NMBAQC

NE Atlantic Marine Biological Analytical Quality Control Scheme

The NE Atlantic Marine Biological
Analytical Quality Control Scheme
www.nmbaqcs.org

Fish Annual Report

2017/2018

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Fish Component Report from the Contractor
Scheme Operation Year 2017 / 2018

Scheme Year 2017 / 2018 Fish Bulletins (hyperlinked)

Reverse Ring Test Bulletin – F_RRT09

Ring Test Bulletin – F_RT11

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

Ring Test Bulletin – F_RT01

Ring Test Bulletin – F_RT02

Ring Test Bulletin – F_RT03

Ring Test Bulletin – F_RT04

Ring Test Bulletin – F_RT05

Ring Test Bulletin – F_RT06

Ring Test Bulletin – F_RT07

Ring Test Bulletin – F_RT08

Ring Test Bulletin – F_RT09

Ring Test Bulletin – F_RT10

1. Introduction

The twenty-fourth year of the NE Atlantic Marine Biological Analytical Quality Control (NMBAQC) Scheme (2017/18) followed the format of the twenty-third year, with a ring test (RT) and a reverse ring test (RRT) being organised. This 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.

The Fish Component of the Scheme is currently in its thirteenth year (2005/06). Twenty-four laboratories participated in the 2017 / 2018 Scheme year. Nineteen participants were government laboratories, four were private consultancies and one was a University 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 Fish Component for the twenty-fourth year of operation of the NMBAQC Scheme.

This 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-third 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_RRT09) (five taxonomic errors for 235 specimens submitted). The majority of specimens were collected during the 2017 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. The Fish Ring Test (F_RT11) produced good agreement between the participating laboratories and the analysing laboratory, PISCES Conservation Ltd. On average 0.23 generic and 0.85 specific differences were recorded per participating laboratory.

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. In contrast to previous Scheme years, most returns arrived on time; only one lab was late, while a second had asked for an extension of the deadline. Thanks to this excellent cooperation with the participating laboratories, results could be analysed promptly and bulletins 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 2017/2018 (the twenty-fourth Scheme year) was coded as F_2401.

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 ninth 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 twelve weeks 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-two laboratories subscribed initially to the ninth Fish Reverse Ring Test. Only seventeen were able to submit specimens for verification, the others were either unsuccessful in sourcing fish, or staff were unable to participate. Only one laboratory submitted data and specimens after the submission deadline. Several laboratories submitted fewer than the specified number of fifteen taxa. In total 235 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_RRT09) 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 only five taxonomic errors out of 235 submitted identifications. In contrast to previous years, taxonomic errors were not limited to a few difficult families, each was found in a different family (i.e. Labridae, Lotidae, Mugilidae, Pleuronectidae and Triglidae). However, the number of taxonomic discrepancies was quite high with 34 instances recorded. The reasons were in most cases (89%) incorrect parentheses used in species names, followed by incorrect year, unaccepted generic name or discrepancies between databases used.

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 2017 to each laboratory.

2.3.1.1 Preparation of the samples

The distributed specimens for the eleventh Fish Ring Test were obtained from a range of surveys from around the UK or by commercial means. 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 thirteen participating laboratories. Thirteen 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 eleventh Fish Ring Test Bulletin (F_RT11) 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_RT11. 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_RT11, the agreement at genus level was quite good, only three differences were recorded from the thirteen data sets received. The number of differences at species level was higher with eleven differences recorded.

Taxonomic differences occurred in a variety of genera and species. The majority was recorded for the common goby *Pomatoschistus microps* (two generic and for specific differences), followed by Nilsson's pipefish *Syngnathus rostellatus* (three specific differences).

Nine of the fifteen circulated specimens were correctly identified by all participating laboratories (*Atherina presbyter/boyeri*, *Clupea harengus*, *Dicentrarchus labrax*, *Liparis liparis*, *Merlangius merlangus*, *Mullus surmuletus*, *Sardina pilchardus*, *Spondylosoma cantharus* and *Sprattus sprattus*).

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-RT11. Laboratories were ordered in three bands: Lowest, Mid and Highest, according to the increased number of differences at species and genus level.

Seven laboratories (LB2406, LB2412, LB2413, LB2414, LB2418, LB2419 and LB2422) correctly identified all specimens. Two laboratories (LB2417 and LB2424) scored one difference at species level, while four laboratories (LB2401, LB2415, LB2416 and LB2425) had more than one difference at genus or species level.

2.3.3 Discussion

This is the eleventh Fish Ring Test circulated through the NMBAQC Scheme and the results were comparable to those from the ten previous exercises (RT28 (F_RT01), RT31 (F_RT02), RT33 (F_RT03), F_RT04, F_RT05, F_RT06, F_RT07, F_RT08, F_RT09 and F_RT10) with a high level of agreement between participating laboratories for the majority of distributed species. 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 specimens (Wheeler 1969, 1978; Maitland & Herdson 2009; Henderson 2014). Ring test specimens were sent to participating laboratories frozen. Frozen specimens tend to maintain their integrity and preserve colour better than those preserved in alcohol.

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_RRT09) and Fish Ring Test (F_RT11) 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 an efficient analysis and delivery of bulletins and annual report on time.

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_RRT09 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_RT11) produced thirteen sets of results from thirteen 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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