The Stone Marten, *Martes foina*, in Dibeen Forest Reserve, Jordan

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ABSTRACT

The Stone Marten, *Martes foina*, was studied in Dibeen Forest Reserve during 2006, using live- traps, spoor route, and spotlight methods. A total of 164 trapping nights were performed, where as six individuals were captured. Spotlight and spoor route methods were ineffective. Details on morphometric measurements, sex, habitat preferences and threats were obtained. Threats are represented mainly by habitat destruction, agricultural expansion, road killing, poisoning, woodcutting and urban developments.

Keywords: Stone Marten, *Martes foina*, Dibeen Forest Reserve, Morphometric measurements, Jordan.

INTRODUCTION

The Stone Marten, *Martes foina*, is has a wide range of distribution extending from Europe, Asia Minor, Iran and extends into northern India to China and Mongolia (Harrison & Bates, 1991). In the Middle East, it is confined to Jordan, Lebanon, Palestine, Syria and Turkey (Harrison & Bates, 1991). In Jordan, the subspecies *Martes foina syriaca* was described by Nehring (1902) from Wadi Syr. Details on its distribution and threats were given by Al- Shafee et al. (1997) and Amr (2012).

A detailed study on the carnivores in Dibeen Forest Reserve (DFR) was performed in 2004 by the Royal Society for the Conservation of Nature (RSCN), and confirmed the presence of the Stone Marten. Our present study was conducted to provide further knowledge on the Stone Marten at DFR, and define threats affecting its population.

METHODS

The Study Area

Dibeen Forest Reserve extends over 8.5 km² of mountainous terrain, with an elevation ranges between 570 to 1050 m asl, and a vegetation dominated by

pine/oak trees. The reserve consists of three main stand types, distributed according to altitude. In the lower elevations, Aleppo pine (*Pinus halepensis*) is dominant with some pure stands and large native trees. The middle elevations is characterized by a pine-oak (*Pinus halepensis*/ *Quercus calliprinos*) association and extends over the majority of the area. The oak is the dominant species in the upper elevations, with small stands of deciduous oak (*Quercus infectoria*) on the uppermost slopes. Other trees present in the forest include *Arbutus andrachne*, *Pistacia palaestina* and *Olea europaea*.

Figure 1: the Stone Marten in Dibeen Forest Reserve.

METHODOLOGY

Three standard methods were employed during the study; live trapping, spotlighting and spoor route.

Live- trapping

A total of 164 trapping nights were performed using 10 medium sized box traps manufactured locally (100X40cm). Traps were placed in wadis, open areas, and slopes. All traps were left *in suite* for 10 successive nights and hidden as much as possible to provide shelter for the captured animals as well as to prevent the trap from being taken by locals. Traps were checked every morning and reset in the late afternoon using sardines and/ or boiled eggs as a bait. Captured animals were weighted and then anesthetized using three shots composed of Atropine Sulfate, followed by Xylocaine and then Ketamine. Anesthetic materials were given with care and based on the

animal body weight. After the animal is fully anaesthetized (around 8 – 12 minutes), it was measured, and sexed. Subsequently, all captured animals were released.

Spotlight

Night time spotlight transects was carried out to cover as much area as possible within the reserve. One-million candle-power spotlight was used during the night, while the car was at low speed (5 to 10 km/h). Nine transects were studied by four persons for a total of 72 man/hour.

Spoor Route

Six routes were performed and involved selecting a start point randomly with researchers walking parallel to each other, depending on the topography of the land. Signs for the presence of the Stone Marten were recorded including footprints, droppings, dens, dead specimens, and skull remains. The total effort for spoor route was 48 man/hour.

RESULTS

A total of six specimens were trapped (4 males and 2 females), with a trapability rate of 3.7%. Spotlight and spoor route methods yielded no results throughout the study.

Tabel 1: Efforts used to study the Stine Marten.

Method	Total effort	No. of captured, sings or observed animals	%
Spotlight	72 man/hour	0	0
Spoor routes	48 man/hour	0	0
Traps	164 trap nights	6	3.7

Table 2 shows morphometric measurements for the captured animals. Measurements were compared to other studies available.

Table 2: Morphometric measurements of Stone Marten from Dibeen Forest Reserve.

No	Sex	Weight (g)							
			HB	T	FA	HF	E	HPD	FFD
1	Male	1700	45	26	10.06	7.06	2.03	3.08	4.05
2	Male	1900	46	24	10.04	7.04	2.04	3.08	4.07
3	Male	1760	45.5	24	10.06	7.07	2.08	3.09	4.06
4	Male	1400	44	27	10.05	7.08	2.07	3.03	4.04
5	Female	1300	41	25	10.08	7.08	2.01	2.01	3.03
6	Female	1350	42	25	9.05	7.02	2.02	2.02	3.05
Mean	Male	1690	45.13	25.25	10.05	7.06	2.06	3.07	4.06
	Female	1325	41.50	25.00	9.57	7.05	2.02	2.02	3.04
Std. deviation	Male	211	0.85	1.50	0.01	0.02	0.02	0.03	0.01
	Female	35	0.71	0.00	0.73	0.04	0.01	0.01	0.01

HB: Head and Body length; T: tail length; FA: forearm length; HF: forearm length; E: ear length; HPD: hind pad length; FFD: forearm pad length.

DISCUSSION

Despite that the Stone Marten is listed as a least concern species based on International Union for the Conservation of Nature Red Lists, its population is sharply declining in Jordan, and is restricted to the rocky mountains of the north part of Jordan (Amr, 2012). In addition, the stone marten is considered a forest dwelling species, which threatening its status as forests in Jordan are severely degraded and represents less than 1% of the total country area (Al Eisawi, 1996). Al- Shafee *et al.* 1997 stated that the population declines are caused by human interference represented by habitat destruction, large-scale of urban developments; construction of roads, agricultural expansion and direct killing.

Knowledge on the Stone Marten external body measurements came from Al-Shafee *et al.* 1997, which was in accordance with the current survey results. Harrison & Bates (1991) provided information about external body measurements for specimens obtained from Iraq and Lebanon. Their results showed larger specimens compared to the specimens collected during this survey. No details were provided on the species body weight based on the available literature, where the average was measured as 1.69 Kg for males and 1.33 Kg for females.

Spotlight and spoor routes were ineffective in the forest for studying the Stone Marten, due to the behavior of this species which has a very fast reaction against the disturbance around (car engine sound and/or human sound). In addition, forest provides a very suitable habitat for hiding due to the dense vegetation and understory cover, which doesn't allow seeing the animal and/or its signs. The high agility of the Stone Marten in tree climbing provides more protection to the species, and decrease the opportunities to eye- contact.

Habitats preferences were studied in accordance to Sacchi & Meriggi (1995) who showed that the Stone Marten prefer bushy area, avoid large forest, preference of low altitudes with abandon houses or isolated houses surrounded by shrubs and crops. Thus; Dibeen Forest can be considered as typical habitat for Stone Marten which has good variety in food sources, and also safe sheltering and breeding sites. Table 2 below illustrates habitats preferences of the Stone Marten in Dibeen Forest Reserve.

Despite the establishment of Dibeen as a forest reserve, several challenges are threatening the status of the Stone Marten and represented by wood cutting, mass tourism, road driving, uncontrolled grazing and habitat fragmentation. Locals around the reserve usually depend on woods for charcoal production or trading, which highly affect this woodland associated species; in addition to reduction in the shelters availability in the reserve. Mass tourism impact and other human activities in the current time is larger than reserve capacity, especially in the weekends, in what known as one

day picnicking. This cause waste dispersal in the picnicking area which attracts the carnivores and may has decayed food. In addition to the negative impacts on the habitat and soil resulted from different activities such as off road driving.

Table 2: Habitat Variability at Dibeen Reserve according to Sacchi & Meriggi (1995).

Habitat variables (Sacchi & Meriggi, 1995)	Variables availability in DFR.
Deciduous forest	+
Conifer Forest	+
Wood fragmentation	+
Mediterranean shrubs	+
Streams	-
Density of abandoned houses	+

Uncontrolled grazing is considered as a major factor in disturbance for wild zone within the reserve. The reserve area is overlapped with the private lands which are used for random agriculture, the reserve is suffering from the degradation of the habitat because of large agricultural demands. The Stone Marten depends directly on habitat quality for survival, so it is highly affected by habitat degradation, in addition to increasing the probability of animals exposure to hunting and absence of safe wildlife corridors. The reserve has large number of roads some of them link the locals villages and the other roads outside the reserve which were increased recently due to urbanization development in Jordan, all these roads cause what called road kill incidences which cause declining in the population sizes. Conserving the site should continue in order to minimize the harmful impact of human on the viability of this species.

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