

# A Retrospective Study on Wild Animals Admitted to Animal Rescue and Rehabilitation Centres in Türkiye

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**Abstract:** The main purpose of this study was to retrospectively reveal the rehabilitation numbers of wild animals admitted to rescue and rehabilitation centres in Türkiye between 2017 and 2021. It was also aimed to investigate the wild animals hospitalized in the centres under mammal, bird and reptile classes at the level of order and species, and to identify the deficiencies in wildlife rehabilitation and to make recommendations. The main material of the research was the data for the years 2017-2021 obtained from the Wildlife Information System-YABIS, a database of the Ministry of Agriculture and Forestry. As the method, numerical data on the species downloaded from YABIS were analysed. Accordingly, it was understood that a total of 35764 cases were admitted to all rescue centres across Türkiye. About 61% of these cases were treated and released into nature, about 34% died and about 5% were placed in zoos. While the Cetartiodactyla was the most affected order in mammals, the most admitted species in the centres was the Roe deer (*Capreolus capreolus*). In birds, the Columbiformes was the most affected order, the most admitted species in the centres was the Rock dove (*Columba livia*). In reptiles, the Testudinata was the most affected order, the most admitted species in the centres was the Mediterranean spur-thighed tortoise (*Testudo graeca*). The increase in the number of cases brought to rehabilitation centres between 2017-2021, excluding 2019, clearly showed the role of rescue and rehabilitation centres in protecting wild animals and providing sustainable wildlife.

**Keywords:** Rehabilitation, rescue centres, treatment, Türkiye, wild animal

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## 1. INTRODUCTION

Wild animals, one of the main components of biodiversity, are at risk in many parts of the world due to threats such as the misuse of poison and illegal hunting, collisions with sheet glass and plastic in the form of windows and electricity power lines, a high density of human population, the impact of the exposure to roaming, stray and feral cats and dogs, climate change and wildfires, habitat fragmentation and loss (Van't Woudt, 1990; Elliott & Avery, 1991; Bevanger, 1998; Fahrig, 2003; Donazar et al., 2005; Klem, 2008; Sanderfoot et al., 2022). As in other countries, the biodiversity of Türkiye has been deteriorating due to rapid human population growth (about 2.5% per annum) and associated intensive or unwise use of natural resources and habitats (Kaya & Raynal, 2001). In this context, wildlife rehabilitation, which is defined as “the treatment and

temporary care of injured, diseased and displaced indigenous animals, and then the subsequent release of healthy animals to suitable habitats in the wild” (Miller, 2012), has become increasingly important.

Wild animal rehabilitation serves principal three main purposes. Firstly, it offers the opportunity to explore wildlife and surrounding more. Secondly, it might promote conservation efforts relating to endangered species. Finally, it provides the welfare requirements of an animal suffering from disease or injury or being orphaned (Vogelnest, 2008). So, the rescue and rehabilitation centres are key factors in the rehabilitation of wildlife for biodiversity conservation and whole ecosystem work.

Türkiye has been among the countries with rich biodiversity in the sense of the intersection of three phylogeographical

regions; Euro-Siberian, the Mediterranean, and Irano-Turanian (Davis et al., 1965). As it has important bird migration routes between the Middle East, Africa and Eastern Europe, and the richest flora among European and Near Eastern countries (Şekercioğlu et al., 2011; Eker et al., 2015), it has been like a small continent in terms of biodiversity (Kahraman et al., 2012). Considering the place of wild animals in this richness, animal rescue and rehabilitation centres were established for the care, treatment and rehabilitation of wild animals confiscated or delivered in accordance with international agreements and legal regulations to which Türkiye has been a party, or animals in need of care or treatment due to natural disasters, environmental problems and injuries. These facilities have been operated within the framework of protocols with the Ministry of Agriculture and Forestry, other public institutions and organizations, zoos or non-governmental organizations (Official Gazette of the Republic of Türkiye, 2004).

The main purpose of this study was to retrospectively present the rehabilitation numbers of wild animals admitted to rescue and rehabilitation centres in Türkiye between 2017 and 2021, to investigate the wild animals hospitalized in the centres under mammal, bird and reptile classes at the level of order and species, and to identify the deficiencies in wildlife rehabilitation and to make recommendations.

## 2. MATERIAL AND METHOD

The main material of the research was the data for the years 2017-2021 obtained from the Wildlife Information System-YABIS, a database of the Ministry of Agriculture and Forestry. YABIS includes data on the number of wild animals which are treated and released back to nature or placed into zoos, and the number of animals that died. Furthermore, it contains information on the species, dates and provinces where wild animals are rehabilitated. Official permission has been obtained from the Ministry of Agriculture and Forestry to use this data. In addition to YABIS data, previous literature related to the subject was also used.

In the first step, rehabilitation data from 2017 to 2021 were downloaded from the YABIS and species were classified as mammals, birds, and reptiles. Then, mammals, birds and reptiles were examined at the order level. The classification of the International Union for Conservation of Nature-IUCN<sup>2</sup> (IUCN, 2022) was taken as the basis while determining the orders to which the species belonged according to the taxonomic classification. Finally, the number of rehabilitated species under each order was determined for each year between 2017 and 2021.

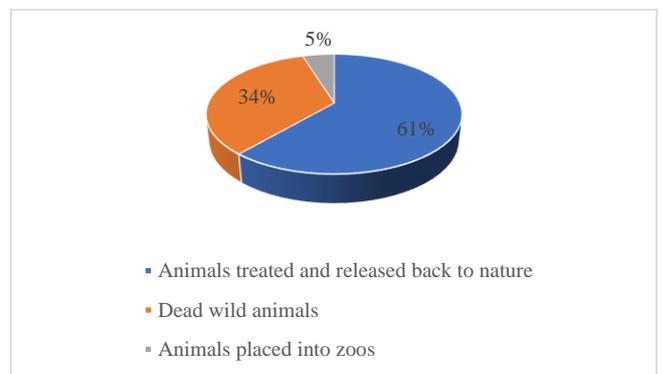
## 3. RESULTS

The number of wild animal cases registered in YABIS (2017-2021) is given in Table 1. As seen in the Table, a total of 35764 cases of wild animals were admitted to all rescue centres across Türkiye.

**Table 1.** The number of wild animal cases registered in YABIS (2017-2021)

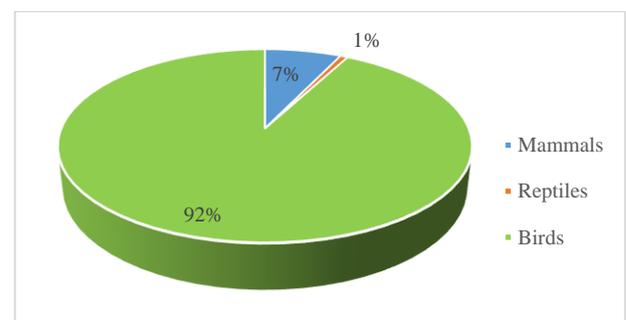
Year	Animals treated and released back to nature	Dead wild animals	Animals placed into zoos	Total
2017	976	553	172	1701
2018	3413	1643	315	5371
2019	2681	1780	194	4655
2020	6348	3149	399	9896
2021	8491	5024	626	14141
Total	21909	12149	1706	35764

A total number of 35764 registered to the database over five years were divided into 3 categories. The approximate percentage distribution of cases between 2017 and 2021 is given in Figure 1. As presented in the Figure, of 35764 total wild animal cases; 21909 wild animals were treated and released into nature, 12149 wild animals died and 1706 wild animals were placed into zoos.



**Figure 1.** The approximate percentage distribution of wild animal cases between 2017 and 2021

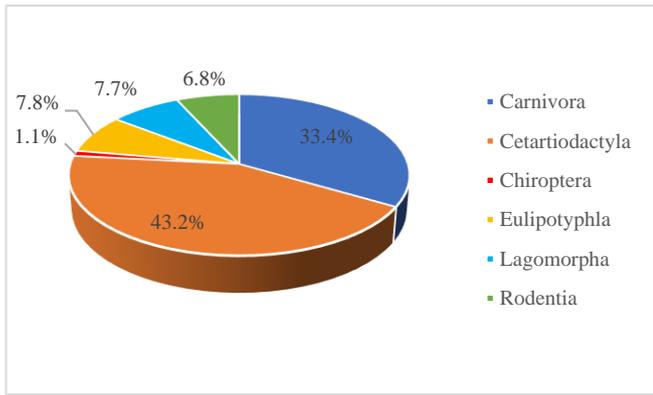
When the total number of 35764 wild animals admitted to the animal rescue and rehabilitation centres from 2017 to 2021 was evaluated in terms of class, it was determined that 2535 of them were mammals, 32979 were birds and 250 were reptiles (Figure 2).



**Figure 2.** The percentage of taxonomic distribution of cases between 2017 and 2021

Among the taxa of mammals, the number of cases admitted to the centres is shown in Figure 3 in terms of order.

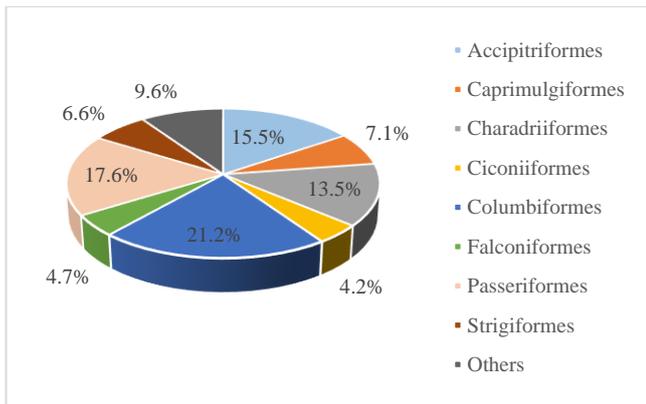
<sup>2</sup> The website of the IUCN Red List of Threatened Species was used for the taxonomic classification.



**Figure 3.** The number of mammal cases in terms of order between 2017 and 2021

Within mammals, Cetartiodactyla was the most affected order (43.2%), followed by Carnivora (33.4%), Eulipotyphla (7.8%), Lagomorpha (7.7%), Rodentia (6.8%) and Chiroptera (1.1%). The most frequently admitted two species to the centres were Roe deer (*Capreolus capreolus*) (47.1% of total mammals) and Red fox (*Vulpes vulpes*) (20.4% of total mammals).

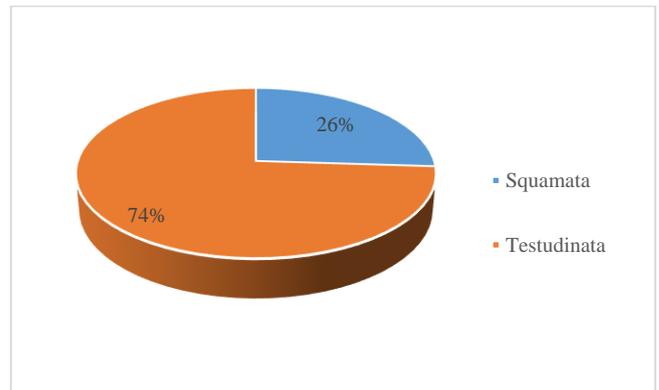
Among the taxa of birds, the number of cases admitted to the centres is shown in Figure 4 in terms of order.



**Figure 4.** The number of bird cases in terms of order between 2017 and 2021

Within birds, Columbiformes was the most affected order (21.2%), followed by Passeriformes (17.6%), Accipitriformes (15.5%), Charadriiformes (13.5%), Caprimulgiformes (7.1%), Strigiformes (6.6%), Falconiformes (4.7%), Ciconiiformes (4.2%) and other least represented orders. The most frequently admitted five species to the centres were Rock dove (*Columba livia*) (14.29% of total birds), Yellow-legged gull (*Larus michahellis*) (7.94% of total birds), Common swift (*Apus apus*) (6.76% of total birds), Buzzard (*Buteo buteo*) (6.58% of total birds) and Long-legged buzzard (*Buteo rufinus*) (4.54% of total birds).

Among the taxa of reptiles, the number of cases admitted to the centres is shown in Figure 5 in terms of order.



**Figure 5.** The number of reptile cases in terms of order between 2017 and 2021

Within reptiles, Testudinata was the most affected order (74%), followed by Squamata (26%). The most frequently admitted species to the centres was Mediterranean spur-thighed tortoise (*Testudo graeca*) (53.2% of total reptiles).

#### 4. DISCUSSION and CONCLUSIONS

As of 2022, there were 11 animal rescue and rehabilitation centres in Türkiye, which were supported by the government and 7 of them were being operated by veterinary faculties within the scope of protocols with the Ministry of Agriculture and Forestry (Ministry of Agriculture and Forestry, 2022). In addition, other public institutions and organizations, zoos or non-governmental organizations also carry out rehabilitation activities within the scope of the protocol with the Ministry.

In this research, the increase in the number of cases admitted to rehabilitation centres between 2017 and 2021 by year, except for 2019, was clearly seen (Table 1). It is assumed that the reason for the decrease in the number of cases admitted to rehabilitation centres in 2019 was due to incomplete data entry into the database. The increase in the number of cases can be considered as one of the indicators of the increasing pressure on wildlife in Türkiye; however, it can be evaluated as a result of an increase in veterinary services regarding wild animals in recent years. Further studies are needed to definitively reveal the reason for this increase.

The total percentage entered to the database over five years was 61% in the category of “animals treated and released back to nature” (Figure 1). In a similar study conducted by Kandır and Aslan (2017), it was reported that the percentage of wild animals treated and released to nature in Türkiye between 2012 and 2015 was 50.18%. When the two researches are compared, the increase of approximately 10% in the releasing between 2017 and 2021 is clear evidence of Türkiye's success in treating wild animals and releasing them back to nature. However, the problems related to measuring the success of rehabilitated wild animals in Türkiye after they are released into the wild are one of the issues to be considered. In order to make sure that rehabilitated animals can survive in the wild and to evaluate the success of their post-release survival, they need to be tracked using methods such as radio-tracking, satellite tracking and bird-ringing (Grogan & Kelly, 2013). For this purpose, it is crucial to

systematically use satellite tracking tools in order to measure the survival success of the rehabilitated wild animals. There is no enough research indicating the success of post-release survival in Türkiye and it is important to encourage that kind of studies from the related institutions. Wildlife management should be connected with the four Rs: Rescue, rehabilitation, release, and research (Pyke & Szabo, 2018). Therefore, it should not be the sole purpose of treating and releasing wild animals into nature but monitoring and research should also be given importance to understand the biology of animals after release.

According to the cases admitted to the centres between 2017 and 2021, approximately 5% of wild animals had to be sent to zoos (Figure 1). Therefore, zoos can play an important role in terms of the keeping of the wild animals which they are unable to return to nature because of the health condition. Consequently, increasing the number of protocols on rehabilitation between veterinary faculties, NGOs, zoos and the Ministry will lead to a significant increase in the number of rehabilitated wild animals.

Considering the cases brought to the centres between 2017 and 2021, birds were the most affected taxonomic group, followed by mammals and fewer reptiles (Figure 2). A similar pattern was found in previous studies (Kandır & Aslan, 2017; Romero et al., 2019). The reason why birds were the most affected is because citizens may have encountered injured birds more frequently in urban areas.

Roe deer (*Capreolus capreolus*) and Rock dove (*Columba livia*) which were the most frequently admitted species to the centres within mammals and birds between 2017 and 2021 (Figure 3 and Figure 4) are listed according to IUCN data as Least Concern (LC) (Lovari, 2016; BirdLife International, 2019). Conversely, Mediterranean spur-thighed tortoise (*Testudo graeca*) which was the most frequently admitted species to the centres within reptiles between 2017 and 2021 (Figure 5) is listed according to IUCN data as Vulnerable (VU) (Tortoise & Freshwater Turtle Specialist Group, 1996).

Considering the limited financial resources and the shortage of trained manpower, the issue of rehabilitating non-endangered wild animals can be discussed as a separate ethical topic. However, it should be taken into account that according to Turkish regulation, every wild animal brought to rehabilitation centres must be treated, regardless of IUCN conservation status.

Besides, the domestication problem may occur as a result of the interaction of wild animals with humans during the rehabilitation process. Assessment of a rehabilitated wild animal's suitability for releasing should be carried out as soon as the treatment procedure is completed (Hall & Zoo, 2005). Therefore once animals have completed their treatment, they should be quickly released back into the environment from which they were rescued. When rehabilitated animals are released into the natural environment, the guide prepared by Species Survival Commission- SSC should be consulted (IUCN/SSC, 2013).

Orphaned wild animals found in nature and brought to the centres by the citizens for treatment are also an important

problem in Türkiye (Coşkun, 2020; Kandır & Tuğrul, 2020). Off-springs are unnecessarily taken from nature by sensitive citizens who think that animals need help. Hence, education and public awareness studies on people about what to do when they see a wild animal in nature should be enhanced by government and related NGOs.

The aim of this research was to form an insight on the rehabilitation of wild animals in Türkiye. In addition to this research, it is deemed necessary to carry out further studies on threat factors that affect wild animals over whole country. Consequently, wild animal rescue and rehabilitation centres can be seen as an indicator in point of detecting of unfavourable effects on nature stemmed from anthropogenic impacts and ecological changes. The rescue and rehabilitation centres play a key role in the protection of wild animals, which are an element of biological diversity, thus helping to ensure a sustainable wildlife. As a consequence, it is considered essential to increase the number of animal rescue and rehabilitation centres in Türkiye.

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### Ethics Committee Approval

N/A

### Peer-review

Externally peer-reviewed.

### Author Contributions

Conceptualization: E.B, R.T.B.G.; Investigation: E.B, R.T.B.G.; Material and Methodology: E.B, R.T.B.G.; Supervision: R.T.B.G.; Visualization: E.B.; Writing-Original Draft: E.B; Writing-review & Editing: R.T.B.G.; Other: All authors have read and agreed to the published version of manuscript.

### Conflict of Interest

The authors have no conflicts of interest to declare.

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