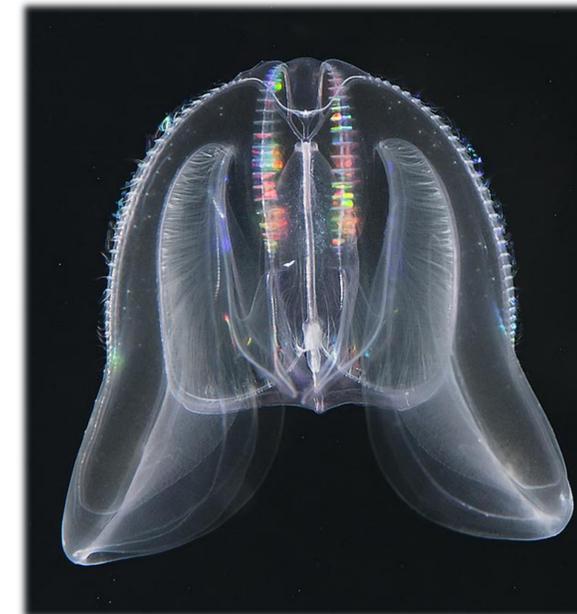


The rise of the invasive ctenophore *Mnemiopsis leidyi*

Motivation:

- ① The introduction of non-native species together with anthropogenic factors is resulting in the loss of finfish populations in many marine ecosystems around the world.
- ② *M. leidyi* gained notoriety in the 1980s when its explosive population growth in the Black Sea coincided with a drastic reduction in anchovy stock in the region.
- ③ *M. leidyi* has been found in coastal waters from northern France to southern Denmark and there is concern about whether a similar devastating outbreak, with its associated economic harm to fisheries, is possible in the North Sea and if so under what conditions.



Ian Gardiner

1st year PhD student

ian.gardiner@strath.ac.uk

Academic Advisors

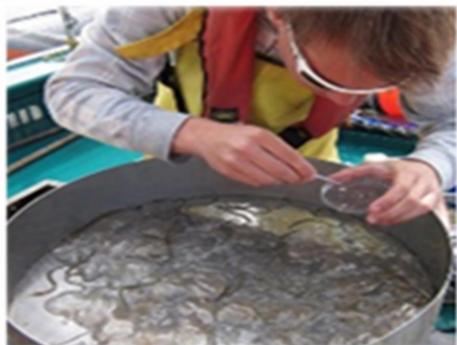
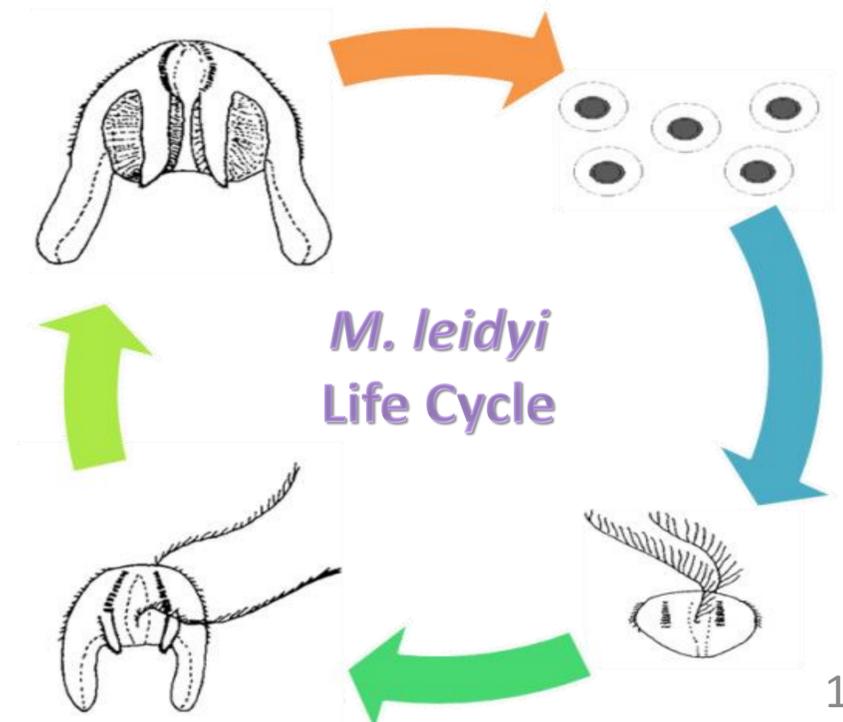
Douglas Speirs (*Uni. of Strathclyde*)

Louise Kelly (*Uni. of Strathclyde*)

Sophie Pitois (*CEFAS*)

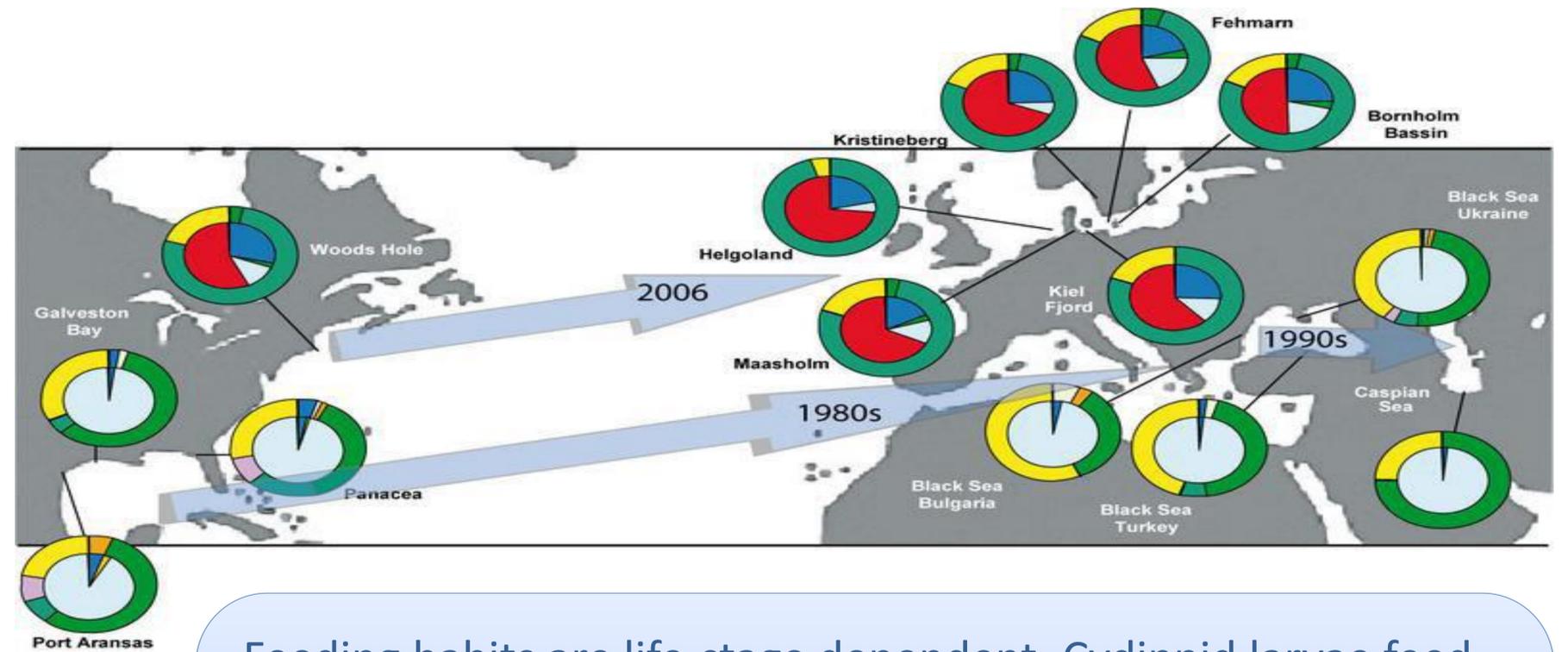
Johan van der Molen (*CEFAS*)

M. leidyi is a self-fertilising hermaphrodite with wide physiological tolerances, a wide dietary niche, rapid growth, short generation times and a high fecundity – all traits associated with successful invasion.



Population Dynamics

There are no specialised overwintering stages, but feeding and reproduction stop as temperatures fall. This means that overall the demography seems to be dominated by source-sink dynamics in which population persistence requires regions with relatively low advection, such as coastal or estuarine regions. This suggests that driving population dynamic models by physical transport derived from ocean circulation models will be an essential component in developing forecasts.



Feeding habits are life-stage dependent. Cydippid larvae feed almost exclusively on microzooplankton and protozoa whereas the lobate forms feed on copepods, eggs and young fish larvae. This together with stage-dependent growth and mortality rates suggest the model must incorporate the four distinct life stages: egg, larvae, transitional and adult.



Future work:

- Construct an explicitly spatial population dynamic model which contains the key elements of its life-history in relation to important environmental drivers such as temperature, salinity, and ocean currents.
- Use this model to forecast potential *M. leidy* outbreaks and in particular monitor the risk of the species establishing a population in UK marine waters.