Spawning habitats of Cape horse mackerel (*Trachurus capensis*) in the Northern Benguela upwelling region

By

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Background

- HMX are described to spawn between Cape Frio (18°20′S) and Cape Cross (22°S), with heaviest spawning in the intermixing zone of warm oceanic and cool coastal water masses (O'Toole 1977)
- Highest egg densities found near Cape Frio (18°30′S) and between 19°30′S and 20°30′S
- Spawning peak in late austral summer (March/April)
Background

- All information on horse mackerel spawning comes from the 1980s or earlier
- There have been changes in system (wind, temperature) since then
- Shift in preferred spawning location for sardine to more southern areas since 1980s (Kreiner et al 2011)
- Spawning locations still the same????
- Eggs and larvae still found in same environmental conditions?
Materials and Methods

- Ichthyoplankton collected during Nansen cruises with Multinet (405 µm) at different depth intervals
- Empirical cumulative distribution function (ecdf) to assess the distribution and association with environmental parameters
- Generalized Additive Models (GAM) to link the distribution eggs and larvae to the prevailing environmental variables (not completed)
- SPQ (single parameter quotient) to assess the preference of horse mackerel spawning in certain parts of the coast (not completed)
Typical sampling grid
Distribution maps

2001 (top)
2005 (bottom)
Vertical distribution of eggs

% horse mackerel eggs

Depth (m)

0 20 40 60 80 100

0 50 100 150 200
Vertical distribution of larvae

% Horse mackerel larvae

Depth (m)

Day

Night
Empirical cumulative distribution function (ecdf) of temperature and salinity and weighted ecdf of the two variables by the density of eggs. Difference between the curves (used as index of preference) is denoted by dashed curves.
Empirical distribution function (ecdf) of oxygen and latitude and weighted ecdf of the two variables by the density of eggs
Empirical distribution function (ecdf) of temperature and salinity and weighted ecdf of the two variables by the density of larvae.
Empirical distribution function (ecdf) of oxygen and latitude and weighted ecdf of the two variables by the density of larvae.
Discussion

Data analysis not completed as Dawit did not get approval to join the NansClim workshop last week

- Most eggs found between 25 and 100m
- Larvae mainly in upper 50m (day and night differences)
Discussion (cont.)

- Highest density of eggs and larvae associated with similar temperature ranges (~18°C - 20°C). (O’Toole - 17°C to 21°C)

- Higher densities of eggs associated with narrow salinity range (around 35.1 psu) compared to higher and wider salinity ranges for larvae (35.6 - 36.1). (O’Toole - 35.2 psu and 35.6 psu)
Discussion (cont.)

- High density area of eggs generally characterized by higher oxygen concentrations compared to areas with high larvae densities.

- No eggs or larvae found at $O_2$ concentrations of less than 2.5 ml/l to 3 ml/l.

- Along shore the distribution of eggs mostly restricted in the central region between 22°S and 20°S with minor peaks at around 19°S and 17°S.

- Distribution of larvae more widespread with areas of high densities of larvae along the coast between 18°S and 23°S.
Thank you!