

Водные биоресурсы и среда обитания

2022, том 5, номер 4, с. 120–124

<http://journal.azniirkh.ru>, www.azniirkh.ru

doi: 10.47921/2619-1024_2022_5_4_120

ISSN 2618-8147 print, ISSN 2619-1024 online



Aquatic Bioresources & Environment

2022, vol. 5, no. 4, pp. 120–124

<http://journal.azniirkh.ru>, www.azniirkh.ru

doi: 10.47921/2619-1024_2022_5_4_120

ISSN 2618-8147 print, ISSN 2619-1024 online

Информационные сообщения

УДК 591.5:569.536

FIRST REPORT OF EPIMELETIC BEHAVIOUR IN A BLACK SEA HARBOUR PORPOISE (*PHOCOENA PHOCOENA RELICTA* ABEL, 1905) TOWARDS A DEAD CALF

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Abstract. The term “epimeletic” (“caregiving”) is used to represent a range of cetacean behavioural patterns directed at dead or distressed conspecifics, including accompanying, lifting to the surface, and protecting from apparent threats. This behaviour has been described in the literature for various cetacean species; however, such reports have not yet involved members of the Phocoenidae family. The Black Sea harbour porpoise (*Phocoena phocoena relicta* Abel, 1905) is an endangered subspecies that is endemic to the Black Sea. Despite the proximity of its habitats to the coast, many aspects of its biology, including behaviour, remain poorly studied. In this paper, we present the first report of epimeletic behaviour in a wild Black Sea harbour porpoise towards a dead calf. The observation took place during the marine mammal stranding network operation off the Crimean coast in July 2018. A recently deceased harbour porpoise calf was found floating on the water surface close to the shore, where it was escorted by a live adult porpoise. We performed a physical examination and an autopsy of the calf, which revealed pulmonary edema, esophagitis, and enteritis. Milk was present in the stomach, indicating recent feeding. We assume that the adult individual could be a lactating female. This observation is probably the only indication to date of the possibility of wild harbour porpoises showing epimeletic behaviour towards dead calves, which emphasizes the importance of conducting wider in-depth studies on their behavioural characteristics and social interaction.

Keywords: harbour porpoise, Black Sea, cetaceans, epimeletic behaviour, marine mammals, *Phocoena phocoena*

ПЕРВЫЙ СЛУЧАЙ РЕГИСТРАЦИИ ЭПИМЕЛЕТИЧЕСКОГО ПОВЕДЕНИЯ ЧЕРНОМОРСКОЙ МОРСКОЙ СВИНЬИ (*PHOCOENA PHOCOENA RELICTA* ABEL, 1905) В ОТНОШЕНИИ ПОГИБШЕГО ДЕТЕНЬША

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Аннотация. Термин «эпимелетический» («поддерживающий») используется для обозначения ряда поведенческих паттернов китообразных по отношению к мертвым или умирающим сородичам, включая их сопровождение, поддержку на поверхности воды и попытки защиты от очевидной угрозы. В литературе данный тип поведения был описан для различных видов китообразных, однако подобные сообщения еще не затрагивали представителей семейства Phocoenidae. Черноморская морская свинья (*Phocoena phocoena relictata* Abel, 1905) — эндемичный для Черного моря подвид, чья численность постоянно сокращается. Несмотря на близость местообитаний азовки к побережью, многие аспекты ее биологии, включая поведение, остаются малоизученными. В данной работе мы приводим первое описание эпимелетического поведения черноморской морской свиньи относительно мертвого детеныша. Наблюдение состоялось в рамках работы сети мониторинга выбросов китообразных на побережье Крыма в июле 2018 г. Свежий труп молодой азовки был найден в воде на расстоянии от берега, где его сопровождала живая взрослая особь. Нами были проведены физикальный осмотр детеныша и патологоанатомическое вскрытие, по результатам которого выявлены отек легких, эзофагит и энтерит. В желудке присутствовало молоко, свидетельствующее о недавнем кормлении, на основании чего мы предполагаем, что сопровождающая особь могла являться кормящей самкой. Сегодня это наблюдение, вероятно, является единственным указанием на возможность проявления дикими морскими свиньями поддерживающего поведения в отношении погибшего потомства, что напоминает о важности проведения более широких и углубленных исследований социального взаимодействия и поведенческих особенностей данного вида.

Ключевые слова: морская свинья, азовка, Черное море, китообразные, эпимелетическое поведение, морские млекопитающие, *Phocoena phocoena*

INTRODUCTION

The harbour porpoise is a relatively small cetacean with a rounded head and a short rostrum, small spatulate teeth with a flattened crown, rounded pectoral fins and a low triangular dorsal fin. These characteristics separate them from dolphins, which are generally larger and tend to have longer tapered rostra and cone-shaped teeth [1]. Harbour porpoises have shorter gestation, lactation periods and lifespans than most other cetaceans [2]. Little is known about porpoise species compared to many dolphin species as they generally exhibit elusive behaviour, avoid human attention, and are rarely active near the water surface, with the exception of respiration, which limits the possibilities for studying their behaviour. However, the finless porpoise and the harbour porpoise have been kept in human care for many years with success, contributing to knowledge on their social interactions, breeding behaviour, and sensory physiology [1].

In the wild, porpoises usually tend to occur in small fluid groups of 1–10 individuals. The only strong bond between individuals seems to be formed by mother–calf pairs that possibly stay together for 1 year until the next calf is born or possibly 2 years if the female becomes pregnant every other year [3, 4].

To date, harbour porpoise is the most well-studied species of the Phocoenidae family, with representatives of the subspecies *P. p. relictata* Abel, 1905, which distinction is based on a number of morphological and genetic characteristics, being the smallest cetacean of the Azov and Black Sea Basin. Despite the extensive studies on the Black Sea harbour porpoise biology, published data on its behaviour in the natural environment are almost completely absent—little is known about it at the individual and social group levels. In this paper, we describe the behavioural responses of a wild Black Sea harbour porpoise (presumably a lactating female) to a dead calf.

MATERIALS AND METHODS

Since April 2017, we conduct a year-round cetacean stranding network operation in the Republic of Crimea. The data on dolphin and porpoise stranding are received by the organization's hotline directly from vacationers, local residents, employees of government agencies, and through the Integrated Duty Dispatcher Service (IDDS). The stranded mammals are regularly examined.

On July 24, 2018, stranding network coordinators received a message about a dead porpoise calf near Solnechnogorskoe Settlement (Alushta District).

The deceased animal was sighted in the water at a distance of about thirty meters from the shore. During the entire observation period, an escorting live adult porpoise was in close proximity to it (the sex could not be reliably identified). Stranding network coordinators received a video recording of its behaviour. According to the materials obtained, the adult animal had normal swimming pattern and adequate respiratory rate; any external visible signs of exhaustion and/or diseases were absent. When it became apparent that the calf was dead, the observers made the decision to remove it from the water (fig. 1).



Fig. 1. Escorting porpoise and the eyewitness carrying the dead calf to the shore. Solnechnogorskoe, the Republic of Crimea

Рис. 1. Сопровождающая азовка и очевидец, толкающий к берегу мертвого детеныша. Пос. Солнечногорское, Республика Крым

When people entered the water and approached, despite a potential threat, the adult porpoise continued to stay nearby even when the distance to them was reduced considerably. Eyewitnesses slowly began to move the dead calf towards the shore. At the same time, the adult individual was observed to exhibit accelerated, agitated swimming along its previous trajectory. Since the observation took place in the evening, the rapid onset of darkness made it impossible to estimate how long the adult porpoise continued to stay near the site. At our request, the eyewitnesses put the dead calf in a cool place and covered it with a wet cloth. Due to technical impossibility of its on-site autopsy, the body was

frozen at $-20\text{ }^{\circ}\text{C}$. The autopsy was performed later on April 29, 2019 (fig. 2).

RESULTS AND DISCUSSION

During the examination, we found that the dead individual was a female with the body length of 71.5 cm, in good physical condition and in a normal state of nutrition. On the basis of the available literature data [5], the female was classified as a neonate in the first month of life, which was evidenced by a combination of characteristics, such as its body length, recently healed umbilical wound, and unerupted teeth. Autopsy and macroscopical examination revealed pulmonary edema, esophagitis, and enteritis. Milk



Fig. 2. Deceased female porpoise taken out of water and prepared for its autopsy

Рис. 2. Труп самки азовки, извлеченный из воды и доставленный для проведения аутопсии

was present in the stomach, indicating recent feeding. It is impossible to speak definitively about the cause of death without histological examination, but we can rule out starvation due to the loss of a nursing female, which is a common cause of death among the Black Sea harbour porpoise calves in spring and summer, probably resulting from gillnet bycatch [6, 7]. Female caregivers are often inferred to be the mothers of the dead or dying calves, but parenthood is rarely confirmed [8]. Since the calf fed on milk shortly before death, we assume that the adult individual could be a lactating female, and her behavior was caregiving, based on the motives of the epimeletic type. The term “epimeletic” (but also “caregiving,” “supporting,” “nurturant”) has been employed with reference to cetacean behaviour toward the dead or dying. This is an umbrella term characterizing a range of behavioural patterns encompassing rescue attempts, postmortem bereavement, the use of surrogates, and compulsive stereotypic behavior [9]. Caldwell and Caldwell [10] divided the epimeletic behaviour of cetaceans into 3 categories: 1) “standing by” (animals remain close to the distressed individual, accompanying it but not providing aid); 2) “excitement” (rapid circling the distressed individual, displaying aggressive behavior towards an apparent threat (e. g., approaching boat or diver); and 3) supportive behavior (keeping on the surface of the water). Epimeletic behaviours also include prolonged contact with a dead individual (including decomposed) and are often observed in cetaceans, frequently with a female caregiver

(presumed mother) supporting a dead calf by carrying, lifting, or sinking it, generally accompanied by other escorting individuals [11]. The most common target (age) group of death-related supportive behaviour toward dead conspecifics is newborns, which may be due to the higher mortality rate in newborns than in older calves and juveniles [12, 13]. In cetaceans, these types of behavior are best described in bottlenose dolphins *Tursiops truncatus* and short-finned pilot whales *Globicephala macrorhynchus*, and, to a lesser extent, in a number of other species; however, there were no published reports concerning harbour porpoises.

In the social system of dolphins, like in all mammalian social systems, the mother–calf bond is the core unit [14]. Strong social bonds, prolonged periods of maternal care (a long phase of immaturity), and even apparent training to hunt have been extensively recorded for several species of cetaceans [15–18], but are less well-known for elusive species such as the harbour porpoise. The process of juveniles learning hunting has been described for harbour porpoises in the North Sea: the adult female was observed releasing live caught fish in front of her calf, giving it a chance to catch (or miss) the prey instead of feeding it directly [19]. The available research on the behavior of porpoise mother–calf pairs indicates that, despite the generally accepted idea of them as animals without strong social relations, the bond between female porpoises and their offspring can be as strong as in other cetaceans.

The existence of epimeletic behaviour towards dead individuals in harbour porpoises is a reminder of the importance of conducting wider and in-depth studies on their behavioural characteristics and social interaction, which is extremely relevant for the subspecies inhabiting the Azov and Black Sea Basin.

ACKNOWLEDGMENTS

The authors express their gratitude to Kelyukh Ekaterina Denisovna for her assistance in translating the article into English.

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Поступила 05.07.2022

Принята к печати 03.08.2022