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Additional records of barnacles (Chelonibiidae, Coronulidae and Lepadidae) from stranded turtles around the British Isles

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ABSTRACT
Additional records of barnacles from turtles in British or Irish waters are presented. These include six turtle barnacle records that had been overlooked in a previous review in 2022 and four new records since 2022. The first records of the barnacles *Chelonibia testudinaria* from a green turtle (*Chelonia mydas*) and of *Platylepas hexastylos* from a Kemp's ridley turtle (*Lepidochelys kempii*) in U.K. waters are discussed. Details are also provided on *Lepas anatifera* and *L. hillii* specimens from a loggerhead turtle (*Caretta caretta*) which stranded on the Isle of Man in January 2016 and notes on new records of *Lepas* spp. from loggerhead turtles in Cornwall and Guernsey in 2022 and 2023. The susceptibility of loggerheads to goose barnacle infestation is discussed, as is the occurrence of Columbus crabs (*Planes minutus*) on loggerhead turtles.

INTRODUCTION

Marine turtles are rather unusual visitors to British seas, with the exception of the leatherback turtle (*Dermochelys coriacea*) which occurs regularly in the summer months. However, hard-shelled turtles are always accidental vagrants, with loggerhead turtles (*Caretta caretta*) being the most frequent, and smaller numbers of Kemp's ridley (*Lepidochelys kempii*) and green turtles (*Chelonia mydas*) also occurring on rare occasions. These latter species are not adapted to our colder waters and are often found in a cold-stunned state. On the other hand, large leatherback turtles can tolerate our cooler waters and intentionally visit the western coasts of Britain and Ireland in the summer to feed on jellyfish. All historical records of turtle sightings and strandings in British and Irish waters are collated in the British and Irish TURTLE Database (Pierpoint & Penrose, 2002) which now holds around 3,000 records from 1748 to 2024. Sightings and stranding of turtles between January 2000 and the end of 2024 showed 835 leatherbacks, 210 loggerheads, 62 Kemp's ridley, 12 green turtles, a single olive ridley (*Lepidochelys olivacea*), and 146 unidentified turtles. An analysis of the long-term records of turtles around the U.K. and Ireland was undertaken by Botterell *et al.* (2020).

Turtles can act as vectors of a variety of exotic epifauna, especially barnacles. Two types of barnacles may occur on turtles: stalked goose barnacles (Lepadoidea) and sessile acorn barnacles (Balanomorpha) (Chan *et al.*, 2021a). Many of the barnacles commonly found on turtles have cosmopolitan distributions and good illustrated keys for most barnacle species likely to occur on turtles in the North Atlantic are provided by Monroe & Limpus (1979) and Zullo (1979). In his synopsis of British barnacles, Southward (2008) cites only three balanomorph barnacle species recorded from turtles in British waters. Lepadoidea barnacles of the family Lepadidae attach to almost any floating objects, frequently including marine turtles (O'Reilly *et al.*, 2022), and in rare cases have even been found on an estuarine terrapin (Lamont *et al.*, 2021) and a trans-oceanic tortoise (Gerlach *et al.*, 2006). Most balanomorph barnacles found on turtles are from more specialised chelonophilic barnacle families (Chelonibiidae, Coronulidae) which occur only on turtle hosts (Zardus, 2021).

A tabulation of records of barnacles from turtles found in British and Irish seas was provided in O'Reilly *et al.* (2022), which cited 23 cases of turtles observed hosting barnacles since 1923. These included four balanomorph chelonophilic species and three lepadid goose barnacle species. This paper provides information on additional records of turtle barnacles in British waters that were overlooked in the 2022 review and other cases of turtle barnacles that have occurred since. The note was prompted by PD alerting MOR about an overlooked turtle barnacle record from the Isle of Man in 2016. Further overlooked and new records were found by a re-examination of Brongersma (1972), a renewed search of the TURTLE Database, and annual reports on British and Irish marine turtle strandings and sightings webpages (https://strandings.com/annual-reports/ or www.UKTurtles.online) as well as checking online news articles and turtle records on the British Marine Life Study Society website (https://www.glaucus.org.uk/).

TURTLE BARNACLE RECORDS

Review of previous barnacle records from British or Irish turtles

Although turtle standings in British or Irish waters generate a lot of interest, little attention is paid to their barnacle hitch-hikers, which may go unrecorded, or their presence may be only vaguely mentioned, even in cases of severe infestation. Barnacle specimens are rarely retained, and few marine ecologists are practised in identification of turtle barnacles.

The first turtle recorded with properly identified barnacles from British seas was a loggerhead from Skye in 1923 (Ritchie, 1924a,b) which hosted a barnacle bonanza with both acorn barnacles (57 *Chelonibia caretta*) and goose barnacles (several *Lepas anatifera* and one *Conchoderma virgatum*). Leatherback turtles that are intentional summer migrants to our waters are the most frequent host of exotic acorn barnacles in our seas, with most records being the acorn barnacle *Stomatolepas dermochelys*, a relatively small species which embeds in the skin of its host. There are also single records of the acorn barnacle *Platylepas coriacea*, and the goose barnacle *C. virgatum*, from leatherbacks in Irish waters and the acorn barnacle *Chelonibia testudinaria* from a leatherback in Wales. The goose barnacles *L. anatifera* and *L. hillii* have mostly been found on loggerheads with only a single record of goose barnacles from a Kemp's ridley.

Overlooked records of turtle barnacles from Brongersma (1972)

Brongersma (1972) compiled a detailed compendium of information on over 500 historical records of turtles from marine waters of the western European seaboard, from the Iberian peninsula north to the Scandinavian peninsula, and including Iceland. These records from the 1700s to 1971 included all records from the British Isles and Ireland, along with notes and observations on the turtles. The notes sometimes mentioned attached epibionts, such as barnacles or crabs, or even accompanying pilot fish or remoras. Of the records of turtle barnacles from around the U.K. and Ireland cited by O'Reilly *et al*. (2022), the first nine (between 1923 and 1971) are included in Brongersma's volume. However, four other references by Brongersma to barnacles from U.K./Irish turtles appear to have been overlooked and are summarised here.

The first record is of a "green turtle ... covered in barnacles and seaweed" taken in a drift net in Mount's Bay, Cornwall, in October 1874 (no. T1874/01 in the TURTLE Database). This is the earliest record of any barnacles from a British turtle. However, Brongersma considered this turtle was more likely to have been a loggerhead. Unfortunately, no details on the type of barnacles were given.

In December 1953, a hard-shelled turtle stranded alive at Broad Sands, Paignton, Devon. The turtle (T1953/03 in database) was described as being "closely festooned with barnacles on carapace, plastron and each flipper". The description of "clusters of barnacles on each flipper" some of which were subsequently "washed off" suggests these were goose barnacles. This turtle was cited as a hawksbill (*Eretmochelys imbricata*) by Taylor (1963) but its identity was not confirmed and is unlikely to be correct. Hence this turtle is now categorised as unidentified. There has only ever been a single confirmed record of a hawksbill turtle from the U.K. or Irish waters, caught in a herring net off Cork in 1983 (O'Riordan *et al*., 1984; King & Berrow, 2009).

In September 1960, a leatherback turtle was observed at St. Bride's Bay, Pembrokeshire. The leatherback turtle (T1960/12 in database) was "at first mistaken for an upturned dingy with barnacles on it" but no details on the barnacles are provided.

In August 1966, another turtle, probably a leatherback, was seen in Mount's Bay, Cornwall (T1966/03 in database) and described as "a grey mass with barnacles and other marine hitch-hikers stuck to its back". Brongersma commented that the remark about barnacles and other hitch-hikers on the back did not fit with a leatherback turtle and that the impression of having barnacles (on this 1966 Mount's Bay leatherback and the aforementioned 1960 St. Bride's Bay leatherback) may have been caused by the whitish flecks on the carapace and/or the tubercles of the keels. Hence, some uncertainty remains about these latter two records of "barnacles".

Other overlooked turtle barnacle records

On 13th January 2003, a live green turtle (no. T2003/01) was found on Saline Beach on the west coast of Guernsey, in the Channel Islands. The turtle was rescued by Guernsey Society for Prevention of Cruelty to Animals (GSPCA) and transferred to the Guernsey Aquarium for rehabilitation. The turtle was a good-sized adult with curved carapace length of 75 cm and width of 56 cm. It was photographed by Richard Lord, who noted three large turtle barnacles on its upper carapace (Fig. 1A), and he posted the images on the website of the British Marine Life Study Society (www.glaucus.org.uk). The barnacles on this turtle were not mentioned in the TURTLE Database. From the photographs it can be estimated that the largest barnacle at the front of the carapace was around 3.5 cm in diameter (Fig. 1B). The relatively large dome-shaped barnacle shell with un-ribbed plates is characteristic of genus *Chelonibia*; the broad V-shaped radii points to *C. testudinaria*, similar to specimens figured by Hayashi (2012), Zardus *et al.* (2014) and Boyd *et al*. (2021), although the transverse notching within the radii is barely discernible in the photo of the Guernsey specimen. The Guernsey green turtle was repatriated to the Canary Islands in April 2004, although its actual origin could not be determined by DNA analysis. By this time the barnacles had been removed (Penrose, 2004).

On 23rd January 2016, a loggerhead turtle was found dead at White Strand beach, on the Isle of Man, in the Irish Sea. The turtle (no. T2016/031) was one of three

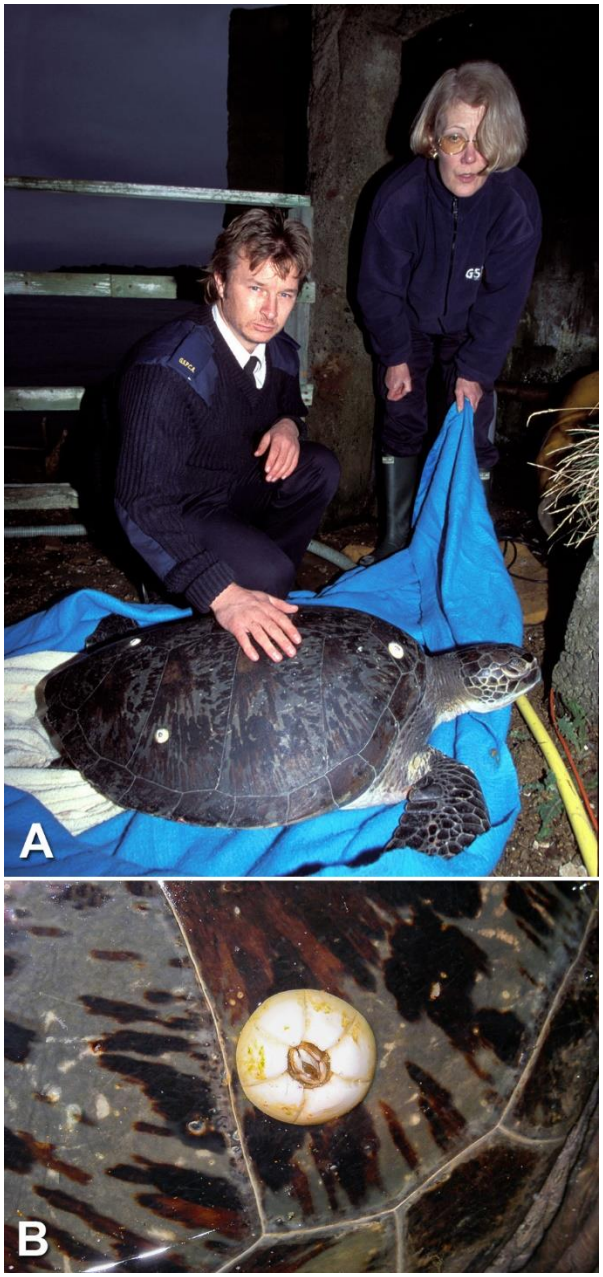

Fig. 1. Green turtle (*Chelonia mydas*), Guernsey, January 2003. Turtle carapace length 75 cm. (A) Oblique dorsal view showing presence of barnacles. (B) Close-up of barnacle (*Chelonibia testudinaria*). Barnacle diameter estimated to be around 3.5 cm. (Photos: R. Lord)

loggerheads that washed up on Manx shores in January 2016, and over 40 turtles that stranded in U.K./Eire waters over the December-January 2015/16 period. The White Strand turtle was transferred to the Manx museum and subsequently photographed by PD. It was 60 cm in length and heavily infested by goose barnacles on the rear and right-hand side of its carapace (Fig. 2A). The turtle was missing its front right flipper, the appearance of the flipper stump suggesting either a congenital defect or a long since healed injury (Fig. 2B). The images indicate that there were at least 80, and perhaps up to 100, goose barnacles attached, ranging from around 4 to 8 cm in length. The barnacles on this turtle were not mentioned in the TURTLE Database.

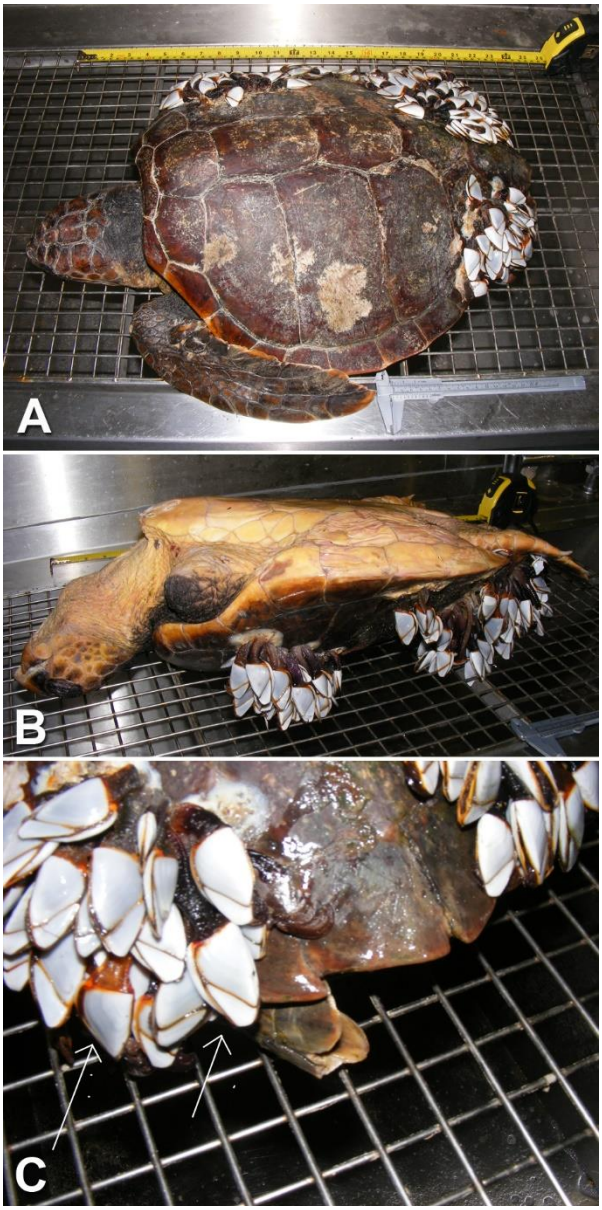

Fig. 2. Loggerhead turtle (*Caretta caretta*) from the Isle of Man, January 2016. Grid squares are 2.5 cm. (A) Dorsal view. (B) Ventral view showing stump of front right flipper. (C) Goose barnacles: *Lepas hillii* (left arrow) and *L. anatifera* (right arrow). (Photos: P. Duncan)

Most of the goose barnacles are identifiable from the photographs as *L. anatifera*, due to their smooth shell plates (without obvious radial ridges), the narrow gap between the carina and scutum plates, and the absence of any rust-coloured band at the top of the peduncle at its junction with the shelled capitulum (Broch, 1959; Southward, 2008). However, there were a few goose barnacles present with distinct orange collars and a larger fleshy gap between the scutum and carina plates which indicates these were referable to *L. hillii* (Fig. 2C).

A single whole barnacle, 4.5 cm long, was retained and preserved for subsequent examination. Most of the other goose barnacles were composted and the calcareous shell plates were subsequently recovered. The right scutum plates of *L. anatifera* have a distinct inner

umbonal tooth at dorsal anterior corner which is absent in *L. hillii* right scutum plates. The anterior edge of the plate is straight in *L. anatifera* with a robust inner ridge. In *L. hillii* the anterior edge is slightly convex without an obvious inner ridge. The left scutum plates of the two species are not distinguishable. Note that the stalk of goose barnacles is at the anterior end and the aperture through which the cirri protrude is orientated ventrally, the cirri being modified legs. The recovered scutum plates included 56 right plates from *L. anatifera* with the diagnostic inner umbonal tooth, and 29 right plates from *L. hillii* without such a tooth (Fig. 3).

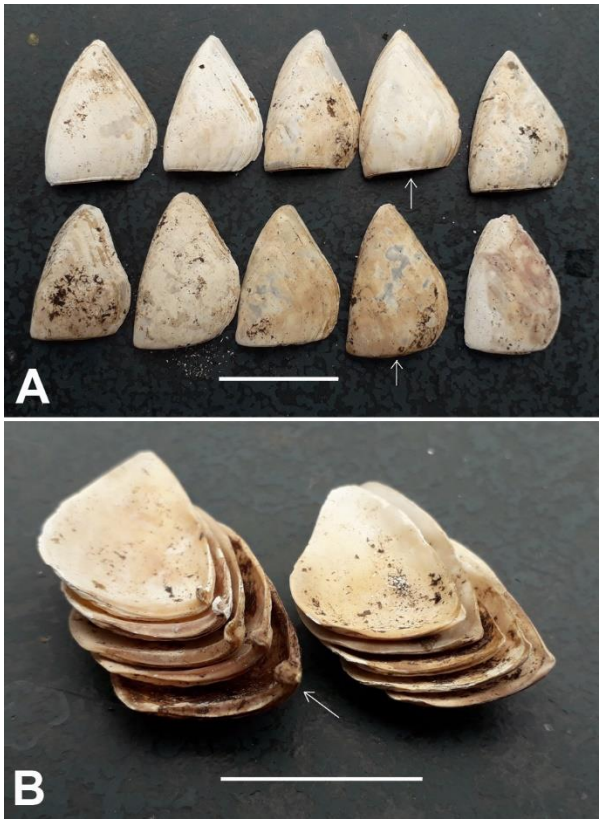

Fig. 3. Scutum plates of *Lepas anatifera* and *L. hillii* from Isle of Man loggerhead turtle, January 2016. Scalebars = 2 cm. (A) Right Scutum plates with anterior edge arrowed: straight in *L. anatifera* (upper row) and slightly curved in *L. hillii* (lower row). (B) Stacks of right scutum plates showing inner umbonal tooth (arrow) and anterior ridge on *L. anatifera* (left stack) and no tooth or ridge on *L. hillii* (right stack). (Photos: M. O'Reilly)

The single preserved goose barnacle was dissected to reveal an inner tooth on the right scutum plate, characteristic of *L. anatifera* as well as the presence of two filamentary appendages adjacent to the oral area, there being three such appendages present in *L. hillii*. The dried shell plates and preserved goose barnacle are deposited in the Manx Museum (Accession numbers: *L. anatifera* 2022-0023/2, *L. hillii* 2022-0023/3). The loggerhead turtle itself was also composted to extract and retain an osteological specimen (Acc. No. 2022-0023/1).

New records of turtle barnacles

On 16th November 2022, a live loggerhead turtle was found stranded by Jude Pearson at Gunwalloe Church Cove, Cornwall. The turtle (no. T2022/12) was a small juvenile with a length only around 20 cm (Cornwall Live, 2022; Penrose & Westfield, 2023). The turtle had at least a dozen large goose barnacles attached to its posterior end (Fig. 4). The turtle was transferred to the Blue Reef Aquarium, Newquay, for rehabilitation where it seems the goose barnacles were removed and discarded. Unfortunately, the turtle died a few weeks later. The post-mortem report by James Barnett suggested the turtle, a male probably less than a year old, was most likely to have died from malnutrition/starvation. Examination of the photo shown in Fig. 4 suggests that both *L. anatifera* and *L. hillii* were present though it is difficult to be certain without closer examination of actual barnacle specimens, which were not retained.

Fig. 4. Juvenile loggerhead turtle (*Caretta caretta*) with goose barnacles, from Gunwalloe Church Cove, Cornwall, November 2022. Turtle length about 20 cm. (Photo: J. Pearson)

On 6th November 2023, following Storm Ciarán, a live loggerhead turtle was found at Chouet beach, Guernsey, Channel Islands, with a mass of goose barnacles attached (ITV, 2023). The turtle was taken into care by Steve Byrne (GSPCA) and transferred to the Guernsey Aquarium for rehabilitation (Byrne, 2024). The turtle (no. T2023/31) was a juvenile with a total length of 30 cm, head to tail, and weight of 800 g net. It carried around 20 large goose barnacles attached to the posterior end, adding another 450 g of weight (Fig. 5).

The barnacles were not examined at the time, but the photographs show a large gap of black flesh between the carina plates and the scutum plates and a hint of an orange collar at base of the capitulum indicating the barnacles were probably *L. hillii*.

Just a few days later, on 10th November 2023, another loggerhead turtle was found at Hayle beach, Cornwall, also with a mass of goose barnacles attached. This turtle (no. T2023/32) was also a juvenile, with a carapace length of 26 cm. A photo taken by Dan Jarvis (British Divers Marine Life Rescue, BDMLR) shows about a

Fig. 5. Juvenile loggerhead turtle (*Caretta caretta*) with goose barnacles from Chouet beach, Guernsey, November 2023. Turtle length about 30 cm. (Photo: S. Byrne)

dozen *Lepas* sp. goose barnacles attached towards the right side of the posterior end (Fig. 6). The barnacles were not examined at the time and the image is not close enough to allow the barnacle species to be determined. This turtle also harboured a Columbus crab (*Planes minutus*) under its carapace, another exotic turtle hitch-hiker usually known from warmer waters. The Hayle turtle was transferred to the Blue Reef Aquarium for rehabilitation. Both the Guernsey and Hayle loggerheads from 2023 were destined for repatriation to Gran Canaria (Penrose & Westfield, 2024).

Fig. 6. Juvenile loggerhead turtle (*Caretta caretta*) with goose barnacles from Hayle beach, Cornwall, November 2023. Turtle carapace length 26 cm. (Photo: D. Jarvis)

Finally, on 23rd December 2024, a Kemp's ridley turtle live stranded on Westward Ho beach in Devon. The turtle (no. T2024/29), a young female 35 cm in overall length, 2.182 kg in weight, and probably around three years old, was transferred to the Blue Reef aquarium for rehabilitation but subsequently died on 8th January 2025. The turtle was subsequently sent for a necropsy (Fig. 7A), which indicated pneumonia as the main cause of death. During the examination, a single barnacle shell was found on the underside on the inframarginal scute on the right side of the plastron (Fig. 7B). The barnacle, an empty shell about 1.5 cm in diameter, was not

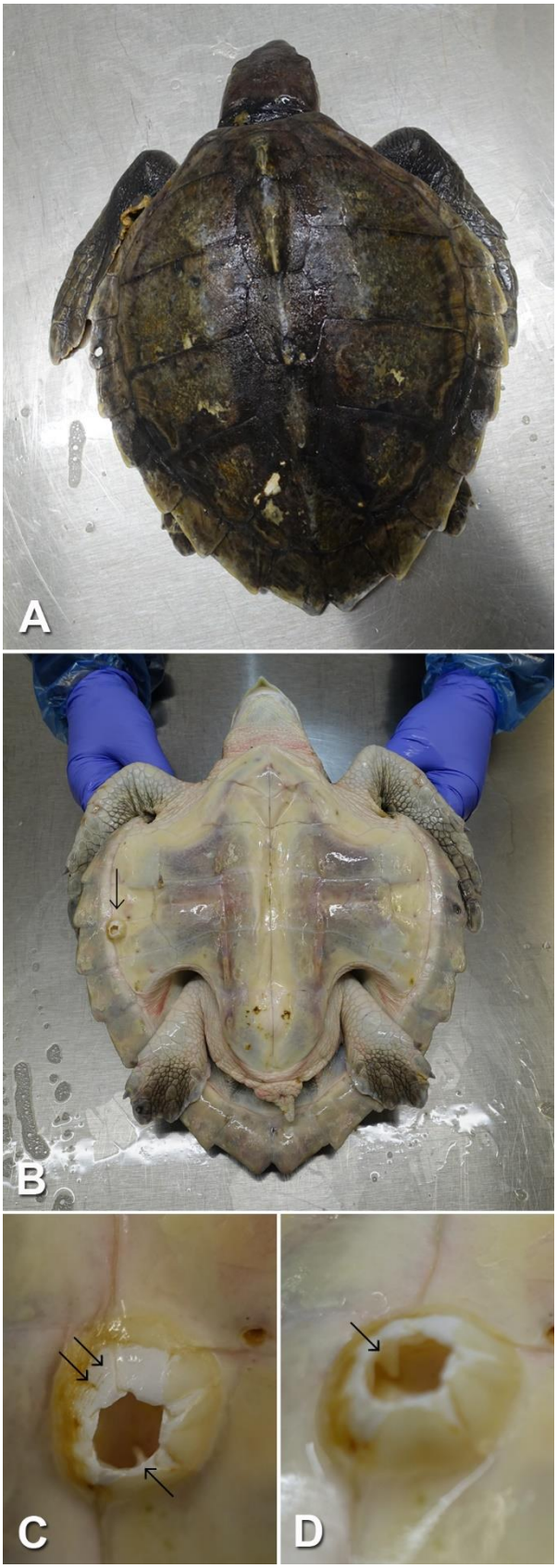

Fig. 7. Juvenile Kemp's ridley turtle (*Lepidochelys kempii*) from Westward Ho, Devon, December 2024. Overall turtle length 35 cm and width 24.6 cm. (A) Dorsal view. (B) Ventral view showing barnacle (arrow). (C,D) Barnacle (*Platylepas hexastylos*) arrowed in B. (C) Close-up view showing striations on left (double arrow) and inner buttress pillar on lower right (single arrow). (D) Oblique view showing internal buttress pillars on upper left (arrow). (Photos: J. Barnett)

retained but an identification can be made from two close-up photographs (Fig. 7C,D). The barnacle has a flattened-dome-shaped shell with distinctive concentric ridges and striations on the shell plates. Inside the empty shell some buttressing pillars are visible which project downwards and help it clasp onto its host. These features are characteristic of *Platylepas hexastylos* and are nicely illustrated in the study by Lazo-Wasem *et al*. (2011) of epibionts on Mexican turtles.

DISCUSSION

Susceptibility of turtles to goose barnacle infestation

The loggerhead is the most frequent of the shelled turtles that accidentally wander into our waters. Juvenile loggerheads spend several years in the pelagic realm before migrating to neritic waters as adults (Witt *et al*., 2007). During their juvenile phase in oceanic gyres, young turtles are susceptible to infestation from the goose barnacles attached to accompanying flotsam (Frick *et al*., 2003). The increase of man-made plastic flotsam in recent decades may possibly increase the prevalence of goose barnacles, potentially exacerbating this problem for turtles (Trewhella & Hatcher, 2015; Barry & Taylor, 2024). Mature loggerheads are less exposed to goose barnacles in coastal waters and are able to carry out self or mutual grooming to remove barnacles (Brongersma, 1972; Frick & McFall, 2007; O'Reilly *et al.*, 2022).

A juvenile loggerhead with a mass of goose barnacles was previously found at Gwithian Beach, Hayle, Cornwall in January 2016 (see Fig. 8 in O'Reilly *et al*. 2022 - note the figure legend citing the host turtle species should read *Caretta caretta*, not *Dermochelys coriacea*). The burden of the barnacles on the juvenile loggerhead from Cornwall in 2016 and the additional juvenile loggerheads mentioned here (Cornwall in November 2022, and Guernsey and Cornwall in November 2023) must have severely impaired their mobility. The juveniles were dragging about half their own body weight in additional barnacles. Another juvenile loggerhead was found on the Dutch coast in December 2023, with around 50 goose barnacles attached posteriorly. These looked like *L. hillii*, although they were mistakenly called "mussels" (Dutch News, 2023). This was one of ten loggerheads that stranded in the Netherlands over the winter of 2023-2024. DNA analysis indicated most of these turtles originated from the Cape Verde Islands, but the one with the goose barnacles came from Florida (De Boer & Goverse, 2024). It would be interesting to compare swimming behaviour and speeds in young turtle specimens with and without barnacles. It seems plausible that such heavy barnacle loads could ultimately cause the demise of such young turtles.

Mature turtles with damaged or missing flippers may also be more susceptible to infestation by goose barnacles. The first recorded case of a turtle covered in barnacles in British waters in 1874 had a severed flipper. Similarly, the loggerheads with severe goose barnacle infestations from Bognor Regis in 1938 and Irvine Bay in December 2015 (see O'Reilly *et al*., 2022) had missing or deformed front flippers, as had the Isle of Man loggerhead in January 2016. Their compromised swimming ability may have increased the likelihood of goose barnacle settlement and impaired the turtles' ability to undertake grooming activities to remove barnacles. In addition, the cumulative effect of missing or damaged flippers and consequent barnacle load may severely compromise effective and efficient swimming, particularly in colder waters.

Turtles and *Chelonibia* barnacles

The stranding of a green turtle in British waters is a very unusual occurrence itself, let alone its hosting of a turtle barnacle species rarely seen in our seas. The green turtle is rare in European Atlantic seas with only occasional vagrants reaching British or Irish waters. Although the nearest green turtle nesting sites are in the eastern Mediterranean (Arnold *et al.*, 2004), the most likely origin of vagrants to British seas is from the western Atlantic. While juvenile green turtles disperse widely, adults appear to remain closer to their breeding grounds (Monzon-Arguello *et al*., 2010). It has been suggested that green turtles may be the least cold-water tolerant of the turtles that reach our shores, thus reducing their chance of survival in our seas (Witt *et al.*, 2007).

There are only 17 authenticated green turtle records in the TURTLE Database up until the end of 2024. Green turtle records up until the end of 2011 are discussed by Quigley (2013), including the 2003 Guernsey specimen, but there is no mention of barnacles being present on any of these turtles. Kemp's ridley are frequent vagrants with 94 records in the TURTLE database until the end of 2024. They breed in the western Atlantic with by far the largest rookery being in Mexico (McInerny & Minting, 2016).

However, it seems that even large barnacles such as *Chelonibia* spp. may be overlooked by many biologists examining stranded turtles. Fortunately, Richard Lord thought to post images of the Guernsey green turtle and its barnacles online that were eventually noticed by the present authors, and James Barnett alerted us to the barnacle on the underside of the recent Kemp's Ridley from Devon.

Chelonibia barnacles are usually large (up to 6 cm in basal diameter) and distinctly dome-shaped, and they cement themselves to their host (Monroe & Limpus, 1979; Zardus, 2021). However, they are able to slowly move location on their hosts (Moriarty *et al*., 2008; Chan *et al*., 2021b). There are two currently recognised extant species, *C. testudinaria* and *C. caretta*, both widely recorded on various turtles in the Atlantic and Pacific Oceans with *C. testudinaria* known from all seven species of marine turtles (Zullo, 1982; Epibiont Research Cooperative, 2007; Zardus, 2021), as well as from the estuarine diamond-backed terrapin (Davis, 1972). *C. caretta* is restricted to loggerheads, green turtles and hawksbills (Epibiont Research Cooperative, 2007). In the Mediterranean Sea both *Chelonibia*

species are known from loggerheads and from green turtles (Fuller *et al*., 2010; Casale *et al*., 2012; Hayashi, 2013). *C. testudinaria* is distinguished by its obvious V-shaped radii with shallow transverse notches or pits. Fully grown *C. testudinaria* are hermaphrodites but the pits within the radii may be settled by small complemental male barnacles (Zardus & Hadfield, 2004). A third species, *C. patula*, which usually attaches to crustaceans, has now been synonymised with *C. testudinaria* (see Bakir *et al*., 2010; Cheang *et al*., 2013, Zardus *et al*., 2014).

There are only two previous records of *Chelonibia* barnacles from turtles in British or Irish waters. The aforementioned loggerhead from Skye in 1923, which hosted nearly 60 *C. caretta*, as well as two species of goose barnacles, and a leatherback (T1993/17) which stranded on the Llŷn (Lleyn) peninsula, North Wales in July 1993 with 15 juvenile *C. testudinaria* attached (Rees & Walker, 1993).

The newly recognised record of *C. testudinaria* from the Guernsey green turtle in 2003 represents the second record of this turtle barnacle in British waters.

The only British record of *C. caretta* is from the Skye loggerhead in 2023, but there is also an even older record of *C. caretta* from just outside of British waters on a loggerhead turtle that stranded in December 1894 on the coast of the Netherlands (Brongersma, 1972). The barnacles collected from its carapace, both *C. caretta* and *P. hexastylos*, were not described until many years later by Holthuis (1952).

***Platylepas* barnacles**

The genus *Platylepas* comprises six extant species of which three are known from sea snakes and three from marine turtles (Zann & Harker, 1978; Hayashi, 2013). Of those from turtles: *P. hexastylos* occurs on all marine turtle species, except the leatherback (and also occurs on sirenians); *P. decorata* only on green, hawksbill, and olive ridley turtles; while *P. coriacea* is restricted to leatherbacks (Monroe & Limpus, 1979; Zardus, 2021). All three of these species are widespread throughout the tropical and subtropical Atlantic and Pacific oceans and *P. hexastylos* has been found on green turtles, loggerheads, and Kemp's ridleys in the western Atlantic (ERC, 2007; Hayashi, 2013). In their study of turtles from Virginia, Lutcavage & Musick (1985) found *C. testudinaria* and *P. hexastylos* to be the most frequent turtle barnacles, occurring on 42% and 17% of 60 loggerheads respectively, while these barnacles were present only infrequently on Kemp's ridleys. In the Mediterranean, *P. hexastylos* has been widely recorded from loggerheads (Casale *et al*., 2012). One of the earliest illustrations of turtle barnacles, depicted on a hawksbill found in Japanese waters in 1836, has been attributed to *P. hexastylos* by Hayashi (2021).

In British or Irish waters there is only a single record of a *Platylepas* barnacle, recovered from a leatherback which stranded near Dingle, Ireland, in 1978 (O'Riordan, 1979). Although originally referred to *P. hexastylos*, it has since been stated by Zardus (2021) that any *Platylepas* occurring on leatherbacks should be attributed to *P. coriacea* which is exclusive to this species of turtle. The closest previous find of *P. hexastylos* is the very old record mentioned above from the Netherlands loggerhead. The new find of *P. hexastylos* from a Kemp's ridley represents the first record of this species in British waters. Although the barnacle was an empty shell at the time of the necropsy, it was intact and alive when the turtle arrived at the Blue Reef aquarium (Steve Matchett, pers.comm.) and thus can be regarded as a *bona fide* record. The rehabilitation regime for cold-stunned marine turtles includes a preliminary "dry" set up to prevent drowning, followed by a freshwater phase to allow the turtles to rehydrate. Any attached barnacles are likely to die during this process.

Columbus crabs and turtles

The occurrence of the Columbus crab on the loggerhead from Hayle in November 2023 is of interest. Columbus crabs are believed to have been the crabs observed amongst *Sargassum* weed by Christopher Columbus as he neared landfall in the Caribbean in 1492 (Chace, 1951). They occur in warmer waters of the North Atlantic and Mediterranean (Pfaller *et al*., 2019) but are occasionally found amongst flotsam cast ashore on the southern and western coasts of Britain and Ireland (Trewhella & Hatcher, 2015; BBC, 2015). The Columbus crab is habitually found in association with turtles, especially loggerheads, with up to 82% harbouring crabs, which adopt a cleaning role on the turtle, feeding on other epibionts such as barnacle cyprids, or parasitic amphipods (Davenport, 1994; Dellinger *et al*., 1997). Other crab species may opportunistically attach to turtles, especially if the carapace is damaged and has cracks and holes (Hayashi & Ohtsuchi, 2025).

However, there are few published records of Columbus crabs on turtles from British or Irish seas, perhaps because the adults, being only around two cm in size, could easily be overlooked. In his monograph on British crabs, Ingle (1980) cites an old Cornish record (from Bate, 1878) of *Planes minutus* found "under the tail of a Hawksbill Turtle". However, Brongersma (1972), quoting from the original source, notes that this turtle, while landed alive at Polperro, Cornwall in Spring of 1867, was in fact captured in the channel "at not a great distance from the French coast and therefore is not to be classed as British". The turtle, which Brongersma suggested was more likely to be a loggerhead, harboured two adult Columbus crabs under the shelter of its tail.

The only records of Columbus crabs from turtles in British or Irish waters come from a loggerhead (no. T2009/26) washed up, freshly dead, at Clonakilty, County Cork, Ireland in 2009 (Doyle *et al*., 2013); and more recently from a loggerhead (no. T2023/12) which live-stranded in February 2023 at Perranporth, Cornwall (TURTLE Database). The new Columbus crab on the

Hayle loggerhead in November 2023 represents the third confirmed finding from a turtle in British or Irish waters.

CONCLUDING REMARKS

The additional turtle barnacle records cited here now brings the total number of cases of turtles recorded with barnacles in British or Irish seas to 33 (see Table 1). The first case with properly identified barnacles was the loggerhead from Skye in 1923 with both acorn and goose barnacles. Of the other 32 turtle barnacle cases: 12 are of goose barnacles, with ten cases from loggerheads and one each from a leatherback and a Kemp's ridley; 11 cases are of acorn barnacles on leatherbacks; one acorn barnacle case from a green turtle; one acorn barnacle case from a Kemp's ridley; and seven cases are of unspecified barnacles. The rather sparse number of records of turtle barnacles recorded in our waters, relative to the number of turtles recorded, probably under-represents their actual frequency. Many turtle barnacles are likely to be overlooked, especially some of the smaller barnacle species that embed or bore into the skin and are easily missed. The recovery of barnacle specimens or high-resolution images is usually required to confirm barnacle identifications. Low-resolution images can be ambiguous or misleading: photos of a juvenile Kemp's ridley that live-stranded in December 2017 appeared to have an acorn barnacle on the front rim of the carapace (Cornwall Live, 2017) but closer examination of additional photos from Dave Hudson revealed this was in fact a pale-coloured indented wound and not a barnacle.

Turtle	Location	Date	Barnacles	Source
Loggerhead? (T1874/01)	Mount's Bay, Cornwall, England	Oct. 1874	"covered in barnacles"	Brongersma, 1972
Loggerhead (T1923/02)	Skye, Scotland	Dec. 1923	*Lepas hillii*, *Conchoderma virgatum*, *Chelonibia caretta*	Brongersma, 1972; Ritchie, 1924a, b
Kemp's Ridley (T1938/05)	Jersey, Channel Isles	Dec. 1938	Goose barnacles on shell	Brongersma, 1972
Loggerhead (T1938/09)	Bognor Regis, Sussex, England	Dec. 1938	Goose barnacles attached	Brongersma, 1972
Loggerhead (T1950/02)	Jersey, Channel Isles	Nov.1950	Goose barnacles (turtle upside-down)	Brongersma, 1972
Unidentified (T1953/03)	Torbay, Devon, England	Dec.1953	Goose? barnacles on carapace, plastron and flippers	Brongersma, 1972
Leatherback (T1959/03	Kilbrannan Sound, Firth of Clyde, Scotland	Aug. 1959	Sessile barnacles	Brongersma, 1972; Stephen, 1961
Leatherback? (T1960/12)	St. Bride's Bay, Pembrokeshire, Wales	Sep. 1960	"with barnacles"	Brongersma, 1972
Leatherback? (T1966/03)	Mount's Bay, Cornwall, England	Aug. 1966	"with barnacles"	Brongersma, 1972
Leatherback (T1967/11)	Crail, Fife, Scotland	Nov. 1967	*Stomatolepas dermochelys*	Brongersma, 1972; Smaldon & Lyster, 1976
Loggerhead (T1970/04)	Perranporth, Cornwall, England	Nov. 1970	*Lepas anatifera* on underside	Brongersma, 1972
Leatherback (T1971/03)	High Island, Co. Cork, Ireland	Jul. 1971	*Stomatolepas dermochelys*	Brongersma, 1972; Smaldon & Lyster, 1976; O'Riordan & Holmes, 1978
Leatherback (T1971/05)	Enys Head, The Lizard, Cornwall, England	Jul. 1971	*Stomatolepas dermochelys*	Brongersma, 1972; Smaldon & Lyster, 1976
Leatherback (T1973/04)	Malin Head, Donegal, Ireland	Jul. 1973	*Stomatolepas dermochelys*	O'Riordan & Holmes, 1978
Leatherback (T1975/05)	Stairhaven, Luce Bay, Kirkcudbrightshire, Scotland	Jul. 1975	*Stomatolepas dermochelys*	Smaldon & Lyster, 1976
Leatherback (T1976/03)	Ventry, Kerry, Ireland	Jul. 1976	*Stomatolepas dermochelys*	O'Riordan & Holmes, 1978
Leatherback (T1987/07)	Dingle, Kerry, Ireland	Jul. 1978	*Platylepas coriacea*	O'Riordan, 1979
Leatherback (T1983/08)	Quilty, Clare, Ireland	Jul. 1983	*Conchoderma virgatum*	O'Connor & Bowmer, 1985
Unidentified (T1992/56)	Kowloon Bridge wreck, Cork, Ireland	Jun./Aug. 1992	Barnacles on carapace and head	TURTLE Database
Leatherback	Lleyn Peninsula,	Jul. 1993	*Chelonibia testudinaria*	Rees & Walker,

(T1993/17)	Gwynedd, Wales			1993
Leatherback (T1997/03)	St. Anthony Lighthouse, Cornwall, England	Jun. 1997	Back covered in barnacles	TURTLE Database
Green Turtle (T2003/01)	Saline Beach, Guernsey, Channel Isles	Jan. 2003	*Chelonibia testudinaria*	www.glaucus.org.uk
Loggerhead (T2006/39)	Pembray, Carmarthenshire, Wales	Dec. 2006	*Lepas anatifera*	Penrose & Gander, 2007
Unidentified (T2008/57)	Wexford, Ireland	Jul. 2008	Barnacles on carapace	TURTLE Database
Loggerhead (T2015/27)	Irvine, North Ayrshire, Scotland	Dec. 2015	*Lepas anatifera*	Brownlow *et al*., 2016; Penrose & Gander, 2016
Loggerhead (T2016/01)	Gwithian Beach, Hayle, Cornwall, England	Jan. 2016	*Lepas hillii*	Penrose & Gander, 2017
Leatherback (T2016/02)	St. Cyrus, Aberdeenshire, Scotland	Jan. 2016	*Stomatolepas dermochelys*	Brownlow *et al*., 2017; Penrose & Gander, 2017
Loggerhead (T2016/031)	White Strand, Isle of Man, Irish Sea	Jan. 2016	*Lepas anatifera*, *Lepas hillii*	This paper
Leatherback (T2018/04)	Marazion, Cornwall, England	Aug. 2018	*Stomatolepas dermochelys*	Wilkinson, 2018; Penrose & Gander, 2019
Loggerhead (T2022/12)	Gunwallow Church Cove, Cornwall, England	Nov. 2022	*Lepas anatifera*, *L.hillii?*	Penrose & Westfield, 2023
Loggerhead (T2023/31)	Chouet, Guernsey, Channel Isles	Nov. 2023	*Lepas hillii*?	Byrne, 2024
Loggerhead (T2023/32)	Hayle, Cornwall, England	Nov. 2023	*Lepas* sp.	This paper
Kemp's Ridley (T2024/29)	Westward Ho, Devon, England	Dec. 2024	*Platylepas hexastylos*	This paper

Table 1. Barnacles reported on marine turtles in the waters around the U.K. and Ireland, 1874 to 2023. The barnacle nomenclature has been updated from original reports. See O'Reilly *et al*. (2022) for full source references.

It is possible that several other exotic turtle barnacle species have yet to be found in our waters (O'Reilly *et al*., 2022). These enigmatic creatures offer an insight into fascinating aspects of evolution and oceanic ecology. It is hoped that this communication will encourage biologists and veterinarians to examine stranded turtles more closely. The numbers of barnacles should be counted or photo-documented along with close-up photos to assist later identification. If barnacles are retained, they should be preserved, preferably in 96% ethanol to assist later molecular studies.

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