

Nest Site Selection by Persian Ground Jay (*Podoces pleskei*) in Bafgh Protected Area, Iran

S. Rasekhinia, S. Aghanajafizadeh, and K. Eslami

II. METHODS

Abstract—We studied the selection of nest sites by Persian ground Jay (*Podoces pleskei*), in a semi-desert central Iran. Habitat variables such as plant species number, height of plant species, vegetation percent and distance to water sources of nest sites were compared with randomly selected non-used sites. The results showed that the most important factors influencing nesting site selection were total vegetation percent and number of shrubs (*Zygophyllum eurypterum* and *Atraphaxis spinosa*). The mean vegetation percent of 20 area selected by Persian Ground Jay was (4.41 ± 0.17) , which was significantly larger than that of the non-selected area (2.08 ± 0.06). The number of *Zygophyllum eurypterum* (1.13 ± 0.01) and *Atraphaxis spinosa* (1.36 ± 0.10) were also significantly higher compared with the control area (0.43 ± 0.07) and (0.58 ± 0.9) respectively.

Keywords—Persian Ground Jay, Habitat variables, Iran.

I. INTRODUCTION

PLESKE'S Ground Jay (*Podoces pleskei*) is a endemic bird in Iran. The species has a wide distribution range and is classified as Least Concern [4]. Populations of this bird present in central steppes of Iran. Knowledge about the habitat selection of this species is not sufficient. Several studies have been carried out on the ecology of ground Jay in Iran. Other study showed incubation period of this bird 16-18 days [2]. Diet of this bird was studied [1] -[3]. Nest sites were located mainly in the top center of dense vegetation, such as thorny bushes of *A. spinosa*, *E. intermedia* and *Z. eurypterum*. The cup shape nests in *A. spinosa* and dome-shaped nests in other species shrubs like *E. intermedia* and *Z. eurypterum* were built from thin branches and twigs [8]. Others found that species such as *A. spinosa*, *E. intermedia* and *Z. eurypterum* are selected for breeding by this species and Nests were rounded cup shaped structures [7]. The aim of this study was to determine habitat variables influencing Ground Jay habitat selection. Hopefully, help the population conservation.

S. Rasekhinia is with Department of Natural Resources, Bandarabbas Branch, Islamic Azad University, Bandarabbas, Iran (phone: +989133531060; e-mail: srasekhinia1060@gmail.com).

S. Aghanajafizadeh is with Department of Environment, Maybod Branch, Islamic Azad University, Maybod, Iran (e-mail: shirinaghanajafi@gmail.com).

K. Eslami is with the Department of Natural Resources, Bandarabbas Branch, Islamic Azad University, Bandarabbas, Iran (e-mail: kian.eslami@gmail.com).

A. Study Area

The study was conducted between Jun to July 2012 in a semi-arid area (20000 ha), Bafgh, located in the east of Yazd province, Iran ($30^{\circ}, 30' - 31^{\circ}, 45' \text{ N}$ and $55^{\circ}, 30' - 55^{\circ}, 50' \text{ E}$). In this region there is a difference in temperature between nights and days and across seasons, with mean monthly minimum of 3° C in January and Maximum of 30° C in July. Average annual precipitation in the area is about 111 mm. The vegetation comprises different species such as *Artemisia sieberi*, *Z. eurypterum* (two dominant species), *Seidlitzia rosmarinus*, *Atraphaxis spinosa*, *Salsola* spp, and *Tamarix* spp.

B. Sampling

The location of each nest was found by using breeding bird protocol [6]. After breeding season, Ground Jay nests were found driving motorcycles at low speed and walking. Once found, the exact location of the new or old nest was determined using GPS. In each sampling quadrats ($20 \times 20\text{-m}$) located in the center of each nest site and habitat variables such as plant species, number and height of each plant species, vegetation percent of each plant species and distance to water sources were measured. Percent cover of total vegetation was estimated. The distance from nearest water source was measured by using GPS. In addition the same numbers of plots were also randomly placed in the area and similar variables were measured within them. Totally 20 present plots and 20 random plots were established.

C. Analysis

Leven's test [5] was used for homogeneity of variances testing. The normality of data distribution was analysed by one-sample Kolmogorov-Smirnov test and variables were transformed using the logarithm and square root transformation in the case of no normality [9]. To assess micro habitat use by Ground Jay in each habitat, we compare vegetation variables measured in use plots (plots placed where Ground Jay nests were detected) with random plots using Mann-whitney test. In order to determine important variables for nesting selection principal component analysis (PCA) was used.

III. RESULTS

Table I summarised the results of Mann-whitney test comparing vegetation variables between use and random plots

in breeding habitat. Number, height and vegetation percent of shrub species (*Z. eurypterum* and *Atraphaxis spinosa*) were significant difference compare with control plots. Principal component analysis revealed the most important habitat variables that affected the nest-site selection by Ground Jay was one main factor with an eigen value of more than one and a cumulative variance of 67% in micro habitat (Table II). This factor is based on number of *Z. eurypterum* and total vegetation percentage. These variables are determining factors in nest site selection.

IV. DISCUSSION

These results are in agreement with results obtained in Touran Biosphere Reserve and in Yazd province [8]-[7]. These studies revealed shrub species such as *Z. eurypterum* is

selected by Ground Jay in breeding season. High density of this plant coverage and high total vegetation in addition to protecting broods of Ground Jay from the severe weather conditions, also affords good camouflage. In addition root of *Z. eurypterum* is part of Ground Jay diet [2]. We suggest shape and material of nests according to vegetation structure is different. Our observation showed that cup shaped nests that were built from thin branches and twigs in this area. Other studies showed nests were rounded cup shaped with soft inner layer in south of Yazd [7] and cup shape nests in *A. bushes* and dome-shaped nests in other species shrubs like *E. intermedia* and *Z. eurypterum* were built from thin branches and twigs [8]. We think drought is the most important factor that decreases population size of this bird in study area.

TABLE I

MEAN \pm SE OF HABITAT VARIABLES IN EACH PLANT COMMUNITY IN NEST-SITE AND RANDOM PLOTS. THE RESULTS OF MANN-WHITNEY TEST FOR COMPARISON BETWEEN NEST-SITE PLOTS AND RANDOM PLOTS IS SHOWN

Variables	Present sites N= 20 Mean	Random sites N=20 Mean	Mann- whitney	P
Vegetation percent	4.41(0.17)	2.08(0.06)	5.44	<0.0001*
Vegetation percentage of <i>Zygophyllum sp</i>	3.10 (0.11)	0.86(0.15)	5.44	<0.001**
Vegetation percentage of <i>Atraphaxis spinosa</i>	2.65(0.23)	0.84(0.13)	4.53	<0.001**
Vegetation percentage of <i>Artemisia sieberi</i>	1.01(0.17)	1.47(0.06)	2.10	0.43 ^{ns}
Height of <i>Zygophyllum</i> <i>Eurypterum</i> (cm)	1.99 (0.01)	1.25 (0.21)	4.40	<0.001**
Height of <i>Atraphaxis</i> <i>spinosa</i> (cm)	1.41(0.10)	1.11(0.16)	0.29	0.77 ^{ns}
Height of <i>Artemisia</i> <i>sieberi</i> (cm)	1.04(0.15)	1.59(0.007)	5.04	<0.001**
Number of <i>Artemisia</i> <i>Sieberi</i>	0.28(0.1)	0.14(0.03)	1.86	0.63 ^{ns}
Number of <i>Zygophyllum</i> <i>sp</i>	1.13(0.01)	0.43(0.07)	5.43	<0.001**
Number of <i>Atraphaxis</i> <i>spinosa</i>	1.36(0.10)	0.58(0.9)	4.49	<0.001**
Distance to water sources (m)	0.73(0. 21)	0.95(0. 14)	5.08	<0.001**

^{ns} Mann-Whitney U- test, wilcoxon, non –significant difference, P>0.05

* Mann- Withney U –test, wilcoxon, significant difference, P<0.05

** Mann- Withney U –test, wilcoxon, significant difference, P<0.01

TABLE II
CORRELATION OF HABITAT VARIABLES WITH THE FIRST PRINCIPALS COMPONENTS DERIVED FROM 20 NEST SITES OF THE GROUND JAY IN YAZD, IRAN

Variables	Principal component
	1
Total vegetation percentage	0.93
Height of <i>Artemisia sieberi</i> (cm)	-0.58
Height of <i>zygophyllum sp</i> (cm)	0.77
Number of <i>zygophyllum sp</i>	0.94
Number of <i>Atraphaxis spinosa</i>	0.83
Distance to water sources(m)	-0.79
Eigenvalue	4.03
Percent of total variance (%)	67.29
Percent of cumulative variance(%)	67.29

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