ICES International Council for the Exploration of the Sea
CIEM Conseil International pour l'Exploration de la Mer

ICES Data Centre

Eggs and Larvae Fact Sheet

2012

ICES Eggs and Larvae Dataset

1 Background

Fish egg and fish larvae data have been collected in the ICES community for a long time for use in stock assessments and management of stocks and spawning areas. The collection of the data is generally organized by ICES coordinated international survey expert groups. In 2010 the working group on Data and Information Management (WGDIM) acknowledged the lack of an international database that would store data collected in ichthyoplankton surveys conducted in the ICES community.
Therefore, an action plan was suggested for ICES Data Centre for creating such a database. In 2010-2011 such a database was developed by ICES Data Centre. The Eggs and Larvae database ensures storage of survey data on an international level, providing an overview of available fish egg and larvae survey data collected and providing a unified portal for scientific access to the ichthyoplankton survey data. Datasets from the surveys were provided to ICES by the responsible expert groups. The final stage of producing an operational database and online system were carried out by the ICES Data Centre.

2 Dataset Overview

This database contains data of mainly ICES coordinated international ichthyoplankton surveys. It consists of data from various ichthyoplankton surveys with different target species and spatial and temporal coverage. The database contains haul information data as well as the underlying data on eggs and larvae.

Currently, the following data are stored in the database:

- North Sea cod and plaice egg surveys (2004, 2009)
  The survey aims at studying fish egg and larval distributions in the winter in the North Sea, target species are cod and plaice. The program is steered by the WGEGGS.
- Atlantic eel (*Anguilla anguilla* and *A. rostrata*) surveys (1902-2007)
  Dataset includes data gathered from various surveys conducted in different times in North Atlantic. The surveys were focused on different stages of eel larvae. The ICES group taking care of the data is WGEEL.
- The International Herring Larvae Surveys (1967-present)
  The ICES programme of international herring larval surveys in the North Sea and adjacent areas has been in operation since 1967. The main purpose of this programme is to provide quantitative estimates of herring larval abundance, which are used as a relative index of changes of the herring spawning-stock biomass in the assessment. The collection of the herring larvae data is the responsibility of WGIPS.
- Mackerel and horse mackerel eggs
  The working group on mackerel and horse mackerel egg surveys (WGMEGS) coordinates the Mackerel and Horse Mackerel Egg Survey in the Northeast Atlantic and the Mackerel Egg Survey in the North Sea, both which are carried out triennially. Eggdata collected from both surveys provide an indices for the strength

of the SSB of both the western and North Sea stocks of Atlantic mackerel (Scomber scombrus) and a relative abundance index of horse mackerel (Trachurus trachurus) spawning stocks in the Northeast Atlantic. The surveys are divided into 3 geographical component areas, the western, southern and the North Sea.

2.1 Quality assurance

As outlined in the WGDIM 2011 report, the working groups collecting the data on ichthyoplankton (WGEGGS, WGMEGS, IBTSWG, WGIPS) are responsible for the content and quality control. Therefore, each dataset is quality checked by the responsible ICES expert group.

3 Dataset and Database notes

3.1 Species name resolution and life-stage information

Currently, the WoRMS (World Register of Marine Species: http://www.marinespecies.org) species names are used in the Eggs and Larvae database. WoRMS is the taxonomic backbone of OBIS (Ocean biogeographic Information System: http://www.iobis.org) and the Aphia IDs provide a mechanism through which it is possible to merge the ICES historical data with other worldwide marine databases. If a taxa could not be resolved to species level, it was resolved to the finest taxonomic level possible based on the taxonomic group information found in the survey documentation.

Stage information has been provided by the responsible expert groups. This field includes information on which developmental (egg/larvae) and maturity stage was recorded in the dataset. Appendix A provides details of the stages recorded in the database.

3.2 Working Group on North Sea Cod and Plaice Egg Surveys in the North Sea (WGEGGS)

The North Sea cod and plaice egg surveys have been conducted in 2004 and 2009 and will be continued in 2013 alongside the MIK herring larvae sampling during the IBTS survey. The surveys were originally directed at cod and plaice, but also supply data of other winter spawning North Sea fish.

The surveys are conducted with Gulf III or VII plankton torpedo's, Bongo nets or CUFES. With the Gulf's and Bongo's double oblique hauls are conducted through the water column till 5m above the sea floor or a maximum of 200m depth. The CUFES sampling is a continues sampling at 5m depth. The mesh size of all sampling equipment is 280 μm. During the sampling temperature and salinity are measured. Flowmeters are used to measure the amount of water filtered while sampling.

The database contains the haul information data, position, time, duration, water volume, depth, temperature and salinity. Eggs and larvae in the samples were counted. All eggs > 1mm were measured and identified to species were possible. Eggs < 1 mm are counted and in 2004 measured and identified as well. There is large overlap in size some gadoids, including cod, and other species, thus identification by eye is not possible. For these, genetic analysis was used to identify the species. All eggs that are measured and identified were also staged following

the stage descriptions in Appendix A. Larvae in the samples were identified to species, measured and development stage assigned.

WGEGGS and WGEGGS2 are the ICES EG responsible for these surveys and more information and analysis of the results can be found in the EG's reports on the ICES website. See Appendix D

3.3 Atlantic eel (*Anguilla anguilla* and *A. rostrata*) larvae database in ICES

In the eel subset, you can find data on eel larvae (leptocephalus and glass eel) catches by haul collected at scientific cruises in the North Atlantic including the Sargasso Sea, since 1902. The database contains e.g. the data collected by Johannes Schmidt at his famous expeditions in the 1920s to the Sargasso Sea, revealing that this is the spawning place for eel. Catches are given in number by length and species, *A.a* or *A.r*, often determined by myomer/vertebrae counts, for each haul as well as technical details of the hauls including gear type, mesh size, depth fished, etc.

The data has been collated from the literature in an Excel file by J. D. McCleave, USA. He has kindly allowed ICES to publish the dataset on the ICES Website, for the benefit of ICES' and other scientists.

A technical note on the data from J.D. McCleave can be found at Appendix B.

3.4 The International Herring Larvae Surveys

The ICES programme of international herring larval surveys in the North Sea and adjacent areas, has been in operation since 1967. The main purpose of this programme is to provide quantitative estimates of herring larval abundance, which are used as a relative index of changes of the herring spawning-stock biomass in the assessment. The larvae surveys are carried out in specific periods and areas, following autumn and winter spawning activity of herring from north to south. Catch data together with specific information like haul position, survey area etc. are reported to the ICES International Herring Larvae dataset annually. The dataset contains information about the surveys conducted since 1972.

3.5 The Working gGroup on Mackerel and Horse Mackerel Eggs Surveys (WGMEGS)

The working group on mackerel and horse mackerel egg surveys (WGMEGS) coordinates the Mackerel and Horse Mackerel Egg Survey in the Northeast Atlantic and the Mackerel Egg Survey in the North Sea, both which are carried out every 3rd year. Egg data collected from both surveys provide an indices for the strength of the SSB of both the western and North Sea stocks of Atlantic mackerel (Scomber scombrus) and a relative abundance index of horse mackerel (Trachurus trachurus) spawning stocks in the Northeast Atlantic. The surveys are divided into 3 geographical component areas, the western, southern and the North Sea. In the western area the mackerel egg survey has been running continuously on a triennial

basis since 1977 and since 1992 has also sampled the southern spawning component. It typically takes place between February and July and aims to cover the entire spawning area from Cadiz in the south up as far as NW Scotland in the North and since 2010 up to the waters around the Faroe Islands and southeast of Iceland. The egg survey in the North Sea has been running since 1968.

A comprehensive description of the survey protocols, analysis techniques together with the methods used for calculating the egg abundance estimates can be found in the WGMEGS survey manual which is contained within Annex 5 of the 2012 WGMEGS.

4 GIS Mapping Facility

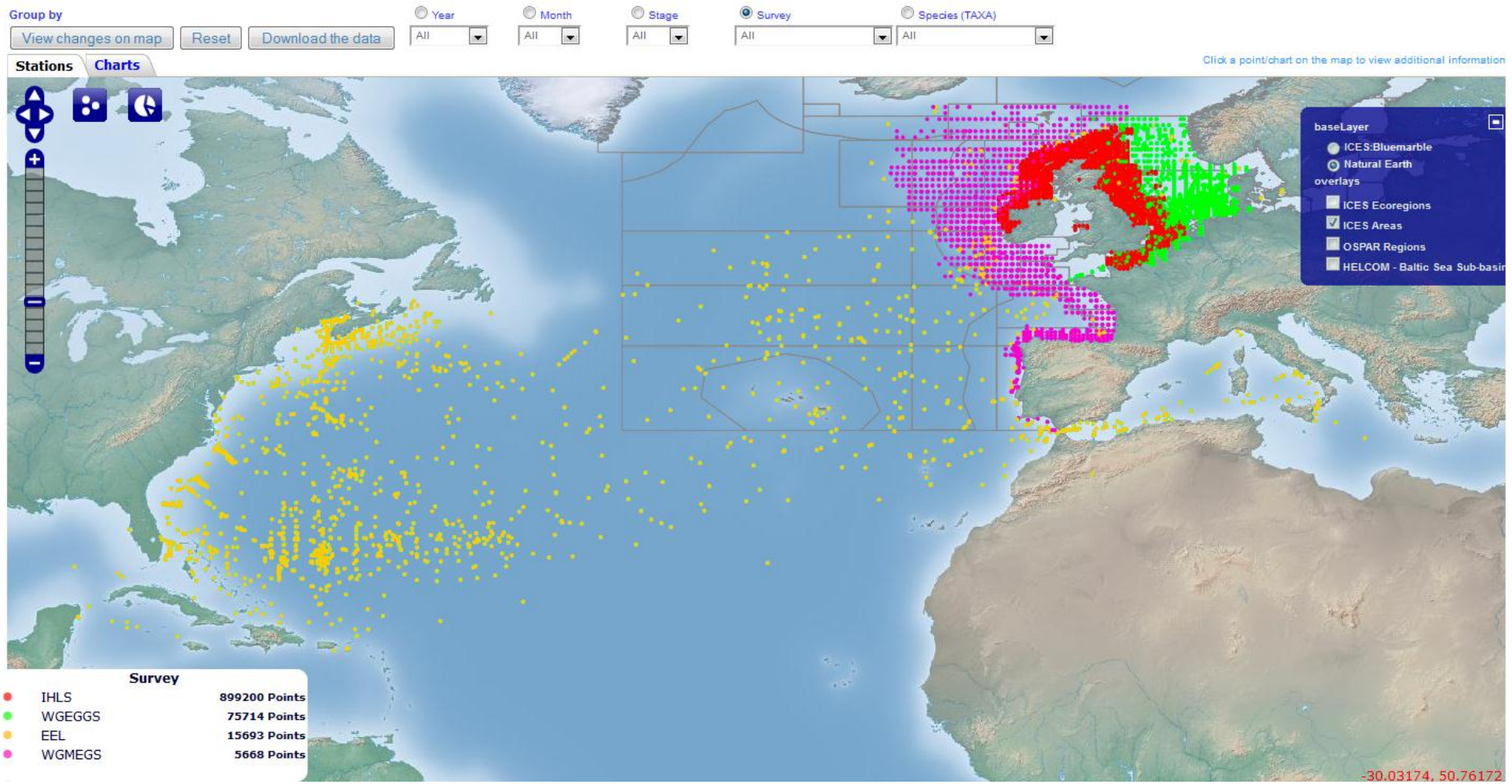

Figure 2 – A screenshot showing measurements collected (Grouped by Survey).

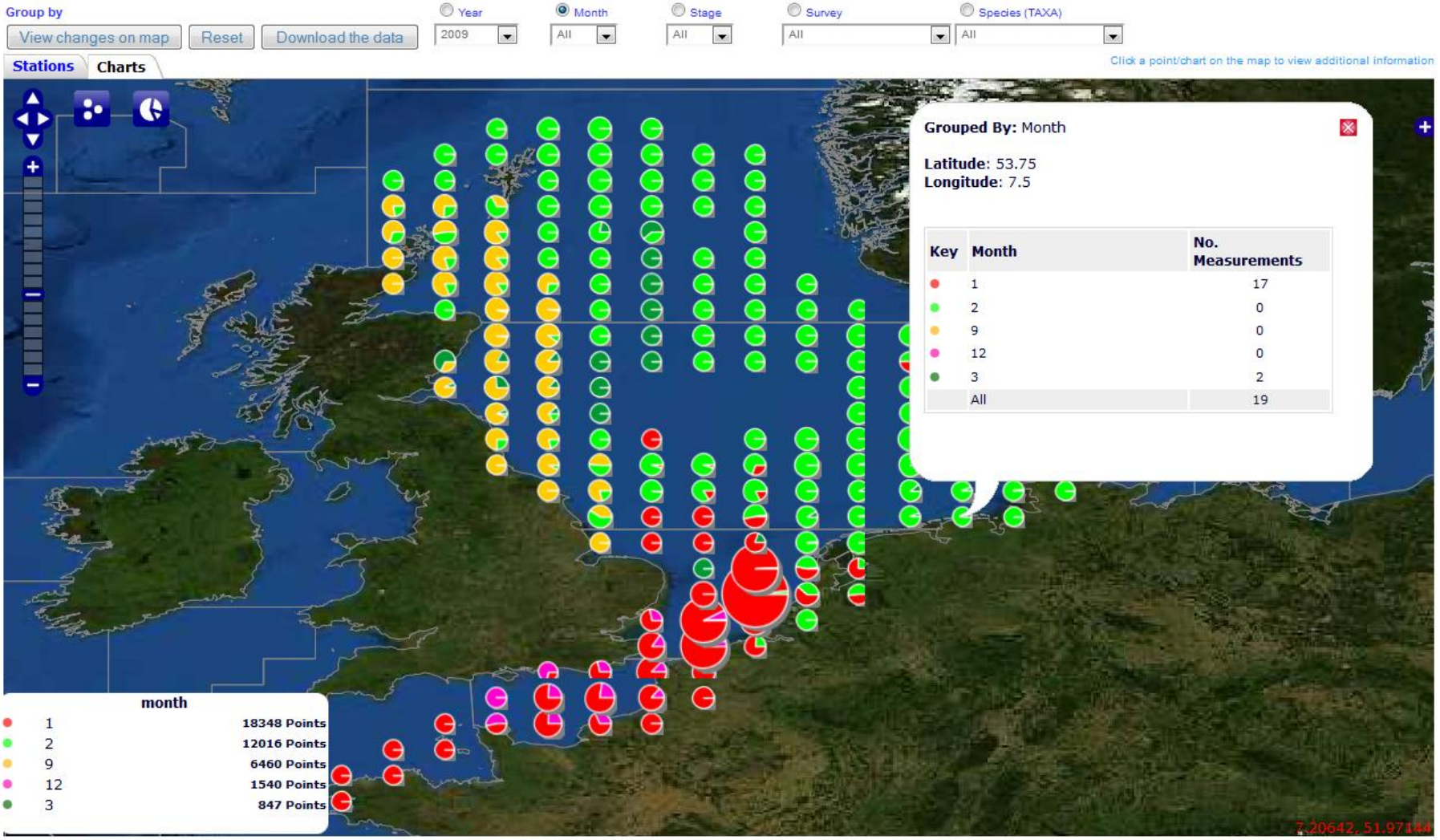

Figure 3 – A screenshot showing measurements collected during 2009 as aggregated Charts (Grouped by Month).

5 Data citation and data use rights

5.1 Data Citation

Please acknowledge Eggs and larvae dataset as well as the relevant survey when using the data:

Simple citation (example)

ICES Eggs and Larvae Database, 2012. ICES, Copenhagen

Extended citation (example)

ICES Eggs and Larvae Database; Atlantic Anguilla surveys (1863-2007)*, Extraction 3 JUNE 2012. ICES, Copenhagen*

Names of the surveys to cite can be found on the Eggs and Larvae page, upon download, or in this document.

Please refer to the ICES Data policy for terms and conditions of data usage and rights.
http://ices.dk/datacentre/datapolicy.asp

Appendix A

Code	Description	CodeGroup
EG	Egg	STAGE
EL-EG_1	E&L surveys: egg - combination of stages 1A and 1B	STAGE
EL-EG_1A	E&L surveys: egg from fertilisation until cleavage produces a cell bundle where ind.cells are invisible	STAGE
EL-EG_1B	E&L surveys: egg formation of blastodisc and subsequent thickening at one pole	STAGE
EL-EG_2	E&L surveys: egg from the first sign of primitive streak until closure of blastopore	STAGE
EL-EG_3	E&L surveys: egg growth of embryo from 1/2 to 3/4 around egg circumference	STAGE
EL-EG_4	E&L surveys: egg growth of embryo from 3/4 to full egg circumference	STAGE
EL-EG_5	E&L surveys: egg growth of embryo until the tail touches the nose or beyond	STAGE
EL-EG_U	E&L surveys: egg stage unknown	STAGE
EL-LV_1	E&L surveys: nephrops larvae rudimentary pleopods present but no supra-orbital spines	STAGE
EL-LV_2	E&L surveys: nephrops larvae supra-orbital spines appear but no uropods	STAGE
EL-LV_GE	E&L surveys: glass eels (eels)	STAGE
EL-LV_LC	E&L surveys: leptocephalus (eels)	STAGE
IM	Immature/sub-adult	STAGE
JV	Juvenile	STAGE
LV	Larvae	STAGE

Appendix B

Explanation of Atlantic *Anguilla* (metadata)

Prepared by J. D. McCleave, March 2011

NOTE: These notes refer to the original Excel workbook, while the notes are still relevant the exact locations and references may not be accurate in the online Eggs and Larvae Dataset

I. Organization of the Excel workbook "Atlantic *Anguilla* database;" the workbook database contains four Excel spreadsheets.

A. *Anguilla anguilla* leptocephali.

1. This sheet contains all leptocephali with ≥112 myomeres or assumed to have ≥112 myomeres and considered to be *A. anguilla*, records of 22,612 specimens.

a) J. Schmidt labeled specimens with 112 myomeres as *Anguilla* sp. (cited in Boëtius and Harding (1985a,b).

b) Boëtius and Harding (1985a) and other recent authors also included specimens with ≥112 myomeres as *A. anguilla* in their tabulations.

B. *Anguilla anguilla* glass eels, records of 63 specimens.

1. The intent was to include glass eels captured at sea, but no attempt was made to verify that the positions recorded are in fact in the sea as opposed to in estuaries.

C. *Anguilla rostrata* leptocephali.

1. This sheet contains all leptocephali with ≤110 myomeres or assumed to have ≤110 myomeres and considered by all authors to be *A. rostrata*, 9633 records of specimens.

2. This sheet also contains all leptocephali with 111 myomeres and considered to be intermediate and determined only as *Anguilla* sp., records of 101 specimens.

a) Boëtius and Harding (1985a) (and J. Schmidt) considered leptocephali with 111 myomeres to be *A. rostrata*.

b) Smith (1968) listed the myomere range for *A. rostrata* as 104-111 and that for *A. anguilla* as 111-119, indicating ambiguity at 111 myomeres. His list of 298 *A. rostrata* with myomeres counted contained no specimens with 111 myomeres.

c) Smith (1989) described *A. rostrata* as having "ca 103-111" myomeres and *A. anguilla* as having "112-119."

d) However, Schoth and Tesch (1982), Kleckner et al. (1985), Kleckner and McCleave (1985), and Tesch and Wegner (1990) all considered leptocephali with 111 myomeres to be intermediate, i.e., *Anguilla* sp. designated as "I." That convention is used in this database.

3. This sheet also contains all leptocephali whose identity could not be established, usually because of specimen damage, i.e., *Anguilla* sp. designated as "U," records of 184 specimens.

D. *Anguilla rostrata* glass eels, records of 285 specimens.

1. The intent was to include glass eels captured at sea, but no attempt was made to verify that the positions recorded are in fact in the sea as opposed to in estuaries.

II. Explanation of spreadsheet column headings and column data.

A. AGENCY/PERSON (col. A).

1. When known, the name of the collector or holder of collections appears in this column.

2. The designation "Danish" is applied to data tabulated in Boëtius and Harding (1985a) before the time of involvement Johannes Schmidt and after Schmidt's last research cruise.

3. "NMFS" refers to collections made by the U.S. National Marine Fisheries Service.

4. "Misc MCZ" refers to miscellaneous specimens housed at the Museum of Comparative Zoology at Harvard University (Cambridge, Massachusetts, USA).

5. "Huntsman/ARC" refers to collections held at the Atlantic Reference Centre a collaboration between the Canadian Department of Fisheries and Oceans and the Huntsman Marine Science Centre (St. Andrews, New Brunswick, Canada).

6. "WHOI" refers to collections not attributable to a person but made by scientists at the Woods Hole Oceanographic Institution (Woods Hole, Massachusetts, USA).

B. SHIP/(Person) (Col. B).

1. If known, the ship on which the specimens were collected is given.

2. If a person collected specimens and transferred them to a collection identified in Col. A, the collector's name appears in parentheses. For example, G. Trombetta collected many specimens of *Anguilla anguilla* from shore and transferred these to J. Schmidt.

C. CRUISE NUMBER (Col. C).

1. If known, the ship's designated cruise number is given.

D. STATION OR COLLECTION MUMBER (Col. D).

1. If known, the ship's station number is included.

2. Alternatively, the repository's collection number is included.
3. For the HUNTSMAN/ARC collections, the ARC catalog number (x) and the Huntsman field collection number (y) are given in the format xxxx/yyyy. Partial information is given as xxxx/ or /yyyy.

E. LATITUDE and LONGITUDE (Cols E-J).
1. Latitude in degrees, latitude in minutes, North latitude, longitude in degrees, longitude in minutes, and East or West longitude of a tow's starting position are given in consecutive columns.
2. If positions are approximate or estimated, that is noted in the COMMENTS (Col. AB).

F. START DATE (Col. K).
1. The starting date of a tow, if known, is given in the format yyyy-mm-dd.
2. If start date is known only to month or year, Col. K is left blank and partial date information is noted in the COMMENTS (Col. AB).

G. START TIME (Col. L).
1. The starting time of a tow, if known, is given in 24-hour format hh:mm.

H. LOC/UTC (Col. M).
1. Start time is designated as local time where the collection was made (LOC) or as Coordinated Universal Time (UTC), essentially equivalent to Greenwich Mean Time.
2. In many cases, times recorded were not readily identified as LOC or UTC and the column is left blank.

I. DURATION (Col. N).
1. Duration of a tow, if known, is given in minutes.

J. SERIES NUMBER (Col. O).
1. If multiple tows were made at a station or if multiple nets were used on a single tow, series numbers may have been assigned to designate the multiplicity.
2. Most, but not all, series numbers are attributable to the collections of J. Schmidt.

K. MAX WIRE OUT (Col. P).
1. The maximum length of towing wire spooled out on a tow is given in meters if known from station data.
2. If tows were stepped to fish at different depths, the maximum wire out is recorded in Col. P.
3. Most, but not all, records of wire out are attributable to the collections of J. Schmidt and to other Danish collections.

L. MAX DEPTH (Col. Q).

1. The maximum depth of a tow is given in meters if known from station data.
2. If tows were stepped to fish at different depths, the maximum depth is recorded in Col. Q.

M. GEAR TYPE (Col. R).
1. Abbreviations for the types of collecting gear used are in this column.
2. Insofar as possible, original designations by the collectors are used even though similar gear may have been designated differently by different collectors. For example, Schoth and Tesch (1982) described the Hamburger Planktonnetz (HP) as a modified Isaacs-Kidd Midwater Trawl (IKMT).
3. Descriptions of the gear types are in section III of this document.

N. SPECIES CODE (Col. S).
1. "A" designates *A. anguilla*.
2. "R" designates *A. rostrata*.
3. "I" designates *Anguilla* with 111 myomeres, here considered intermediate and included in the *A. rostrata* spreadsheet.
4. "U" designates *Anguilla* that could not be identified to species, usually because of damage to the specimen and included in the *A. rostrata* spreadsheet.

O. TOTAL LENGTH (Col. T).
1. Total length, if known, is given in millimeters.

P. FREQ (Col. U).
1. The number (frequency) of individuals of the same total length (and the same number of myomeres (Col. W), if applicable) in a tow or other collection.

Q. META (Col. V).
1. "m" designates a specimen described by the collector as metamorphosing from leptocephalus to glass eel.

R. NUMBER OF MYOMERES (Col. W).
1. The total number of myomeres is given if known.
2. In many cases, especially those attributable to J. Schmidt, the myomeres were only counted sufficiently to determine the species, i.e., myomeres were not counted exactly. Discussion of this point is in Boëtius and Harding (1985b).

S. SURFACE TEMPERATURE (Col. X).
1. Surface temperature in degrees Celsius is given if known.

T. SURFACE SALINITY (Col. Y).
1. Surface salinity is given if known.

U. PRIMARY REFERENCE (Col. Z).
1. The primary reference is the main source of the data pertaining to the leptocephali.

2. The primary reference may also contain that data pertaining to the station.

V. SECONDARY REFERENCES (Col. AA).

1. The secondary references may be the main source of the data pertaining to the station.

a) For example, J. Schmidt published separate papers with great detail on the stations sampled on his major cruises.

b) For example, Tesch (1982) published the station data accompanying Schoth and Tesch (1982) and other papers on the distribution of leptocephali.

2. The secondary references may also contain original sources of data, where a better tabulation is cited as the primary reference.

W. COMMENTS (Col. AB).

1. Comments are used sparingly to provide explanation of situations not easily accommodated in the formats of other columns, e.g., incomplete collection dates and non-ship collections.

III. Key to gear types abbreviated in column R of the database.

Gear symbol	Gear name	Mesh size(s), cm	Example literature source(s)
Bongo	Bongo zooplankton sampler	0.05	Schnack et al. (1994)
EMT	Engel midwater trawl		Kleckner et al. (1985)
SmHP	Hamburger Planktonnetz, 2.1 m^2, a modified IKMT	0.085	Schoth and Tesch (1982)
HP	Hamburger Planktonnetz, 6.2 m^2, a modified IKMT	0.05	Schoth and Tesch (1982)
1.8MIKMT	Isaacs-Kidd midwater trawl, 1.8 m		L. Van Guelpen (pers. com.)
2MIKMT	Isaacs-Kidd midwater trawl, 2 m		D. G. Smith (pers. com.)
3MIKMT	Isaacs-Kidd midwater trawl, 3 m	6.4, 1.3, 0.075	Backus et al. (1969)

		0.05 0.165	Kleckner et al. (1983) McCleave and Kleckner (1987)
IKMT6	Isaacs-Kidd midwater trawl, 6 m^2	0.03	Schnack et al. (1994)
MMT	Marinovich midwater trawl	1.3, 0.38, 0.075	Backus et al. (1969)
MKTN	Modified krill trawl net, 15.7 m^2	Cod end = 0.45	Bast and Strehlow (1990)
MOC	Multiple opening-closing net, 1.4 m^2		Schoth and Tesch (1982)
10MMOC	Multiple opening-closing net, 10 m^2	0.3	Wiebe et al. (1976) Ring Group (1981)
1MNN	Neuston net, 1 m^2		Kleckner et al. (1985)
PELIK	Pelagic trawl with an IKMT mounted within		van Utrecht and Holleboom (1985)
PPT	Pelagic trawl, Peterson		Boëtius and Harding (1985a)
RMT1+8	Rectangular midwater trawl, opening and closing, 1 m^2 and 8m^2	1 m^2 = 0.032 8 m^2 = 0.45, 0.1	van der Spoel (1981)
10MRMT	Rectangular midwater trawl, 10 m^2		Kleckner et al. (1985)
C130	Ring net, 1.3-m diam.		Boëtius and Harding (1985a)
0.3MRN	Ring net, 0.3-m diam.		Eldred (1968)
0.5MRN	Ring net, 0.5-m diam.	0.0175	Eldred (1968)
1MRN	Ring net, 1-m diam.		Kleckner et al. (1985)
2MRN	Ring net, 2 m diam.	0.05 or 0.165	Castonguay and McCleave (1987)

MIK2	Ring net, 3.5-m diam.	0.056	Munk et al. (2010)
3MRN	Ring net, 3-m diam.		Boëtius and Harding (1985a)
E300	Ring net, 3-m diam.		Schmidt (1929)
1MCC	Ring net, cheese cloth, 1-m diam.		Bowman (1913)
PS150	Ring net, silk and stramin, 1.5-m diam.		Schmidt (1919)
P150	Ring net, silk, 1.5-m diam.		Schmidt (1919, 1929)
P100	Ring net, silk, 1-m diam.[a]		Schmidt (1929)
S150	Ring net, stramin, 1.5-m diam.		Schmidt (1919, 1929)
S100	Ring net, stramin, 1-m diam.[b]		Schmidt (1919, 1929)
S200	Ring net, stramin, 2-m diam.		Schmidt (1919, 1929)
0.5MS	Silk net, 0.5-m diam.		Lea (1913)
0.75MS	Silk net, 0.75-m diam.		Lea (1913)
1MS	Silk net, 1-m diam.		Lea (1913)
12FS	Silk net, 30.5-cm diam. fine		Bowman (1913)
ST	Small trawl		Bowman (1913)
1.8MTT	Tucker trawl, 1.8 m		Kleckner et al. (1985)
TT22	Tucker trawl, 2 m x 2 m		Ross et al. (2007)
YFT	Young fish trawl		Bowman (1913), Lea (1913)
Y200	Young fish trawl, 2-m diam.		Schmidt (1929) Boëtius and Harding (1985a)

Y330	Young fish trawl, 3.3-m diam.		Boëtius and Harding (1985a)
PYFT	Young fish trawl, Peterson		Bowman (1913)
6ftx1in	(uncertain)		Boëtius and Harding (1985a)
1.5ftx1in	(uncertain)		Boëtius and Harding (1985a)

IV. Literature cited in Atlantic *Anguilla* database and in this document.

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Appendix C

Download field description

Name of the field	Description
ID	Identifier
DateTime	Date of sampling
Latitude	Latitude, Station position
Longitude	Longitude, Station position
HaulLat	Hauling latitude in decimal degrees
HaulLon	Hauling longitude in decimal degrees
Stage	Eggs and Larvae stage
Species	Species latin name using WORMS vocabulary
Survey	The survey name
Num. counted	number of eggs counted
Length	Lenght
Volume Filter Internal	filtered volume internal flow meter
Volume Filter External	filtered volume external flow meter
Haul Num.	unique code for merging with haul data, derived from yearshipcruisehaul
Sample Num.	Haul number
Country	Country
Ship	Ship
Aperture	Aper = Aperture of mouth of gear in mm
E/W	E/W, Station position
FlowMeter Int. Calibration	calibration internal flow meter
FlowMeter Revs Int.	internal flow meter revolutions
FlowMeter Ext. Calibration	calibration external flow meter
FlowMeter Revs Ext.	external flow meter revolutions
Water Depth	Water depth (m)
Max Sampling Depth	The maximum depth of a tow is given in meters if known from station data
Haul Depth	maximum sampler depth in water column(m)
Haul Duration	Duration of a tow, if known, is given in minutes
NoMeas	Number of larvae measured from that sample
MeasYolk	Number of yolk-sac larvae measured from that sample
TotMeas	Number of total larvae measured from that sample

Caught	Number of larvae caught in that sample
CaugYolk	Number of yolk-sac larvae caught in that sample
TotCaug	Number of total larvae caught in that sample
TotPerm2	Total number of larvae per square meter
AbSmall	Number of larvae < 10 mm per square metre (<11 mm in Southern North Sea)
AbMedium	Number of larvae 10-15 mm per square metre (11-16 mm in SNS)
AbLarge	Numnber of larvae > 15 mm per square metre (> 16 mm in SNS)
AbYolk	Number of yolk-sac larvae per square metre
Area-code	Area-Code
Period	Nation and Sampling period
Sampling Period	Survey Time, Sampling period
Temp max sampler depth	Water temperature at maximum sampler depth
ICES Rec. Code	ICES rectangle and position code
Agency/Person	Can be and Agency or a person
Ship/Person	Can be the ship or a person
Cruise Number	If known, the ship's designated cruise number is given
Original SampleID	unique code for merging with haul data, derived from year ship cruise haul
Station Number	The station Number
Series Number	If multiple tows were made at a station or if multiple nets were used on a single tow, series numbers may have been assigned to designate the multiplicity
Wire Out	The maximum length of towing wire spooled out on a tow is given in meters if known from station data.
Meta	designates a specimen described by the collector as metamorphosing from leptocephalus to glass eel.
Primary Reference	The primary reference is the main source of the data pertaining to the leptocephali
Secondary Reference	The secondary references may be the main source of the data pertaining to the station
Num. of Myomeres	Number of Myomeres
Gear	gear efficiency
Net Opening	diameter of nosecone/intake
Temperature at surface	temperature at surface (5 m)
Temperature at 20m	temperature at 20m
Temperature at 50m	temperature at 50m
Temperature at 100m	temperature at 100m
Sub factor	Raisor factor
Salinity	Surface salinity
Salinity at 20m	Salinity at 20 m

Bottom salinity	Bottom Salinity
DayNight	DayNight
Statrec	ICES sub divisions
haulval	HaulVal
bycspecreccode	By catch species
stdspecreccode	Standard species catch
speedwater	speed through the water
winddir	Wind direction
windspeed	Wind speed
thermocline	Thermocline
thclinedepth	depth of thermocline
Gear count	Num. Of gears
Gear Type	Gear Type
CTD model	CTD Model
Mesh size	mesh size of the net
Flow meter type	Flow meter type
Sub sample instruments	Sub sample instruments
Haul distance	Haul distance
Gear efficiency	gear efficiency
Identification	method of species identification (visual, geneprobe, etc.)
Preservation	Preservation of Samples
Diameter oil globule	diameter of the oil globule
Oil globules present	oil globules present/absent
Number oil globules	number of oil globules
Notes	comments

Appendix D

Analysis of results: WGEGGS North Sea Cod and Plaice Eggs

Results have also been published in various scientific journals:

Fox, C. J., Taylor, M., Dickey-Collas, M., Fossum, P., Kraus, G., Rohlf, N., Munk, P., et al. 2008. Mapping the spawning grounds of North Sea cod (Gadus morhua) by direct and indirect means. Proceedings of the Royal Society B: Biological Sciences, 275: 1543-1548.

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Munk, P., Fox, C. J., Bolle, L. J., Damme, C. J. G. v., Fossum, P., and Kraus, G. 2009. Spawning of North Sea fishes linked to hydrographic features. Fisheries Oceanography, 18: 458-469.

Damme, C. J. G. v., Bolle, L. J., Fox, C. J., Fossum, P., Kraus, G., Munk, P., Rohlf, N., et al. 2009. A reanalysis of North Sea plaice spawning-stock biomass using the annual egg production method. ICES J. Mar. Sci., 66: 1999-2011.

Nash, R. D. M., Wright, P. J., Matejusova, I., Dimitrov, S. P., O'Sullivan, M., Augley, J., and Höffle, H. 2012. Spawning location of Norway pout (Trisopterus esmarkii Nilsson) in the North Sea. ICES Journal of Marine Science: Journal du Conseil, 69: 1338-1346.