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The Hawksbill Turtle (*Eretmochelys imbricata*) in the Russian Far East and Other New Sea Turtle Records

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Abstract—Between 2018 and 2023, four new records of sea turtles (Dermochelyidae, Cheloniidae) belonging to three species (*Dermochelys coriacea*, *Chelonia mydas*, and *Eretmochelys imbricata*) were recorded in waters of the Russian Far East. The hawksbill turtle (*E. imbricata*) is reported from Russia for the first time. This adult female was caught by fishermen in the strait between Kunashir and Shikotan islands. An adult specimen of *D. coriacea* was captured in nets in the Kunashir Strait of the Sea of Okhotsk near the village of Tretyakovo. Several skeleton fragments of *Ch. mydas* were found near the Alyokhin Cape of Kunashir Island. The green turtle, *Ch. mydas*, is recorded from the Kuril Islands for the first time, and it is very likely that specimen belongs to the Pacific subspecies, the black turtle, *Ch. m. agassizii*. Another species of sea turtle, the olive ridley, *Lepidochelys olivacea*, is also likely to occur in the southern part of the Far Eastern sea area. The leatherback turtle, *D. coriacea*, is the only species regularly entering Russia's waters and has been recorded at least two dozen times in the Sea of Japan, the Sea of Okhotsk, and the Bering Sea, and in the Pacific waters of the Russian economic zone near the southern Kuril Islands. Two other species, the loggerhead, *Caretta caretta*, and the green turtle, *Ch. mydas*, have been recorded only a few times. The actual number of sea turtles entering Russia's waters is higher than the number given in official sources. The tendency for sea turtle records to increase in the temperate and subarctic zones seems to be associated with increased fishing in the region. Bycatch study in temperate and subarctic zones may provide new information on the distribution and biology of sea turtles in the north and also allow for methods for reducing accidental turtle mortality to be developed.

Keywords: hawksbill turtle, *Eretmochelys imbricata*, sea turtles, Cheloniidae, Dermochelyidae, Far East, Russia

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INTRODUCTION

The world fauna of modern sea turtles includes seven species from two families: Dermochelyidae (one species) and Cheloniidae (six species) (Rhodin et al., 2021), and near the coast China, Japan, and Korea in East Asia, only five species are found: the leatherback turtle (*Dermochelys coriacea* (Vandellius 1761)); loggerhead turtle (*Caretta caretta* (Linnaeus 1758)); green turtle (*Chelonia mydas* (Linnaeus 1758)); Hawksbill (*Eretmochelys imbricata* (Linnaeus 1766)), and the olive ridley (*Lepidochelys olivacea* (Eschscholtz 1829)) (Zhao and Alder, 1993; Goris and Maeda, 2004; Chan et al., 2007; Cheng and Chen, 1997; Mortimer and Donnelly, 2008; Saito et al., 2018; *Krasnaya kniga...*, 2020; Il-Hun et al., 2020; Wang et al., 2021, 2021; Rhodin et al., 2021). Three species of sea turtles were recorded in Russian waters, two species each in the Black and Barents seas, and all three species in Far Eastern waters. All species of sea turtles continue to show a downward trend in numbers and have a high conservation status: *Dermochelys coriacea* and *Eretmochelys imbricata* are Critically Endangered (CR), *Caretta caretta* and *Lepidochelys olivacea* are vulnerable (VU), and *Chelonia mydas* is Endangered (EN) (Abreu-Grobois and Plotkin, 2008; Casale and Tucker, 2017; Mortimer and Donnelly, 2008; Seminoff, 2004; Wallace et al., 2013).

For the Russian marine area, regular visits are typical only for *Dermochelys coriacea* (Terentyev and Chernov, 1949; Bannikov et al., 1977; Borkin and Basarukin, 1986; Kuzmin, 2002; Kharin, 2008). Two other species, *Caretta caretta* and *Chelonia mydas,* were recorded only a few times (Ananjeva et al., 2006; Kharin, 2008; Kharin and Vyshkvartsev, 2012; Malandziya et al., 2012; Pestov and Kletnoi, 2012; Dunaev and Orlova, 2021). All three species have also been observed in Far Eastern waters. *Dermochelys coriacea* has been recorded at least two dozen times in the Sea of Japan, the Sea of Okhotsk, and the Bering Sea, as well as in the Pacific waters of the Russian eco-

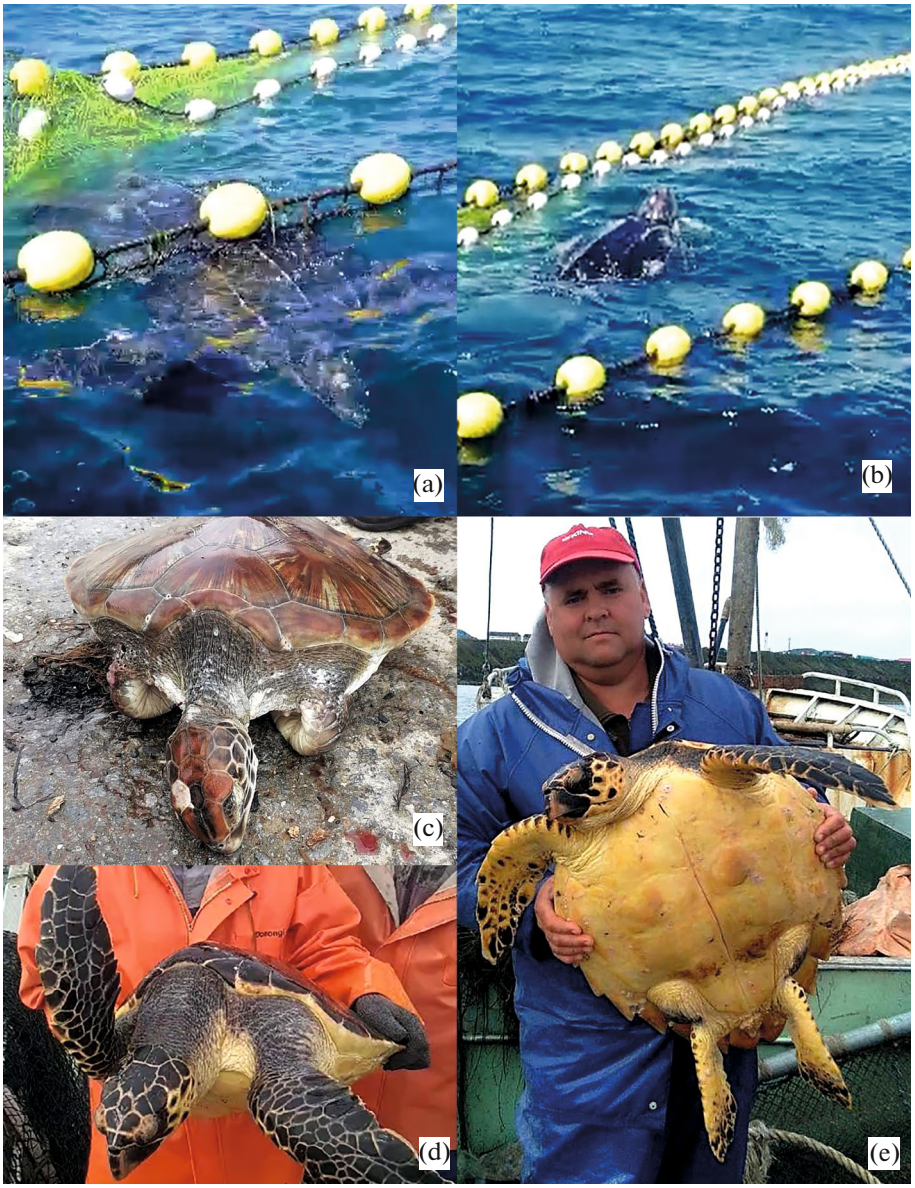

Fig. 1. Sea turtles recorded in Russian Far Eastern waters in 2018–2023: (a–b) *Dermochelys coriacea*, caught in nets in the Kunashir Strait in 2018; (c) dead female *Chelonia mydas* in the vicinity of the city of Nakhodka in 2023; and (d–e) *Eretmochelys imbricata*, caught in a net in the strait between the islands of Kunashir and Shikotan in 2023.

nomic zone in the area of the southern Kuril Islands (Emelyanov, 1937; Borkin and Basarukin, 1986; Sheiko and Nikanorov, 2000; Kharin, 2008; Poltev et al., 2010; Tokranov, 2015). On the contrary, the approaches of *Caretta caretta* and *Chelonia mydas* in the Sea of Japan in the southern part of Primorskii krai are extremely rare. The loggerhead turtle was discovered on August 28, 1940, in Manchzhur Bay (Sosnovskii, 1943), the shell of a green turtle was found in Novgorod Bay in mid-June 2012 (Kharin and Vyshkvartsev, 2012). It is believed that the increased frequency of encounters with sea turtles in temperate and subarctic waters since the 1970s is associated with increased fishing, as well as warm currents, periodic warming of sea water, and even global warming (Borkin and Basarukin, 1986; Kharin and Vyshkvartsev, 2012; Tokranov, 2015).

On September 20, 2018, fishermen from coastal fishing teams of the local fish processing plant (foreman M.O. Permin, LLC PCF Yuzhno-Kurilskii Fish Processing Plant) on the Sea of Okhotsk side of Kunashir Island in the Kunashir Strait near the village of Tretyakov (Yuzhno-Kurilsk urban district, Sakhalin region) (*Arkhiv...,* 2018), an adult specimen of *Dermochelys coriacea* was caught. Based on the available photo and video materials, we calculated the approximate length of the carapace at about 1 m (Figs. 1a, 1b). The turtle was not injured and swam away, after the

fishermen freed her. This is already at least the 16th documented encounter of the species in Russian waters (Borkin and Basarukin, 1986; Sheiko and Nikanorov, 2000; Kharin, 2008).

On July 24, 2023, in the vicinity of the town of Nakhodka, local residents discovered a dead sea turtle that had washed up on the shore of Tungus Bay (Fig. 1c). It turned out to be a subadult female green turtle (*Trepang DV,* 2023). Two large prefrontal scales are clearly visible on the turtle's head. The occipital scale is absent. The nape scale does not make contact with the first costal scute, and there are four costal scutes on the carapace. The carapace length is about 0.6 m. The turtle has the light body coloration characteristic of the species (Pritchard and Mortimer, 1999; Wyneken, 2001, 2003).

On September 21, 2023, in the strait between the islands of Kunashir and Shikotan, in the area of the South Kuril Cape in the net for fishermen of LLC PCF Yuzhno-Kurilsk Fish Processing Plant, another large sea turtle was caught. A video recording of this event was posted on the Telegram social network on the Trepang DV public site (*Trepang DV,* 2023a) (Figs. 1d, 1e). The turtle got trapped and could not get out on its own. The fishermen removed the turtle from their gear and released it into the ocean, as the fishing brigade leader I.Yu. Matveytsev reported to the staff of the Kuril Reserve. According to him, in 12 years of work at this location, this was the first time the team had caught such a marine reptile. The turtle turned out to be an adult female hawksbill turtle with a carapace length about 0.8 m. The turtle has features typical of the hawksbill turtle (Pritchard and Mortimer, 1999; Wyneken, 2003)—two claws on the forelimbs, three postorbital scales, four costal scutes, a serrated edge of the carapace, a short tail, and a yellowish body color. This is the first registration of *Eretmochelys imbricata* in Russian waters.

Finally, on September 17, 2023, on the territory of the Kurilskii State Nature Reserve in the area of Cape Alekhina on the Okhotsk coast of the Sea of Okhotsk of Kunashir Island, an employee of the Pobeda Sakhalin Museum and Memorial Complex, I.A. Samarin, discovered several fragments of the skeleton of a relatively recently deceased sea turtle: one left costal plate (IV) and three right costal plates (III–V) in articulation, six right marginal plates (I–VI), and a left hypoplastron (Fig. 2). The free ends of the ribs on the costal plates are almost not preserved and, judging by the remains, were damaged by some predator that gnawed the bones of an already dead turtle. The shape of the elongated internal processes of the hypoplastron, as well as, probably, the wide fontanelles on the carapace, allows us to attribute the remains to a green turtle (Zangerl, 1958). The scalloped carapace skeleton characteristic of this species is not noticeable due to the broken ends of the ribs.

The actual number of sea turtles swimming in Russian waters is higher than official sources indicate. Thus, Borkin and Basarukin (1986) indicated that, according to survey data from fishermen and captains of fishing vessels, encounters with these reptiles in the area of the southern Kuril Islands are not such a rare occurrence. Unfortunately, in those cases where turtles were captured, they were either used for food or ended up in private collections. Naturally, no reports of these records were made to the press or to museums. First of all, these indications concerned leatherback turtles, which were repeatedly recorded in subarctic and temperate waters, rising to the Sea of Okhotsk and Bering Sea (Kharin, 2008; Poltev et al., 2010; Tokranov, 2015), while loggerhead and green turtles were recorded only occasionally in Peter the Great Bay in the Sea of Japan in the southern part of Primorskii krai (Sosnovsky, 1943; Kharin and Vyshkvartsev, 2012).

The rarity of encounters in the north of the hawksbill turtle, the southernmost species of sea turtle encountered in Russian waters, is probably due to its greater thermophilicity (Mortimer and Donnelly, 2008). However, this species is characterized by very long migrations. Previously, it was believed that the hawksbill is tied to coral reefs, which are its feeding grounds and are located close to breeding sites. Subsequently, high migration activity of *E. imbricata* was demonstrated, primarily by males migrating thousands of kilometers from breeding sites (Plotkin, 2003).

The discovery of a green turtle on Kunashir Island is especially interesting (Fig. 3). This is not only the first discovery of a green turtle on the Kuril Islands, but also the northernmost discovery of this species in Asia. The nearest permanent habitats in Japan are located in the southern part of Honshu Island (Goris and Maeda, 2004), and the nearest points of discovery outside the main range are known from the east coast of Honshu up to 40° N. (Hayashi and Yasuda, 2021). It should be noted that the Pacific part of the range of the green turtle, including the east coast of Japan, is inhabited by another subspecies, the so-called black turtle (*Chelonia mydas agassizii* Bocourt 1868). This subspecies differs from the Japanese green turtle (*Chelonia mydas japonica* (Thunberg 1787)) with dark coloration and some morphometric features and is considered as a full species by a number of researchers (Pritchard, 2001; Okamoto and Kamezaki, 2014; Álvarez-Varas et al., 2019). Thus, the Kuril find is very likely to belong to a black turtle (*Ch. m. agassizii*), which has never before been registered in Russian territorial waters.

In addition, in the southern part of the Far Eastern marine area, another species may be found: *Lepidochelys olivacea*, as indicated by the recent registration of this species off the coast of South Korea (Il-Hun et al., 2020). The record of *Lepidochelys olivacea* in the

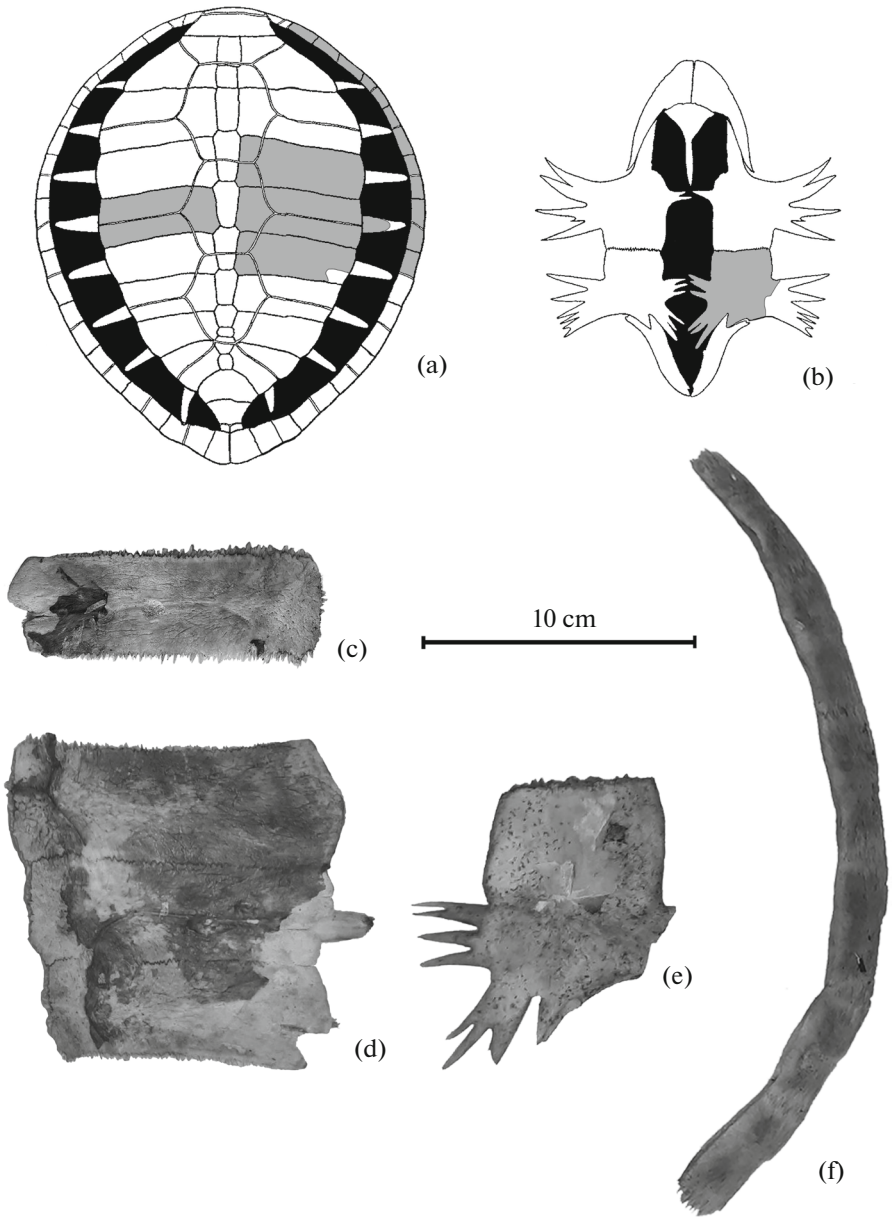

Fig. 2. Bone plates of *Chelonia mydas*, discovered on Kunashir Island in 2023: (a–b) diagram of the plastron and carapace of a green turtle by Zangerl, 1958 with modifications, the found plates are shaded in gray; (c) IV left costal plate; (d) III–V right costal plates; (e) left hypoplastron; (f) II–VII right marginal plates.

coastal waters of China coincides with the entry sites of other species of sea turtles (Wang et al., 2021), which were also registered in the Russian Far East.

The presence of turtles in marine waters of temperate and subarctic climates has been known for a long time. Thus, off the coast of northern Europe, as far as Ireland, Norway, and the Russian Barents Sea, *Caretta caretta* was recorded. *Chelonia mydas* was observed as far north as the British Isles; *Eretmochelys imbricata,* in the English Channel; and *Dermochelys coriacea,* off the coasts of Great Britain, Iceland, Norway, Denmark, Sweden, Germany, and the Netherlands, and was also recorded in the Barents Sea, Alaska, and Kamchatka (Lescure, 1997; Bannikov et al., 1977). According to recent research, the apparent undercount of sea turtles entering temperate and subarctic waters affects not only *Dermochelys coriacea*, but also *Caretta caretta*. The latter species is capable of migrating over significant distances. Thus, loggerheads, which appeared in large numbers in 2016 off the coast of San Diego, California, had arrived there from Japan rather than migrating from more southern Central American waters as originally thought. This was the beginning of a large-scale research experiment called

Fig. 3. Sea turtle discovery points 2018–2023: square, *Dermochelys coriacea*, Sea of Okhotsk, Kunashir Strait near the village of Tretyakov, 2018; black circle, *Chelonia mydas*, Sea of Japan, Tungus Bay, 2023; triangle, *Eretmochelys imbricata*, Sea of Okhotsk, South Kuril Cape, 2023; white circle, *Chelonia mydas*, Kunashir Island, Cape Alyokhina, 2023.

"Stretch" (http://turtle.hpa.edu/stretch), which is designed to test the "warm corridor" hypothesis, which suggests that El Niño and other periodic ocean warming events sometimes create a corridor of warm water cutting through the cold California Current, which allows migrating turtles that happen to be nearby to cross the barrier (Briscoe et al., 2021; Duncombe, 2021).

The trend towards an increase in the number of turtle encounters in the temperate and subarctic zones continues, which is explained by a significant increase in fishing. Over the past five years, from 2018 to 2023, three species of sea turtles have been recorded entering Russian Far Eastern waters (*Dermochelys coriacea*, *Chelonia mydas,* and *Eretmochelys imbricata*). Moreover, the hawksbill, caught by fishermen in the strait between the islands of Kunashir and Shikotan, was recorded for the fauna of Russia for the first time. In addition, for the first time, a green turtle has been registered for the Kuril Islands, and it is highly likely that this individual belongs to a Pacific subspecies, the black turtle (*Ch. m. agassizii*). In the southern part of the Far Eastern marine area, another species of sea turtle, the olive ridley, is also likely to appear. Studying bycatch in temperate and subarctic zones could provide new information on the distribution and biology of northern sea turtles and could lead to the development of methods to reduce incidental mortality of turtles.

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ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This work does not contain any human or animal studies meeting the criteria of Directive 2010/63/EU.

CONFLICT OF INTEREST

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

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