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Diver Study of Wild Short Snouted Seahorses (*Hippocampus hippocampus*) in Torbay, Devon

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The British Isles are home to 2 species of Seahorse, *Hippocampus guttulatus* (The Spiny Seahorse) and *Hippocampus hippocampus* (The Short Snouted Seahorse); the British Seahorse Survey was set up in 1994 by The Seahorse Trust to study both of the species in the wild and we have now accrued a huge amount of data about them but it is seldom we get a chance to study individuals for any length of time in the wild. So the opportunity to study a pair of *Hippocampus hippocampus* in Torbay, Devon for 3 months was invaluable to gather much needed data on their ecology and behaviour in the wild.

John Newman (the Seahorse Trust) studied a pair of Short Snouted Seahorses at Babbacombe in Torbay in Devon and spent over 300 hours watching behaviour and taking photographs.

Introduction

The Seahorse Trust runs the British Seahorse Survey (BSS) and runs the National Seahorse Database (NSD) at its headquarters at Escot Park nr Ottery St Mary in East Devon and has focused on both British species of seahorses in the UK. Through their work they have made numerous discoveries about both British species of seahorses and submitted and got both species protected under the Wildlife and Countryside Act (1981). British seahorses have been known about for some considerable time (BSS, The Seahorse Trust) with historic artwork cut into stone carvings from the 3rd and 5th centuries but very little is known about the behaviour of individuals and their links and association to the environment around them.

The Seahorse Trust has undertaken a tagging project of individual seahorses on the Spiny Seahorse (*Hippocampus guttulatus*) at Studland bay in Dorset (Studland bay Seahorse Tagging project, The Seahorse Trust) but has never had the opportunity to study Short Snouted Seahorses (*H. hippocampus*) in the wild in the UK. So, John Newman of The Seahorse Trust finding and studying a pair of them in 2007 gave us a unique opportunity. John spent in excess of 300 hours underwater watching this pair and made numerous unique observations and discoveries.

Species

Both European species of Seahorse are found within Torbay often no more than a few metres apart, they can share approximately the same area but they are both differently slightly adapted to a varying ecological niches due to the slight difference in the evolution of the snout and the external appearance of their bodies. The Spiny Seahorse as its name suggests has a more 'hairy' appearance with a mane of appendages on the top of the head and down the dorsal region to the top of the dorsal fin whereas the Short Snouted Seahorse has a shorter stocky body and a wider shorter snout but lacks the appendages sometimes found in Short Snouted Seahorses in the rest of its range throughout Europe. In Spiny Seahorse's younger animals often have more and denser appendages than older animals which are a resultant adaptation to the more transient life of the younger Seahorses which often rely on this camouflage ability to blend in and not be seen. As they mature and become more settled into territories these 'hairy appendages' reduce in density and length as they are not so vital in remaining cryptically hidden.



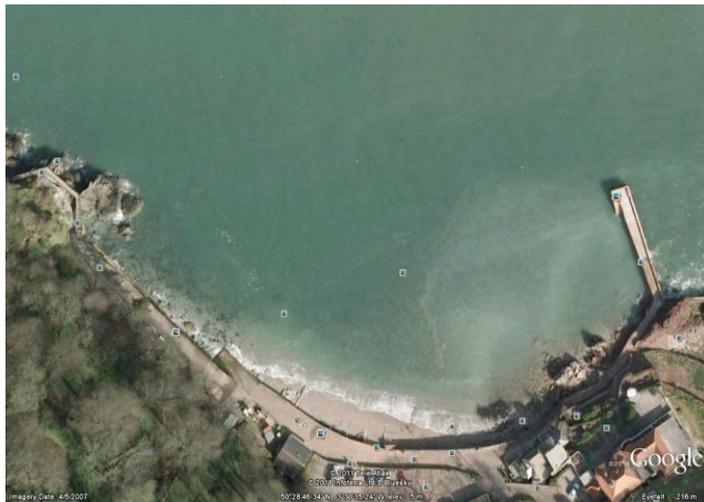
Fig 1. The pair of Short Snouted Seahorses observed by John Newman during his survey period.

Location

Both species are found throughout Europe and through the work of PhD student Lucy Woodall it has recently been shown that the European populations of both species can be divided horizontally throughout their range. The UK populations form part of a Northern European Meta population whose southern geographical limit is on the Atlantic Coast of France, roughly in line with Cape Finistere and the northern geographical limit is Scotland up into the Shetland Isles.

Torbay is located on the South Coast of Devon and is a horse shoe shaped bay facing due east, it is a sheltered bay which has a number of smaller sheltered bays within its harbour limits including Babbacombe which is located on the most eastern side of the bay; just outside of the main bay. Babbacombe also faces due east and is surrounded by high red sandstone wooded cliffs, making it very sheltered against the predominantly south western weather patterns; except in the most severe of north-easterly and easterly storms.

Babbacombe Bay is crescent shaped and has a wide promenade running around its edge with a stony beach in front of it. The beach is usually covered up at high tide and the algal cover in the littoral zone comes quite high up the beach as

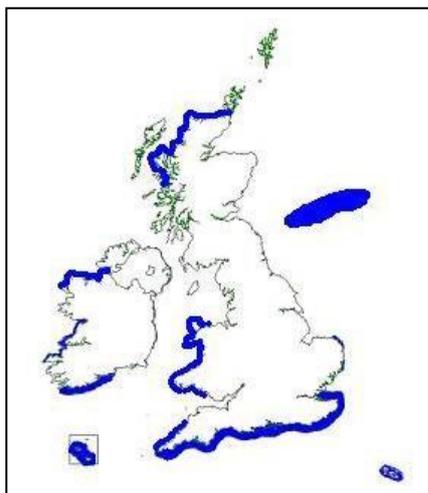


the beach inclines steeply into the sea. As the seabed recedes it goes through a range of transitions and various ecological zones from smaller boulders to at its extreme a silt/sand seabed giving rise to a large diversity of habitats and species within a relatively small narrow zone that forms tight banding corridors of habitat type parallel to the beach. The depth is approximately 10-12 metres in the centre of the bay which provides a relatively stable environment except when the severe easterly storms occur. Visibility varies greatly and is also influenced by the easterly weather patterns and this is why the majority of algae live close the edge of the beach down to 3 to 4 metres; only small amounts of hardy brown alga occur sporadically in the centre of the bay.

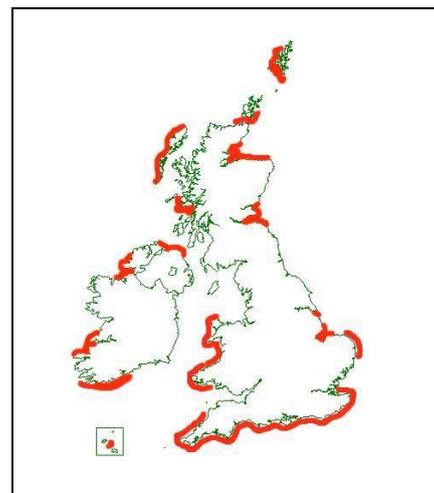
Fig 2. Babbacombe Bay, part of Torbay Harbour area in South Devon.

Countrywide distribution

The 2 British species of seahorses have a countrywide distribution that is influenced by the Gulf Stream which brings warm waters to allow for the production of plankton that is the building blocks of life in UK waters, so they are found predominantly on the south and west coasts however as the Gulf Stream edges around the north and south of the British Isles it does allow for small populations of seahorses. Fig 3. Distribution of both British species of seahorse.



H. hippocampus distribution



H. guttulatus distribution

Fig 3. Distribution of both British species of seahorse

Method

During the period of the study (July to September 2007) John dived on average over 1,500 minutes per week on some occasions giving in total a study time in excess of 300 hours during the term of the study, this included diving on and off from 6.30 a.m. to 9 p.m. depending on tidal access; very often diving during the night to give an overall picture of the behaviour of this pair of Seahorses at all times.

During the period of the survey he became very familiar with the movements and behaviour of the pair within their known range to a point that when they moved after an unseasonal easterly storm (28th/29th August) he was able to scour the area and re-find them on another spot where they stayed until the next big storm (end of September) during which they moved out of the bay and into deeper water

Observations were taken visually, by camera (stills and video) and by making notes on a dive slate these were then given to Neil Garrick-Maidment Executive Director of The Seahorse Trust for collation and inclusion onto the National Seahorse Database (NSD). Observations were made every day of the period of the survey except when visibility or weather making this the longest continuous survey of a pair of Short Snouted Seahorses in the UK. This longevity is invaluable to the knowledge gained for this species and seahorses in general.

During the period of the survey the male stayed on one location except after he moved after a severe easterly storm (28th/29th of August) where he stayed for the rest of the period of the survey until he moved into deeper water, however the female was more transient and she was located by doing daily circular searches out from the last known location from the previous days diving or from the males location.

The survey site was mapped out using a chart datum point which was a triangular mooring block that is marked on Admiralty maps (which would not move regardless of sea state.) and other distinctive features that made up their home ranges.

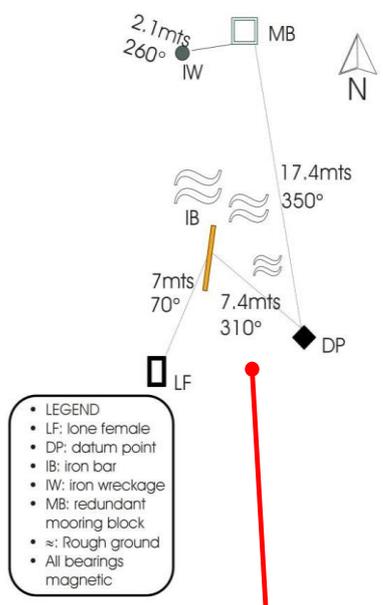


Fig 5. Picture courtesy of Google Earth showing Babbacombe Bay and area of survey in red



Fig 4. Diagram showing chart datum and features of interest.

Observations

During the period of this survey a number of observations were made that have given us a greater understanding of this species. This information gathered will feed into our overall knowledge of Seahorses in the UK and to seahorses in general allowing us to help better protect them in the wild with the forthcoming Marine Conservation Zones.

Below are some of the main points noted during the survey:

- From the beginning of the survey until the 28th/29th of August the male lived solely on an iron bar (6 to 10 metres) with a couple of pieces of kelp on it. During the 28th and 29th a severe storm stopped diving on the site and on the 30th when John went to find the male he was gone. John did a circular search to find the male who was relocated on the mooring block (MB) (7 to 11 metres) approximately 17 metres to the north where he stayed until the storms in September made the pair move on.
- The only time he moved off his original holdfast was due to a 5 knot marker buoy moving in strong north-easterly weather and bashing up against his holdfast but he did return after it moved out of the way.
- Almost every morning the pair would come together to reinforce their pair bonding and although they did not always do a courtship dance it is thought that this helped to reinforce pair bonding cutting down time used in acquiring partners and maximising breeding capacity.
- The female would be observed coming into the male's location at 7.45 am to 8.30 am almost every morning but just occasionally the female would already be with the male by the time John dived on the site and located the male. It did not matter what the tidal state was when she came to the male and was often observed swimming against a strong current to get to him.
- After arriving to the male's 'territory' the female would hook onto the nearest piece of kelp to the male and then spend an hour or so with the male before moving away again for the rest of the day.
- If the pair conducted a courtship dance the colour change was not always radical and if colour change was observed this was normally as a result of them going over the lighter coloured sand and silt as can be seen in other pairs of seahorses but it resulted in the male becoming pregnant and giving birth 3 times during the time of the survey which is average for British seahorses; although from evidence of juveniles and fry it is known that the seahorse breeding period could and is probably longer than just this 3 month period.
- The seabed in the study area was predominantly sand and silt with just the iron bar with its pieces of kelp for the male to hold onto. The female was often observed attached to unattached algae or small pieces of algae attached to the seabed.
- Seahorses are often known to 'raft' on unattached pieces of weed and this is one of the ways that recruitment to other areas takes place.
- Associated species in the area were snakelock anemone, kelp (*Laminaria*), cuttlefish eggs, encrusting algae (coralline) Sand gobies, velvet swimming crabs, prawns, hermit crabs, gastropods, red algae, slipper limpets, various shell fish, seasquirts, scallops, bryzoans, Dragonets, Conger eel juveniles.
- The area has been heavily scoured due to intensive scalloping over the years but recently large mooring buoys (2010) have been placed on the site making it very difficult to scallop on this site.
- As the seabed is relatively open it allows for extreme tidal and current flows and the seahorses were often observed flattened to the seabed by this movement.
- No observations were made of either of them eating during this time although body mass and condition indicated that they must have been feeding especially as there was ample food around and it is possible due to the construction of their eyes which are designed to see in very low light levels that they were in fact feeding at night.
- Babbacombe is a heavily dived site but the camouflage of the Seahorses allowed them great protection from prying eyes as the vast majority of divers could not find them.

Legal protection

All Seahorse species are listed under CITES, the BERN Convention OSPAR and now here in the UK for the two native species the Wildlife and Countryside Act (2008) which was a direct result of the work volunteers of the British Seahorse Survey run by The Seahorse Trust.

Since the 6th of April 2008 both British species of seahorse, the Spiny (*H. guttulatus*) and the Short Snouted (*H. hippocampus*) have been fully protected under the Wildlife and Countryside Act in England and Wales. Their protection is:-

Seahorses are protected under schedule 5, section 9 which states offences are:-

Part 1	intentional killing, injuring, taking
Part 2	possession or control (live or dead animal, part or derivative)
Part 4 (a)	damage to, destruction of, obstruction of, access to any structure or place used by a scheduled animal for shelter or protection
Part 4 (b)	disturbance of animal occupying such a structure or place
Part 5 (a)	selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative)
Part 5 (b)	advertising for buying or selling such things

Schedule 5 lists animals species that are protected under Section 9; Section 9 which prohibits the intentional killing, injuring or taking of the species listed in Schedule 5 and also prohibits their possession and the trade in the wild animals listed. The 2 seahorse species are also further protected from disturbance by prohibiting actions that affect places they use for shelter.

Section 9 has several parts (see below) that specifically protect against killing and taking (9.1), possession of or possession of part of (9.2), disturbance or destruction/obstruction of places of shelter (9.4), selling (9.5a) or advertising for sale (9.5b).

Conclusion

Babbacombe is a unique area and is home to a wide variety of species, yearly it is the main egg laying site in the spring for Cuttlefish and Lump suckers and Short Snouted Seahorses have been observed on the site a number of times over successive years with diver observations and unique footage of a pair doing a courtship display in 2011 (name and location withheld for privacy).

With the inclusion of both British Seahorses under the Wildlife and Countryside act in 2008 it is vital for known seahorse areas to be included within the upcoming Marine protected Zones, with this in mind The Seahorse Trust has made available data from the National Seahorse Database to the authorities so that this vital information can be used to protect these important sites.

The importance of this survey is two-fold; firstly the longevity of the survey allowed for previously unavailable observations and secondly data on the observations of Short Snouted Seahorses in the wild have been few and far between. The Spiny Seahorses have been well covered through The Seahorse Trust's Studland Seahorse Tagging project and information from both surveys has and will be compared for future reference.

Seahorses are highly cryptic by nature and observations in the wild are few but because of the longevity of the British Seahorse Survey it means we have now built up a picture of the movements of seahorses throughout the year and we have better ideas of their habitat preference and locations.

It is obvious from observations that there is a distinct preference between the two species as to habitat type and the Short Snouted Seahorse is commonly seen on sand and silt seabed's. The shape and design of them with the short stocky body, thick strong tail for gripping in extremes and the large (in proportion to the Spiny Seahorse) dorsal fin means they tend to be more mobile and can cope better with strong tides and currents.

Divers and fishermen are vital to the knowledge gained in both seahorse species and so reports of sightings to The Seahorse Trust are crucial in allowing us to gain a better understanding of them and their needs in the wild and the trust is very grateful to all for sightings sent into us.



Even with excess of 650 sightings held on the National Seahorse database we still need to know more so surveys such as this one and the Studland Seahorse Tagging Project and the British Seahorses Survey will give us a greater insight into one of nature's greatest secrets, the little 'horses of the sea'.

Fig 6. The male pregnant Short Snouted Seahorse observed at Babbcombe bay in Torbay Devon.



Fig 7, 8 and 9 showing courtship displays and the substrate the pair lived on during the survey



The pair of seahorses taking part in their courtship display. Both of them are posturing to the other and the male is holding his dorsal fin erect and his has puffed his pouch out to impress the female.

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