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COMMON PHEASANT (*Phasianus colchicus* L.1758) MANAGEMENT IN SERBIA

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SUMMARY

The common pheasant (Phasianus colchicus L. 1758) is an allochtonous game species of great importance to the hunting sector in Serbia. Growing concerns over a decline in its population raise issues about the proper management and hunting of common pheasants. As this research tends to identify the importance of common pheasants to Serbian hunters, the present study is based on a mixed research model combining traditional analyses with social studies on Serbian hunters. The data utilized have been collected from the annual management plans of 272 hunting grounds across Serbia and the interviews with 377 hunters. The results obtained suggest that there are significant differences between the analyzed variables in the management plans examined, which indicates that the pheasant hunting management in Serbia is not harmonized. However, the social studies conducted identify the common pheasant as the most hunted and popular game species with Serbian hunters. Accordingly, the common pheasant hunting and management in Serbia has to be improved in order to meet the hunters' expectations and ensure their satisfaction.

Key words: Phasianus colchicus, game management, hunters

INTRODUCTION

The common pheasant (*Phasianus colchicus* L.) is a bird species featuring a wide habitat range across the Northern Hemisphere. A number of authors (Stanković et al., 1992, Gajić & Popović, 2010) argue that the common pheasant has originated in the Central Asia, whereas the IUCN Red List (2019) also identifies it as a native species in the Far East countries such as China, Taiwan, Viet Nam and Korean Peninsula. Furthermore, the common pheasant can be found in Northern America, both in the United States and Canada, and several islands in the Caribbean and the Pacific. In Europe, it is present almost across the entire continent, except the Iberian Peninsula, Alps, Baltic countries and northern parts of Scandinavia (Map 1). Such a wide range of distribution is associated with human efforts to introduce common pheasants into non-native natural habitats.

Ristić & Trifunović (2016) believe that the common pheasant presence in Europe can be traced back to antiquity, becoming an abundant game species during the XIV and XV century. Stanković et al. (1992) claim that pheasants have been breed since the V century B.C. in the ancient Greece. However, Jevremović & Jovančić (2009) state that pheasants have existed in Europe since the Middle Ages. Nevertheless, all these authors agree that pheasants have been present in Europe as a allochthonous game species for at least several centuries and are very popular with European hunters. The common pheasant was introduced into Serbia in 1880 by King Milan Obrenović on his estate in Toponica near Niš (Čeović, 1953; Stanković et al., 1992; Jevremović & Jovančić, 2009) and has played an important role in the Serbian hunting sector ever since. However, the common pheasant, as an allochthonous game species, has never completely adapted to Serbian habitats and its existence has had to be supported with periodical

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 introductions of stocks raised on game farms (Suchy et al., 2008; Popović et al., 2011a; Đorđević et al., 2017). The common pheasant is a game species popular with hunters due to attractive appearance, delicious meat, high abundance and hunting practice. Pheasants are mostly hunted in group hunts with bird dogs, which hunters especially enjoy. However, studies on hunters are scarce and do not appeal to scientists in Serbia. Under such circumstances, there is a limited body of data on the importance of both pheasant hunting and management. Moreover, growing concerns over a decline in their population raise issues about the proper management and hunting of common pheasants (Gajić & Popović, 2010; Popović et al., 2011; Ristić et al., 2013). As a decrease in the common pheasant abundance would have a negative effect on the Serbian hunting sector, the pheasant management in Serbian is gaining increased attention.
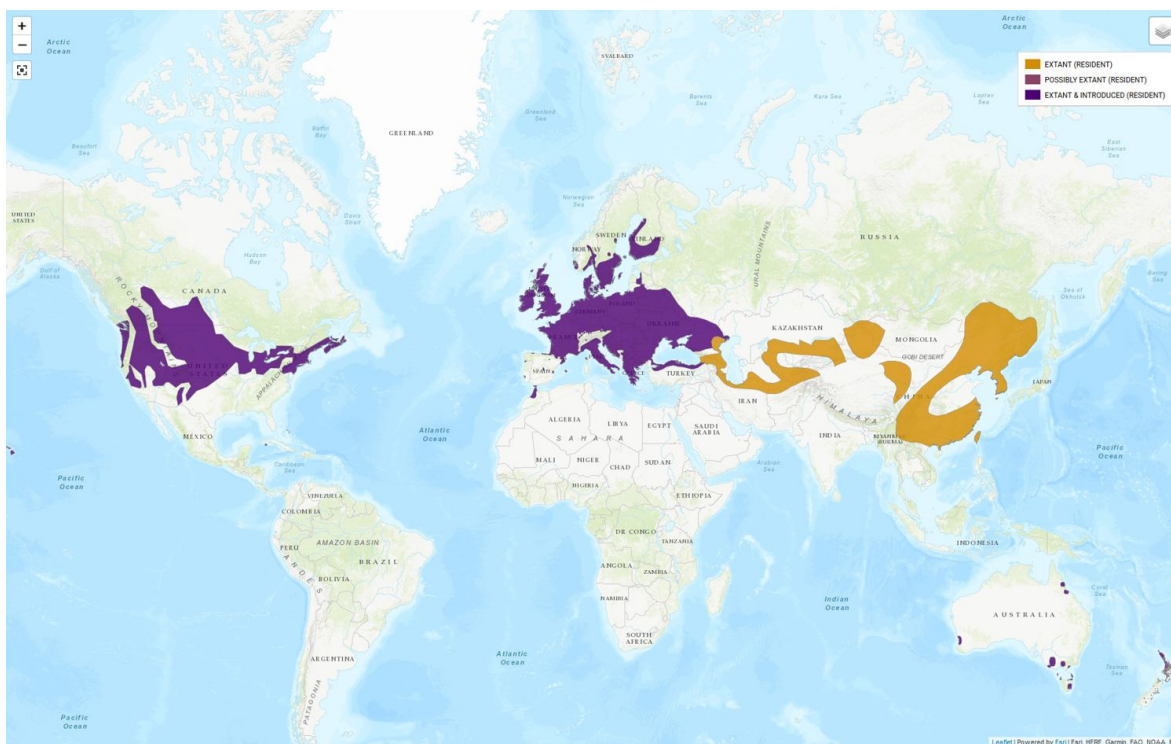
Map 1. Areal distribution of the common pheasant in the world (IUCN Red List, 2019)

The purpose of this study is to identify the features of common pheasant hunting and management in Serbia with an emphasis on the species presence in Serbia and the importance to the Serbian hunting sector.

MATERIALS AND METHODS

In order to determine the abundance of common pheasants in Serbia, the official hunting statistics were used. The game management features were collected from hunting grounds across Serbia, for the hunting season of 2012/13, by the Directorate of Forestry on behalf of the Ministry of Agriculture and Environment (former Ministry of Agriculture, Forestry and Water Management), as part of their regular activities. The experimental data were collected using a questionnaire (created by the Directorate of Forestry), which was distributed to every hunting ground in digital form. The questionnaire forms were created in the Microsoft Office Excel 2007 file. Each hunting ground user was obliged to provide the data on game management characteristics from their annual management plans. A total of 272 out of 354 hunting grounds, which is 77% of all the hunting grounds in Vojvodina and Central Serbia, provided the required data. Such sample has a confidence interval of 2.85 (Creative Research Systems, 2007) and it can be considered biased because it includes only the hunting grounds which provided the data to the Directorate of Forestry. The rest of the hunting grounds did not provide the data due to unknown reasons. It is likely that some of them were not able to do so because they were newly established due to changes occurring in the sector. Although the data collected are not the most representative of the hunting sector in Serbia, they still provide the best sample under given circumstances. The survey was conducted at the national level, with the exception of the Autonomous Province of Kosovo and Metohija.

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A questionnaire was compiled for the purpose of collecting data on Serbian hunters' opinions. A simple random sample was chosen as the most appropriate sampling method so that all hunters have equal opportunities to be chosen. The sampling frame consisted of those hunters who purchased a hunting license for the hunting season of 2011/12. The list of hunting licenses was analyzed in order to delete duplicates and foreign hunters. The sample size was calculated with a confidence interval of 4.95 and a confidence level of 95% for a population of 85,000 hunters although the filtered list contained 76,266 hunters. The final sample size embraced 390 hunters, who were selected by the research randomizer (Randomizer, 2012). The process of establishing a random sample is presented in Figure 1.
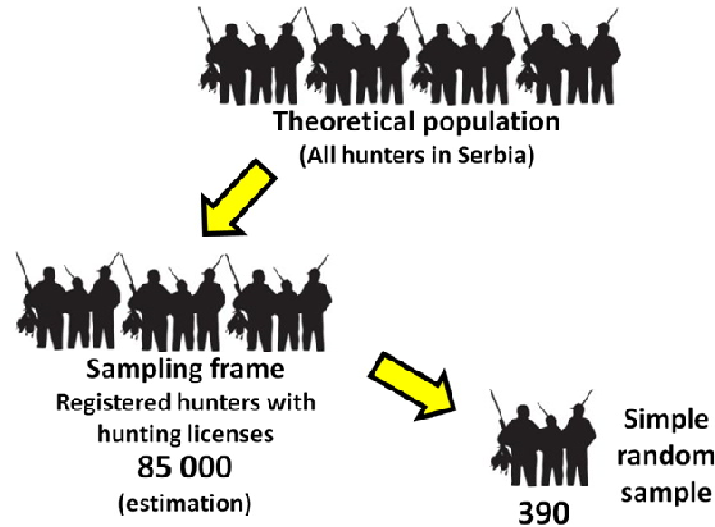

Figure 1. Process of creating a simple random sample

Subsequently, a map of hunter distribution was made in Arc GIS 9.3. A list of hunters from the Excel program was linked with a graphic map, thus providing a number for each settlement which was used as the ID code. This layer was applied on the TK 100 topographic map of Serbia with the 1:100 000 scale. A visual distribution of hunters was used to organize the data collection. In order to make data collection easier and more efficient, Serbia was divided into several regions according to the sample distribution of hunters (Map 2). All the hunters were interviewed personally using the face-to-face method.

For description of the data collected, means and standard deviations were used for the numerical data, whereas frequencies and percentages for the categorical data. For testing the difference between various groups, t-tests were used for independent samples as well as one-way ANOVA tests. Differences between the repeated measurements were tested using paired sample t-tests. For dependent and independent variable analyses, multiple regression (if criterion was numerical) or binary logistic (if criterion vas binary) regression analyses were used.

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Map 2. Sample distribution of hunters in Serbia

RESULTS AND DISCUSSION

Calculations based on the data obtained from the hunting grounds under consideration estimate that the common pheasant population in Serbia amounts to 295,563 individuals, which is slightly over the optimal size of 293,046 birds. Therefore, these results suggest that the common pheasant population is overabundant. Same findings set the planned shooting quota at 215,376 individuals which is around 73% of the total abundance. However, the realized shooting quota is 117,779 individuals, which is around 40% of the entire population. The estimates of the common pheasant population obtained from the Statistical Yearbook of Serbia (2019) for the period 2011-2017 (Tab. 1) suggest that the population size is increasing, whereas culling is decreasing.

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Table 1. Common pheasant population size and hunters' bag per year (Statistical Yearbook of Serbia, 2019).

Year	Population number (thousands)	Hunters' bag (thousands)
2011	337	162
2013	344	146
2015	334	128
2017	350	141

The data obtained from the hunting grounds' management plans and the Statistical Yearbook suggest that the population of common pheasants in Serbia is overabundant and indicates a growing trend. These findings are not consistent with the estimates provided by other authors (Beuković et al., 2004; Popović, 2006; IUCN Red List, 2019 and BirdLife International, 2019). The data presented in Table 2 show a noticeable drop in the population number since 1999, which means that the population is recovering but still does not fulfill its potential. According to Šelmić & Working Group LSS (2001), the abundance of pheasants decreased from 625,235 individuals in 1990 to 394,068 individuals in 1999. This negative trend also affected the hunters' bag and incomes for the hunting sector. The same authors found that the shooting quota for pheasants decreased nearly threefold from 1990 to 1999. As the common pheasant is one of the most important game species in the Serbian hunting sector, these authors established a model which aimed to predict the population dynamic until 2010. Unfortunately, the results obtained did not meet the initial estimates because the population number decreased fourfold.

Table 2. Comparison of the common pheasant abundance and culling in the period 1999-2013
(Lavadinović, 2007; Statistical Yearbook of Serbia, 2012).

	Year							
	1999	2001	2003	2005	2007	2009	2011	2013
Population number	421,000	372,000	391,000	409,000	406,000	403,000	337,000	295,563
Culling	122,000	124,000	127,000	165,000	160,000	173,000	162,000	117,779

Descriptive statistics on the common pheasant management identifies variations between the hunting grounds under consideration, which suggests there are differences in management practices (Tab. 3).

Table 3. Common pheasant management descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Optimal abundance	132	0	7,650	1,705.80	1,626.331
Spring census estimates	196	0	7,500	1,305.12	1,270.726
Planned shooting quota	192	0	4,575	861.91	886.590
Realised shooting	187	0	2,408	483.94	527.705
Abundance at the end of a hunting season	172	0	7,522	1,320.35	1,248.569

The hunting management of common pheasants was evaluated on the basis of variables recorded in the annual management plans of the hunting grounds under consideration. Dependent sample t-tests were used to identify the potential differences between the following parameters: the optimal abundance and spring census estimates for a particular game species, the planned shooting quota and realized shooting quota, and the optimal abundance and the abundance at the end of a hunting season. The data obtained are presented in Tables 4 and 5.

Table 4. Descriptive statistics for the pheasant management variables

Pairs	Game management variables	Mean	N	Std. Deviation	Std. Error Mean
I	Optimal abundance	1,674.17	126	1,626.426	144.894
	Spring census estimate	1,439.46	126	1,462.493	130.289
II	Planned shooting quota	860.99	183	863.198	63.809
	Realised shooting quota	476.70	183	518.080	38.298
III	Optimal abundance	1,590.14	115	1,535.029	143.142
	Abundance at the end of hunting season	1,417.94	115	1,400.141	130.564

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Table 5. Paired sample statistics for the common pheasant management.

Pairs	Game management variables	t	df	Sig. (2-tailed)
I	Optimal abundance	4.290	125	0.000
	Spring census estimate			
II	Planned shooting quota	11.016	182	0.000
	Realised shooting quota			
III	Optimal abundance	3.562	114	0.001
	Abundance at the end of hunting season			

The analysis of the variables in management plans show a mismatch between all the pairs analyzed. The optimal abundance is harmonized neither with the spring census estimate nor with the abundance at the end of the hunting season. Furthermore, both the planned and realized shooting quotas are significantly different, which suggests that the plans examined were not properly implemented.

The survey response rate was higher than expected since a total of 377 (out of 390) hunters took part in the research. All the respondents were asked to list 5 game species they hunted the most during the last 5 years. These findings were used to identify the importance of game species for Serbian hunters. The results obtained are shown in Figures 2 to 6 below.
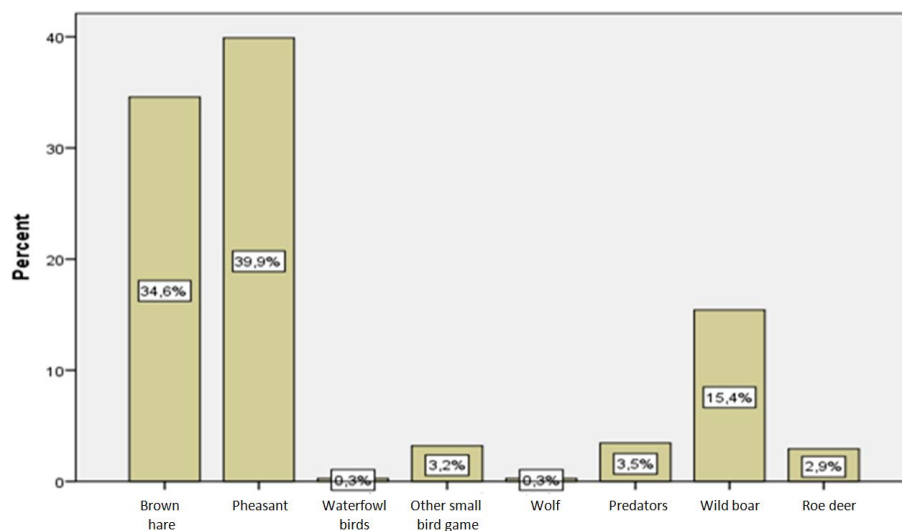

Figure 2. The most hunted game species in Serbia during the last 5 years according to the interviewed hunters
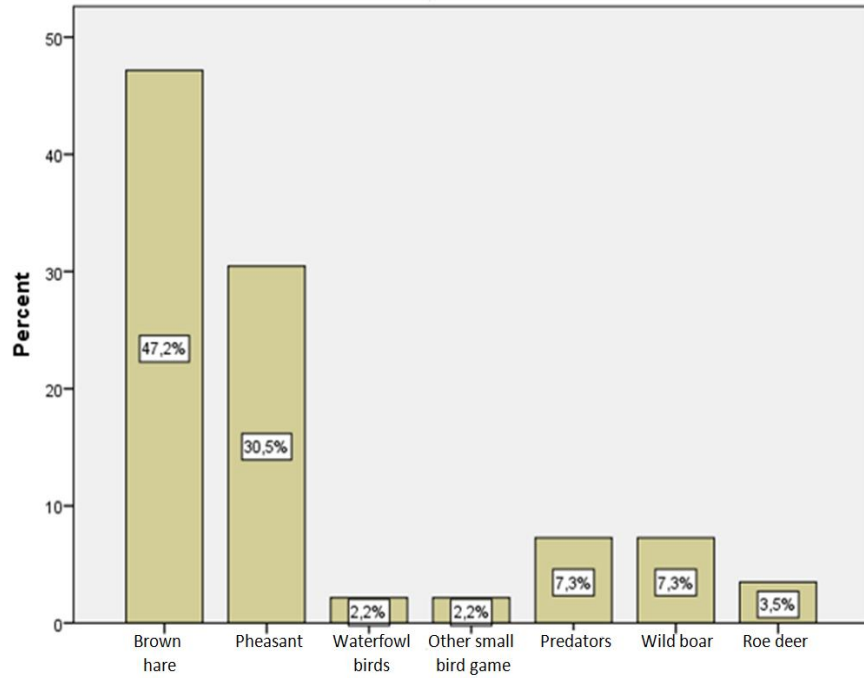
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Figure 3. The second most hunted game species in Serbia during the last 5 years according to the interviewed hunters
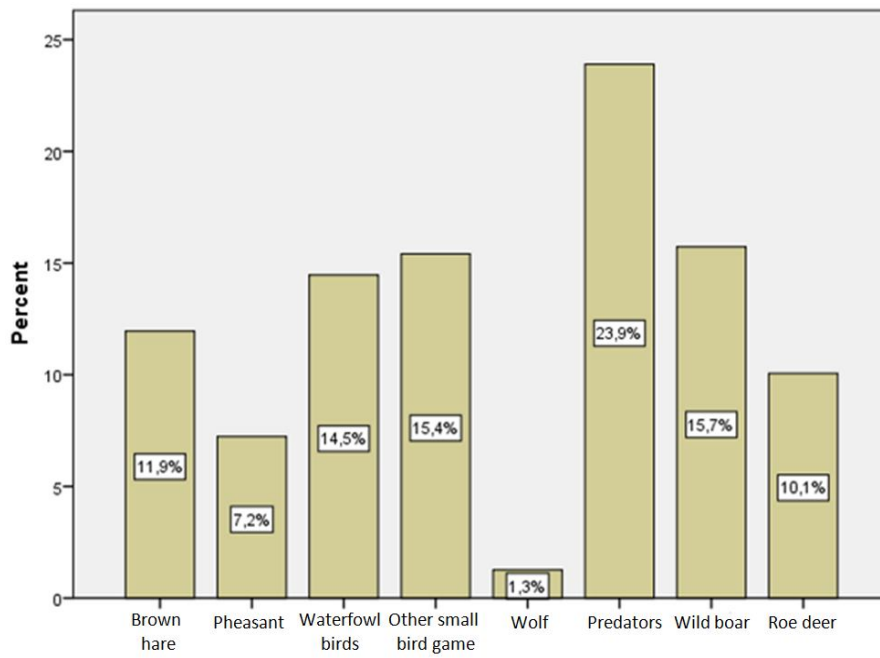

Figure 4. The third most hunted game species in Serbia during the last 5 years according to the interviewed hunters
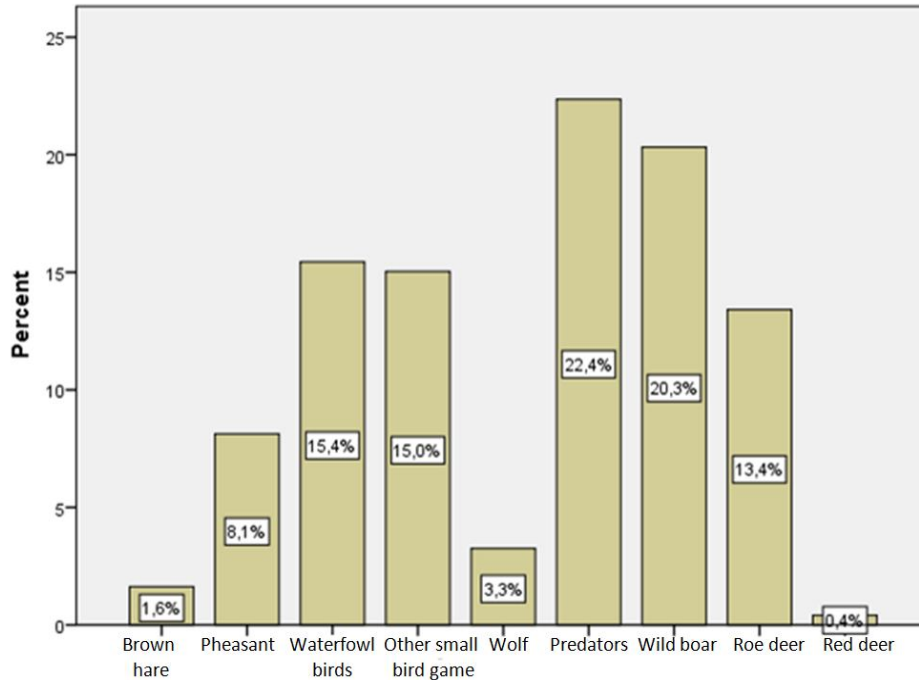
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Figure 5. The fourth most hunted game species in Serbia during the last 5 years according to the interviewed hunters
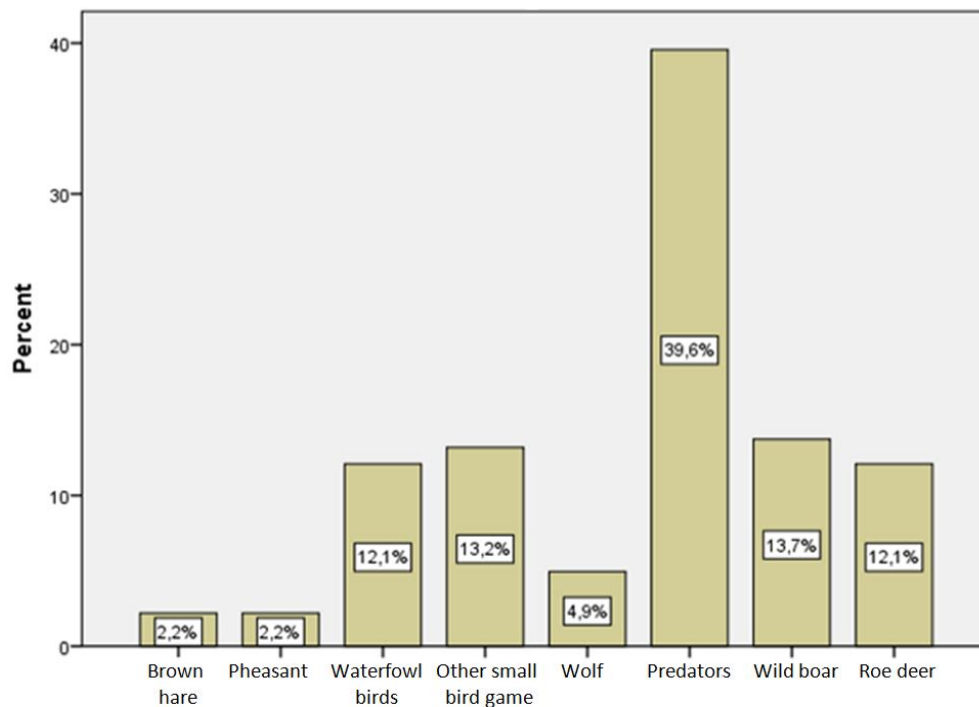

Figure 6. The fifth most hunted game species in Serbia during the last 5 years according to the interviewed hunters

The results obtained show that almost 40% of the hunters interviewed listed the common pheasant as the game species they hunted the most, followed by the brown hare (35%). Therefore, the common pheasant, followed by the brown hare, is the most hunted species in Serbia and the top choice among Serbian hunters. The reason behind such a choice of Serbian hunters may lie in their poor financial situation and using pheasant meat as a relevant supplement to their diet (Lavadinović, 2016). Popović et al. (2011) consider pheasants as one of the most important small game

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species in hunting grounds managed by hunting fellowships, whereas Gajić i Popović (2010) identify pheasants as the most numerous wild bird species in Serbia.

CONCLUSION

The results obtained indicate that the population of common pheasants in Serbia is decreasing, although a slight recovery has been noticed. However, the population number is far below the estimates form the 1990s. Moreover, the pheasant hunting management cope with unhamonious variables in the management plans of hunting grounds across the country, which directly affects the population recovery and undermines the achievement of set management goals. The survey conducted among Serbian hunters identify the common pheasant as the game species of highest importance, which raises a concern that poor common pheasant management will adversely affect hunters, their expectations of hunting seasons and economic results of the Serbian hunting sector.

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