ATLANTIC BLUEFIN TUNA DATA BASE FOR AGE AND STOCK IDENTIFICATION

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SUMMARY

The GBYP has been effective in stimulating research on Bluefin tuna age determination and stock identification. The data resulting from this research is vital to the assessment of the species but is currently distributed across multiple laboratories. Centralizing this information is essential to safeguard it against loss and make it easily accessible for analysis. To that end, a format for a database is proposed.

RÉSUMÉ

Le GBYP a été efficace pour stimuler la recherche portant sur la détermination de l'âge et l'identification des stocks de thon rouge. Les données résultant de cette recherche sont essentielles à l'évaluation des espèces, mais celles-ci sont actuellement distribuées dans plusieurs laboratoires. La centralisation de ces informations est indispensable pour empêcher leur perte et les rendre facilement accessibles pour les analyses. À cette fin, un format de base de données est proposé.

RESUMEN

El GBYP ha sido eficaz a la hora de estimular las investigaciones sobre la determinación de la edad del atún rojo y la identificación del stock. Los datos resultantes de esta investigación son vitales para la evaluación de la especie pero actualmente están distribuidos entre múltiples laboratorios. Es esencial centralizar esta información para impedir su pérdida y conseguir que sea fácilmente accesible para los análisis. Con este fin, se propone un formato para una base de datos.

KEYWORDS

Bluefin tuna, Ageing, Mixing, Database

1. Introduction

The purpose of this document is to propose a format for a database to contain ageing and stock identification information from samples of Atlantic bluefin tuna (*Thunnus thynnus*) collected by National sampling programs, Universities and the GBYP. The recent Bluefin Data Preparatory Meeting (Madrid, March 2015) provided numerous examples of the future potential of this data but also highlighted the fact that it needed to be responsibly managed. In its current form, it is not possible to access the data quickly and in a repeatable fashion (i.e. it is possible to introduce duplicate records or omit them). Details about the samples are absent so it is difficult to know which fish have participated in multiple analyses (e.g. true age, shape analysis for stock ID, micro-constituent analysis for stock ID, DNA analysis for stock ID or close kin analysis, lipid analysis or diet analysis) thus limiting the utility of the sampling and scope of what we can learn.

The current proposal is to create a database with three tables linked by a unique identifier. One table will contain the metadata (descriptions about the sample's origin) while the other two will contain the direct ageing information and stock identification respectively. The proposed data base structure aims to contain all needed information assuring that the fields included fulfill the standards for obtaining a good quality data base.

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It is necessary to reach an agreement as to the format so that the database will contain the minimal necessary information in order to assure that analyses based on it will only be framed within the context of the SCRS stock assessment activities, thus avoiding the reluctance of researchers to provide the data which they intend to use in their own current and future publications. To achieve this, we suggest that ICCAT keeps and regulates access to this database, once researchers have established the structure.

Another important consideration when designing the database is that the methods employed for stock identification do not always allow individual assignment, for example, not many fish under GBYP-microchemistry have individual assignments, just proportions for a pool of individuals. Thus a holistic approach to the database structure is required so that it can account for methodologies that provide probabilistic results in both an individual and group format.

2. Proposed Format for the Sampling Information Table

1) Unique ID assigned by database maintainer (no duplicates)
2) Sample ID = ID from laboratory of origin
3) Sampling Laboratory
4) Year of catch
5) Month of catch
6) Lat of catch = latitude coordinate in decimal degrees; $Lat = D + \frac{M}{60} + \frac{SS}{3600}$
7) Lon of catch = longitude coordinate in decimal degrees; $Lon = D + \frac{M}{60} + \frac{SS}{3600}$
8) ICCAT Sampling Area
9) Geographical area. As precise as possible. Example, Gulf of Mexico, Bay of Biscay, etc.
10) Fishing gear (ICCAT coding)
11) SFL in cm
12) Type of SFL Original or converted
13) RWT in kg
14) Type of RWT Original or converted
15) Notes
16) Tag #
17) Tag type: conventional or floy
18) Disposition: (recovered, released,neither)
19) Analyses performed: (Lipid,Diet,Mixing,Ageing,Origin,CloseKin)=LDMAOC
20) Samples Archived: (Otolith,Spine,Tissue,…)=OST

3. Proposed Format for the Direct Ageing Table

1) Unique ID assigned by database maintainer (can be repeated for multiple hard parts per fish)
2) Sample ID = ID from laboratory of origin
3) Sampling Laboratory
4) Year of catch
5) Ager laboratory = Example IEO_Santander, NOAA_Florida, SABS, …
6) Structure aged = Otolith or Fin spine
   For paired calcified structures coming from the same specimen (otoliths and spines) both structures will be used to facilitate comparative analyses.
7) Age
8) Adjusted age or the adjustment to apply
   [**Otoliths**: Rule: When counting opaque bands: If the fish is caught between January 1 and the assumed time of the opaque band formation (June 1) then 1 year is added to the age. When counting translucent bands: If the fish is caught between June 1 and 31 of December then 1 year is subtracted to the age.
   Fin Spines: All ages from fin spines are adjusted following Rodriguez-Marin et al. (2012) and Luque *et al.* (2014).]
9) Type of band counting. Translucent or opaque
10) First annulus scale. Yes/No for use of an identification scale on the first annulus of otolith.
11) Standardized criterion. Yes/ No. Whether the Busawon *et al.* (2014) standardized criterion for otoliths was applied. OR Rodriguez-Marin *et al*. (2012) and Luque *et al.* (2014) standardized criterion for fin spines.

[This is somehow redundant with information contained in previous fields, but the standardized criterion refers to more detailed information as for example for otoliths: "1) prior to production ageing, readers read the reference set (100 images) one time single blind under reflected light type. A precision level of APE and CV of 10% or lower and no bias was considered acceptable to support production ageing. 2) A the reference scale was used as a guide to identify the first annulus. 3) Annulus counts were made along the longest (ventral) arm of the sectioned sagittae otolith ("Y" type section). 4) Annuli are a bipartite structure consisting of a translucent and opaque zone; age was estimated by counting the opaque bands. 5) Age estimates were assigned based on annuli count."]

12) Edge type: Translucent or opaque
13) Readability: 1=Pattern present-no meaning, 2=Pattern present-unsure with age estimate, 3=Good pattern present-slightly unsure in some areas, 4=Good pattern-confident with age estimate.
14) Ager: Name of reader
15) Reading experience: Expert or non-expert. in ageing Atlantic Bluefin tuna using specified calcified structure
16) Date of reading

4. Proposed Format for the Stock Identification Table

1) Unique ID assigned by database maintainer (can be repeated for multiple analyses per fish)
2) Sample ID = ID from laboratory of origin
3) Sampling Laboratory
4) Year of catch
5) Stock Identification laboratory. Research center that conducted the analysis for identification of stock
6) StockID = East or West
7) IDMethod = Method: Genetics, Stable isotopes, Otolith shape, Trace elements, holistic.
8) Predicted Probability: Probability of origin (see StockID).
9) Fields related to close kin analysis

5. Recommendations

1. In the short term, develop Excel spreadsheets or an Access database for the data that is currently available. This could be the responsibility of a single CPC or lab.
2. In the medium term, migrate the data to an ICCAT database the can be accessed by the secretariat or upon request. Make links to the two tagging tables.

References

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