

Bed Site Selection by Wild Boar (*Sus scrofa*) in Baghshadi Protected Area, Yazd Province, Iran

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II. METHODS

Abstract—Populations of wild boar present in semi-arid steppe of central Iran. We studied features influencing bed site selection by this species in this steppe of Iran. Habitat features of the detected bed site were compared with randomly selected by quantifying number of habitat variables in semi- arid area in Iran. The results revealed that the most important influencing factors in bed site selection were vegetation cover, number of *Artemisia sieberi*, percentage cover and height of *Acer cinerascens*, percentage cover and height of *Amygdalus scoparia*. This is the first ecological study of the wild boar in a protected area of the semi desert biome of Iran. Sustainability of wild boar populations in this area dependent to shrubs of *A. scoparia* and *A. cinerascens* for thermal and camouflage cover.

Keywords—Bed site selection, Wild boar, Yazd, Iran.

I. INTRODUCTION

THE wild boar species (*Sus scrofa*) have a good global distribution. Although various studies have focused on this species worldwide, our knowledge of its ecology in Iran is sparse. In the endangered-species list of the IUCN this animal has been categorized in the “least concern” category [4]. Studies have been carried out on this species on a global level. The results of study in Ferance revealed wild boars chose *Phillyrea angustifolia* bushes for their resting location and *Ulmus campestris* clusters for gnawing [1]. Studies were used to study the bearings of 22 female boars during the summers ranging between 2003 and 2006 in the north of Western Germany. Results show three types of habitat arrangement: 1- young boars that limited their habitat within the limits of farmlands; 2 – migratory boars alternating between forest and farmland and 3 – forest boars that remained within forest limits. One-year-old boars were usually migratory whilst family groups did not wander but remained either on farmland or in forest. The average habitat range for farmland boars was smaller than the overall average of summer habitat range, whereas the habitat range of migratory and forest boars showed no significant difference. There was also no significant difference between the three groups in terms of habitat range size [2]. The aim of this study is to determine the habitat factors which determine the wild boar’s choice of resting location in the Baghshadi protected area. Distinguishing these factors will significantly aid the management of this species.

A. Study Area

The study was conducted between March to May 2011 in an forest oasis in semi-arid area (10000 ha), Baghshadi, located in south of Yazd, Iran (31 30-39 32N and 54 40, 55 42). In this region there is a different in temperature between nights and days and across season with mean monthly minimum of 2c in January and maximum of 30 C in July. Average annual precipitation in the area is about 100 mm. The physiognomy of the place presents a total woody shrub plant cover ranging from 50 to 65 %. The vegetation comprises different woodland species such as Pistachio tree (*Pistachia atlantica*), Mountain Almed (*A. scoparia*) and Montpellier Maple (*A. cinerascens*) as well as bush species such as Sagebrush (*A. sieberi*), Harmel (*Peganum harmala*) in lower.

B. Sampling

Totally 20 bed sites were recorded and variables such as tree height, canopy cover, distance to fields, water resources and edge of forest oasis were measured. We measured tree height using scale stick. Distance to resources and fields were measured by GIS software.

C. Analysis

Leven test [3] was used for homogeneity of variance testing. The normality of data distribution was analysed by one sample Kolmogorov- Smirnov test and variables were transformed using the logarithm transformation in case of normality [5]. To determine important microhabitat characteristics for bed site selection, an independent t- test was used to compare used and none used microhabitat variables. Logistic regression was used to determine which variables best explained the presence/ absence of individuals for each sampling area. This analysis was used for modeling binary response data by the method of Maximum likelihood. Backward stepwise selection was then used to select the best model. The overall model significance was based on log-likelihood X2 statistics classification accuracy and the Hosmer-Lemeshow Lack-of-Fit test. The SPSS 16.0 statistical package was used for statistical analysis.

III. RESULTS

Table I Summarised the results of habitat variables at bed sites utilized by wild boar (*S. scrofa*) and at random sites at khatam province, Yazd, Iran. Table2. Revealed Correlation of habitat variables with the first three principal components derived from 20 bed sites of the wild boar. The t- test revealed that vegetation , percentage cover and number of *A. scoparia* , *A. cinerascens* shrubs , number of *A. sieberi* and distance to oasis are more important in bed sites compare random sites.

Table II Revealed Correlation of habitat variables with the first three principal components derived from 20 bed sites of the wild boar. The first component was total vegetation. The second factor was Vegetation of *A. cinerascens* and the third factor was number of *A. sieberi*.

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IV. DISCUSSION

The results revealed that bed sites of wild boar in Baghshadi protected area do not distributed randomly. This animal prefers area with high vegetation of *A. scoparia* and *A. cinerascens* that far of oasis edge. Area with more *Artemisia sieberi* numbers are favored. It seems that avoiding the edge of this forest patch and hiding in the denser central areas of the forest affords more camouflage and lessens the risk of predatory strikes. PCA analysis showed vegetation is one of the most important variables affecting bed sites in wild boar. It seems that this animal chooses these locations in order to survive the unbearable heat and cold of the desert region.

This plant coverage in addition to protecting wild boar from the severe weather conditions, also affords good camouflage. The second factor is vegetation and height of *A. cinerascens* and the third factor is number of *A. sieberi*. The *A. cinerascens* and *A. scoparia* species are preferable for the animal in comparison to other types of plant coverage because of their shrub form and dense canopy. The roots of the *A. sieberi* are used as a food source and means of quenching thirst especially considering the recent droughts afflicting the area. In order to conservation the wild boar, areas with good plant coverage specifically *A. scoparia* and *A. cinerascens* bushes which are taller and have a higher foliage dome should be selected.

TABLE I

HABITAT VARIABLES AT BED SITES UTILIZED BY WILD BOAR (*S. SCROFA*) AND AT RANDOM SITES IN KHATAM PROVINCE, YAZD, IRAN. INDEPENDENT TWO-SAMPLE T TEST, SIGNIFICANT DIFFERENCE, SIGNIFICANT (IN BOLD) WITH $P < 0.05$, $N = 40$ FOR USED AND NON – USED

Variables	Present sites N= 20 Mean	Random sites N=20 Mean	Two sample t- test	P
Vegetation percent	0.52 ± 0.09	0.14±0.05	15.66	<0.0001*
Percentage cover of <i>Amygdalus sp</i>	7.91± 8.26	2.22± 3.72	2.81	0.008*
Percentage cover of <i>Acer cinerascens</i>	11.06± 18.20	0.04±0.21	4.00	<0.0001*
Height of <i>Acer cinerascens</i> (m)	2.17±2.09	0.27±0.87	3.62	0.001*
Height of <i>Amygdalus sp</i> (m)	1.88± 1.5	0.19± 0.26	2.18	0.03*
Number of <i>Artemisia sieberi</i>	222.4±139.87	61.05±42.25	3.58	0.001*
Number of <i>Amygdalus</i>	23.7± 24.7	0.44± 0.64	2.51	0.01*
Number of <i>Pistacia sp</i>	1.15±1.72	0.8±1.15	0.33	0.74
Number of <i>Astragalus sp</i>	29.6± 50.95	11.25± 13.15	1.8	0.07
Distance to fields	8010± 2406	7082± 5021	1.89	0.06
Distance to water	1485± 1231	10942± 5021	1.37	0.17
Number of <i>Acer</i>	6.95±10	0.11±0.34	2.91	0.006*

*Independent t test, significant difference, $P < 0.05$

TABLE II

CORRELATION OF HABITAT VARIABLES WITH THE FIRST THREE PRINCIPALS COMPONENTS DRIVED FROM 20 BED SITES OF THE WILD BOAR IN YAZD, IRAN

Variables	Principal component		
	1	2	3
Number of <i>Artemisia sieberi</i>	0.17	0.32	0.88
Number of <i>Amygdalus sp</i>	0.65	-0.67	-0.07
Number of <i>Acer cinerascens</i>	0.59	0.70	-0.27
Vegetation of <i>Acer cinerascens</i>	0.61	0.72	-0.19
Vegetation of <i>Amygdalus sp</i>	0.73	-0.57	-0.02
Height of <i>Amygdalus sp</i> (m)	0.70	-0.66	-0.11
Height of <i>Acer cinerascens</i> (m)	0.65	0.69	-0.20
Distance to edge of forest patch	0.62	-0.23	0.05
Total vegetation	0.77	0.13	0.48
Eigenvalue	3.65	2.89	1.19
Percent of total variance (%)	40.60	32.17	13.21
Percent of cumulative variance(%)	40.60	72.77	85.99

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REFERENCES

- [1] Dardaillon, M, "Seasonal variations in habitat selection and spatial distribution of wild boar (*Sus Scrofa*) in the Camargue, Southern France". *Behavioural Processes*, Vol 13, Issue 3, pp.251-268, 2002.
- [2] Keuling , O., Stier, N., Roth , M, "Commuting, shifting or remaining?: Different spatial utilisation patterns of wild boar *Sus scrofa* in forest and field crops during summer". *Mammalian Biology*, Vol. 74, pp. 145-152, 2009.
- [3] Levene, H, Olkin et al. (Eds), *Contribution to probability and statistics: essay in Honor of Harold Hotelling- Stanford*, 1960, pp.278-292.
- [4] IUCN Red List of Threatened Species, IUCN. <http://www.redlist.org>. 2011.
- [5] Zar, j. H, *Bio statistical analysis*. New Jersey, 1996, 662pp.