

## 20 Frequently Asked Questions on Whales and Dolphins

### **Dolphin or Whale?**

Biologists divide cetacean groups into two suborders, the baleen whales (mysticetes) and the toothed whales (odontocetes). The suborder Mysticeti (mysticetes, or baleen whales) includes four families, six genera, and at least 13 species; while, the suborder Odontoceti (odontocetes, or toothed cetaceans) includes 10 families, 40 genera, and at least 70 species. Therefore, the groups of toothed whales are much more diverse than that of baleen whales.

The two suborders are distinguished by two major morphological features - presence of teeth and number of blowhole. Toothed whales have teeth and a single blowhole while baleen whales have baleen plates and two blowholes. In addition, their predation tactics are different. Toothed whales use echolocation to locate prey, while baleen whales are filter-feeders which do not use echolocation to prey.

### **In Group or Alone?**

The social organization of different cetacean species ranges widely, from the highly complex societies of some toothed whales (e.g. Orca and Long-finned Pilot whale), to largely solitary ones of baleen whales. The social organization of any population reflects the influence of various ecological factors. The group size and social behaviour are strongly influenced by both the predation pressure and distribution of resources. Toothed whales tend to have a more complex social organization from stable or semi-stable bonds between related individuals. This reflects not only the strategy of hunting, but also the advantages of group defense against predators such as sharks. Some are active and more acrobatic at the water surface, while some are more cryptic, showing little of themselves as they surface to breathe.

### **How to See?**

Most dolphins have excellent eyesight which allows them to see well above and below the water. However, vision becomes of less and less value with water depth. Therefore, visual sense is ineffective under the water except at close range. Instead, cetaceans detect the surroundings and communicate primarily by "echolocation", which is the production of

sounds that allow an animal to orient itself and locate objects by means of the returning sound waves or echoes. The sounds made by different cetaceans are different from type, frequency and strength; therefore the sounds are unique to a specific species.

### **How to Hear?**

They have excellent hearing capacity. Hearing is important for all cetaceans to navigate, feed and communicate. Their frequencies range of hearing is generally as high as 150 kilohertz, which is similar to that of bats. In fact, baleen whales and toothed whales use sound differently. Some baleen whales produce a series of notes like 'songs' to communicate to others, and mostly emit low-frequency broadband sounds. On the other hand, toothed whales produce and receive sound wave to locate food and navigate, in which the process is known as echolocation, and they produce mostly high-frequency narrowband sounds.

### **What and How to Eat?**

It is hard to generalize what preys whales and dolphins feed on, but a few trends can be noted. Some species have a broad diet, while others specialize on a very limited range of prey. For instance, finless porpoises feed on squid and many different kinds of fishes, while some others feed on smaller marine mammals, such as orcas that feed on sea lions and seals, and even baby baleen whales. On the contrary, baleen whales use their baleen plates to filter-feed planktons out of water. For example, the blue whale feeds exclusively on krill (a small shrimp-like creature).

Cetaceans have different ways to catch and eat their prey. For baleen whales, they use baleen to filter food. Lunge feeding is a technique that they thrust their body into a high concentration of prey from deep to surface with their mouth opens. Then, they swallow the preys without chewing. Another technique is skim feeding that they open mouths for a few minutes in the area where the concentration of prey is not high enough. Also, bubble netting is that they trap the targets within bubbles. It is a typical technique for humpback whales.

Toothed whales have teeth to catch and hold the prey. However, like baleen whales, they swallow whole prey as their teeth are not adapted for chewing. If the size of the prey is too

large, they would shake it into smaller pieces to swallow.

### **Do They Taste Food?**

Not many taste buds are found on tongue of whales and dolphins, but the research in 1970s stated that bottlenose dolphin can distinguish four tastes, sweet, sour, bitter and salty. It is because they do not only use stimuli from taste buds but also from the olfactory senses. Gustation is a very useful sense in their life. For example, it helps to recognize the decomposition of dead bodies. The waste products would release sexual pheromones for mating. Certainly, taste is also an indicator of nearby food or blood from a wounded animal.

### **How to Drink?**

They do not drink water actively. They live in seawater that contains salt, so they have mechanisms to reduce water loss and obtain fresh water, like no perspiration. Therefore, they do not have to drink seawater. They obtain small amount of water from their prey, like fish.

### **How to Mate?**

Cetaceans exhibit a considerable variation in reproductive biology and mating strategies. The mating system of a species is determined by the distribution of the females, which in turn is based upon environmental constraints (e.g. availability of habitat). Male mating strategies include visual or acoustic displays to attract females. Different species of cetaceans become sexually mature at a wide range of ages. For example, the humpback whale can become mature by four years of age, while the Indo-Pacific humpback dolphins are sexually mature at 10-12 years old, and the bowhead Whale become mature at 15-20 years old.

### **How to Sleep?**

Whales and dolphins do sleep, but not soundly. Land mammals have a breathing reflex. However, for cetaceans, breathing is a conscious activity. Once they lose the consciousness during sleeping, they do not breathe and even die of suffocation. Bottlenose dolphins are known to sleep with shutting down one half of the brain. Another half of the brain remains its consciousness for breathing and watching out of predators.

### **How to Play?**

Whales and dolphins play with others in order to develop their reflexes and skills. It is not difficult to see their playful behaviors. For example, some species love bow riding and surf riding. They may gain benefits of free-riders, or even feeding. Lively behaviors also include breaching, which occurs when they leap out of water and descends onto their backs with a huge splash. It is also common to observe spy-hopping that the whales come out of the water, pause and look around. In addition, they perform other interesting acts, like tail slapping and swimming on one side.

### **How to Protect Themselves?**

Whales would use their tails or flukes to protect themselves. When they encounter enemies, like killer whales or whalers, they would bring their flukes down powerfully at the sea surface to attack them. Humpback whale's longer flippers are helpful, too. Also, toothed whales would use their teeth to protect themselves. Except utilizing their different parts of body, whales would group in numbers to avoid being attacked.

### **How Many Teeth?**

Unlike other terrestrial mammals, whales and dolphins do not use their teeth to chew food, but only grab prey. Therefore, their teeth are homodont, which are not classified into different types, like incisors, canines, premolars and molars.

The number of teeth in different species is variable. For Indo-Pacific humpback dolphin, they have 30-36 teeth in the upper jaws and 24-34 in the lower jaws. For finless porpoises, there are 13 – 22 teeth in each side of the jaws. In addition, the number of teeth ranges from 76 to 100 in bottlenose dolphins and 160 to 200 in common dolphin.

However, some species only contain teeth in one side of the jaws, such as the sperm whales with teeth only in lower jaws. Narwhals only have two tooth buds in their upper jaws. The left one extends and produces a tusk up to 3 metres in males and grows out through the front of the head, but the growth of tusk in female is not normally seen.

### **How Large Are Newborns?**

The newborn whales and dolphins is about one-third to half of the length of their mothers. As their growth rate is the fastest in the early stage, neonates increase their length rapidly in the first year of life. They reach the maximum length when they become physically mature. The blue whale gives birth to the largest young, which is about 7.3 meters in length and 3 metric tons in weight.

Other small cetacean's fetus is much smaller. Indo-Pacific humpback dolphin fetus is about 100 cm in length. For finless porpoise, their newborn length is only 70 cm, weighing less than 15 lbs.

### **How Old Do They Get?**

The life span of different species of whales and dolphins varies. The age can be determined by estimating the growth layers in ear plugs of baleen whales or the growth-layer groups in the teeth of toothed whales.

From individual recognition of killer whales in the Pacific Northwest, it is believed that the longevity is 50 to 60 years for male and 80 to 90 years for females. Also, it is believed that sperm whale can live up to 60 years. The life span of most baleen whales is longer. For example, fin whales have been recorded to live up to 94 years of age. For the bottlenose dolphins, the maximum age was estimated to be 40 to 50 years old. For Indo-Pacific humpback dolphin, the oldest animal known in Hong Kong is 38 years old, but scientists believe that they can reach over 40 years old.

### **Do They Have Twins?**

Like other large animals, cetaceans tend to produce single off-spring. Gestation is also relatively long varying from eight months of some porpoises as long as 16 months of sperm whale. The duration of lactation can be as long as several years in the case of some toothed whales. Prolonged lactation occurs only in species characterized by extended familial associations, such as sperm whale and many dolphins. By contrast, baleen whales usually wean their offspring after six to 12 months.

### **Do They Cry?**

Whales do not cry as they do not have lacrimal glands, responsible for the secretion of aqueous tear, near their orbit. Many people wonder why there is really something like tears near their eyes. Actually, it is the thick viscous fluid secreted by Harderian glands. It is accessory gland to lacrimal glands in some animals. As whales live in water, their eyes will not dry out. Research had been done to study Harderian glands in Black Sea bottlenose dolphins. It suggested that the glands are sexually specific which may be used to produce sexual pheromones and other physiological activities.

### **Why Do They Sing**

Only some of the baleen whales sing. The 'song' is a distinct sequence that produces a series of notes. All animals in one area and time produce the same song and changes in different seasons. Humpback whale is the best known example. Actually, only male humpback sings. It is believed that the reason why they do so is to define territory, and to attract female for mating during courtship.

### **Why Do They Always Smile?**

Humans always have different facial expressions for communication. Unlike humans, dolphins and porpoises have thick and immobile skin, and lack muscle, so they do not produce any facial expressions. Also, due to limited visibility under sea, it is useless for them to do so. Therefore, their "smiling" mouth tells nothing about their mood.

### **Do They Attack Human?**

From previous records, whales attack boats that provoked them. It is somehow a defensive response. Though there were still many unprovoked merchant vessels that were sunk or severely damaged by whales, it was believed that most cases were only accidental. There was a case that a whale tried to break a thin pack ice where an artist with an expeditionist was standing on it. It may be explained that the whale thought it was the shadow of a seal, but it was not attempted to attack people.

### **What Is a Blow?**

It is an explosive breath when whales and dolphins surface and exhale via blowhole which is located at the top of the head. The blow is always misunderstood as a spout of water,



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but it actually consists of 3 elements. First, it is caused by condensation of warm air from lungs, especially in cool air. Also, the spout also includes mucous particles accumulated from the inner lining of respiratory system and the remaining water inside the whale's nasal passage. Their blows sometimes can be used to identify different species. The size, shape and angle of the blow can also provide cue to identify them. For example, baleen whales give a double blow as they have two blowholes.

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