Project Update: March 2018

Temperate reefs fishes from western Patagonian are long living animals, with low energy budgets and high site fidelity. They present complex reproduction strategies and low reproduction potential. This and other features of their life strategies make them particularly vulnerable to local impacts. Trawl fisheries impact the environment by removing target animals, producing discards and scraping the sea bottom: factors that can alter the availability of different prey. We studied the trophodynamics of two reef fishes of Western Patagonia: The Argentine sandperch *Pseudopercis semifasciata* and the Argentine sea bass *Acanthistius patachonicus*. Previous studies suggested that the sea bass feeds more on soft bottom prey and less on water column prey than the sandperch. Also, a broader diet and foraging range was descripted for the sandperch. Diet features were compared between trawled and non-trawled areas using stable isotope analysis of C and N along an overlapping size range.

In March 2017 we participated on the National Sandperch Fishing Festival, which takes place at Bahia Camarones, a non-trawled area in northern Patagonia, Argentina. During the festival, we assisted a co-worker who has been monitoring the festival's capture for more than 15 years, constructing an indirect estimate of the conservation status of the reef. The estimation comprises species identification and size measurements, related to the number of fishermen and the amount of fishing hours. From the event, we extracted dorsal muscle samples and labeled each one with the species and size. Around 200 samples were obtained. Meanwhile, during February and March, onboard observers collected around 130 samples of reef fishes captured as by-catch in a coastal trawl fishery. The fishery operates approximately 100 km north from Bahía Camarones. Muscle tissue was extracted, labeled with the species identity and the size of the individual. Back at the laboratory samples were dried, converted into fine powder and sent for isotope determination to the University of New Mexico, Albuquerque.

At trawled areas, isotopic niches were wider (Area sandperch: 0.34; Area sea bass: 0.64) and more overlapped with each other (0.1) than at non-trawled areas (Area sandperch: 0.32, sea bass: 0.11; Niche Overlap: 0.04). Trends along body sizes resulted non-significant for the sea bass ($p>0.05$). The sandperch showed significant trends of $\delta^{13}C$ values vs size only at trawled areas ($p= 0.004$), while trends of $\delta^{15}N$ values vs size were significant only at non-trawled areas ($p= 0.005$).

The seabass increases its trophic diversity at trawled areas which could be a consequence of changes on the availability of soft bottom prey by the scrapping and/or the usage of discards. Regarding the sandperch, it is expected to increase the trophic level with the development of its size. This was met at non-trawled areas, while at the opponent site, diets were relatively constant through sizes. Carbon trends could also be reflecting the availability of more benthic preys on impacted environments enhanced by the development of foraging behaviour. Finally, non-trawled area appears to have a better scenery for diet specialisation, whist trawled area seems to be offering a more "similar menu".

This is one of a few cases where the theory of trawling impacts on diet features is actually met and the differences on trophodynamics between species sets a good case to capture its complexity.

On another hand, an increasing abundance of the squat lobster *Munida gregaria* and its growing importance on the fish's diet was reported for the area. This could be an attenuating factor of diet differences between sites for both species, as a highly and equally abundant and available prey at both areas.

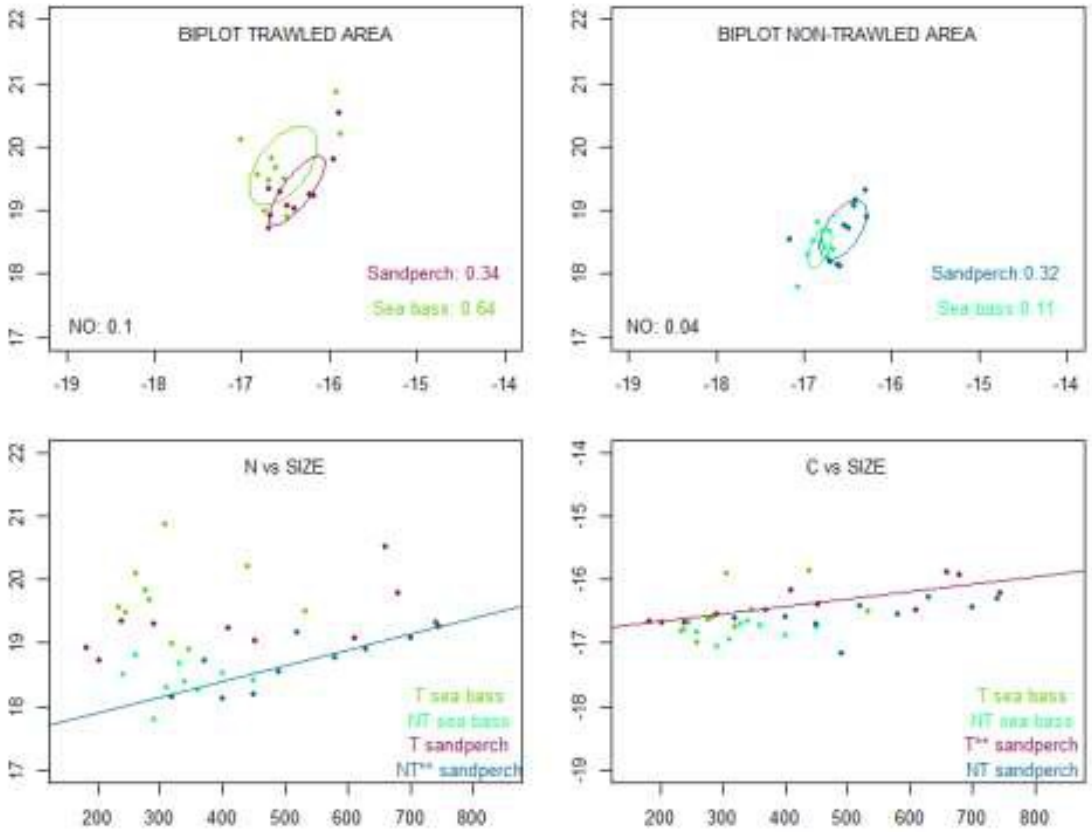

*Figure 1: Above= biplots (values of $\delta^{15}N$ vs $\delta^{13}C$ expressed in ‰) from trawled and non-trawled areas. Each species present the area of the ellipse, and each biplot the value of the % overlap between ellipses (NO). Below= trend of $\delta^{15}N$ (left) and $\delta^{13}C$ (right) vs the sizes of the animals expressed in millimeters. Each one has both species from trawled (T) and non-trawled (NT) environments. Significant trends are represented by the linear regression and designated with **.*

Sample collection was repeated in 2018 and samples are being processed. We also sampled a second non-trawled area (Caleta Sara) which will be also included in the analysis, but it was only possible for 1 year because in 2018 the fishing journey was prevented by weather conditions. The rocky fish *Sebastes oculatus* was excluded from the general analysis because it did not appear as bycatch at the trawled area.

However, general lineal models will be applied using all available information to identify the main factors that shape the patron of variability on reef fish trophodynamics (species, site, year or type of fishing impacts). The no-take zone was also excluded from the analysis because no fish was caught during two fishing campaigns.

On the National Sandperch Fishing Festival 2018 two big banners of the biology of the reef fishes were displayed at the main stage of the event. Banners focused on communicating basal information of the species, aiming to transmit the vulnerability of the species, and to bring over their life story to the people. One was about the sandperch, with curiosities and information about our current studies, and the other one focused on differentiating the sea bass and the rocky fish, which are commonly confused by locals. This gave the opportunity to talk with locals, sport fishers and authorities. A formal talk at the local school was concerted for the first semester of 2018.


¿QUÉ ES CLIMA?
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INIDEP

Fishing impacts on the feeding habits of temperate reef-fishes

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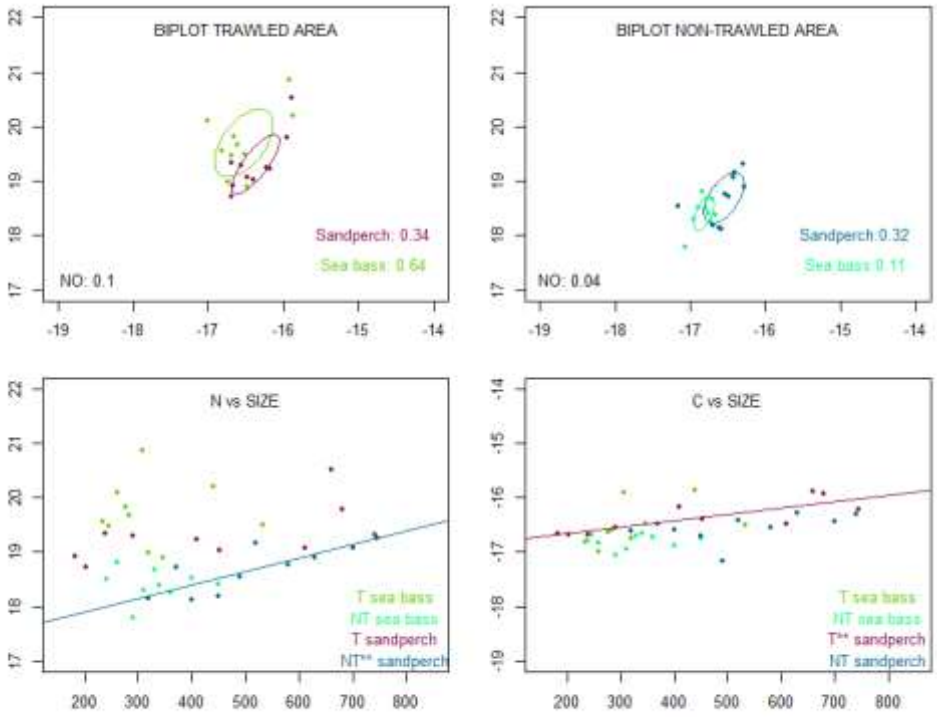

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