NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

The NE Atlantic Marine Biological
Analytical Quality Control Scheme
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Fish Annual Report

2018/2019

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Thomson Unicomarine Ltd.
Date of Issue: 3rd June 2019

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Fish Component Report from the Contractor
Scheme Operation Year 2018 / 2019

Scheme Year 2017 / 2018 Fish Bulletins (hyperlinked)

Reverse Ring Test Bulletin – F_RRT10

Ring Test Bulletin – F_RT12

Previous Fish Bulletins (hyperlinked)

Reverse Ring Test Bulletin – F_RRT01

Reverse Ring Test Bulletin – F_RRT02

Reverse Ring Test Bulletin – F_RRT03

Reverse Ring Test Bulletin – F_RRT04

Reverse Ring Test Bulletin – F_RRT05

Reverse Ring Test Bulletin – F_RRT06

Reverse Ring Test Bulletin – F_RRT07

Reverse Ring Test Bulletin – F_RRT08

Reverse Ring Test Bulletin – F_RRT09

Ring Test Bulletin – F_RT01

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Ring Test Bulletin – F_RT10

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1. Introduction

The twenty-fifth year of the NE Atlantic Marine Biological Analytical Quality Control (NMBAQC) Scheme (2018/19) followed the format of the twenty-fourth year, with a ring test (RT) and a reverse ring test (RRT) being organised. The Fish Component of the Scheme is currently in its fourteenth year (start 2005/06). It involved the distribution of test specimens to participating laboratories and the centralised examination of returned data for the first module, and re-analysis of fish specimens submitted by participants for the latter. The component was managed by the contractor Thomson Unicomarine Ltd., while the results of both ring tests were analysed by PISCES Conservation Ltd.

Twenty-five laboratories originally signed up for Scheme year 2018/2019. But due to lack of fish for re-analysis in the RRT module, three laboratories had to withdraw, leaving the number of participants at twenty-two. Seventeen participants were government laboratories, three private consultancies, one a University and one a chartered laboratory. Although some fish are sampled under the Clean Seas Environment Monitoring Programme (CSEMP), the number of target species is relatively few. However, the requirement to monitor fish assemblages in transitional waters for the Water Framework Directive (WFD) provides a major impetus for the Fish Component modules.

1.1 Summary of Performance

This report presents the results of the fourteenth year of the Fish Component (twenty-fifth year of the NMBAQC Scheme).

The component consisted of two modules:

- Re-identification of fifteen fish specimens supplied by each of the participating laboratories (Fish Reverse Ring Test).
- Identification of fifteen fish specimens circulated by the contractor (Fish Ring Test).

The analytical procedures of both modules were the same as for the twenty-fourth year of the Scheme. The results for each of the modules are presented and discussed below.

Fish Reverse Ring Test (F_RRT): The identification of fifteen fish specimens selected and supplied by the participating laboratories was relatively accurate (F_RRT10) (thirteen taxonomic errors for 244 specimens submitted). The majority of specimens were collected during the 2018 autumn monitoring surveys. As observed in previous years, there were differences in the approach to the reverse ring test by the participating laboratories; some used this as a test for confirming voucher specimens, whilst others submitted problematic specimens, hence comparison of results is not applicable.

Fish Ring Test (F_RT): Fifteen fish specimens were distributed to the participants by the contractor. Compared to the previous year, the Fish Ring Test (F_RT12) produced a higher number of taxonomic differences between the participating laboratories and the analysing laboratory, PISCES Conservation Ltd. On average 0.75 generic and 1.83 specific differences were recorded per participating laboratory (compared to 0.23 generic and 0.85 specific differences in the previous year). The 2018 Fish Ring Test included three different species from the genus *Pomatoschistus*, which largely accounted for the increased number of specific differences.

1.2. Statement of Performance

A Statement of Performance will be issued to each participating laboratory summarising the results for each of the modules completed. These statements were first circulated with the 1998/1999 annual report, for the purpose of providing evidence of Scheme participation and for monitoring year on year progress.

2. Summary of the Fish Component

2.1. Introduction

Both modules are described in more detail below. A brief outline of the information to be obtained from each module is given, together with a description of the preparation of the necessary materials and brief details of the processing instructions given to each of the participating laboratories.

2.1.1. Logistics

The labelling and distribution procedures employed previously have been maintained and specific details can be found in the Scheme's annual reports for 1994/95 and 1995/96 (Unicomarine, 1995, 1996).

2.1.2. Data returns

Return of data to Thomson Unicomarine Ltd. followed the same process as in previous years. Spreadsheet-based forms were distributed via e-mail. All returned data were converted to Excel 2003 format for storage and analysis. Reminders were distributed shortly before each deadline. Similar to the last Scheme year, most returns arrived on time or were only slightly late. Thanks to this excellent cooperation with the participating laboratories, results could be analysed promptly and results delivered on time.

2.1.3. Confidentiality

To preserve the confidentiality of participating laboratories, each is identified by a randomly assigned four-digit Laboratory Code. Codes followed the previous year's format and were given the letter F to differentiate from other NMBAQC components., e.g. Laboratory number one in 2018/2019 (the twenty-fifth Scheme year) was coded as F_2501.

2.2 Fish Reverse Ring Test (F_RRT) Module

2.2.1 Description

The Fish Reverse Ring Test is a training module which provides external verification of the identification of fish specimens and encourages laboratories to build verified reference collections. The creation and use of reference collections are viewed as best practice to improve identifications and achieve consistency. The Fish Reverse Ring Test assesses the ability of the participating laboratories to identify material from their own area, or with which they are familiar, and allows also to have difficult specimens examined externally. For this tenth Fish Reverse Ring Test, participants were required to submit a collection of fifteen specimens for re-examination by PISCES Conservation Ltd.

2.2.1.1 Selection of fauna

The different geographical distributions of species and areas in which participants are operating means that a request for a uniform set of species from all laboratories is unlikely to be successful. Accordingly, participants were asked to submit, wherever possible, specimens from WFD monitoring surveys and were allowed to include one unidentified or problematic taxon.

2.2.1.2 Analysis

Fish Reverse Ring Test packs, which included instructions, labels for each of the specimens and a prepared results sheet, were distributed to participants. If requested, polystyrene boxes and ice-strips were also supplied to enable best transportation for frozen fish. Participating laboratories were given approximately three months to prepare and submit their specimens. All specimens were re-identified by PISCES Conservation Ltd. and their results compared with those of the participating laboratories. Specimens were returned to the laboratories after analysis, if requested.

2.2.2. Results

2.2.2.1 General comments

Twenty-one laboratories subscribed initially to the tenth Fish Reverse Ring Test. However, only eighteen were able to submit specimens for verification. Four laboratories submitted data and specimens shortly after the submission deadline. Several laboratories submitted fewer than the specified number of fifteen taxa. In total 244 specimens were submitted for verification. Two specimens were unidentified and highlighted as a problematic taxon.

2.2.2.2 Analysis of material from participating laboratories

For re-identification of the submitted specimens, the analysing laboratory (PISCES Conservation Ltd.) used a variety of identification literature and an in-house reference collection. A preliminary report with individual results was sent to each participant. Due to this module's emphasis upon training and due to the diversity of submissions, comparison of results is not applicable and, as such, no summary statistics can be provided.

The Fish Reverse Ring Test Bulletin (F_RRT10) summarised the results of all participants. Table 1 lists the data and specimens received, while Table 2 gives details on the taxonomic errors and discrepancies observed. Participants were notified that the bulletin is available for download on the Scheme's website (www.nmbaqcs.org).

2.2.3 Discussion

In the majority of instances, identifications by PISCES Conservation Ltd. were in agreement with those by the participating laboratories, with thirteen taxonomic errors out of 244 submitted identifications. Taxonomic errors were not limited to a few difficult families, but were found across several families.

The number of taxonomic discrepancies was slightly higher with nineteen instances recorded. The reasons were unaccepted generic name, incorrect year or incorrect parentheses. Only five out of eighteen participants submitted full species names (genus, species, author, year).

2.3 Fish Ring Test (F_RT) Module

2.3.1 Description

The Fish Ring Test examines inter-laboratory variation in participants' ability to identify fish taxa and attempts to determine whether any differences were the result of inadequate keys, lack of reference material (e.g. growth series), or the incorrect use of satisfactory keys. Participants can submit multiple sets to allow sub-teams or individual analysts to receive specific results and feedback. One set of fifteen fish specimens was distributed in December 2018 to each laboratory.

2.3.1.1 Preparation of the samples

The distributed specimens for the twelfth Fish Ring Test were obtained from a range of surveys from around the UK or by commercial means. This year's focus was on small-sized and young estuarine fish. Every attempt was made to provide animals in a similar condition and of similar size for each participant. Each specimen sent was given an individual and unique coded label and participants were asked to retain the material for subsequent checking.

2.3.1.2 Analysis required

The participating laboratories were required to identify each of the ring test specimens to species level or indicate if they would not routinely do so. Laboratories could also add brief notes and information on the keys or other literature used for their identifications. Approximately six weeks were allowed for the analysis of the ring test specimens.

2.3.2 Results

2.3.2.1 General comments

The implementation of this part of the Scheme was the same as in previous years. The Fish Ring Test is designed as a learning exercise and allows to discover where specific difficulties lie within particular taxa. CSEMP laboratories are required to participate in this module, though it is not used for assigning pass or fail flags.

Fifteen fish specimens and details on their respective habitat (depth, salinity, substratum and geographical location) were circulated to the twelve participating laboratories. Twelve sets of results were returned and there were no multiple sets of results submitted. Each laboratory was first sent a preliminary report with their individual results and given the opportunity for discussion. A summary of all results is presented in the twelfth Fish Ring Test Bulletin (F_RT12) together with detailed comments and pictures on the taxonomic differences observed. Participants were notified that the bulletin is available for download on the Scheme's website (www.nmbaqcs.org).

2.3.2.2 Returns from participating laboratories

Each laboratory returned a previously circulated spreadsheet with their identification results. These were then compared with the auditor's identifications to determine the number of taxonomic differences. Synonyms or spelling errors were highlighted in square brackets, but not included in the scoring of differences.

2.3.2.3 Scoring of ring test results

Scores were determined by increasing a participant's score by one for each difference between their identification and the auditor's identification, i.e. for each instance where text other than a dash or a bracketed name appears in the appropriate column in Tables 2 and 3 of F_RT12. Two separate scores were maintained for differences found at genus or species level.

2.3.2.4 Taxonomic differences observed

As summarised in Table 1 of F_RT12, the disagreement at genus level was rather high, with nine differences recorded from the twelve data sets received. The number of differences at species level was even higher with twenty-two differences recorded.

Taxonomic differences occurred in a variety of genera and species. The majority were recorded for the gobies *Pomatoschistus lozanoi* (one generic and eight specific differences) and *P. microps* (two generic and five specific differences), followed by the sole *Solea solea* (two generic and two specific differences).

Six of the fifteen circulated specimens were correctly identified by all participating laboratories (*Dicentrarchus labrax*, *Osmerus eperlanus, Atherina presbyter*, *Eutrigla gurnardus, Merlangius merlangus* and *Trisopterus luscus*).

2.3.2.5 Differences between participating laboratories

The number of differences recorded at genus and species level by each of the participating laboratories were shown in Graph 1 and Table 3 of F_RT12. Laboratories were ordered in three bands: Lowest, Mid and Highest, according to the increased number of differences at species and genus level.

Only two laboratories (LB2516 and LB2522) correctly identified all specimens and only three others (LB2502, LB2523 and LB2524) scored one difference at species level. The remaining seven laboratories had two or more differences at species level and five of these scored additional differences at generic level.

2.3.3 Discussion

This is the twelfth Fish Ring Test circulated through the NMBAQC Scheme and the higher number of differences clearly showed that the focus on small-sized and young fish represented a challenge for most laboratories. This module is considered to provide valuable training and to be an indicator of problematic groups and possible areas for further targeted exercises or inclusion at taxonomic workshops. The inclusion of images and detailed taxonomic comments in the ring test bulletins have further emphasised the learning aspect. Most laboratories are using the same literature to identify fish (Wheeler 1969, 1978; Maitland & Herdson 2009; Henderson 2015).

3. Conclusions and Recommendations

A number of observations may be made from the results of the modules described above. The following is a summary of the major points.

1. The latest Fish Reverse Ring Test (F_RRT10) and Fish Ring Test (F_RT12) were successfully implemented and their format can be continued in the next Scheme year. Participants are encouraged to provide feedback to enable protocols and bulletins to be improved where necessary.

2. The majority of participating laboratories submitted their data / specimens before the deadline, or were only slightly late. This allowed for a fast analysis and delivery of results.

3. Laboratories are encouraged to collate fish identification literature to improve their identification skills and follow the most recent results in taxonomy. The Scheme has produced a UK Standard Taxonomic Literature database. Participants are encouraged to review the content and give details of additions wherever possible. Referring to databases such as Catalog of Fishes, FishBase or WoRMS is recommended to check the validity of scientific names. Discrepancies between those databases were highlighted in the F_RRT10 bulletin.

4. The maintenance of a comprehensive reference collection has numerous benefits, such as improving identification ability, training new staff and maintaining consistency of identification between surveys. The inclusion of growth series is extremely useful for certain taxa. Ideally all surveys should have an associated reference collection to facilitate cross-checking or keep track of changes in taxonomy. It is strongly recommended that laboratories implement and expand in-house reference collections of fish; these collections could include images and physical specimens.

5. Future Fish Ring Test circulations will target taxa identified in the Fish Reverse Ring Tests as potentially problematic. Participants are encouraged to inform the contractor of difficult taxa that should be included in ring tests. Participants are also invited to submit specimens for use in such exercises (approximately 20 specimens of equal size and condition would be required for inclusion).

6. The Ring Test and Reverse Ring Test modules offer training and baseline data for fish; a quality control module could be devised to provide quantifiable data assurance.

7. This year's Fish Ring Test (F_RT12) produced twelve sets of results from twelve participating laboratories. No participant submitted multiple data sets. The option of multiple data submissions per participant laboratory will be continued into future ring tests. Participants should not submit multiple sets of data if these data represent a replicated consensus; multiple data submissions are to allow sub-teams and individual analysts to receive specific results and feedback.

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