

BULGARIAN BLACK SEA GOBIES AS IMPORTANT OBJECT IN THE COMMERCIAL FISHING

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Abstract

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According to the official sources (National Agency of Fisheries and Aquaculture) gobies in the industrial fish catches take second place only after the sprat. In fact these catches are much higher, because the registered in the NAFA landings are less than 10% (unofficial data). This is the first in-depth survey on the gobies in Bulgaria, aimed to give information about the species composition in angling and commercial catches. It covered most of the Bulgarian Black Sea coastline for the period 2009-2012. The study sites, equipment and techniques were chosen to be as close as possible to these of the local fishermen, observations on the local markets and interviews with fishermen were also carried out. 8 of the 24 native to Bulgaria goby species were presented in the sampling. The largest percentage has taken the round goby (*Neogobius melanostomus*), followed by the black goby (*Gobius niger*), the giant goby (*Gobius cobitis*) and the mushroom goby (*Neogobius eurycephalus*); smaller part was taken by the knout goby (*Mesogobius batrachocephalus*). The smaller quantities were established for the grass goby (*Zosterisessor ophiocephalus*), broad-headed (Pinchuk's) goby (*Neogobius cephalargoides*) and rock goby (*Gobius paganelus*). Also there are clear indications for overfishing of this fish resource.

Key words: Black Sea, family Gobiidae, gobies, industrial fishing

Introduction

Family Gobiidae is one of the largest taxons of fish and vertebrate animals. It consists of more than 2000 species combined in more than 200 genera (Nelson, 1994). The gobies are small sized fish, rarely more than 11 cm in length. Most of them are marine species, but there are also brackish and freshwater. Their distribution covers the tropical, subtropical and temperate waters of the world ocean and they are one of the key elements of the benthic ichthyofauna (Nelson, 1994). In 1912 Chichkov presented the first official data on the gobiid ichthyofauna in Bulgaria (Gheorghiev, 1966). In the following years the knowledge on the gobies is expanded (Drensky, 1923, 1931). In 1966 Gheorghiev published to that point the largest and most informative study on the family Gobiidae in Bulgaria. He gave detailed information about the systematic, distribution, biology and ecology

of the Bulgarian gobies and stated that the taxonomy of the group is very poorly studied. According to last and actualized data (Vassilev and Pehlivanov, 2005; Vassilev et al., 2011) in Bulgaria there are living 24 goby species distributed in 11 genera. 8 of them are target species for intensive industrial and recreational fishing: giant goby (*Gobius cobitis* Pallas, 1814), black goby (*Gobius niger* Linnaeus, 1758), rock goby (*Gobius paganelus* Linnaeus, 1758), knout goby (*Mesogobius batrachocephalus* Pallas, 1814), round goby (*Neogobius melanostomus* Pallas, 1814), broad-headed (Pinchuk's) goby (*Neogobius cephalargoides* Pinchuk, 1976), mushroom goby (*Neogobius eurycephalus* Kessler, 1874), grass goby (*Zosterisessor ophiocephalus* Pallas, 1814).

Until this point the fishermen divide the goby species in their catches to two "categories": "Lihnus" (*M. batrachocephalus*) and "popcheta" (gobies), and doesn't make difference between separate species. The importance of this study

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is that it is the first to give clear view on the goby species and their abundance represented in the industrial and angling catches.

According to NAFA (National Agency of Fisheries and Aquaculture) (Figure 1) in 20s – 30s years of the XX century the catches of gobies in the Bulgarian Black Sea coast varied from 40 to 140 tons per year (t/y). In 40s – 50s the catches increased up to 120-150 t/y. In 60s of XX century the goby catches decreased to 87 t/y. In the 90s the catches increased several times – from 380 up to 639 t/y. According to last data the catches for the period 2003-2011 were between 26 and 125 t/y.

The economic importance of the gobies is primarily for the local communities and cities. For the Bulgarian marine industrial fishing they are the second largest object after the sprat (*Sprattus sprattus* Linnaeus, 1758), but in recent years they

decreased reversely to the horse mackerel (*Trachurus mediterraneus* Steindachner, 1868) and the red mullet (*Mullus barbatus* Linnaeus, 1758) (NAFA data in the online journal <http://bgfermer.bg>). The realization of the gobies in Bulgaria is as fresh fish in the markets, while in some other Black Sea countries (Ukraine and Russia) some of the gobies are resource for the can food industry. The gobies are important object for recreational activities with social significance such as angling or spearfishing, and some are desired objects by the aquarists.

Materials and Methods

For the period 2009–2012 were conducted ichthyological surveys that covered most of the Bulgarian Black Sea coastline. The species were primarily determined *in-situ*, but a part

Table 1
Goby catches according to site and fishing method for the period 2009-2012

Localities	Date	Type	Duration (h)	Depth (m)	Substrate	NM		GN		GC		MB		NE		GP		ZO	
						N	W (g)	N	W (g)	N	W (g)	N	W (g)	N	W (g)	N	W (g)	N	W (g)
Primorsko	V. 2009	GN	12	4	SR					1	158								
Tsarevo	V. 2009	GN	12	10	SR	36	1850					6	700						
Primorsko	V. 2009	GN	12	6	R	3	125			2	235								
Sinemorets	V. 2009	GN	12	5	R	15	1050			3	195								
Perla	VI. 2009	GN	12	6	SR	5	235			1	75								
Sinemorets	VI. 2009	GN	12	5	SR	8	395	10	360	1	105	3	290						
Shkorpilovtsi	VI. 2009	GN	12	18	SR	10	460	4	205										
Shkorpilovtsi	VI. 2009	GN	12	12	R	115	3565	12	380										
Primorsko	IV. 2010	GN	12	4,5	SR	1	37												
Primorsko	IV. 2010	GN	12	7	R	7	150	5	105										
Durankulak	VI. 2010	GN	12	4,5	SR	31	1190	1	15	1	20	1	175						
Shabla	VI. 2010	GN	12	7,5	R	9	213	19	209										
Primorsko	VI. 2010	GN	12	11	SR	2	45												
Kiten	VI. 2010	GN	12	4,5	R	7	135			20	1750								
Perla	VI. 2010	GN	12	7,5	R	15	395			7	245								
Sozopol	VI. 2012	GN	20	6-10	SR	9	342							1	66				
Primorsko	V. 2012	FT	2	4-8	SShR	4	152	2	55	2	263					3	90		
Sinemorets	V. 2012	FT	12	6-12	R					4	527	6	682	4	264				
Perla	VI. 2012	FT	12	2-4	SR	21	798							1	66				
Kamchia	VI. 2012	FT	12	4-6	SA	5	190												
Tulenovo	VI. 2012	FT	12	4-8	SR	36	1368					1	122	10	660				
Shabla	VI. 2012	FT	8	4-8	SFS	51	1938					4	488	21	1386				
Pomorie	V. 2012	FT	8	3-5	SZ	11	418											2	232
Sozopol	VI. 2012	SF	3	2-8	SR	2	76			1	131								
Tulenovo	VI. 2012	SF	3	2-8	ShR	15	570	1	27	1	131			3	198				

The following abbreviations are used: for fishing technique – GN (gill nets), FT (fish traps) and SF (spearfishing); for type of substrate – R (rocks), SR (sand and rocks), SShR (sand, shells and rocks), SA (sand and algae) and SZ (sand and zosteria bed); N (number of specimens); W (weight); for the fish species – NM (*Neogobius melanostomus*), GN (*Gobius niger*), GC (*Gobius cobitis*), MB (*Mesogobius batrachecephalus*), NE (*Neogobius euryccephalus*), GP (*Gobius pagannellus*) and ZO (*Zosterisessor ophiocephalus*)

of the specimens were preserved for laboratory analyses. Sampling was carried out by spearfishing, gill nets (bottom, 3-layer, with 25 mm size of the “eye” in the middle layer) or with a line of fish traps with dimensions 80x40 cm, baited or not. The duration of the sampling was between 2 and 12 hours for nets and traps, and 3 hours for spearfishing (Table 1). Same type and same number (15) of fish traps were used among all samplings in order to standardize the catch. Same approach was applied to the nets – gill net 100 m long and 4m high. Catch per Unit of Effort of the respective gear was used. The study sites, equipment and techniques of fishing were chosen to be as close as possible to these of the local fishermen in order to collect adequate data for each specific location. We conducted observations on the local markets and interviews with local fishermen concerning the species composition in catches and their comparative partition.

Results and Discussion

The gobies are important object for the industrial and recreational fishing. Main industrial techniques for catching gobies are the use of bottom angling (“chukonta”), gill nets and fish traps. The fishermen that use nets and traps are obligated to have a license for industrial fishing from NAFA (Ministry of agriculture and food). The bottom angling is not regulated as industrial fishing. With this method fishermen catch mainly knout and round gobies. Our and published data of NAFA (in <http://shabla.be>) show that one angler can catch 8 or more kilograms of gobies per day only with a single pole, while the permitted quantity for a recreational fisherman is 3 kg of fish per day.

In the last few years there is a tendency toward mass use of fish traps instead of gill nets. This type of fishing have some advantages – selective goby fishing and avoiding the bycatch of the black scorpionfish (*Scorpaena porcus* Linnaeus, 1758) which enters the gill nets and is very difficult to be removed because of the many spikes with painful and poisonous sting that this fish have.

On the basis of the conducted research the gobies are a major fishing object for the Bulgarian marine industrial fishing. The collected data (Table 1) show that the round goby is the most abundant species, having presence in all the catches with comparative abundance 72% and biomass 60% of all the specimens. The second place is taken by the black goby with 9% and 5%, giant goby with 8% and 15%, mushroom goby with 7% and 10% respectively. As additional catch we register the knout goby (comparative abundance 3%, biomass 9%), grass goby (<1%, <1%) and rock goby (<1%, <1%) respectively. The type of the substrate define the presence of more specialized species such as the grass goby, which is

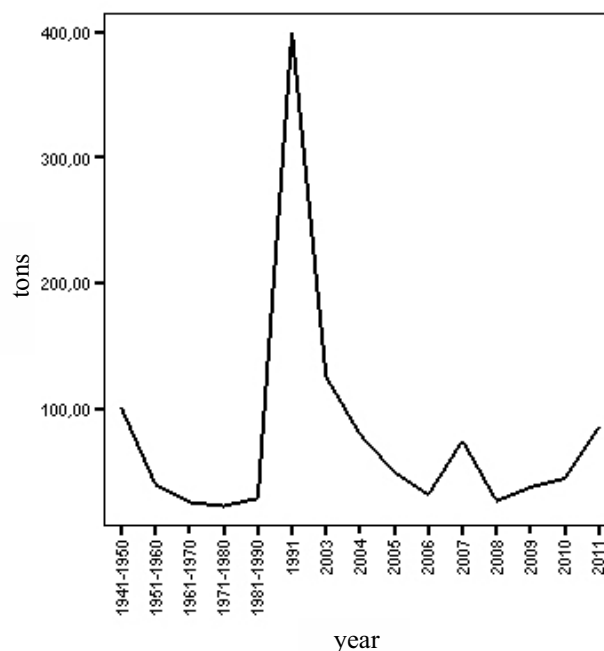


Fig. 1. NAFA data for the goby catches (tones per year) for the period 1941–2011

phytophilyc species, that live among sea meadows of *Zostera spp.*, while the rock goby is found exclusively on rocks. The round and black goby are more ecologically plastic species and inhabit different substrates.

From interviews and data collected during this project we know that one standard fish trap for exposure per night can catch as much as 5 kg of fish, as the main part of it are gobies and small percent is bycatch, consisting of the shore rockling (*Gaidropsarus mediterraneus* Linnaeus, 1758), whiting (*Merlangius merlangus* Linnaeus, 1758) and other fish. In the catches from the fish traps the biggest part is going to the round and mushroom goby, as in the catches sometimes enters single specimens of giant, grass, broad-headed, black and knout gobies. For exposure of 12 hours one fish trap catch average 2.3 round gobies, 0.04 black gobies, 0.1 giant gobies, 0.2 knout gobies, 0.66 mushroom gobies, 0.05 rock gobies and 0.04 grass gobies. Gill nets with length of 100 m for 12 hours average catch 16 round gobies, 3 black gobies, 2 giant gobies, 0.5 knout gobies, 0.06 mushroom gobies. For 3 hours of spearfishing one person catch 8.5 round gobies, 0.5 black gobies, 1 giant goby, 1.5 mushroom gobies, but this values can vary depending on the season, location and time of the day.

From our research we can state that the bottom angling technique catch primarily round goby, black goby and rarely

other species. In deeper waters this fishing method catches knout gobies. In some specific locations covered with sea grass (*Zostera* spp.) it catches exclusively grass gobies.

The conducted observations on the fish markets in Varna, Bourgas, smaller coast towns and even not regulated markets directly on the harbors, showed that the most common and with the highest relative percents in the catches is the round goby, followed by the mushroom goby (in the northern coastline) or the giant goby (in the southern coastline) and knout goby (also known as “Lihnus”). After these observations and interviews with fishermen we received the information that a big part of the catches are not declared and registered in the NAFA. According to unofficial data the fishermen declare not more than 10% of their catches. The catches of the anglers are not known and controlled, sometimes can be quite big as mentioned above and they must not be underestimated.

Conclusion

This study is one of the first in-depth researches of the gobies as object of fisheries in Bulgaria and showed that they are important for the fishing industry and local communities. The significant decrease of the goby catches in the last years shows a clear overfishing in the past. Negative influence on the goby populations now has the poaching and the unregulated fishing. We recommend to the respective institutions and municipalities to take immediate actions such as: to hold a discussion with the scientists, government and municipality representatives, and fishermen in order to give the clear view to the question in all the concerned sides, to create and establish a program for sustainable development of this important resource and in general for the protection of the coastline habitats and to take actions toward increasing

the knowledge of the people about this and similar environmental problems.

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