

# POPULATION STRUCTURE AND NUMBER DYNAMICS OF GREAT BUSTARD IN THE FEDERAL PROTECTED AREA "SARATOVSKI ZAKAZNIK"

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**Abstract.** Study of the population structure and number dynamics of Great Bustards in the Federal Protected Area "Saratovski Zakaznik" (Saratov region, Russia, a total area of 443 km<sup>2</sup>) was carried out in 1998, 2000 and 2001. The interannual fluctuations of the population are shown to be insignificant (152, 189, and 141 birds in 1998, 2000, and 2001, respectively). A trend in the dynamics has been revealed, it suggests promotion of breeding by means of control over crop rotation, introduction of an advanced agrotechnology, and other factors of agriculture provided that its intensity and profitability are preserved. Extension of the Federal Protected Area and further promotion of its nature-preservation status are desirable.

**Key words:** Great Bustard, *Otis tarda*, Saratov region, numbers.

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**Популяционная структура и межгодовая динамика численности дрофы в федеральном заказнике "Саратовский". - В.Г. Табачишин, А.В. Хрустов, Е.В. Завьялов. - Беркут. 13 (1). 2004.** - Представлены результаты исследований структуры и динамики численности популяции дрофы, обитающей на территории федерального заказника "Саратовский" (Саратовская область, Россия) общей площадью 443 км<sup>2</sup>, проведенных в 1998, 2000 и 2001 гг. Показано, что межгодовая амплитуда колебаний численности за период исследований была незначительна (соответственно 152, 189 и 141 особи в 1998, 2000 и 2001 гг.). Выявленная тенденция в динамике количественных показателей определяет целесообразность разработки комплекса мер, направленных на повышение успеха размножения птиц путем регулирования севооборота, агротехники и других элементов сельскохозяйственного производства при сохранении его интенсивности и рентабельности. Крайне целесообразно рассмотрение вопроса о расширении границ заказника и дальнейшем повышении его природоохранного статуса.

The Great Bustard (*Otis tarda*) is now a globally threatened species (Collar et al., 1994; Stattersfield, Capper, 2000). It is included in the Red Books of IUCN, Russia and the Saratov region (Red Book ..., 1996, 2001; Heredia et al., 1996) and the corresponding documents of those countries which it inhabits. Now the habitat of the species has a mosaic structure with small areas occupied by isolated breeding groups. One of the most numerous Russian populations is located in Saratov region, mainly, on the left bank of the Volga river (Khrustov et al., 2000, 2003a, 2003b).

Contemporary investigation of the Great Bustard biology, analysis of its distribution and population dynamics enable one to reveal the requirements of the species to the dwelling environment and its limiting factors, which is finally needed for the design of preservation strategy principles. Such fieldworks are of high

priority on protected natural areas which serve national standards and reservations of biological variety. The Federal Protected Area "Saratovski Zakaznik" on the north of the Lower-Volga region is one of these places in view of its nature-conservation significance. The stability of the Great Bustard population inhabiting there largely underlies the possibility of other, smaller habitats and of the whole Eastern-European population to exist. That is why its preservation is a vital task of not only regional but also national and international scale.

## Study area and methods

The Federal Protected Area "Saratovski Zakaznik" is situated at the centre of the Saratov Left-Volga-bank Region (Fedorovski district) within the Karaman, High-Uzen, and Eruslan-Malouzen landscape regions of the



Table 1

Structure and dynamics of the Great Bustard population in the Federal Protected Area “Saratovski Zakaznik” in the premigration period, %

Динамика частоты встречаемости дрофы в различных местообитаниях заказника “Саратовский” в предмиграционный период, %

Biotope	1998	2000	2001	Average
Winter fields	38,5 / 44,7	50.0 / 41.2	30.8 / 38.2	40.0 / 41.5
Harvested cereal fields	46.2 / 43.4	28.6 / 54.5	46.2 / 59.3	42.5 / 52.3
Non-harvested cereal fields	7.7 / 10.5	–	7.5 / 0.3	5.0 / 3.4
Fallow land	7.6 / 1.4	7.1 / 1.6	–	4.9 / 1.1
Virgin land	–	14.3 / 2.7	15.4 / 2.2	7.6 / 1.7

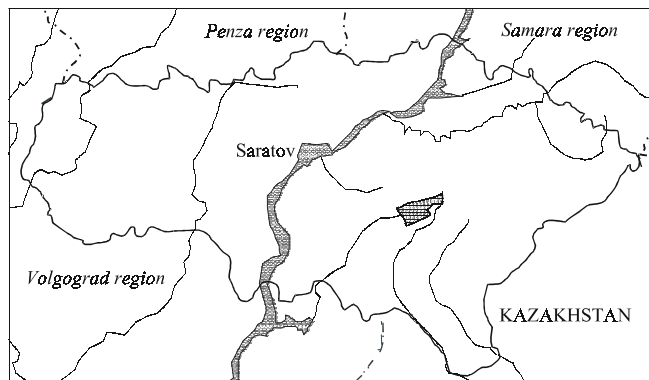
**Note.** The nominator and denominator represent the occurrence frequency and % of the total number, respectively.

Low-Syrtovalaya plain, its area makes 443 km<sup>2</sup> (Fig.).

The territory under survey is highly cultivated. E. g., the arable lands amount to 79.2 % of the total area, 20 % of which are occupied by fallow lands. About 12 % of the area is occupied by natural pastures, meadow hayfields take less than 1 %. Cereals (winter and spring wheat, spring barley, winter rye, maize, millet), perennial fodder crops, and annual grass crops predominate there.

Several autumn censuses of Great Bustards (15.09 to 15.10, 1998, 2000 and 2001) were carried out in order to characterize the bird population and to follow its changes in time and space. Constant but not fixed routes were designed to count birds in all the types of biotopes. The census was conducted by two teams of two people operating from four-wheel drive vehicles within 10 x 10 km squares drawn by means of a procedure similar to the UTM system (100 x 100 km) used for the compilation of the EBCC Atlas of European Breeding Birds (Hagemejer, Blair,

1997). The length of each route was not restricted, and all the birds in the survey band (1.5 + 1.5 km) were counted with binoculars (10–12<sup>x</sup>) and telescopes (30<sup>x</sup>). The vehicle was moving by zigzags; stopping after every 2 km or changing the movement direction, we observed the neighbourhood for 10–30 min. One square a day was usually examined provided that the weather was sunny. Surveys began at dawn and ended at dusk, with a pause during midday (11<sup>00</sup> – 15<sup>00</sup>, local time). The sites where birds were seen were mapped in a 1 :



Location of the Federal Protected Area “Saratovski Zakaznik” in Saratov region.

Схема расположения федерального степного заказника “Саратовский” в Саратовской области.

Table 2

Dynamics of Great Bustard occurrence in the Federal Protected Area “Saratovski Zakaznik” in the premigration period, %

Динамика частоты встречаемости групп дрофы на территории степного заказника “Саратовский” в предмиграционный период, %

Year	Flock size					
	1	2 – 9	10 – 19	20 – 29	30 – 39	> 40
1998	7.6 / 0.7	38.5 / 10.4	30.8 / 39.3	15.4 / 28.2	7.7 / 21.4	0 / 0
2000	7.1 / 0.5	50.0 / 12.2	14.3 / 16.9	14.3 / 28.0	7.1 / 15.9	7.2 / 26.5
2001	25.0 / 2.3	41.7 / 11.5	8.3 / 9.9	8.4 / 17.6	8.3 / 25.2	8.3 / 33.5
Average	12.8 / 1.3	43.6 / 11.4	17.9 / 22.2	12.8 / 25.2	7.7 / 20.3	5.2 / 19.9

**Note.** The nominator and denominator represent the occurrence frequency and % of the total population, respectively.

100 000 scale with special attention paid to features in the bird behaviour; the sex and age structure of separate groups was estimated. The sex of each bird was determined visually. The total length of the routes was 787 km.

Statistical data processing and map drawing were performed with MapInfo Professional, MAG and Statgraphics software.

## Results and Discussion

The bird distribution in the Protected Area in the premigration period was found to be of aggregate character, only separate parcels showed a uniform distribution. E. g., more than a half of Great Bustards seen was located in the south-eastern (71.1 %), central (61.9 %), and north-eastern (65.6 %) parts of the area in 1998, 2000, and 2001, respectively. The population fluctuated from year to year insignificantly, 152, 185, and 141 birds were registered in 1998, 2000 and 2001, respectively.

Great Bustards were most often seen on winter fields and harvested cereal fields while other kinds of arable lands exhibited a much lower number of birds (Table 1). Most likely that they are the protection properties of stubble fields which attract birds: Great Bustards hidden in the spaces between rows be-

come practically imperceptible while they can observe the vicinity well. Moreover, young growth of weeds on harvested cereal fields, ear and seed remains serve the main forage for Great Bustards in this period (Lane at al., 1999; Tabachishin et al., 2004).

Thus, the dynamics of land tenure intensity, features of crop rotation, the presence and availability of feed, and the absence of stress factors should be regarded as the principal causes of the observed changes in the spatial population structure.

The sex and age structure of the population under study comprises social communities of several types, namely, unisexual groups (chiefly, males older than three years) and groups of juvenile Great Bustards (both males and females). Birds of both sexes constitute a category of singles. The population of such aggregates usually did not exceed 28 individuals; rare were 30–50-member flocks of non-breeding birds (both males and females) living a nomadic life. The largest (usually mixed) flocks occupied winter fields as well as harvested cereal ones. The smallest female-dominated groups with young individuals kept on fallow lands.

2–9-member and 10–19-member flocks were met most often (on the average, 43.6 and



17.9 % of the registered flocks, respectively). At the same time, the majority of Great Bustards was concentrated in 20–50-member flocks (Table 2). Single birds were met few times only for the fieldwork period.

17.9 % of flocks were consisted of males only (23.0, 14.3 and 25.0 in 1998, 2000, and 2001, respectively), 25.6 % were mixed. The mean sex ratio in the mixed flocks was 2.5 females per male (2.8, 2.1 and 2.8 in 1998, 2000 and 2001, respectively). It follows that in the premigration period the majority of males keeps apart, in small (3–22, 13.2 on the average) flocks. The fraction of females varied from 35.9 % (2001) to 37.6 % (2000). Individuals younger than one year occurred much more seldom; their fraction in the population under study varied from 17.7 % (1998) to 22.1 % (2001), it corresponded to 0.6 chicks per female.

Thus, the study conducted has shown the Great Bustard distribution on the territory of the Federal Protected Area "Saratovski Zakaznik" to be non-uniform, depending on the type of agrocenoses used in land cultivation. The conglomeration structure is due to a whole set of natural and anthropogenic factors, of which the food base richness and the anxiety factor are predominant.

The relatively high values of Great Bustard numbers and the population density in the Protected Area give evidence of a stability of the modern state of the group, the region under survey should be considered as a key link in the preservation of Great Bustards as a species.

In order to promote bird breeding, a set of measures (control over crop rotation, introduction of an advanced agrotechnology, and other factors of agriculture provided that its intensity and profitability are preserved) should be designed. A question of extension of the Federal Protected Area and promotion of its legal status should be raised.

The work was supported by the Biological Sciences Department of Russian Academy of Sciences, the "Fundamental principles of control over biological resources" program.

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