

Spatial and temporal variability of *Sardinella aurita* and *Sardinella maderensis* in Senegalese waters: effect of non-climatic variables

Ousmane DIANKHA^{1,5,*}, Patrice BREHMER^{2,4}, Bamol Ali Sow³, Modou THIAW⁴,
Massal FALL⁴ and Amadou Thierno GAYE⁵

¹Ministère de l'Environnement et du Développement Durable (MEDD), Direction des Aires Marines Communautaires Protégées (DAMCP), Dakar, Senegal

²Institut de Recherche pour le Développement (IRD), UMR 195 Lemar, BP 1386 Dakar, Senegal

³Université Assane Seck de Ziguinchor (UASZ), Laboratoire d'Océanographie, des Sciences de l'Environnement et du Climat (LOSEC), Département de Physique UFR Sciences & Technologies - BP 523, Ziguinchor, Sénégal

⁴Institut Sénégalais de Recherches Agricoles (ISRA)/Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT), Pôle de Recherche de Hann, BP 2241, Dakar, Sénégal

⁵Université Cheick Anta Diop (UCAD), Ecole Supérieure de Polytechnique (ESP), Laboratoire de Physique de l'Atmosphère et de l'Océan Siméon Fongang (LPAO-SF), BP 5085, Dakar Fann, Senegal

*Correspondance: Tél: (+221) 77 447 57 51; Courriel: ousmane.diankha25@gmail.com (O. DIANKHA)

Reçu le 26/10/2015; publié le 15/05/2016

AWA © MS WP2_S2_39

Abstract

Firstly, this work describes how two economically important small pelagic species, *Sardinella aurita* and *Sardinella maderensis* fisheries are distributed along Senegalese coast over ten years (2004-2013). Secondly, it reports the influence of non-climatic variables on this spatial and temporal repartition of abundance of these species. Two spatial areas were defined, the northern and southern zones. The generalized additive models (GAM) were applied to quantify the effect of non-climatic variables on abundance and distribution of both *Sardinella aurita* and *Sardinella maderensis*. Cubic spline smoothers and Poisson distribution were used to build up the models. Since reliability of local fishery abundance is supposed to be proportional to fishing (sampling) effort, two models were built: the standard unweighted model (where fishing effort is not taking into account) and the weighted model (incorporating fishing effort). The variables included in the models were: year, month, season, zone and fishing gear. It appears that biomass, fishing effort and abundance of both species are unevenly distributed in Senegalese waters. For *Sardinella aurita*, the factor gear, in both unweighted and weighted models is the most important with respectively 47.4% and 54.1% of the total deviance. In the unweighted model the variable month comes in second (5.06%), while it is the variable zone with 4.75% in the weighted model. The factor year is supporting 4.99% in the unweighted model and 4.61% in the weighted model. However, the effect of temporal factor season on *Sardinella aurita* is relatively negligible. Regarding *Sardinella maderensis*, the factor zone is the most important with 13.90%. It come the variables gear, year month and season with respectively (6.35%, 3.21%, 1.55% and 0.5%). In the weighted model, gear is responsible for 13.20% of the deviance, while zone explains 4.65%.



Commission Sous-Régionale des Pêches
Sub-Regional Fisheries Commission



International Conference ICAWA 2015

Extended book of Abstract

THE AWA PROJECT
Ecosystem Approach
to the management
of fisheries and the
marine environment
in West African waters

Cap-Vert

Mauritanie

Sénégal

Gambie

Guinée Bissau

Guinée

Sierra Leone

ISBN: 978-2-9553602-0-2



Bundesministerium
für Bildung
und Forschung



Institut de recherche
pour le développement



Trilateral German-French-African research initiative



Edited by:

Patrice BREHMER (IRD, France; Dakar), Babacar BA (CSRP, Sub-Region; Banjul) & Gerd KRAUS (TI, Germany; Hamburg).

Technical support: Marie Madeleine GOMEZ (CSRP), Ndague DIOGOUL (IRD).

With the collaboration of:

Peter BRANDT, Bamol Ali SOW, Alban LAZAR, Xavier CAPET, Heino FOCK, Eric MACHU, Hamet Diaw DIADIHO, Didier JOUFFRE, Ibrahima DIALLO, Joern SCHMIDT, Werner EKAU, Amadou GAYE, Mahfoudhould TALEB SIDI, Modou THIAW, Cl Abdoulaye DIOP, Adama MBAYE, Dienaba Beye TRAORE, Moussa SALL, Mariline DIARA, Assane FALL, Ibrahima LY, Ivanice MONTEIRO, Vamara KONE, Aboubacar TOGUYENI, Marie BONNIN, Abdelmalek FARAJ.

ISBN: 978-2-9553602-0-2

Sub Regional Fisheries Commission / Commission Sous Régionale des Pêches ©2016

Cover design: AWA (BMBF – IRD) project

Logo and flyers: Laurent CORSINI (IRD)

Translation: Amadou NDIONE (independent)

Sponsors ICAWA 2015: