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### The evolution of Greek fauna since classical times

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## THE EVOLUTION OF GREEK FAUNA SINCE CLASSICAL TIMES

*Konstantinos Sidiropoulos, Rosa-Maria Polymeni and Anastasios Legakis*

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**ABSTRACT:** This article concerns the Greek fauna of classical and late antiquity and changes up to the present day. The main sources for the fauna of antiquity are historical, geographical and zoological texts, as well as descriptions from travellers who visited Greece. The study of the texts of classical and late antiquity was based on the following classical authors: Xenophon, Aristotle, Aristophanes Byzantios, Pliny, Dio Chrysostom, Plutarch, Pausanias and Aelian. Some species that were present in the Greek fauna of classical and late antiquity, such as the lion and the leopard, are today extinct in Greece, whereas some other species that are now common, such as the cat, the chicken and the peacock, were introduced about that time or a little earlier from other regions. Some other species that are also common today, such as the wild rabbit and the pheasant, were unknown at that time, as they appeared later in Greece from other areas.

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### *Introduction*

The Greek landscape until the late nineteenth century was an area of incomparably rich fauna, with several species of animals that are now extinct or in much smaller numbers. For the current state of the environment and the fauna of Greece, human activities and interventions are almost exclusively responsible.

The main causes for the deterioration of Greek fauna in classical and late antiquity were mainly the increase in human population, the destruction or reduction of habitats of wild animals due to human interventions (e.g. deforestation), intense hunting activity and, generally, thoughtless collection and consumption of wild animals by the Greeks and Romans. In the early to mid-twentieth century, the situation was close to the brink of disaster.

Later, new threats were added, such as industrial pollution, contamination by pesticides, careless tourism development, the creation of thousands of provincial and forest roads, increasing urbanization, the extermination of large animals because they were considered pests by farmers and breeders and so on. However, over the last 30-40 years there have been many efforts to conserve and protect national parks and endangered habitats, animals and plants due to the development of greater environmental awareness and to changes in legislation relating to the environment and the establishment of protection measures. Today, Greek fauna, despite the environmental disasters,

remains one of the richest in Europe and the Mediterranean, both in number of species and in population sizes of specific species and animals. Overall in Greece, approximately 23,000 species of land and freshwater fauna have been recorded, as well as 3500 marine species. When the fauna is fully studied, it is likely to include up to 50,000 species.

### *Classical, Hellenistic and Roman Times*

Although nowadays we have a very large amount of information on the state of Greek fauna, in the past it was not always so. In Ancient Greece, the first recordings of fauna started in the fifth century BC by a few writers of that time. However, only some of them considered the animals in a scientific way in the current sense. Most of them emphasized the relationship of animals with humans (e.g. hunting, farming, etc.) or considered them as mythological figures, while most of the people of that time ignored animals in general.

The first written records of animals in Greece come from the *Iliad* and the *Odyssey*, two works attributed to the legendary writer Homer. In the fifth century BC, Herodotus (485-421 BC) and Xenophon (440-355 BC) can be considered as the first who provided solid data from various parts of Greece.<sup>1</sup> Aristotle (384-322 BC) was the first person whom we could consider as a zoologist. He wrote several books on the animals of Greece, including such subjects as the movement, the parts and the reproduction of animals.<sup>2</sup> Aristophanes of Byzantium (257-180 BC) edited Aristotle's zoological works and added much new data.<sup>3</sup> Pliny the Elder (23-79 AD) supplied extensive details on the fauna of Italy and Greece in his *Natural History*. Dio Chrysostom (40-120 AD) travelled extensively and provided much data on the life of animals.<sup>4</sup> Plutarch (50-120 AD) included in his *Morals* many philosophical, political and scientific ideas.<sup>5</sup> Pausanias (110-180 AD) was a Greek traveller and geographer who gave detailed descriptions of his journeys, including zoological information.<sup>6</sup> Finally, Aelian (170-235 AD) was a Roman author and teacher. In his writings he described, among other

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<sup>1</sup> Xenophon, *On Horsemanship* and *Hunting with Dogs*.

<sup>2</sup> Aristotle, *History of Animals*, *On the Parts of Animals*, *On the Motion of Animals*, *On the Beginnings of Animals* and *On the Generation of Animals*.

<sup>3</sup> Aristophanes of Byzantium, *Epitome Aristotelis de animalibus*.

<sup>4</sup> Dio Chrysostom, *The Euboean Discourse*, or *The Hunter*.

<sup>5</sup> Plutarch, *Morals*: "Which are the More Crafty, Water Animals or Those Creatures that Breed upon the Land?"

<sup>6</sup> Pausanias, *Description of Greece*.

things, the animals that he met on his travels.<sup>7</sup> Dionysius Periegetes (second century AD) paraphrased a text that is considered to be a transliteration of a poem attributed to the sophist Eutecnius; in this text the various species and habits of birds are described.

### *The Byzantine Period (Fifth – Fifteenth Centuries AD)*

The Byzantines were influenced by the Graeco-Roman tradition (mainly by the works of Aristotle) and gave animals a special place. In many cases we encounter them in theological narratives about the creation of the world. For example, we find speeches of Basil the Great with strange and outlandish stories featuring animals (for example, in the four books of Timotheus of Gaza [fifth century AD]).<sup>8</sup>

In these works, the wild side of nature is not mentioned at all. The animals look like harmless creatures of God, reminding man of the presence of the Creator. At the same time, animals, for example cattle and pigs as well as dogs, are mentioned mainly as having a relationship with pastoral life. The animals in the everyday life of the Byzantines had several roles, some of them connected with superstitions or magical practices, while others had special symbolism. Animals were separated into two categories: the first was based on material designed to observe nature and could be described as “theoretical”, while the second was based on sources for the study of human and animal coexistence in everyday life and can be described as “applied”.<sup>9</sup> Thus, during the period when religious images were completely banned in churches, images of animals, especially birds between geometric and floral designs, were allowed.

Most of the data provided here is not localized and therefore it is difficult to identify the geographical origin.

Emperor Constantine VII Porphyrogenitus (905-959 AD), who promoted the letters, wrote a treatise on animals entitled *Collection on the History of Animals, Terrestrial, Birds and Marine*, of which only two of four volumes

<sup>7</sup> Aelian, *On the Nature of Animals*.

<sup>8</sup> Timotheus of Gaza, *On Animals: Fragments of a Byzantine Paraphrase of an Animal Book of the 5th Century*, transl. F. S. Bodenheimer and A. Rabinowitz, Paris and Leiden 1949.

<sup>9</sup> Taxiarchis Kolias, “Ο άνθρωπος και τα ζώα στο Βυζάντιο” [Man and animals in Byzantium], in I. Anagnostakis, T. G. Kolias and E. Papadopoulou (eds), *Ζώα και περιβάλλον στο Βυζάντιο (7ος-12ος αι.)* [Animals and environment in Byzantium (seventh – twelfth centuries)], Athens: Institute for Byzantine Research / National Hellenic Research Foundation, 2011, pp. 15-22.

have survived. It refers to how animals are classified and how viviparous animals behave. Around the same time several books on veterinary medicine were written, mostly related to horses and hunting hawks. The oldest veterinary manuscript from the Early Byzantine period, entitled “Hippiatrica”, dates to the tenth century.<sup>10</sup> Many of these books were variations of the work of the best-known veterinarian of that period, Apsyrtus (active c. 300 AD). Other veterinary books of the time, written by Dimitrios Pepagomenos (1200-1300 AD), have prescriptions for the treatment of hawk diseases, as hawks were used by Emperor Michael VIII Palaiologos and his aristocracy for hunting; he also wrote a book of instructions on the species, breeding and training of dogs.<sup>11</sup>

In the ninth century, the island of Paros was almost uninhabited. However, there were reports that many deer and wild goats lived there.<sup>12</sup> In 1088, Emperor Alexius I Comnenus sent a letter to the monk Christodoulos at the monastery of Patmos, where he noted the presence of hares, deer, geese, ducks, partridges, cranes, swans, pheasants, wild fowl, pigeons and other birds.<sup>13</sup>

From the literature of the Late Byzantine period, we can highlight three anonymous satirical poems of the fourteenth century about animals: “Poulologos”, “Narration on Tetrapod Animals” and “Missal of an Honoured Donkey”. These poems assign various human properties to corresponding ones in animals. Therefore, the lion is referred to as king, the hawks as soldiers, the large carnivores as the partners of the king and so on.

The protection of crops from flocks of birds and from wild animals was a constant problem in the rural economy of Byzantium. Despite the literary stereotypes referring to the close association of pastoral nomadic life with animal husbandry, Byzantium had a basic economic activity of broad social layers. Both written sources and the evidence from excavations in Asia Minor show that the Byzantines knew and identified two types of cattle, oxen (*Bos taurus primigenius*) and buffalo (*Bubalus bubalis*), already domesticated for many uses by humans. Cattle were used mainly as work animals in agriculture, making use of their power (for example in freight carriages). The Byzantines

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<sup>10</sup> Anne-Marie Doyen-Higuet, “The ‘Hippiatrica’ and Byzantine Veterinary Medicine”, *Dumbarton Oaks Papers* 38 (1984), pp. 111-120.

<sup>11</sup> Dimitrios Pepagomenos, *On the Breeding of Hawks and their Care, Second Treatise on More Rustic Ornithology* and *Cynosophion*.

<sup>12</sup> T. Ioannou, *Μνημεία ἀγιολογικά* [Hagiographical monuments], Venice 1884, p. 9.

<sup>13</sup> Era Vranoussi, *Βυζαντινά έγγραφα της Μονής Πάτμου, Α΄: Αυτοκρατορικά* [Byzantine documents from the monastery of Patmos, I: Imperial], Athens: Institute of Byzantine Research / National Hellenic Research Foundation, 1980.

also appreciated the products of cows and buffaloes, such as milk, cheese and butter. Veal played only a minor role in their diet, and they preferred chicken, lamb, pork and goat meat. Information about daily activities related to the domestic fowl or the consumption of poultry products, although sporadic, shows that poultry was an integral part of everyday life. At the same time, rare and exotic birds are a regular presence in the descriptions of gardens, imperial residences, ceremonial dinners and fabrics or valuables.

On the ways and means by which the hunt took place in Byzantium, we can mention that the lower classes chased different animals from the upper classes and the emperor. For the upper classes, hunting required massive mobilization and preparation, as well as the participation of many people, each of whom had a specific role, involving for example hunting dogs and hawks. On the other hand, the poor had limited means, and their success was based on their ability. Hunting helped to create cohesion, which was a common cause, especially concerning the family. Of course, researchers have pointed out that hunting was mainly a preparation for war, and it was also the main instrument for recreation and fun, accompanied by a symposium. In Byzantine literature, there are very few systematic works concerning the hunting of animals and its technique; however, references to hunting show that it was a beloved and widespread activity.<sup>14</sup>

Eustathius of Thessaloniki (1115-1195) wrote that hunting was very common during the twelfth century. In his writings he included numerous valuable extracts from earlier writers.<sup>15</sup> Michael Choniates [Akominatos] (1138-1222) noted that in the mid-twelfth century to the early thirteenth game was rare in Attica and was sought after even by the Latins who ruled Athens. He also mentioned that deer, hares and wild boars decorated the palace of Emperor Andronikos I.<sup>16</sup>

Constantine Manassis (c. 1130 – c. 1187) stated in his treatise *Ekphrasis of a Crane Hunt* that the hunting of cranes is easy because hunting falcons were used. On the other hand, hunting roe deer is tiresome because they needed to use horses. He also provided a description of the hunting of finches and goldfinches. A similar description comes from Constantine Panthechnis

<sup>14</sup> Anastasios Sinakos, “Το κυνήγι κατά τη μέση βυζαντινή εποχή (7ος-12ος αι.)” [Hunting during the Middle Byzantine epoch, seventh – twelfth centuries], in Anagnostakis, Kolias and Papadopoulou (eds), *Ζώα και περιβάλλον στο Βυζάντιο*, pp. 71-86.

<sup>15</sup> Eustathius of Thessaloniki, *Commentary on Dionysius Periegetes*.

<sup>16</sup> S. P. Lambros (ed.), *Μιχαήλ Ἀκομινάτου τοῦ Χωνιάτου. Τὰ σωζόμενα* [Michael Akominatos of Choniates: Fragments], 2 vols, Athens 1879-1880.

(twelfth century), who wrote about the hunting of partridges and hares.<sup>17</sup> Other species that were caught were greenfinches, geese, ducks, wood pigeons, turtle doves, quail and pheasants.<sup>18</sup> An unusual bird, the peacock, was mentioned in a decree of Emperor Nikephoros Botaneiates (1002-1081), who declared that the Vatopedi monastery was relieved from supplying geese, ducks, partridges, cranes and peacocks.<sup>19</sup>

Apart from dogs, the hunters used several bird species, such as peregrine falcons, harriers, common kestrels, hobbies and kites. Peregrine falcons came from Zagora and Stenimachos, falcons from Thessaloniki and Pelagonia, kestrels from Mount Meleniko and hobbies from Didymoteicho.<sup>20</sup>

In the early fifteenth century, the Florentine Cristoforo Buondelmonti (1386 – c. 1430), trying to emphasize that the island of Naxos was almost deserted because of Ottoman raids, stated that: “Today you only see crowds of jackals, screaming hideously, and flocks of wild animals that roam the scrublands and the plains.”<sup>21</sup> He added that the island was full of partridges. He also mentioned that it was well known that the jackal existed on the island of Andros, and that on Anafi there were no snakes.

Around the same time an important Italian traveller, Cyriacus of Ancona [Ciriaco de’ Pizzicolli] (1391-1452), visited Greece.<sup>22</sup> According to his reports, the area of Aktion was then forested and rich in wild mammals and birds. About another trip, to the Peloponnese, he wrote that hunters saw that a ruler of the region had killed a deer and a large bear, near the sources of the Alpheus River.

Valuable information on the fauna of Mount Taygetos was given by John Eugenikos (1394-1454) in his *Κώμης έκφρασις* [Ekphrasis of Komi], a description of medieval Petrina written between 1413 and 1430. From this we learn that red deer, wild boars, roe deer, foxes, hares, partridges, quail, pigeons and woodpigeons lived there.

In the fifteenth century, the Italian monk Francisco Suriano mentioned the presence of red and roe deer, wild goats, hares, crows and pigeons in

<sup>17</sup> Constantine Panthechnis, *Ekphrasis of Hunting Partridges and Hares*.

<sup>18</sup> Faidon Koukoules, “Κυνηγετικά εκ της εποχής των Κομνηνών και των Παλαιολόγων” [Hunting in the eras of the Comneni and the Palaiologoi], *Επετηρίς Εταιρείας Βυζαντινών Σπουδών* (1932), pp. 3-33.

<sup>19</sup> *Ibid.*

<sup>20</sup> *Ibid.*

<sup>21</sup> Cristoforo Buondelmonti, *Liber insularum Archipelagi* (1420).

<sup>22</sup> Cyriacus of Ancona, *Commentariorum Cyriaci Anconitani, nova fragmenta, notis illustrate*, Pesaro 1763.

Crete.<sup>23</sup> Around the end of the fifteenth century, the islands of Antiparos and Sikinos were uninhabited, and the most abundant animals were eagles and wild asses, which came from tame donkeys who, after their abandonment, had returned to the wild.<sup>24</sup>

### *Later Times (Sixteenth – Nineteenth Centuries)*

The main sources for the fauna of later times are foreign travellers, naturalists and scientists, mainly German, Italian, French and British, conquerors' reports, Greek intellectuals and philosophers and Greek scientists and researchers.

#### 1. Sixteenth Century

Holton mentioned that during the Venetian conquest of Crete, the upper meadows, the cypress-dominated forests and the rocky mountain slopes yielded abundant game (deer, wild goats, hares and wildfowl).<sup>25</sup>

Jean Chesneau, secretary to the French ambassador in Constantinople, was astonished in 1546 by the domesticated partridges of Chios.<sup>26</sup> They were caught while they were young and, when they grew up, they were left to graze with the wild ones on the mountains of the region.

The French geographer André Thevet, who travelled to Crete in 1549, stated that hawks and other raptors lived in abundance in the mountains.<sup>27</sup>

One of the most descriptive authors of that time was Pierre Belon, who provided extensive accounts of the fauna and included many drawings of animals in his work.<sup>28</sup>

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<sup>23</sup> Francesco Suriano, *Il trattato di Terra Santa e dell'Oriente di Frate Francesco Suriano, missionario e viaggiatore del secolo XV*, ed. Girolamo Golubovich, Milan: Tipografia Editrice Artigianelli, 1900.

<sup>24</sup> William Miller, *The Latins in the Levant: A History of Frankish Greece (1204-1566)*, New York: E. P. Dutton & Co., 1908.

<sup>25</sup> David Holton, *Literature and Society in Renaissance Crete*, Cambridge: Cambridge University Press, 1991.

<sup>26</sup> Jean Chesneau, *Le voyage de monsieur d'Aramon, ambassadeur pour le Roy en Levant, escript par un noble homme Jean Chesneau, publié et annoté par M. Ch. Schefer*, Paris: Ernest Leroux, 1887.

<sup>27</sup> André Thevet, *Cosmographie de Levant*, Lyon: Jean de Tournes and Guillaume Gazeau, 1554.

<sup>28</sup> Pierre Belon, *L'histoire de la nature des oyseaux, avec leurs descriptions et naïfs portraits retirez du naturel, écrite en sept livres*, Paris: Guillaume Cavellat, 1555.



When the Flemish nobleman Joos van Ghistele (1446-1525) visited Greece in the second half of the fifteenth century, he was impressed with the numerous wild boars on Delos and Tenedos.<sup>29</sup>

Nicolas de Nicolay passed by Chios in 1551 and also wrote about the countless domesticated partridges that existed in many villages, wandering free like hens, in flocks of approximately 300 birds.<sup>30</sup> This is something that was confirmed a few years later by the Flemish naturalist and diplomat Ogier Ghiselin de Busbecq, who in addition provided information on their breeding.<sup>31</sup>

Several sources confirm the existence of bears, deer and wild boars in the sources of the Alpheus River.<sup>32</sup>

## 2. Seventeenth Century

In 1611 Georges Sandys visited the Mediterranean and noted that Crete nourished nothing that is wild, except hares, red deer and fallow deer.<sup>33</sup>

The Frenchman the Sieur Du Loir reported that in 1639, passing by Kakia Skala, near Athens, he was impressed by the number of eagles flying near the surrounding rocks, where they had their nests.<sup>34</sup>

Melchisédech Thévenot, who travelled in the East from 1653 until 1667, had a good knowledge of the Aegean islands and supplied much information about them.<sup>35</sup> He wrote that the residents of Andros ate goat meat, although the island was full of game, such as hares, rabbits and partridges. However, there were no hunters, nor firearms. The lack of firearms is another reason for the abundance of animal life on the Aegean islands at the time. For Naxos he stated that there were numerous tall deer that had probably been brought in from mainland Greece for hunting carried out by the dukes of Naxos. He also stated that partridges were abundant.

In 1669, the Capuchin friar Robert de Dreux followed all the phases of a hunt organized in honour of Sultan Mehmed IV in the region of Larissa.<sup>36</sup>

<sup>29</sup> Ambrosius Zeebout, *Tvoyage van Mher Joos van Ghistele*, Ghent 1557.

<sup>30</sup> Nicolas de Nicolay, *Les quatre premiers livres des navigations et peregrinations orientales*, Lyon: Guillome Roville, 1568.

<sup>31</sup> Ogier Ghiselin de Busbecq, *Legationis Turcicae epistolae quatuor*, Paris 1589.

<sup>32</sup> Robert Sallares, *Ecology of the Ancient Natural World*, Ithaca: Cornell University Press, 1991.

<sup>33</sup> George Sandys, *Four Books, Containing a Description of the Turkish Empire, of Ægypt, of the Holy Land, of the Remote Parts of Italy, and Islands Adjoining*, London: W. Barrell, 1621.

<sup>34</sup> Du Loir, *Les voyages du sieur Du Loir*, Paris: François Clouzier, 1654.

<sup>35</sup> Melchisédech Thévenot, *Relations de divers voyages curieux*, 2 vols, Paris: André Cramoisy, 1663-1672.

<sup>36</sup> Robert de Dreux, *Voyage en Turquie et en Grèce*, Paris: Les Belles Lettres, 1925.

Approximately 20,000 men were recruited from local villages in order to chase animals through the forests, bringing them close to a podium where the sultan was sitting. The animals tried to escape, hitting and injuring or even killing some people, while the sultan enjoyed the spectacle. These animals must have included wolves, bears and probably wild pigs and deer, since they caused so much harm to the crowd.

The Englishman Bernard Randolph, who in 1675 toured parts of Greece, wrote that there were many deer Mytilini.<sup>37</sup> There is a possibility that these deer were fallow deer (*Dama dama*), like the ones who live today on Rhodes.

The French physician Jacob Spon, who toured Greece in the second half of the seventeenth century, mentioned that Delos was the realm of hares and rabbits, while in Attica he reported that at a water source near Mount Kitheronas wolves, bears and wild boars descended in the night to drink water.<sup>38</sup>

It is also recorded that bears and wild boars still lived in Porto Rafti, near Athens, in 1675.<sup>39</sup>

### 3. Eighteenth Century

In 1729 the Dutchman Johannes Aegidius van Egmont passed by the Aegean islands.<sup>40</sup> On Milos he found abundant game: partridges, turtledoves, woodcocks and even wild ducks, while partridges were plentiful on Kythnos. Arriving on Chios he did not fail to write about the abundant partridges along with other wild birds that were offered to the rich resident hunters.

The Englishman Charles Thompson, who visited Attica in the summer of 1730, spent a night in Hasia at the foot of Mount Parnitha.<sup>41</sup> The wolves were so many in the area that he was unable to sleep because of their howling.

The British archaeologist Richard Chandler came to Greece in 1764. From him we learn that during his visit Mount Parnitha was full of deer and wolves.<sup>42</sup> Whoever killed a wolf would bring it to Athens and bargain for a tip.

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<sup>37</sup> Bernard Randolph, *The Present State of the Islands in the Archipelago (or Arches), Sea of Constantinople, and Gulf of Smyrna; with the Islands of Candia, and Rhodes*, Oxford 1687.

<sup>38</sup> Jacob Spon, *Voyage d'Italie, de Dalmatie, de Grèce et du Levant*, Lyon: Antoine Cellier, 1678.

<sup>39</sup> Sallares, *Ecology of the Ancient Natural World*.

<sup>40</sup> Johannes Aegidius van Egmont and John Heyman, *Travels through Part of Europe, Asia Minor, the Islands of the Archipelago; Syria, Palestine, Egypt, Mount Sinai &c.*, Vol. I, London: L. Davis and C. Reymers, 1759.

<sup>41</sup> Charles Thompson, *The Travels of the Late Charles Thompson, Esq.*, Vol. II, Reading: C. Micklewright, 1744.

<sup>42</sup> Richard Chandler, *Travels in Greece, or an Account of a Tour Made at the Expense of the Society of Dilettanti*, Oxford 1776.

He also took part in a falconry organized on Mount Hymettus. This means, of course, that the mountain was full of game.

The French traveller Charles-Nicolas-Sigisbert Sonnini de Manoncourt wrote in his journal that Greece was a rich hunting ground.<sup>43</sup> He was particularly impressed by the abundance of hares and pheasants. During the winter, pheasants were abundant both on the islands and in mainland Greece. In the region of Serres and Thessaloniki they were bred in cages and sold in the market. We learn further that the Turks of Macedonia hunted pheasants with hawks.

In the late eighteenth century the Dutch traveller Hendrik Frieseman wrote that jackals and wolves existed on Samos.<sup>44</sup> Today, only a small population of jackals still lives on this island. Equally important is the information that there were so many partridges on Kythnos that they were sold in cages very cheaply to neighbouring islands.

André Grasset de Saint-Sauveur, son of the consul of France on Corfu, settled on the island in 1781. In one point in his journal he mentioned the way that the locals on Zakynthos hunted seals.<sup>45</sup>

Joseph Pitton de Tournefort observed that the wild goats of Crete lived in herds in the mountains.<sup>46</sup> Brisson suggested that the real name of these goats should be *Capra cretensis* rather than *Capra aegagrus cretica*, as they are known today.<sup>47</sup> Claude-Étienne Savary wrote that the high mountains of Crete were inhabited only by goats.<sup>48</sup>

#### 4. Nineteenth Century

The Frenchman François-Charles-Hugues-Laurent Pouqueville, consul of France at the court of Ali Pasha from 1806 to 1816, gave us an enormous wealth of information on the Greek fauna of the time in two works.<sup>49</sup> In the

<sup>43</sup> Charles-Nicolas-Sigisbert Sonnini de Manoncourt, *Voyage en Grèce et en Turquie*, Paris: F. Buisson, 1801.

<sup>44</sup> Hendrik Frieseman, *Description historique et géographique de l'Archipel*, Neuwied: Société Typographique, 1789.

<sup>45</sup> André Grasset de Saint-Sauveur, *Voyage historique, littéraire et pittoresque dans les îles et possessions ci-devant vénitiennes du Levant*, Paris: Tavernier, 1800.

<sup>46</sup> Joseph Pitton de Tournefort, *Relation d'un voyage du Levant*, Lyon: Anisson and Posuel, 1717.

<sup>47</sup> Mathurin Jacques Brisson, *Regnum animale in classes IX distributum, sive Synopsis methodica*, rev. ed., Leiden: Haak, 1762.

<sup>48</sup> Claude-Étienne Savary, *Lettres sur la Grèce, faisant suite de celles de l'Égypte*, Paris: Onfroï, 1788.

<sup>49</sup> François-Charles-Hugues-Laurent Pouqueville, *Voyage en Morée, à Constantinople*,

first of these, he mentioned that in 1799 at the mouth of the Alpheus River there lies a chain of salt lakes and lagoons filled with waterfowl, eels and other fish. Arriving at Pylos he saw a shallow lagoon stretching out in front of the city. Only very small boats could pass from its mouth and they were used to chase geese and ducks that gathered there by the thousands. Another interesting piece of information is that the mountains around Pylos were covered with forests and were full of hares. The forests located on the banks of the Pamissos River and in the northern part of the Taygetos mountain range were so full with wild boars that they descended near residential areas. Another bit of information passed on by Pouqueville was that in the village of Harvati, on the route between Tripoli and Sparta, there were rich forests of oak full of wolves and foxes. For Poros and Galatas in Troizina, he stated that rich forests existed and that they had deer, wild boars, hares and partridges. In Pouqueville's time the presence of wolves must have been a daily reality in Arcadia. When it snowed for several weeks, wolves descended from Mount Lykaion, reaching the outskirts of cities. He wrote that Mount Taygetos was full of wild boars, roe deer and red deer, while jackals were common animals in the Peloponnese and often attacked cows. In another part of his work he wrote that the residents of Arcadia bred large hunting dogs, which were used to kill wolves, jackals and foxes. In his second work, *Voyage dans la Grèce*, Pouqueville noted that the Greeks and Vlachs who lived in the villages of Tzoumerka sold skins of hares and foxes, while residents of Kalarrytes traded rabbit and bear skins. Therefore, at that time the south of the Pindos mountain range had hares, foxes and bears. He also mentioned that around Athens there were many swamps, especially in Faliron and Piraeus. These helped many birds, especially storks, to build nests and find food.

According to Henry Holland, Thomas Smart Hughes and William Martin Leake, a wide variety of fish was caught in the waters of Lake Pamvotis, in north-western Greece.<sup>50</sup> Eel, bass, carp, crayfish and tsuma (*Pelagus epiroticus*), which are small fish caught with special silky nets, were all sought after.

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*en Albanie, et dans plusieurs autres parties de l'Empire Ottoman*, 3 vols, Paris: Gabon et Cie, 1805; and *Voyage dans la Grèce*, 5 vols, Paris: Firmin Didot, 1820-1821.

<sup>50</sup> Henry Holland, *Travels in the Ionian Isles, Albania, Thessaly, Macedonia, etc., during the Years 1812 and 1813*, London 1815; Thomas Smart Hughes, *Travels in Sicily, Greece and Albania*, London 1820; William Martin Leake, *Travels in Northern Greece*, London: J. Rodwell, 1835, and *id.*, *Peloponnesiaca: A Supplement to Travels in the Morea*, London: J. Rodwell, 1846. See also T. Kondylis, "Οι πόλεις της Ηπείρου στα κείμενα ξένων περιηγητών, μέσα 17ου – μέσα 19ου αιώνα" [The towns of Epirus in the texts of foreign travellers, mid-seventeenth – mid-eighteenth century], n.p., n.d. (accessible online).

Among the vegetation of the lake, there were sheltered cormorants and wild ducks. The banks that were under Mount Mitsikeli were steep, and the surrounding mountains sheltered many predatory birds. The white-tailed eagle, the red kites, the Egyptian vulture and other species of vultures, the cormorants and the cranes were some of the most remarkable birds.

In the early nineteenth century there were deer, foxes, jackals and wolves in Marathon, otters in Boeotia and bats in Athens, as well as wild cats, lynx, weasels and wild goats on Mount Parnassus. During the nineteenth century, there were also lynx on Mount Parnitha, jackals on Poros, bears and deer on Mount Taygetos and red deer in Vilia, west of Attica.<sup>51</sup>

The English traveller Edward Daniel Clarke, in a visit to Thebes in the early nineteenth century, noted that hunting was plentiful in Boeotia.<sup>52</sup> He noticed that the local Albanians did not eat hares (according to him, neither did the ancient Boeotians), nor used their skins. Therefore, hares would have been abundant.

The English army captain William Martin Leake, who regularly travelled to Greece for six years gathering information for the British government, provided much data on Greek fauna.<sup>53</sup> On 2 January 1806 Leake arrived in Athens. Among other places, he made excursions to Mount Parnitha, which was abundant with wild boars, wolves, hares, partridges and a few bears. A few months earlier, in the autumn of 1805 he learned that in Siatista, in northern Greece, there were so many hares that people were chasing them without hunting dogs and in the winter they killed them with sticks. Another valuable piece of information was that the fish in Lake Kastoria included carp, eel and catfish. All three species were caught in very large quantities. In November 1806, Leake arrived at the mouth of the Strymon River, at a village called Neochori, known for its famous eels, some of which were huge. In Ioannina, where he stayed for some time, he wrote that the main types of fish were eels, the endemic Epirus minnow, an endemic fish of Lake Pamvotis and the Louros River and carp. Lake Pamvotis was also rich in waterfowl. In the northern part of the lake, hunting was prohibited, and only Ali Pasha and his sons could hunt the abundant wild ducks.

Edward Dodwell mentioned that the Boeotian Kifissos River abounded with terrapins (*Emys orbicularis*), whose skulls were more black than yellow.<sup>54</sup>

<sup>51</sup> Sallares, *Ecology of the Ancient Natural World*.

<sup>52</sup> Edward Daniel Clarke, *Travels in Various Countries of Europe, Asia and Africa [...]* Part the Second, *Greece, Egypt and the Holy Land*, London: T. Cadell and W. Davies, 1814.

<sup>53</sup> Leake, *Travels in Northern Greece*, and *id.*, *Peloponnesiaca*.

<sup>54</sup> Edward Dodwell, *A Classical and Topographical Tour through Greece*, London: Rodwell and Martin, 1819.

In a manuscript of Argyris Philippidis written in 1815, we learn that Lake Karla, in the early nineteenth century, had five fish species: common roach, common rudd, tench, carp and sometimes eels, which were few, but tasty.<sup>55</sup>

The French Morea Expedition (1828-1833) was the first organized and collaborative effort to describe the geography, botany, zoology and fine arts of the Peloponnese and the Aegean islands. After the mission was completed, the results of the zoological research were recorded in a separate volume.<sup>56</sup> This marked the beginning of the scientific study of the fauna of Greece.

The last report on the existence of the beaver in Greece comes from A. De Hoestin, who visited the Alpheus River in the nineteenth century, although in northern Greece the animals must have disappeared much later. The name of the town of Kastoria apparently comes from this animal, which lived on the banks of Lake Kastoria. Also, a beaver was killed at Messolonghi in 1839 and it was donated to the Zoological Museum of the University of Athens in 1933.<sup>57</sup>

In 1833 the occasional appearance of bears in the mountains of Arcadia and Laconia was generally confirmed by the locals. They sporadically appeared in several parts of the Peloponnese. In 1844 bears could also be found in the Pindos mountain range and on Mount Olympus.<sup>58</sup>

The presence of the chamois on Mount Parnassus was confirmed in the mid-nineteenth century by Theodor von Heldreich.<sup>59</sup> The famous German botanist and naturalist, who lived in Greece from 1851 to until his death in 1902, wrote that fallow and red deer still existed in Acarnania, in western Greece. Similarly, red deer also existed in his days on Mounts Parnitha and Penteli, in Euboea and in northern central Greece.

Erhard mentioned that on Samos a panther was shot in 1858, without giving further details.<sup>60</sup> This obviously refers to the leopard of Samos, which

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<sup>55</sup> Argyris Philippidis, *Μερική Γεωγραφία* [Partial geography] (1815), published by T. Sperantsas in *Τα περιωθεντα έργα του Αργύρη Φιλίππιδη. Μερική Γεωγραφία – Βιβλίου Ηθικών* [The saved works of Argyris Philippidis: Partial geography – A book of morals], Athens 1978.

<sup>56</sup> Jean-Baptiste Bory de Saint-Vincent, *Expédition scientifique de Morée. Section des sciences physiques. Zoologie. Tome III*, Strasbourg: Levraut, 1832.

<sup>57</sup> Giorgios Sfikas, *Ελληνική φύση μέσα στους αιώνες* [Greek nature through the centuries], Athens 1985.

<sup>58</sup> Norman Douglas, *Birds and Beasts of the Greek Anthology*, London: Chapman and Hall Ltd, 1928.

<sup>59</sup> Theodor von Heldreich, *La faune de la Grèce, 1er partie. Animaux vertébrés*, Athens 1878.

<sup>60</sup> Dr Erhard, *Fauna der Cycladen. I. Theil. Die Wirbeltiere der Cycladen (Mit einer Karte)*, Leipzig 1858.

is actually an Asian leopard. A small population of this species existed on Samos until the late nineteenth century.<sup>61</sup>

The German naturalist Anton Lindermayer indicated that the vulture *Gyps fulvus* was so common in Greece during the summer that 20-25 of them could be seen flying together, while albino blackbirds were very common on Mount Kyllini in Arcadia, a fact also noted by Pausanias and Aristotle.<sup>62</sup> Likewise, according to him, in the nineteenth century there were large populations of wild pheasants in Greece, and swans were very common in Lake Kopais and other lakes.

The Zoological Museum of the University of Athens has a lynx killed on Mount Parnitha on 18 March 1862, a stuffed wild boar that was killed in Attica in 1861, a stuffed bear slain in 1894 in Aigani, near Larissa, and a red deer killed in Vilia. None of these species occur today in the locations mentioned above.

### *The Situation Today*

Greek fauna includes representatives of most animal tribes. According to recent data, 23,130 land and freshwater species have been recorded.<sup>63</sup> To these we could add another 3500 species of marine animals. However, it is known that the fauna of Greece is not well studied. The vertebrates have been most thoroughly researched, while larger gaps exist in invertebrates. It is believed that Greek fauna must include about 50,000 species. The fauna of Greece has more affinities with the fauna of the Eastern Mediterranean, a region affected by Europe, the Middle East and Africa. In many areas of Greece, Eastern Mediterranean element fauna dominates. The South European elements are also important and they increase as we move towards the north of the country. In the northern regions of Greece we often find clearly European, but also Palaearctic elements.

Based on some animal groups, Greece is divided into zoogeographical areas, each having its own distinctive fauna.<sup>64</sup> The main historical factors that

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<sup>61</sup> Douglas, *Birds and Beasts of the Greek Anthology*.

<sup>62</sup> Anton Lindermayer, *Die Vögel Griechenlands. Ein Beitrag zur Fauna dieses Landes*, Passau 1860.

<sup>63</sup> Anastasios Legakis, "How Many Animal Species are There in Greece?", Pan-Hellenic Conference of the Association of Greek Ecologists and the Hellenic Zoological Society, Mytilene, November 2004.

<sup>64</sup> Anastasios Legakis *et al.*, *Animal Diversity*, Dept of Biology, University of Athens, Athens 2006.



have shaped these areas are the presence of glaciers and the cold climate of the Pleistocene, the old links of the islands with the mainland and to each other, the existence of barriers that prevent dispersion and the changes in vegetation, especially in the last 20,000 years. Important ecological factors include the climate, such as temperature and humidity, soil, vegetation, altitude, the mosaic of Mediterranean-type ecosystems and human activities.

There are certain groups of animals which include a significant number of species compared with the corresponding number of other European countries. Groups such as isopods, terrestrial molluscs and reptiles are the most abundant in Greece, in relation to its size.<sup>65</sup> This species density is due to many reasons. On the one hand, there is a mosaic of ecosystems, for example in a short distance one may encounter beaches, maquis, forests and other ecosystems. On the other hand, as mentioned above, Greece is in a biogeographical crossroads between various dispersion routes. The fragmentation of Greece's surface in islands, and also "mountainous" islands, has led to the creation of many endemic species. In fact, the high rate of endemism is another peculiarity of Greek fauna. Taking into account the list of species that have so far been recorded, Greece has approximately 4000 endemic species of land and freshwater animals, a percentage of 17%.

Some areas of Greece have a particularly high number of species, especially endemic ones. This high number can be derived from the long-term isolation and intense speciation that followed. Unfortunately, there is little data on the status of the population of these species. It could be said that the population is relatively sparse, if compared with the corresponding Central European populations. However, there are groups which reach very high population levels, for example some lizard species, Orthoptera and Coleoptera that have adapted to warm climates. On the other hand, vertebrates do not form populations with high densities.

### *Some Notes on Specific Animals*

#### 1. Lions

The lion must have been abundant in northern Greece.<sup>66</sup> Bones found in excavations and dated to 3500 BC reveal their presence in Dikili Tash, near

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<sup>65</sup> Legakis, "How Many Animal Species are There in Greece?"

<sup>66</sup> Annik E. Schnitzler, "Past and Present Distribution of the North African-Asian Lion Subgroup: A Review" *Mammal Review* 41/3 (2011), pp. 220-243.



Drama in northern Greece.<sup>67</sup> Fossil remains dating from the Bronze Age have been recorded at Kastanas in the north,<sup>68</sup> Delphi, Tiryns, Pylos,<sup>69</sup> Kolona, Mycenae, Samos<sup>70</sup> and Kalapodi (near Mount Olympus).<sup>71</sup> Lions became extinct in the Peloponnese during the late Mycenaean Age.<sup>72</sup> Herodotus mentioned that the camels of Xerxes during his campaign in the fifth century BC were devoured by lions in Macedonia. Aristotle mentioned the presence of lions in the areas of the Nestos River and the Acheloos River. Lion bones from the Archaic Period were dated from 13 localities in Greece as far south as the northern Peloponnese.<sup>73</sup>

## 2. Bears

Bears existed throughout Greece in the past. Pausanias mentioned the presence of bears on Mount Parnitha, near Athens, and on Mount Taygetos in the southern Peloponnese. Cyriacus of Ancona also noted their presence in the Peloponnese in the thirteenth century. The constant hunting through the ages shrunk their distribution to remote areas of north-west and northern Greece. Today its range in Greece consists of two geographically distinct nuclei, located in the Pindos mountain range in the north-west and the Rodopi mountain complex in the north-east.<sup>74</sup>

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<sup>67</sup> Daniel Helmer, "Le Dikili Tash à l'époque néolithique. Faune sauvage et domestique", *Dossiers Archéologie*, special issue: Grèce, aux origines du monde égéen 222 (1997), pp. 40-41.

<sup>68</sup> Cornelia Becker, *Kastanas. Die Tierknochenfunde*, *Prähistorische Archäologie in Südeuropa* 5, Berlin: Wissenschaftsverlag Volker Spiess, 1986.

<sup>69</sup> Günter Nobis, "Zur Verbreitung des Löwen auf der Peloponnes in späthelladisch/mykenischer Zeit", *Tier und Museum* 7 (2001), pp. 95-98.

<sup>70</sup> Eftychia Yannouli, "Non-domestic Carnivores in Greek Prehistory: A Review", in E. Kotjabopoulou *et al.* (eds), *Zooarchaeology in Greece: Recent Advances*, British School at Athens Studies 9, Athens 2003, pp. 175-192.

<sup>71</sup> Adolf Bernhard Meyer, "The Antiquity of the Lion in Greece", *Zoologische Garten* 44 (1903), pp. 661-667.

<sup>72</sup> Xavier de Planhol, *Le paysage animal. L'homme et la grande faune. Une zoogéographie historique*, Paris: Fayard, 2004.

<sup>73</sup> Nancy R. Thomas, "The Early Mycenaean Lion up to Date", *Charis: Essays in Honor of Sara A. Immerwahr*, *Hesperia Supplements* 33, Athens: The American School of Classical Studies at Athens, 2004, pp. 161-199.

<sup>74</sup> Giorgios Mertzanis, Alexios Giannakopoulos and Charilaos Pylidis, "Ursus arctos Linnaeus, 1758", in A. Legakis and P. Maragou (eds), *The Red Data Book of the Threatened Animals of Greece*, Athens: Hellenic Zoological Society, 2009, pp. 387-389.

### 3. Wolves

The wolf was present throughout Greece in the past. Travellers of the eighteenth century mention them even on Mount Parnitha, near Athens. Up until the 1930s, the species distribution extended to the whole of the mainland. The wolf was exterminated from the Peloponnese prior to the 1940s and from the Prefectures of Boeotia and southern Fokida in Central Greece in the 1960s. Re-establishment of wolf numbers begun in the 1980s due to the abandonment of the bounty system and the use of poisoned baits. Population numbers seem to be stable in most parts of its range, with a possible increase in its southern distribution.<sup>75</sup>

### 4. Jackals

Greece, previously one of the region's strongholds for the species, has experienced a large-scale population decline in the past three decades. The entire jackal population is now confined to a few clusters grouped into 7 sub-areas with criteria such as connectivity and isolation. The golden jackal has disappeared from central and western Greece and is currently confined in discontinuous, isolated population clusters in the Peloponnese, Fokida, Samos, Chalkidiki and north-eastern Greece. The current minimum size of the jackal population in Greece has been estimated at 160-170 different territorial groups. The largest population cluster was found in the Nestos-Vistonida area in the north-east.<sup>76</sup>

### 5. Wild Boars

Pausanias mentioned the presence of wild boars on Mount Parnitha, near Athens, and on Mount Taygetos in the southern Peloponnese. Wild boars were also mentioned by several travellers of the sixteenth and seventeenth centuries in the sources of the Alpheus River in the Peloponnese and in Porto Rafti, near Athens, and in the nineteenth century on Mounts Taygetos and Parnitha and on Poros in the northern Peloponnese. In the early twentieth century the wild boar was exterminated from the Peloponnese because of hunting. Today, a small population exists on the island of Samos. A few years ago, wild boars were reintroduced in the Peloponnese, and there are plans to introduce them in other parts of Greece.

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<sup>75</sup> Information from the Callisto environmental organization (2016). See <http://www.callisto.gr/en/lykos.php>.

<sup>76</sup> Giorgios Giannatos, "*Canis aureus* Linnaeus, 1758", in Legakis and Maragou (eds), *The Red Data Book*, pp. 371-373.

## 6. Balkan Chamois

There are very few data on the past distribution of the Balkan chamois in Greece. This is because it is an elusive animal, living in mountainous areas. The most recent archaeozoological findings come from the Bronze Age in Macedonia<sup>77</sup> and Epirus.<sup>78</sup> Pausanias noted its presence on Mount Taygetos in the Peloponnese. The present range of distribution of the chamois in Greece is limited to 24 geographically distinct populations that can be grouped in 6 different population groups. The size of the populations is increasing.<sup>79</sup>

## 7. Red Deer

In the past, red deer existed both in mainland Greece and on some islands. The insular populations must have been introduced by humans between 1600 and 1000 BC, such as on the islands of Kea, Mykonos and Crete.<sup>80</sup> Pausanias mentioned the presence of red deer on Mount Taygetos in the Peloponnese. In the sixteenth century its presence was detected in the sources of the Alpheus River in the Peloponnese. John Eugenikos described its presence on Mount Taygetos in the fifteenth century. Sandys in 1611 observed them on Crete.

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<sup>77</sup> Sandor Bökönyi and Denes Jánossy, "Faunal Remains", in Colin Renfrew, Marija Gimbutas and Ernestine Elster (eds), *Excavations at Sitagroi: A Prehistoric Village in Northeast Greece*, Vol. I, Monumenta Archaeologica 13, Institute of Archaeology, University of California, Los Angeles 1986, pp. 63-132.

<sup>78</sup> Eleni Kotjabopoulou, Eleni Panagopoulou and Eudokia Adam, "The Boila Rockshelter: Further Evidence of Human Activity in the Voïdomatis Gorge", in G. N. Bailey *et al.* (eds), *The Palaeolithic Archaeology of Greece and Adjacent Areas*, British School at Athens, Athens 1999, pp. 197-210.

<sup>79</sup> Haritakis Papaioannou, *The Balkan Chamois* (*Rupicapra rupicapra balcanica Bolka*, 1925) *in Greece*, PhD thesis, University of Ioannina, 2016.

<sup>80</sup> C. Keller, "Neue Beiträge zur Kenntnis der altkretischen Haustiere", *Vierteljahrsschrift* 57/1-2 (1912), pp. 282-290; Owen Bedwin, "The Animal Bones, Appendix 2" in M. R. Popham (ed.), *The Minoan Unexplored Mansion at Knossos*, British School at Athens supplementary volume, 17, London 1984, pp. 307-308; David S. Reese, "The Faunal Remains, Block AG; The Triton Shell Vessel, Building AB; The Faunal Remains, Building AB; The Faunal Remains, Area AE; The Faunal Remains, Building AM; The Faunal Remains, Building AD Center", in P. P. Betancourt and C. Davaras (eds), *Pseira, 1: The Minoan Buildings on the West Side of Area A*, Philadelphia: University of Pennsylvania, 1995; Nellie Phoca-Cosmetatou, "Economy and Occupation in the Cyclades during the Late Neolithic: The Example of Ftelia, Mykonos", in N. J. Brodie *et al.* (eds), *Horizon: A Colloquium on the Prehistory of the Cyclades*, McDonald Institute for Archaeological Research, Cambridge 2008, pp. 37-41.

There are several documents describing its presence in the nineteenth century in southern Greece. Pouqueville mentioned it on Mount Taygetos, Heldreich described it in Acarnania in western Greece, on Mounts Parnitha and Penteli, near Athens, and on the island of Euboea. A stuffed red deer coming from Vilia, killed in 1894, is included in the collection of the Zoological Museum of the University of Athens. During recent decades, the red deer in Greece has suffered a dramatic decrease in numbers and distribution. In the past it was relatively abundant in central and northern Greece and on Euboea, but gradually it was restricted only to the regions of Macedonia and Thrace. The red deer disappeared from the Sithonia Peninsula of Chalkidiki 20 years ago, and now only a remnant population of 20-30 individuals survives in the Rodopi Mountains, along the Greek-Bulgarian border. A significant population of a few hundred animals lives in Parnitha National Park, near Athens. Although the origin of this population is unclear, its enhancement by introductions from Bavaria and Serbia at the beginning of the twentieth century is documented. A part of this population exhibits tame behaviour, and supplementary food has been offered since 2007, when a wildfire destroyed a big part of its habitat. Finally, a very small population, around 10 animals, that was introduced by the Forest Service in Raftanaioi-Pramada in Epirus still survives.<sup>81</sup>

## 8. Roe Deer

In the past, roe deer was abundant, both on the mainland and on the islands. The most recent records of its presence on the islands come from Crete, up to 500-700 AD.<sup>82</sup> Today, it has been restricted to isolated forested areas of central and northern Greece. The mountains Iti, Vardousia, Giona and Parnassus are at the southern edge of its distribution. Due to fragmentation of its habitat and distribution, there are possible subpopulations with restricted connection. It disappeared from the Peloponnese, though it has recently been reintroduced in Kalavryta Sanctuary, as well as in north Euboea. Its hunting is prohibited, but poaching is the main threat for the species.<sup>83</sup>

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<sup>81</sup> Athanasios Sfougaris, "*Cervus elaphus* Linnaeus, 1758", in Legakis and Maragou (eds), *The Red Data Book*, pp. 363-364.

<sup>82</sup> Barbara Wilkens, "The Fauna from Italian Excavations on Crete", in D. S. Reese (eds), *The Pleistocene and Holocene Fauna of Crete and its First Settlers*, Madison: Prehistory Press, 1996, pp. 241-262.

<sup>83</sup> Athanasios Sfougaris and Dimitrios Tsaparis, "*Capreolus capreolus* Linnaeus, 1758", in Legakis and Maragou (eds), *The Red Data Book*, pp. 390-392.

## 9. Fallow Deer

In the past, fallow deer were abundant throughout mainland and insular Greece. Bökönyi reported the presence of fallow deer in 4500 BC on Saliagos, a small island of the Cyclades.<sup>84</sup> He contested that the species was autochthonous on islands and not imported for sacrificial purposes. The mainland animals remained until the beginning of the twentieth century. The last report comes from the 1930s regarding a small population in Akarnania in western Greece.<sup>85</sup> Today, the fallow deer of Rhodes are the only free-ranging population in Greece and are protected by national legislation. The Rhodes population is of ancient origin and with a distinct genetic signature. Its habitat is a mixture of forests, shrubland and agricultural land. Main threats to the species include, among others, poaching, the lack of a management system of deer damage to farm land, the reduction of water resources and the lack of genetic stock outside Rhodes.<sup>86</sup>

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<sup>84</sup> Sandor Bökönyi, "Angaben zum frühholozänen Vorkommen des Damhirsches *Cervus (Dama) dama* (Linné, 1758) in Europa", *Säugetierkundliche Mitteilungen* 19 (1971), pp. 206-217.

<sup>85</sup> Pavlos Drandakis, *Μεγάλη ελληνική εγκυκλοπαίδεια* [Great Greek encyclopaedia], Athens 1934.

<sup>86</sup> Despina Mertzanidou, "*Dama dama* (Linnaeus, 1758)", in Legakis and Maragou (eds), *The Red Data Book*, pp. 378-379.