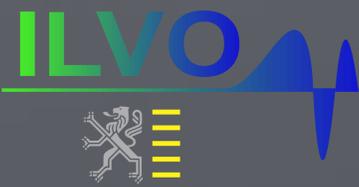


# Zooplankton in the southern North Sea and the link with (semi-)pelagic fish and fisheries



Karl Van Ginderdeuren<sup>1</sup>, Hans Hillewaert<sup>1</sup>, Kris Hostens<sup>1</sup> and Magda Vincx<sup>2</sup>

<sup>1</sup> Institute for Agricultural and Fisheries Research (ILVO), Animal Sciences, Biological Environmental Research, Ankerstraat 1, B-8400 Oostende, Belgium

<sup>2</sup> University of Ghent, Biology Department, Marine Biology Section, Krijgslaan 281 S8, B-9000 Gent, Belgium



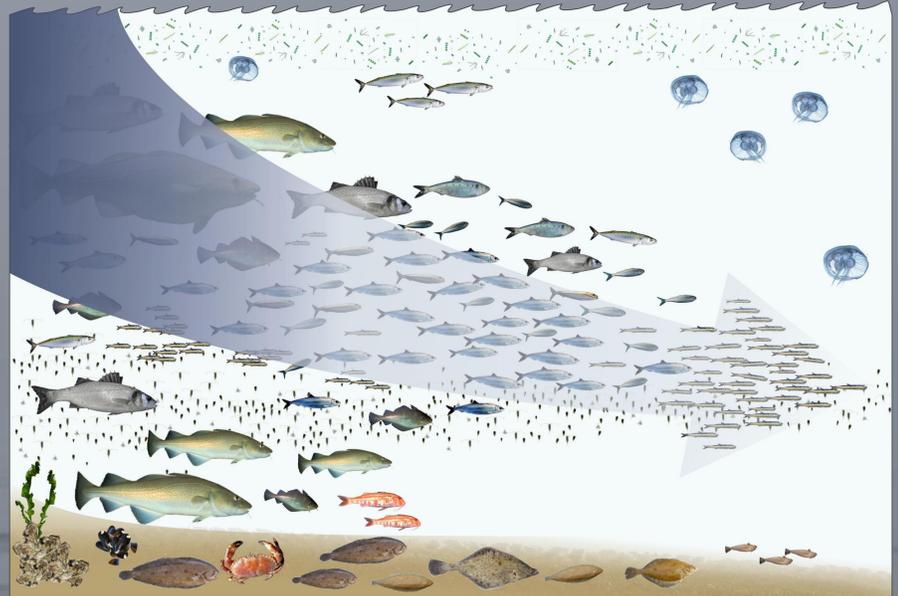
Are beam trawl fisheries running hot? (© KVG)



Fish caught in a pelagic trawl (© KVG)

## Fishing down the food web

- ▶ Global evolutionary trend: Ecosystem shift from benthic towards (semi-)pelagic dominance
- ▶ Pelagic fisheries contribute highly to the total fish catch in different seas
- ▶ Increase in jellyfish and other low-trophic planktivorous pelagic species
  - Mediated by Climate Change: Shifts in numbers, distribution and community structure of fish, seabirds and zooplankton. Appearance of Invasive species.
  - Investigating this trend in the southern North Sea is highly expedient.



Fishing down the food web: will North Sea commercial fish stocks diminish further and shift towards lower trophic levels? (© ILVO - Hans Hillewaert)

## Sustainable strategy for the Flemish fisheries sector implies:

- ▶ Expanding the used fishing methods: usage of fish pots, longlines, fishing lines, gill nets, trammel nets, (semi-) pelagic nets
- ▶ Developing niche fisheries that are more profitable, selective and ecologically sound
- ▶ A sustainable use of other natural marine resources

## Quest for Pelagic Enlightenment

- ▶ Link between (semi-)pelagic fish and their prey on the Belgian Continental Shelf
- ▶ Link between (semi-)pelagic fish and their predators (seabirds and jellyfish)

- ▶ Which species of (semi-)pelagic fish are present where and when on the BCS? – Spatial and temporal variation in fish presence
- ▶ Structuring role of biotic (fish prey – zooplankton and fish, also benthos) and abiotic (e.g. temperature, salinity, hydrography) variables -Spatial and temporal variation in zooplankton presence
- ▶ Diet study of these fish by examining stomach contents and calculating carbon flows
- ▶ Possibility of upscaling these relationships between fish and plankton, to a higher spatial level
- ▶ Search for mismatches between predators and their prey

## P R E L I M I N A R Y R E S U L T S



Alive *Clione limacina* (© KVG)



Sprat (© Hans Hillewaert)



Mackerel portrait (© KVG)



Herring (© Hans Hillewaert)



Horse mackerel portrait (© KVG)

## Preliminary results of WP2 Zooplankton samples

Taken in BPNS with WP2 net (200 µm) in January-November 2009

- ▶ Calanoid copepods omnipresent: *Temora longicornis*, *Acartia clausi*, *Centropages typicus* and *C. hamatus* constitute the greater part of the copepod community.
- ▶ Further offshore, typical oceanic species such as *Calanus helgolandicus* occur.
- ▶ Juvenile polychaete worms and barnacle larvae are found abundantly, implying a benthic-pelagic coupling.
- ▶ Bigger species that actively hunt the other plankton are arrow worms (e.g. *Sagitta setosa*), fish larvae and mysids.

## Pelagic fish in BPNS

in January-November 2009, fished with a semi-pelagic net (3 x 1 m) and a pelagic net (4 x 4 m).

- ▶ Herring *Clupea harengus* and sprat *Sprattus sprattus* are common during the winter half year. Mostly age 0 and 1 classes staying close to the shore.
- ▶ Adult herring is found in autumn during spawning migration towards the English Channel
- ▶ Summer brings along mackerel *Scomber scombrus* and horse mackerel *Trachurus trachurus*. Horse mackerel juveniles are occasionally very abundant in the offshore pelagic fish community.

## A more gelatinous future for the BPNS?

- ▶ In 2009 the first gelatinous zooplankton was observed in March and April: sea gooseberries *Pleurobrachia pileus* and moon jellies *Aurelia aurita*.
- ▶ An increase in sea temperature during summer and autumn facilitates an increase in gelatinous plankton such as blue jellyfish *Cyanea lamarckii*, compass jellyfish *Chrysaora hysoscella* and marigold *Rhizostoma octopus*.
- ▶ The plankton samples also contained hydrozoan medusa and the ctenophores *Beroe* and *Mnemiopsis leidyi* (up to hundreds).



*Mnemiopsis leidyi* (© KVG)

Institute for Agricultural and Fisheries Research, Animal Sciences – Fisheries

ILVO, Biological Environmental Research, Ankerstraat 1, 8400 Oostende, Belgium

+32(0)59/569848 Karl.Vanginderdeuren@ilvo.vlaanderen.be