# Manual for RTRIM-shell\_2.0

This manual is intended to guide RTRIM-shell\_2.0 users through the index calculation process.   
If interested in detailed description of RTRIM-shell inputs and outputs, see the RTRIM-shell tutorial at the PECBMS webpage <https://pecbms.info/methods/software/trim/>, please. Although the tutorial was created as a guide through an older RTRIM-shell version, the description of RTRIM-shell inputs and outputs is still valid.

RTRIM-shell\_2.0 is a version for 2024 Update created by Javier Rivas Salvador. Main intention is to make the tool as much user friendly as possible. On the other hand, the national coordinators, who need to modify the program, have an opportunity in the script ‘RTRIM-shell\_2.0\01\_Scripts\DO\_NOT\_MODIFY\ **x3\_functions\_Shell\_Rtrim.R**’

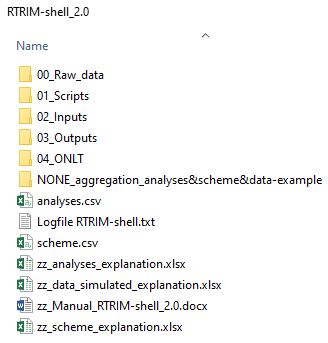
THERE ARE NO CHANGES IN THE CALCULATION METHODS BETWEEN VERSIONS RTRIM-shell\_v1.7 AND RTRIM-shell\_2.0

There are big changes in design. All the previously used scripts from the script for RTRIM-shell input preparation to script for zipping files to be uploaded into On-line Tool (ONLT) are now merged into one script under the name RTRIM-shell.

User has only to change 2 tables defining setting of calculation in RTRIM-shell (analyses.csv & scheme.csv) and modify path in the main script RTRIM-shell\_2.0.R.

RTRIM-shell\_2.0 contains example data, which can be easily modified to your own data and outputs.

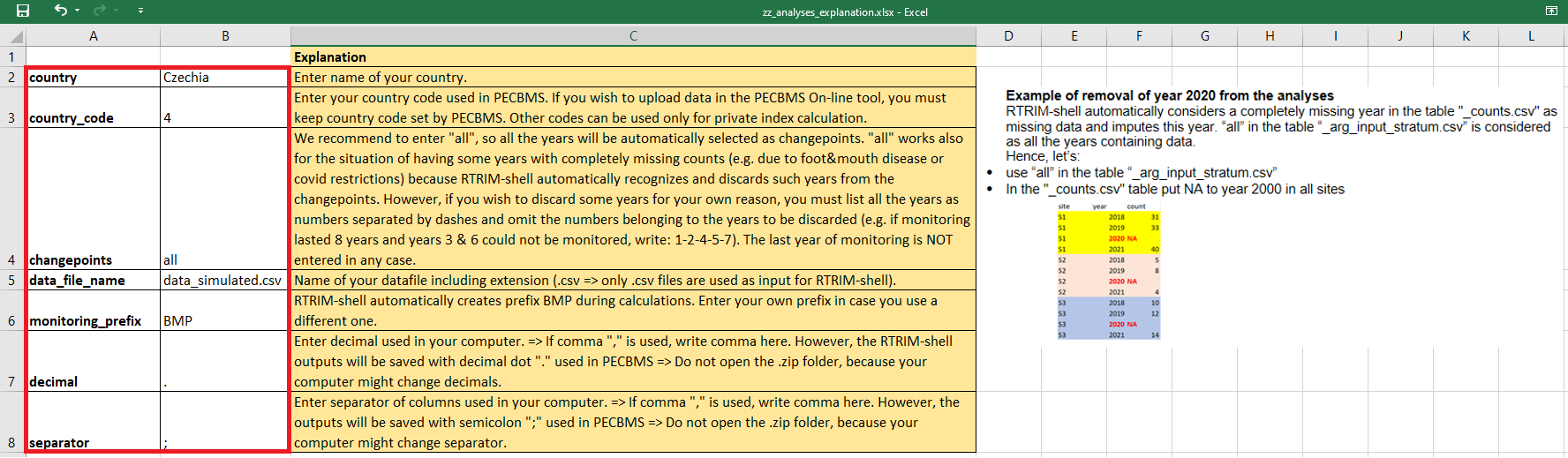
*Figure 1: RTRIM-shell\_2.0 contains 5 folders (00\_ - 04\_) used for whole process from data preparation to zipping files requested for upload into On-line tool; folder “NONE\_aggregation\_analyses&scheme&data-example” with sources for aggregation NONE; files “analyses.csv” & “scheme.csv” for RTRIM-shell settings, file “Logfile RTRIM-shell.txt documenting whole process from data preparation to zipping files requested for upload into On-line tool and files marked by “zz\_” explaining tables and steps used in RTRIM-shell\_2.0.*



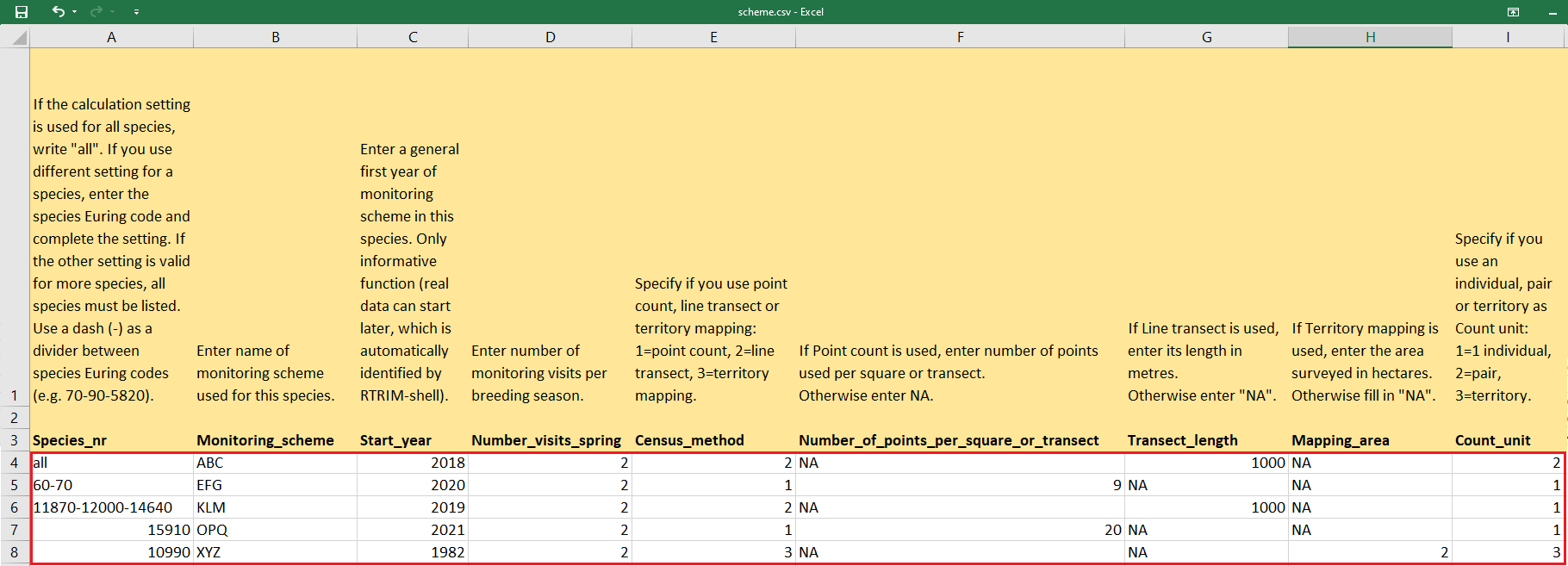
## Tables used for index calculation in RTRIM-shell\_2.0

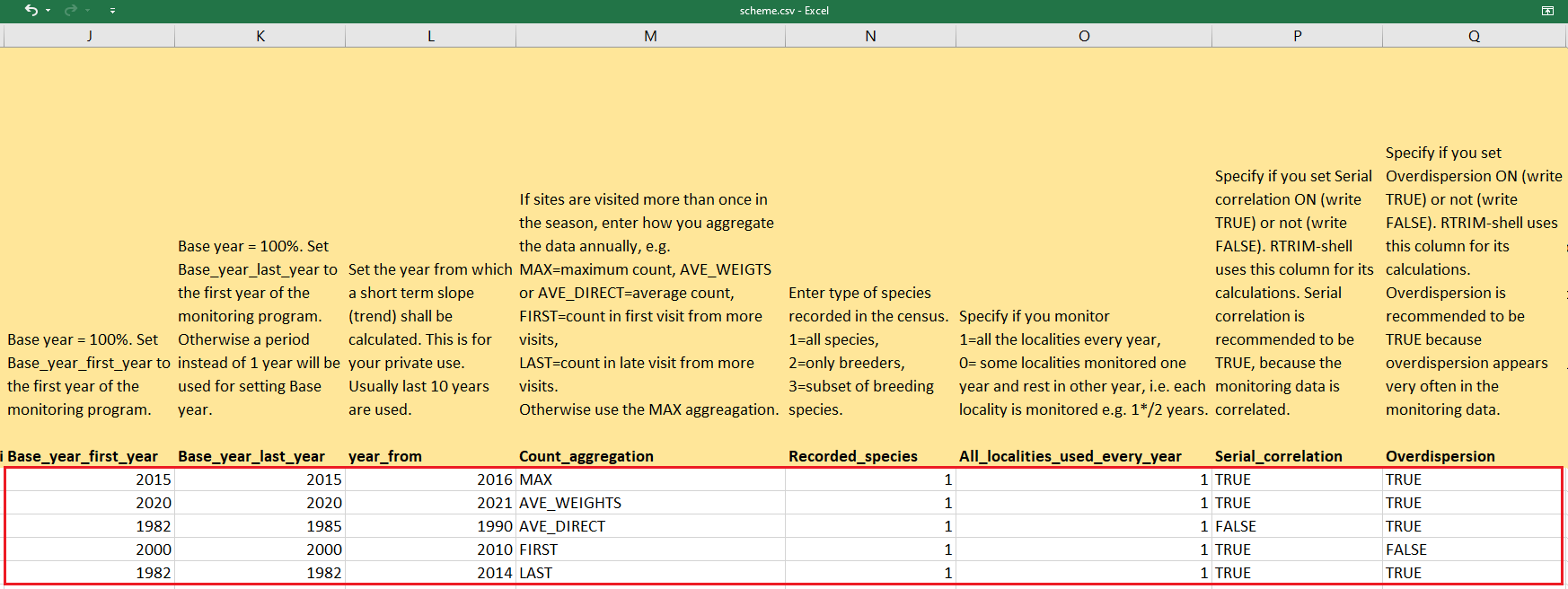
Both tables have to be saved in the main RTRIM-shell folder.

**analyses.csv**

* Source table with the information for RTRIM-shell. National coordinator fills this table with information on her/his country, input dataset and formatting of the files.
* *Figure 2: An explanation (orange colour) is added to the table for this Manual purposes. You have to fill the data in red frame in table analyses.csv.*

**scheme.csv**

* Source of information for Monitoring\_scheme.csv table and RTRIM-shell calculation.
* It is extremely important to fill the table precisely and double-check!!!
* Species\_nr: can take two forms two types of values
  + - * “all”: this row will contain info for the major part of species
      * “60-70”: species 60 AND 70 are treated as an exemption for the general rule and RTRIM-shell will treat them according to the information in this row. List all the species with dashes. It is possible to add various exceptions by adding rows.
* Figure: An explanation is added to the table for the Manual purposes. This table with explanations can be also found in the RTRIM-shell\_2.0 folder and is called “zz\_scheme\_explanation.xlsx”. It is divided into 2 halves for the Manual purposes. The data in red frame in table analyses.csv has to be filled to the table called “scheme.csv”.
* *Figure 3: Table scheme.csv divided in 2 halves with added explanations: 1. half**:*

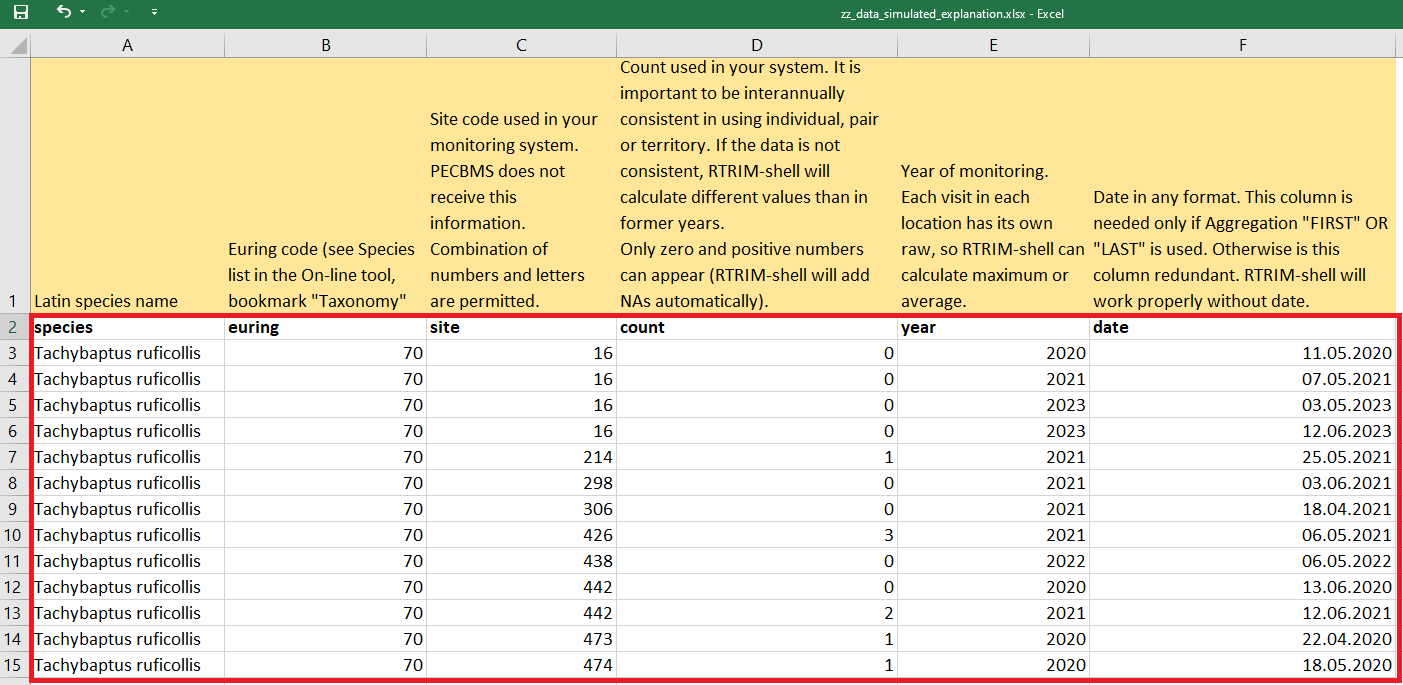
*Table scheme.csv divided in 2 halves with added explanations: 2. half:*

*Table 1: Detailed explanation of the Aggregations set in the table scheme.csv:*

|  |  |  |  |
| --- | --- | --- | --- |
| Type of Aggregation | General description | Use of Weights | Aggregation details |
| MAX | Selects the maximum count for each location/year combination. | No | Visit with maximal number of birds/pairs in the breeding season is used for index calculation |
| AVE\_DIRECT | Provides mean number of observed counts among all the visits for each location/year combination. | No | Average number of birds detected in a locality is calculated already during data preparation and used for index calculation. Index calculated by using aggregation AVE\_DIRECT differs slightly from index gained by AVE\_WEIGHTS. |
| AVE\_WEIGHTS | Calculates the sum of count for each location/year combination, which is used during the index calculation. | Yes | Weight is used in the form 1/number of visits per year. Index differs slightly from index gained by AVE\_DIRECT. AWE\_WEIGHTS corresponds with method used in TRIM/BirdStats. |
| FIRST | Selects the earliest visit for each location/year combination. | No | Data from first visit in the breeding season is used. |
| LAST | Selects the latest visit for each location/year combination. | No | Data from last visit in the breeding season is used. This aggregation is used often in the South Europe for species, because migration during first visit. Use of last visit guarantees monitoring of birds breeding in a locality. |
| NONE | Intended for skilled coordinators who have their own scripts for aggregations/weights. | Depends on monitoring scheme. | No weights are used and the table scheme.csv must be sewed precisely on the monitoring scheme. Let’s contact Javier Rivas <rivassalvador@birdlife.cz> if you are interested in this aggregation. |

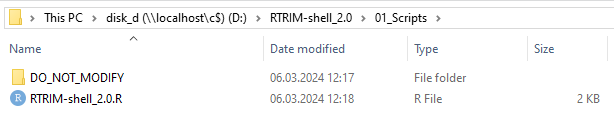
## Folders used for index calculation in RTRIM-shell\_2.0

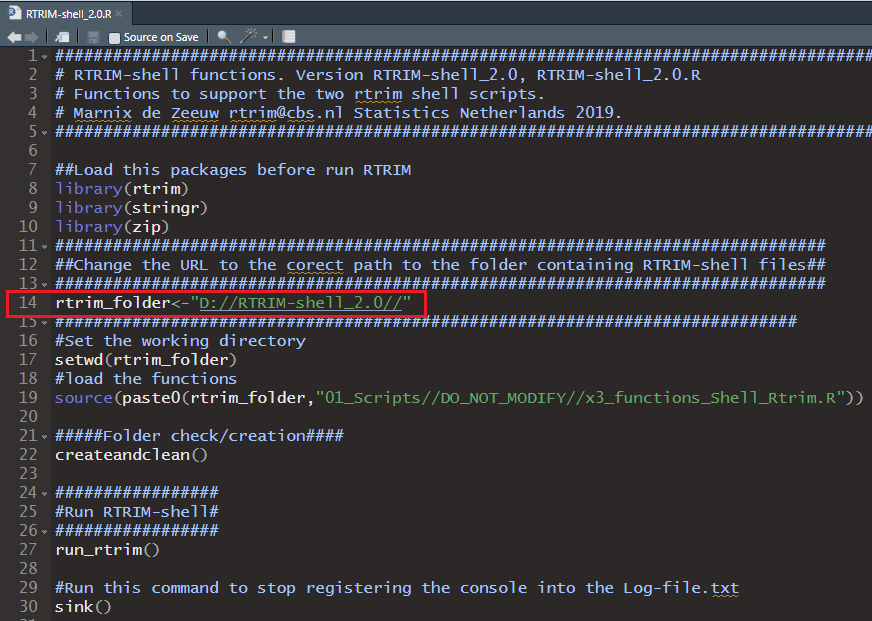
**00\_Raw\_data**

* + Contains table with all raw data. RTRIM-shell\_2.0 script is able to pick proper data according to the option stated in table scheme.csv.
  + Column “date” is date of visit. It is only necessary to add this column for the aggregation FIRST/LAST visit. This column does not have to be added for other aggregations.
  + We try to reduce the amount of pre-processing that some coordinators were conducting before running RTRIM. Therefore, the program itself will select the necessary data for the calculation according to the aggregation methods implemented in RTRIM. Let’s just set aggregation method in the table “scheme.csv”.
  + *Figure 4: Data table serving as source of data for RTRIM-shell.*

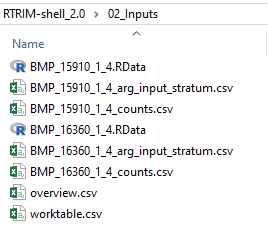
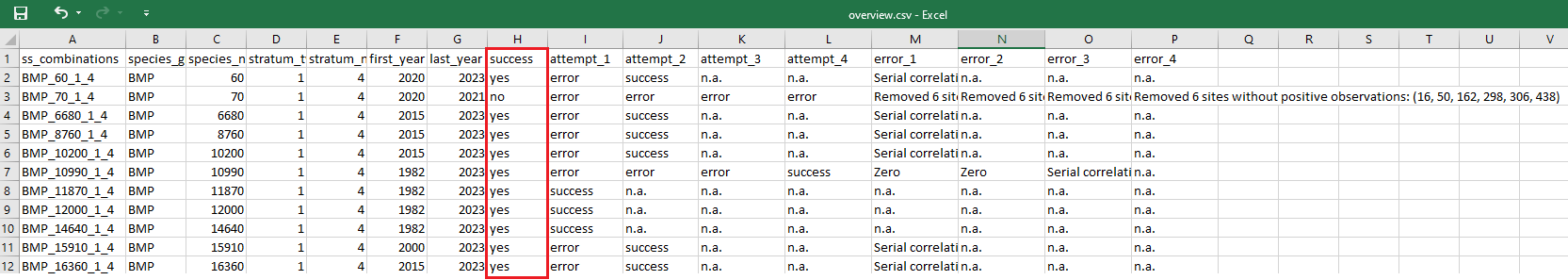
**01\_Scripts**

* + This folder contains a script, which has to be run to calculate indices and then it contains a folder called DO\_NOT\_MODIFY
  + *Figure 5: Folder 01\_Scripts contains sript RTRIM-shell\_2.0, which automatically runs the script with functions and folder DO\_NOT\_MODIFY, which includes script with functions and Species list.*



* + 1. Script RTRIM-shell\_2.0.R
       - This is the script, which has to be run by you and which will automatically run the second script with functions.
       - The whole RTRIM-shell calculation is automated and the only task that has to be done is to exchange path marked by red frame in the picture for the path in your own computer. Then let’s run the script.
       - “Createandclean()” function will create the foldes 02,03 and 04 if they do not exist. If the folder RTRIM-shell\_2.0 already contains these folders, their content will be deleted prior a new rtrim run.
       - *Figure 6: Script RTRIM-shell\_2.0; path to be modified to the path in your computer is highlighted in red frame.*
    2. Folder DO\_NOT\_MODIFY
       - Species\_list.csv
         * This file contains a PECBMS list of all European species. The list is used for On-line tool (left tool bar/ Taxonomy). Before calculation, it is recommended to check if your euring codes match with this PECBMS.
       - x3\_functions\_Shell\_Rtrim.R
         * All the previous RTRIM-shell scripts are now hidden in this script.
         * Original scripts 01\_shell\_rtrim\_strata.r& 02\_processingOutputSpeciesStratumCombination\_SumTab.R have been turned into functions and are now part of this script.
         * If you intend to do your own modifications, let’s inform Eva Šilarová [silarova@birdlife.cz](mailto:silarova@birdlife.cz) and Javier Rivas [rivassalvador@birdlife.cz](mailto:rivassalvador@birdlife.cz), please.

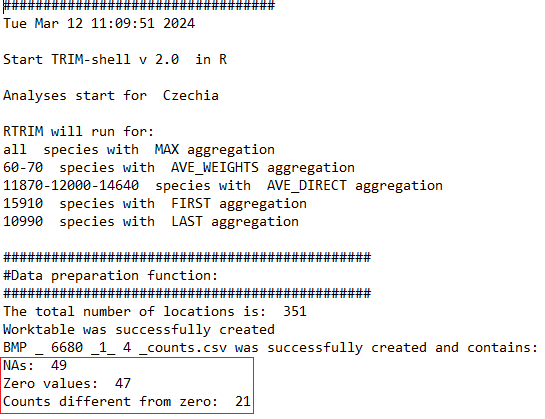
**02\_Inputs**

* This folder is automatically created (if not present in RTRIM-shell\_2.0) or emptied (if present from former RTRIM-shell runs) before index calculations and will be filled by the RTRIM-shell inputs when you run the script RTRIM-shell\_2.0.R
* Figure is a PrintScreen with example of 01\_Inputs filled with the RTRIM-shell inputs from which indices will be calculated
* *Figure 7: RTRIM-shell fills the folder “02\_Inputs” with \_arg\_input\_stratum.csv, \_counts.csv, overview.csv and worktable.csv.* *For detailled description of these files watch RTRIM-shell tutorial at the PECBMS webpage.*
* Let’s check the file **overview.csv** after each run (see example below). Overview.csv shows all species and announces which calculations were successful or unsuccessful (column “success”). RTRIM-shell does not calculate species with very poor data. If so, read details in the columns ”error”. Check the counts.csv table of an unsuccessful species and assess, if this species is needed for calculations. If you need to calculate index anyway, it is possible to truncate the time series to series of years with positive values (if there is e.g. only one positive value in 10 years of NAs, let’s delete these 10 years and recalculate the index). If index is calculated, use your expert knowledge to assess, if the Time Totals and Indices are real. If the calculation was successful in attempt\_4, RTRIM-shell used the simplest model, which may be unrealistic. Therefore, we recommend to decide, if such indices are reliable. If such a species is uploaded into On-line tool, let’s comment it in the bookmark Data controls/Specific comments window.
* *Figure 8: Table “overview.csv” enables to see what species index was successfully calculated (column “success”) and also what model was used for successful calculation (columns “attempt\_1-4”). See column “error1-4” acknowledge potential problem.*

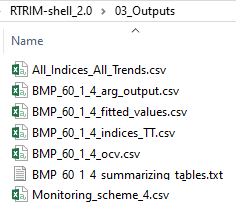
**LogFile**

* More detailed information on the preparation and calculation processes can be retrieved from the LogFile, which is is automatically created and saved in the RTRIM-shell\_2.0 folder (see *Figure 1*).
* This file is news in this RTRIM-shell version. It documents whole process from RTRIM-shell input preparation to zipping files required for On-line tool upload.
* It is easy to find out, where did the calculation stop (in case of a problem) and what is cause of problem.

*Figure 9: LogFile shows in detail all the processes running in RTRIM-shell. First part of LogFile with summary of NAs, Zero values and Counts different from zero in species 6680.*

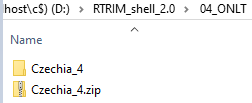


**03\_Outputs**

* This folder is automatically created (if not present in RTRIM-shell\_2.0) or emptied (if present from former RTRIM-shell runs) before index calculations and will be filled by the RTRIM-shell inputs when you run the script RTRIM-shell\_2.0.R
* Table Monitoring\_table\_{country\_code}.csv is automatically created by the program and saved here. Sometimes table Monitoring\_table\_{country\_code}.csv is not visible in the Windows Commander, but Total commander always shows this table.
* *Figure 10:* *RTRIM-shell fills the folder “03\_Outputs” with files All\_Indices\_All\_Trends.csv, \_arg\_output\_stratum.csv, \_fitted\_values.csv, \_indices\_TT.csv, \_ocv.csv, \_summarizing\_tables.txt and Monitoring\_scheme\_{country-code}.csv tables.* *For detailled description of these files watch RTRIM-shell tutorial at the PECBMS webpage.*

**04\_ONLT**

* This folder is automatically created (if not present in RTRIM-shell\_2.0) or emptied (if present from former RTRIM-shell runs) before index calculations.
* RTRIM-shell automatically copies the files from the folders 02\_Inputs and 03\_Outputs and zips them for the On-line tool (ONLT). The zipped folder is ready to be uploaded to the On-line tool. => Check the unzipped folder but DON’T TOUCH the .zip folder “country\_{country-code}”
* RTRIM-shell selects only files requested by the ONLT => PECBMS does not require \_counts.csv and \_fitted\_values.csv. These tables are under your private ownership.
* *Figure 11: RTRIM-shell automatically copies the files from the folders 02\_Inputs and 03\_Outputs. The zipped folder is ready to be uploaded to the On-line tool. => Check the unzipped folder but DON’T TOUCH the .zip folder “country\_{country-code}”, here “Czechia\_4.zip”.*



## Manual RTRIM-shell\_2.0

1. Create table containing your own data and save it in the folder 00\_Raw\_data
   * This data will be used for creating RTRIM-shell inputs and further index and Time Total calculations
   * Remember to add the “date” column if you intend to use aggregation methods “FIRST” or “LAST”
2. Fill the table analyses.csv with information on your dataset
3. Fill the table scheme.csv with information on your dataset
4. Open a script RTRIM-shell\_2.0.R in the folder ‘01\_Scripts’ and change path to the main folder with RTRIM-shell on line #14.
5. Run the script RTRIM-shell\_2.0

## Error messages:

1. Replacement has length zero

> run\_rtrim()

Error in x[[jj]][iseq] <- vjj : replacement has length zero

* + Your computer reads some of input tables in a wrong way and adds special characters invisible in .csv format
  + Solution: Open the .csv inputs as .txt and delete the characters, which should not be in the table.
  + Example: Monitoring\_scheme table was missing and the files were not zipped and saved in folder ‚ONLT‘
    1. Problem was in computer – during the calculation process R added ˇdż.EURING in the EURING column in species\_list.csv => Javi wrote a line in script setting strictly column names in species\_list.csv (13/11/2023)

Explanation of RTRIM-shell inputs and outputs  
### \_arg\_input\_stratum.csv###

# In addition to a file with count data, rtrim requires arguments to inform how the analysis should be done.

# For each file with count data, an associated argument file is needed, with a similar name, except for the last part: "\_arg\_input\_stratum.csv" instead of "\_counts.csv" .

# Thus, datafile BMP\_11870\_1\_4\_counts.csv needs to be accompanied by arguments file BMP\_11870\_1\_4\_arg\_input\_stratum.csv.

# Format of \_arg\_input\_stratum.csv is as follows:

#

# File Base\_year\_first\_year Base\_year\_last\_year Changepoints Serial\_correlation Overdispersion Presence\_weights Presence\_monthfactors Year\_from Save\_fitted\_values

# BMP\_11870\_1\_4 1990 1990 ALL TRUE TRUE TRUE FALSE 2007 TRUE

#

# File: short name of file to be analysed, i.e., datafilename without \_"counts.csv"

# Rather than choosing one particular base year (as in the old TRIM), it is also possible to use a number of years as base period.

# This is NOT recommended for the PECBMS data, use first year as Base\_year\_first\_year and Base\_year\_last\_year, please. # 28-02-2022 Eva Silarova

# Base\_year\_first\_year: Calendar year used as base year for indices.

# Base\_year\_last\_year: Calendar year used as base year for indices.

# If Base\_year\_first\_year equals Base\_year\_last\_year a single year is used as base year

# If Base\_year\_first\_year < Base\_year\_last\_year, a period is used as base time

# In the latter case, Base\_year\_first\_year is the first year of the period.

# Changepoints: Changepoints used to calculate the indices are usually set to "all". !!!BE AWARE!!! If any of changepoints shall be excluded e.g. due to covid,

# changepoints shall be listed in \_arg\_input\_stratum, do not include last year of time series!!!

# Serial correlation: Set to "TRUE" when serial correlation needs to be taken into account. Otherwise set to "FALSE".

# Overdispersion: Set to "TRUE" when overdisperion needs to be taken into account. Otherwise set to "FALSE".

# Presence\_weights: TRUE when weights are available, FALSE when not.

# Presence\_monthfactors: TRUE when available, FALSE when not. NOT recommended for PECBMS.

# Year\_from: first calendar year of the subperiod over which also a slope needs to be computed.

# Last year of the subperiod equals the last year of the entire period.

# Save\_fitted\_values: Set to "TRUE" when the fitted values need to be saved. Otherwise set to "FALSE".

# rtrim starts with trying the most elaborate model.

# When the analysis of that model fails, a less elaborate model is tried.

# Output for each species is stored in a RData-file, in the working directory with the count files.

# That output needs to be processed with a separate script ("processingOutputSpeciesStratumCombinations.r").

# rtrim enables to run models with covariates, but this rtrim shell does NOT support that option.

# For more information we refer to the trim-vignettes in R.

