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OVERLAPPING BETWEEN THE HUNTING SEASONS OF THE MAIN GAME SPECIES AND THE PICKING INTERVALS OF TRUFFLES IN ROMANIA

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Abstract

Truffle picking and hunting are two forest-related activities able to steer hot disputes over the forest sustainability. The reason is simple: hunting and truffle picking, at the same time and within the same forest, may cause deadly accidents. Across Europe, there are several countries with long tradition in picking truffles and hunting, such as Italy, France or Spain, but the legal framework regarding these doings differ from country to country. The goal of this study was to highlight the overlapping between the picking intervals of the main truffle species with the hunting periods of the most common wildlife species of hunting interest across Romania. In addition, for some of the most common game species, the assessed population size was also presented. Data regarding the assessed population size of the wildlife species was centralized from the website of the central authority responsible for wildlife management. In case of truffles, data contained by recently published scientific papers and information available on specialized and popular websites from Romania were compiled in order to figure the picking periods across the year. In general, the harvesting seasons of the truffles is overlapping in October, November and December, when the hunting is permitted for most of the game species.

Key words**:** *game species, hunting, NWFPs, truffle, wildlife*

INTRODUCTION

Nowadays, the truffles and the game products are perhaps the most valued non-wood forest products (NWFPs) worldwide, but especially in European countries. Truffle market is considered to be one of the most exclusivist, and also the most volatile in terms of prices. For example, in Italy, the price paid eight years ago for almost one kilogram of white truffle was 105,000 Euros [5].

The truffles (family *Tuberaceae* P.Micheli ex F.H.Wigg.) are hypogeous fungi growing in symbiosis with a broad diversity of angiosperm and gymnosperm species in a variety of habitats [12], being distributed mainly in the northern hemisphere. Most of the species belong to genus *Tuber* P.Micheli ex F.H.Wigg., that contains almost two hundreds species [1] of socio-economic importance [2], approximately twenty of them being found in Europe, the summer truffle (*Tuber aestivum* Vittad.) being the most common across European countries [3]. Eight of them are appreciated for their gastronomic value, namely the black truffle (*Tuber melanosporum* Vittad.), the truffle of the White Madonna (*T. magnatum* Pico), the summer truffle (*T. aestivum* Vittad.), the brumale truffle (*T. brumale* Vitt.) the smooth black truffle (*T. macrosporum* Vittad.), the whitish truffle (*T. borchii* Vittad.), *T. mesentericum* Vitt. and *T. oligospermum* (Tul. and C. Tul) [4], especially the first two [14], [17] in Italian, Spanish, French and Croatian cuisines [18], but also in Poland, the truffles being considered as rare fungi [21]. In Italy, Spain and France, the highest quantities of black truffles originate from special cultures, called truffières [22]. For the moment, in Romania, only the summer truffle was introduced in culture [6].

It is difficult to estimate how many truffles pickers are operating in Europe since not all

of them are registered in associations or other legal entities. Instead, in many countries across Europe, tens of thousands or even hundreds of thousands of hunters exist. For example, according to the report issued by the European Federation of Associations for Hunting & Conservation, almost a decade ago, more than 60,000 hunters were recorded in Romania [10]. The numbers are even higher in countries with a long tradition in hunting, such as France, Spain, United Kingdom or Italy [10].

In Romania, according to the definition provided by the Forest Code, the NWFPs include, among others, forest fruits, medicinal and aromatic plants, game products, edible mushrooms and truffles, a.s.o.

Black truffle, summer truffle, truffle of the White Madonna and brumale truffle represent the main truffle species of harvesting interest in Romania [4], the first one being the most spread species [7]. Their main host-trees belong to different oak species (*Quercus* spp.), common hazel (*Corylus avellana* L.), European hornbeam (*Carpinus betulus* L.), linden species (*Tilia* spp.), Norway spruce [*Picea abies* (L.) H. Karst.], common beech (*Fagus sylvatica* L.), black pine (*Pinus nigra* Arn.), poplars (*Populus* spp.) or willows (*Salix* spp.) [3], [7], [13]. Having in mind that the beech, Norway spruce and oaks account, in total, for more than 70% of Romanian forests, the potential for truffles picking is quite high.

However, there are some constraints that limit the distribution of the truffles in Romania, such as the soil conditions. For example, the truffle of the White Madonna and the black truffle require soils formed on limestone well supplied with water all year long [3]. This is why *T. magnatum* can be found in the southern Romania, especially in mixed-oak stands [7]. Contrasting other truffles that prefer the alkaline soils, the summer truffle grows also into soils with pH ranging from 6.6 to 7.3. It is able to tolerate a large spectrum of soil textures, but the soil must be well aerated and must have a constant humidity [7].

Currently, several truffle picking techniques are known. Some of them are based on observing the soil cracks or by telling a specific sound produced when the soil is being hit, or by observing the flight of certain insects. There are also more precise methods, such as using pigs or trained dogs [7].

As regards the game species, in Romania the hunting is permitted for 18 mammal species and 39 bird species. The list of these species is provided by the Annex no. 1 of the Law no. 407/2006 - Law of Hunting and Wild Fauna Protection. Red deer (*Cervus elaphus* L.), European roe deer (*Capreolus capreolus* L.), wild boar (*Sus scrofa* L.), common pheasant (*Phasianus colchicus* L.), European hare (*Lepus europaeus* Pallas) are among the most important game species for which the hunting is permitted. Romania is also known for its populations of large carnivores of European importance, such as gray wolf (*Canis lupus* L.), brown bear (*Ursus arctos* L.) and wildcat (*Felis silvestris* Schreber). As regards these species the hunting is derogated when and where the damages produced to the local livestock are too numerous. So, between 2007 and 2015, as many as 12,169 large carnivores were hunted, out of which 3,636 were brown bears, 4,554 gray wolfs, and 3.981 wildcats, respectively [9].

In Romania, the hunting realm stretches over 21.9 million hectares, being divided into 2,151 hunting grounds, most of them (1,873) being managed by hunters' associations, by National Forest Administration Romsilva (255) and only a few (23) by forest research and academic institutions. Most of the hunting grounds are located in plain regions (41.7%), followed by the ones in hilly (37.5%) and mountain regions (20.8%) [15].

If the hunting has long been regulated by different laws and formal instructions (regarding the hunting periods and the annual quotas of hunting), the situation is not well clarified at all when it comes to truffles picking. According to paragraph (4) of the Article 58 of the Law no. 46/2008, the forest products belong to the landowners, with the exception of game and wildlife fish.

The situation becomes more complicated if we take into account the next paragraph (5) of the same article, according to which the harvesting of the NWFPs specific to the national forestry fund shall be made on the basis of the licenses issued by the forest districts, in accordance with the instructions provided by a ministerial order. Up to present, no normative act was issued in this respect. By December 2016, a set of technical norms was produced in order to regulate the harvesting of these products and it was published on the website of the central authority responsible for forest management [16]. The bill contained a list of 120 mushroom species and 171 herbaceous plants, shrub and tree species that were considered of high interest. Among them, seven taxa of genus *Tuber* were listed [16].

Under these circumstances, some NFA regional directorates reduced the harvested quantities. For example, Arad and Gorj Forestry Directorates imposed the limit of two tons per year [8], [19].

In other European countries, the situation is different. For example, in Croatia, there is a unique season for picking all truffles species (*i.e.* 15.09-31.01) and the pickers must buy permits in order to harvest truffles from the state-owned forests [23]. In Serbia, the pickers should pay a tax for harvesting and trading with truffles [20].

In European countries where the truffle market has been developed, several associations and federations are registered. For example, in Spain there is the *Truffle Harvesters Federation* [11], while in Italy two national federations exist, namely *Federazione Italiana Tartuficoltori Associati*, for truffle growers and cultivators and *Federazione Nazionale delle Associazioni dei Tartufai Italiani*, for the truffle hunters and another two truffle hunters associations are based in Istria, Croatia [23]. In Romania, according to our knowledge, there was recently established an association based in Bucharest, namely *Asociația Căutătorilor de Trufe din România*.

The purpose of this study was to highlight the overlapping between the picking intervals in the case of truffles with the hunting periods of the main game species across Romania. Moreover, for some of the most common game species, the evaluated population size was also highlighted.

MATERIALS AND METHODS

The hunting periods of the main species of fauna are provided by the legal framework (Law no. 407/2006). The population size of the wildlife species of hunting interest was assessed based on the data from the last two hunting seasons which is available on the website of the central authority responsible for wildlife management.

In case of truffles, since there is no official document that states the picking intervals, data from scientific papers and information from specialized and popular web-sites from Romania (*i.e.* http://www.trufarom.ro/ and https://trufesiciuperci.wordpress.com) were compiled in order to figure out the picking periods across the year.

RESULTS AND DISCUSSIONS

Among the game species of hunting interest from Romania, European hare, wild boar, red deer, pheasant and grey partridge are among the most common species.

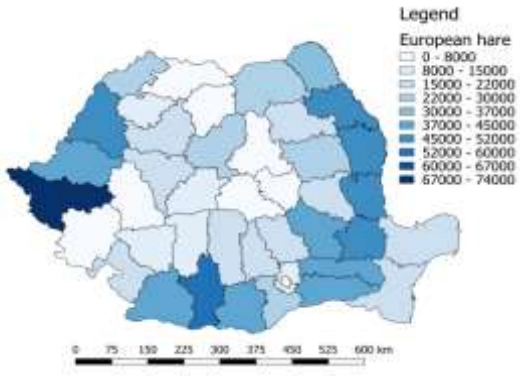

Fig. 1. European hare (*Lepus europaeus* Pallas.) population size
Source: http://apepaduri.gov.ro/efective/

The population size of *Lepus europaeus* is given in Figure 1. The highest concentrations of European hare individuals were found in Timiș County (Western Romania) followed by the ones from the eastern and southern

parts of Romania, respectively. The smallest populations were recorded in the districts located along the Carpathians (*e.g.* Hunedoara, Sibiu, Brașov, Covasna, Harghita, etc.).
The biggest population of wild boar (*Sus scrofa* L.) is also found in Western Romania, in Arad and Bihor Counties (Figure 2).
Among the 41 counties across Romania, Brăila and Galați (Central-Eastern Romania) counties recorded the lowest populations.

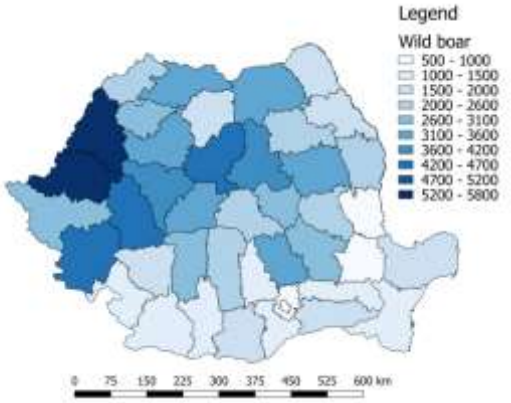

Fig. 2. Wild boar (*Sus scrofa* L.) population size
Source: http://apepaduri.gov.ro/efective/

Red deer (*Cervus elaphus* L.) prefers habitats with high percentage of forests as it is the case of the districts located in northern Romania, especially Suceava County (Figure 3). Few individuals were recorded in the districts from the southern part of the country.

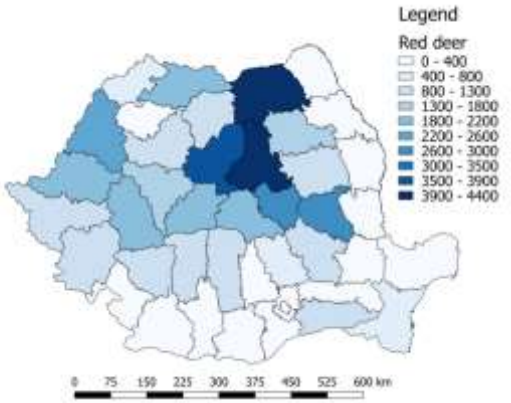

Fig. 3. Red deer (*Cervus elaphus* L.) population size
Source: http://apepaduri.gov.ro/efective/

Like in the case of European hare, the biggest population of pheasant (*Phasianus colchicus* L.) was recorded in Timiș County, Western Romania (Figure 4). This species is less common across the counties from the eastern part of the country.
Unlike the above-mentioned species, in the case of grey partridge the biggest population was located in the southern part of the country, mainly in Olt, Dolj and Teleorman counties (Figure 5).

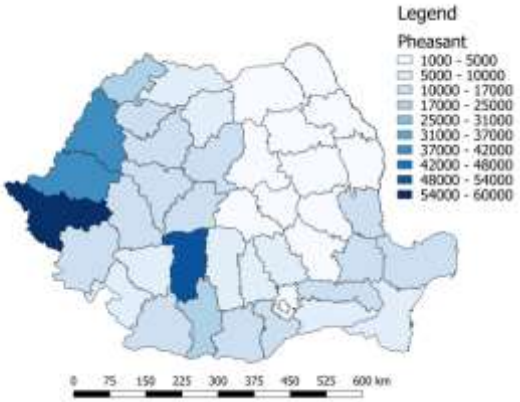

Fig. 4. Common pheasant (*Phasianus colchicus* L.) population size
Source: http://apepaduri.gov.ro/efective/

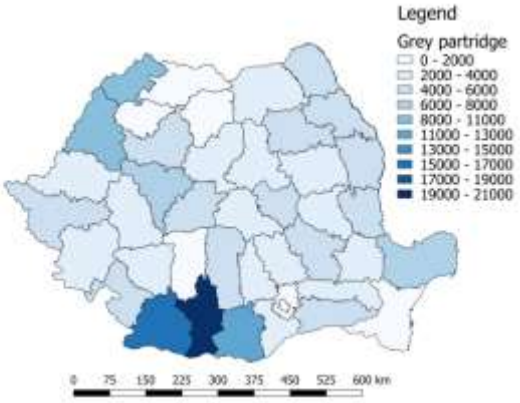

Fig. 5. Grey partridge (*Perdix perdix* L.) population size
Source: http://apepaduri.gov.ro/efective/

The hunting season of the main game species and harvesting season of the truffles in Romania is given in Table 1. Since, according to the legislation, a new hunting season starts in May, this month was chosen as reference. As it can be seen from the table, there are game species that have a short hunting season (*e.g. Dama dama*, *Marmota marmota*, *Streptopelia turtur* or *Alauda arvensis*) and species for which hunting is permitted almost the whole year.
As regards the truffles, the picking interval is between May and March.

It seems that the harvesting seasons of the truffles is overlapping in October, November and December, when the hunting is permitted for most of the game species.

Table 1. Hunting seasons of the main game species and harvesting seasons of the truffles in Romania

Game, birds and truffles	Month 5 6 7 8 9 10 11 12 1 2 3 4 5
Capreolus capreolus (male)	
Canis aureus, Sus scrofa (male), *Vulpes vulpes*	
Sus scrofa (female and piglet)	
Meles meles	
Ondatra zibethica	
Capreolus capreolus (female), *Cervus elaphus* (female and offspring), *Dama dama* (female and offspring)	
Cervus elaphus (male for selection)	
Dama dama (male for selection), *Rupicapra rupicapra* (individual for selection)	
Martes sp, Mustela erminea, Mustela nivalis, Nyctereutes procyonoides, Oryctolagus cuniculus, Putorius putorius	
Ovis aries musimon	
Cervus elaphus (male for trophy)	
Marmota marmot	
Rupicapra rupicapra (individual for trophy)	
Dama dama (male for trophy)	
Lepus europaeus	
Corvus corone cornix, Corvus corone sardonius, Pica pica	
Corvus monedula	
Streptopelia decaocto, Sturnus vulgaris	
Anser anser rubrirostris, Anas penelope, A. strepera, A. clypeata, Aythya ferina, A. marila, Bucephala clangula	
Anas acuta, Corvus frugilegus	
Coturnix coturnix	
Streptopelia turtur	
Gallinula chloropus, Gallinago gallinago, Garrulus glandarius, Lymnocryptes minimus, Scolopax rusticola, Turdus iliacus, T. philomelos, T. pilaris, T. viscivorus	
Anas crecca, Columba oenas, C. palumbus, Fulica atra	
Aythya fuligula	
Perdix perdix	
Bonasa bonasia	
Alauda arvensis	
Phasianus colchicus	
Anser albifrons	
Tuber aestivum	
Tuber brumale	
Tuber magnatum	
Tuber macrosporum	
Tuber mesentericum, T. uncinatum, Choiromyces meandriformis	
Tuber excavatum	

Source: Law no. 407/2006, http://www.trufarom.ro/ and https://trufesiciuperci.wordpress.com

CONCLUSIONS

In general, there is a high level of overlapping between the hunting periods of the main game species and the picking intervals of truffles.

Since the Romanian legal framework regarding the truffles picking is not clear at all, and the hunters' associations work on a solid legal base, the potential risk of conflicts between the two categories of stakeholders is very high.

Poaching is another important threat for both, either hunters or truffle pickers and, therefore, a thorough regulation in both sectors is

mandatory, especially on public forests, where the communication between truffle pickers and forest rangers is weak and based on informal connections.

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