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HOUBARA POPULATION ESTIMATES IN PUNJAB, PAKISTAN (NOVEMBER 2000)

Muhammad Sajid Nadeem, M. Anwar Maan, Tariq Mahmood, Raja Muhammad Ikram

Abstract. In Punjab the total wintering habitat of Houbara Bustard is 32,300 km^2. Surveys for Houbara population in Punjab were conducted in November 2000. Population was estimated about 4,729 birds with overall density of 0.150 ± 0.007 ind./km^2. In Rajanpur 426, in Thal 662 and in Cholistan 3,644 Houbara were estimated. Sand dunes and vegetation cover were identified as important factor to make precise and accurate estimates, assuming random distribution of sand dunes (P = 1.0), the visibility of each transect under study was variable. With increase in sand dunes and vegetation cover the probability of sighting Houbara was decreased.

Key words: Houbara Bustard, *Chlamydotis undulata,* Pakistan, wintering, number, conservation.

Address: M.S. Nadeem, Biochemistry Department, Hazara University, Mansehra, NWFP, Pakistan; e-mail: sajid_nm2003@yahoo.co.uk.

Оценки численности джека в Пенджабе, Пакистан (ноябрь 2000 г.). - М.С. Надим, М.А. Маан, Т. Махмуд, Р.М. Икрам. - Беркут. 14 (1). 2005. - В Пенджабе общая площадь мест зимовки джека составляет 32 300 км^2. Популяция исследовалась в ноябре 2000 г. Общая численность была оценена в 4729 птиц с общей плотностью 0.150 ± 0.007 ос./км^2. Численность джека в Раджанпуре оценивается в 462 ос., в Тале – 662, в Холистане – 3644. Важным фактором при учетах было наличие песчаных дюн и растительности. Они уменьшали видимость птиц и точность учетов.

INTODUCTION

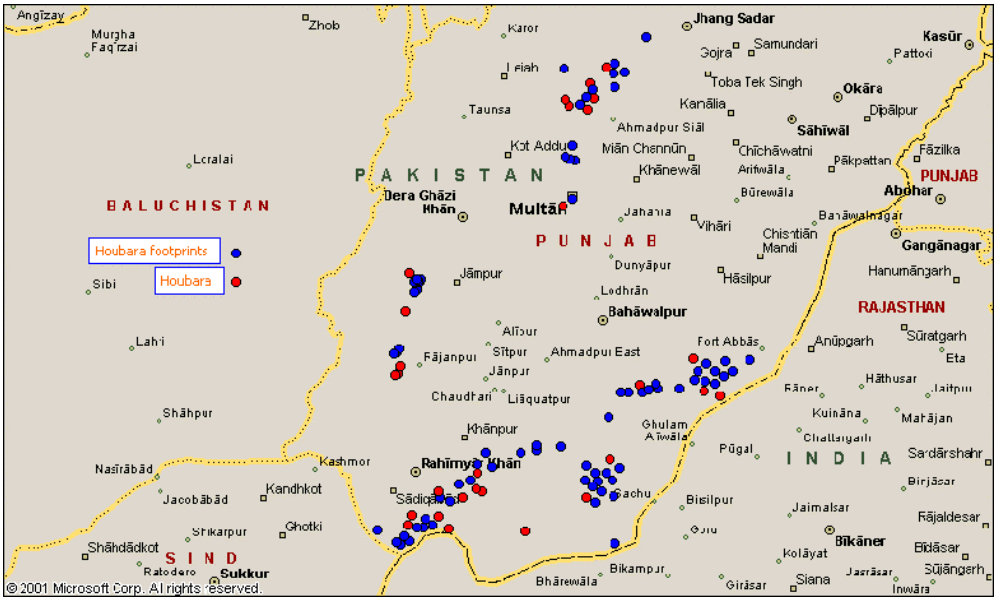
Houbara (*Chlamydotis undulata macqueenii*) is mercilessly destroyed in Pakistan by falconries from Gulf States. Mian (1997) reported a decline rate of Houbara 18 % per annum. Combreau and Launay (2001) noted in Kazakhstan between autumn 1998 and spring 2001, the relative density of breeder and migrants has dropped 48 % and 49 % respectively suggesting a decline in the range of 15 % per annum.

Trapping and falconry are the main reasons for the decline of Houbara. These birds are being trapped on a large scale (4,000–7,000 per year) and smuggled to Middle Eastern Countries (Goriup, 1997). In a recent questionnaire survey of 101 falconers, approximately 20 % of the clients, at Abu Dhabi Falcon Hospital in 2000 (Bailey, 1996) 42 % said they used 1–15 Houbara to train their falcons each season. There are about 8–10 Falcon Hospital in the region, probably with similar client numbers, it is clear that Goriup's (1997) estimate of 4000–7000 may even underestimate the scale of the problem. Houbara Trapping is more common in Rajanpur/Rojhan, Sadiqabad, Khanpur and Fort Abbas.

The present study was undertaken in November 2000 to know the current situation in Province of Punjab, Pakistan.

MATERIALS AND METHODS

Population estimates for Houbara were compared following Simple Strip and Probability methods. Transects of 10 km length and 500 m wide (250 m on both sides) were studied, by driving 4 x 4 vehicle at a low speed (20 km/h) along transect. Transects were taken randomly at different prime habitats with use of one vehicle. Survey time was from sunrise to 10^{30} am and from 3 pm to sunset. The distance of birds flushed was noted in approximation and indirect clues such as footprints, droppings and feathers were noted on both sides of transects. Fresh footprints and droppings were considered while estimating population. The data were analyzed following standard statistics (Tanner, 1978; Maan et. al., 1999).



Houbara distribution in Punjab in 2000.

Statistics used

Density, D = ng/2W (L).

Total population estimates, P = D x A, where:

n – number of Houbara groups observed,

g – mean group size,

2W – width of transect on both side of transect,

L – total length of all transects,

A – total area of habitat

Correction factor:

S = Sighting probability for distance for Houbara / Probability of out of sight area in the transect under study.

Missing population = No. of sighting x Mean group size x Correction factor.

Accuracy of population estimates

In Thal particularly, the area is uneven, with undulating sand dunes and characteristic vegetation of the area. With these factors, i. e. height of sand dunes and vegetation cover effect, the visibility of transect and birds present across the dunes could not be observed. Similarly, thick vegetation helps the bird to camouflage and it cannot be observed with certainty. Sand dunes with vegetation cover further strengthen this factor and interfere with sighting of birds. These factors affect the detection of birds and there are chances of missing the birds present in transects under study. The following assumptions can be made:

1) Houbara Bustard is randomly distributed in the study area;

2) the probability of distribution of sand dunes, vegetation cover and plain area is the same throughout the study area (habitat), i. e. sand dunes are randomly distributed throughout the habitat (P = 1.0);

3) in each transect, there is some area that is out of sight due to sand dunes and vegetation cover in which probability of sighting the bird is very low;

4) the missing population in the out of sight area can be worked out by calculating correction factor. The correction factor is sighting probability of Houbara for distance and the probability of distribution of out of sight area in each transect;

5) with the increase in distance and vegetation cover, the probability of sighting the bird is decreased.

Based on these assumptions, missing population in the study area and in the total habitat

was calculated (modified from Neter et. al., 1979).

The locations of Houbara sighting was recorded by GPS and map was created in "Map point 2000" by using this information.

RESULTS

In Punjab the total wintering habitat of Houbara Bustard is 32,300 km^2, Rajanpur/Rojhan shares 4,600 km^2 (14.24 %), Thal 4,800 km^2 (14.86 %) and Cholistan 22,900 km^2 (70.90 %). Different fraction of Houbara population (Photo 1–2) enters in these three habitats. Surveys for Houbara population in these areas were conducted. Results are summarized in Tables 1 and 2 (also see map).

Photo 1. Houbara under *Capparis* plant in Rahim Yar Khan.

Rajanpur / Rojhan

In Rajanpur area 42 transects were studied covering an area of 210 km^2. The density of Houbara was calculated as 0.142 ind./ km^2. A total of 426 birds were estimated in area of 3,000 km^2. Majority of the birds were observed around *Capparis* plants. The area of Rojhan (1600 km^2) could not be surveyed due to conflict between a local tribe (Mazari) and advance protection party of Dubai. The extensive trapping of Houbara was reported in

Table 1

Estimation of Houbara population in Punjab, November 2000
Оценка численности джека в Пенджабе в ноябре 2000 г.

Name of the area	Total (surveyed) area, km^2	Transects, n	Birds (+footprints) recorded	Density, ind./km^2	Estimated population
Rajanpur/Rojhan					
Rajanpur	3,000 (210)	42	10 (+20)	0.142 ± 0.023	426
Rojhan 1,600 km^2 could not be surveyed due to local tribe conflict					
Thal					
Choubara	1,632 (85)	17	9 (+ 4)	0.152 ± 0.046	248
Mankera	1,270 (60)	12	1 (+ 7)	0.133 ± 0.056	168
Athara Hazari	1,036 (45)	9	1 (+ 6)	0.155 ± 0.075	160
Muzaffargarh	862 (50)	10	0 (+ 5)	0.100 ± 0.056	86
Overall	4,800 (240)	48	11 (+ 22)	0.138 ± 0.020	662
Cholistan					
Sadiqabad	2,098 (70)	14	3 (+ 10)	0.185 ± 0.059	388
Rahim Yar Khan	7,953 (220)	44	14 (+22)	0.163 ± 0.023	1296
Yazman	10,857 (250)	50	3 (+35)	0.152 ± 0.020	1650
Fort Abbas	1,992 (130)	26	4 (+16)	0.154 ± 0.034	307
Overall	22,900 (670)	134	24 (+83)	0.159 ± 0.010	3641
Punjab Total	30,700 (1120)	224	45 (+125)	0.150 ± 0.007	4729

Photo 2. Houbara in Rajanpur area.

Rojhan area. Total 30 Houbara (10 + 20 footprints) were recorded in 25 groups. Maximum group size was 4 Houbara.

The missing population due to sand dunes and vegetation cover in Rajanpur was estimated using probability method (Table 2). According to it 80 % Houbara population was distributed up to 100 m from observer and observed with probability of 0.8 due to visibility factor of transect under study, while 20 % population was distributed from 200 to 250 m and observed with probability 0.2. Missing population was estimated as 143 birds. Therefore estimated population in Rajanpur area was 426 to 569 birds.

Thal

In Thal area, 48 transects were taken covering an area of 240 km^2. Houbara density was 0.138 ind./km^2 and total population was estimated as 662 Houbara. Distribution in different areas of Thal is given in Table 1. The highest population was 0.155 ind./km^2 in Athara Hazari (District Jhang), followed by 0.152 ind./km^2 in Choubara (District Layyah), 0.133 ind./km^2 in Mankera (District Bhakkar) and 0.1 ind./km^2 in Muzaffar garh. In Muzaffar garh, the army was on exercises, thus only 9 transects was driven while the prime area could not be surveyed. Hunting was in progress in Athara Hazari and Mankera. Feathers of Houbara with cartridges were seen in both areas. Total 33 Houbara (11+22 footprints) were recorded in 28 groups. Maximum group size was 3 Houbara.

The missing population in Thal was calculated using the probability method (Table 2). It showed that 64 % Houbara population was distributed up to 100 m from observer and observed with probability of 0.64 due to visibility factor of transect under study, while 36 % population was distributed from 100 to 200m and observed with probability 0.36. Missing population estimated as 200 birds. Thus according to estimates there were 662 to 862 birds in the area of Thal in November 2000.

Cholistan

In Cholistan 134 transects were studied covering an area of 670 km^2. The density was 0.159 ind./km^2, while the total estimated population was 3,641 birds (Table 1). The highest density was in Sadiqabad 0.185 ind./km^2 followed by 0.163, 0.154, 0.152 for Rahim Yar Khan, Fort Abbas and Yazman respectively. Total 107 Houbara (24+83 footprints) were recorded in 99 groups. Maximum group size was 4 birds.

The missing population in Cholistan was calculated using the probability method (Table 2). It

Table 2

Frequency and calculated probability of Houbara occurrence in transects in different areas.
(Width of transect 250 m on each side)
Частота и расчетная вероятность встречаемости джека на маршрутах на различных территориях

Distance (m)	Rajanpur/Rojhan	Thal	Cholistan
0–100	8 (0.8)	7 (0.64)	18 (0.75)
100–200	0 (0)	4 (0.36)	6 (0.25)
200–250	2 (0.2)	0 (0)	0 (0)

indicates that 75 % Houbara population was distributed up to 100 m from observer and observed with probability of 0.75 due to visibility factor of transect under study, while 25 % population was distributed from 100 to 200 m and observed with probability 0.25. Missing population was estimated 991 birds. It was estimated that there were 3,641 to 4,632 birds in the area of Cholistan in 2000.

DISCUSSION

The climate of the desert area is highly uncertain. The change in temperature and rainfall affects the dispersion of houbara. Mian (1997a) concluded that a higher clumping of Houbara was noted under drought conditions while a random distribution was observed following mild rainfall. He reported that Houbara did not maintain territory in its wintering grounds and tended to have a random distribution. Mian (1997b) mentioned that the fluctuations in bird densities were generally controlled by the variation in rainfall and availability of green foliage. The drought conditions were severe in Balochistan from the last three years. Therefore may be houbara does not stay in Balochistan and bulk of the population migrated to the habitats in Punjab areas.

Population of Houbara was estimated as 4729 to 6,059 birds in Punjab during 2000. Out of which 77.05 % population was distributed in Cholistan, 13.93 % in Thal and 9.02 % in Rajanpur. The highest densities were observed in Sadiqabad (0.185), Rahim Yar Khan (0.163) Athara Hazari (0.155) and Fort Abbas (0.154) ind./km^2. Mian et al. (1997) reported the densities during December 1992, as 0.318, 0.131, 0.088, 0.050, 0.114 and 0.056 for Rajanpur, Rojhan, Northern Thal, Central Thal, Central Cholistan and Southern Cholistan respectively. In present study overall densities in three habitats of Punjab in 2000 were 0.142 ± 0.023, 0.138 ± 0.020 and 0.159 ± 0.010 ind./km^2 in Rajanpur, Thal and Cholistan respectively.

Although the population of Houbara is declining all over the world but still Punjab hosts a significant number of wintering houbara every year. Overall density in Punjab was calculated as 0.150 ± 0.007 ind./km^2 in 2000. To visualize the exact situation, the population estimates should be carried out in other Provinces, i. e. Sindh, Balochistan and NWFP at least for five years. It will be more meaningful if the estimate were carried out at the same time in all Provinces with the same methodology.

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