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Concurrent sampling: a view from the experience of the Spanish sampling programme

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JUSTIFICATION

IEO has been asked by RCM NA to provide an evaluation of the concurrent sampling carried out from 2009 following EU Data Collection Framework. Given that IEO has always applied the concurrent sampling on board (as part of the Discards Sampling Programme), the present document refers exclusively to the on-shore sampling. It has to be noted that some of these considerations were already presented to the Workshop on Implementation Studies on Concurrent Length Sampling (WKISCON2) as requested by ICES. So some figures are taken from the work developed there, based on the 2008-2014 data series provided by IEO. Considerations on quality issues (not addressed by WKISCON2) are presented as part of a case study focused on the Northern Spanish coastal small-scale gillnets fleet.

LENGTH DATA FOR MORE SPECIES

The number of species has increased significantly since the implementation of concurrent sampling in the Spanish on-shore sampling program (Figure 1). This is allowing IEO to provide biometric data to a larger number of ICES assessment working groups. In addition to the traditional target species of the Spanish fleet, assessed by WGBIE (formerly WGHMM), WGCSE, WGHANSA and WGWIDE, IEO has extended the provision of length data to other WGs as WGDEEP, WGNEW, WGCEPH or WGEF.

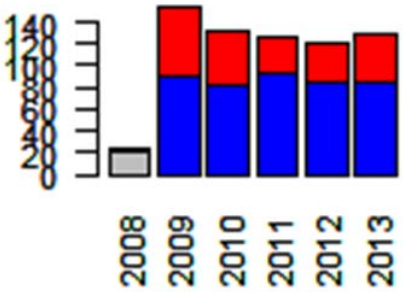

Figure 1. Number of species sampled onshore. Red bars indicate the proportion of rare species – arbitrary criteria of no more than 500 individuals measured or occurrence in less than 6 trips— (from WKISCON2 analysis)

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IMPROVEMENTS IN THE COLLECTION OF LANDING DATA

These improvements can be divided into two points:

- Taxonomic identification of landings.
The IEO sampling program started to focus on more speciessince the concurrent sampling was implemented. As a result, it was proved some species were not properly identified by fishermen/auctions, affecting the quality of fishery statistics. These problems are generally due to difficulties in the taxonomic identification, the low catches or similar sale prices. In some cases, IEO sampling team works with the local auction staff in order to improve the taxonomic identification level. Some common examples of these species are Diplodus spp. (*D. cervinus, D. puntazzo, D. sargus, D. vulgaris*), Scorpaena spp. (*S. scrofa, S. porcus, S. Notata*), Trisopterus (*T. luscus, T. minutus*), Beryx spp. (*B. decadactylus, B. splendens*), Trachurus spp. (*T. mediterraneus, T. picturatus, T. trachurus*), Triglidae (*Aspitrigla cuculus, Chelidonichthys lucerna, Chelidonichthys obscurus, Eutrigla gurnardus, Trygla lyra*), distinctions between *Todaropsis eblanae* and *Illex coindetti* or the register of species usually low reported as *Eledone cirrosa*.

- Quality of catch composition.
Concurrent sampling provides samplers the opportunity to work closer to the catches of all species and obliges them to spend more time with boxes in the auction. Both things allow a better evaluation of the landings, meaning an increase in the quality of the catch composition registered by the samplers.

Improvements in the collection of landing data (taxonomic identification of landings and quality of catch composition) increase IEO capability to supply commercial catch data. For 2015 ICES working groups IEO provided information on these species: *Aphanopus carbo, Argentina silus, Beryx spp, Brosme brosme, Centrophorus squamosus, Centroscymnus coelolepis, Coryphaenoides rupestris, Dicentrarchus labrax, Eledone cirrhosa, Eledone moschata, Eledone spp, Engraulis encrasicolus, Eutrigla gurnardus, Galeorhinus galeus, Hoplostethus atlanticus, Illex coindetii, Illex spp, Lepidorhombus boscii, Lepidorhombus spp, Lepidorhombus whiffiagonis, Loligo forbesi, Loligo spp, Loligo vulgaris, Lophius budegassa, Lophius piscatorius, Lophius spp, Macrourus berglax, Melanogrammus aeglefinus, Merlangius merlangus, Merluccius merluccius, Molva dypterygia, Molva molva, Mustelus asterias, Nephrops norvegicus, Octopus vulgaris, Ommastrephidae, Pagellus bogaraveo, Phycis blennoides, Pleuronectes platessa, Pollachius pollachius, Raja batis, Raja brachyura, Raja circularis, Raja clavata, Raja fullonica, Raja montagui, Raja naevus, Raja undulata, Sardina pilchardus, Scyliorhinus canicula, Sepia elegans, Sepia officinalis, Sepia orbignyana, Sepia spp, Solea solea, Todarodes sagittatus, Todaropsis eblanae, Todaropsis spp, Trachurus spp* and *Trachurus trachurus*.

QUALITATIVE ANALYSIS

1. TRIPS SAMPLED

Results of the analysis done comparing data from 2008 to 2014 (Figure 2) show a decrease (around 25%) of the total number of trips sampled onshore by IEO. That could be a relevant issue as the number of trips (primary sampling unit) sampled are seen as one of the

recommended quality indicators by experts groups and workshops dealing with quality indicators (as WKPICS series).

Nevertheless, the IEO reduction of trips sampled onshore from 2008 is related to an overall redesign of the market sampling that took place between 2009-2010. This was due primarily to: a) evidences showing some fisheries (mostly purse seiners) were oversampled; b) in 2009 the sampling of the bottom trawlers in the south area of Division IXa changed from market sampling to on-board sampling. Thus, this reduction cannot be attributed to an unwanted effect of the adoption of concurrent sampling. Current number (more or less stable during last years) has proven to be better adjusted to end-users needs, mainly ICES requirements, without major problems reported.

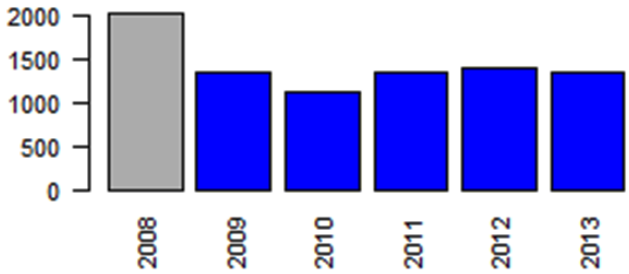

Figure 2. Number of trips sampled onshore (from WKISCON2 analysis)

2. ESTIMATION OF PRECISION

The precision indices (CV) in the Spanish sampled data have proved the difficulties to reach the DCF precision levels in length data for most of species before and after the implementation of concurrent sampling. Discussions in previous years (PGCCDBS, RCMs, WKPICS series) show a general objection to make it mandatory to achieve those targets. Nevertheless, the use of CVs as indicators of precision are still recommended by EG's to allow the data quality assessments prior to be used, e.g. in ICES assessments working groups.

Results of an analysis of CVs in the northern Spanish coastal small scale gillnet fleet has shown a slightly improvement in the precision achieved for hake between 2008 and 2014. Other species with significant biometric data in this fishery (as striped red mullet, Atlantic horse mackerel, Atlantic mackerel, axillary seabrem or pouting) cannot be compared because hake was the only species sampled before concurrent implementation. However, these species present similar or better CVs than the CV observed in the hake data. Analysis of the delta values with the COST tool (Figure 3) show also a quality improvement in the concurrent scenario compared to 2008. These analyses have to be further developed for more cases studies.

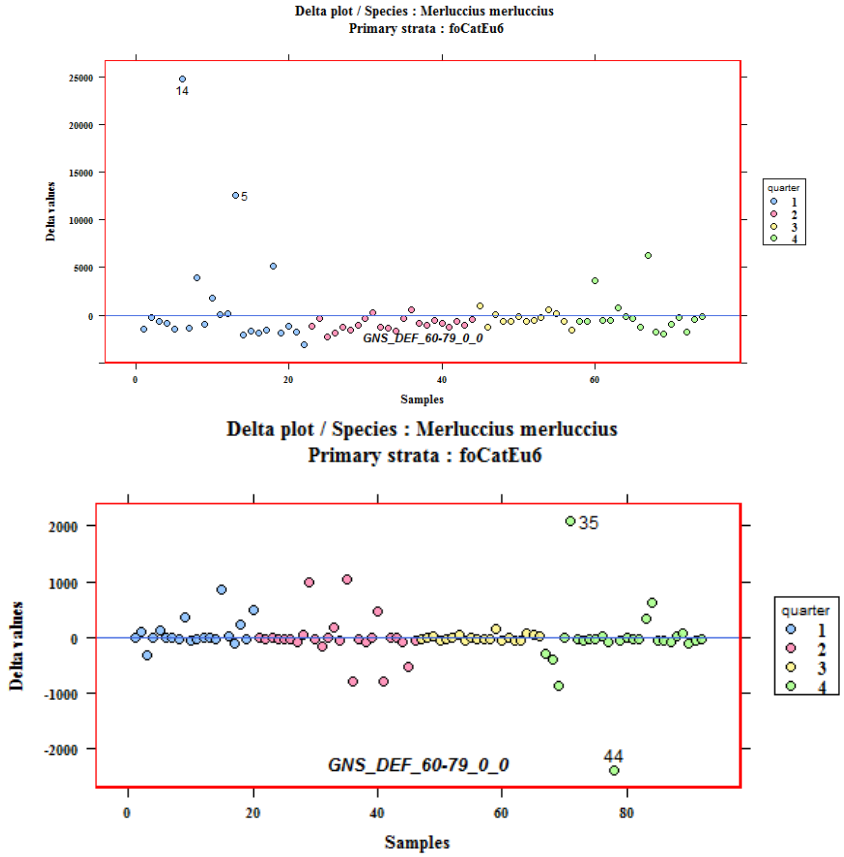

Figure 3. Delta plot (COST package) for hake length data in 2008 (above) and 2014 (below) for small scale gillnets in the Northern Spanish coast. Note different axis scale.

IMPLEMENTATION DIFFICULTIES

IEO adopted the concurrent sampling following EU Data Collection Framework that made it mandatory in 2009. IEO has experienced different problems concerning the implementation of this sampling strategy:

- Number of samplers for bottom otter trawlers and bottom pair trawlers.
The previous Spanish sampling protocol considered one sampler by sampling operation. Since the concurrent sampling implementation, it was necessary to organize sampling teams of two or three people to cover mixed-species trawl metiers (bottom otter trawlers and bottom pair trawlers) due to the amount of species and the short time available.

- Increase of sampling time.
The increase of species entails an increase of the sampling time depending on the fishing activity. While concurrent sampling of purse seines or fishing pots does not show significant differences compare to the old stock-based approach, the sampling time increase in other métiers as trawlers and gillnetters.

Landing, auctioning and removal of fish can be performed very quickly, so the implementation of concurrent sampling obliged to adapt the sampling methodology, mainly the use of digital voice recorders.

- Physical access to some species.
Before the implementation of concurrent strategy, sampling at the market already entailed some difficulties related with the access to the fish. These problems increased with concurrent sampling. Problems specially arose concerning some species of greater commercial value. These species are perfectly laid out on trays and even covered with plastic sheets. The aim is to make catches' presentation more attractive to improve their economic value. Sampling these species once they have been arranged is seen as an interference in fishermen's/auction's work. This problem persists in some cases although fishermen are getting used to the sampling.

- Storage and management of the fisheries data base.
The original data base had been designed for a number of target species. The shift to concurrent sampling demanded the adaptation of the data base to receive and manage new information (masters data register, updates, etc).

- Data entry.
Time employed to upload sampling data into the data bases increased considerably as well as the time needed to check the sampling data.

COMPARISON VERSUS A LIST OF STOCKS OF INTEREST

Important characteristic of concurrent sampling is the homogeneity in the data collection through all fishing activities and species, thus allowing current and future undetermined uses of the information apart from those highlighted. These benefits could not be completely obtained from alternative proposed systems as the use of a broader list of stocks of interest to replace the old stock-based approach. Main reasons are:

- Difficulty to define a group of current species of interest. Presently all end-users can beneficiate from concurrent data while defining a group of species could only be done through "current" and "identified" end-users.
- Difficulty to anticipate the evolution of that group of species: entrances and exits from the selected group of species can only be done *a posteriori* (one or several years later)
- Difficulties to obtain a consistent historic data series. Once the need is detected, the sampling programme has to be updated to compile the information, meaning both some time period is needed to start the sampling (thus not registering the information) and previous time series is not available.

This doesn't avoid that concurrent sampling faces some difficulties which make necessary work on future improvements. Prioritization of species by fishing activity (prioritize the most abundant species in each activity) could ensure the collection of statistically robust information for key species –as required for assessment– without compromising other benefits and uses of concurrent data.

FINAL CONSIDERATIONS

From the scientific point of view, concurrent sampling has facilitated the leap from the single-stock approach towards a more species-global and ecosystem approach, while it provides an important source of information to manage poor-data stocks.

An important criticism has been the lack of coordination of its implementation between countries. This can be amended betting on a real regionalization of the European sampling programs. The regional standardization of a list of secondary species (to prioritize species, not to restrict them) would allow saving the economic cost done in last years.

Besides not affecting the quality of the information collected, the concurrent sampling approach allows extending the provision of scientific fishery data to ICES for more stocks, thus making this approach a reasonable strategy of sampling at present as part of statistically sound sampling schemes being developed.