

Facts about the Danish Eel Expedition 2014

The expedition

The Danish Eel Expedition 2014 (SARGASSO-EEL) is an extensive research expedition to the European eel's spawning grounds in the Sargasso Sea subsequently following the eel larvae's drift back to Europe. The Sargasso Sea is a large oceanic area between Bermuda and the West Indies. Led by DTU Aqua the expedition involves leading experts from a range of Danish and international universities. Together, the more than 20 research projects covered by the expedition shall fill the gaps in our knowledge about the breeding habits and early life of the mysterious eel. Denmark's biggest marine research vessel, Dana, owned by DTU has been chosen for the voyage. The expedition is jointly financed by the Danish Centre for Marine Research and the Carlsberg Foundation.

Why?

In the past 30 years there has been a dramatic decline in the eel population. Today, the number of young eel returning to the coasts of Europe is just 2-10 per cent of the quantities seen in the 1970s. In 2008, the dramatic decline in eel numbers led the International Union for Conservation of Nature (IUCN) to add the eel to its list of critically endangered species.

A characteristic feature of the eel is that spawning takes place far from the juvenile nursery grounds in Europe, requiring the eel larvae to ride the ocean currents for a 6,000 kilometre return journey across the Atlantic. The Danish researchers will investigate whether climate-related changes in the eel's spawning grounds or the ocean currents transporting the eel larvae to Europe are responsible for the eel's sharp decline. The expedition will also gather information on the food preferences of the newly hatched eel – the understanding of eel larval feeding is a prerequisite for successful rearing of larvae and the farming of eel. Farmed eel can be used for re-stocking and using these for consumption would lower the fishing pressure on the population

What?

The researchers will search for the specific areas of eel spawning and investigate how the spawning could be affected by climate-dependent fronts and ocean currents. Further they will look into the questions: why the eel spawns in the Sargasso Sea, which route the eel larvae take back to Europe, and what they feed on during their long migration. The eel spawn in an area where warm subtropical and colder northern waters meet, and the researchers will examine whether climate change leading to higher temperatures of subtropical waters, could affect eel larvae survival and thus the numbers of larvae returning to Europe.

The expedition research project will examine:

- The extent of the spawning area – do the spawning eel congregate in specific areas?
- How water masses and ocean currents affect eel egg and larval transport
- Whether presence of eel can be determined on the basis of DNA remains present in the water
- Whether larval transport is directed to areas of particularly good feeding conditions
- What are the food items of eel during the early stages?
- Larval swimming behaviour
- Larval growth and the growth of their potential food source
- The production of potential food sources – how many are consumed and how many sink to the bottom of the ocean?
- The condition of the eels spawning in the Sargasso Sea (assuming it is possible to catch an adult eel)

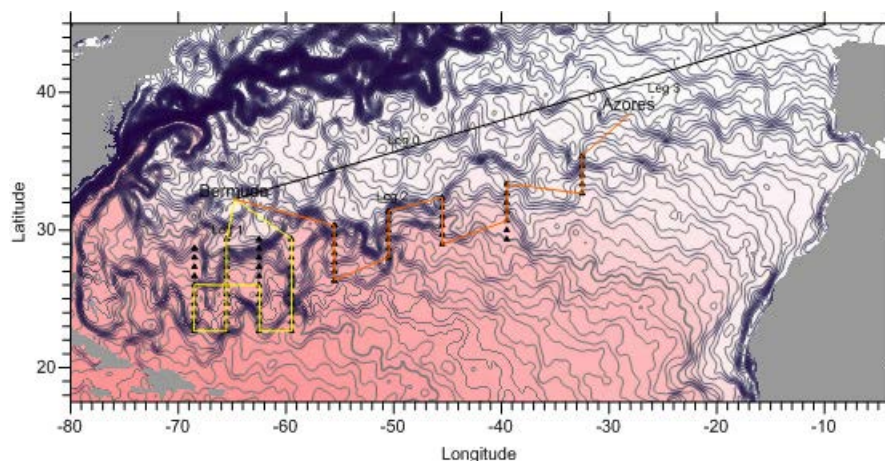
- Whether larval survival is linked to climate change and whether there has been a climate change influencing the spawning area conditions during the past 20 years.

Who?

The expedition brings together almost 40 experts from a wide range of research areas at both Danish and international universities and institutions. The expedition, which is headed by Senior Researcher Peter Munk from DTU Aqua, is funded by the Danish Centre for Marine Research and the Carlsberg Foundation. The marine research vessel, Dana, is owned by DTU.

The route

- 28 February: Departure from Hirtshals, Denmark.
- 14 March: Arrival in Bermuda, where participants will board.
- 15 March–6 April: First period of fieldwork starting from and returning to Bermuda. About half of the work will take place in the Bermuda Triangle.
- 7–22 April: Second period of fieldwork from Bermuda to the Azores.
- 23 April–5 May: Third period of fieldwork, where after Dana returns to Hirtshals. During the home voyage, researchers will take samples and fish for eel juveniles to chart their return route to Europe.



Dana's route in the first and second fieldwork period.

The vessel

The marine research vessel, Dana is owned by DTU and based in Hirtshals. Dana is 78 metres long, with a draught of 5.7 metres. Dana is Denmark's largest marine research vessel and the only ocean-going Danish research ship. The ship was built in 1980–81 at Dannebrog Shipyard in Aarhus and constructed specifically for marine research. On board, there are five wet and dry laboratories equipped with a wide range of scientific instruments. In addition, Dana features a comprehensive range of equipment for trawling and water and seabed sampling. The vessel can accommodate 38 people, including a crew of 12–15.



The research vessel, Dana. Photo: Line Reeh.

Proud Danish traditions

The Danish Eel Expedition 2014 is taking place 101 years after the first expedition targeting the eel's spawning grounds. The 1913 expedition was organized by the Danish researcher and biologist Dr. Johannes Schmidt, who several years earlier had suggested that the eel spawning grounds would be in the mid-Atlantic. Subsequent expeditions to the eel spawning grounds have basically confirmed Schmidt's findings, but there are still many unanswered questions concerning the reproduction and early life of the European eel.

There were also Danish expeditions to the Sargasso Sea in 1966 and in 2007 (Galathea 3).

Amazing life of the European eel

The European eel spawns in the Sargasso Sea. As the eel larvae grow, they drift back towards Europe, gradually metamorphosing into so-called glass eels which are transparent and approx. five centimetres long. These make their way up rivers, streams and lakes or remain in shallow coastal waters. In fresh water, they change colour, their sides and belly taking on a brownish-yellow hue – hence they become yellow eels. On reaching sexual maturity after 5-15 years, the yellow eel changes colour once again – this time to black or grey with a white or glossy belly. Now known as the silver eel, it measures 33-100 cm in length. At the beginning of September, the adult European eels leave their foraging area in Europe, heading for the Atlantic Ocean to begin the 6,000 kilometre journey to the Sargasso Sea to spawn.

Eel farming

Despite attempts spanning several decades to establish large-scale eel breeding in captivity, eel farming has been unsuccessful. DTU Aqua in Denmark have managed to produce viable eggs, hatch larvae and sustain their life for up to 26 days, which is a world record for European eel and an important step towards successful breeding. The next major challenge is to find a suitable larval food source.

The study of eel larvae and their potential food sources on the eel expedition, will contribute to the general understanding of larval feeding and could give an important input to these breeding attempts..

Further information (including press photos)

www.aqua.dtu.dk/aaleekspedition (in Danish)

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