Structure demographique des populations de sar (Diplodus spp.: Pisces) du parc national de Port-Cros, Rapport final, Parc National de Port-Cros, 1996.

Hinz, H., Renones, O., Gouraguine, A., Johnson, A. F., and Moranta, J.: Fish nursery value of algae habitats in temperate coastal reefs, PeerJ, 7, e6797, https://doi.org/10.7717/peerj.6797, 2019.

Horton, T., Gofas, S., Kroh, A., Poore, G. C., Read, G., Rosenberg, G., Stöhr, S., Bailly, N., Boury-Esnault, N., Brandão, S. N., Costello, M. J., Decock, W., Dekeyzer, S., Hernandez, F., Mees, J., Paulay, G., Vandepitte, L., Vanhoorne, B., and Vranken, S.: Improving nomenclatural consistency: a decade of experience in the World Register of Marine Species, European Journal of Taxonomy, https://doi.org/10.5852/ejt.2017.389, 2017.

Irisson, J.-O., Faillettaz, R., Petit, F., and De Liege, G.: RadeICHTHYO : Abundance of settlement-stage fish larvae (ichthyoplankton) in the bay of Villefranche-sur-mer, SEANOE, https://doi.org/10.17882/52943, type: dataset, 2018.

Le Direach, L., Ruitton, S., Dufour, V., Cantou, M., De Monbrison, D., Astruch, P., Bonhomme, D., Fourt, M., Guilloux, L., and Martin, V.: Programme ECONAUT : Peuplements de poissons et qualite environnementale des ports de plaisance en Mediterranee, Rapport intermediaire d'avancement, Convention Fondation d'Entreprise TOTAL pour la Biodiversite et la Mer – GIS Posidonie/BRL/Universite Montpellier2/CNRS, 2009.

Macpherson, E. and Raventos, N.: Settlement patterns and post-settlement survival in two Mediterranean littoral fishes: influences of early-life traits and environmental variables, Marine Biology, 148, 167–177, https://doi.org/10.1007/s00227-005-0059-5, 2005.

Macpherson, E. and Raventos, N.: Relationship between pelagic larval duration and geographic distribution of Mediterranean littoral fishes, Marine Ecology Progress Series, 327, 257–265, https://doi.org/10.3354/meps327257, 2006.

Mercader, M., Rider, M., Cheminee, A., Pastor, J., Zawadzki, A., Merciere, A., Crec'hriou, R., Verdoit-Jarraya, M., and Lenfant, P.: Spatial distribution of juvenile fish along an artificialized seascape, insights from common coastal species in the Northwestern Mediterranean Sea, Marine Environmental Research, 137, 60–72, https://doi.org/10.1016/j.marenvres.2018.02.030, 2018.

Olivar, M. P., Sabates, A., Alemany, F., and Torres, A. P.: Abundance of early stages of mesopelagic fish through the water column and diel patterns in the western Mediterranean in winter and summer, PANGAEA, https://doi.org/10.1594/PANGAEA.927754, type: data set, 2021.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hrobjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., Stewart, L. A., Thomas, J., Tricco, A. C., Welch, V. A., Whiting, P., and Moher, D.: The PRISMA 2020 statement: an updated guideline for reporting systematic reviews, BMJ, 372, 1:9, https://doi.org/10.1136/bmj.n71, 2021.

Raventos, N., Torrado, H., Arthur, R., Alcoverro, T., and Macpherson, E.: Temperature reduces fish dispersal as larvae grow faster to their settlement size, Journal of Animal Ecology, 90, 1419–1432, https://doi.org/10.1111/1365-2656.13435, 2021.

Rouanet, E., Le Direach, L., Leteurtrois, M., Lucchini, N., and Harmelin-Vivien, M.: Programme BABYCROS : Zones potentielles de nurserie de poissons dans le Parc national de Port-Cros, Final report, Contrat Union Europeenne GALPA GALICA, Region Sud et GIS Posidonie, Marseille, 2020.

Ruitton, S.: Les communautes benthiques et nectobenthiques associees aux amenagements littoraux en Mediterranee nord-occidentale : structure et fonctionnement, PhD Thesis, Universite Aix Marseille II, Marseille, http://www.theses.fr/1999AIX22062, 1999.

Ruitton, S., Harmelin, J.-G., Harmelin-Vivien, M., and Le Direach, L.: Les populations de sars (Diplodus spp.) de l'île du Levant et les apports du recrutement local, Rapport final, Contrat Parc national de Port-Cros & GIS Posidonie, 2009.

Spalding, M. D., Fox, H. E., Allen, G. R., Davidson, N., Ferdana, Z. A., Finlayson, M., Halpern, B. S., Jorge, M. A., Lombana, A., Lourie, S. A., Martin, K. D., McManus, E., Molnar, J., Recchia, C. A., and Robertson, J.: Marine Ecoregions of the World: A Bioregionalization of Coastal and Shelf Areas, BioScience, 57, 573–583, https://doi.org/10.1641/B570707, 2007.

Ventura, D., Jona Lasinio, G., and Ardizzone, G.: Temporal partitioning of microhabitat use among four juvenile fish species of the genus *Diplodus* (Pisces: Perciformes, Sparidae), Marine Ecology, 36, 1013–1032, https://doi.org/10.1111/maec.12198, 2015.

Ventura, D., Bonhomme, V., Colangelo, P., Bonifazi, A., Jona-Lasinio, G., and Ardizzone, G.: Does morphology predict trophic niche differentiation? Relationship between feeding habits and body shape in four co-occurring juvenile species (Pisces: Perciformes, Sparidae), Estuarine, Coastal and Shelf Science, 191, 84–95, https://doi.org/10.1016/j.ecss.2017.04.014, 2017.

Ventura, D., Bonifazi, A., Lasinio, G. J., Gravina, M. F., Mancini, E., and Ardizzone, G.: Can microscale habitat-related differences influence the abundance of ectoparasites ? Multiple evidences from two juvenile coastal fish (Perciformes: Sparidae), Estuarine, Coastal and Shelf Science, 209, 110–122, https://doi.org/10.1016/j.ecss.2018.05.020, 2018.

Victor, B. C.: Delayed Metamorphosis with Reduced Larval Growth in a Coral Reef Fish (*Thalassoma bifasciatum*), Canadian Journal of Fisheries and Aquatic Sciences, 43, 1208–1213, https://doi.org/10.1139/f86-150, 1986.