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GAME SPECIES FROM TULCEA COUNTY AND THEIR MANAGEMENT

Lucian DINCĂ[1], Cristian Mihai ENESCU[2], Voichița TIMIȘ-GÂNSAC[3]

[1]"Marin Drăcea" National Institute for Research and Development in Forestry (INCDS), 13 Cloșca Street, Brașov-500040, Romania; E-mail: dinka.lucian@gmail.com
[2]University of Agronomic Sciences and Veterinary Medicine Bucharest, 59 Mărăști Boulevard, 1st District, Bucharest-011464, Romania; Email: mihaienescu21@gmail.com
[3]University of Oradea, Faculty of Environmental Protection, 26 Magheru Street, Oradea-410048, Romania; Email: timisvoichita@yahoo.com

Corresponding author: timisvoichita@yahoo.com

Abstract

Hunting has been always an important activity in Romania, not only due to the presence of high numbers of game species, but also for their variety. Tulcea County has a total of 54 hunting funds that account for 580.701 hectares, being one of the counties with high potential in terms of hunting. Amongst the main hunting species from Tulcea County (red deer, fallow deer, roe deer, European hare, pheasant, partridge, badger, fox, raccoon dog, jackal, ferret, weasel, stoat, musk, ducks, gooses) eight were chosen and prioritized based on nineteen criteria established within COST Action FP 1203. An analytical hierarchic process (AHP) was used and the analysis were performed by the aid of Expert Choice Desktop software package. The most important game species were the wild boar and the roe deer, while the least important were the golden jackal and the red fox. Specific game management measures were proposed.

Key words**:** *AHP, game management, hunting, Tulcea, wild animals*

INTRODUCTION

Hunting is the human activity of killing or trapping wild animals for different purposes. It appeared together with human evolution, while its methods and means were constantly improved as the human society developed. Nowadays, the concept of hunting includes besides the specific hunting activities a broad spectrum of measures for conserving biodiversity and managing the wild fauna. Moreover, the list of activities is completed by trainings for specialists, research and scientific studies, awareness actions for promoting the role of the wild fauna, sociological studies etc. These management measures and activities are needed because it is well known that the management of the game pool limits the number of hunted species and intends to conserve the habitats, including the biodiversity [21], [22].

Hunting has been always an important activity in our country, not only due to the presence of high numbers of game species, but also for their variety. It is well known that the diversity of Romania's natural ecosystems favored the conservation of a rich genetic fund in the case of mammalians [23]. Also, hunting offers not only food, but also other derived products (*e.g.* furs, trophies) [16].

The "game" concept refers to the totality of species of hunting interest present on a defined territory. Some of these species can be permanently hunted, while others are integrally protected. The protection category can change in time based on the evolution of the environmental factors and the size of the population. The hunter's obligation is to know the regulations related to the hunting of certain species and to contribute to their conservation [7].

In Romania, the national hunting fund is divided into 2,151 hunting units that are managed by private or state forest units and hunting associations [11]. The organization of hunting activity is regulated by the Law no. 407/2006 [18]. This law includes a list of 18 mammals and 39 birds for which the hunting is permitted, 11 mammals and 110 birds for which the hunting is prohibited, respectively.

Across Tulcea County, there are 54 hunting funds with a total area of 580,701 hectares, from which 21 are managed by Tulcea Forestry Directorate, a subunit of National Forest Administration Romsilva (37.6%), 11 funds are managed by the County Hunting and Sport Fishing Association (30.8%) and 3 funds are administered by the Sportive Fishing Associations (7.8 %). The main game species from Tulcea County are represented by: red deer, fallow deer, roe deer, wild boar, pheasant, partridge, red fox, raccoon dog, jackal, ferret, weasel, stoat, ducks and gooses. Most of the birds and fishes are found in Danube Delta, the biosphere reservation (declared by Law no. 82/1993 [19]), due to its specific ecosystems [28].
The aim of the study was to highlight the most important game species from Tulcea County.

MATERIALS AND METHODS

Tulcea County is located in the southern-eastern part of Romania, in Dobrogea region. Its neighbors are Constanța County in the South, Brăila County in the West, Galați County and the border with Ukraine in the North and the Black Sea in the East (Fig. 1).

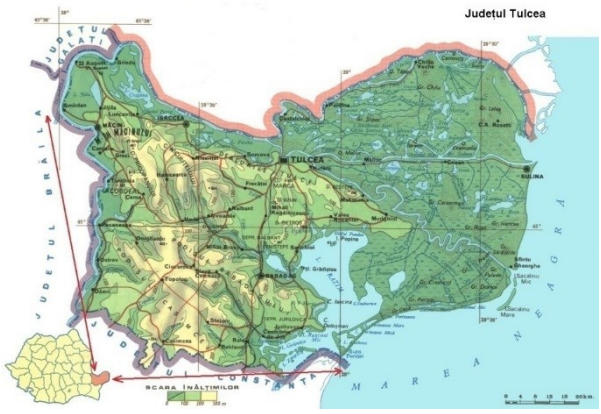

Fig. 1. Location of Tulcea County
Source: http://pe-harta.ro/judete/Tulcea.jpg, Accessed Feb.10, 2018

The climate in Tulcea has an excessive temperate-continental character, slightly moderate across Danube Delta. The annual rainfall amount accounts for 500-550 mm in North and West and decreases toward 400 mm or less in Danube Delta. The annual average temperature reaches 11°C in West and South areas and 11-12°C in Danube Delta. Summers are hot and dry, with few but torrential rains ussualy accompanied by hailstones and thunders, while the winters are moderately cold and the precipitations are lacking. However, winters are frosty, due to harsh and persistent winds, representing the most unpleasant climatic element.
The area of the forest fund in Tulcea County accounts for 105,000 hectares, out of which 93,600 hectares (89%) represent forests [17]. Forests are distributed only in high hills, forming compact stands (*e.g.* Slava Cercheza, Ciucurova, Topolog, Hamcearca and Luncavița areas). Tulcea is famous also for its special forests, such as Luncavița, a tertiary relict with representatives of genus *Fagus* L.
In order to determine the most important game species an Analytic Hierarchy Proces (AHP) was performed, by using the 19 criteria designated within COST Action FP1203 (www.nwfps.eu) and used in a study conducted in the case of Ialomița County aimed at highlighting the most promising non-wood forest products [9]. The list of the 19 criteria consists in: Criterion 1: Harvesting period (1: the shortest harvesting period … 8: the longest harvesting period); Criterion 2: Portfolio of derived products (1: the smallest number of deriver products … 8: the highest number of derived products); Criterion 3: Harvested quantity by one worker in 8 hours (1: the lowest quantity … 8: the highest quantity); Criterion 4: Harvesting cost (1: the lowest cost … 8: the highest cost); Criterion 5: Knowledge for recognition (1: most recognizable product … 8: hardest recognizable product); Criterion 6: Knowledge for harvesting (1: the less knowledge necessary … 8: most knowledge necessary); Criterion 7: Tools needed for harvesting (1: the least … 8: the more); Criterion 8: Complexity of harvesting process (1: lowest … 8: highest); Criterion 9: Distribution range (1: lowest … 8: highest); Criterion 10: Market potential (1: low … 8: high); Criterion 11: The price of raw product (1: lowest … 8: highest); Criterion 12: The price of the derived product (1: lowest … 8: highest); Criterion 13: Transport from the harvesting point to the storage center (1: the most easy … 8: the most complicated);

Criterion 14: Perishability (1: lowest … 8: highest); Criterion 15: "Celebrity" of the product on the market (1: the least known … 8: the most popular); Criterion 16: Market demand (1: lowest … 8: highest); Criterion 17: Biotic threats (1: the fewest threats … 8: the most threats); Criterion 18: Abiotic threats (1: the fewest threats … 8: the most threats); Criterion 19: Development of the process of harvesting (1: undeveloped … 8: extremely developed). The analyses were conducted with Expert Choice Desktop (v. 11.5.1683).

Based on the information available in official reports/documents and by taking into account the experts' knowledge, the following eight game species were chosen for analysis, namely: the mallard (*Anas platyrhynchos* L.), the white goose (*Anser anser rubrirostris* L.), the wild boar (*Sus scrofa* L.), the golden jackal (*Canis aureaus* L.), the roe deer (*Capreolus capreolus* L.), European mouflon (*Ovis orientalis musimon* L.), European hare (*Lepus europaeus* Pallas.) and the red fox (*Vulpes vulpes* L.). The AHP alternative ranking is present in Table 1.

RESULTS AND DISCUSSIONS

Table 1. AHP alternative ranking

Criterion	Game species							
	mallard	white goose	wild boar	golden jackal	roe deer	European mouflon	European hare	red fox
1	5	4	6	8	3	1	2	7
2	3	5	7	1	8	6	4	2
3	8	7	4	1	3	2	6	5
4	4	5	7	3	8	6	1	2
5	4	3	7	8	6	5	2	1
6	4	3	5	6	7	8	1	2
7	7	5	6	1	8	4	3	2
8	5	4	7	1	6	8	3	2
9	5	4	7	1	3	2	6	8
10	3	4	8	1	7	5	6	2
11	3	4	7	1	8	6	5	2
12	3	5	8	1	7	6	4	2
13	1	2	8	5	7	6	3	4
14	4	3	7	1	8	6	5	2
15	4	3	7	1	8	6	5	2
16	4	3	8	1	7	6	5	2
17	7	6	3	1	4	5	8	2
18	8	7	6	1	3	4	5	2
19	4	5	7	1	8	6	3	2

Source: Own results.

According to the AHP results, the most appreciated game species were the **wild boar** (ro. mistreț) and the **roe deer** (ro. căprior), while the ones with the lowest general score were the **golden jackal** (ro. șacal auriu) and the **red fox** (ro. vulpe) (Fig.2). In the case of **wild boar** similar results were obtained also in other countries, such as Argeș County, where the wild boar ranked second [10] and Maramureș County, where it was placed on the third position [8].

Roe deer is the main representative of family *Cervidae* that is found in almost all European countries (with the exception of Ireland, Cyprus, Corsica, Sardinia, Sicily and most smaller islands). This species has a high economic value for meat production and sport hunting [5]. The presence of roe deer in the North-West part of Tulcea County is an example of natural species expansion.

European mouflon (ro. muflon) ranked third. The **mouflon** was introduced in Balc City from Bihor County during the Second World War. Almost three decades ago, the managers of the hunting fund wanted to introduce it also in Retezat forests (southern-western part of

Romania), but the attempt failed due to snow and large predators [20]. Between 1966 and 1967, 37 individuals were freed in Dobrogea [6]. In Romania, the mouflon is considered an allochthonous species that has regained its importance and interest in the last years [3].

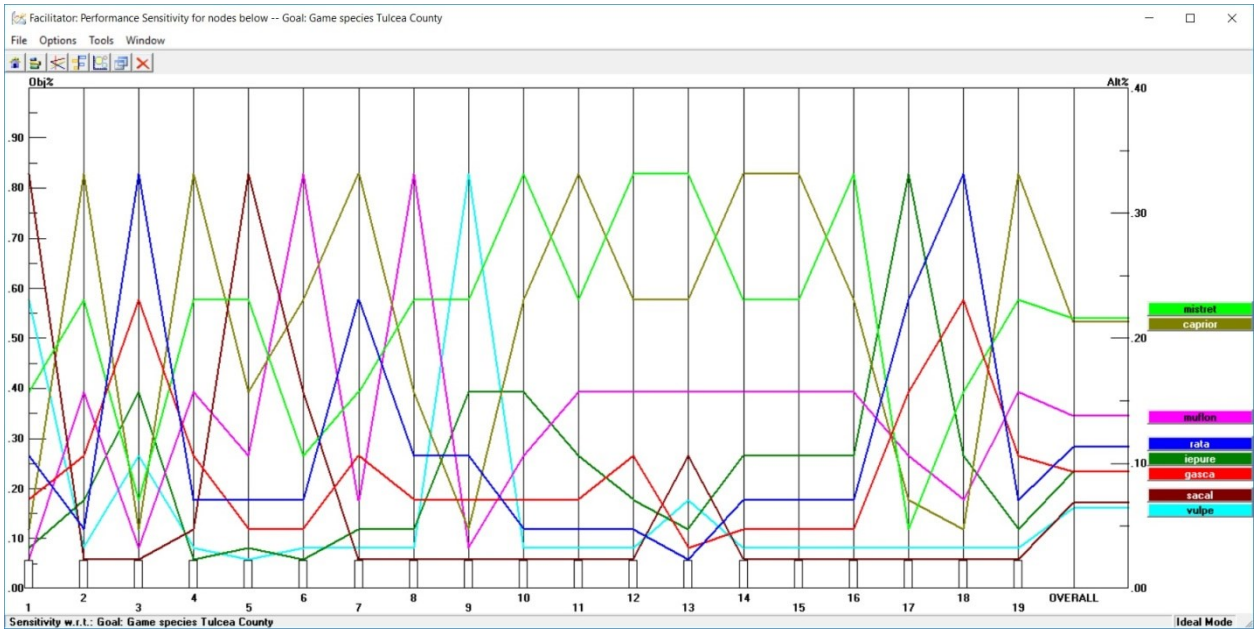

Fig. 2. Ranking of the selected game species
Source: original.

The **mallard** (ro. rață), which ranked fourth, is the most bidder bird species of hunting interest in Romania, its annual quota at national level being more than 131 thousands individuals. In the case of the second bird species from our study, namely the **white goose** (ro. gâscă), that was situated on the sixth place, the national annual quota is more than 60 thousands individuals [25], [26]. The lower performance of the white goose could be explained by the fact that it is one of the most sensitive species as regards the biotic and abiotic threats (criteria 17 and 18).

The **golden jackal** received the smallest scores in almost all the situations, with the exception of criteria 1 and 5, where it registered maximum values. This species is widespread in the entire country (from South-East towards North-West), in the ecological niche freed after the extinction of wolfs [1], [15], [24]. The largest populations can be found in the south area of the country, in Constanța and Dolj, followed by Călărași, Olt, Tulcea, Teleorman, Ialomița, Vaslui and Mehedinți Counties. In Dobrogea, the habitat conditions are favorable, as the climate is hotter and the competition reduced as wolfs have become very rare, while in Tulcea the last wolf was hunted in 1985, its place being taken by the jackal [2], [4], [13]. Largest populations of jackals (45 individuals) were found in in the southern part of Constanța County, in Cochirleni [12].

The last position in the top was occupied by the **red fox** that recorded good scores only for criteria 1 and 9. In our country, red fox populations are predominantly found in the Romanian Plain, Dobrogea, Sub Carpathian hills or Bucegi Plateau. For the previous year, it was estimated that approximately 700 red foxes would be harvested from Tulcea County.

Management measures regarding hunting in Tulcea County

In Romania, game management is determined by the hunting regime instituted through special laws and by the property regime of the territorial fund, some changes being recorded during the past century [14]. Nowadays, according to Article 58, paragraph (3) of the Forest Code (Law 46/2008), the fauna of hunting interest represent one of the main categories of non-wood forest products, together with fish from mountain waters,

forest fruits, forest seeds, truffles and edible mushrooms, medicinal plants, resin, a.s.o. Moreover, in accordance with paragraph (4) of the same article of the Forest Code, the forest products belong to their owners, with the exception of hunting and wildlife fish.

At a national level, the hunting quota for the game species is established, based on studies and field observation, by the central authority responsible for forests (*i.e*. Ministry of Waters and Forests) through a specialized directorate.

For example, in the case of crop goose the national annual quota was increased (by 7.4% times) from 3,436 (in the hunting season 2009/2010) to 25,536 individuals (in the hunting season 2015/2016). In the same timeframe, a similar trend was observed also in the case of summer goose and white-fronted goose, with an increase from 12,680 to 25,176 individuals and from 27,031 to 66,668 individuals, respectively. This fact alarmed the Romanian Ornithological Society (SOR), which protested many times against the game laws, the large harvest quotas and the extension of the hunting period for both goose species. For comparison, by taking into consideration that Romania shares with Bulgaria a large part of the habitat of the latter mentioned species, the most interesting thing is that in Bulgaria the summer goose is not hunted and white-fronted goose has a shorter hunting season. In Romania the habitat conditions are more favorable due to the lengthiness of humid habitats (especially in Tulcea County), where large goose populations are concentrated, both from hatching species (summer goose) as well as from winter guests (white-fronted goose). Along the Danube and even in the protected areas, the goose populations are much smaller [27]. The crop goose was excluded from the list of species that can be hunted due to the pressure posed by environment protection organizations, while the quotas for all the other species were reduced at national level in 2017-2018 hunting season (14,768 individuals in the case of the summer goose and 49,139 individuals in the case of white-fronted goose, respectively). This decrease has also affected Tulcea County [25], [26].

As regards the jackal, as a result of a national population increase, the quota established for this species during the last hunting seasons has increased from 7,383 to 8,298 individuals. However, for Tulcea County the quota has decreased from 572 to 501 individuals, but it could increase in future.

CONCLUSIONS

Game management must be based on scientific and organizational arguments amongst which, in our opinion, the followings are the most important ones:

- knowing the biology, morpho-anatomical, ethological and ecological aspects of the game species;
- respecting the hunting culture principles;
- protecting the game by ameliorating their life conditions, controlling the number of harmful species and fighting against poaching;
- the rational exploitation of game populations and the efficient capitalization of the resulted products and benefits.

The vegetation from Tulcea County, together with the climate specific to this area represent favorable conditions for the presence of a large number of bird and animal species. Amongst them, the most important game species are the wild boar and the roe deer, while the golden jackal and the red fox are the least important.

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