THE FIRST CAPTURE OF THE WHITING *MERLANGIUS MERLANGUS* (GADIFORMES: GADIDAE) IN THE DVINA BAY OF THE WHITE SEA

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Received February 05, 2024

Revised March 21, 2024

Accepted Match 22, 2024

Whiting (*Merlangius merlangus* Linnaeus, 1758) was first recorded in the Dvina Bay of the White Sea in May 2015. In June and August 2023, four more specimens were caught in the apex of the Dvina Bay. The paper presents morphometric and some biological data on the preserved specimen. The whiting is characterized by a southern boreal distribution and is not a typical representative of the White Sea ichthyofauna. Apparently, its captures are associated with the introduction of juveniles into the White Sea.

Keywords: whiting, *Merlangius merlangus*, morphology, Dvina Bay.

DOI: 10.31857/S00428752250109e8

INTRODUCTION

Whiting *Merlangius merlangus* (Linnaeus, 1758) is a marine, bottom-pelagic, south boreal, European species (Andriashev, Chernova, 1994). It is widely distributed around Europe, reaching the southwestern part of the Barents Sea (Kola Bay) to the north (Andriashev, 1954; Mecklenburg et al., 2018). It was first caught in the White Sea in Kandalaksha Bay in 2013 (Chernova, 2023). Information on the occurrence of this species in other areas of the White Sea was previously absent. The aim of our work is to report the first catches in Dvina Bay of this thermophilic species, which is uncharacteristic for the White Sea fauna.

MATERIAL AND METHODOLOGY

Whiting specimens were caught by employees of the Northern Branch of the All-Russian Research Institute of Fisheries and Oceanography (VNIRO) during planned monitoring studies in the inner part of the Dvina Bay in Yandovaya Bay (Fig. 1). In May 2015, 1 specimen was caught in a herring weir (mesh size at the end 16 mm); information about this has not been previously published. Unfortunately, it was not possible to preserve the specimen, but this catch can be considered the first registration of whiting in the specified water area. In June 2023, 1 specimen of the species under consideration (Fig. 2) was caught in a fixed trap, and in August of the same year, 3 more specimens were caught with gill nets (mesh size 30 mm).

The specimen caught in June 2023 was fixed in a 4% formalin solution (3 specimens from the nets were not preserved). Biological and morphological analyses were performed according to generally accepted methods (Pravdin, 1966; Instructions..., 2004). Age determination was carried out using burnt otoliths (Christensen, 1964; Chilton, Beamish, 1982).

RESULTS AND DISCUSSION

The total body length of the fixed specimen was 15.0 cm, standard length (*SL*) – 13.7 cm, weight 21.3 g, age 1+, juvenile specimen. The otolith is shown in Fig. 3. The table presents values of 24 plastic and seven meristic features. Compared to specimens from the Kandalaksha Bay (Chernova, 2023), there are both matching indicators and those differing in greater or lesser directions. For example, the relative lengths of the head and snout coincide, while the length of the upper jaw in the specimen from the Dvina Bay is larger. The lengths of the bases of the 1st and 2nd dorsal fins are smaller (11.7 and 15.3% *SL* versus minimum values in specimens from the Kandalaksha Bay – 14.0 and 17.5% *SL* respectively), and the length of the base of the 3rd dorsal fin is larger (16.8% *SL* versus the maximum value of 15.4% *SL*). More than half of the fin ray

counts coincide. Overall, the morphometric indicators of the Dvina specimen do not exceed the known variation limits for the species.

Plastic and Countable Characteristics of Whiting *Merlangius merlangus* from the Inner Part of Dvina Bay of the White Sea

Characteristic	Value	Characteristic	Value
Body length, cm:		In % *SL*	
- total (*TL*)	15.0	Fin length:	
- according to Smith (*FL*)	14.7	- pectoral	15.3
- standard (*SL*)	13.7	- ventral	9.5
In % *SL*		Maximum fin height:	
Length:		- 1st dorsal	12.4
- head	27.0	- 1st anal	5.1
- snout	9.5	Distance:	
- upper jaw	12.4	- antedorsal	35.8
- lower jaw	8.8	- anteanal	35.0
- postorbital head section	10.2	- ventroanal	10.9
- caudal peduncle	15.3	Horizontal eye diameter	6.6
Body height:		Countable characteristics	
- maximum	19.7	Number of rays in fin:	
- minimum	5.1	- 1st dorsal	14
Fin base length:		- 2nd dorsal	17
- 1st dorsal	11.7	- 3rd dorsal	21
- 2nd dorsal	15.3	- 1st anal	32
- 3rd dorsal	16.8	- 2nd anal	22
- 1st anal	32.8	Number of gill rakers on 1st gill arch	21
- 2nd anal	16.8	Number of vertebrae	54

Whiting is not a typical representative of the White Sea ichthyofauna; our data expand the known area of its habitat in the White Sea. Apparently, catches of this species are accidental, similar to catches of mackerel (Fuks, 2005) or garfish (Dolgov, Zabavnikov, 2021) and are associated with the drift of juvenile whiting into the White Sea.

The appearance of thermophilic fish species in the White Sea is often associated with water temperature increases (Dolgov, 2016; Chernova, 2023). However, according to data from the Northern Branch of VNIRO, in 2023 in Yandovaya Bay during the research period, the average water temperature for the first half of June was 1°C lower than its five-year average value. So is

the appearance of whiting in the White Sea related to climate warming? Monitoring studies in subsequent years may provide an answer to this question.

FUNDING

This work was funded by the budget of the Northern Branch of VNIRO. No additional grants were received for conducting or supervising this specific research.

COMPLIANCE WITH ETHICAL STANDARDS

The collection and processing of material did not contradict international standards for animal treatment, in accordance with Directive 2010/63/EU of the European Parliament and of the Council of the European Union dated 22.09.2010 on the protection of animals used for scientific purposes (https://ruslasa.ru/wp-content/uploads/2017/06/Directive_201063_rus.pdf).

CONFLICT OF INTEREST

The authors of this work declare that they have no conflict of interest.

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FIGURE CAPTIONS

Fig. 1. Capture locations (☆) of whiting *Merlangius merlangus* in the inner part of the Dvina Bay.

Fig. 2. Whiting *Merlangius merlangus TL* 15 cm from the inner part of the Dvina Bay of the White Sea, June 2023.

Fig. 3. Otoliths of whiting (medial view) *Merlangius merlangus TL* 15 cm from the inner part of the Dvina Bay of the White Sea. Scale: 1 mm.