ORIGINAL RESEARCH PAPER

An analysis of the dynamics of commercial fishing in the inland waters of Romania, between 2008 and 2022

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Abstract

This paper presents an analysis of the quantitative and qualitative dynamics of the structure of commercial fish catches in the inland waters of Romania during the period 2008 – 2022. The aquatic ecosystems in Romania where legal commercial fishing is carried out are represented by: the Danube River, the Danube Delta, the Razim - Sinoie lake complex, the Prut and Siret Rivers.

The processed data are taken from the official website of the National Agency for Fisheries and Aquaculture. They come from data reported by economic agents authorised to practice commercial fishing.

The total catch recorded between 2008 – 2022 is ~47043 t, ranging from a minimum of 2457 t (2010) to a maximum of 3868.51 t (2016).

The main species caught in the period 2008 -2012 were the following: prussian carp (41.09%), freshwater bream (10.79%), pontic shad (11.02%), roach (6.10%), carp (6.09%) and among the predatory species we mention wels catfish (4.94%), and northern pike (3.68%). zander (3.06%),

Keywords: capture, fish, commercial catches, evolution, trend.

Introduction

Fishing on inland waters represents one of the oldest and most important activities carried out by human communities in Romania. By "inland waters," we mean rivers, natural and reservoir lakes, ponds, and the hydrographic complex of the Danube Delta. These aquatic ecosystems offer optimal conditions for the development of a large number of fish species, are essential food and economic resources, and serve as recreational spaces.

From a socio-economic perspective, inland fishing makes a significant contribution to supporting riparian communities. For the population of the Danube Delta, fishing is not only a basic source of food but also the main traditional economic activity. Catches are valued in local markets and regionally, contributing to food security and the maintenance of gastronomic traditions.

In addition to its economic importance, fishing also plays a significant ecological role. Fish populations are key links in aquatic food chains, and variations in their abundance directly reflect the health of aquatic ecosystems. For example, a decrease in catches of sensitive

species such as zander or catfish may indicate increased anthropogenic pressures (overfishing, pollution, hydrological changes). At the same time, an increase in the share of invasive or eutrophic-tolerant species (e.g. crucian carp, bighead carp, silver carp) may signal ecological imbalances. Thus, inland fishing can be used as an indirect indicator of the quality of the aquatic environment.

Currently, inland fisheries face several significant challenges. Overexploitation of resources, poaching, pollution, and habitat fragmentation have led to significant decreases in catches and the depletion of stocks of valuable species. Climate change, manifested by prolonged droughts, decreased river flows or extreme temperature variations, represents additional pressure factors on aquatic ecosystems. At the same time, Romania's integration into the European Union has brought the need to align with the Common Fisheries Policy and the Community directives on the protection of biodiversity and the sustainable use of resources.

Thus, inland fishing has a double significance: on the one hand, it is an economic and social activity with a vital role in local communities, and on the other hand, it is a sensitive indicator of environmental conditions and the balance of aquatic ecosystems. The analysis of long-term official catches provides essential information for understanding trends, identifying pressure factors and formulating policies for the sustainable management of aquatic bioresources.

The purpose of this paper is to analyze the dynamics of catches in the inland waters of our country. The analysis is based on official statistics recorded by the National Fisheries and Aquaculture Agency. Official fish catch statistics are considered proxy indicators of stock size and have been widely used to uncover patterns and trends in fisheries. (Christensen *et al.*, 2003, Pauly *et al.*, 2013; Tsikliras *et al.*, 2013)

Materials and methods
Materials
Fish data

The analysis of the fish catches' dynamics in 2008 - 2022 was made using the official records of the National Agency for Fisheries and Aquaculture [1].

Results and discussion

Total commercial catches from 2008 to 2022 range from a minimum of 2457 t (in 2010) to a maximum of 3868.51 t (in 2016). The multiannual average is ~3136.2 t. (Figure 1)
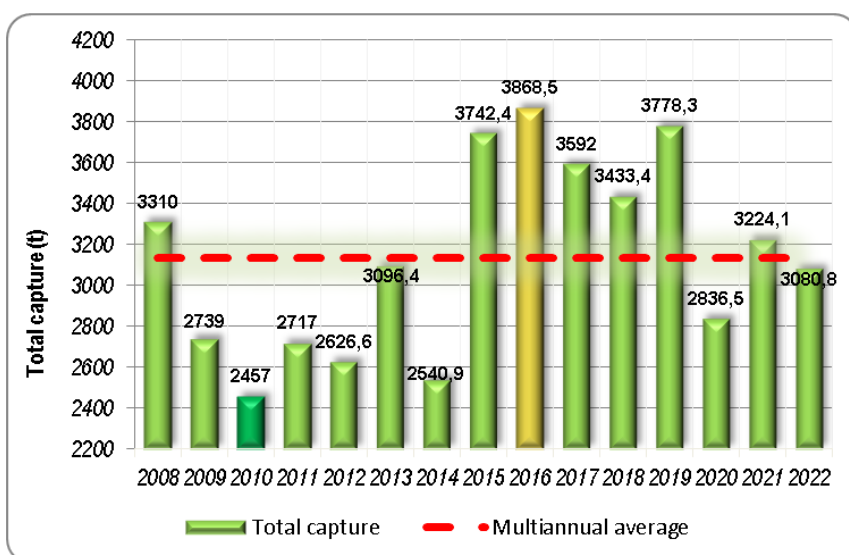
Figure 1. Annual catch dynamics (2008 – 2022)

It is observed that total catches vary from year to year. These oscillations are correlated with annual quota and fishing effort regulations.

Between 2008 and 2022, official catches included between 18 and 21 fish species, plus two more categories: "*other species*" and "*other cyprinids*" (which include small species that are not important for commercial fishing). The list of catches by species and categories is given in Table 1.

Table 1: Structure by categories and species of catches (in tonnes) of official catch

Freshwater species			
Non-predatory fish species	Capture (t)	% from category	% from total
Crucian carp	49	0,18	0,104
Common nase	71,35	0,17	0,152
Grass carp	73,39	0,176	0,156
Bleak	191,044	0,457	0,407
Tench	264,73	0,633	0,563
Rudd	311,147	0,745	0,662
Vimba bream	383,78	0,918	0,817
Bighead carp	486,42	1,164	1,035
Barbel	521,185	1,247	1,109
White bream	541,48	1,295	1,153
Silver carp	963,29	2,305	2,051
Carp	2861,91	6,848	6,092

Roach	2866,951	6,86	6,103
Freshwater bream	5074,27	12,142	10,802
Prussian carp	19331,14	46,259	41,154
Other freshwater species	1051,6	2,5165	2,239
Predatory fish			
Asp	379,11	0,907	0,807
European perch	612,58	1,466	1,304
Pike-perch	1696,93	4,06	3,613
Northern pike	1732,43	4,146	3,688
Wels catfish	2325,55	5,565	4,951
Marine species			
Pontic shad	5183,821	100	11,035
Total freshwater species	**41789,287**	**100**	**88,964**
Total marine species	**5183,821**		**11,035**
Total catches	**46973,108**		**100**

88.83% of the catches are represented by freshwater species, 11.02% migratory marine species (pontic shad) and crayfish 0.148% (figure 2).
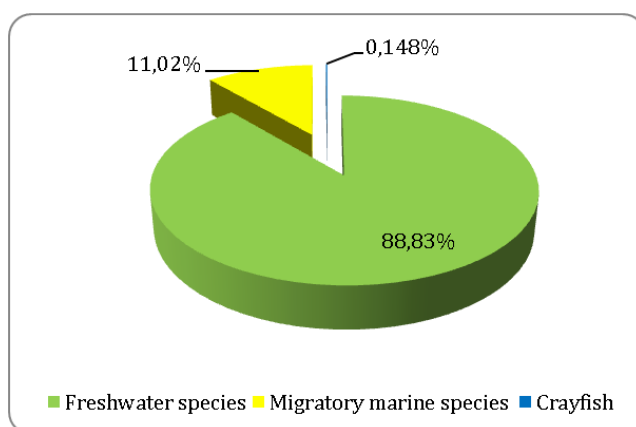

Figure 2: Structure of catches by categories

Freshwater catches are dominated by non-predatory fish species (78.36%), the percentage of predatory species being only 14.36% (excluding pontic shad which is ichthyophagous but is a migratory marine species).

The most abundant freshwater species are: crucian carp (41.15%) and freshwater bream (10.8%). These 2 species have percentages higher than 10%. They are followed by roach (6.1%), carp (6.093%), and silver carp (2.05%).
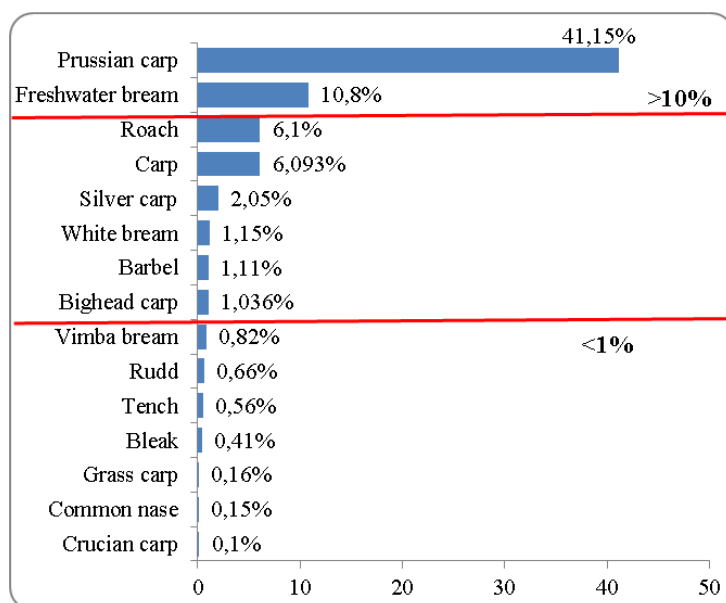
Figure 3: Abundance of non-predatory species in catches

Among the predatory (non-migratory) fish species, wels catfish is the most abundant in catches (4.95%), followed by northern pike (3.69%), pike-perch (3.61%), European perch (1.3%) and asp (0.81%).
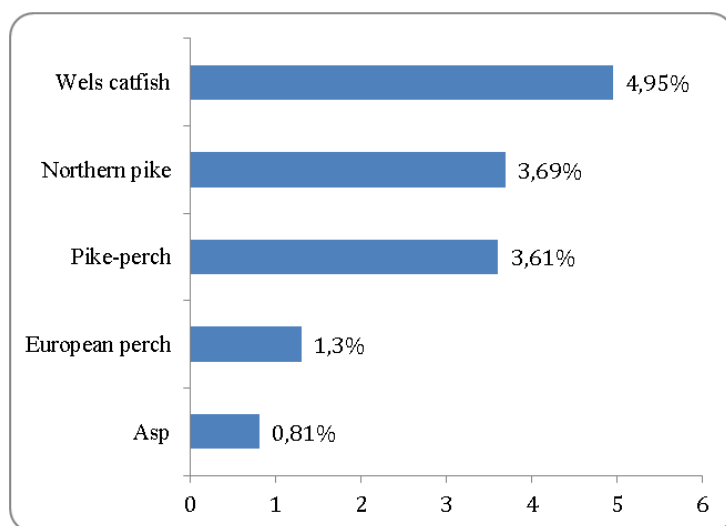

Figure 4: Abundance of predatory fish species

Conclusions

Commercial fishing in Romania is carried out exclusively by professional fishermen, and catches and fishing effort are regulated annually by specific normative acts.

From a quantitative point of view, the commercial catches ranged from 2,500 to 4,000 t, with a multi-year average of ~3,100 t.

The analysis of the taxonomic structure of the ichthyofauna reveals dominance of the Cyprinidae family (including allochthonous Asian species), with the highest relative abundance (88.96%).

Of these, crucian carp (*Carassius gibelio*) represents 41.15% of the total catches, freshwater bream (*Abramis brama*) – 10.8%, roach (*Rutilus rutilus*) – 6.1% and carp (*Cyprinus carpio*) – 6.093%.

It should be noted that although there are still many species in the catches, the percentage of crucian carp exceeds 40%, clearly showing its dominance. This dominance can lead to an imbalance in ichthyofaunal structure and a decrease in the biodiversity of aquatic ecosystems.

This is due to several characteristics that make the crucian carp an invasive species, to the detriment of those with greater economic value.

These characteristics include high tolerance to water pollution and temperature variations; competition for food (omnivorous species gradually eliminate more sensitive species); and high reproductive capacity (gynogenesis, several spawnings per season).

The trophic structure is completed by piscivorous species, with a significant relative abundance: wels catfish (*Silurus glanis)* – 4.95%, northern pike (*Esox lucius*) – 3.69% and pike-perch (*Sander lucioperca*) – 3.61%.

Acknowledgments

References

Christensen, V., S. Guenette, J.J. Heymans, C.J. Walters, R. Watson, D. Zeller and D. Pauly. 2003. A hundred-year decline of North Atlantic predatory fishes. Fish Fish., 4: 1−24.

Pauly, D., R. Hilborn and T.A. Branch. 2013. Does catch reflect abundance? Nature, 494: 303–306.

Tsikliras, A.C., V.Z. Tsiros & K.I. Stergiou. 2013. Assessing the state of Greek marine fisheries resources. Fish. Manage. Ecol., 20: 34-41

Internet:

[1] Statistical reports on total catches for commercial fishing 2008 – 2021 - The total catches reported by the authorized economic agents to practice the commercial fishing in the waters under the jurisdiction of Romania, available at https://www.anpa.ro/wp-content/uploads/2024/09/Pescuit-Com.-Ape-Interioare_08-22.pdf