

## GREAT BUSTARD RESTOCKING IN EURASIA

Cristina GARLEA<sup>1</sup>, Marcel Th. PARASCHIVESCU<sup>1</sup>, Florin RADU<sup>2</sup>

<sup>1</sup>Academia Română, Calea 13 Septembrie nr. 13, Bucharest, România

<sup>2</sup>Fundația Drobia România, Str. Radu Șerban, nr. 553, Giurgiu, România

Corresponding author email: cgarlea@yahoo.com

### Abstract

*The significant risk of biodiversity loss in Eurasia there is the habitat fragmentation of great bustard (otis tarda). This reduces the flow of individuals between populations. The great bustard is a globally endangered species that has recently suffered dramatic declines due to agriculture intensification as well as other anthropological actions. The paper presents a comparative inventory of the population in the sites from Spain up to China. There are presented the threats and the necessary conservation measure for prevention of the extinction of the species, based on the integration of our large data series obtained during the last two decades in the world. The data collection includes informations referring to individual behavior and population dynamics (mating system, dispersal capability, migratory behavior, annual recruitment, mortality, and longevity), habitat availability (carrying capacity, satellite imagery) and genetic structure of the population.*

*The paper also presents the Romanian approach of the great bustard restocking by the development of national center in National Park Comana, using the site of a former tank polygon Mihai Bravu, Giurgiu County. These research works are conducted in the Program of scientific cooperation with Moldavia Republic, in the theme Eco-economics research regarding compared restoration in Romania and Moldavia Republic.*

**Key words:** biodiversity conservation, great bustard, Romania.

### INTRODUCTION

The great bustard is on the IUCN Red List of Threatened Species, and European populations have been in long-term decline, only arrested by conservation projects in some areas. The running projects will contribute to conservation of the species in the world.

Great bustards favourite lowlands, river valleys, and undulating open country, avoiding steep or rocky terrain, deserts, wetlands, forests, and savannas or parklands with more than isolated or small clumps of trees. Arable fields bearing crops such as oilseed rape, kale and lucerne now apparently appear to be more attractive than natural steppe, although farmland areas with high agricultural disturbance near human settlements are often avoided.

### OTIS TARDA IN EUROPE

In Europe have been managed projects for otis tarada restocking with the following objectives:

- Significantly increase the population of great bustards in Europe

- Detailed monitoring to improve understanding of the interaction between released bustards and their environment
- Development of a long-term strategy to guide future work on great bustard
- Formulation and promotion of agri-environment options to improve the suitability of the 'wider countryside' for great bustards
- Re-establishment of the great bustard as an integral part of Europe avifauna
- Translocation of juvenile great bustards from Russia and Spain each year
- Management of the release area to maximize its value to great bustards year-round
- Secure extensive areas of suitable habitat for great bustard across a wider area through the development and promotion of targeted options for inclusion within agri-environment schemes
- Protection of bustards and their nests and eggs from threats such as disturbance, egg-collecting and predation
- Rigorous monitoring program to improve knowledge of bustard distribution, ecology and behavior

- Communication and dissemination actions undertaken to develop a high profile for the project both in local communities and in key target
- Links developed with projects targeting great bustards elsewhere in the EU to allow the multi-way exchange of experiences and lessons learned.

Some lessons learned in UK and Spain are presented below:

#### **UK**

The main objective of the British project is to increase the small population of great bustards on Salisbury Plain-Southern England, in order to develop a self-sustaining population in the country. A five years activity was conducted in a LIFE+ project.

In the UK, the great bustard became nationally extinct when the last bird was shot in 1832. This iconic species of the Wiltshire landscape returned to the UK in 2004 when the Director of the Great Bustard Group, David Waters, established the 10-year trial reintroduction. The project sourced birds rescued from agricultural operations in Russia with a plan to release 20 birds per year onto Salisbury Plain. The project had early success with females laying infertile eggs in year three, males reaching maturity in year five followed by the first chicks to be hatched for over 170 years fledging in the same year.

The great bustard was originally a locally common and widely distributed breeding species in many parts of the UK. It occurred on chalk downland in central southern England and in the open sandy Brecklands of eastern England. In addition, great bustards from continental Europe moved to the UK during the colder months.

Traditionally birds of expansive grass plains (steppe), they have adapted well to modern agricultural landscapes. They are frequently found in semi-cultivated/managed grasslands, arable farmland and traditional lowland hay meadows. (Burnside et al,2012)

With help from Natural England, bustard-friendly habitat options are being developed to be implemented through the ELS and HLS agri-environment scheme. Work with the landowner of the new confidential release site to agree predator control strategy, and deploy electrified fox-proof fencing around the

perimeter of the release field, and erect soft-release pens within the field these also having fox-proof electrified fencing surrounding them. Although predator control is practiced by the local farming community, predation of ground-nesting birds by foxes is still the biggest problem.

**Spain** Habitat fragmentation reduces the flow of individuals between populations, constituting a major risk of biodiversity loss. The great bustard (Figure 1) is a globally endangered species that has recently suffered dramatic declines due to agriculture intensification, and human-induced habitat fragmentation. The Iberian Peninsula represents, with more than half the world total, the species' last stronghold, but conservation measures are urgently needed to maintain genetic diversity, counteract isolation, and prevent the species' extinction. This project aims to assess the impact of changing land-use patterns, and other important human-induced sources of mortality, on great bustards in Iberia, and to propose ways to reconcile agricultural and rural development with species survival. This will be achieved through integration of our large data series obtained through radiotracking during the last two decades on individual behavior and population dynamics (mating system, dispersal capability, migratory behavior, annual recruitment, mortality, longevity), habitat availability (carrying capacity, satellite imagery) and genetic structure of the population (mitochondrial and nuclear DNA analyses) in spatially-explicit simulation models. The models will (a) help testing relevant hypotheses of metapopulation theory, (b) provide an analytical framework for assessing how patterns of land use affect the long-term survival of bustards, and (c) indicate ways to minimize human impacts on the conservation of the species and its habitat.

The project aims to assess human impacts on the viability of great bustards in Iberia, the last stronghold of this globally endangered species. We will test the hypothesis that changing land-use patterns, habitat fragmentation, and other human impacts are affecting the species' survival by reducing the contact between isolated groups, decreasing genetic diversity, and altering fundamental demographic parameters (annual recruitment, sex ratio, mortality).

There are established some research directions as follows:

- To assess the current status, population trends and habitat availability of great bustards in selected Iberian subpopulations by defining the sizes and shapes of suitable habitat patches, and assessing for each patch its carrying capacity and degree of isolation from all others.
- To update and revalidate the current distribution and habitat availability of the species in Iberia during the breeding and non-breeding season.
- To assess the current impact of human-induced negative factors on the population dynamics of selected subpopulations
- To assess the extent and distribution of the species' composite genetic diversity in the Iberian Peninsula, weigh up the significance of individual populations to the overall genetic diversity, and relate patterns of genetic variability with spatial distribution in habitat quality (landscape genetics).
- To elucidate the historical landscape-level processes or human factors that have shaped the current distribution pattern of the species.
- To identify non-viable populations and propose rational measures for the conservation of the species in the context of sustainable development.

Availability of steppe habitats is not a limiting factor for great bustards in the Spanish region. It has profound implications for the conservation of this globally endangered species. It occurs in open flat or somewhat rolling landscapes, usually with a mixture of crops (cereals, vineyards, fodder plants, in some countries also with stepic grassland [J. C. Alonso *in litt.* 2012).

An important help for the teams of restocking projects was given by the farmers in the areas concerning the biodiversity conservation.



Figure 1. *Otis tarda* (by courtesy of photo author)

## ROMANIAN APPROACH

In Romania has been developed public politics of restocking for some species, by projects funded from state budget as well as European Commission. In this respect it was designed a National Centre for great bustards in Mihai Bravu, Giurgiu county (Figure 2). This decision regarding the site based on soil analysis, pollution assessment, hunting evaluation, remediation of the ground, Natura 2000 sites, national parks, heritage and tradition.



Figure 2. Proposed site for great bustard reserve in Romania – Mihai Bravu, Giurgiu county (by courtesy of FDR, 2012)

The main objectives of the project are the followings:

- development of infrastructure for reproduction and growth in semicaptivity Great Bustard, including establishment of the sanctuary and adult offspring
- developing a multidisciplinary research program
- initiating international collaboration with advanced European centers (Spain, UK) and other countries (Russia, Ukraine, Moldova, Serbia)
- reintroduction of the species *Otis tarda* in the natural environment
- development of modern methods for public acceptance and support activities restocking tourism project in reserve
- activities of global biodiversity conservation.

A part of activity includes the gathering of the rules concerning the project. There were evaluated European legislation, public politics in different countries, ongoing activities for conservation of the species. Trends of the population development, monitoring schemes as well legal protection status have been studied. (Garlea et al, 2012)

The design of the physical protection system based on the otis tarda vulnerabilities. There are special fences (Figure 3), the last one, inside in the reserve, must be smooth. The site is guarded with rangers and it is provided with electronic surveillance.



Figure 3. Smooth fence to sanctuary  
(by courtesy of FDR)

The advanced methods for education and increasing of public acceptance have been studied, the success of the project being significantly influenced by the support of people. The National Centre for great bustard developed on the former military site could be an important research area promoting the transborder cooperation in the field.

## RESTOCKING POLITICS IN THE WORLD

The Asian subspecies of Great Bustard, found only in Mongolia, China, and Russian South Siberia, is of special concern. Though few surveys have been undertaken in Mongolia, the population has been estimated at just 1500 birds. These bustards are particularly at risk as Mongolia transitions from communism to a free-market economy, replete with road construction, increased natural resource development, and land privatization.

Threats to the Great Bustard are numerous. Bustard nests, simple scrapes in the ground, are destroyed by the activity of agricultural machinery in the fields they inhabit. The insect food base so important to the rapid growth of chicks is eliminated with pesticides. Though they are strong fliers, heavy-bodied bustards are not maneuverable enough to avoid collisions with electrical lines. And though now

illegal, hunting by humans also plays a role in these declines. Our team is working to quantify the risks to bustards in Central Asia, and we communicate with local people and conservation agencies to develop conservation plans. (Li Lin et al, 2008)

Great Bustards have a range stretching across Eurasia, from Iberia and Morocco in the west to China in the east, though their distribution is extremely fragmented and numbers are low in many parts of their range. The world Great Bustard population is estimated to be between 43,500 and 51,200 individual birds. The species has undergone a long-term and marked decline, especially since the early 19th century. This decline has been slowed in the past 20 years by major conservation action in many countries. In that period the European population has increased, driven by a rise in the large Iberian population as well as in the world. Over 50% of the world population of Great Bustards is found in Iberia. The only other substantial population is found in western Russia. Several countries have small, threatened populations. Some are in the initial stages of recovery, like those in Hungary, Austria and Germany, thanks to conservation work, but the continuing existence of others, for example in Morocco or Iran, is less certain.

The East Asian population of the subspecies *Otis tarda dybowskii* is thought to total 3,500 to 4,700 birds. (Kessler, 2012)

Great Bustards are highly gregarious birds that form social units termed 'droves'. Males and females live in separate droves and there is a tendency for birds of the same age to keep together. Large, often loose, flocks form in winter, which may wander in search of food, sometimes joining up with other flocks. Female droves visit groups of displaying males briefly during the breeding season.

Gait is slow and deliberate but bustards are capable of surprisingly fast dashes. Feeding action is a swift pick-up of food from the ground and fast 'snatching' of vegetation. They have a very wary nature. They will often withdraw into tall vegetation when alarmed, but never into bushes or trees, and sometimes they will fly away. Flight is between 30-100 m above ground, with an action noticeably regular and uninterrupted. They never glide, but beat their wings slowly and majestically, making

rapid progress. Wings are long and deeply fingered appearing mostly white. They are generally silent, unless flushed or threatened at very close range, when a nasal bark is sometimes heard. The lack of an opposable hind claw means they cannot perch, so they are a completely ground-dwelling bird. Their notoriously shy and wary behavior makes them very difficult to observe.

Great Bustard is omnivorous, meaning it eats both animal and plant matter. Diet is mainly composed of plants during spring, autumn and winter. Typically they take young shoots, leaves, flowers, ripe and unripe seeds but occasionally also rhizomes, bulbs, berries and fruits. The proportion of animal food varies with season, locality, age and sex of bird, but they are mostly carnivorous in summer.

Females typically become sexually mature from two years of age and males typically from four years. Great Bustards have a mating system termed 'lekking'. Males compete for females with an elaborate visual display. Females appear to visit several males before copulating and appear to be very selective in their choice of mate. Mating success is strongly skewed, with the majority of mating performed by a small proportion of males at a lek site. No pair bonds are formed and pairings may differ from year to year.

Populations are migratory in the east, and dispersive or resident elsewhere. In the former USSR, Great Bustards are often considered truly migratory, except in southern Ukraine where resident. The Ukrainian population is boosted by up to 10,000 birds in the winter, mostly from the Russian Federation. However, recent winter observations of birds wintering in Russia at -30C with deep snow cover suggests that even in hard winters not all migrate. Great Bustards have been reported from Syria and Iraq in winter but whether birds still breed in these countries is unknown.

Young Great Bustards begin developing their adult plumage at about two months, and begin to develop flying skills at the same time. They practice by stretching, running, flapping, and making small hops and jumps to get airborne.

By three months they are able to fly reasonable distances. Juveniles are independent by their first winter, but normally stay with their mother until the next breeding season. The natural

mortality of Great Bustards in the wild is over 80% in the first year.

Table 1. *Otis tarda* population reported in 2012

Countries with current breeding records	Number of Great Bustards
Austria	175
Bulgaria	0
China (NW Xinjiang)	2,000 – 3,000
Czech Republic	1 – 6
Germany	110
Hungary	1,353
Iran	89 – 161
Kazakhstan	0 – 50
Moldova	0
Mongolia, NE China, SE Russia	1,500 – 1,700
Morocco	91 – 108
Portugal	1,399
Romania	0 – 4
Russia (European)	8,000 – 11,000
Serbia & Montenegro	35 – 40
Ukraine	500 – 850
Slovakia	8 – 16
Spain	27,500 – 30,000
Turkey	764 – 1,250

Taking into account the previous biological characteristics of great bustard can be evaluate the population and world restocking politics. In the Table 1. are presented data reported by different territories. (Li Lin et al, 2012).

## CONCLUSIONS

The actions for biodiversity conservation in Eurasia are extended in the last three years.

The advance research is studying the genetic structure of the population.

The development of the Romanian project in Mihai Bravu National Center depends by European support.

## ACKNOWLEDGEMENTS

We are proud to express our thanks to Spanish colleagues who sent to FDR the most important part of their dedicated results as well as to UNESCO office in Mongolia. The authors also collaborated with Lucian Dumitru and V.E. Puscasu in previous works referring to great bustards restocking in Romania.

## REFERENCES

- Alonso, J. C., Martín, C. A., Alonso, J. A., Palacín, C., Magaña, M., Lieckfeldt, D., Pitra, C., 2009. Genetic diversity of the great bustard in Iberia and Morocco : risks from current population fragmentation. *Conservation Genetics*, 10 (2), p. 379-390.
- Alonso, J. C., Martín, C. A., Palacín, C., Magaña, M., Martín, B., 2003a. Distribution, size and recent trends of the great bustard *Otis tarda* population in Madrid region, Spain. *Ardeola*, 50, p. 21-29.
- Alonso, J. C., Martín, C. A., Palacín, C., Martín, B., Magaña, M., 2005a. The Great Bustard *Otis tarda* in Andalusia, southern Spain: status, distribution and trends. *Ardeola*, 53, p. 67-78.
- Alonso, J. C., Palacín, C., Alonso, J. A., Martín, C. A., 2009. Post-breeding migration in male great bustards: low tolerance of the heaviest Palaearctic bird to summer heat. *Behavioral Ecology and Sociobiology*, DOI 10.1007/s00265-009-0783-9
- Alonso, J. C., Martín, C. A., Alonso, J. A., Palacín, C., Magaña, M., Lieckfeldt, D., Pitra, C., 2009. Genetic diversity of the great bustard in Iberia and Morocco : risks from current population fragmentation. *Conservation Genetics*, 10 (2), p. 379-390.
- Alonso, J. C., Martín, C. A., Palacín, C., Martín, B., Magaña, M., 02005a. The Great Bustard *Otis tarda* in Andalusia, southern Spain : status, distribution and trends. *Ardeola*, 53, p. 67-78.
- Burnside, R. J., Carter, I., Dawes, A., Waters, D., Lock, L., Goriup, P. and Szekely, T., (2012). The UK great bustard *Otis tarda* reintroduction trial: A 5-year progress report. *Oryx*, 46 (1). pp.112-121. ISSN 0030-605
- Garlea C., Predoi G., Dimitru L., Anton M., Radu F., 2012. National Centre of great bustard growth and reproduction in semicaptivity for restocking of population in Romania-.Int.Simp.USAMV BUCHAREST
- Garlea C, Alecu I, Dumitru L, Anton M., Radu F., 2012. Dezvoltare durabila in arealul Mihai Bravu-Romania-Conf.IEA,Romanian Academy
- Kessler M., 2012. Central Asian Great Bustard Project
- Li Lin, Junhong Wang Xiaomin Shen, Angyang, 2008. Status of distribution of great bustard in northeast China, Journal of forestry research Issue 2