

Current Status of the Great Bustard *Otis tarda* in Boukan, West Azerbaijan, Iran

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Abstract: The population status of the Great Bustard *Otis tarda* was assessed in three regions of Boukan, West Azerbaijan Province, Iran, from 2002 to 2008. Surveys were undertaken in the Sootav, Yenggija-Albelaq and Qazlian plains. An increase in numbers was recorded at Sootav plain, while little change was observed in the Yenggija-Albelaq plain during this period. The Qazlian plain seems to be less important than the other two areas. The mean maximum density per 10 square km was 2.26 ± 0.41 ($N=23$) in Sootav, 5.12 ± 0.98 ($N=18$) in Yenggija-Albelaq and 4.08 ± 1.43 ($N=11$) in Qazlian. Based on these observations, the current number of Great Bustards in these areas is estimated to be about 35–40 individuals, and shows a dramatic decline since the last decade. Without effective conservation measures, the species may face extinction in Iran.

Keywords: Great Bustard, *Otis tarda*, population, status, West Azerbaijan, Iran.

INTRODUCTION

The Great Bustard *Otis tarda* occurs in highly fragmented populations across the Palearctic region, from the Iberian Peninsula and Morocco, eastwards to China (del Hoyo *et al.* 1996, Alonso *et al.* 2000, 2003). During the last two centuries, its Palearctic distribution has decreased due to habitat changes caused mainly by agricultural transformation and development of human infrastructure, but also by hunting pressure (Collar 1985, del Hoyo *et al.* 1996, Chan & Goroshko 1998, Palacin & Alonso 2008). This might cause a rapid population decline equivalent to more than 30% in the next decade (BirdLife International 2004). The world population is estimated to be between 43,500 and 51,200 individuals, of which *c.*60% occur in Spain (Palacin & Alonso 2008). The overall population trend is believed to be declining worldwide as a consequence of the intensification of agriculture and, in some places, hunting and expansion of infrastructure (Palacin & Alonso 2008). Currently, it is considered as Vulnerable (Vu) in the Red List

of Threatened Species (BirdLife International 2008).

In Iran, the species occurs in the western parts of the country, from the northern provinces to Kermanshah in the central west (Scott 1971, Kahrom 1979, Cornwallis 1983, Razdan & Mansoori 1989, Amini-Tareh 2000). Great Bustards have been reported in 21 areas in the western provinces of Iran: seven in West Azerbaijan, one in East Azerbaijan, five in Kurdistan, seven in Kermanshah, and one in Hamadan (Amini-Tareh 2000). In West Azarbaijan Province, three regions, namely Khaki, Sootav plain and Behi-e Boukan, have been reported as suitable habitat for this species and are located in the Boukan area (Amini-Tareh 2000).

Habitat destruction and hunting have caused a sharp decline in the Great Bustard population in Iran in recent decades and the species has disappeared from a majority of the locations in which it has been recorded in the past (Amini-Tareh 2000, Barati & Amireifar 2008). Currently, some areas in the Boukan region in West Azerbaijan seem to be the most important refuges for the Great Bustard in Iran (supported

by A. A. Amerifar, pers. comm. and A. B., pers. obs. in recent years). However, updated information on the status of the species in this region is scarce. The principal areas are the Sootav plain, Yengija-Albolaq plain, Qazlian plain, Sekaniyan plain and Khaver Zamin plain. Of these five areas, only the Sootav plain has been declared a No-Hunting Area and the other areas do not receive any formal protection. In the present study, we investigated the status of the Great Bustard at three important localities in the Boukan area, Sootav plain, Yenggija-Albolaq plain and Qazlian plain, from 2002 to 2008.

STUDY AREAS AND METHODS

This survey was carried out in three plains in

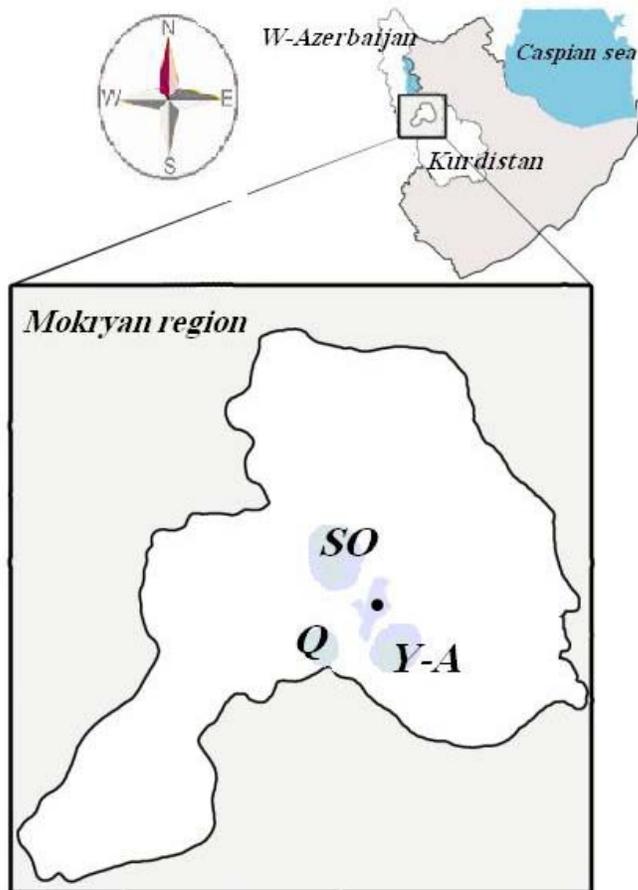


Figure 1. Location of three survey areas in Boukan, West Azerbaijan Province, northwestern Iran (So: Sootav, Q: Qazlian and Y-A: Yengija-Albolaq).

the Boukan area in Mokryan region (Babani 1998) in the south of West Azerbaijan Province, Iran, namely Sootav, Yenggija-Albolaq and Qazlian plains (Fig. 1). Sootav plain (36°33'–36°37'N, 46°08'–46°12'E; c. 44 square km, 1,410 m a.s.l.) lies 4 km north of the city of Boukan. Yenggija-Albolaq plain (36°26'–36°28'N, 46°13'–46°17'E; c. 21.7 square km, 1,465 m a.s.l.) is located east and southeast of Boukan between Yenggija and Albolaq villages. Qazlian plain (36°28'–36°30'N, 46°08'–46°10'E; 9.8 square km, 1,330 m a.s.l.) is located 4 km southwest of Boukan. The coordinates were measured by GPS.

All three plains are almost entirely cultivated with cereals (mainly wheat *Triticum aestivum* and barley *Hordeum vulgare*) and legumes (chick-pea *Cicer arietinum* and lentil *Lens culinaris*). Some minor crops are alfalfa *Medicago sativa*, clover *Trifolium* sp. and oilseeds. About 10% of the plains remain natural grasslands. The climate is characterised as dry with hot summers and cold winters. According to data from the Meteorology Organization of Iran, the mean annual temperature and rainfall are 13.2°C and 370.2 mm, with most rainfall occurring from November to May.

Great Bustard surveys were conducted from 2002 to 2008. Observations were made in the morning (07:00–09:00) or afternoon (17:00–19:00), at least four times a month. All observations were made with 10×40 Bushnell binoculars or a 20–60× telescope. All tracks accessible by car were covered in each survey, and observations were also made from the adjacent hills. The types of crops and changes in agricultural activities were recorded wherever possible. The maximum number of Great Bustards observed was noted for each month, season and year. Variations in bird density were calculated on the basis of mean number of Great Bustards per 10 square km. The One-way ANOVA test was performed for comparison of the mean densities in the three areas.

RESULTS

Seasonal variations in the maximum numbers of Great Bustards from 2002 to 2008 are presented in Table 1. Most of the observations occurred in spring and autumn (Table 1). The mean maximum density per 10 square km in Sootav was 2.26 ± 0.41 ($N=23$), in Yenggija-Albelaq 5.12 ± 0.98 ($N=18$) and in Qazlian 4.08 ± 1.43 ($N=11$) (Table 1). The One-way ANOVA test showed that the difference between the areas was significant ($F_{2,49}=3.479$, $P>0.05$; Table 1). According to our observations, Sootav and Yenggija-Albelaq plains are important breeding areas for Great Bustards. Although some fluctuations were observed, the maximum number of birds showed little change up to 2007 (Table 1, Fig.

2). The highest number of birds seen in a single observation was 33 individuals in the Yenggija-Albelaq area in autumn 2008 (Table 1). Qazlian had fewer birds than the other areas especially during 2005–2007. Table 2 presents the monthly records of Great Bustards at Sootav plain in 2002–2007, while the observations in 2008 are summarized in Figure 3. Based on these observations, the current number of Great Bustards in these areas is estimated to be about 35–40 individuals. In the Yenggija-Albelaq area, little fluctuation was found in bird numbers except in 2008 when the highest numbers were recorded. Our observations suggest that the Yenggija-Albelaq plain is the main area used by Great Bustards in the autumn (Table 1).

Table 1. Seasonal variation in the maximum number of Great Bustards observed in three areas of Boukan, Mokryan region, West Azerbaijan, Iran, in 2002–2008.

Location	Season	2002	2003	2004	2005	2006	2007	2008
Sootav	Winter	-	0	-	-	0	1	7
	Spring	8	10	6	21	21	19	23
	Summer	2	9	6	7	1	5	12
	Autumn	0	9	10	-	-	27	25
Yenggija-Albelaq	Winter	-	0	-	-	-	-	-
	Spring	8	0	5	-	-	-	-
	Summer	9	3	9	6	7	2	12
	Autumn	12	25	14	23	18	14	33
Qazlian	Winter	-	0	-	-	-	-	13
	Spring	0	0	-	-	-	-	-
	Summer	5	0	4	-	-	-	11
	Autumn	0	-	5	-	-	-	6

Table 2. Monthly numbers of Great Bustards observed in Sootav plain, Mokryan region, West Azerbaijan, Iran, in 2002–2007.

Month	2002	2003	2004	2005	2006	2007
January	-	0	-	-	0	-
February	-	0	-	-	0	-
March	-	0	-	-	0	1
April	8	10	4	21	21	19
May	8	10	6	18	-	7
June	4	2	6	5	-	-
July	2	2	4	6	1	3
August	1	2	6	7	-	5
September	-	9	6	-	-	-
October	-	9	10	-	-	5
November	-	6	2	-	-	27
December	-	-	-	-	-	21

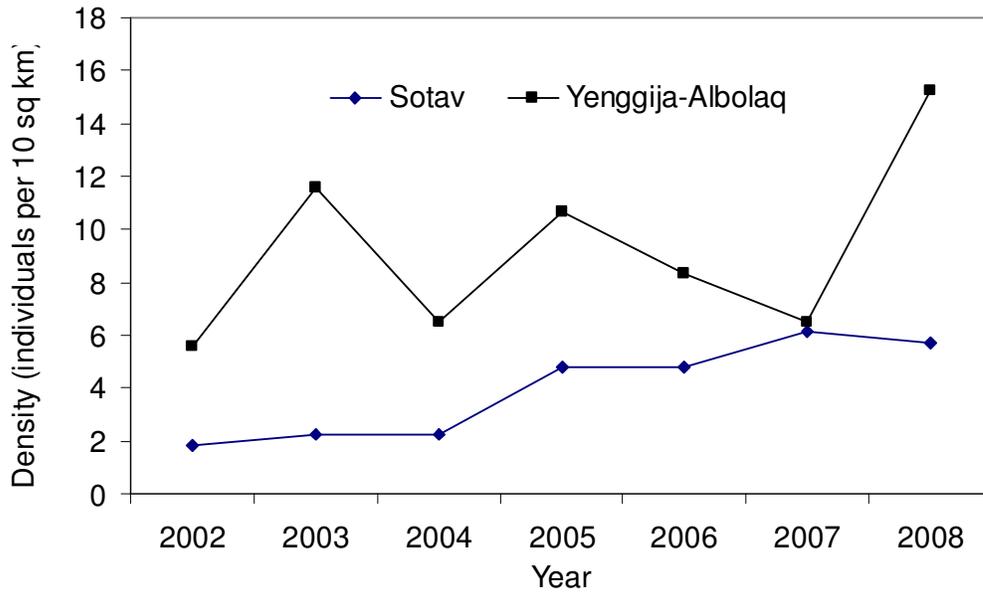


Figure 2. Variation in the maximum density of Great Bustards in Sootav and Yenggija-Albolaq plains (2002–2008).

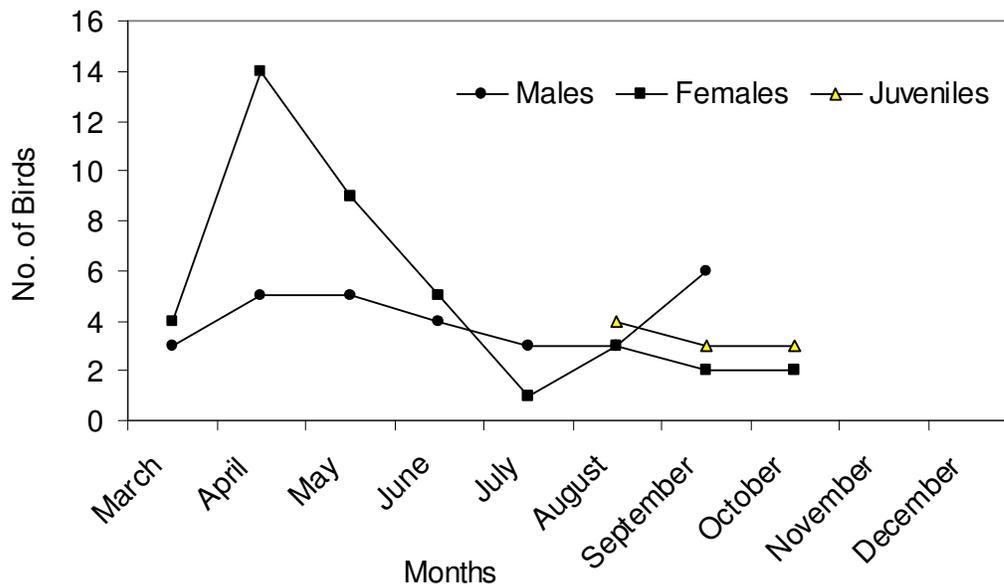


Figure 3. Monthly variation in the number of Great Bustards observed in Sootav Plain, West Azerbaijan Province, Iran, in 2008.

DISCUSSION

In recent decades, plains in the Boukan area have been favourable habitat for Great Bustards (Amini-Tareh 2000). Observers in the past decades have reported about 100–200 individuals in the Boukan plains (Boukan

Office of the Department of the Environment (DOE), unpubl. data), but the population has declined to the current low numbers mainly due to hunting and habitat destruction. However, the Boukan plains are still the most important habitat for this species in Iran based on unpublished data of the DOE surveys and

personal observations of the authors. Meanwhile, the current surveys have shown a slight rise in the maximum numbers in Sootav plain. This increase is possibly due to the continuous monitoring of this habitat by game wardens of the Department of the Environment.

Sootav plain differs from the other studied areas in that it is mostly covered by dry cereal crops (Fig. 4) and human disturbance is lower. However, even here mechanization of agriculture and irrigation pose threats to the habitat, and loss of habitat quality is imminent (personal observation). It is possible that the populations of Great Bustards move between the three habitats, and future studies should focus on this aspect. The lower numbers of Great Bustards in winter suggest that Sootav plain is mainly summer habitat and that the birds migrate to other regions in winter. Observations have shown that Sootav plain is an important breeding area for the Great Bustard. The lower maximum number of birds in winter in this area compared with Qazlian plain is possibly related to lower food resources, as there are less alfalfa fields in the Sootav plain.



Figure 4. Great Bustards in Sootav plain, Boukan in spring 2008 © R. Abdulkarimi.

In Yenggija-Albelaq, birds can easily use the alfalfa and clover farms as a food source in autumn. Further, the annual decrease in human presence at the end of agricultural activities in this plain in autumn could explain the higher bustard density here. Incidentally, the yearly decrease in bustard numbers in spring coincides with the beginning of agricultural activities and human presence. Traditional farming (dry cultivation) has helped in preserving this plain

as suitable habitat for the Great Bustard and has ultimately favoured population growth. However, disturbance in the form of urban expansion, especially in the southwest and northwest of the plain, continues to be the main threat.

Qazlian seems to be less important than the other two plains. However, Great Bustards have been observed in this area in recent years. It is possible that a part of the breeding population has moved from Qazlian to Sootav, as the DOE rangers continuously patrol and guard Sootav plain and thus provide for a more secure habitat. Dry cultivation has been common in this plain in the past, but in recent years modern irrigated agriculture is on the rise. Observations suggest that Qazlian may be important in winter probably due to the lower altitude of this plain. Increase in the mechanization of agriculture and consequently rising human presence is probably the main cause of the decline in bird numbers in Qazlian plain.

The observed positive changes in the maximum numbers and density of Great Bustards in all the three plains combined could be related to recent efforts by the DOE and other organizations such as NGOs in Boukan District. These efforts have reduced human presence in the bustard habitat. Another important step in the conservation of Great Bustards has probably been the prevention of hunting in collaboration with landowners in the surveyed areas, particularly during the breeding season.

Since Great Bustard populations have decreased in many parts of their range in Iran (Amini-Tareh 2000, Barati & Amerifar 2008), the plains of Boukan have become the most important habitat for this species in Iran. The maximum number of birds observed during the present study in Sootav plain (27 in autumn 2007) is markedly lower than the 60 individuals recorded in winter 1994 by Amini-Tareh (2000). Despite the recent rise in the numbers of birds observed, the overall population has significantly decreased, when compared to the 60 breeding females and 200–300 wintering birds reported for western Iran during the 1992–94 period (Amini-Tareh 2000). We consider it likely that the main cause of population decline in these areas is the expansion of irrigated agriculture systems especially in the breeding season, which results in habitat destruction as

well as an increase in human presence and the resulting disturbance. Changes in farming practices have also been shown to be the most important factor affecting Great Bustard habitat in Kurdistan province (Barati & Amerifar 2008).

Detailed surveys of the breeding population and reproductive ecology and factors affecting breeding output must be carried out to understand the problems bustards face and to prevent disturbance during the breeding season. The patterns of movement of Great Bustards within their current distribution in Iran remain unknown and should also be investigated in future studies.

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