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Population Trends of the Most Common Large Game in the Hunting Area in Eastern Croatia in 2008 – 2018

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Abstract

Red deer, roe deer, and wild boar belong to a group of large game and are the most common species of game in the hunting area in Eastern Croatia. The research was conducted by the company hunting staff in the Osijek-Baranja County, area of Kućanci in the interval from 2008 to 2018. Knowing the number of wildlife in the hunting area is the base for establishing growth and planning shootings. It is important to keep the balance in the hunting ground to avoid transmission and spreading of diseases and reduce traffic accidents as well as vehicle and wildlife damages. Given the fact that populations of large game have great importance in Croatia, the main objective of the study was to determine population trends of red deer, roe deer, and wild boar in the hunting ground in Eastern Croatia in 2008 – 2018.

Key words: red deer, roe deer, wild boar, population, hunting area.

Introduction

Red deer, roe deer, and wild boar belong to a group of large game and are the most common species of game in the hunting area in Eastern Croatia. Red deer (*Cervus elaphus*) is one of the largest deer species. Frequently called "king of the woods", it can be seen in Europe in the forest compounds of main watercourses – Danube, Sava, Drava, and mountain woods of Croatia, Slovenia, Hungary, Germany, Austria, Romania, Slovakia, and the Czech Republic. Lower density of red deer population can be found in Poland, Norway, Spain, Sweden, France, Denmark, and the European part of Russia. Regarding the condition in Croatia, the red deer is pretty numerous in the areas of Baranja and Slavonia, as well as in Gorski Kotar.

In accordance with the LSO (2019), the lifespan of a red deer is 15-20 years. According to Darabuš and Jakelić (2002), there are plenty of causes of population reduction. Wolves, bears, lynxes, and poachers are the main natural enemies of the red deer. Weather disasters like deep snow, ice, fires, and floods can as well produce a significant population decrease. At last, the death rate in the population of red deer could be caused by traffic (Darabuš and Jakelić, 2002). In recent decades, roe deer (Capreolus capreolus) have established their numbers significantly and today are found everywhere around Europe except Iceland, Ireland, north Scandinavia, and the Mediterranean islands (Gaudry et al., 2018; Padie et al., 2015 and Bonnot et al., 2017). Roe deer can endure an extensive climate ranges, from high cold sites in the Alps where they can be seen at heights of up to 3000 meters, also in the winter depths, toward dry heat of the Balkan karst. Populations of wild boar (Sus scrofa) are detected in most of Europe, in the north to the Baltic and North Seas. However, they no longer exist in the British Isles, even though reintroduction has been considered (Blüchel, 2000).

In the Republic of Croatia, we find them on the entire territory even on the isles, where they are unwanted. It was ascertained that there were nearly 300 wild boars in Croatian hunting grounds after the Second World War. Today in Croatia there are over 10,000 wild boars (Darabuš and Jakelić, 2002). Climate is the natural limiting factor for the spreading of wild boar. In past years we have witnessed progressive warming with milder winters. As a result, offspring can die due to severe climatic conditions (Janicki et al., 2007). Following Olczak et al. (2015), in severe conditions wild pigs make more powerful nests. When it comes to climate disasters, frost without snow is the most dangerous for wild boars. Rooting is a significant way to find food and if the ground glaciates then wild boar cannot root. According to Merta et al. (2015), breeding and existence of a wild boar population are formed by the quality and availability of the food

supply, hiding and thermal cover, climate, climate conditions, large predators and hunting.

Especially, age groups of wild boars differ in rates of survival and fertility. According to Gavran d.o.o. (2019b), the first initial data on the hunting ground appeared in the year 1721. Then, Karlo VI bestowed Baron Prandau land and woods south of the Drava River while serving in the war against Turks.

Additionally, throughout the First World War and right after, poaching destroyed most wildlife. Besides, in 1938, a long and sharp winter had a great influence on wildlife. Until the Second World War, game number increased. In According to the Gavran d.o.o. (2019a), the hunting ground nowadays forms a natural complex of 9364 hectares, located in Eastern Croatia and wildlife game populations equal in number live in the whole territory. The cultivated surface of the ground in the hunting grounds is utilized for planting bushes for wildlife, foremost grasslands, for increasing the nutritional potential of hunting areas as well as the wild game number. Furthermore, some areas, such as pastures and meadows, are used for grass production.

Material and Methods

The research was carried out in the Osijek-Baranja County, area of Kućanci in the period from 2008-2018. The analyzed data in the article is the property of Gavran d.o.o. company and investigation was made by the company's hunting staff. For the purpose of this research, data from annual plans and hunting bases were used to analyze the number of big game and gender structure in the observed area. Following Gavran (2019a), the hunting area was managed by Croatian Forests Ltd. Zagreb until 2005. Since then Đurđenica hunting area has been separated into 5 new hunting areas, which have been given for concession or lease.

The Gavran d.o.o. company became a concessionaire of the Kapelački lug hunting area and has been managing 5738 hectares of the hunting area. The Prkos d.o.o. company, which is a secondary company of Gavran d.o.o., is managing the marginal Đurđenica hunting area of 3626 hectares and has a business collaboration agreement with Gavran d.o.o., offering sales services of commercial hunting in that hunting area. The two hunting areas create a natural compound of 9364 hectares and the same number of deer game population lives in the area. Bearing in mind the hunting area organization, the hunting crew of the Gavran d.o.o. company fixed the present hunting-technical and hunting-management facilities in the hunting area, and as well built the new ones.

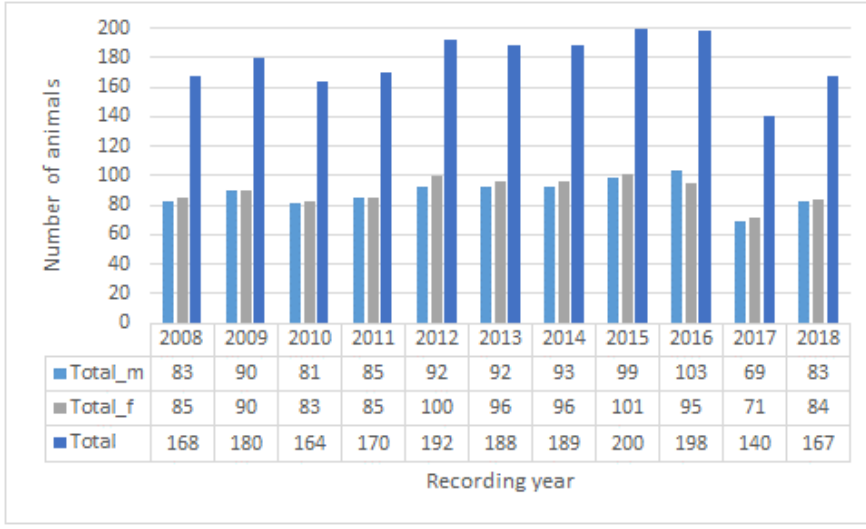
The cultivable area in the hunting grounds is used for planting game fields, first of all clover grass mixtures for increasing the hunting capacity of

the hunting grounds and wildlife number in the hunting area. Red deer, roe deer, and wild boar are the main game species represented in the hunting ground.

Some other species can also be found, such as a badger, wildcat, pine marten, brown hare, fox, jackal, polecat, pheasant, woodcock, common wood pigeon, mallard, hooded crow, common magpie, and jay. As regards the technical equipment of the hunting area, the following facilities have been set up there: food storage facilities, feeders for deer, roe deer, and wild boar, salt pans, and high checks.

Results and Discussion

During the analyzed period from 2008 to the yea 2018, the total number of red deer ranged from 140 to 200 in the hunting ground in Eastern Croatia. the number of males (deer) ranged from 69 to 103, while the number of females (hinds) ranged from 71 to 101. The highest number of deer was recorded in 2016 and the largest number of hinds was in 2015. The number of red deer was reduced in 2017, the smallest number of both gender, males and females, was recorded due to a research study performed by "INA" d.o.o. Zagreb. In the period 2017/2018, 23 heads of red deer were released into the hunting ground, while during the period 2018/2019, 37 heads of deer game were released.

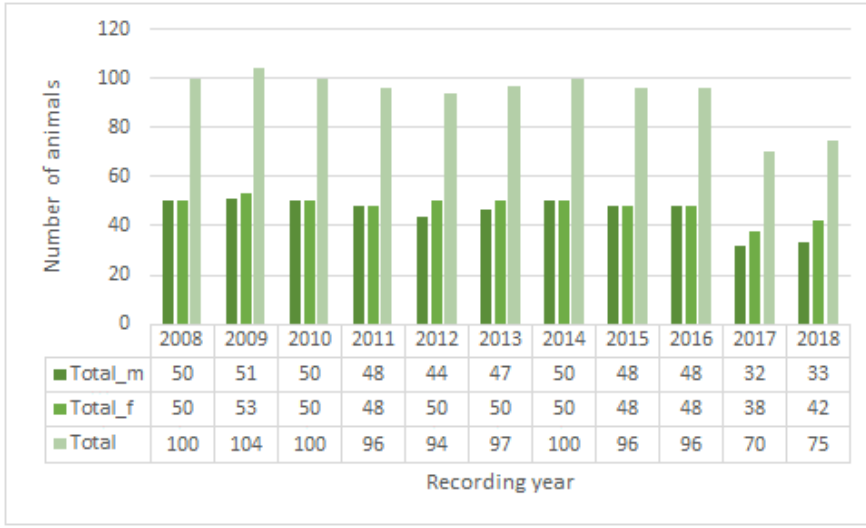


	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total_m	83	90	81	85	92	92	93	99	103	69	83
Total_f	85	90	83	85	100	96	96	101	95	71	84
Total	168	180	164	170	192	188	189	200	198	140	167

Graph 1. The total number of males and females (red deer) in the 2008 – 2018 period. (Total_m - total males; Total_f - total females)

The total number of roe deer ranged from 70 to 104. The number of males ranged from 32 to 51 and the number of females ranged from 38 to 53. The biggest number of males (bucks) and females (does) was recorded in 2009.

The smallest number of bucks and hinds was recorded in 2017, the same situation as red deer. The company's hunting staff gave us the information that in 2017 and 2018, the number of roe deer was reduced due to a research study conducted by "INA" d.o.o. Zagreb.



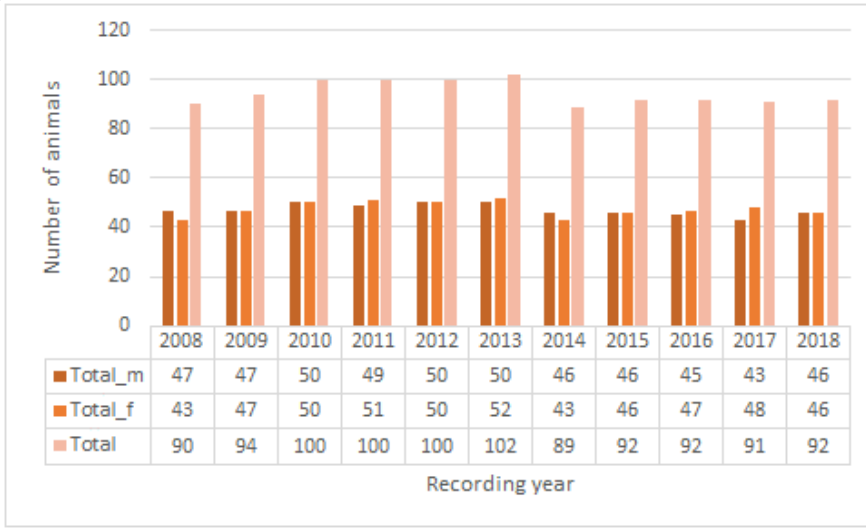
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total_m	50	51	50	48	44	47	50	48	48	32	33
Total_f	50	53	50	48	50	50	50	48	48	38	42
Total	100	104	100	96	94	97	100	96	96	70	75

Graph 2. The total number of males and females (roe deer) in the 2008 – 2018 period. (Total_m - total males; Total_f - total females)

The total number of wild boar population ranged from 89 to 102. The number of males ranged from 43 to 50 and the number of females ranged from 43 to 52. The biggest number of males (boars) was recorded in 2009, 2012 and 2013. The highest number of females (sows) was recorded in 2013. The smallest number of boars was recorded in 2017, while the lowest number of sows was in 2008 and 2014.

In the 2013 – 2017 period data about roe deer were gathered and another study was made at the level of Croatia. According to Bagarić (2018), with over 60000 individuals, roe deer is the most populated species of all ungulates in the Republic of Croatia and it is spread through all counties. In 2016/2017 it also appeared in Dubrovnik-Neretva County where it was not present until then. In 2005 there were 45320 roe deer in Croatia and 8127

throats were shot. On the other hand, in 2016/2017 a base stock of game was 65936 heads and 15389 were shot. Accordingly, the number of roe deer in Croatia has increased significantly over the past ten years.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total_m	47	47	50	49	50	50	46	46	45	43	46
Total_f	43	47	50	51	50	52	43	46	47	48	46
Total	90	94	100	100	100	102	89	92	92	91	92

Graph 3. The total number of males and females (wild boar) in the 2008 – 2018 period. (Total_m - total males; Total_f - total females)

In accordance to Plard et al. (2014), the reduced growth rate of roe deer appears to be attributable to present climate change and it is likely to get more critical since the spring vegetation flush continues developing with global warming. According to Pittiglio et al. (2018), wild boar populations management and control require correct and exact space information on species distribution and number. Their results showed that winter sharpness, temperature, and rainfall aberrations, along with vegetation composition, are the principal macro-ecological determining factors of the wild boar allocation and abundance in northern and moderate ranges, particularly as they influence the population dynamics, especially the survival of new-born piglets.

Significant elements for the dynamics of the population of different ungulate species are climate conditions. Further, conditions of the environment influence the existence of offspring together with the breeding of mature animals. (Geisser and Reyer, 2005). Regarding the red deer, negative correlation with climate conditions could happen when increased energy needs during the cold weather (Parker and Robbins, 1985) force the animals to use complementary farmland and as a result reveal themselves to the natural enemies - hunters.

According to Owen-Smith (2010), male survival (red deer) was more changeable than that of females at all phases, since calving to maturity.

Adult females appeared less sensitive to extreme density or climate conditions than males. Higher temperatures had a positive impact on population increase and juvenile survival.

Based on Conservation Magazine (2015), the wild boar population is growing throughout the continent, while the increasing rate differs as regards the region. According to Vetter et al. (2015), climate change is known to affect ecosystems worldwide, but a comprehension of its influence on big and widespread animals, and likely population-specific responses, are still rare. In that research the wild boar was used as a model species. Results that reveal that population expands across Europe are strongly correlated with increasingly mild winters, yet with region-specific threshold temperatures for the start of exponential increase.

They also discovered that abundant access to important food resources, for example beechnuts, can outbalance the negative consequences of cold winters on wild boar population growth. According to Muže (2018), by counting heads at the start of the hunting year, the real number of wild game is defined and could be bigger or lower than the predetermined fund.

Nevertheless, for the purpose of managing the game fund economically, it is important to comprehend it and diminish it to the ideal state due to the subsequent reasons: controlling damage can be achieved by sustaining the optimal number of game per unit area. In order to decrease their number, the game number needs to be reduced, particularly the wild boar population to a bearable level. With too much wildlife, traffic accidents have been growing and resulting in damage to vehicles and wildlife. Red deer, wild boar, roe deer, and brown bear are the biggest and most expensive damages. The number of required feeding sites and other hunting facilities is calculated in regard to the wildlife number. In line with the number of a game per unit of the hunting area, the type and amount of game feeding are calculated and the areas for processing and planting cultures are defined. The aforementioned improve environmental conditions and retain game in the hunting area.

Knowing wildlife number is the base for establishing growth and planning shootings. In case of a higher number of wild animals at the beginning of the season than the prescribed fund, it is diminished to the prescribed parent fund by a reduction shoot. The relationship between gender and age structure in the desired direction is also corrected by the shoot. The number estimates give information on horizontal and vertical game movements, and including indicators like perennial hunting, game damage provides information about the size and population trend, its stability, growth, or decline. One of the factors that depend on whether or not the disease will

occur in the hunting area is sustaining optimal population density. Exorbitant density can be helpful for the spread and transmission of contagious diseases that can directly or indirectly endanger people.

Conclusion

The number of large game in the hunting ground is mostly constant, except for 2017 and 2018, when the number of red deer and roe deer decreased due to the research study. Given that the study area has favourable climate conditions that do not have a very detrimental effect on wildlife, this number could increase in the future. Climate conditions are significant elements for the dynamics of the population of different ungulate species. Knowing the number of wildlife in the hunting area is the base for establishing growth and planning shootings. It is important to keep the balance in the hunting ground to avoid transmission and spread of diseases and reduce traffic accidents as well as vehicle and wildlife damages.

Taking into account the fact that the hunting ground has many available resources and there is a meaningful human activity that can regenerate a wildlife population by releasing heads, there is a probability that the number of red deer and roe deer game will increase slowly year after year, and by maintaining optimal conditions, the number of wild boars will remain constant.

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Трендови популација најчешће крупне дивљачи у ловишту у Источној Хрватској у интервалу 2008. – 2018.

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Сажетак

Јелен обични, срна обична и дивља свиња припадају скупини крупне дивљачи и најчешћа су врста дивљачи у ловишту у источној Хрватској. Истраживање је провело ловно особље тврtке у Осјечко-барањској жупанији, подручје Кућанци у интервалу од 2008. до 2018. године. Познавање броја дивљих животиња у ловишту је основа за успостављање раста и планирање одстрјела. Важно је одржавати равнотежу у ловишту како би се избјегло преношење и ширење болести те смањиле прометне несреће, као и штета на возилима и дивљачи. С обзиром на чињеницу да популације крупне дивљачи имају велику важност у Хрватској, главни циљ истраживања био је утврдити популацијске трендове јелена обичног, срне обичне и дивље свиње у ловишту у источној Хрватској у интервалу од 2008. до 2018. године.

Кључне ријечи: јелен обични, срна обична, дивља свиња, популација, ловиште

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