

BLACK SEA4FISH

BlackSea4Fish project

Online Presentation Series 3

MULTISPECIES MODELING OF BLACK SEA RESOURCES USING MASS-BALANCE
MODELS

(ECOPATH WITH ECOSIM, EWE)

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Questions and answers

1. Madalina Galatchi: National Institute for Marine Research and Development “Grigore Antipa”, Romania

How different are predictions from field observations? For example, how does the future prediction for 2015-2020 compare with what actually happened?

Ekin: I did not do it in systematic manner, but especially by following the catch statistics and some other available information, I see that some species, for instance horse mackerel, the prediction was that more than 90% percent decrease in biomass which means almost extinctions. That is not the case. For some species, this simulation overestimated the situation, like in horse mackerel. But the overall picture is true, it fits well with the observations, decrease of fish stocks by 30-40% is occurring in Black Sea. For example anchovy MSY is predicted 270K tonnes but if you check its catch, it is not possible to reach this value. Because the biomass of the stock is currently low.

2. Madalina Galatchi: National Institute for Marine Research and Development “Grigore Antipa”, Romania

Regarding the primary production, you showed that you linked it with the increase of the fish stock, but did you think it was linked the higher level of temperature? Because we know that when temperature is high, primary production is high also.

Ekin: Of course biogeochemical model links it to temperature too. But we cannot say it is always the case, that's to say when the temperature is high primary production is also high, because it can go the other way around as well. For example, when the temperature is high and there is also strong stratification in the water column, this could also reduce nutrient enrichment. I think it is a much more complex mechanism. I say it here when there are spikes in net primary productivity (2007-2012) which was introduced to the trophic model in EwE, I also observed this kind of oscillations (NPP) in planktivorous fish in line with the NPP. That is why I said if there is no NPP considered it can lead to a very grim situation. Because if the NPP is higher than average, and a certain level of exploitation is ongoing on some fish species, it may seem ok. But, if the NPP drops next year, but same fishing mortality is realized, stock may collapse; hence, resource availability and fishing mortality should be considered together.

3. Igor Celic, National Institute of Oceanography and Applied Geophysics, Italy

Commented in the chat area : When the temperature high also the respiration is higher.

We are comparing biogeochemical model outputs and considering the increase in temperature for future climate scenarios. And I actually noticed yes, primary production increases but the respiration of the whole system increases too, especially for the planktonic food web.

4. Jeroen Steenbek, Ecopath International Initiative, Spain

Commented in the chat area: EwE does not include temperature by default in the model.

Ekin: In this coupled model set up, primary production simulated by the biogeochemical model is introduced as a time series forcing function for the lower trophic level; that's to say phytoplankton and also their nutrient uptake. As Igor said respiration increases, but as Jeroen says this increasing respiration is not implemented in EwE. So, it is not possible to see this increasing respiration of the groups in the system.

5. Betulla Morello, FAO-GFCM, Italy

I just have a comment rather than question. Stock assessments under the hat of the GFCM only started some 7 years or so ago, and since 2018, STECF no longer performs Black Sea assessments. . Due to Covid-19 we had to skip assessments in 2020, but they will be updated soon and it would be good to make the comparison between single-species assessments and an updated version of Ekin's EwE.. It will be really interesting to introduce multispecies model to the GFCM working group, especially because scientists in the region have stressed the need for this approach.

6. Nazli Demirel: BlackSea4Fish Project

I would like to add some words. We also made stock assessment studies using the data limited model CMSY for Black Sea stocks. And when I was working on this paper Fmsy values were way lower than STECF estimates. Ekin found a similar result when comparing EwE and single species assessments. I checked the values and theirs were lower and this was validation for me for the CMSY outputs.

As seen, there is a huge knowledge behind this model, biogeochemical cycles, species biology, zooplankton, primary production, trophic relation between species. So, within the current knowledge what do you think we need more of to increase the precision of these modeling studies?

Ekin: What I need to underline is systematic samplings, systematic samplings, and systematic samplings. Because, we rely on this while building models. Systematic, high frequency in time and high frequency in space. In all parts of the food web in the field, this is very important. This modeling is an abstraction including a whole realm of different data. When the uncertainty of this data is low, then our models are more reliable and have better skill. This applies at all levels.

Also the other important thing is having reliable catch statistics data. The collection of catch statistics data is at the mercy of fishers and we do not have any landing point obligation, so we do not know if what fishers declare is correct or not. This collection of catch statistics should be carried out by independent officials. If we can improve the catch statistics, our multispecies modeling and the management advice produced will be much more reliable.

7. Nazli Demirel: BlackSea4Fish Project

Thank you Ekin. I know GFCM put valuable effort to collect Vessel Monitoring System, and they are already publishing it in the web page. I think rather than landing this will be important.