Nursery ground processes for junenile plaice in Icelandic waters

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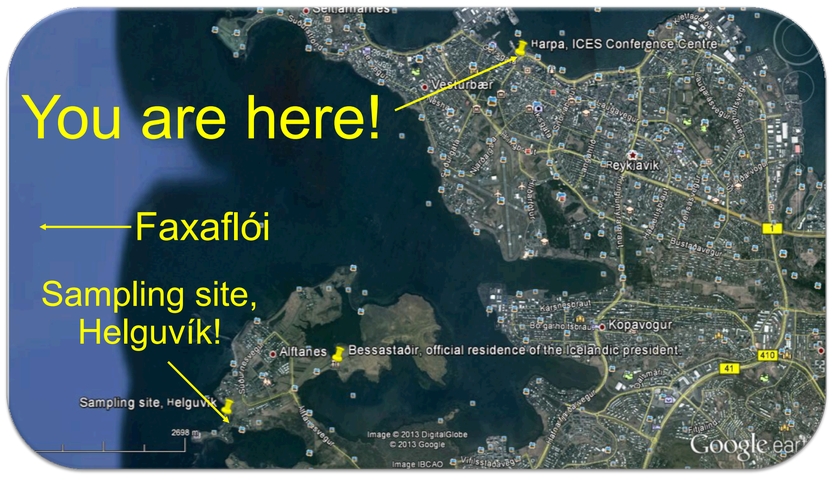
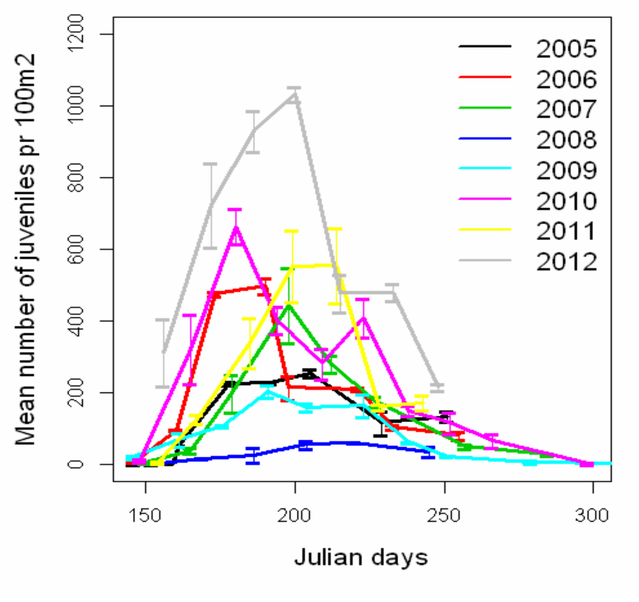
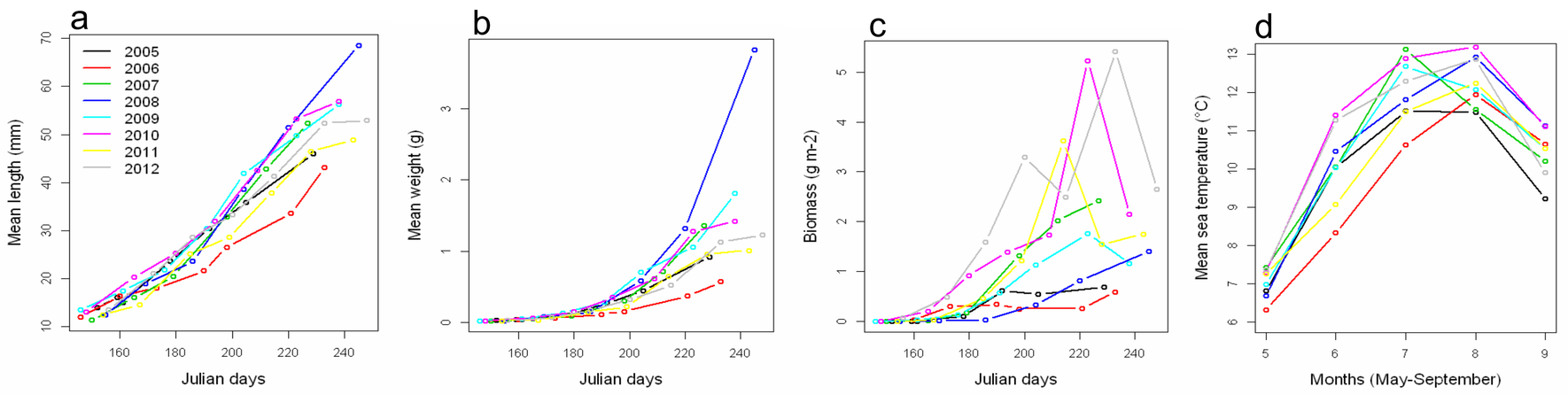
Sandy shore ecosystems are essential nursery grounds for flatfish species where both the quality and quantity of habitat can control the recruitment processes. Juvenile plaice (*Pleuronectes platessa*) can be found in high densities on the spatially restricted sandy-bottom beaches all around Iceland. The objective was to analyse the distinctive features of a highly fertile nursery ground. The interannual variability in settlement, density and growth of juvenile plaice was examined bi-weekly from spring to fall at a highly fertile nursery ground (Helguvík in Álftanes) in SW-Iceland from 2005 to presence. Newly settled individuals were first observed in the end of May to early June and settlement lasted until mid-July and densities peaked in early July. The inter-annual variability in density and growth of juvenile plaice on the nursery ground and the subsequent year-class strength derived from survey of nearby important fishing ground (Faxaflói) is discussed.



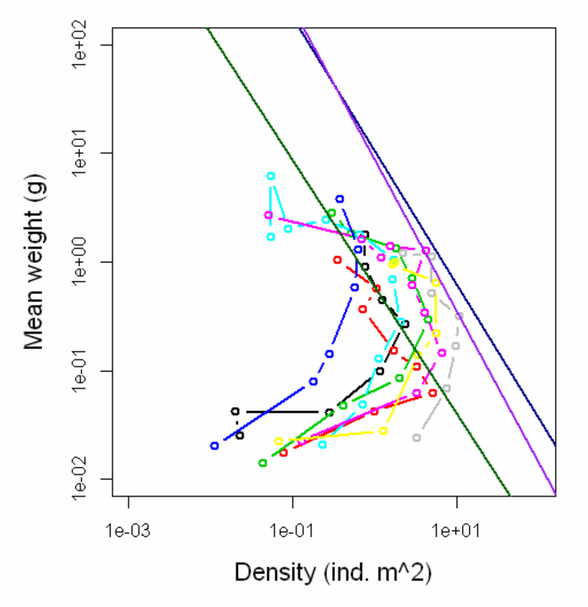


Density & Growth
Density of juvenile plaice individuals in Helguvík varied between years. Since the onset of sampling, the summer of 2012 had the highest plaice density, which was among the highest reported for this species. During that peak year the average length and weight was not distinct from other years. In 2008 when juvenile density was very low, the length and weight generally did not stand out compared to years with high density. The slowest growth was during the summer of 2006 which was also the coldest.



Mean **length** (mm), mean **weight** (g) and **biomass** (g*m^2) are plotted against Julian days (a. b. and c.). Sea **temperature** (°C) in Reykjavík harbour shown for summer months May-September (d.).

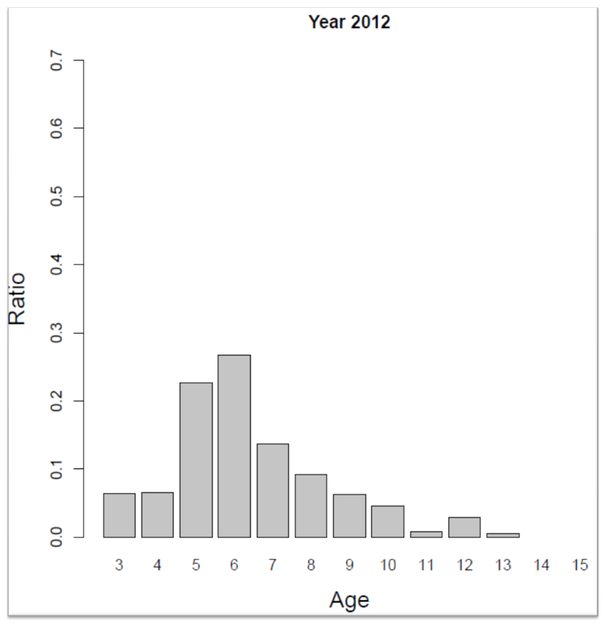
A self-thinning or dynamic thinning rule describes changes in populations over periods of time, where a change in density is an outcome of an increase in mean weight. Dynamic thinning line has a slope of -4/3 and evolves when mean body size increases and density declines over time by mortality or emigration (*e.g.* Nash *et. al.* 2007).



Dynamic thinning
A significant relationship was found in 2006 and 2007. Site specific dynamic thinning line for all years in Helguvík had a slope of -1.3994 ($p<0.05$). Over the study period, **population density was on three occasions high enough to reach the site specific self-thinning line**, indicating that the population approached the carrying capacity of the nursery ground.

Relationship trajectories between mean weight (g) and density (ind. m^2) for years 2005-2012 shown among with published site specific dynamic thinning lines for Helguvík Bay (purple), Port Erin Bay Isle of Man (dark green) and Ardmucknish Bay Scotland (blue) to show comparison between three nursery areas.

Helguvík – Adult stock size?



When age distribution of plaice from annual flatfish survey in Faxaflói and density of juveniles in Helguvík are compared, high density years are reflected in strong yearclasses, for example between juveniles in 2006 and 2007 and 5 & 6 year olds in 2012. **These observations indicate that data from Helguvík can be used to predict recruitment in Faxaflói, but longer time series is needed.**

Reference

Nash, R.D.M., Geffen, A. J., Burrows, M. T., Gibson, R. N. 2007. Dynamics of shallow-water juvenile flatfish nursery grounds: application of the self-thinning rule. Mar. Ecol. Prog. Ser. 344, 231–244.

Acknowledgements

We wish to express our gratitude to to all who participated during sampling