Manuel Hidalgo, Enric Massutí, Joan Moranta, Joan Cartes, Josep Lloret, Pere Oliver and Beatriz Morales-Nin, (2007). Seasonal and short spatial patterns in European hake (Merluccius merluccius L.) recruitment process at the Balearic Islands (western Mediterranean): The role of environment on distribution and condition . Journal of Marine Systems. Volume 71, Issues 3-4, June 2008, Pages 367-384. The Wrapping Up of the IDEA Project: - International workshop on environment, demersal resources and fisheries.

Abstract: This study evaluates the link between the recruitment process of European hake (Merluccius merluccius L.) of the Balearic Islands (western Mediterranean) and the environmental and physiological conditions. Spatio-temporal variation of abundance and condition of fish were evaluated at two locations each with different oceanographic conditions, one in the north (Sóller, SO) and another in the south (Cabrera, CA) of Mallorca Island. Environmental variables explored were hydrography, sediment characteristics, phytoplankton pigment concentration (ppc) and the trophic resources of hake. Individuals were divided in three life stages: recruits, post-recruits and young adults. Hepatosomatic index (HSI), relative condition index (Kn), gonadosomatic index (GSI) and fullness index (FI) were analysed for the three life stages. Recruitment starts in February with the incorporation of smaller hakes, and it can be followed through spring and early summer with a peak in April. However, some spatial heterogeneity in the recruitment process has been found between north and south of the Island. The main pulse of recruitment occurred at a different time in the two areas. Spatial heterogeneity was also consistent with the condition of hake recruits, with higher values of Kn and HSI at SO than at CA. Maximum values of Kn were found in February at SO and in April at CA, coinciding with the start of the different recruitment pulses to the fishing grounds. Post-recruits and young adults also showed higher condition at SO than at CA. The arrival in spring of the Western Winter Intermediate Waters (WIW) drives the spatial-temporal variation in abundance and condition of hake. Ppc was highly correlated with recruit abundance with a time lag of two months, while for post-recruits the time lag was three months. The observed differences in the condition of hake between areas could be a consequence of the fact that the waters to the north of Mallorca are comparatively more under the seasonal influence of WIW which is formed in more productive areas. Thus, this study characterises the short temporal and spatial variability in the hake recruitment process off the Balearic Islands, both in terms of abundance and fish condition. This pattern is explained on the basis of the mesoscale environmental variability observed between north and south of Mallorca and the ecological adaptive strategy of recruiting in the optimal environmental season.

Keywords: European hake; Recruitment; Environment; Condition indices; Energy allocation; Western Mediterranean