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**SC-09-30**

# Genetic analysis to inform the stock structure of Patagonian toothfish (*Dissostichus eleginoides*) (SER2022-TOP1 Final Report)

The SIOFA Secretariat

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**Abstract**

This paper presents the final report of SIOFA project SER2022-TOP1 'Genetic analysis to inform the stock structure of Patagonian toothfish (*Dissostichus eleginoides*)', which was completed in 2023.
This report was reviewed by the project manager, the project coordinator, and the project Advisory Panel, and then published on the corresponding project page on the SIOFA website (https://siofa.org/science/sc-works/SER2022-TOP1) in September 2023.



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**Recommendations**

The report authors recommended that the SC9 **considers** the following proposals:

- **Proposed sampling strategy**
  To the degree possible, onboard observer sampling should target spawning individuals (maturity stage 4; Table 1) in the three fishing zones (SIR, DCR, and Williams Ridge and target from November to March in flat areas (<0.2 radians) of >800m and <2000 m depth (see section 6.1), and collecting a minimum of 30 samples per site up to 100 samples per site (see section 6.2.2). We note that while sampling of spawning individuals is preferable, the habitat, area, and the time period of sampling are most important as these samples will likely be sufficient to discriminate between populations.
  We note that there may be a trade off between the number of samples that should be taken and the restrictions on the times, depths, and maturity stages over which samples are taken, and what is feasible for the commercial vessel. Therefore, we recommend attempting to source additional samples from alternate sources. Flag states should be approached to request well-preserved samples (see section 6.2.2 for description of the acceptable state of a sample) collected in previous campaigns. The details of the appropriate contacts should be provided by the SIOFA SC to the TOP2 consultants to facilitate this request. Armaments in Reunion Island should be approached to request access to sample fish that have been caught in the three target areas.
- **Proposed sampling protocol**
  We recommend that trip data (vessel, registration number, date, latitude and longitude of catch) and biometric data (weight, length, maturity, sex) be collected along with two fin clips, following the protocol defined in section 8.1. We stress the importance of sterilizing the sampling tools between each fish sampled to avoid contamination between individuals.
- **Proposed genetic analyses**
  We recommend that a dataset composed of Single Nucleotide Polymorphisms (SNPs) loci should be generated for *Dissostichus eleginoides* in the southwest Indian Ocean (see section 6.2). We recommend analyzing the samples using a "reduced representation approach" such as RADseq or GBS, described above, for SNP discovery in individuals of *D. eleginoides*.
  To analyze the minimum recommended number of samples, i.e. 30 per site, the current budget allocated by SIOFA to the SER2022 TOP2 project, i.e. 34 000 € is about 2 400 € too low (Table 11). We will continue to search for lower-cost alternatives for the sample processing, but we also request that additional funds be allocated to allow for this minimum recommended sample processing. If no further funding can be allocated, CD Genomics will allow us to send less than 90 samples and will charge us a price-per-sample of 97.34 €. Therefore, the number of samples that can be processed at budget would be about 65, or 20-22 samples per each of the three sites.
  Chris Darby (CEFAS), project leader on a recent study to analyze the population structure of Patagonian toothfish throughout the Southern Ocean, should be contacted to determine whether it would be possible to include our samples in their analyses, thereby vastly reducing costs.


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## Literature and data review, Sampling strategy proposal, Feasibility study, and Sampling, laboratory, and shipping protocols

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5 JUNE 2023

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