diversity

MDPI

Article

The Taurus Mountains, the Hotspot of Western Palearctic Biodiversity, Is in Danger: Marble Quarries Affect Wildlife

Tamer Albayrak [1,2,*] and Tamer Yılmaz [3]

[1] Lab of Ornithology, Department of Biology, Science and Art Faculty, Burdur Mehmet Akif Ersoy University, Burdur 15030, Turkey
[2] Department of Mathematics and Science Education, Buca Faculty of Education, Dokuz Eylül University, İzmir 35390, Turkey
[3] Institude of Science, Burdur Mehmet Akif Ersoy University, Burdur 15030, Turkey; tameryilmaz15@gmail.com
* Correspondence: tamer.albayrak@deu.edu.tr

Abstract: The Taurus Mountains in the Mediterranean Coastal Basin, considered a biodiversity hotspot, have a rich biodiversity in the Western Palearctic. The number of marble quarries in the Taurus Mountains has dramatically expanded over the past ten years. The objectives of this study are to (i) determine the impacts of quarrying on wildlife and (ii) determine the potential impacts of quarrying on the future of Taurus. A total of 57,547 photos and video images were analyzed on 5447 photo-trap days in two areas, the marble quarries and the control areas. Using 97 randomly selected marble quarries, the area they cover and their annual growth rates were determined. The most commonly seen animals were the wolf (*Canis lupus*), fox (*Vulpes vulpes*), lynx (*Lynx lynx*), and wild boar (*Sus scrofa*) in the control area, and the jackal (*Canis aureus*) and hare (*Lepus europaeus*) in the marble quarries ($p < 0.001$). Additionally, we found a significant positive correlation between the distance from the geographical center of the marble quarries and the number of dates of wolf, fox and wild boar sightings, with a significant negative correlation for hares ($p < 0.05$). A positive correlation was found between the area of marble quarries and the duration of operation ($R = 0.89$, $p < 0.00$). The waste from quarries, which makes up 79.7% of the total land used for this purpose, is the greatest cause of habitat degradation. According to calculations, even if no new marble quarries are built as of right now, 7.14% of the Taurus Mountains may have disappeared by the year 2027, and by the year 2032, 8.25% of the Taurus ecosystems may have disappeared completely. The Taurus Mountains, a center of Western Palearctic biodiversity, are being threatened by marble quarries. This study advances our knowledge of how marble quarries may affect wildlife. New strategies must be developed as soon as possible to protect the Taurus Mountains, the hotspot of the Mediterranean basin.

Keywords: wolf; *Canis lupus*; jackal; *Canis aureus*; fox; *Vulpes vulpes*; lynx; *Lynx lynx*; wild boar; *Sus scrofa*; hare; *Lepus europaeus*; photo trap; conservation

Citation: Albayrak, T.; Yılmaz, T. The Taurus Mountains, the Hotspot of Western Palearctic Biodiversity, Is in Danger: Marble Quarries Affect Wildlife. *Diversity* **2024**, *16*, 267. https://doi.org/10.3390/d16050267

Academic Editor: Luc Legal

Received: 28 March 2024
Revised: 24 April 2024
Accepted: 29 April 2024
Published: 30 April 2024

1. Introduction

The diversity of its plants and animals makes Anatolia one of the Western Palearctic's (WP) high-biodiversity zones. Anatolia was a key refuge for many WP species during the last Ice Age and includes a variety of habitats from sea level to 5000 m above sea level. The animals and plants of the northern regions of the WP, which are not part of Anatolia, moved to the Anatolian refuges during the Ice Age. They evolved there; some of them stayed in Anatolia, and some of them moved to Europe to recolonize the European fauna after the Ice Age [1]. Due to these kinds of influences, Anatolian biodiversity has reached 169 mammal [2], 491–512 bird [3], 139 reptile [4], 35 amphibian [5], 33,820 insect [6], and 12,000 plant [7] species. A large proportion of them live in the Taurus Mountains, which extend along the Mediterranean coast in the WP [8–10]. In addition, there are unique

endemic species in the Taurus Mountains [7] and Taurus-specific genetic structures of widespread populations, e.g., mammals [11], birds [12], amphibians [13], and relict species from the last glacial period, e.g., Orthoptera, [14]. In addition, newly discovered plants [15] and animals [16] are found in Taurus.

Recently, a significant amount of biodiversity has been lost due to various reasons such as industrialization and the rapid increase in the human population [17]. In recent decades, some species such as the Falklands wolf (*Dusicyon australis*) [18] and Pinta Giant Tortoise (*Chelonoidis abingdonii*) [19] have disappeared from the wild. According to IUCN, 26% of mammals, 14% of birds, and 41% of amphibians are considered threatened species [20]. Anthropological impacts in rainforests and Mediterranean basins, which are hotspots of the world's biodiversity, threaten many species, including potential species we have yet to discover. Habitat destruction and fragmentation and agricultural monocultures are causing natural habitat collapse and population decline. Marble quarries have the same effect, causing habitat destruction and fragmentation. Over time, this situation leads to the extinction of species. Therefore, monitoring wildlife is extremely important for biodiversity conservation, and the photo-trapping method is extremely useful for this purpose.

The photo-trapping method is useful for detecting wildlife, especially cryptic species such as Caracal (*Caracal caracal* [21]), wolf, (*Canis lupus* [22]), and Monk Seal, (*Monachus monachus* [23]). In addition to detecting species with a systematic photo-trapping study, daily and seasonal activity times can also be determined [24]. To identify wildlife in Anatolia, photo-trapping studies were conducted in Beydağları [10], Yenice Forest [25], and deciduous forests [26].

Marble quarries cause habitat destruction by removing the soil layer and exposing the stone layer. It is not precisely known whether the number of marble quarries in Turkey has increased in the last decade, but exports amounted to USD 4.6 million in 2000 (about 500 quarries) and increased 370-fold to USD 1.7 billion in 2020 (about 1500 quarries) [27]. Marble quarries showed a very serious increase of 891.44% (from 148.41 hectares to 1577.52 hectares) between 1995 and 2020 in a local area of the Taurus Mountains [28]. These marble quarries operate with low productivity due to the rock structure of the Taurus Mountains. In addition to the irreversible destruction of the habitats where marble quarries are operated, wildlife is expected to be affected by human activity and noise pollution caused by the 24/7 operation of these quarries. The Taurus Mountains, one of the most important areas of the Mediterranean region, which is considered a hotspot of Western Palearctic biodiversity, may be threatened by the rapid increase in marble quarries, and wildlife can be affected by these activities. Unfortunately, to the best of the authors' knowledge, there are no studies investigating the influence of marble quarries on wildlife. Therefore, the objectives of this study are to (i) determine the impacts of quarrying on wildlife and (ii) determine the potential impacts of quarrying on the future of Taurus. To achieve these objectives, we first determined the number of current marble quarries and then examined the impact of these quarries on wildlife. More than 50,000 photo-trap images were analyzed in the area where the quarries are located and the adjacent control area to determine if the quarries are affecting wildlife.

2. Materials and Methods

2.1. Study Area and Design

This study was conducted in the western Taurus Mountains (Taurus). To determine the effects of marble quarries on wildlife, two adjacent areas, each approximately 120 km^2 and with the same habitat type and elevation, were selected as the marble quarry area (MQA) and control area (CA). The MQA is located in the Dumlu Mountains, where 51 marble quarries are active, and the CA is located in the Söğüt Mountains, where there are no marble quarries (Figure 1). The occupied areas of the randomly selected 97 active marble quarries were calculated using Google Earth for currently covered areas, and Google Earth Timelapse to find out how much area was occupied in prior years and the year in which operations started in the western Taurus Mountains.

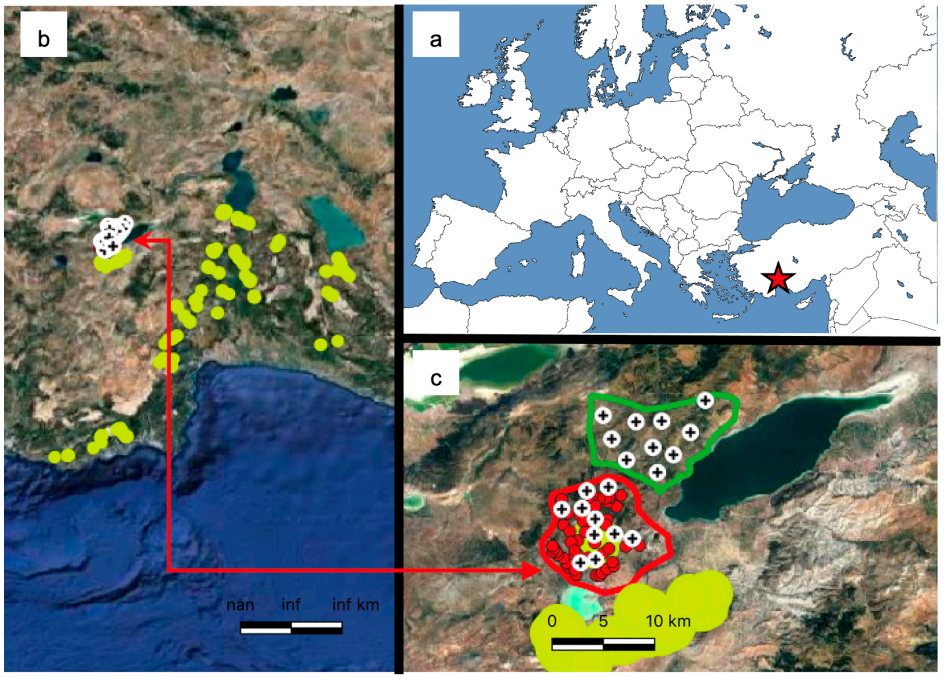

Figure 1. Western Taurus is the study area and the areas where the photo-trapping study will be conducted. (**a**): Study area location; red star (**b**): yellow dots are randomly selected marble quarries in western Taurus; (**c**): areas where the photo-trap study is conducted; red dots are marble quarries in MQA, green line is the control area, and plus signs are the photo-trap locations.

2.2. Photo Trap and Target Species

To determine photo-trap locations, each study area was divided into 30 quadrats of 4 km^2, and ten quadrats were selected to represent the entire study area on the map. A total of 20 Bushnell Trophycams and Reconyx UXR6 photo traps, ten each, were placed on animal track transit routes in the MQA and CA. The photo traps, two photos and ten seconds of video per trigger, were operated over 399 days between 1 December 2015 and 2 January 2017.

A total of 57,547 photos/video pictures were taken during 5447 photo-trap days. If there were numerous photographs of what appeared to be the same animal in a series, they were counted as a single sighting, which refers to a single datum. With these single sightings, 16995 mammal data were obtained, and these data were used in the analysis.

Six target species were evaluated in this study, including wolf (*Canis lupus*), jackal (*Canis aureus*), fox (*Vulpes vulpes*), lynx (*Lynx lynx*), wild boar (*Sus scrofa*), and hare (*Lepus europaeus*).

2.3. Data Analyses

The average annual growth rate of the marble quarry is calculated by dividing the area covered by the quarry by the year of its operation. The areas that will be covered after 5 and 10 years were calculated using the average annual growth rate (n = 97). To determine the differences in the prevalence of target species between the marble quarries and the control areas, a *t*-test was performed. The central location was determined using the coordinates of the 51 quarries in the MQA. To understand the impact of the quarries on wildlife, a correlation analysis was conducted between the prevalence of target species and their distance from the central location.

A correlation analysis was also conducted to determine the relationship among the target species. The numbers reported in the analyses are the total number of data collected in a day, indicating the frequency of target species activity, not the total number of individuals in the field. All statistics were generated in R Studio v.2021.09.2 [29] and SPSS 17 software [30].

3. Results

3.1. Marble Quarries

In general, there were few marble quarries in Taurus in 2005, but the number of quarries increased rapidly after 2008. The first of the 97 selected marble quarries started operation in 2005. Ninety-one of them were in operation in 2011; in 2016, all quarries were in operation and used a total of 1868 hectares, and a total area of 3164 hectares was calculated to be used by the 97 marble quarries in April 2021. It was found that only 20.3 ± 6.6% of the total area where the quarries caused habitat destruction was the area where the marble blocks were quarried, while 79.7 ± 6.6% was the area where the waste produced during the quarrying of these blocks was disposed of.

It was calculated that the average area of a marble quarry from the first year of activity of the 97 selected marble quarries from western Taurus in the 5th, 10th, and 15th years is 13.34 ± 15.89 (n = 97), 24.88 ± 29.66 (n = 91), and 49.20 (n = 1) hectares, respectively. A statistically significant positive correlation was found between each year of operation and the covered area of these years, which were determined using Google Earth Timelapse ($R = 0.89$, $p < 0.01$; Figure 2 left). Also, a non-significant but positive correlation was found between the year in which activity started and the currently covered area of the quarries ($R = 0.18$, $p = 0.07$; Figure 2 right).

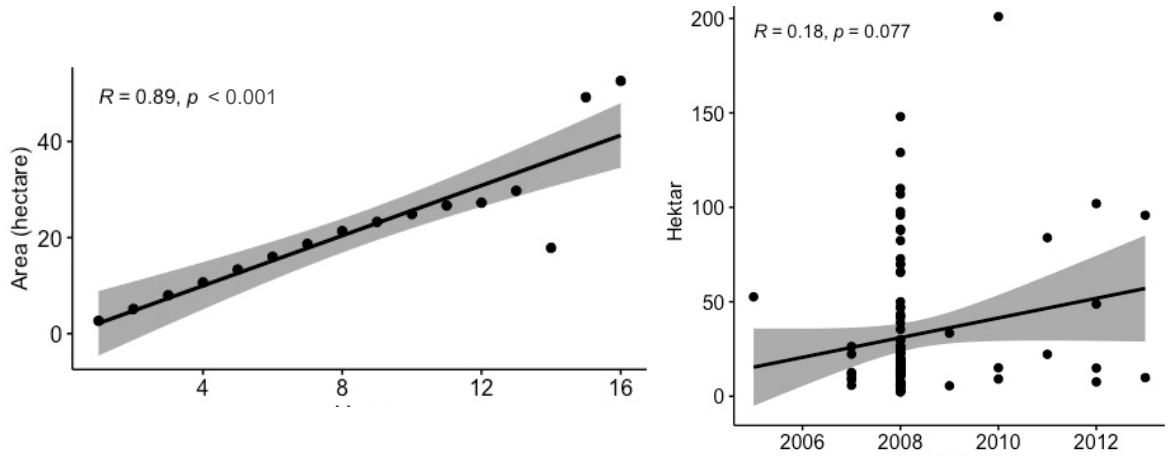

Figure 2. Growth rate of marble quarries (n = 97); correlation analysis between each year of operation and covered area of these years, which were determined using Google Earth Timelapse (**left**). Correlation analysis between the first year of activity and the currently covered area of the quarries (**right**).

3.2. Photo Traps

To determine the impact of marble quarries on wildlife, we analyzed a total of 57,547 photo and video images from a total of 5447 photo-trap days in the MQA and CA. We identified 12 mammal species from 16995 data. Of these data, 13441 included the target species wolf (*Canis lupus*), jackal (*Canis aureus*), fox (*Vulpes vulpes*), lynx (*Lynx lynx*), wild boar (*Sus scrofa*), and hare (*Lepus europaeus*). In addition to the target species, Beech Marten (*Martes foina*), Pygmy Weasel (*Mustela nivalis*), European Badger (*Meles meles*), Southern White-breasted Hedgehog (*Erinaceus concolor*), Anatolian Tree Squirrel (*Sciurus anomalus*) and Williams' Jerboa (*Allactaga williamsi*), the latter of which was recorded for the first time in Burdur province, were also recorded.

Looking at the monthly maximum numbers of the target species in the MQA and CA, we find that their abundance varies depending on the month. During the summer months, the abundance of the target species generally decreased, with the exception of feral hogs. It can be seen that seasonal densities are similar between wolves and wild boars and between lynxes and hares (Figure 3).

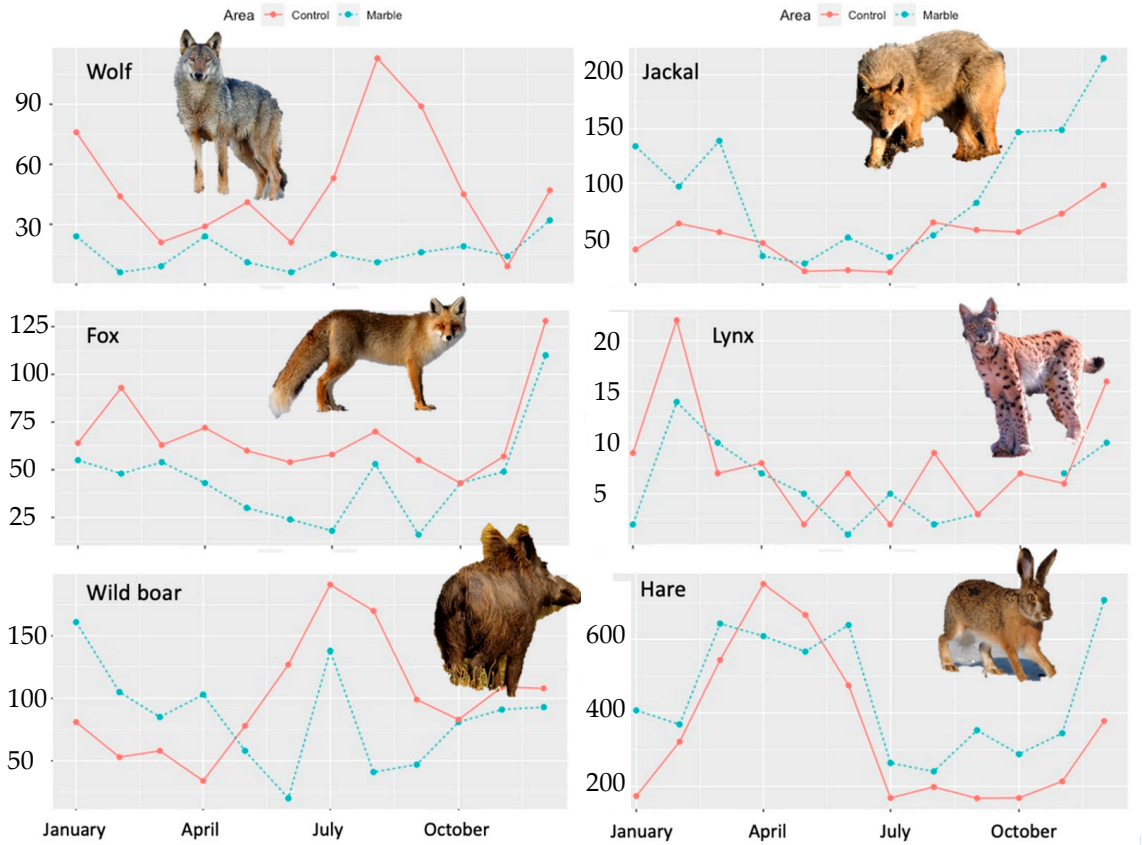

Figure 3. Monthly total number of daily recorded individuals of the target species associated with areas. Y axis: total numbers; X axis: months.

When examining the daily activity times of the target species in relation to the areas, it was found that the species were generally active at night and had low activity between 10:00 and 15:00 (Figure 4). Wolves, foxes, and jackals appeared to be more active during the day in the control area, but no statistical difference was found between the two areas ($p > 0.05$).

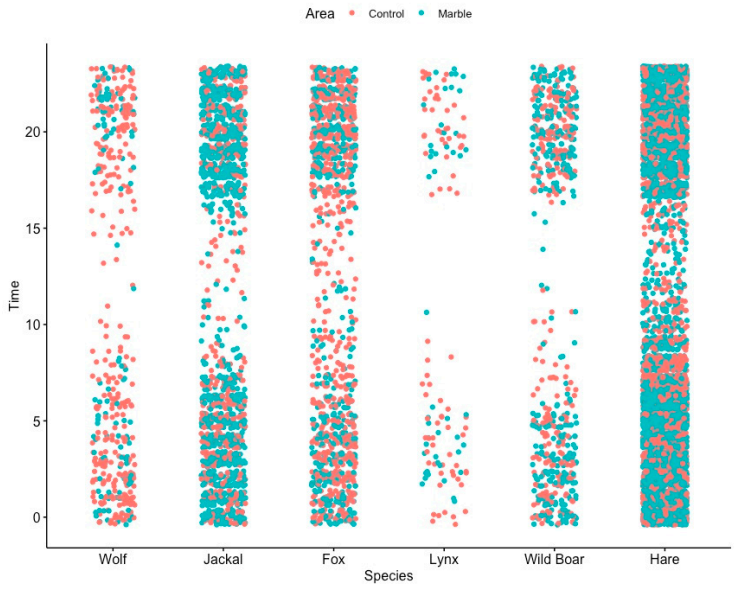

Figure 4. Daily activity times of target species, depending on area.

Four predators and two prey species compared based on the total number of individuals recorded in a day are listed in Table 1 and Figure 3. Wolves, foxes, lynxes, and wild boars were more abundant in the control areas; these differences were statistically significant for wolves and foxes ($p < 0.001$). Hares and jackals were statistically more common in the marble quarry area ($p < 0.001$; Table 1). A positive correlation was found between some target species, while a negative correlation was found between wolves and hares when the two areas were evaluated together (Figure 5).

Table 1. Statistical comparison of total individuals recorded in the two areas on a daily basis. n: number of days the species were recorded.

Species	Marble Quarry Area			Control Area			
	n	Daily Mean ± SD	Max	n	Daily Mean ± SD	Max	*p*
Wolf	105	1.78 ± 1.19	8	186	3.16 ± 3.76	25	0.000
Lynx	45	1.47 ± 0.84	4	65	1.51 ± 1.03	7	0.826
Fox	264	2.06 ± 1.23	8	311	2.63 ± 1.59	10	0.000
Jackal	319	3.62 ± 2.49	15	259	2.34 ± 1.77	12	0.000
Wild boar	213	4.80 ± 6.06	31	207	5.75 ± 8.52	45	0.187
Hare	380	14.29 ± 8.69	50	391	10.81 ± 8.77	55	0.000

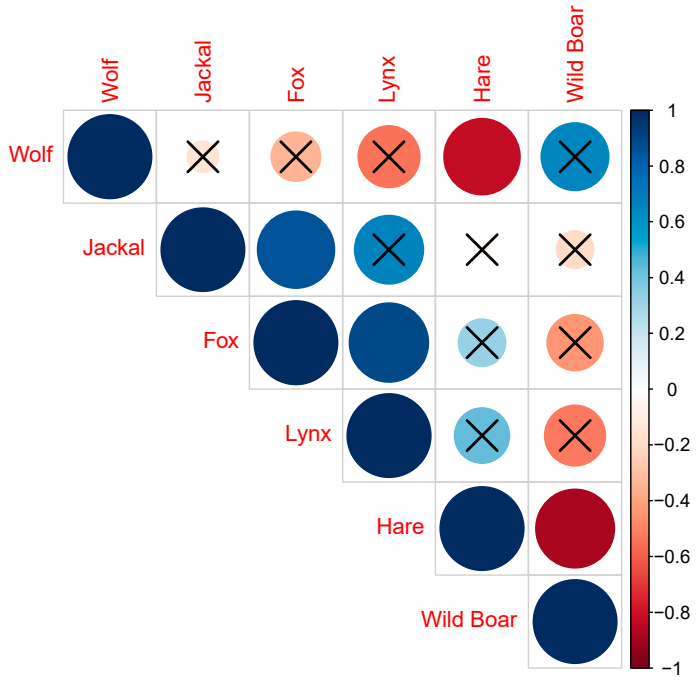

Figure 5. Pearson correlation between target species. The color indicates the *R* value, the size of the circle indicates the *p*-value, and the cross indicates non-significant values ($p > 0.05$).

We found a positive correlation between the distance of the photo-trap site from the center of the quarries and their daily total individuals of wolves, foxes, and wild boars. The wolves ($R = 0.21$, $p < 0.01$), foxes ($R = 0.09$, $p < 0.01$), and wild boars ($R = 0.09$, $p < 0.05$) were affected by the marble quarries and were found at a greater distance from the quarry center (Figure 6). While there was no statistical correlation for jackals and lynxes, a negative correlation was found for hares (Figure 6).

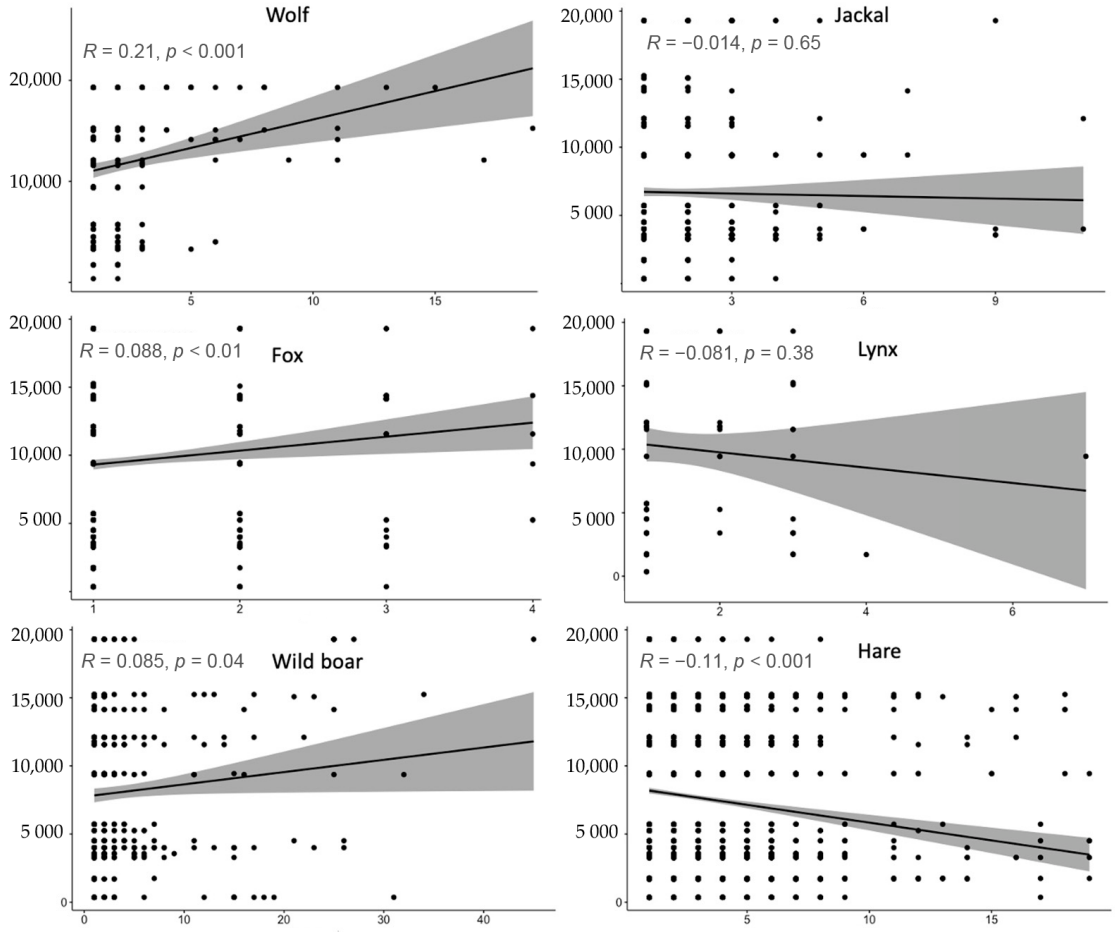

Figure 6. Correlation analysis between distance (m) of target species to quarry center (y axis) and daily total number of individuals captured by each camera (x axis).

4. Discussion

4.1. Habitat Destruction by Marble Quarries

Marble activities have attracted the attention of people in Turkey from the Roman Empire period until today [31]. Since the rock structure of the Taurus Mountains (Taurus) consists of limestone suitable for marble quarrying, marble quarries, which are open-pit mines, have become the focus of these activities [27]. In order to mine marble blocks, the surface layers, soil and vegetation, must be removed and the unbroken rocks on the ground must be cut. Due to the fragmented rock structure of the Taurus Mountains, marble quarries operate at low productivity and produce too much waste. More habitats are destroyed due to the methods of waste disposal. It was found that only one-fifth (20.3 $\pm$ 6.6%) of the total area was the area where marble blocks were quarried, while four-fifths (79.7 $\pm$ 6.6%) was the waste produced during the quarrying of these blocks. The operation of marble quarries produces too much waste, which is indiscriminately disposed of from the slopes due to the low productivity of the quarries. Habitat destruction in quarries increases significantly with the number of years of operation in western Taurus (Figure 2 left; $R = 0.89$ $p < 0.01$). If this increase (18% per year) continues with this correlation rate, the selected 97 marble quarries might cover 8541 hectares in 2027 after five years and 19540 hectares 10 years later in 2032. A non-statistically significant (Figure 2 right; $R = 0.18$ $p = 0.077$) but positive correlation was found between the currently covered area and the first year of activity. This correlation shows that newly opened marble quarries occupy more area than the old quarries.

4.2. Impact of Marble Quarries on Wildlife

Species have been found to be negatively affected by the alteration of an area's natural habitat by changing species diversity [32,33] and the populations of mammals [34,35], birds [34,35], reptiles [36,37], and amphibians [34,35]. The community changes when a habitat is altered, but nearly all species disappear in the area when a habitat is destroyed. Marble quarries destroy habitats and lead to habitat fragmentation. In this context, we found that the area covered by marble quarries is equivalent to the habitat fragmentation caused by quarries, but much larger.

We took 57,547 photos and video images on 5447 photo-trap days for a full year in the quarry area and in the control area without quarries, which has a similar habitat and elevation, to determine the impact of the marble quarries on wildlife. Although the target species wolf, jackal, fox, lynx, wild boar, and hare were detected in both the marble quarries and the control area, wolves, foxes (statistically significant $p < 0.05$), lynxes, and wild boars were more abundant in the control area (Table 1). In addition, the occurrence of wolves, foxes, and wild boars increased statistically the farther they were from the geographic center of the marble quarries ($p < 0.05$; Figure 6). Our results show that habitat destruction and fragmentation caused by marble quarries harms wildlife and the species move as far away from quarries as possible, except jackals and hares.

Jackals and hares were found to be more abundant in the marble quarries than in the control area. It is thought that this is due to the fact that jackals usually feed on human waste caused by human activities. Ćirović et al. [38] found that 71.8% of the jackal's diet was human waste. The fact that the jackal was more abundant in the marble quarry area is probably due to the fact that its predators, wolf, fox, and lynx, are less abundant in this area compared to the control area, as well as to the absence of illegal hunters, since the marble quarries are in operation around the clock.

4.3. Potential Impact of Marble Quarries on the Wider Taurus, the Hotspot of Mediterranean Biodiversity

The Mediterranean Coastal Basin is a region of high biodiversity in the Western Palearctic [39]; within this region, the Taurus Mountains form the Western Palearctic hotspot. The Taurus Mountains are a biodiversity hotspot because they are a mountain range that rises up to 3000 m above sea level, as well as due to its unique microclimate and its habitats that range from scrub to alpine zones. Moreover, the southern part of the Taurus served as a vital refuge for many animal species during the last Ice Age. They evolved, and after the Ice Age, the species expanded their range from this refuge and restored European biogeography. The Taurus Mountains harbor not only endemic species [13] under the influence of the Ice Age, but also specific genetic structures of some widespread species such as Fallow deer (*Dama dama*) [40] and Krüper's Nuthatch (*Sitta krueperi*) [12]. The presence of newly identified plant and animal species is an important indication that the biodiversity of Taurus is not yet fully known. This could be due to the deep valleys and difficult-to-access cliffs of Taurus. The existence of orchid species living only in a single valley of Taurus [41,42]—seven species and twenty-one subspecies of the genus *Lyciasalamandra* from southern Taurus [43,44]—as well as a specific clade of populations due to refugium effects on the population [12,45] are important examples of how specific species and genetic structures have evolved in Taurus.

Taurus' unique limestone habitats are being destroyed by rapidly increasing marble quarries in the last decade. Our study found that target mammal species are being impacted by direct marble quarries and are moving as far away as possible from the geographic center of the quarries. While the lower and southern parts of Taurus are already under severe pressure from tourism and human settlement, the northern and higher parts are also under severe pressure from marble quarries. The main reason for habitat destruction is the indiscriminate burial of waste from the quarries. Tercan and Dereli [28] found that forest and semi-natural areas are generally allocated to marble quarries, which take up 4.69% of the total area and showed a serious increase of 891.44% (average 164.48% in five years)

between 1995 and 2020 in Burdur province. According to our calculations using the growth rates of Tercan and Dereli [28] (R n = 0.98 $p < 0.01$ between percentage of MQA based on total area and year), it is expected that even if no new marble quarries are established as of today, because the marble quarries have been established throughout the Taurus Mountains, 7.14% of Taurus habitats in 2027 (and 8.25% by 2032) may have disappeared. This situation will lead to both the extinction of locally endemic species and the extinction of the genetic structures of many species specific to the Taurus Mountains.

4.4. Recommendations

When issuing operating permits for the marble quarries, new methods should be created. We have found that the main problem of habitat destruction is the waste produced from the quarries, which accounts for 79.7% of the total area used for this purpose. To protect Taurus, the hotspot of Mediterranean biodiversity, marble quarries with low productivity should not be allowed, and quarry waste should not be allowed to be dumped indiscriminately on the slopes. The waste should be collected in a designated area. When issuing and controlling licenses for quarries, scientific studies should be conducted that take into account the biodiversity of the region. New strategies must be developed as soon as possible to protect the Taurus Mountains.

5. Conclusions

Habitat destruction and the fragmentation of marble quarries were found to negatively impact wildlife. Our hypothesis was confirmed by the target species, with the exception of the jackal, which feeds mainly on human waste. Marble quarries, which have multiplied like cancer cells that have metastasized in the last decade, pose a significant threat to the Taurus Mountains, the hotspot of Western Palearctic biodiversity.

Author Contributions: T.Y. conducted fieldwork, edited data, and assisted in article writing; T.A. analyzed data and wrote the article. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Data Availability Statement: The data presented in the study are included in the article, further raw data inquiries are available from the corresponding author upon reasonable request.

Acknowledgments: The experiments comply with the current laws of the country in which they were performed. We thank Yusuf Çınar who determined the marble quarry areas in Google Earth.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Hewitt, G. Post-glacial re-colonization of European biota. *Biol. J. Linn. Soc.* **1999**, *68*, 87–112. [CrossRef]
2. Özkurt, Ş.Ö.; Bulut, Ş. *Türkiye Memelileri*; Panama Yayıncılık: Ankara, Türkiye, 2021.
3. Kiziroğlu, İ. *Türkiye Kuşları Cep Kitabı: The Pocket Book for Birds of Türkiye*; Sarıyıldız Ofset ve Matbaacılık: Ankara, Türkiye, 2015.
4. Ilgaz, Ç. Endemism Status in the Reptile Fauna of Turkey. *J. Inst. Sci. Technol.* **2019**, *9*, 1243–1252. [CrossRef]
5. Kurnaz, M. Species list of Amphibians and Reptiles from Turkey. *J. Anim. Divers.* **2020**, *2*, 10–32. [CrossRef]
6. Tezcan, S. Analysis Of The Insect Fauna of Turkey And Suggestions For Future Studies. *Munis Entomol. Zool.* **2020**, *15*, 690–710.
7. Şenkul, Ç.; Kaya, S. Geographical distribu#on of endemic plants of Turkey. *Türk Coğrafya Derg.* **2017**, *69*, 109–120. [CrossRef]
8. Atalay, I. The effects of mountainous areas on biodiversity: A case study from the northern Anatolian Mountains and the Taurus Mountains. *Grazer Schriften der Geogr. und Raumforsch.* **2006**, *41*, 17–26.
9. Ciplak, B. Distribution of Tettigoniinae (Orthoptera, Tettigoniidae) bush-crickets in Turkey: The importance of the Anatolian Taurus mountains in biodiversity and implications for conservation. *Biodivers. Conserv.* **2003**, *12*, 47–64. [CrossRef]
10. Albayrak, T.; Giannatos, G.; Kabasakal, B. Carnivore and Ungulate Populations in the Beydaglari Mountains (Antalya, Turkey): Border Region between Asia and Europe. *Polish J. Ecol.* **2012**, *60*, 419–428.
11. Gür, H.; Perktaş, U.; Gür, M.K. Do climate-driven altitudinal range shifts explain the intraspecific diversification of a narrow ranging montane mammal, Taurus ground squirrels? *Mammal Res.* **2018**, *63*, 197–211. [CrossRef]

12. Albayrak, T.; Gonzalez, J.; Drovetski, S.V.; Wink, M. Phylogeography and population structure of Kruper's Nuthatch *Sitta krueperi* from Turkey based on microsatellites and mitochondrial DNA. *J. Ornithol.* **2012**, *153*, 405–411. [CrossRef]
13. Göçmen, B.; Akman, B. *Lyciasalamandra arikani* n. sp. & L. yehudahi n. sp.(Amphibia: Salamandridae), two new Lycian salamanders from Southwestern Anatolia. *North. West. J. Zool.* **2012**, *8*, 181–194.
14. Ciplak, B. The analogy between interglacial and global warming for the glacial relicts in a refugium: A biogeographic perspective for conservation of Anatolian Orthoptera. *Insect Ecol. Conserv.* **2008**, *661*, 135–163.
15. Yildirim, H.; Tekşen, M. Fritillaria arsusiana (Lilieae, Liliaceae), a new species from southern Anatolia. *Phytotaxa* **2021**, *502*, 133–159. [CrossRef]
16. Lohaj, R.; Anlaş, S. Two new species of the genus laemostenus bonelli sg. Antisphodrus Schaufuss from Turkey (Coleoptera: Carabidae: Sphodrini). *Zootaxa* **2021**, *4942*, 95–108. [CrossRef] [PubMed]
17. McDonald, R.I.; Mansur, A.V.; Ascensão, F.; Colbert, M.; Crossman, K.; Elmqvist, T.; Gonzalez, A.; Güneralp, B.; Haase, D.; Hamann, M.; et al. Research gaps in knowledge of the impact of urban growth on biodiversity. *Nat. Sustain.* **2020**, *3*, 16–24. [CrossRef]
18. Sillero-Zubiri, C. Dusicyon australis. *IUCN Red List Threat. Species*. 2015, p. e.T6923A82310440. Available online: https://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T6923A82310440.en (accessed on 1 March 2020).
19. Cayot, L.J.; Gibbs, J.P.; Tapia, W.; Caccone, A. *Chelonoidis abingdonii*, Pinta Giant Tortoise. *IUCN Red List Threat. Species* **2016**, *8235*, e.T9017A65487433. Available online: https://doi.org/10.2305/IUCN.UK.2016-1.RLTS.T9017A65487433.en (accessed on 1 March 2020).
20. IUCN IUCN 2021. The IUCN Red List of Threatened Species. *Version 2021-1*. 2021. Available online: https://www.iucnredlist.org (accessed on 1 March 2020).
21. Giannatos, G.; Albayrak, T.; Erdoğan, A. Status of the Caracal in Protected Areas in South-western Turkey. *CAT News* **2006**, *45*, 23–24.
22. Albayrak, T. Anthropogenic barriers to the distribution of the Grey Wolf (*Canis lupus* Linnaeus, 1758) in the Beydaglari Mountains area, Turkey (Mammalia: Carnivora). *Zool. Middle East* **2011**, *52*, 11–16. [CrossRef]
23. Gucu, A.C.; Sakinan, S.; Ok, M. Occurrence of the critically endangered mediterranean monk seal, monachus monachus, at olympos-beydağları national park, Turkey (mammalia: Phocidae). *Zool. Middle East* **2009**, *46*, 3–8. [CrossRef]
24. Naidenko, S.; Chistopolova, M.; Hernandez-Blanco, J.A.; Erofeeva, M.; Rozhnov, V. The effect of highway on spatial distribution and daily activity of mammals. *Transp. Res. Part D Transp. Environ.* **2021**, *94*, 102808. [CrossRef]
25. Can, Ö.E.; Togan, İ. Camera trapping of large mammals in Yenice Forest, Turkey: Local information versus camera traps. *Oryx* **2009**, *43*, 427. [CrossRef]
26. Çoğal, M.; Sözen, M. Camera trapping of medium and large-sized mammals in western black sea deciduous forests in Turkey. *Turkish J. Zool.* **2020**, *44*, 181–188. [CrossRef]
27. Ticaret Bakanlığı, İ.G.M. *Doğal Taşlar Sektör Raporu, Maden, Metal ve Orman Ürünleri Dairesi*; Ticaret Bakanlığı Yayınları: Ankara, Turkey, 2021.
28. Tercan, E.; Dereli, M.A. Monitoring of marble quarries expansion and land cover changes using satellite images and gis on a rural settlement of burdur province, turkey. *El-Cezeri J. Sci. Eng.* **2021**, *8*, 741–750. [CrossRef]
29. R Core Team. *R: A Language and Environment for Statistical Computing*; R Foundation for Statistical Computing: Vienna, Austria, 2021; Available online: http://www.R-project.org (accessed on 1 March 2020).
30. Kalaycı, S. *SPSS Uygulamalı Cok Değişkenli Istatistik Teknikleri*; Asil Yayın Dağıtım: Ankara, Turkey, 2010; Volume 426.
31. Long, L.E. Extracting economics from Roman marble quarries†. *Econ. Hist. Rev.* **2017**, *70*, 52–78. [CrossRef]
32. Zhu, H.; Xu, Z.F.; Wang, H.; Li, B.G. Tropical rain forest fragmentation and its ecological and species diversity changes in southern Yunnan. *Biodivers. Conserv.* **2004**, *13*, 1355–1372. [CrossRef]
33. Dumbrell, A.J.; Clark, E.J.; Frost, G.A.; Randell, T.E.; Pitchford, J.W.; Hill, J.K. Changes in species diversity following habitat disturbance are dependent on spatial scale: Theoretical and empirical evidence. *J. Appl. Ecol.* **2008**, *45*, 1531–1539. [CrossRef]
34. Bowler, D.E.; Heldbjerg, H.; Fox, A.D.; de Jong, M.; Böhning-Gaese, K. Long-term declines of European insectivorous bird populations and potential causes. *Conserv. Biol.* **2019**, *33*, 1120–1130. [CrossRef] [PubMed]
35. Schmiegelow, F.K.A.; Mönkkönen, M. Habitat loss and fragmentation in dynamic landscapes: Avian perspectives from the boreal forest. *Ecol. Appl.* **2002**, *12*, 375–389. [CrossRef]
36. Cabrera, M.P. Effects of the habitat alteration on three lizard species in santa María, Catamarca, Argentina. *Herpetol. Conserv. Biol.* **2021**, *16*, 150–156.
37. Stanford, C.B.; Iverson, J.B.; Rhodin, A.G.J.; Paul van Dijk, P.; Mittermeier, R.A.; Kuchling, G.; Berry, K.H.; Bertolero, A.; Bjorndal, K.A.; Blanck, T.E.G.; et al. Turtles and Tortoises are in Trouble. *Curr. Biol.* **2020**, *30*, R721–R735. [CrossRef]
38. Ćirović, D.; Penezić, A.; Krofel, M. Jackals as cleaners: Ecosystem services provided by a mesocarnivore in human-dominated landscapes. *Biol. Conserv.* **2016**, *199*, 51–55. [CrossRef]
39. Myers, N.; Mittermeier, R.A.; Mittermeier, C.G.; da Fonseca, G.A.B.; Kent, J. Biodiversity hotspots for conservation priorities. *Nature* **2000**, *403*, 853–858. [CrossRef] [PubMed]
40. Baker, K.H.; Gray, H.W.I.; Ramovs, V.; Mertzanidou, D.; Akin, Pekşen; Bilgin, C.C.; Sykes, N.; Hoelzel, A.R. Strong population structure in a species manipulated by humans since the Neolithic: The European fallow deer (*Dama dama dama*). *Heredity (Edinb).* **2017**, *119*, 16–26. [CrossRef]

41. Deniz, İ.G.; Genç, İ.; Yücel, G.; Sümbül, H.; Sezik, E.; Tuna, M. Karyomorphology and nuclear DNA content of sixteen Ophrys L. taxa from Turkey. *Plant Biosyst.* **2018**, *152*, 711–719. [CrossRef]
42. Hürkan, K.; Sramkó, G.V.A.M. *The Orchid Flora of Turkish Graveyards: A Comprehensive Field Survey*; Löki, V., Tökölyi, J., Süveges, K., Lovas-Kiss, Á., Eds.; Botanischer Garten und Botanisches Museum: Berlin, Germany, 2015; Volume 2, pp. 231–243, Berlin-Dahlem Stable. Available online: https://www.jstor (accessed on 1 March 2020).
43. Göçmen, B.; Veith, M.; Akman, B.; Godmann, O.; Igci, N.; Oğuz, M.A. New records of the Turkish lycian salamanders (*lyciasalamandra*, salamandridae). *North. West. J. Zool.* **2013**, *9*, 319–328.
44. Mezzasalma, M.; Odierna, G.; Petraccioli, A.; Veith, M.; Guarino, F.M. Karyological diversification in the genus *lyciasalamandra* (Urodela: Salamandridae). *Animals* **2021**, *11*, 1709. [CrossRef]
45. Kornilios, P.; Ilgaz, Ç.; Kumlutaş, Y.; Giokas, S.; Fraguedakis-Tsolis, S.; Chondropoulos, B. The role of Anatolian refugia in herpetofaunal diversity: An mtDNA analysis of Typhlops vermicularis Merrem, 1820 (Squamata, Typhlopidae). *Amphib. Reptil.* **2011**, *32*, 351–363. [CrossRef]