Using the ratio of juvenile sardine : anchovy estimated by the June 2021 recruit survey to predict the 2021 small sardine bycatch with anchovy

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A check performed on the method used by de Moor (2020a) to suggest how much small (<14cm) sardine bycatch could be realistically expected with the anchovy catch during 2020 shows the prediction method was rather accurate using the ratio of sardine : anchovy measured in numbers (although the prediction was based on an anchovy TAC that was not realised). This same method is used to suggest how much small sardine bycatch could be realistically expected with the anchovy catch during 2021.

Keywords: anchovy catch, sardine : anchovy ratio, sardine bycatch

Introduction

de Moor (2020a) estimated a linear relationship between the log of the ratio of small sardine : anchovy in the survey and the log of the ratio of small sardine to anchovy estimated by the assessment model at the time of the survey (de Moor 2020b), based on the method of de Moor and Butterworth (2020). The slope of this relationship was 0.73 when the survey ratio was based on recruit biomass and 1.04 when the survey ratio was based on recruit numbers (Figure 1).

de Moor (2020a) used the June 2020 survey ratio of small sardine : anchovy to predict a 'true' ratio of small sardine: anchovy at the time of the survey of 0.022 (in number) or 0.011 (in biomass). Assuming the bycatch ratio remains constant throughout the year (although it typically decreases during the year), de Moor (2020a) predicted one could thus expect that the sardine bycatch associated with an anchovy catch of 350 000t would be 7591t (based on the ratio in numbers) or 3881t (based on the ratio in biomass). de Moor (2020a) also noted that such a prediction ignores the variability about the relationships (as seen, for example, in Figure 1).

Update in 2021

Assuming once again that the bycatch ratio remains constant throughout the year and using the final 2020 anchovy catch of 282820t, this relationship would predict the associated small sardine bycatch in 2020 to be 6134t (ratio in numbers) or 3136t (ratio in biomass). The realised small sardine bycatch with anchovy in 2020 was 6364t.

In the absence of an updated anchovy assessment, this relationship cannot be updated. However, the June 2021 survey ratio of small sardine : anchovy of 0.014 (in number) or 0.023 (in biomass) can once again be used to predict the 'true' ratio of 0.016 (in number) or 0.006 (in biomass). If this ratio remains constant throughout the year, one might thus expect that a 2021 anchovy catch of 300 000t would result in a small sardine bycatch of 4897t (ratio in numbers) or 1657t (ratio in biomass). Similarly, one might thus expect that a 2021 anchovy catch of 350 000t would result in a small sardine bycatch of 5713t (ratio in numbers) or 1934t (ratio in biomass).

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Once again, readers are reminded that such predictions are relatively simplistic, ignoring within-season drop-off in the bycatch ratio, and ignore variability.

References

de Moor CL. 2020a. Using the ratio of juvenile sardine: anchovy estimated by the June 2020 recruit survey to predict the 2020 sardine bycatch. DFFE: Branch Fisheries Document FISHERIES/2020/JUL/SWG-PEL/62.

de Moor CL. 2020b. The South African anchovy assessment with annual maturity ogives. DFFE: Branch Fisheries Document: FISHERIES/2020/JUL/SWG-PEL/51.

de Moor CL and Butterworth DS. 2020. Does the ratio of juvenile sardine : anchovy observed in the fishery and the recruit surveys correlate with that predicted by models? DFFE Branch Fisheries Document FISHERIES/2020/JUN/SWG-PEL/49.

Figure 1a. The ratio of sardine to anchovy recruit **numbers** as estimated by the May/June recruit survey plotted against the ratio of model predicted sardine to anchovy recruit numbers at the time of the survey from 1987-2019 (de Moor 2020b). In the middle plot the ratios are plotted in log space. The regression lines plotted are forced through the origin. The right plot shows residuals resulting from the fit in log space.
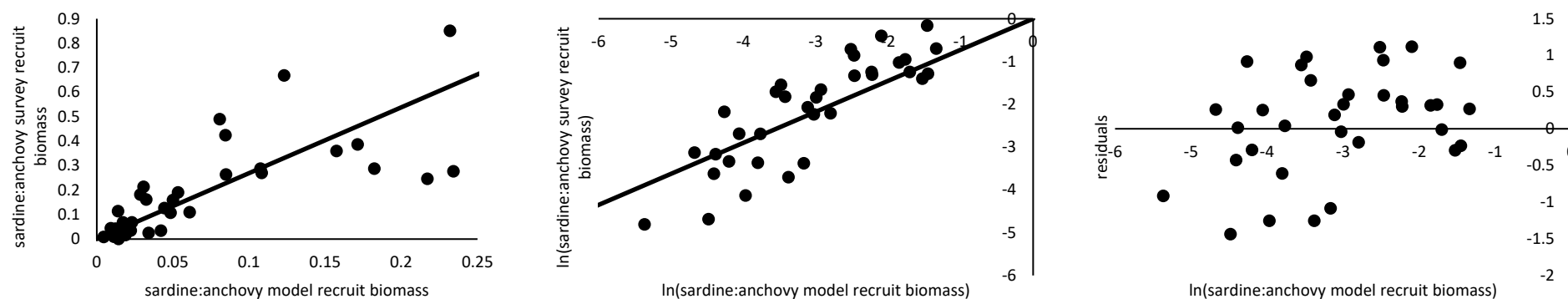

Figure 1b. The ratio of sardine to anchovy recruit **biomass** as estimated by the May/June recruit survey plotted against the ratio of model predicted sardine to anchovy recruit biomass at the time of the survey from 1987-2019 (de Moor 2020b). In the middle plot the ratios are plotted in log space. The regression lines plotted are forced through the origin. The right plot shows residuals resulting from the fit in log space.