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Research article/Araştırma makalesi

The study on the population of Great Bustard (*Otis tarda*) in Altıntaş plain, Kütahya/Turkey

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Abstract

The Great Bustard (*Otis tarda*) is the biggest species in the western Palearctic species of the Otididae and the Male Great Bustard (*Otis tarda*) is one of the heaviest flying birds. The species is globally threatened species classified as "Vulnerable" by IUCN (IUCN, 2012) and is listed in the CİTES appendix II. In brief The Great Bustard (*Otis tarda*) world population is estimated to be 44.054–57.005 individuals in 2010, of which about 57-70% occur in Spain. Turkey occurs only 1-2% of world population.

Between March 2010-October 2011 and March-May 2012 censuses of Great Bustards (*Otis tarda*)population was carried out in Altıntaş Plain Wildlife Development Area, Kütahya, Turkey. The total numbers of birds counted during 3 breeding, 2 summer and 1 wintering period as a result of field survey including a total of 20 months was 8 individuals (2 males, 5 females and 1 second year male) in 1 lek area. In survey area important threats to the population include use of pesticides and rodenticide, collision with power lines, habitat loss through infrastructural changes (construction of a motorway and airway), disturbance in breeding areas and illegal hunting. Therefore, immediate conservation actions are urgently required to save this extremely endangered population from extinction.

Key words: *Otis tarda*, Great Bustard, Otididae, Turkey

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Kütahya/Altıntaş ovasındaki Büyük Toy Kuşu (*Otis tarda*)'nun populasyonu üzerine bir çalışma

Özet

Büyük toy kuşu (*Otis tarda*), Otididae familyasının Batı Palearktik de bulunan türlerinden en büyük olanıdır ve erkek toy kuşu, uçabilen en ağır kuşlardan biridir. Bu tür, Küresel Tehlikedeki Kuşlar Listesi'nde (IUCN, 2011) Hassas 'Vulnerable' ve Bern sözleşmesinde EK-II statüsündedir. Toy kuşunun dünya populasyonu, şu anki tahminlere göre 44.054 ile 57.005 birey arasındadır ve en geniş populasyon İspanya'dadır (% 57-70). Türkiye ise dünya populasyonunun % 1-2' sini barındırmaktadır.

Büyük toy kuşu populasyonunun sayımları Mart 2010-Ekim 2011 ve Mart-Mayıs 2012 tarihleri arasında Kütahya ili Altıntaş ilçesinde bulunan Yaban Hayatı Geliştirme Sahası içinde gerçekleştirildi. 3 üreme dönemi, 2 yazlama ve 1 de kışlama dönemi olmak üzere toplamda 20 aylık arazi çalışmaları sonucunda, 1 toplanma (Lek) alanı içinde toplam 8 (2 erkek, 5 dişi ve 1 iki yaşında erkek) birey tespit edildi. Çalışma alanı içinde bu türü tehdit eden faktörler arasında pestisit ve rodentisit kullanımı, elektrik hatları ile çarpışmalar, altyapısal değişikliklerle (anayol ve havaalanı inşaatı) habitat kayıpları-kesikliliği, üreme alanları içindeki insan kaynaklı huzursuzluk ve yasadışı avcılık büyük öneme sahiptir. Bu nedenle, alanda yaşayan ve son derece tehlike altındaki bu populasyonun devamı için acil olarak koruma önlemleri alınması gerekmektedir.

Anahtar Kelimeler: *Otis tarda*, Büyük Toy Kuşu, Otididae, Türkiye

1. Introduction

The great bustard (*Otis tarda*) is the biggest species in the western Palearctic species of the Otididae and the Male Great Bustard (*Otis tarda*) is one of the heaviest flying birds(Anonim, 2004). The species is a globally threatened species, classified as "vulnerable" under current IUCN conservation criteria (Alonso et al., 2003; IUCN 2012; Kılıç

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and Karakaş, 2005) and is listed in the CİTES appendix II. During the last two centuries its Palaearctic distribution range has decreased due to habitat changes caused mainly by agricultural transformations and human infrastructures, Hunting, (Alonso et al., 2003; Kılıç and Karakaş, 2005), Modernisation of agriculture and irrigation methods and using pesticides, rodenticides and insecticides (Karakaş and Akarsu, 2009; Kılıç and Karakaş, 2005). Particularly during the last decades, many central European populations of the species have declined to extinction or severely endangered (Alonso et al., 2003), except in İberia, where populations are considered stabilised, and in Russia, where an increase has been reported (Karakaş and Akarsu, 2009).

The Great Bustard (*Otis tarda*) world population is estimated to be 44.054–57.005 individuals in 2010, of which about 57-70% occur in Spain, while Turkey occurs only 1-2% of world population (Alonso and Palacin, 2010). Turkey's population was estimated as 800-3000 individuals in early 1990s, 145-4000 individuals in 1996, 3000-6000 individuals in 2000, 764-1250 individuals in 2004, 500-1000 individuals in 2005, 764-1250 individuals in 2008, 1066 individuals in 2009 and 400-1000 individuals in 2010 (Kollar,1996; Morales and Martin, 2002; Kılıç and Karakaş, 2005; Palacín and Alonso, 2008; Karakaş and Akarsu, 2009; Alonso and Palacin, 2010). The species has two discrete subpopulations in Turkey; one of them is located in inner Anatolia and inner part of Southern Anatolia, the other one is located in Eastern and South-eastern Anatolia (Karakaş and Akarsu, 2009; Kılıç and Karakaş, 2005). Altıntaş plain is one of the important population area of the Great Bustard in western of Turkey due to it has status of Wildlife Development Area.However, Altıntaş plain is a one of the 97 Important Bird Area (Yarar and Magnin, 1997).

Main purposes of this study are to find out population, Lek areas and possible negative factors in breeding and spreading of Great bustard (*Otis tarda)* in WildLifeDevelopment Area in Altıntaş, Kütahya.

2. Materials and methods

2.1. Study area

Altıntaş Plain Wildlife Development Area is located on the South of Kütahya, with coordinates $39^0$04'-$39^0$12' N, $29^0$55'-30^0 08' and its total area is 15.040 hectares. Altitude of the area varies between 1000-1414meters. The current status of the area is Wildlife Development Area and there are approximately 12 villiages within the area with a total population of 5000people.

Continental climate dominates the area, thus, summers are hot and dry; and winters are cold and rainy. Average annual temperature is 10,7 ^oC, average annual sunshine duration is 69,5 days, number of average annual rainy days is 120,5, average annual rainfall is 547,3 (kg/m^2), average annual relative humidity is % 58. Highest average temperature occurs in July and August, while lowest average temperatures ocur in January and February.

2.2. Methods

Field surveys were carried out between March 2010 – October 2011 and March 2012 – May 2012 in Wildlife Development Area which is located in Kütahya Province Altıntaş District. Investigations were carried out via a 4x4 terrain vehicle by following available road network with 10-30 km/h speed and by waiting for 45-60 minute durations on spots that have full sight of the area – spot observation method – (Hellmich and İdaghdour, 2002). As equipments, 10x50 Bushnell binoculars, Konus brand telescope (with 15-45 magnification), Sony Alfa 200 brand camera with Sony brand 75-300 lens and JVC brand GZ-MG330AU model video camera were used.

For breeding season with high male and female population, countings were concentrated on March-April months, and for post-breeding season, countings were concentrated on August-September months. Besides, countings were also carried out regularly in other months, at least once in a month.

Observations were carried out 5 hours after the dawn and 3 hours before the nightfall since during these periods great bustard is very active, and during these periods meteorologic events like heat mist that prevents determining the bird's sex and age from long distances are very litte or none (Martinez, 2008).

When bustard was observed, date, hour, geographical coordinates, habitat type, its (their) number, sex and age was recorded. In addition to these, foot prints of the great bustard, and feathers that it lost while shedding or preening were collected as evidence for bird's presence at the area. Finally, all of these data were marked on a 1:25.000 scale map. Moreover, during the investigations, local people were interviewed about the presence of the bird in the area. However, data obtained by interviews weren't added to the countings; but spots that the bird was seen were observed more carefully. For checking oral expressions, a photograpgh of Grey heron (*Ardea cinerea*) was shown as bustard (Hellmich and İdaghdour, 2002).

Counting results were evaluated under 2 sub-headings as March-July Breeding Season and August-February Post-Breeding Season. Moreover, post-breeding season was then separated and evaluated as August-November Summering and December-February Wintering season.

3. Results

Field surveys carried out between March 2010-October 2011 and March 2012-May 2012 in Altıntaş Plain Wildlife Development Field which is located in Kütahya Province Altıntaş District are summarized below. As a result

of the field investigations, a field was identified as bustards' gathering field (Lek area). Moreover, during the field studies, footprints, faeces and feather samples belonging to the bustard were found.

3.1. Breeding season

In the observations belonging to 2010 breeding season, on 1025 mt., only during the observation conducted in April one male individual was observed. However, in this breeding season, any other female or male individual was not observed. During the 2011 breeding season, on March and May, two male individual were seen in breeding feather; on April, two male individuals were seen in breeding feather while they were performing breeding behavior. On june 2011 one male individual and on July 2011 two male individuals were observed while feeding in breeding feather. All of the male individuals observed in 2011 breeding season, were observed at the same spot, at 1051 mt. However, at this season, no female individuals were observed.

In 2012 breeding season, during the observations conducted in March, neither male nor female individuals were observed. During the observations conducted in April, a total of two male individuals were observed; of them, one was performing display behavior and the other one was feeding.

During 2010, 2011 and 2012 breeding seasons, it couldn't be determined whether the male and female individuals breeded or not. Moreover, it couldn't be determined whether bustards build nest or not. Accordingly, this species' breeding success in this area couldn't be calculated.

3.2. Post-breeding season

This season comprises the period between August-February and is separated into two sections as August-Nowember summering season and December-February wintering season.

3.2.1. Summering

During the 2010 summering season, at 1052 mt, a young male aged 2 was observed while resting on the harvested plains and faeces sample belonging to this individual was found. In september, at 1082 mt. a female bevy consisting of 5 individuals was observed. In the female bevy observed in this period, no nestlings were observed. Finally, on October 2010, one male individual was observed on 1060 mt. After this date, during 2010 summering season, no other individuals were observed.

As for 2010 summering season, during the observations conducted in August and October no individuals were observed. However, great bustard feathers were found at one spot during the observations in August, and at two different spots, during the observations in October.

3.2.2. Wintering

During the 2010 wintering season, only in December, 2 male individuals were observed at 1028 mt. During this season, other than 2 male individuals, no female or male individuals were observed.

During the 2011 wintering season, no observations were conducted, since field surveys were concluded.

As a result, since we couldn't catch via several methods and couldn't mark in some way to distiguish them from each other, population number that we've declared as the study result is the maxiumum number of the species observed at one time. According to this, depending on the observations, maximum number of bustard in the field is 1 young male (2 years old), 5 females and 2 male individuals. Sex ratio of the population is 1:1,6 (male:female).

4. Discussion

The Great Bustard (*Otis tarda*) is the biggest one among the species from Otididae family's West Palearctic and male bustard is one of the heaviest birds that can fly. This species is in "Vulnerable" status in the list of birds under Global threat (Kılıç and Karakaş, 2005; Kiziroğlu, 2008; IUCN, 2012) and in SPEC 1 status in Europe, in Class 1 status in China and in EK-II status in Bern Contract (Gao, et al., 2008; Morales and Martin, 2002). In our country, as the result of annual hunting regulations determined by Land Hunting Code numbered 4915 and by Central Hunting Commission that is authorized by this code, hunting or catching of Bustard alive is prohibited since 1977. According to current estimations, world population of bustard is between 44.054-57.005 individuals and the widest population is in Spain (% 57-70). Turkey is housing about % 1-2 of the population (Alonso and Palacin, 2010).

During the working period, the number of bustards counted in the area is 8 (5 females, 2 males and 1 young male). The most current bustard number in Turkey is declared 200-300 breeding couples as according to Karakaş and Akarsu (2009), and 400-1000 individuals according to Alonso and Palacin (2010). The number we've obtained as the result of the study represents % 0,008-0,02 of the population estimated in Turkey and % 14-18 x 10^{-6} of the world population estimation.

The bustard is local since it is observed during whole year in the observations conducted in our working area. This conclusion is also verified by the interviews conducted with the local people and is also in accordance with

Kiziroğlu (2008; 2009). However, we came up with the idea that the female individuals are in somewhere else outside the area in the post-breeding season, since during the study period, the female individuals are observed only in the observation conducted in September 2010 and they were not observed in the observations conducted in post-breeding season. However, an accurate conclusion cannot be made since we do not have clear data.

In the observations conducted in the working area which comprises 3 breeding seasons, the site called as Domalankırı Hill, which is mainly composed of fallowed areas and where it is possible to oversee a distance over 1 km (Morales and Martin 2002; Alonso, et al., 2000), is determined as "Lek Field", after male individuals with breeding feather were observed. According to Moreira et al. (2004), during the breeding season, while males mainly prefer fallowed areas, the females mainly prefer cereal areas and they watch the males' exhibiton behaviours by hiding themselves. This conclusion explains why we didn't see the female individuals during our observations in 2011 and 2012 breeding seasons, while we have seen the breeding males.

During our working period, while we have seen males with breeding feather and breeding behavior, it couldn't be observed whether they have breeded with the females or not. Moreover, despite the regular observations conducted between May-August, within the working area, we couldn't determine any nesting area belonging to the species. Accordingly, during our study period, species' breeding success in Altıntaş Plain Wildlife Development area couldn't be determined. However, observation of one young male individual in August 2010 proves that in 2008 a successful breeding took place for at least 1 couple. These results make us think that females of this species build nest in somewhere else, outside our study area, however we cannot make an accurate conclusion since we do not have clear data.

Moreover, when the faeces sample belonging to 2 year old young male was investigated, affirming that Lane et al. (1999), it is understood that it prefers wheat and barley seed, much more than invertabrate and green plant material.

Factors threaten the population of great bustard are reported as; by Kılıç and Karakaş (2005) and Hellmich and Idaghdour (2002): illegal hunting, agricultural reinforcements such as watering and pesticide usage, habitat losses via infrastructural changes such as construction of roads and energy lines, disturbances occurred during agricultural activities and accidents caused because of energy lines or antennas; by Alonso, et al., (2005): illegal hunting, collisons with electric lines, agricultural concentration on breeding areas; by Pinto, et al., (2005) and Raab et al.,(2010): Agricultural concentration, illegal hunting, construction of road and energy lines, forestation; by Abdulkarimi, et al., (2010): presence of human beings and disturbance especially during breeding season, destruction of suitable habitats with the widening of agricultural watering systems and illegal hunting. As is seen, one of the threats that all of the authors consider important is the illegal hunting of the species. Although Altıntaş Plain Wildlife Development Area, our study field, is protected and hunting is strictly prohibited, it is known that some hunters from the villages located in the area and some outsiders hunt rabbit illegaly and are arrested. Of course, while rabbit hunting, in case of encountering a bustard, it is impossible to not to desire hunting it, so as, this conclusion is verified during the interviews conducted with the local people.

Chemical substances such as rodenticides etc. have been reported to be an important risk for nontarget species - either by consumption of processed seed/birdseed (primary poisoning) or by secondary poisoning when predators eat poisoned animals). Since bustards are also an omnivor species, they are seriously affected by these chemical substances, because both processed seeds and poisoned rodents are potential parts of their nutrition styles (or since it directly dies, or its chances of survival is prevented because of decreasing breeding or increasing patogen and parasite load). Best example to this condition is the mass death of some non-target bird and mammal species (*Buteo buteo, Melanocorypha calandra, Columba livia, Lepus granatensis*) after widely usage of rodenticides against field mouse (*Microtus arvalis*) population in the agricultural fields of Castilla y León area in North Spain (Lemus, et al., 2011). During the study period, although we have not encountered any death of bustard because of being exposed to chemical substances in Altıntaş Plain Wildlife development area, it was learned via the interviews conducted with the local people that, in the previous years, several bustards died because of many chemical drugs such as Ester, Calamity, Dursban, either by directly spraying onto crops or by mixing with wheat-barley and locating on field edges against rodents.

In his study investigating the effects of human activities on Great bustard's behaviour, Sastre, et al., (2009) has identified vehicle traffic and pedestrians as the main cause of disturbance. Moreover, he states that, motorcycles, dogs, helicopters and planes are also harmful, depending on the duration of continuity and its abundance. He declares that, these disturbances cause the flight responses which increases the possibility of hitting to electric lines, which is the main cause of unnatural death causes for the bustard. When this conclusion is evaluated regarding our study area, there is a village at 1700 mt. Northeast of the Lek area in the area, there is a main road at 1000 mt. east in the southwest direction; there are electric lines at 960 mt. north in southwestern direction and at 1400 mt east in southeast direction. As a consequence, especially during the breeding season, when bustard moves because of disturbance caused by the vehicles passing from the main road and the local people and stray dogs, there is high risk of hitting to the electric lines, even though the lines are marked. Moreover, there is an airport construction site at 9 km. southeast of the Lek area. When the airport construction is completed and is avaliable for air traffic, the disturbance caused by the planes passing over the gathering point, will decrease this species' breeding success and will cause the extinction of this already rare species in this area.

In the 12 villages located in study area, the number of people is about 5000 and almost all of the source of income depends on grain and beet agriculture. It is estimated that, ovine and bovine breeding performed with a number varying between 2500-4000. Agriculture and shepherding activities cause less disturbance compared to other factors and generally they don't cause the bustard's flight response (Sastre, et al., 2009). However, it was observed that, performance of these activities around "Lek Area" during breeding season, disturbs the bustard and it is considered that, as a consequence of this, species' breeding success or nesting success may be affected negatively.

As a result, the population determined in the working area during our working period is 8. Population's sex ratio is 1:1,6 (male:female). As a consequence of this condition, if protecting precautions are not immediately taken against the factors threatening this species in this area, during the forthcoming ten years, extinction of this population in Altıntaş Plain Wildlife Development area is inevitable.

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