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MEDITERRANEAN MONK SEAL BEHAVIOUR

Can we afford to discard anecdotal accounts?

Harun Güçlüsoy, William M. Johnson, Alexandros A. Karamanlidis

For as long as people have walked the Earth, their lives have been touched by animals. They have dominated and feared them, hunted, fished and farmed them, conferred supernatural powers upon them, treated them cruelly, with compassion and even religious respect. The very survival of ancient people depended upon a keen knowledge of wild animals, their habitat and behaviour patterns. Even today, the study of animal behaviour continues to be an important human pursuit, fulfilling a yearning for knowledge, for improved quality of life, or simply for profit. Research into insect reproductive behaviour, for example, is geared towards prevention of insect-borne diseases such as malaria, and also maximising agricultural output through pest control. On the other end of the scale, advancing knowledge of animal migration is helping conservationists design networks of “staging post” reserves that may ultimately save some endangered species from extinction.

The study of animal behaviour is a relative newcomer to the biological sciences.

Even today, monk seal research continues to rely on anecdotal accounts of fishermen and seafarers

Charles Darwin’s pioneering book, *The Expression of the Emotions of Man and Animals*, published in 1872, mapped a strategy for behavioural research that is still in use today. Unprepared for Darwin’s insight and revolutionary thinking, however, it was to take another 100 years for science to acknowledge his contribution. In 1973, the Nobel Prize for Physiology or Medicine was awarded to three pioneering zoologists, Karl von Frisch, Konrad Lorenz and Niko Tinbergen. According to the Nobel citation, they were the principal architects of the new science of ethology, the scientific study of animal behaviour. It was the first time that any contributor to the behavioural sciences had been honoured in this way, and it meant that the discipline of animal behaviour, which had its modern roots in the work of Charles Darwin, had finally arrived. One of the most significant contributions of von Frisch, Lorenz and Tinbergen was to demonstrate that behavioural traits are measurable entities in much the same way as anatomical or physiological traits.

Behavioural observations of Mediterranean monk seals date back to Aristotle, the Father of Zoology who, in his groundbreaking work *Natural History*, described the herding and social behaviour of seals on the coasts of Lesbos in the fourth century B.C. (Johnson & Lavigne 1999a).

In 1741, the famous Russian explorer and naturalist Georg Wilhelm Steller, while marooned on Bering Island, made a remarkably concise behavioural description of the sea lions that crowded its rugged shores (Frost 1993). Since Steller’s time, literally hundreds of authors have published works on the behaviour of Pinnipeds.

Compared to its northern relatives, however, or even to its endangered cousin in Hawaii, *Monachus schauinslandi*, our understanding of the behaviour of the Mediterranean monk seal (*Monachus monachus*) is seriously limited – a fact already recognised in the 1970s when scientists first began piecing together fragments of knowledge in an effort to devise a coherent action plan to rescue the dwindling species.

The characteristic obstacles that researchers face in pinniped behavioural studies, such as monitoring the animals while they are at sea or utilising tracking devices, are compounded in the case of the monk seal by low population numbers, colony fragmentation, inaccessibility of habitat, and the generally shy and retiring nature of the species.

Even so, direct observational research carried out over the years has succeeded in shedding some light on various aspects of Mediterranean monk seal behaviour. The early efforts of Mursaloglu (1984), Marchessaux (1989) and Dendrinos et al. (1994) provided significant information on mother-pup relationships, adult territorial and neonatal behaviour. More recently, long-term projects in Cabo Blanco (Mauritania / western Sahara), Madeira and Turkey have yielded some valuable insights into breeding and feeding habits and the use of caves by the species (Gazo et al. 1999, Neves 1998, Güçlüsoy et al. 1999).

All in all, however, reliable behavioural data on the Mediterranean monk seal remains meagre in volume and exceedingly difficult to gather. That presents an enduring problem for conservationists, who are required to design rescue and management plans based on detailed and accurate scientific knowledge of a species' biology and behaviour (Reed & Blaustein 1999).

Where Mediterranean monk seals are concerned, pursuing the research-to-conservation objective has been something of a hit and miss affair ever since efforts first began in earnest in the 1970s. Even today, faced with the same practical difficulties that have hamstrung researchers from the outset, data gathering continues to rely on anecdotal accounts of fishermen and seafarers, on logical and not-so-logical deduction, on comparative analysis with other pinniped species, on observations in captivity, and finally, on results of empirical research not infrequently based on conflicting or incompatible methodologies. While reliance on anecdotal sources has tended to diminish as *in situ* research becomes more technically sophisticated, it is important to remember that the evidence of fishermen and other coastal inhabitants has played a key role in improving knowledge of an otherwise obscure species, providing information on population numbers and distribution, prey preferences and feeding habits, and even seasonal movements (Berkes 1978).

Yet while anecdotal accounts have demonstrated their value in some key areas of monk seal conservation, it remains to be seen whether their full potential has been exploited elsewhere, particularly in terms of little understood aspects of the species' behaviour.

To date, ethological fragments are scattered among literally thousands of scientific papers, many of them unpublished. There has been no serious attempt to collate and cross-reference them. Conceivably, such information – when subject to proper scrutiny and coupled with newly collected anecdotal evidence – might offer promising new lines of inquiry in the ethological research of *Monachus monachus*.

The tricky part of any such compilation process is to separate fact from myth.

Here are a number of examples:

The grape-eating seal

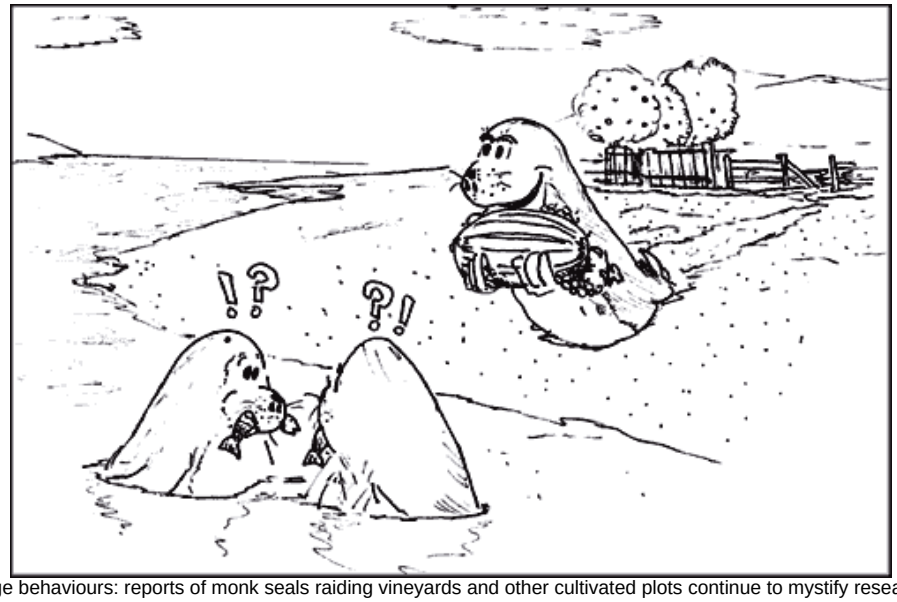
Reports originating from as far afield as Algeria, Corsica, Croatia and Turkey have accused the monk seal of sneaking into vineyards in the dead of night and feeding on succulent summer grapes (Anon. 1975, Brusina 1889, Hainard 1962, Jacob 1979, Ronald & Healey 1976). Indeed, the first reports of such behaviour appear in Renaissance times and were repeated, albeit with a dose of scepticism, in the first modern scientific description of the species authored by Johann Hermann (Hermann 1779). Brusina (1889) notes that "the inhabitants of the Dalmatian coast definitely assert that the seals come ashore during the night to suck the ripe grapes from the vines". The behaviour is also cited in the 1853 edition of the French Encyclopaedia of Natural History (Johnson & Lavigne, in prep.).

According to a more recent report, the monk seal was even risking extinction in Algeria with such mischievous behaviour, as irate farmers armed with shotguns took their revenge on the marauding animals (Anon. 1975).

In another description originating from the Cassis region of France around 1930, naturalist Gilles Cheylan reports that he originally attributed the repeated plundering of a seaside vineyard to wild boars. Hoping to catch the culprits, he and his companions set out for the vineyard at night, but instead of boars, found "four rather small seals diving into the sea which was about 20 meters away."

Coincidence? Cheylan concludes that because of the steep slope, the seals "must have used the goat path which leads from the beach to the vineyard" (Jacob 1979).

Recent reports of monk seals in Algeria feeding on potatoes, tomatoes and other crops cultivated near beaches only serves to deepen the mystery (Boutiba & Abdelghani 1997).



Strange behaviours: reports of monk seals raiding vineyards and other cultivated plots continue to mystify researchers (© Angelos Sanopoulos)

Boudouresque & Lefevre (1991) attributed the seal's grape and other vegetarian feeding habits to overfishing and consequent malnutrition – an unlikely hypothesis given the fact that the first reports are at least 500 years old.

Despite numerous anecdotal reports, the authenticity of the grape-eating phenomenon remains problematic, probably because no one in the scientific community can quite bring themselves to believe the monk seal capable of such an act. An earlier hypothesis, that seals may have inadvertently trampled the grapes as they sought shade in vineyards from the fierce midsummer sun, is also unsatisfactory since most "raids" appear to have been nocturnal. A casual foray into the vineyards with no particular objective other than curiosity can also be discounted, given the significant effort that monk seals – as ungainly as any Pinniped on land – must expend crawling ashore and then onto even higher land.

Such exertions, in fact, may well be indicative of pup or juvenile seals – as does the essentially inquisitive, adventurous nature of such behaviour. Indeed, Cheylan's description of "rather small seals" tends to confirm such a view. And what is to say that the monk seal, an opportunistic feeder at any time, is not even more adventurous in its tastes when young?

Migration

One of the first references to seal migration belongs to a Tunisian deckhand on a smuggler's boat in the early 19th century, who claimed to have seen herds of seals along the shores of southern Crete. Finding two pups in a cave one day, the crewmen decided to mark their identity, etching deep crosses between their eyes. Years later, on another smuggling expedition beyond the Straits of Gibraltar, the crew landed on an island and killed four large, beach-loafing seals. One of the dead, claimed the Tunisian, still bore a white scar between its eyes in the shape of a cross and can only have been "one of the two animals which were marked six or seven years before – or perhaps more – Allah knows." Seeking to explain the phenomenon, he added: "The seals always go towards the setting sun, contrary to the turtles which, like the Hajjis, always go towards the east" (Gavard 1927).

The smuggler's tale suggests that a grain of truth can be found in even the quaintest folklore. While monk seals do not habitually move in opposition to the Hajjis, they *can* sometimes travel significant distances – in search, perhaps, of bluer pastures, or better feeding grounds. Circumstantial evidence gathered during the 1970s suggested along-shore movements of between 50 – 600 km (Berkes 1976), findings generally supported by later observational deductions (Bayed 2001, Adamantopoulou et al. 1999).

Monk seals also commute between colonies, so-called seasonal movements that may take advantage of fish migrations, or breeding opportunities. Common sense now, you might think, but it was largely on the basis of anecdotal reports that researchers in the 1970s realised just how dynamic and how crucial interaction might be between fragmented colonies. That perceived importance was also reflected in the first conservation action plans for the dwindling species, envisaging networks of interconnecting reserves that would help nourish and sustain those movements. With governments and nature managers having other priorities in mind, however, precious little has been achieved towards that aim in the intervening quarter century.

Only relatively recently has field research and firsthand observation in Turkey (Veryeri 2001, Veryeri et al. 2001) and Mauritania (Cedenilla et al. 2002) confirmed previous assumptions on monk seal movements based on anecdotal evidence.

Breaking wind

A monk seal in Turkey, offering a noisy and forceful exhalation after diving

Already maligned as a stealer of fish and a wrecker of nets, monk seals have also gained a certain notoriety for their chronic flatulence.

Such antisocial behaviour even inspired a 16th century Benedictine hermit monk to write a poem denigrating the impudent seal who "lets off wind" so that even "the sea begins to hubble-bubble" (Johnson & Lavigne, in prep.).

Some fishermen in the Northern Sporades even claim that monk seals are able to use their powerful intestinal gases to hunt down prey hiding in rocky crevices underwater – a story also heard by researchers in Mauritania.

It is likely that misinterpretation and traditionally negative attitudes (Johnson & Lavigne 1999a) have given rise to such myths. Field experience has shown that what fishermen mistake for the sound of a seal breaking wind is, in fact, the animal forcefully exhaling, often after a long dive.

Character building

The Mediterranean monk seal has been variously described as mischievous, inquisitive, gregarious, solitary (hence the name, *Monachus*, according to some fanciful reports), docile, aggressive, easily adapting to captivity, shy and retiring, terrified of human disturbance.

Monk seals have died during blood and tissue collection procedures – possibly as a result of fright and panic. Monk seals have played and frolicked among human swimmers, even in areas where they had suffered serious persecution in the past. Human disturbance, on the other hand, has been known to make pups into orphans, and to provoke pregnant mothers to abort their foetuses.

Why the discrepancy?

> "It soon lost all fear of the numerous visitors around its enclosure. It entered and left the water under the curious eyes of the spectators and learned quickly to recognise me amongst them, turning towards me and crying when it demanded food – all of which didn't prevent it from breaking the index finger of my right hand with a bite, one day when I tried to stroke it…" (Gavard 1927).

Historical and anecdotal accounts point to several, interrelating causes. First and foremost is habitat and how it shapes behaviour.

Comparative interpretation of ancient texts has revealed a fundamental deterioration of monk seal habitat since ancient times, driven by human disturbance and persecution. Over the centuries, monk seals have been displaced from open sandy beaches and great arching caverns that encouraged gregarious behaviour, to occupy increasingly marginal habitat, including caves that cannot even meet the essential biological needs of the species. Habitat deterioration has acted selectively against colony formation, in favour of individuals or mothers with pups. By severely limiting social interaction, mating and breeding success has been compromised, as has the animal's gregarious behaviour for which it was so renowned in ancient times (Johnson & Lavigne 1999 a, b).

Then why are monk seals seen swimming into busy harbours, through the Corinth Canal, across Izmir and Thermaikos Bay – heavily polluted stretches of water in the Mediterranean? Why are they playing hide and seek with human swimmers?

The answer may lie in youthful curiosity and trust. Most, if not all, of the cases cited above involve juvenile animals. And like most juveniles, monk seal teenagers too, can be incautious, naive, even reckless. Most monk seals that end up entangled in fishermen's nets, for example, are pups or juveniles – another behavioural phenomenon originally gleaned from anecdotal accounts and later verified by firsthand observations (Mursaloglu 1984, Jeny Androukaki, pers. comm. 2002. See also, When fishermen save seals, TMG 3(1): May 2000, and Snared and drowned, TMG 4 (1): May 2001).

In 1985 in Greece, researchers “confirmed that the young are not afraid of man and even let themselves be petted…” (Ronald 1985). As history itself has shown, when cave intruders come in malice rather than misguided scientific curiosity, monk seals can pay a heavy price for their legendary trusting nature. In the 16th century, monk seal hunters were even taken aback by the docility and tameness of their prey (Johnson & Lavigne, in prep.).

Pioneering monk seal behaviourists like Bahtiye Mursaloglu knew that fishermen’s reports could not always be taken at face value; that in village communities tales can quickly grow tall in the telling. Along the Aegean coast, for example, she came to realise “the unreliability of the numbers stated by fishermen and casual observers,” largely because they were unable to clearly distinguish one seal individual from another (Mursaloglu 1991). Elsewhere, however, researchers have seen fishermen inflating seal numbers in the hope that it will improve their chances of compensation for damaged nets and reduced catches.

While anecdotal evidence cannot be equated with scientific fact, it can serve as a serious basis for further inquiry. Indeed, the use of anecdotal data is not simply a quirk of the monk seal conservation “scene”, but a procedure gaining increasing acceptance in the understanding of poorly studied issues in diverse scientific disciplines. Such has been the case, for instance, in the management of the alligator snapping turtle (Berlin 1998) or even in the understanding of the effects of cannabis on the mood of psychologically disordered patients (Grinspoon & Bakalar 1998). Blehr (1997), pleads for a modification of ethological ground rules that will allow the presentation even of tentative hypotheses based on anecdotal data. The author argues that, especially in the study of free-ranging mammals – as is the case with the Mediterranean monk seal – “relevant behavioural observations lie outside the ethologist’s control, and can only be replicated by further chance encounters. Observations in their anecdotal form should therefore be made available to other ethologists despite their lack of quantifiable data. This would allow for the creation of a pool of more or less unique observations helping to better understand behaviour.”

> “A similar story was told in Kusadasi. A group of fishermen from Bodrum once witnessed a very ferocious battle between a seal and an unusually large octopus. The seal was unable to subdue the octopus and came very close to suffocation when the octopus blocked his nostrils. The seal swam over to the fishermen and ‘asked for help’. The fishermen removed the octopus to save the seal’s life and the seal followed the boat all the way to Bodrum harbour ‘to show his gratitude’. Similar stories were told in two other communities...” (Berkes et al. 1979).

Logical deduction, comparative analysis (with other species and with the results of empirical research), preponderance of evidence (commonality of reports) – these are among the essential methods that researchers must apply in attempting to sift plausible ethological fact from myth and dubious folklore.

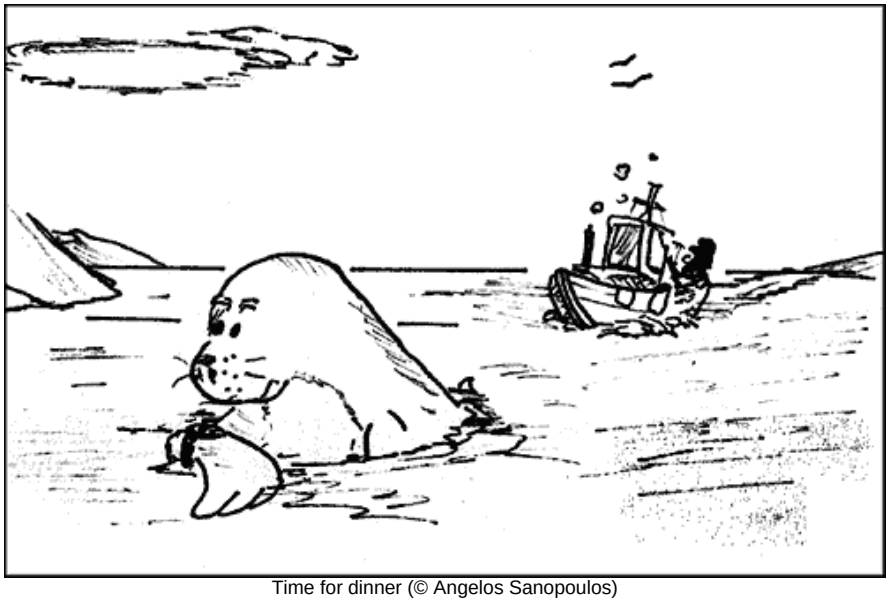
Such is the volume and diversity of anecdotal data focusing on the monk seal that a methodical approach is equally indispensable. Although the collation and comparison of such data has yet to be attempted in any comprehensive or systematic way, research should seek to:

- Identify, collate and analyse behavioural and biological facts buried in legends, folklore and anecdotal reports.
- Determine how anecdotal information has shaped human attitudes (often negatively) towards *Monachus monachus*.
- Ascertain how anecdotal evidence contradicts contemporary understanding of monk seal ethology, and how such data might fill missing gaps in scientific knowledge, and be usefully applied to the conservation of the species.

Monk seals appear in the local folklore of the Mediterranean region in numerous, often colourful, mutations.

Fishermen have regarded the monk seal as a cunning, voracious foe since ancient times, but to what extent do the following reports constitute observational fact, or prejudiced myth? Monk seals, according to Turkish and Greek fishermen:

- Keep a keen look out for fishing marker buoys that alert them when fishermen have laid out their nets and dinner is ready.
- Splash the surface of the water to drive fish into the nets.
- When feeding from the net, show a distinct preference for quality fish that command the highest prices in the marketplace.
- Rarely bother to retrieve fish that fall from the net onto the sea bed.
- Feed on the choicest fish cuts but leave the head in the nets.
- Attack the opposite end of the net as the fishermen haul in their catch.
- Wait for fishermen at strategic locations, and follow them out on their fishing trips.



Time for dinner (© Angelos Sanopoulos)

- Are capable of recognising individual fishing boats and fishermen and are thus able to identify which carry guns and which are more likely to harm them.
- Know, conversely, which fishermen are friendly, and visit them selectively in order to be fed. This habit has led to the popular saying in Turkey and Greece that “every fisherman has his own seal.”

Turkish fishermen have also reported observing monk seals mating in the water (an event rarely, if ever, observed by researchers) and territorial fights between males.

Given its past contribution and science’s current dearth of knowledge on the species, it is regrettable that so little effort is being made to collate and analyse the anecdotal evidence already at hand – evidence that could provide valuable insights into the behaviour of Europe’s most endangered marine mammal.

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