

Theme Session B

Large-scale changes in the migration of small pelagic fish and the factors modulating such changes

This session is co-sponsored by PICES

ICES CM 2006/B:01

Distributional changes observed in Pacific hake (*Merluccius productus*) in association with environmental conditions in the California Current System

Ken Cooke, John Holmes, Guy Fleischer, Rebecca Thomas, and Patrick Ressler

We investigate changes in the distribution of Pacific hake (*Merluccius productus*) observed by joint Canada-US acoustic-trawl surveys from 1995–2005. During the summer season, Pacific hake are found along the west coast of the United States and Canada, typically ranging from Monterey, CA (ca. 36°N) northward to Queen Charlotte Islands, British Columbia (ca. 52°N) at depths from about 100 m to 300 m. Stock assessment surveys have documented substantial changes in summer distribution and abundance resulting from physical forcing through climate-ocean interactions. Shifts are shown on temporal and spatial scales reflective of El Niño-Southern Oscillation events and of more localized, seasonal changes. Hake distribution patterns vary from sparse and dispersed well offshore to dense, fairly contiguous aggregations at the shelf break to discrete schools shoreward of the shelf edge. The northward extent of the summer distribution changed in the 1990s and was related to warmer surface temperatures and stronger poleward flow during this period. Based on the variability in both the along-shore and northward distribution between surveys, we suggest that hake may be an excellent indicator of change within the California Current ecosystem. We use multivariate data sets to illustrate aggregation patterns in association with other pelagic species and with environmental structures. Hake distribution is strongly linked to California Current flow patterns and to zones of high productivity. The improved understanding of the relation between environmental characteristics and the organisms, as well as their intra- and inter-specific interactions is important in describing habitat, ecosystem structure and in assessing stock status.

Keywords: Pacific hake, *Merluccius productus*, California Current, continental shelf edge, distribution, ocean conditions.

Contact author – Ken Cooke: Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C. V9T 6N7, Canada [tel: +1 250 756 7125, fax: +1 250 756 7053, e-mail: cookek@pac.dfo-mpo.gc.ca].

ICES CM 2006/B:02

Pacific sardine (*Sardinops caeruleus*) around the southern tip of the Baja California peninsula, Mexico and its relation to the interannual variability of the California Current

Rubén Rodríguez-Sánchez, Sofia Ortega-García, and Héctor Villalobos

Within the total distribution of *Sardinops caeruleus* (from Alaska to inside the Gulf of California), the labelling of a population or isolated stock inside the Gulf of California (GulCa) using different diagnostic characteristics has been mostly justified because of the stock's supposed geographic isolation caused by the Baja California peninsula and the presence of an oceanographic front off the southern end of the Gulf. We have made a revision of the frequency of the annual occurrence of Pacific sardine around the tip of the peninsula using catch records of live bait during the last warming regimen (1980–1997), a period where a northward geographical shift in the position of the center of distribution and bulk of the biomass of sardine in the California Current system is indicated. This shift could, hypothetically, increase the isolation of a putative sardine population inside the GulCa. We assume that the presence of sardine around the tip is related to movements toward either side of the peninsula. These events are analyzed in relation to the interannual variability of SST and the advection of the California Current during the same period. We found that sardine abundance in this area increased during years with cold conditions and the increase of a southward advection of the California Current. These conditions seemingly facilitate the movement of fish between the ocean and the gulf sides of the peninsula.

Keywords: Pacific sardine, California Current, Gulf of California, migration, interannual variability.

Contact author – Rubén Rodríguez-Sánchez: CICIMAR-IPN, Apdo. Post. 592, La Paz, B.C.S., 23096, México [tel: +52 612 12 303 50, fax: +52 612 12 253 44, e-mail: rrod-rig@ipn.mx].

ICES CM 2006/B:03

Age-specific migration and availability of Pacific sardine (*Sardinops sagax*) off the west coast of the American continent

Nancy C. H. Lo

Historical catch and tagging data were collected in the 1930s and 1940s before the collapse of sardine populations in the mid-1960s off the coast from California to British Columbia, Canada. Pacific sardine reappeared in the catch of California wet fisheries in the mid-1980s.

Ichthyoplankton surveys and trawl surveys have been conducted off California since 1986. Special ichthyoplankton-trawls surveys were conducted in March and July from July 2003 to March 2005 off Oregon and Washington to gain knowledge of the biological characteristics and migration of Pacific sardine in that area.

Data sets collected in the 1930s and 1940s were analyzed to estimate the age-specific migration rates and the availability coefficients for the fishing mortality with sea temperature in 1941–1947. The preliminary results indicated that the migration rates of sardine from Central California to the northwest are positively correlated with warm waters, with fish being more available to the fishery off California during the warm years. The opposite is true for the fish in the Northwestern area. For data collected in 2003–2005, only size-specific migration rates were estimated because age data are not available. It appears that sardines are still migrating, but the estimated rates are different from those from the early period prior to the collapse.

Keywords: Pacific sardine, migration.

Contact author – Nancy Lo: Southwest Fisheries Science Center, 8604 La Jolla Shores Dr., La Jolla, CA 92037, USA [tel: +1 858-546-7123, fax: +1 858-546-5656, e-mail: Nancy.Lo@noaa.gov].

ICES CM 2006/B:04

Expansion and contraction of the spawning ground of Japanese sardine in the last 25 years with resurgence and collapse of the spawning biomass

Yoshiro Watanabe, Yoshioki Oozeki, and Hiroshi Nishida

Spawning biomass of the Pacific stock of Japanese sardine *Sardinops melanostictus* increased from 2.6 million tonnes in 1978 to a peak of 13.4 million tonnes in 1988, but collapsed in the 1990s and decreased to 0.076 million tonnes in 2002. Annual egg production of the stock increased from 450 trillion in 1979 to 9000 trillion in 1986, and declined to 31 trillion in 2002. During the increase and decline of the SSB and egg production, the area of the spawning ground increased from $137 \times 10^3 \text{ km}^2$ in 1978 to $252 \times 10^3 \text{ km}^2$ in 1988

when the SSB was at its peak. Adult sardines spawned in the Pacific coastal waters of southern Japan in the years of small SSB, but expanded offshore for spawning when the SSB became large. The SSB started declining in the early 1990s, but the area of the spawning ground continued to increase to $310 \times 10^3 \text{ km}^2$ in 1993 and 1994 and then drastically reduced to $110 \times 10^3 \text{ km}^2$ in 1997. The delayed reduction of the spawning ground area will be discussed in relation to reproductive ecology of the stock.

Keywords: Japanese sardine, spawning ground, SSB, egg production.

Contact author – Yoshiro Watanabe: Ocean Research Institute, University of Tokyo, 1-15-1 Minamidai, Nakano-ku, Tokyo 164-8639, Japan [tel: +81 3 5351 6497, fax: +81 3 5351 6498, e-mail: ywantanab@ori.u-tokyo.ac.jp].

ICES CM 2006/B:05

Long-scale and seasonal shifts in distribution patterns of small pelagic fish off the Northwest African coast related to environmental factors

Alla Galactionova, A. Sirota, and P. Chernyshkov

Most small pelagic fish species off the Northwest African coast (Central Eastern Atlantic) demonstrate long spatial migrations, depending on the environmental conditions. The main influencing factors are seasonal and interannual variations of the North East Trade Winds, sea surface temperature, coastal upwelling intensity, and oceanographic front positions. Long-scale changes in the stock structures affect the fish distribution pattern as well.

Comparative analyses of the commercial fishery statistics and data of the scientific surveys for 1985–2004 reveal distinctive features in the distribution of chub mackerel (*Scomber japonicus*) and round sardinella (*Sardinella aurita*). Migration patterns, i.e. tracks and spatial boundaries had significantly changed in size and location during that period. Two distribution patterns and two corresponding distinctive periods were observed for each of the two species.

Significant changes in biomass and abundance were observed as well for both fish species. The traits in fish migration changes corresponded to the interannual variability of the environmental conditions in the Central Eastern Atlantic. Results of comparative analyses on the variability of the North East Trade Wind, thermal conditions over the continental shelf of the Northwest Africa, coastal upwelling intensity, oceanographic front location, and fish distribution changes are provided in the report.

Keywords: small pelagic, migration, environmental variability.

Contact author – Alexander Sirota: Atlantic Research Institute of Marine Fisheries and Oceanography, 5, Dm. Donskoy Str., Kaliningrad, 236000, Russia [tel: +7 4012 225 625, fax: +7 4012 219 997, e-mail: sirota@atlant.baltnet.ru; amsirota@rambler.ru].

ICES CM 2006/B:06

Large-scale and meso-scale changes in the migration and distribution of Baltic sprat in 1992–2005 and factors determining such changes

Valeriy N. Feldman, Tatiana G. Vasilieva, and Svetlana M. Kasatkina

The purpose of the research was to assess changes in horizontal migration and distribution of sprat in the Baltic Sea in the 1990s–2000s depending on population abundance, age structure and environmental factors, including the Baltic water warming. On the basis of sufficiently long-term series of disaggregated data of the hydroacoustic surveys carried out by RV “Atlantiro” and “Atlantida” during 1992–2005, the forms of juvenile and adult fish distribution and migration in the spawning and feeding periods were studied within and between ICES Subdivisions in the Baltic Sea both in latitudinal and longitudinal directions. The resulting data series supplemented with the data for 2000–2005 confirm the relationship observed earlier between meso-scale latitudinal migrations and age structure of sprat stock components and depth-specific hydrography. The large-scale changes of sprat distribution and migrations between the southern and the northern areas of the Baltic Sea are related to the climate variations affecting the temperature regime of the Baltic Sea.

Keywords: Baltic sprat, acoustic surveys, abundance, demography, distribution, seasonal migration, hydrography, climate.

Contact author – Valeriy N. Feldman: Atlantic Scientific Research Institute of Marine Fisheries and Oceanography (AtlantNIRO), 5 Dmitry Donskoy st., 236000, Kaliningrad, Russia [tel: +7 4012 952 369, fax: +7 4012 219 997, e-mail: feldman@atlant.baltnet.ru]

ICES CM 2006/B:07

The entrainment hypothesis: an explanation for persistence and innovation in spawning migrations and life cycle spatial patterns

Pierre Petitgas, Dave Reid, Benjamin Planque, Vanessa Moucan, Enrique Nogueira, Brendan O’Hea, and Unai Cotano

Fish stock dynamics is commonly modelled using vital traits only. But here, it is argued that the life cycle spatial pattern is a determinant of population dynamics. Stock recoveries have taken longer than predicted and important changes in the geographical organisation of life cycles have been observed. The paper proposes a conceptual framework in which to envisage population functioning under climate change and change in population demography and substructure. The ‘Entrainment hypothesis’ is formulated to address conservatism and variation in life cycle geographic patterns. The ‘En-

trainment hypothesis’ states that life cycle closure results from spawning migrations and that spawning migrations are sustained by repeat spawners. Repeat spawners would have the knowledge of migration routes and would be those that are responsible for the persistence of the life cycle spatial organisation. They would lead first spawners to maintain the life cycle pattern. The adult / young fish encounter would take place in definable geographic / temporal areas (e.g., feeding grounds), which would allow for the entrainment of the young into the adult spawning migration. The paper further suggests a plan for the falsification of the hypothesis. Required information is listed that would provide consistency, support or demonstration of the hypothesis. Spatial behaviour and learning between generations are seen as central factors in sustaining migration routes and selecting spawning habitats. As a consequence it is suggested to consider in the spatial modelling of habitat selection a stock memory function based on population status. Finally, implications of the hypothesis for spatial management are reviewed.

Keywords: life cycle, behaviour, migration, meta-population.

Contact author – Pierre Petitgas: IFREMER, dept. Ecology and Models for Fisheries, BP 21105, 44311 cedex 3, Nantes, France [tel: +33 240 37 41 63, fax: +33 240 37 40 75, e-mail: pierre.petitgas@ifremer.fr].

ICES CM 2006/B:08

Comparison of large-scale migrations of sardines, herring and anchovy in Pacific and European waters

Jürgen Alheit

Small pelagic fish such as sardine, herring, and anchovy are prone to dramatic changes in abundance. Such population fluctuations are usually accompanied by geographic expansions and contractions and often lead to large-scale migrations over thousands of kilometres. This has been observed *inter alia* for Pacific sardines (genus: *Sardinops*) and the Atlanto-Scandian herring as well as for European anchovies and sardines (genus: *Sardina*). This contribution will describe these migrations and compare them in their ecological context.

Keywords: sardines, anchovies, herring, migrations.

Contact author – Jürgen Alheit: Baltic Sea Research Institute, Seestr. 15, 27607 Warnemünde, Germany [tel: +49 381 519 7208, fax: +49 381 519 7440, e-mail: juergen.alheit@io-warnemuende.de].

ICES CM 2006/B:09

Decadal shifts of spawning grounds of small pelagic fishes off the Pacific coast of Japan

Yoshioki Oozeki, H. Kubota, A. Takasuka, and R. Kimura

Sea surface temperature (SST) and salinity (SSS) in the spawning grounds of small pelagic fishes, Japanese sardine *Sardinops melanostictus*, Japanese anchovy *Engraulis japonicus*, and round herring *Etrumeus teres*, were analyzed based on the long-term egg survey dataset from 1947 to 2002. A total of 116,074 samples were obtained mainly by vertical tows of the long NORPAC net (45-cm mouth diameter and 0.335-mm mesh size) from a depth of 150 m to the surface. Temperature salinity diagrams for spawning grounds showed different characteristics among these species. Sardine spawning grounds were distributed from 10°C to 25°C in SST and the abundant egg distributions were observed mainly at 33.5 ppt to 34.5 ppt in SSS. Temperature and salinity of anchovy ranged from 10°C to over 30°C in SST and from 28 ppt to 34 ppt in SSS, respectively. Temperature ranges of the spawning grounds of round herring were similar to those of anchovy, but the round herring eggs were concentrated only in the narrow range of SSS from 33.5 ppt to 34.5 ppt. Mean SST in the spawning ground of sardine increased gradually from 1974 to 1988 and then decreased from 1994 to 1996 with the disappearance of the spawning ground on and outside the Kuroshio Current. Mean SSS in the spawning ground of anchovy decreased from 1975 to 1985, as their spawning activity increased in the coastal areas. The observed temporal and spatial shifts of the spawning grounds of small pelagic fishes would be determined by population size and decadal climate change.

Keywords: sardine, anchovy, round herring, spawning ground, sea surface temperature, sea surface salinity, decadal shift.

Contact author – Yoshioki Oozeki: National Research Institute of Fisheries Science, Fisheries Research Agency, 2-12-4 Fukuura, Yokohama 236-8648, Japan [tel: +81 45 788 7635, fax: +81 45 788 7636, e-mail: oozeki@affrc.go.jp].

ICES CM 2006/B:10

Numerical domination and herring migrations

Geir Huse, Anders Fernö, and Jens Christian Holst

There is accumulating evidence in favour of the hypothesis that herring migrations are influenced by social learning. The “adopted-migrant hypothesis” postulates that recruit spawning herring learn the migration pattern of the stock by schooling with older individuals. However, this learning can be interrupted if the stock is unstable or if there is a lack of overlap between old and young individuals. The process where abun-

dant cohorts “repel” socially transmitted information from older cohorts, thus inhibiting leadership by experienced individuals, has been coined numerical domination. There have been substantial changes in the location of the overwintering area of Norwegian spring spawning (NSS) herring during the last 50 years. Here we show that these changes co-occur with the recruitment of relatively strong year classes to the spawning stock. We argue that lack of leadership due to numerical domination is a key factor in establishing new migration patterns in NSS herring.

Keywords: herring, migration, schooling, social learning, demography.

Contact author – Geir Huse: Institute of Marine Research, Box 1870 Nordnes, NO-5817 Bergen, Norway [tel: +47 5523 6988, fax: +47 5523 8687, e-mail: geir.huse@imr.no].

ICES CM 2006/B:11

Has fishing pressure caused a major shift in the distribution of South African sardine?

Janet C. Coetzee, Carl D. van der Lingen, Tracey Fairweather, and Laurence Hutchings

A major shift in the distribution of South African sardine (*Sardinops sagax*) has resulted in a significant mismatch in fishing effort versus fish abundance in recent years. The fishery for sardine started on the west coast during the 1940s, and processing capacity there increased rapidly together with large increases in annual landings to the early 1960s, after which the fishery collapsed due to overfishing. Since the inception of conservative management practices in the 1980s the population has steadily increased, and currently supports catches similar to pre-collapse levels. Since 2001, however, the bulk of the sardine population has been situated on the south coast, far away from processing facilities. Fishing effort has increased substantially on the south and east coasts, particularly during the past three years, reflecting the decline in abundance of sardine on the west coast. Three hypotheses explaining the change in distribution of sardine are explored; the first that intensely localized (i.e. west coast) fishing pressure depleted the west coast part (or sub stock) of the population; the second that the shift was environmentally induced following changes in the west coast environment; and the third that successful south coast spawning and recruit survivorship contributed disproportionately more towards the bulk of recruitment, and that progeny spawned in that region now dominate the population and exhibit natal homing. These hypotheses are evaluated, and management implications of the shift are discussed.

Keywords: sardine, distribution, spatial dynamics, fishing effort, environment, management, biological indicators.

Contact author – Janet C. Coetzee: Marine and Coastal Management, Department of Environmental Affairs and Tourism, Private Bag X2, Rogge Bay, 8012, South Africa [tel: +27 21 402 3176, fax: +27 21 421 7406, e-mail: jcoetzee@deat.gov.za].

ICES CM 2006/B:12

Alternation in the spatial distribution of sardine and anchovy in the Humboldt Current: effects of climate or behavioural interactions?

Mariano Gutierrez and Francois Gerlotto

Sardines and anchovies are known to occupy alternately a given space, especially in upwelling areas. In the case of the Humboldt Current and the Peruvian fishery, the two populations display successive phases of dominance and co-occurrence. Two major reasons are given in the literature explaining such a pattern: the role of decadal climatic changes and the behavioural characteristics of schooling fish. The paper analyses the different strategies of the two species, and evaluates the possible effect of one species over the other through competition, coexistence, etc. The spatial distributions of the two species are compared in time and space through the analysis of 20 years of acoustic surveys. The respective effects of fish spatial strategies and climatic conditions are considered. No obvious competition for space is apparent from these results, and the major reason for alternation and dominance of one species over the other is climatic, not behavioural.

Keywords: pelagic fish, spatial distribution, competition, alternation, climatic change.

Contact author – Mariano Gutierrez: IMARPE, Gammarra y General Valle s/n, Chucuito, La Punta, Callao, Peru [tel: +511 429 1858, e-mail: mgutierrez@imarpe.gob.pe].

ICES CM 2006/B:13

Effects of the oxygen minimum zone on the distribution and behaviour of micronektonic acoustic back-scattering layers off Peru

Rodolfo Cornejo, Arnaud Bertrand, and Mariano Gutierrez

The Humboldt Current system is characterized by an intense Oxygen Minimum Zone (OMZ), similar to that in other regions (i.e. Arabian sea, northwest Pacific, Southwestern Africa), but is also considered to be one of the most extreme and shallow of the world's oceans. The intensity and extent of the OMZ increases southward of Equator due to enhanced physical and biological processes such as mixing and remineralisation. In order to describe the ecological implications of OMZ on the spatial and temporal distribution and gregarious behaviour of micronektonic community, we used three simultaneous approaches: (1) pelagic trawls, (2) acoustic measurements, and (3) hydrographic profiles in the upper 500-m layer along longitudinal transects crossing the Humboldt Current region off Peru (05°S–18°S) at 50 to 200 nautical mile intervals from the coast. The samples showed that the OMZ had a dramatic effect on the micronekton biomass and distribution at epi-

mesopelagic depths. In the core of the OMZ region, micronekton catches were dominated by the *Phosichthyid Vinciguerria lucetia*, the Euphausiid *Euphausia mucronata* and Myctophids (mainly *Diogenichthys laternatus* and *Lampanyctus* spp). Acoustics allowed observing that micronekton performed regular diel vertical migrations and formed scattered to thick shoals during the day at the depth of minimum oxygen concentration and shallow layers at night. Proxy of the spatial occupation level of the water mass by the micronekton (e.g. SA+ and index of surface occupation) indicated that *Vinciguerria lucetia*, Myctophids and Euphausiids are important components in the production of intense acoustic back-scattering layers in OMZ. The active schooling behaviour of these species indicates an opportunistic behaviour to optimal conditions of food and an anti-predator window in the OMZ off Peru.

Keywords: acoustic back-scattering layers, Peru, micronekton, oxygen minimum zone, schooling behaviour, diel migration.

Contact author – Rodolfo Cornejo: Departamento de Oceanografía, Universidad de Concepción, Cabina 9, Chile [tel: +56 41 204 239, e-mail: rocornejo@udec.cl].

ICES CM 2006/B:14

Long-term changes in the pattern of the prespawning migration of the western mackerel (*Scomber scombrus*) since 1975, using commercial vessel data

D. G. Reid, A. Eltink, C. J. Kelly, and M. Clark

The changes in the timing of the pre-spawning migration of the western spawning component of the north-east Atlantic mackerel have been dramatic over the last 30 years. While this has been widely recognized the last published information on this was by Walsh & Martin in 1986. An ICES CM paper (Reid *et al.*, 2003) developed this work using further data gathered within the SEFOS project. The current paper adds new data on commercial catches since 1997. The commercial data used was not official catch statistics, but was derived from these and modified based on observer data and personal contacts with vessels. Walsh & Martin showed that the migration became steadily later from 1976 to 1984. Catches in ICES Division VIa peaked in early September in 1976 and in mid-December by 1984.

Contact author – Dave Reid: FRS Marine Laboratory, P.O. Box 101, Victoria Road, Torry, Aberdeen AB11 9DB, Scotland, UK [e-mail: Reiddg@marlab.ac.uk].

ICES CM 2006/B:15 – Poster

Link between migration, the reproductive cycle and condition of *Sardinella aurita* off Mauritania, Northwest Africa

Remment ter Hofstede and Mark Dickey-Collas

Round sardinella (*Sardinella aurita*), an indeterminate spawner, is known to migrate annually up and down the northwestern African coast between 12° and 22°N. Migration starts off Senegal in May, and by August most of the stock is distributed in the northern part of the Mauritanian EEZ. In early wintertime, the species moves rapidly to the south again. This migratory route is assumed to be closely linked to the large seasonal variation in the annual sea surface temperature (SST) cycle, in which a warm-water front enters the Mauritanian zone from the south in May, moving north during the summer and cooling down in wintertime again.

This study uses monthly sampling of *S. aurita* from commercial catches (2000–2003) to show that the migration pattern is not only associated with spawning activity but also with a distinct seasonality in fish condition. Despite finding that some *S. aurita* spawn in the Mauritanian EEZ throughout the entire year, a clear peak in spawning exists during the summer (June–September). This seasonality can be monitored through the increase in gonad weight and fat content of the fish in springtime. Although feeding is maintained during the months after spawning, the physical condition of the fish collapses, and fat content rapidly declines.

Keywords: *Sardinella*, small pelagic fish, spawning, migration, seasonality, Mauritania.

Contact author – Remment ter Hofstede: IMARES – Institute for Marine Resources and Ecosystem Studies, P.O. Box 68, 1970 AB IJmuiden, The Netherlands [tel: +31 255 564 646, fax: +31 255 564 644, e-mail: remment.terhofstede@wur.nl].

ICES CM 2006/B:16 – Poster

Effect of sea surface temperature on migrations of sardinella (*Sardinella aurita*) in West Africa

Pablo Tjoe-awie, E. Ould Mahmoud, and M. Ould Taleb Sidi

Sardinellas off the Northwest African coast perform annual north-south migrations stretching from Senegal to Morocco. The fish pass the waters of Mauritania both during their northward migration and during their return south. Catches in Mauritania depend on the residence time of the fish in Mauritanian waters. This residence time probably depends on the availability of food in the Mauritanian zone. Our hypothesis is that high water temperatures reflect low upwelling and thus low food abundance. We therefore expect a reduced residence time in the Mauritanian zone in years with high water temperatures. This hypothesis is tested by

comparing monthly catches by pelagic trawlers with data on sea surface temperature derived from infra-red satellite images and *in situ* temperature measurements.

Contact author – Pablo Tjoe-awie: IMARES – Nouadhibou, Mauritania [e-mail: pablo.tjoe-awie@wur.nl].

ICES CM 2006/B:17 – Poster

Particularities of the length composition of *Alfonsin Beryx splendens* Lowe, 1833 on seamounts of the northern part of the Atlantic Ocean

Dmitry A. Kozlov

Alfonsin is one of the most important commercial species of deep-sea fishery on the seamounts of the open Northern Atlantic Ocean. Research of the length composition of this species is of current importance. The work is based on the results of 30 scientific expeditions carried out at AtlantNIRO and Zaprybpromrazvedka vessels in the areas of the Corner seamount, Azores complex, Mid-Atlantic Ridge (MAR) and continental slope of Morocco, West Sahara and Northern Mauritania during 1965–2004, and data from AtlantNIRO archives. The research results showed certain differences in the length composition of alfonsin inhabiting various parts of the Northern Atlantic Ocean. All these differences were discussed in compliance with the hypothesis on the migration of this species between the areas considered and their relationship to the oceanologic processes.

Keywords: Alfonsin, length composition, biology, seamounts, northern part of the Atlantic.

Contact author – Dmitry A. Kozlov: Atlantic Research Institute of Marine Fisheries and Oceanography (AtlantNIRO), 5 Dmitry Donskoy st., 236000, Kaliningrad, Russia [tel: +7 4012 225 487, fax: +7 4012 219 997, e-mail: dak@atlant.baltnet.ru].

ICES CM 2006/B:18 – Poster

Origin of *Notoscopelus kroeyeri* in the Northeast Atlantic

Súni Lamhauge, Anatoly Filin, and Ivan Oganin

The lanternfish *Notoscopelus kroeyeri* is widely distributed in the North Atlantic, being one of the most widespread lanternfish species inhabiting the mesopelagic community. The literature contains information on length distributions, feeding habits and some meristic characters from the Northeast (NEA) and the Northwest Atlantic (NWA). The aims were to compare the *N. kroeyeri* from these wide areas on each side of the Mid-Atlantic Ridge (MAR), and to test whether the samples within the NEA area, i.e. from the northern NEA (Norwegian and Faroese waters) and the southern NEA (Hatton Plateau and Porcupine Bank areas) have the same origin. The present study validates that *N. kroeyeri* from the NEA and NWA were different. The *N. kroeyeri* from the NEA have fewer gill-rakers (mean = 26.6) than those from the MAR (mean =

27.6) and NWA (mean= 28.5). It is concluded that the *N. kroeyerii* in Faroese and Norwegian waters are of the same origin as those from the Porcupine Bank and Hatton Plateau.

Contact author – Súi Lamhauge: Faroese Fishery laboratory, Nóatún 1, Tórshavn, Faroe Islands [tel: +298 353 948, fax: +298 353 901, e-mail: sl@frs.fo].