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WINTERING POPULATION OF HOUBARA BUSTARD IN PUNJAB, PAKISTAN (2002–2003)

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Abstract. The Houbara Bustard population in three Localities of Punjab (Rajanpur-Rojhan, Thal and Cholistan) was surveyed in November 2002 and 2003. The population of Houbara in Punjab was estimated to comprise of 4,393 birds with a density of 0.136 ± 0.005 birds/km² in 2002 and 3,813 birds with a density of 0.118 ± 0.005 birds/km² in 2003. The population in 2003 was 13.2% smaller and 14.5% less dense than in 2002. Population size and density data of a number of other studies carried out on the Houbara in the recent past in the same areas were compared. Houbara habitat in Punjab has been shrinking, degraded and converted into agricultural fields.

Key words: Houbara Bustard, *Chlamydotis macqueenii*, number, population density, habitat, conservation.
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Зимняя популяция джека в Пенджабе, Пакистан (2002–2003). - М.С. Надим, Т. Махмуд, М. Асиф. - Беркут. 19 (1-2). 2010. - Пакистан является одним из основных мест зимовки джека. Численность вида изучалась на трех участках в штате Пенджаб (Раджанпур-Роджхан, Тал и Холистан) в ноябре 2002 и 2003 гг. Учеты проводились с автомобиля на трансектах длиной 10 км и шириной по 250 м в обе стороны. Трансекты закладывались методом случайного выбора в различных пригодных биотопах. По полученным данным рассчитывались численность и плотность населения. Общая численность джека в Пенджабе была оценена в 4393 птицы в 2002 г. и 3813 птиц в 2003 г. Местообитания вида в Пенджабе находятся под угрозой из-за деградации и освоения для сельского хозяйства.

Introduction

The Asian Houbara Bustard, previously considered as a subspecies *Chlamydotis undulata macqueenii*, has been recently proposed the status of a species *Chlamydotis macqueenii* (Knox et al., 2002). This steppe and desert dwelling bird ranges from Mongolia to the Arabian Peninsula through Central Asia (Collar, 1980; Del Hoyo et al., 1997; Goriup, 1997). Its total population is estimated to range from 39,000–52,000 birds of which 30,000–40,000 breed in Kazakhstan, 6,000–9,000 in Uzbekistan, over 500 birds in Turkmenistan and as many again in China (Goriup, 1997). The situation of the Mongolian population is not clear (Goriup, 1997). Decline in the wintering populations of the Houbara has been rapid in almost all the regions for which reports are available and now it is considered much smaller than it was 10–12 years ago. An average of 27–30% annual decline, both in relative abundance and density, has been reported for China, Kazakhstan, and Oman (Tourenq et al., 2005).

Pakistan is one of the main wintering areas of the Houbara and one of the countries where

hunting and poaching risks are great. Until the mid 1980s, the number of the Houbara killed by falconers in Pakistan varied from 3,000 and 7,000 birds per year (Goriup, 1997). Mian and Dasti (1985) and Mian (1984) reported that in 1982–1983, 5,000 to 6,000 birds were hunted in Balochistan alone. Houbara Bustard is also heavily trapped, in Pakistan, and sent to the Arabian Peninsula for falcon training purposes (Bailey et al., 1999). The number of the Houbara taken by trappers in Pakistan has been estimated to range from 3,000 to 14,000 birds per annum (Goriup, 1997; Bailey et al., 1998). United Arabs Emirates alone received 7,000 poached Houbara from Pakistan (Bailey, pers. comm.). Combreau et al. (2001) suggested that 73.5% mortality in adult breeding Houbara in Kazakhstan and China was due to high hunting and poaching pressure in its wintering grounds. The severe hunting pressure to which Houbara has been exposed during the last thirty years along with harsh climate in its range and low breeding success (less than 20% probability of one egg to produce a two month old fledging chick (Lavee, 1988; Combreau et al., 2002)) has significantly led to the decline in its population.

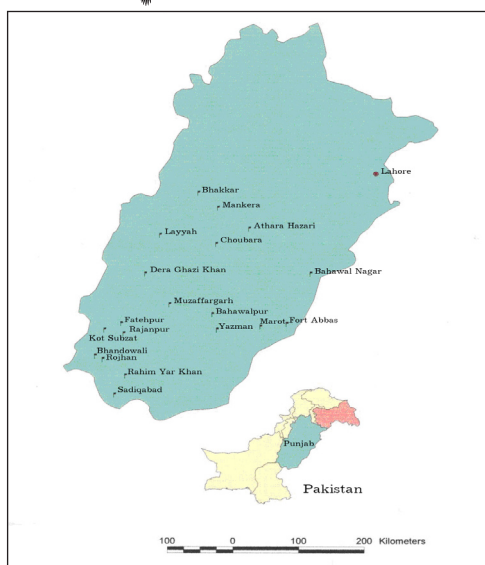


Fig. 1. Study area.

Рис. 1. Район исследований.

In the Punjab province of Pakistan, the total wintering habitat of Houbara Bustard approximates 32,300 km²; Rajanpur/Rojhan component contributes some 4,600 km² (14.2%), Thal 4,800 km² (14.9%), and Cholistan 22,900 km² (70.9%) (Nadeem et al., 2004). These three sub-habitats have somewhat different vegetation cover mainly due to difference in topography, and extent of disturbance and utilization by the human population (Dasti, Agnew, 1994).

The present study was undertaken to know the actual status of the wintering population of Houbara Bustard and how did it compare with the previous estimates of its population in Punjab.

Material and Methods

Study Area

Thal (Choubara, Mankera, Athara Hazari, Muzaffargarh) and Cholistan (Sadiqabad, Rahim Yar Khan, Yazman, Fort Abbas), lying between 69–70°E and 28–32°N, are the main arid lands of the Punjab province of Pakistan (Fig. 1). Sand dunes are common in these deserts. The climatic conditions are severe being very

arid and subject to extreme temperatures. In summer strong hot winds with sand are common and maximum temperature frequently rises loaded beyond 45 °C in May and June. During winter the temperature occasionally falls to the freezing point in late December and January. The rain is erratic and the annual fall averages about 120 mm. Periods of increased precipitation and drought of varying length are not uncommon. In Thal, the soils are dense and saline-alkaline, while in Cholistan alkalination is relatively less frequent (FAO/UNESCO/WMO, 1962; National Range Management Committee, 1973).

The natural vegetation patterns of Thal and Cholistan seem to be not different. Rather, vegetational variations are related to topography, disturbance and utilization by the human population. The inhabitants lead a nomadic life moving in search of better water resources and pastures for their livestock (Dasti, Agnew, 1994). The desert areas particularly those at the periphery and close to irrigation canals have been cultivated (Akbar, Arshad, 2000).

The Rajanpur-Rojhan area falls in the tropical thorn forest zone of the southern part of Dera Ghazi Khan, an arid trans-Indus district of Punjab. As a result of cultivation the forest is receding. Uncultivated saline flats, however serve as its mainstays.

Population Estimates

Population estimates of the Houbara were obtained using the simple strip method. The birds found on the transects, 10 km long and 500 m wide (250 m wide on both sides of the median census line), were counted while driving a 4 × 4 motorized vehicle on the control line at a low speed (10–20 m/h) through the entire length of the transects. The transects were taken randomly at different potential habitats. Survey time was from sunrise to 11 am and from 3 pm to sunset. Presence of indirect clues such as footprints, droppings and feathers were noted on both sides of the census line. The Houbara camouflaged so effectively that often radio-trackers could not detect the tagged individuals visually until they betrayed



their presence by leaving the hiding place suddenly from a close distance (Nadeem et al., 2003). Thus the possibility of missing some of the birds during census could not be ruled out. In order to minimize this deficiency fresh footprints present at a given place were taken into consideration by counting just one bird provided the prints looked fresh, had not been treaded by any insect, reptile or any other animal. In case just a single Houbara was sighted within 250 m of the fresh footprints it was not considered for count. However, if per chance two or more birds were noted within 250 m, the sighted birds replaced the one bird counted on the basis of footprints. The data thus collected were analyzed employing standard statistics following Tanner (1978) and Maan et al. (1999).

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

Total population estimates, $P = DA$.

Where: n = number of Houbara groups observed;

g – mean group size;

$2W$ – width of transect on both side of the median line;

L – total length of all the transects;

A – total area of habitat.

Results

Habitat

The dominant plant species of the Rajanpur-Rojhan component of the study area were *Dipterygium glaucum*, *Calligonum polygonoides*, *Prosopis cineraria*, *Cymbopogon jwarancusa*, *Lasiurus scindicus*, *Capparis decidua*, *Aerva javanica* and *Haloxyton salicornicum*. Among the sub-dominant species were *Farsetia hamiltonii*, *Ochthochloa compressa*, *Stipagrostis plumosa*, *Fagonia indica* and *Tribulus longipetalus*. *Suaeda fruticosa*, *Echinochloa colona*, *Corchorus depressus* and *Pennisetum divisum* were not common. Cultivated *Brassica* spp. and *Sorgham bicolor* in combination with the natural vegetation served as the preferred feeding patches.

In Rojhan, the vegetation looked healthier and greener than the Rajanpur area. The shrubs

of *Capparis decidua* were full of fruits and the Houbara hanged around in the vicinity of these plants. Trapping was common in Rojhan as it constituted a part of the tribal belt where the writ of the Wildlife Department was less effective.

In Thal, trapping of Houbara was not common instead hunting pressure was high. Feathers of the Houbara often with empty cartridges were noted in Choubara, Mankera and Athara Hazari. Most of the prime habitat of Houbara in Muzaffar Garh was not available for the census as exercises of the army were going on there. For this reason just a few transects were available for the survey. The Choubara and Mankera areas had been allocated to Saudi but they had not hunted there for the past several years. However, illegal parties from Qatar hunted here in collusion with the local bureaucracy. Athara Hazari and Muzaffar Garh area's which had been allocated to UAE, were hunted regularly for the Houbara.

The dominant plants of the Thal area were *Calligonum polygonoides*, *Aerva javanica*, *Cymbopogon jwarancusa*, *Dipterygium glaucum*, *Leptadenia pyrotechnica*, *Haloxyton salicornicum*, and *Fagonia indica*. The sub-dominant species comprised *Ochthochloa compressa*, *Cenchrus biflorus*, *Farsetia hamiltonii*, *Salsola baryosma*, *Calotropis procera*, *Salvadora oleoides* and *Crotalaria burhia*. *Prosopis cineraria*, *Acacia nilotica*, *Heliotropium crispum*, *Sonchus oleraceus* and *Ziziphus mauritiana* were sparsely distributed.

Thal area is rich in sand dunes of varying heights. Some of the dunes had been cultivated and sowed with chickpea (*Cicer arietinum*) by the locals. There occurred some patches of thick vegetation between the dunes and in low-lying areas. Houbara preferred to feed on the chickpeas but the disturbance that attended the agricultural activities forced them to less attractive areas. However, they appeared to not miss a chance of exploiting the food resources of the chickpea patches. Appropriation of land for agriculture is a serious threat to the wintering habitat of the Houbara.

In Cholistan the dominant plant species were *Dipterygium glaucum*, *Cymbopogon*



Photo 1. Houbara Bustard in Rahim Yar Khan.
Фото 1. Джек в Рахимъярхане.



Photo 2. Fresh footprints of Houbara Bustard.
Фото 2. Свежие следы джека.

jwarancusa, *Aerya javanica*, *Calligonum polygonoides*, *Lasiurus scindicus*, *Haloxylon salicornicum*, *Suaeda fruticosa*, *Haloxylon recurvum*, *Capparis decidua*, and *Fagonia indica*. The sub-dominant species consisted of *Indigofera argentea*, *Farsetia hamiltonii*, *Cressa cretica*, *Leptadenia pyrotechnica*, *Salsola baryosma* and *Tribulus longipetalus*. *Amaranthus viridus*, *Blepharis ciliaris*, *Blepharis scindica*, *Corchorus capsularis*, *Echinochloa frumentacea*, *Ziziphus numularia* and *Tephrosia uniflora* were rare.

Population Size and Density

The estimates of size and density of the wintering population of the Houbara (Photo 1–4) made in the November of 2002 and 2003 in the Rajanpur-Rojhan, Thal and Cholistan areas of the Punjab are given in Table 1. The Cholistan habitat being larger in size, harbored

about 71% of the total Punjab population of the Houbara in 2002 and 2003. The Rajanpur-Rojhan and Thal areas shared the remaining population in approximately equal proportions. Thal was relatively sparsely populated than were the other two areas both in 2002 and 2003. In 2003 all the three areas evidenced lower densities averaging to 0.118 birds per km² as compared to 0.136 of the previous year (Table 1, Fig. 2).

Figure 2 depicts the density estimates based on bird sighting plus footprints, and sighting alone. The footprint counts formed 36% and 42% of the total density estimates for 2002 and 2003 in Rajhanpur-Rojhan area, 56% and 64% in Thal area, 59% and 53% in the Cholistan area. This seems to suggest that in the latter two areas the Houbara camouflage was more effective than in the Rajanpur-Rojhan area.



Photo 3. Houbara Bustard in Choubara.
Фото 3. Джек в Чаубаре.



Photo 4. Houbara Bustard in Fort Abbas area.
Фото 4. Джек в районе Форт Аббаса.



Estimates of the size and density of the Houbara Bustard population in Punjab in November of 2002 and 2003
 (The estimates were compared after limping sighting and footprint data)
 Оценки численности и плотности популяции джека в Пенджабе в ноябре 2002 и 2003 гг. (по встречам птиц и следам)

Census area	Total available area of habitat (km ²)	2002				2003			
		Area of transect censuses, km ² (No. transect)	Birds recorded (Birds sighted)	Density per km ² of transect area (± SE)	Population size in available habitat	Area of transect censuses, km ² (No. transect)	Birds recorded (Birds sighted)	Density per km ² of transect area (± SE)	Population size in available habitat
RAJANPUR-ROJHAN									
Rajapur	3000	190 (38)	21 (15)	0.111 (0.020)	333	155 (31)	19 (13)	0.123 (0.026)	369
Rojhan	1600	110 (22)	20 (11)	0.182 (0.040)	291	145 (29)	19 (9)	0.131 (0.030)	210
Overall	4600	300 (60)	41 (26)	0.136 (0.016)	624	300 (60)	38 (22)	0.126 (0.017)	579
THAL									
Choubara	1632	120 (24)	14 (8)	0.117 (0.032)	191	120 (24)	11 (5)	0.092 (0.028)	150
Mankera	1270	70 (14)	10 (4)	0.143 (0.052)	181	70 (14)	9 (3)	0.129 (0.050)	164
Athara Hazari	1036	95 (19)	15 (7)	0.158 (0.043)	163	95 (19)	14 (5)	0.147 (0.042)	152
Muzaffargarh	862	70 (14)	6 (1)	0.086 (0.041)	74	65 (13)	5 (1)	0.076 (0.037)	66
Overall	4800	355 (71)	45 (20)	0.127 (0.015)	609	350 (70)	39 (14)	0.111 (0.013)	532
CHOLISTAN									
Sadiqabad	2098	110 (22)	11 (6)	0.100 (0.031)	209	125 (25)	10 (4)	0.080 (0.028)	168
Rahim Yar Khan	7953	305 (61)	52 (14)	0.170 (0.019)	1352	250 (50)	33 (13)	0.132 (0.021)	1050
Yazman	10857	320 (64)	39 (21)	0.122 (0.015)	1324	270 (54)	30 (16)	0.111 (0.017)	1205
Fort Abbas	1992	145 (29)	20 (9)	0.138 (0.030)	275	150 (30)	21 (11)	0.140 (0.029)	279
Overall	22900	880 (176)	122 (50)	0.138 (0.008)	3160	795 (159)	94 (44)	0.118 (0.008)	2702
Total Punjab	32300	1535 (307)	208 (96)	0.136 (0.005)	4393	1445 (289)	171 (80)	0.118 (0.005)	3813

Table 1

Table 2

Temporal changes in the habitat size, population size and density of wintering Houbara population in the Punjab
Изменения площади биотопов, численности и плотности населения зимующей популяции джека в Пенджабе

Year	Habitat size (km ²)			Population size, ind.			Density per km ²				Reference		
	Rajanpur-Rojhan	Thal	Cholistan	Total	Rajanpur-Rojhan	Thal	Cholistan	Total Punjab	Rajanpur-Rojhan	Thal		Cholistan	Average Punjab
1991	9,600	10,900	27,000	47,500	1,174	567	1,810	3,551	0.176	0.058	0.075	0.075	Mian et al., 1997
1993	6,500	4,800	22,934	34,234	962	840	3,187	4,989	0.148	0.175	0.139	0.146	Chaudhry, 1994
1999	4,600	4,800	22,900	32,300	496	625*	3,733	4,854	0.108	0.166	0.163	0.152	Nadeem et al., 2004
2000	4,600	4,800	22,900	32,300	426*	662	3,641	4,729	0.142	0.138	0.159	0.150	Nadeem et al., 2005a
2001	4,600	4,800	22,900	32,300	685	672	3,389	4,746	0.149	0.140	0.148	0.147	Nadeem et al., 2005b
2002	4,600	4,800	22,900	32,300	624	609	3,160	4,393	0.136	0.127	0.138	0.136	Present study
2003	4,600	4,800	22,900	32,300	579	532	2,702	3,813	0.126	0.111	0.118	0.118	Present study

* Sub-area Athara Hazari of Thal (1036 km²) in 1999 and sub-area Rojhan of Thal Thomi (1600 km²) in 2000 could not be surveyed on account of logistic and administrative constraints.

Discussion

The data of this study show that Cholistan, being the largest wintering ground in Punjab, harbored a much larger population of Houbara than did the other two areas. The size of the habitat available to Houbara in Punjab has been shrinking from 47,500 km² in 1991 to 34,234 km² in 1993, and by 1999 it was reduced to 32,300 km² (Chaudhry, 1994; Mian et al., 1997; Nadeem et al., 2004). As such the Houbara habitat in 1999 was about 31% smaller than it was in 1991. After 1999, information about the size and quality of the bird's habitat in Punjab seems to have been not updated. In our study too the size of the habitat has been shown to be the same as it was in 1999. But in view of the allotment of land, especially in Cholistan, to the locals for agricultural purpose (Akbar, Arshad, 1999) must have significantly changed the extent and quality of the habitat of Houbara in Punjab. Authentic information regarding these aspects of the Houbara habitats is indispensable for obtaining reliable estimates of its population size.

The density of the Houbara population of Rajanpur-Rojhan, Thal and Cholistan varied widely in 1991, 1993 and 1999 (Table 2). In 1991, the Rajanpur-Rojhan area was more densely populated than were the other two areas. In 1993, Thal was better populated than were the other areas. In 1999, the inter-area density picture was just the opposite of what it was in 1991. Such inter-area variations may be attributed to local climatic conditions and ecological opportunities (Goriup, 1997).

During the period extending from 1999 through 2003, the Houbara population of Punjab was censused by the same set of workers using the same methodology, while the size of the habitat had remained unchanged. During this



period, the average density and the size of the wintering population of Houbara generally declined with a slight acceleration in 2002 and 2003 (Table 2). The decline was perhaps due to the destruction and deterioration of the habitat. But, in order to have a better assessment of the situation we need to have a true picture regarding the size and quality of the habitat that was actually available to the Houbara. We do not know whether our method of sampling was an improvement over the ones that had been used in the past. What we know is the fact that a census method must be dependable and efficient in providing more accurate information about the parameter. We believe that by including fresh footprints in our counts we have made our census data more realistic.

However, we must point out that had we not included the footprints in our counts a grim picture of the status of the wintering population of Houbara in Punjab would have emerged.

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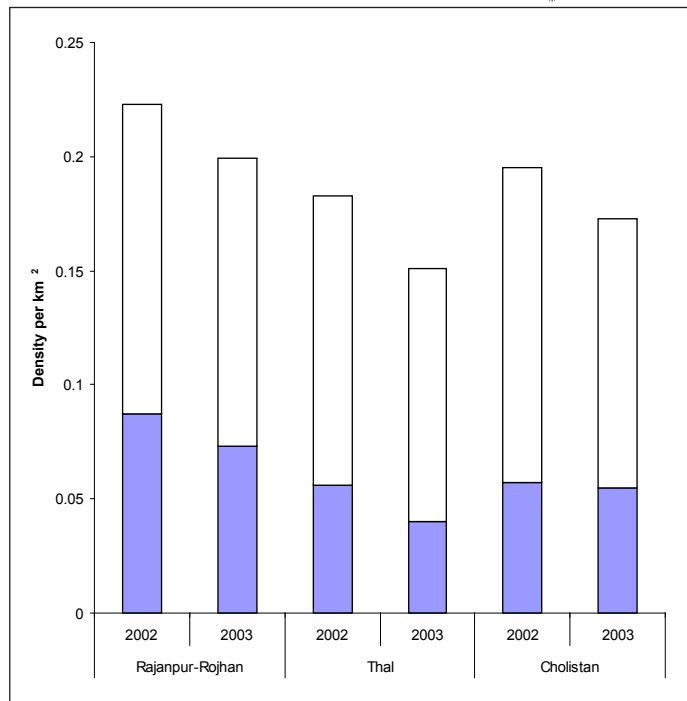


Fig. 2. Density of the wintering population of the Houbara Bustard in three areas of Punjab (ind./km²).

The shaded bars depict the density estimates based on sightings only while the total bars are based on sighting plus fresh footprints.

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Чернецов Н.С. Миграция воробьиных птиц: остановки и полет. М.: КМК, 2010. 173 с.

В последние десятилетия развернулись довольно интенсивные исследования экологии и поведения мигрирующих птиц на остановках, но монографических обобщений их результатов до сих пор не было. Книга Н.С. Чернецова восполняет этот пробел.

Автор обобщил и проанализировал результаты многолетнего изучения миграций воробьиных птиц, прежде всего дальних ночных мигрантов. В основу книги положен обильный материал, собранный на Куршской косе и на двух стационарах в оазисах. Оказалось, что многие устояв-

шиеся представления об энергетике и регуляции миграций требуют пересмотра. Так, и полевые, и экспериментальные данные показали, что энергетическая цена миграционного полета существенно ниже, чем принято считать. Широкая вариация скорости накопления жира на остановках – не артефакт, а реально существующее явление. Весьма значительное место Н.С. Чернецов уделил разбору и критике теории оптимальной миграции. Автором предложена качественная модель поведения мигрирующих воробьиных птиц.

Книга будет весьма интересной для орнитологов, изучающих миграции, да и не только для них.

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