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Kachar, Marina; Sawosz, Ewa; Chwalibog, André

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Abstract

After humans, orcas (Orcinus orcas) are the most widely distributed mammals on Earth. They are incredibly effective predators, commonly referred to as ‘wolves of the sea.’ Although they are frequently dubbed killer whales, they are actually the largest member of the oceanic dolphin family (Delphinidae). Given that they are well–adapted to any climate, they can be found in numerous aquatic locations including the Antarctic and Arctic regions as well as in tropical areas. They are unrivaled oceanic apex predators, possessing a number of qualities that suggest considerable intelligence. Following the sperm whale, orcas have the second largest brain of all oceanic mammals. Moreover, their highly evolved communication manners, usage of echolocation and compelling sleep patterns all attest to the impressiveness of this group of marine mammals. However, they need to be recognized and accepted as outstanding social creatures that can coexist with humans.

Keywords: killer whale, dolphin, behavior, social habits, language

Introduction

Orcas are marine carnivores that are easily recognizable by the distinctive black and white coloring of their rounded bodies, along with the dorsal fin in the middle of their backs. They can grow to up to 7.7meters (females) and 9.0meters (males), and weigh up to six tons. In the wild, this warm–blooded mammal lives from 50 to 90 years. Orcas are known for mating all year long, unlike other cetacean species. Males reach breeding maturity when they are about 5.6meters long, and females reach breeding maturity when they are about 4.9meters long. Female orcas have relationships with multiple partners, while males do not breed within the same pod, which keeps the genetic pool very vibrant.

Orca calves are one of the few animals usually born tail first. Calves are born about 2.1meters long. In her lifetime, a female orca may have four to six offspring. Orcas have demonstrated captivating social habits, such as living in highly distinctive lifelong pods, as well as exceptional memory and communication skills (amongst other qualities), which have enabled them to acquire immense popularity amongst cetacean admirers. Their various interesting social habits, along with their communication patterns, render them surprisingly different from other mammals. Yet when cruising with their pod members, their speed is only about 5–10km/hr. The orca must quickly expel used air from its lungs at the surface, which produces the loud distinguishing sound or ‘blow.’ In most cases, orcas breathe in 20second intervals in succession (3–4times), and then submerge for a longer period of time. Orcas are able to control the flow of blood to their brains and hearts, which ensures that they do not suffer from a lack of oxygen while they are submerged. When swimming, orcas can reach incredible speeds (for their size) of approximately 40km/hr, rendering them one of the fastest marine mammals. Yet when cruising with their pod members, their speed is only about 5–10km/hr.

Orcas are known for mating all year long, unlike other cetacean species. Males reach breeding maturity when they are about 5.6meters long, and females reach breeding maturity when they are about 4.9meters long. Female orcas have relationships with multiple partners, while males do not breed within the same pod, which keeps the genetic pool very vibrant. Thus, after maturation male orcas venture away from their family pod in search of females from other orca families, but they will always return. The mothers give birth approximately every three to 10years, and their pregnancy lasts 17 months, which is longer than any other marine mammal. Calves are born about 2.1meters long. Orcas are one of the few animals usually born tail first. In her lifetime, a female orca may have four to six offspring. Orcas have demonstrated captivating social habits, such as living in highly distinctive lifelong pods, as well as exceptional memory and communication skills (amongst other qualities), which have enabled them to acquire immense popularity amongst cetacean admirers.

An impressive combination of high intelligence, outstanding hunting techniques, and tremendous physical power makes the orca one of the planet’s leading predators. This complex creature has an array of tremendous social skills. Orcas have demonstrated captivating social habits, such as living in highly distinctive lifelong pods, as well as exceptional memory and communication skills (amongst other qualities), which have enabled them to acquire immense popularity amongst cetacean admirers. Their various interesting social habits, along with their communication patterns, render them surprisingly different from other mammals.
Orcas are social mammals. Their brain is nearly four times the size of a human brain, weighing almost seven kilograms. In analyzing their brains, researchers have developed various hypotheses regarding orcas’ intelligence. Based on observations both in captivity and in the wild, orcas seem to exhibit a wide range of emotions, including frustration, anger, fear, joy and even self-awareness, which makes them enthralling to observe as social mammals.

Misconceptions concerning the name

Orcinus orca is one of the oceanic dolphin family’s 35 species, and probably evolved around 11 million years ago. Despite having morphological similarities with false killer whales (Pseudorca crassidens), pilot whales (Globicephala melas) and pygmy killer whales (Feresa attenuate), its closest relatives are the snub fin dolphin (Orcaella heinsohni) and Irrawaddy dolphin (Orcaella brevirostris). The reason that people refer to orcas as whales is because sailors historically called these marine mammals ‘whale killers’ after witnessing them preying on whales and other marine species. In spite of their ferocious nickname ‘killer,’ they have never been known to show aggression to humans in the wild.

Life in the pod

These extraordinary mammals tend to swim in sea depths of between 20–60 meters, and constantly move in remarkably well-balanced and permanent pods, led by older females. Researchers have identified three types of pods: resident (primarily residing in one area); transient (traveling over a relatively wide area); and offshore pods (roaming the deep blue waters). Life in the pod

Even though they can regularly be spotted near to coastlines, orcas can swim to depths of about 300 meters in search of food. Depending on their diet and age, they can consume up to 10% of their body weight every day. Orcas are known for eating any animal they come across, and as such exist at the top of the food chain as apex predators: their meals may consist of whales, seals, sharks, squid, fish, other dolphins, and in some cases, birds. The pod can swim up to 160 kilometers in one day in search of food. Having worked together to catch prey, orcas will share their meal with the members of the pod, especially with the youngest pod members. Their hunting techniques may vary depending on the pod, but the unity of the pod is constant even during hunts. Their close-knit bonds, in addition to their exceptional hunting methods, make these marine mammals one of the most feared in the animal kingdom. It has been documented that pod members will force large numbers of fish into one area of the ocean, and will then take turns feeding. However, even more compelling is the fact that they may beach themselves (slide onto the shore) to scare penguins or seals into the water for other pod members to hunt. In polar regions, orcas are known to knock down the blocks of ice on which seals rest in order to hunt them. In order to perform such an act, they use their bodies to create forceful waves, causing the seals to slide into the water. When hunting humpback whales in Australian waters, orcas are known to cooperate, separating mothers from calves in order to expeditiously hunt them. It has been documented that orcas use their prevailing tails, called ‘flukes,’ as weapons during their hunts. Furthermore, pod members may even leave their pods for a few hours in search of prey, returning afterwards. This is interesting because in studying orcas’ behavior, scientists have realized that there seems to be very little or almost no migration due to water temperatures or weather; they only tend to venture into different water areas if food becomes scarce. Given that most cetaceans demonstrate standard migration patterns, this behavior renders orcas rather distinctive.

Orcas are very similar to humans in their care for their offspring. Calves are not only known to receive education from their mothers, but also discipline and ‘punishment,’ which helps make them relatable to humans. Signs of a female orca’s ‘anger’ include strong head movements, hitting their tail in the water, emitting unusual noises using their teeth, and a range of other rather intimidating body movements. Mothers form exceptionally close bonds with their sons. If a mother orca is alive but has no surviving sons, she will swim not just with her daughters but with her grandchildren as well. The adult daughters (who might have their own offspring), may separate from their mother to a certain extent, but will not travel far from her. Orcas are very protective of their young: it has been documented that adolescent females often assist their mother in caring for the young. Such ‘babysitting’ by young females prepares them for the later responsibility of becoming a mother. Males within the pod are also known to babysit. The orca is one of just four species on the planet in which females routinely experience menopause; indeed, most animals retain the ability to reproduce until death. The other three species that experience menopause and stop breeding years before the end of their lives are humans, short-finned pilot whales, and false killer whales.

Social habits

In studying orcas’ lifestyles, many marine biologists have come to the conclusion that these animals possess their own culture, akin to humans. This conclusion is based on the fact that diverse pods have diverse personalities, behaviors, ways of communication and diets; moreover, social contact and bonding with other pod members are highly valued. It has been noted that orcas enjoy playing for a long time.
Orcas are social mammals

The orca’s skull is oval–shaped and contains one of the biggest brains on Earth.5 An orca’s brain is one of its most remarkable instruments used in everyday life, yet it is not completely explored. Many studies have indicated that orcas possess a remarkable photographic memory. In tests conducted on orcas in captivity, the animals were able to recall testing patterns up to 25 years after first being conducted.4 However, what makes their brains so captivating is the fact that areas of the brain that are known to encompass emotional thought and response are larger (percentage wise) in orcas than in any other animal.11 Neurologists explain that the area called the limbic system is responsible for processing all emotions. The orca’s brain contains an extra lobe of tissue immediately next to the limbic system and neocortex called the paralimbic lobe, which humans do not possess. The paralimbic lobe is an outgrowth of the areas of the brain that are known to control communication and social emotions in all other mammals, rendering it possible that orcas experience feelings, emotions and social connections such as love, joy and grief on a level that human beings cannot even comprehend. It is certain that orcas can understand hand signals, symbols on flashcards, and vocal cues when interacting with humans.44 Furthermore, it has been proven that orcas can understand numbers and can recognize themselves in a mirror.41

Sleep patterns

Orcas can be found in the oceanic surface layers while sleeping. They sleep from five to eight hours a day. However, there is a big difference in the ways in which orcas sleep in comparison to humans. Given that their sleep is unihemispheric (also described as ‘one–sided sleep,’ which in reality means they are only half–asleep), their breathing patterns differ from humans, who breathe unconsciously during sleep.45 Orcas are conscious breathers, which accounts for why they can never fall completely asleep. The orca shuts down one hemisphere of its brain as well as the opposite eye controlled by that hemisphere, while the other hemisphere and eye remain alert. This makes them awake and asleep simultaneously. EEG studies with dolphins have helped researchers to determine this kind of sleep.46 If the orca were to go into an unconscious state of deep sleep, it would suffocate and drown. An interesting fact is that orca calves spend the first months of their lives wide awake, with no sleep whatsoever.40 Indeed, adult orcas can be seen sleeping while the young calves continue swimming nearby.47 There are many reasons behind this type of ‘non–sleeping’ among orca calves. One is that this could be a way of staying safe from potentially harmful predators while they are still young; after all, mortality rates are high amongst newborn orcas. The second key reason is that these infants need to keep their bodies warm through constant activity until they grow older and develop a blubber.40 Even during sleep, members of a pod will form a very tight circle, synchronizing their movements and breathing. Resting in such a way also helps the pod members to avoid boats at a time when only half of their brain is awake.40

Echolocation and language

Orcas have very well–developed senses. They can hear an ample range of sounds, possess admirable vision in and out of the water, and their skin is very sensitive to the touch.48 Like most dolphins, orcas use a biological sonar called echolocation to communicate, but also to capture prey when vision cannot be used. During their underwater search for food (or during the night), echolocation facilitates the location of objects and prey.49 Orcas will make a sound that travels through the water. When the sound wave hits an object, it bounces back and returns to the orca. Using echolocation, orcas can detect other animals or objects in the area, as well as their size and shape. The clicks emitted through a fatty organ in the forehead (called the melon) hit objects and bounce back to the orca with important information. Moreover, due to the fact that marine mammals are able to detect echolocation, orcas can decrease the clicks they emit when hunting, so as to not advertise their presence.48

The so–called orca language is one of the most complex within any animal species.3 The calls that orcas produce are as loud as jet plane engines, making communication possible at all times, regardless of distance between the animals.49 Every pod ‘sounds’ very different, hence the noises they produce are characteristic only to their pod.48 They communicate with each other through very distinctive whistles and definite calls, in addition to low frequency pops.40 The single blowhole at the top of the head is used not only to breathe, but also to communicate, constantly chattering amongst themselves.47,48 Phonic lips are delicate folds of skin within the blowhole, which make the orca able to create different communicative clicks. Whistle sounds are produced by the larynx (enabling them to create more than one sound at a time), since they do not have vocal cords.40 Orcas use their jaws to

Image from Andreas B. Heide (Barba.no)

Brain

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make clapping sounds, which can be heard throughout the water. In possessing their own dialect of sounds, each pod member can recognize their pod from about 12 kilometers away based on specific calls. Whistles are used for private and close–range communication, while pulsed calls are used for long–range communication. Learning their mother’s dialect is a slow process for the baby orca. The young orca needs about two years of practice to attain a full repertoire of sounds. Mothers have been recorded using exceptionally diverse sounds when communicating with their offspring (‘baby talk’), in contrast to the sounds they use to communicate with adult members of the pod. Even though they have their own pod language, when they talk to other pods they use a more communal language. Just like people, orcas that live great distances apart possess completely different dialects. An example is the results obtained from an analysis of Norwegian and Icelandic orca pods: 23 different calls made by Norwegian and 24 different calls made by Icelandic orcas were distinguished, yet the two populations did not share any of the same calls. It has been observed that orcas have specific ways of communicating with people as well. In the wild, it has been recognized that orcas are far more cooperative with humans, as proven in the case of the orcas of Eden, Australia. This finding was documented in the 1840s by whaling overseer Sir Oswald Brierly in his extensive diaries. A group of orcas off the coast of Eden assisted in whale hunting. The orcas would find target whales, lead them into a bay, and then alert the whales of their presence in order to help catch them. The leader of the orcas was named Old Tom, and he would be amongst the first to alert the human whalers of the presence of whales by breaching or tail slapping at the mouth of the Kiah River. The whalers would kill the whales and let the orcas feed on the whales before bringing in the whales. Thus, this relationship was clearly exceptionally interdependent.

**Conclusion**

*Orcinus Orca* is certainly one of the finest specimens of marine wildlife. These fully aquatic mammals spend their lives underwater in highly impressive societies, making them one of the most social mammals on Earth. Orcas are incredibly intelligent ocean animals with a great sense of survival. They are also one of the most socially bonded creatures. We can certainly learn a lot from these noteworthy marine mammals, such as the power of unity, strong family ties and emotions. Indeed, orcas need to be understood and acknowledged by humans as outstanding social creatures that coexist with humanity.

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**Conflict of interest**

The author declares no conflict of interest.

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