Web application and database for collecting and managing fisheries data

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Introduction

On the Institute of Oceanography and Fisheries web application based on relational database is developed for the purpose of managing and validation of fisheries data. Application also provide outputs needed for preparing various reports. Application manage data from different fishing gear / fishing method (bottom trawl, cast net, drift net, etc.) and for commercial and non commercial species. Interface have fields for filtering data on the left side, and it is organized hierarchically with tabs. Tabs are: metadata about fishing including coordinates, weight distribution, length distribution laboratory analysis, map and length-weight distribution (Figure 1). Data are inserted directly from web browser with build in semiautomatic validation.

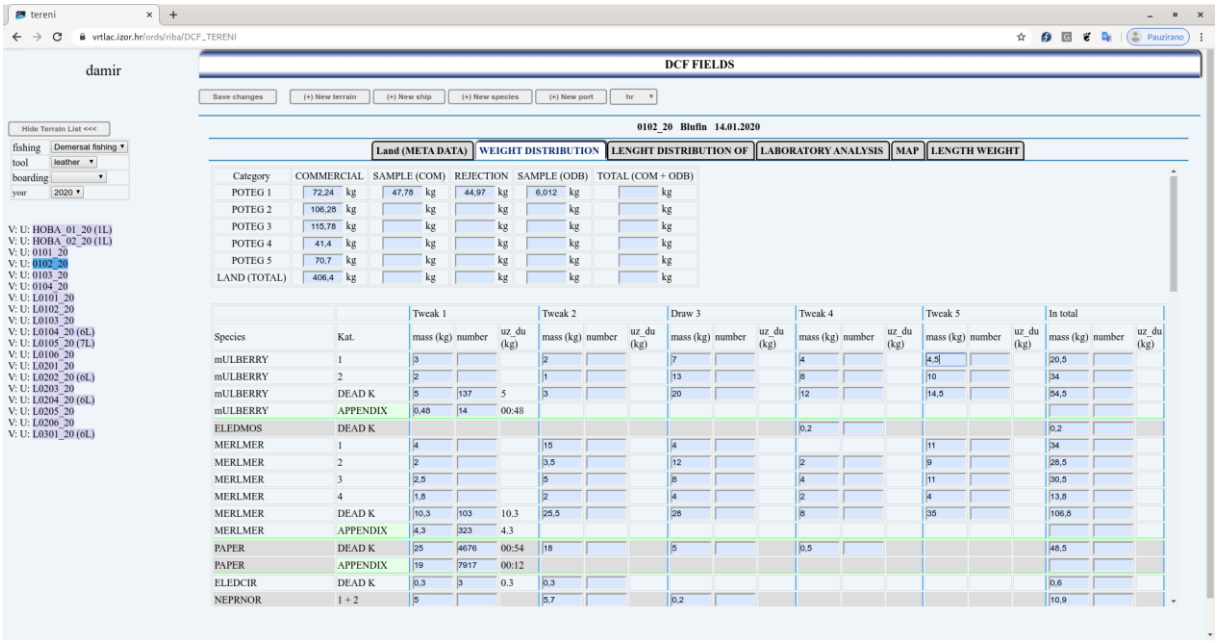

Figure 1: Application interface with active weight distribution tab

Development

Excel spreadsheets where used before usage of relational database for storing fisheries data. First version of application has multiple stage loading process:

- exporting multiple worksheet excel spreadsheet into one csv file using macro
- parsing csv file and loading into temporary structure
- correcting structural (depedencies) errors like wrong name of ship or species
- transponing data into permanent and related database tables

This process where used to insert data from already inserted excel files. For normal data insertion in second stage of application development, direct web interface was developed. Database structure was

also improved to can manage different fishing methods and tools data. Catch is generally divided into categories and to commercial and non commercial catch. Side catch is also managed.

Results

As output results from application and database various outputs were created (Figure 2). Data quality was increased by two major methods. Direct input have consistency checks and limitations (no free text for species or ship) with automatic sums checks (total weight of sample vs. sum of weight distribution). Also all outputs were available at any time (not need to collect all data and then perform analysis) what in case of spotted irregularity makes space for organizing additional data collection for some area or time period. Instant visualisations showing length distribution and length-weight helps in the identifying and correction of input errors. Database is used for data management of national fisheries monitoring and for European Commission - Data Collection Framework reporting. Outputs are prepared according reporting demands in tabular form (downloadable in csv format) and also in graphical forms.

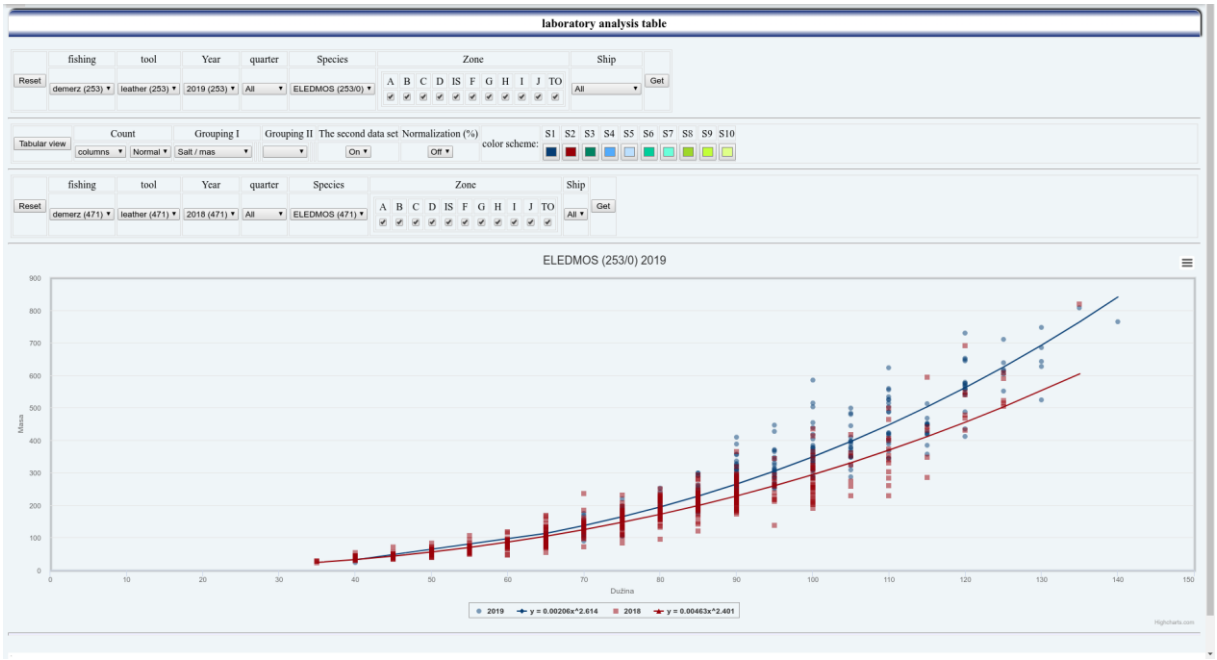

Figure 2: comparation of two yearly data sets and length-weight relationship using in the standard allometric equation W=aL^b (y=ax^b)

Conclusion

Biological data are often hardest for transposing into some predefined structure. Tight collaboration between fisheries expert, data manager and IT developer is needed. Database procedures manages methodology for calculation of estimated total stock based on avaliable measured samples. As result we have improved data quality and semi automatically prepared data for reporting. Visualisation of some trends and fish distribution (Figure 3) make possible for fish expert to better plan and manage such valuable resource as fish stock.

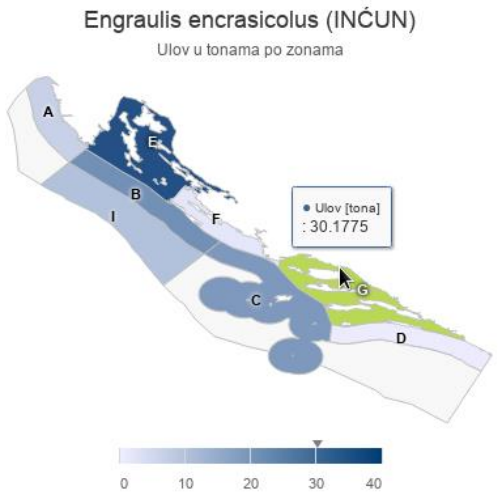

Figure 3: distribution of species within zones