Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development
Vol. 17, Issue 4, 2017
PRINT ISSN 2284-7995, E-ISSN 2285-3952

STUDY REGARDING CERVIDAE EVOLUTION, IN GIURGIU COUNTY, BETWEEN 2006 - 2015

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Abstract

This is just a partial study for an ample research regarding evolution of species from Cervidae family in Romania. The programme is developed in collaboration with Romanian Hunter's Federation. The main purpose of this study is to reveal the reality, to find causes and to elaborate long term strategies in direction of biodiversity conservation, especially for wild game. In the last years the Romanian hunters indicate that the number of roe deer population decreasing, because of intensive agriculture and also because of high number of predators (bear, wolf and lynx population). The analysis is based on the official data from national evaluation of sedentary game in Giurgiu County. Hunting territories in this area are managed by National Forest Authority, county associations of hunters and other associations for conservation of biodiversity and management of hunting territories. The real cervidae livestock was analyzed between 2006 and 2015 by county, and sex, and in comparison with the optimal livestock (maximal number of individuals who can leave in a hunting area without causing damage to the agricultural fields or in the forest). Considering the new agricultural techniques and technologies it is relatively normal to find a numerical depreciation of wild game. In analysed period in Giurgiu County, the cervidae populations is good and representative. Also, there were analyzed the differences between what can be seen in hunting territories and what is reported. As a conclusion, the official evaluation is not perfect and the problem is to put together population from fence area (intensive growth) with the population from free area. In this case, it is needed to evaluate exactly the livestock and to developed a long term strategy for conservation of biodiversity.

Key words**:** *cervidae, evaluation, game, Giurgiu*

INTRODUCTION

It is a certitude that in the hunting areas the number of game species has decreasing. This situation was detected by hunters, no matter the hunting territories that they used for hunting. All over the world, scientific organizations, hunter's associations and organizations involved in environmental protection collaborate in the direction of conservation of the environment and biodiversity, implicitly in the protection of wildlife. The subjects of this researches are mainly the members of cervidae species. A lot of researches have as principal subject the red deer, especially in North America and in North – Western European countries. The themes aim are deep, detailed topics, mainly focused on the influences of the special and general environment on behavior, growth rate, etc., as well as pathological aspects. So, in Scotland, S.D. Albon, F.E. Guinness, T.H. Clutton-Brock, studies the influence of climatic variation on the birth weights of Red deer [1]. In Slovakia, Trdan S., Vidrih M., Vesel A., Bobnar A., shows that, at the forest border, because of red deer grazing, the herbal production is damaged with 50% [14]. In this case, probably they have a big density or it is a temporary agglomeration. In 2000, J. Slate L., E. B. Kruuk, T. C. Marshall, J. M. Pemberton, T. H. Clutton-Brock, analyzing a red deer population in the Islands of Rum (Scotland), demonstrate that inbreeding depression influences lifetime breeding success in wild population of red deer [13].

In Europe, a big project was "Big carnivores in Carpathians" (1995-2003) developed by WWF in Romania. The aim of this project was to analyze the wild livestock of brown bears, wolves, lynx and wild cat and to determinate the status of this species. The conclusions was that all this four species of predators are

endangered and must be protected. It is interesting that in the middle of '90's, some Romanian researchers show that the Romanian brown bear was the biggest livestock from Europe [4]. More than that, the brown bear real number was almost three times bigger than the optimal number [10] (optimal population – maximum number of individuals who can live in an area without depreciating forest and agricultural crops [8]). Protection of this predators led to decreasing of prey species, especially of that species that cohabitate in the same area with the brown bear and wolf. We refer here especially to red deer and roe deer. In almost the same time, from South, a new predator arrive in Romania: the jackal (Canis Aureus). In the past, some individual of Canis Aureus was observed in South-East of Romania, more exactly in Dobrogea area, and especially in Danube Delta. But this time, jackals was hunted in Alba County, at more than 400 km from the South border. In comparison with foxes, jackals prefers small game and roe deer and red deer kids. In the absence of a predator, the number of jackals has increased numerically and has expanded vertiginously. It is a fox competitor and, due to superior physiological and morphological characteristics, he became the predominant predator of the roe deer and even red deer, preferring the youth, but not getting back in front of the mature specimens, especially in the case of roe deer. In this situation, when in the field the red deer has became a rarity, and the red deer it is obvious at a lower level, it is a must to know the real livestock and the real evolution of species, in order to developing medium and long-term strategies for the conservation of cervidae species. We cannot leave aside the economic aspects, the deer representing the second species of hunting interest in Romania (after the rabbit) [3], and the deer, by the species characteristics and hunting fees practiced.

Regarding the fallow deer, it is not a autochthonous species. In Romania the fallow deer was imported, for the first time, in centuries I-II, by Romans, being bred in fence area. After barbarians invasion, the fallow deer escape from this fence areas and became wild[9, 11]. In 1830 fallow deer were colonized in a forest with an area of 4,000 ha, situated along Crisul Negru, (today's territory of Hungary), on the border with Romania. Due to the existence of the wolves, entire stock grew hard. Because of this, in 1900 the forest and a part of the agricultural land has closed. Due to the favorable conditions the fallow deer stock has grown so much that it has created important forest damage. So, after about 15 years (roughly in 1915) the fence area has disbanded and it is supposed that some fallow deer has moved to the forest of Socodor, located at 9-12 km [2]. In 1918 the fallow deer in Romania numbered 500 individuals grouped in nine cores. The only individuals who lived in freedom were at Savarsin and Socodor, Arad County [5].

In 2007, according to the "Report on Romania's state of forests in 2007" the fallow deer livestock from freedom was evaluated at 5,700 specimens [6]. Unfortunately, the economical value and the interest for hunting this species is low. More than that, due to physiological, ethological and morphological characteristics, the fallow deer is a food competitor for roe deer and red deer.

MATERIALS AND METHODS

It was analyzed the official data from national evaluation of sedentary game in Giurgiu County area, more exactly for roe deer, fallow deer and red deer and it was calculated statistics, in order to have a better view of situation. The hunting territories in this county are managed by National Forest Authority, county associations of hunters and other associations for conservation of biodiversity and management of hunting territories.

It was analyzed the livestock of Cervidae between 2006 and 2015 by sexes, and in comparison with optimal livestock, in accordance with the rating keys for hunting territories [7, 12].

There were also used some statistics like average population, standard deviation, error of average, and variability coefficient in order to have a better overview of the population evolution. In other way, our study is based on

the official reports of hunting areas administrators, centralized at ministerial level, due to the fact that the evaluation of cervidae species, on such a large area, involves a huge number of observers and a lot of time (in according with the methodological norms for game evaluation in Romania). More than that, a correct evaluation must be done in the same time for all 42 hunting areas from Giurgiu County (over 300,000 ha), Romania.

RESULTS AND DISCUSSIONS

Analyzing the data from Table 1 and Figure 1, we can easily observe that the livestock is relatively stable until 2012, when the fallow deer population increasing from 84 to 136 individuals.

Table 1. Real livestock of cervidae in Giurgiu County

Year	Roe Deer *(heads)*	Fallow Deer *(heads)*	Red Deer *(heads)*
2006	2,157	78	115
2007	2,180	78	110
2008	2,293	83	121
2009	2,351	82	110
2010	2,398	84	105
2011	2,391	86	105
2012	2,369	84	105
2013	2,407	136	102
2014	2,503	189	101
2015	2,669	268	100

Source: Own calculation

As we expected, the roe deer is dominating, from numerical point of view, the other two species, being the most important species of big game in south east, after the wild boar.

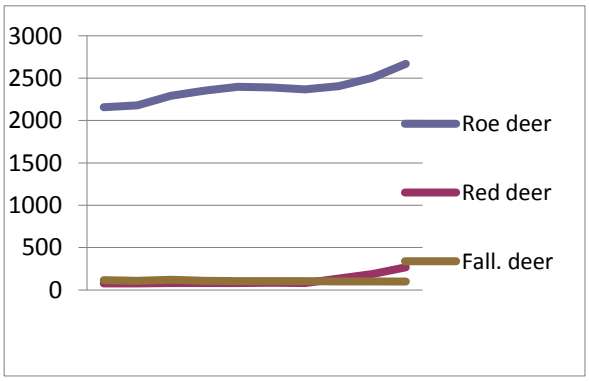

Fig. 1. Graphic representation of cervidae evolution
Source: Own determination

For red deer, the individuals are mainly located in the meadow of the Danube. In the rest of Giurgiu County we can find red deer in only one hunting fence areas - Singureni. The fallow deer is breeding al in two hunting fence areas: Singureni and Bolintin.

Analyzing by species we find, in red deer population (figure 2), an increasing number of males starting from 2013 till 2015, with an yearly average of 42.85% in 2013, 32.5% in 2014 and 24.53% in 2015. Females and youth livestock have almost the same evolution (41.67% in 2013, 39.67% in 2014, etc.).

The natural increasing rate for red deer is normally 15%. This situation, revealed above, it is a unreal due to the fact that in official evaluation was put together the individuals from free area and individuals from hunting fence areas, even if this last individuals does not have the same legal regulation. We can say that this is a huge mistake because we have now an inexact, an unreal image of red deer situation.

The statistics calculated for red deer is presented in table 2

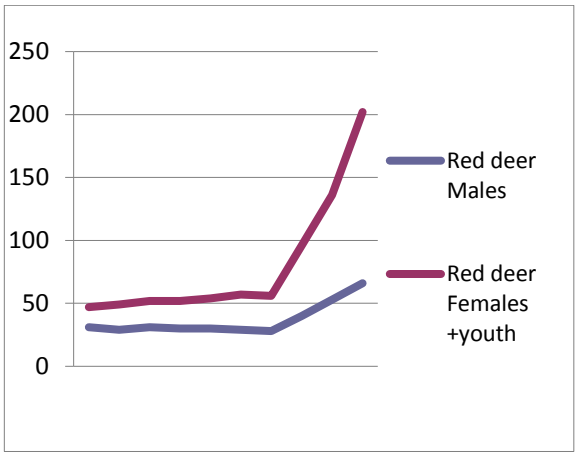

Fig. 2. Graphic representation of red deer evolution
Source: Own determination

We must say that the fallow deer it is breed in these two fence areas: Bolintin (administrated by National Forest Authority) and Singureni (administrated by Hunters Asociation "Bradul"). In this last case we talk about a mixt breeding: wild boar, fallow deer, roe deer and red deer. Calculated statistics for this species is presented in table 3.

Table 2. Calculated statistics for red deer

Specification	Red deer		
	Total, from which:	Males	Females & youth
2006	***78.00***	31.00	***47.00***
2007	78.00	29.00	49.00
2008	83.00	31.00	52.00
2009	82.00	30.00	52.00
2010	84.00	30.00	54.00
2011	86.00	29.00	57.00
2012	84.00	***28.00***	56.00
2013	136.00	40.00	96.00
2014	189.00	53.00	136.00
2015	**268.00**	**66.00**	**202.00**
X	116.80	36.70	80.10
STDEV	64.04	12.84	51.29
Sx	21.35	4.28	17.10
CV%	54.83	34.99	64.03

Source: Own calculation

In Figure 3 it is represented graphically the evolution of fallow deer in Giurgiu County.

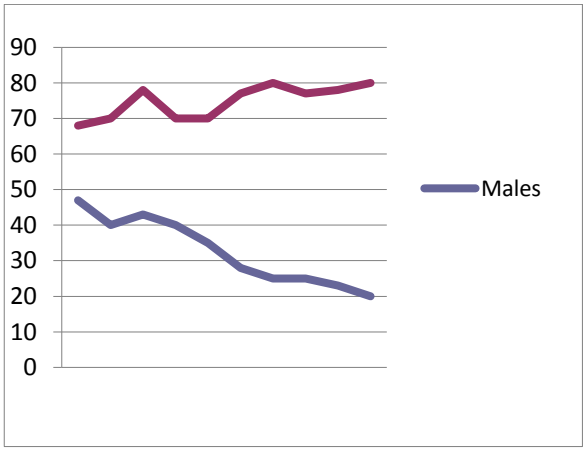

Fig. 3. Graphic representation of fallow deer evolution
Source: Own determination

In the male case it is obvious a numerical involution (-42.55%). For females and youths we record a constantly increasing but with a low intensity (about 17.65% between 2006 – 2015). From economically point of view, the increasing of fallow deer population it is not a good idea. Hunters interest for this type of cervidae is low, and the hunting and economic value is also low. In comparison with the others two species of cervidae that was analyzed, the fallow deer is cheap, being lower than red deer and near the red deer, as we can observe in Figure 3.

Table 3. Calculated statistics for fallow deer

Specification	Fallow deer		
	Total, of which:	Males	Females & youth
2006	115.00	47.00	***68.00***
2007	110.00	40.00	70.00
2008	**121.00**	43.00	78.00
2009	110.00	40.00	70.00
2010	105.00	35.00	70.00
2011	105.00	28.00	77.00
2012	105.00	25.00	80.00
2013	102.00	25.00	77.00
2014	101.00	23.00	78.00
2015	***100.00***	***20.00***	**80.00**
X	107.40	32.60	74.80
STDEV	6.65	9.54	4.71
Sx	2.22	3.18	1.57
CV%	6.19	29.25	6.30

Source: Own calculation

In roe deer population we observe a constant trend, with low fluctuation. In male case we remark an involution, from numerical point of view, between 2010 – 2011 (-9.41%). In 2012 the increasing was insignificant - only 0.12%, in 2013 and 2014 we talk about +3.58%, and in 2015 we observe an increasing of 7.03%.
Graphic representation of roe deer evolution is presented in Fig. 4 and statistics in Table 4. The roe deer females record an increasing between 2006 and 2011.

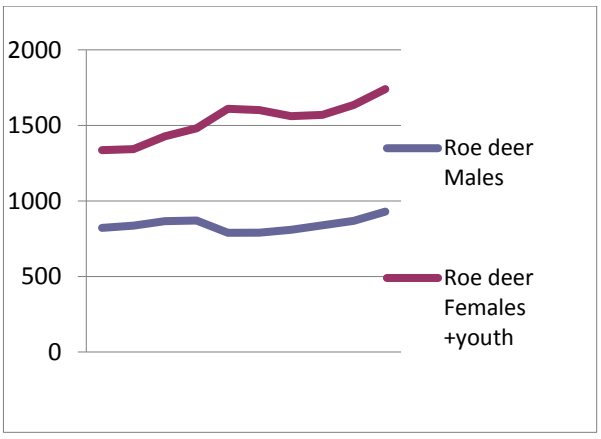

Fig. 4. Graphic representation of roe deer evolution
Source: Own determination

Table 4. Calculated statistics for roe deer

Specification	Roe deer		
	Total, from which:	Males	Females & youth
2006	***2,157.00***	821.00	***1,336.00***
2007	2,180.00	837.00	1,343.00
2008	2,293.00	865.00	1,428.00
2009	2,351.00	871.00	1,480.00
2010	2,398.00	***789.00***	1,609.00
2011	2,391.00	790.00	1,601.00
2012	2,369.00	809.00	1,560.00
2013	2,407.00	838.00	1,569.00
2014	2,503.00	868.00	1,635.00
2015	**2,669.00**	**929.00**	**1,740.00**
X	2,371.80	841.70	1,530.10
STDEV	148.10	43.07	130.95
Sx	49.37	14.36	43.65
CV%	6.24	5.12	8.56

It is interesting to analyze that from 2012 till 2013 we observe a decreasing of females and youths, at fix one year difference from the decreasing of males.

All this situation can be attribute to the decreasing number of youths because of inadequate sex ratio. Practically some females was not mated.

The principal factors was the moment of resigning of management contracts for hunting areas. In this case, a large part of administrators extract the game a little bit illogical. Attention! Maintaining a sex ratio, in roe deer population, 1 female for 1.1 or maximum 1.5 males it is a good measure to maintain a good and strong population.

CONCLUSIONS

The evaluation of game population is totally unclear. Some species, like fallow deer, are absent in free hunting areas but appear in national evaluation because of breeding in fence areas. It is a must to have an evaluation only for free hunting areas and separately for fence hunting areas.

Exaggerate extraction of roe deer males, and an unbalanced sex ratio can lead to decreasing of population from numerical and qualitative point of view.

We strongly recommend:

-Compulsory, for hunting areas administrators, to maintain a population with an ascendant trend till to the optimal population;

-Implication of hunters in surveillance of obligatory action of administrators (evaluation, feeding, etc.);

-Active implication of national hunting area administration in game evaluation;

-Compulsory, for hunting areas administrators, to maintain the sex ratio and all technical parameters in order to conserve and preserve biodiversity;

-Realization of some areas reports regarding principal factors who influenced the diagnosis keys;

-Respect the term:"selection hunting";

-Diversification of fence hunting areas activity in direction of repopulation in free hunting areas.

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