ASPECTS REGARDING THE CINEGETIC FAUNA FROM COVASNA COUNTY

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Abstract

County's fauna represents an important biodiversity and economic element. Hierarchizing species based on certain criteria helps us emphasize their importance in certain segments. These types of classifications use AHP models practiced in diverse domains, including biology sciences. Covasna's land fund occupies a surface of 370980 ha on which 34 game funds are displayed. We have selected 8 species from the species that comprise this county's fauna, namely bear (Ursus arctos), lynx (Lynx lynx), grouse (Tetrao urogalus), tree marten (Martes martes), jay (Garrulus glandarius), forest woodcock (Scolopax rusticola), trout (Salmo trutta), and chub (Squalius cephalus). According to the AHP hierarchy results, the most important game species from Covasna county are trout (Salmo trutta fario), chub (Squalius cephalus), and forest woodcock (Scolopax rusticola), while lynx is the least important one (Lynx lynx). The complexity of the 19 criteria used for this research attests to the fact that the results are surprising if we take into account the importance of some species..

Keywords*:* AHP, Covasna, game fund, trout, chub

INTRODUCTION

Hunting was regulated in Transylvania from the year 1504 when serfs were prohibited to hunt certain species (Witting, 1941). This was not only absolute protection but also a means to reserve the entire game resource for the grand nobility, especially for their hunting parties.

Through previous experiences (Ciontu et al., 2018; Timis-Gansac et al., 2018; Ciontu et al., 2020; Crisan et al., 2020; Vechiu & Dincă, 2021) as well as in the economic context, we can create a hierarchy based on a set of criteria. This can be applied to products from the same category as well as to different products: tree species (Dinca et al., 2020; Timis-Gansac et al., 2020; Dinca et al., 2021), medicinal plants, forest fruits, species from the game fauna, mushrooms etc. AHP is a worldwide decision support model used in studying complex aspects involved in taking decisions. The system proved to be useful in numerous domains such as informatics (Rădulescu, 2015), viticulture (Buciumeanu et al, 2020; Vizitiu et al., 2020), and

biodiversity (Timis-Gansac et al., 2020; Dinca et al., 2020; Cantar et al., 2021). Furthermore, certain recommendations were also made regarding its usage and limits (Erdogan et al, 2017, Ishizaka & Labib 2009).

MATERIAL AND METHOD

The case study was realized in Covasna County. Here, the relief is mainly mountainous, combined with intramountain basins. The county has 34 game funds with an average surface of 11495 ha (fig.1).

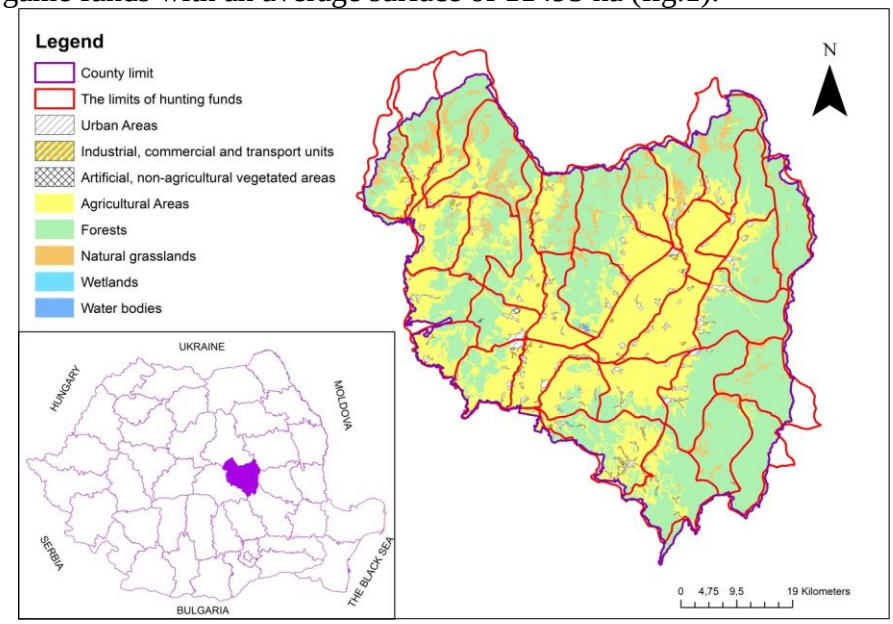

Fig. 1 Location of Covasna County (geodata source: landcorine.org and ancpi.ro)

The land fund surface amounts to 370980ha and is divided according to Table 1(source: insse.ro)

Table 1

Covasna County land fund

Usage category	**Surface (ha)**
Fields with agricultural usage	**185939**
Arable	83151
Meadows	60915
Hay fields	41281
Orchards and tree nurseries	592
Fields with non-agricultural usage	**185041**
Forests and other fields with forest vegetation	165161
Waters, sloughs	2971
Constructions	11195
Communication means	4795
Degraded and unproductive fields	919
Total	**370980**

As it can be seen in Table 1, we have a balanced distribution between agricultural and non-agricultural fields as both of them have almost equal surfaces. Amongst the non-agricultural surfaces, the largest percentage is occupied by fields covered by forest vegetation. These represent 89% and 45% of the land fund's total surface. This diversity of land usage ensures good conditions for the development of game fauna on the county's entire surface.

The fauna is represented by stag (*Cervus elaphus)*, buck (*Capreolus capreolus)*, boar (*Sus scrofa)*, link (*Lynx lynx)*, tree marten (*Martes martes)*, wolf (*Canis lupulus)*, fox (*Vulpes vulpes)*, squirrel (*Sciurius vulgaris)*, iepure (*Lepus europaeus)*, ferret (*Putorius putorius*), grouse (*Tetrao urogallus)*, jay (*Garrulus galdarius*), and magpie (*Pica pica*).

The fishing stock is composed of Olt river and Negru river, its affluent from the studied area, as well as interior streams from Întorsurii, Vrancei, Bodoc and Baraolt Mountains. The county also has affluents of Buzău river.

The fishing fauna with a game importance is represented by trout (*Salmo trutta fario*), barbell (Barbus barbus), chub (*Squalius cephalus*), minnow (*Phoxinus phoxinus*), and European bulhead (*Cottus gobio*) (Pișota et al, 1975).

Amongst the game interest species, we have chosen and analysed 8 species: bear (*Ursus arctos*), linx (*Lynx lynx*), grouse (*Tetrao urogalus*), tree marten (*Martes martes*), jay (*Garrulus glandarius*), forest woodcock (*Scolopax rusticola*), trout (*Salmo trutta*), and chub (*Squalius cephalus*). The species were studied and used in an analytical hierarchy process (AHP), while the analyses were realized with the Expert Choice Desktop software.

RESULTS AND DISCUSSION

The alternative AHP classification for the 19 criteria taken into account for this study is rendered in Table 2.

Table 2

AHP alternative ranking

Criteria		Animal species							
		Ursus arctos	Lynx Lynx	Tetrao urogalus	Martes martes	Garrulus glandarius	Scolopax rusticola	Salmo trutta	Squalius cephalus
		1	2	3	4	5	6	7	8
1	Harvesting period	3	2	1	4	8	7	5	6
2	Harvested quantity by one worker in 8 hours	1	2	3	4	7	5	6	8
3	Harvesting cost	4	3	5	6	1	2	8	7
4	Knowledge for harvesting	3	4	5	2	1	8	7	6
5	Tools needed for harvesting	2	1	3	4	5	6	8	7
6	Complexity of harvesting process	4	1	7	3	2	8	5	6
7	Development of the process of harvesting	1	2	5	3	4	6	7	8
8	Knowledge for recognition	1	2	5	7	3	8	4	6
9	Distribution range	7	1	2	4	8	3	5	6
10	Biotic threats	1	2	8	3	4	5	6	7
11	Abiotic threats	1	2	7	4	3	5	8	6
12	Perishability	1	2	6	4	3	5	8	7
13	Market potential	7	3	2	4	1	5	8	6
14	Market demand	7	1	2	4	3	6	8	5
15	Celebrity" of the product on the market	4	3	2	5	1	6	8	7
16	The price of raw product	8	7	4	5	1	2	6	3
17	The price of the derived product	5	6	3	7	1	2	8	4
18	Portfolio of derived products	5	3	2	4	1	6	8	7
19	Transport from the harvesting point to the storage centre	7	2	6	5	1	3	8	4

If we analyze the AHP results, the most important game species from Covasna county are trout (*Salmo trutta fario*), chub (*Squalius cephalus*),

and forest woodcock (*Scolopax rusticola*), while the least important one is lynx (*Lynx lynx*) (Figure 2).

Four species are grouped with similar values, namely bear (*Ursus arctos*), grouse (*Tetrao urogallus*), forest marten (*Martes martes*) and jay (*Garrulus galdarius*). They received minimum grades for certain criteria, even though for others they received a maximum score.

We can observe that trout species (*Salmo trutta fario and Squalius cephalus*) have obtained high scores, with a maximum of ones in 10 criteria in the case of trout.

Table 3

Data regarding the hunting effective and shares from Covasna County during 2021 (source: mmediu.ro)

Species	***Effective***	***Harvest***
Tetrao urogallus	501	0
Martes martes	565	72
Scolopax rusticola	unknown	37
Garrulus galdarius	unknown	307
Ursus arctos	454**	24*
Lynx lynx	65**	0

* derogations

**resulting from the centralization of 11 hunting funds in the period 2009-2011

In regard to game management, Table 3 presents the harvesting effective and shares approved for 2021. For species that were excluded from hunting during the last years (*Ursus arctos*, *Lynx lynx*), we have presented the last known effective and the number of samples that received shooting derogations.

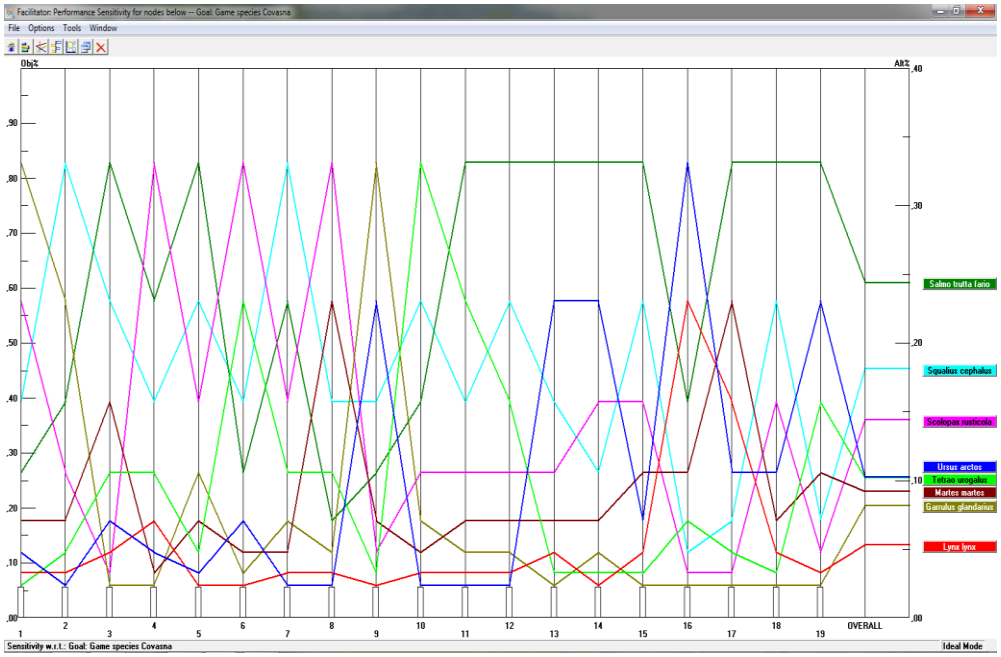

Fig. 2 Ranking of the selected NWFPs

Grouse (*Tetrao urogallus*) is mainly presented in alpine areas and presents a rather high game interest. The effectives estimated in 1968 were 10500 samples, with an annual harvest of 250 samples. In 1999, there were 7850 samples with an annual harvest of 180 samples (Micu, 2005). It is important to maintain this species effective by differentiating their coupling places through proper forest zoning (Negruțiu, 1983). Nowadays, Covasna County has an effective 501 samples.

Tree marten (*Martes martes*) is present in far areas as well as near cities, due to its varied nutrition. The numbers vary based on the presence of squirrels, their favorite nourishment. It was estimated that their population was between 9000-10000 samples during 1960-1970, with an annual harvest of 1200-1600 samples. 30 years later, their population has evolved to 16700 samples with an annual harvest of 340 samples (Micu, 2005). Our studied county records 565 samples.

Chub (*Squalius cephalus*) belongs to the secondary fish fauna from mountain waters and interferes with trout and barbell. Unlike trout, it has a small increase, while its meat is inferior from a culinary perspective. As it attacks fish saplings from poor waters, it is recommended to limit its reproduction (Witting & Cotta, 1955).

Even though it occupies the last place from our hierarchy, **Lynx** (*Lynx lynx*) is an animal with a rather large presence in our county. According to the 1969 evaluation, there were 931 samples at a national level, while Covasna County had between 50 and 100 samples (Geacu, 2007). Nowadays, the effectives are high, representing high importance in protected areas.

CONCLUSIONS

Even though our hierarchy's results place trout and chub at the top, it is advisable for them not to coexist together as one of them can go extinct due to a lack of sufficient food.

Lynx, an endangered animal from almost a century, is situated in the last place based on the studied 19 criteria. Being a solitary animal with an exclusive night activity (excepting mating season), it is rather hard to trace. The legislative context can play a decisive role in these evaluations for certain species that could have an advantage or a disadvantage.

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