**PREDICTION OF CAPELIN GROWTH FOR USE IN CAPTOOL**

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**Background**

Since 1999, a 1-year prognosis of capelin has also been made during the assessment, using CapTool. The prognosis gives the abundance of 1+ capelin during the survey in year \( y+1 \), based on the survey of 1+ capelin in year \( y \), as well as the 0-group survey in year \( y \). The temperature and the cod stock abundance are also taken into account in this prediction. Since capelin is a key species in the ecosystem, e.g. as food for cod (Gadus morhua) and other predators, such a 1-year prediction is important for predicting the development of other important stocks in the ecosystem. It also gives some indication of whether the stock will be large enough to support a fishery in year \( y+2 \). An evaluation of the prediction methodology is given in Gjøsæter et al. (this symposium).

A key element in the 1-year predictions is the growth. In this poster, we make regressions in order to improve the 1-year predictions for capelin length growth, which are used in CapTool.

**Results of regressions**

\[
\begin{align*}
L_{y+1,1} &= 0.36L_{y,0} + 8.10 \\ (r^2=0.20, \ p< 0.05) \\
L_{y+1,2} &= 0.49LI_{y,1} - 0.26\text{Cap}_{y+1} + 9.29 \\ (r^2=0.66, \ p< 0.05) \\
L_{y+1,3} &= 1.37 LI_{y,2} - 1.39 \\ (r^2=0.34, \ p< 0.05)
\end{align*}
\]

- \( LI_{y,a} \): Mean length (cm) of immature capelin of age \( a \) in year \( y \), from capelin survey
- \( L_{y+1,a+1} \): Mean length (cm) of (all) capelin of age \( a+1 \) in year \( y+1 \), from the capelin survey
- \( L_{y,0} \): Mean length (cm) of 0-group capelin, as observed during the 0-group survey in year \( y \)
- \( \text{Cap}_{y} \): Biomass (million tonnes) of capelin (1+) in year \( y \)
The following variables were tested, but found not to improve the models:

- Kola temperature January-September or August-September.
- Plankton abundance by size fraction or total, from autumn survey.

Conclusions

- Length of age 1-3 capelin depends on length of age 0-2 capelin the year before.
- Growth from age 1 to 2 seems to be density-dependent.
- For growth from year y to y+1, no relationship was found to temperature or plankton abundance in year y.
- The equations given will be implemented in CapTool.

Further work

- Break the data (temperature, plankton etc. down by area/water mass.
- Check correlation with ambient temperature and with inflow of water to the Barents Sea.