



The analysis of the scores awarded to the trophies of brown bear skulls in the South-Eastern part of the Eastern Carpathians - reflection on the wildlife management.

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Target specie

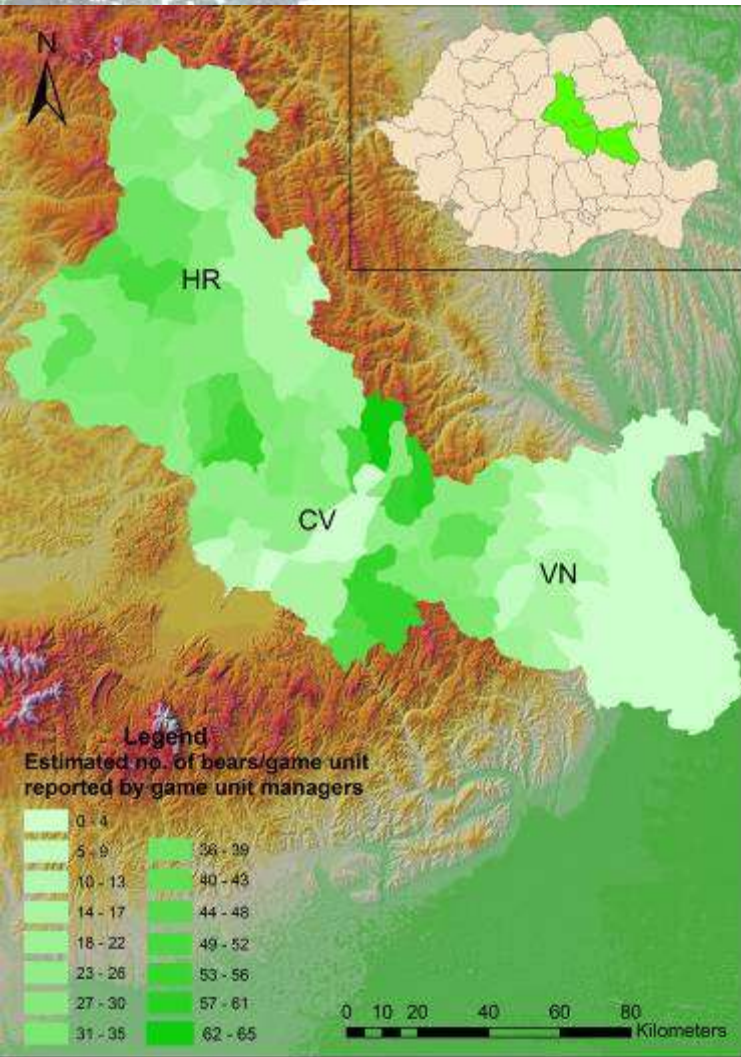
- *Ursus arctos*, Linnaeus, 1758
- Conservation status (RO) : vulnerable
- Romanian estimated population: approx. 6000
- Hunted individuals: 250-350/year



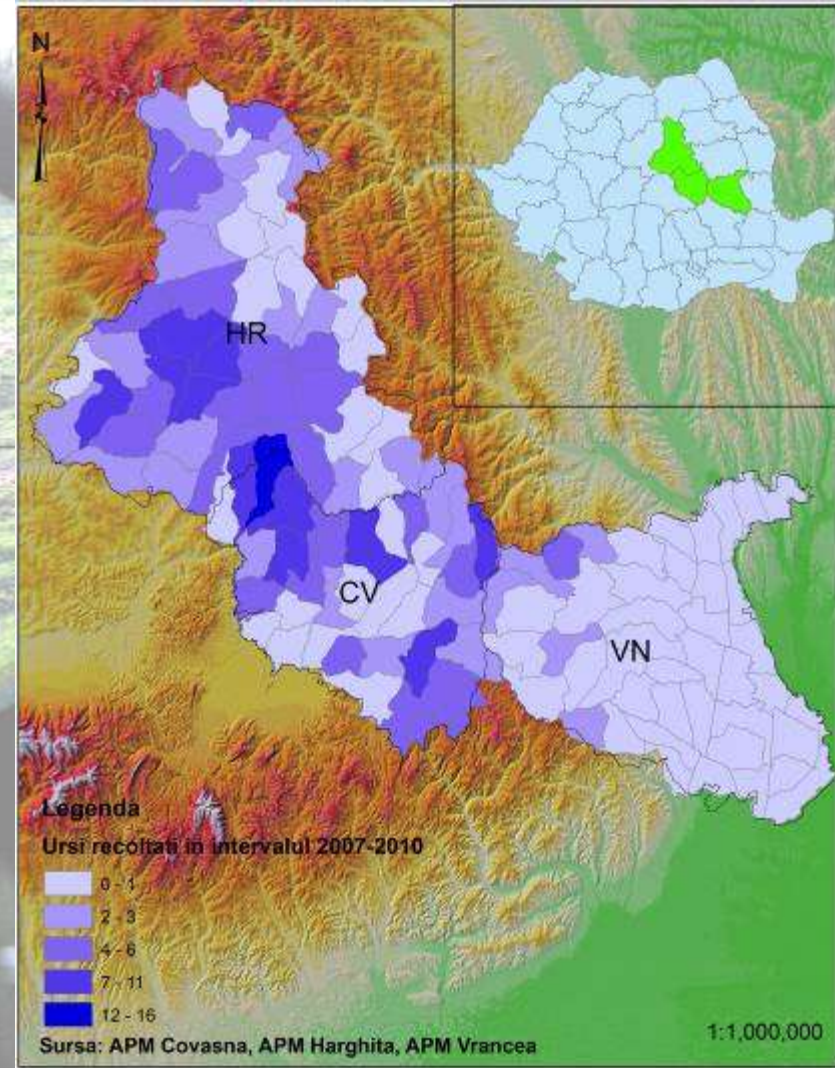
Context of the study

- High level of hunting quota in Covasna, Harghita and Vrancea county
- Different ways of hunting bears (selective and nonselective)
- 304 shot bears during September 2007 until December 2010
- 304 scores for trophy
- Lack of study regarding shot bears (304, meaning 5% of estimated bear population at national level)
- No impact study on how hunting activities are affecting the structure of bear population
- LIFEURSUS project - LIFE08/NAT/RO/000500

Study area



Study area covering approx. 10 % of the estimated brown bear habitat at national level and approx. 30% of the estimated brown bear population



Data collection

WHY THE SKULL?

- Impossible to change the size of the trophy.
- Recognized at international level by the International Hunting Committee as the trophy indicates the size of a hunted individual.
- Official reports of the game unit managers for each shot bears according to the Romanian law for derogation of the Habitat Directive
- Data for 50 females and 254 males, different estimated age from 2 years to 28 years

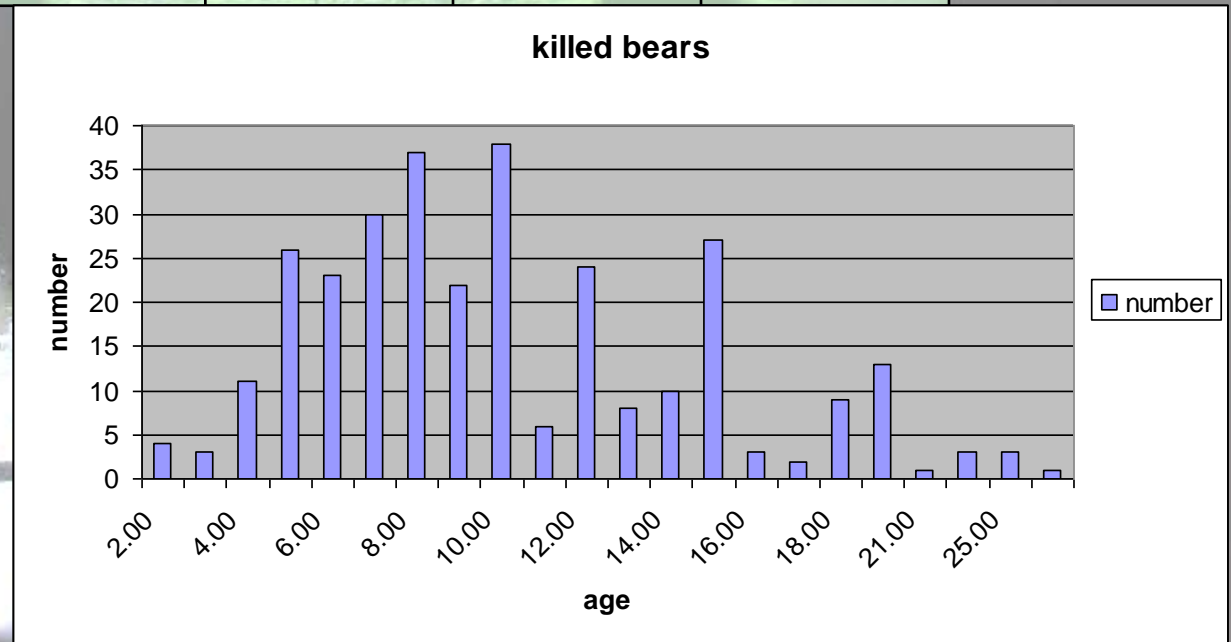
HOW THE SCORES ARE CALCULATED?



Results

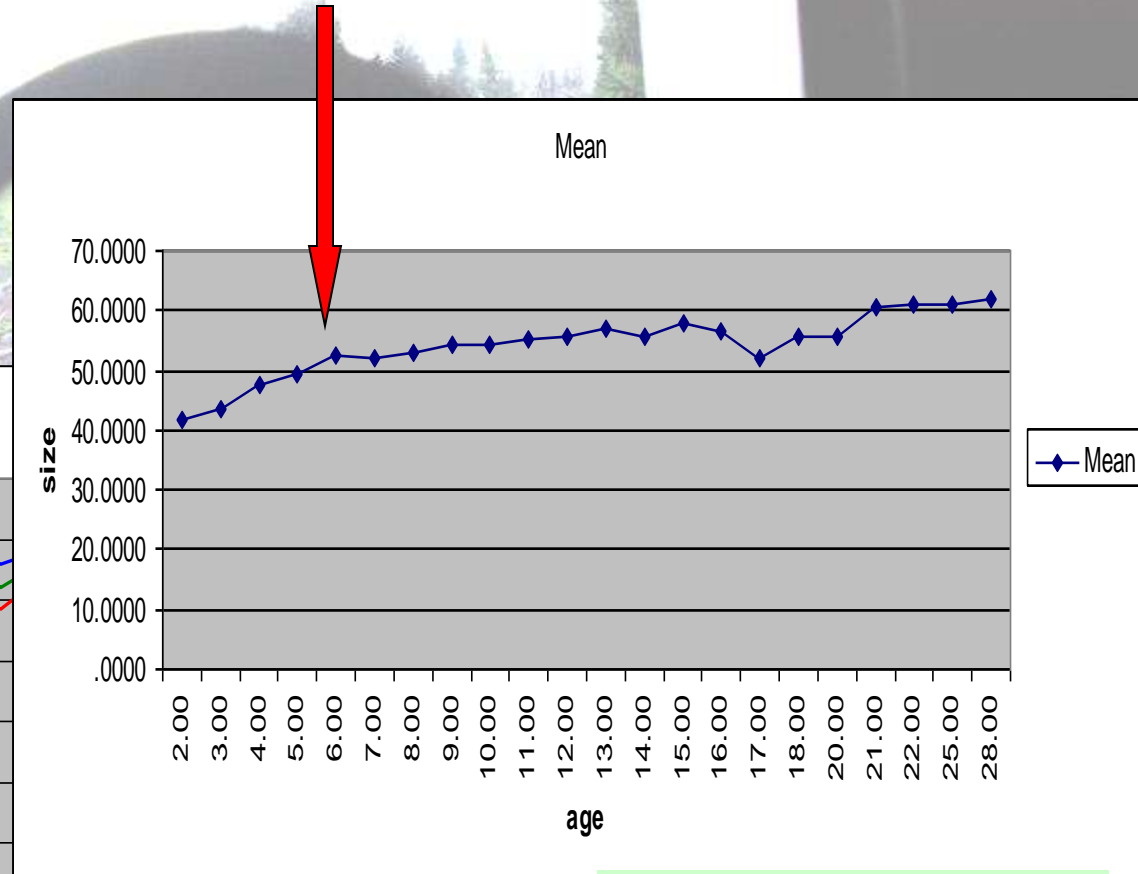
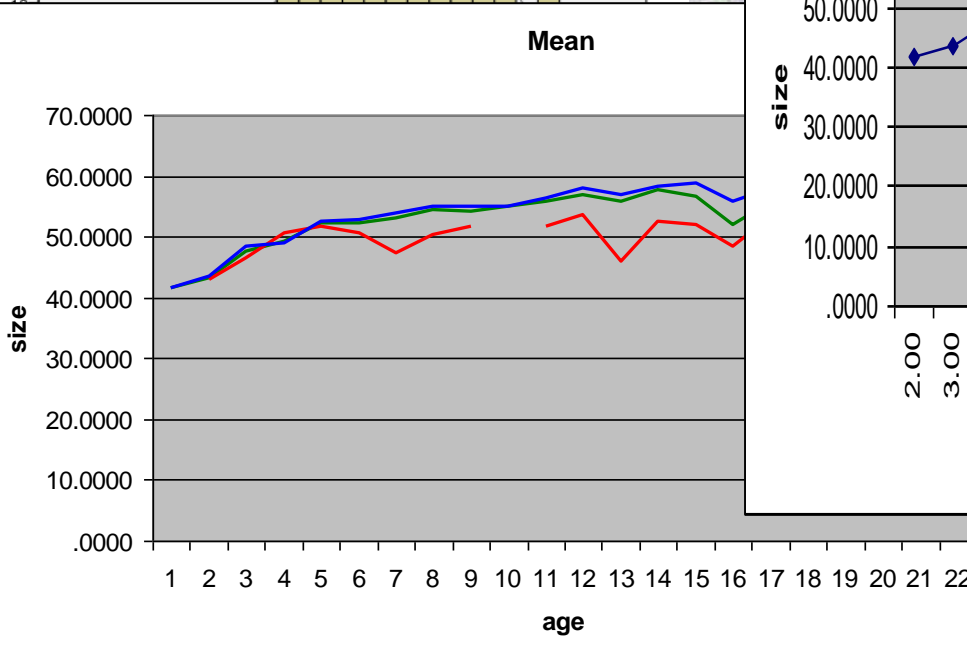
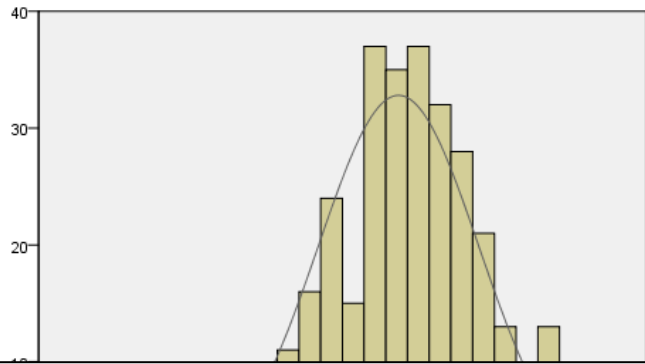
Estimated age and Trophy Score (TS)

	Sex	N	Mean	Std. Deviation	Std. Error Mean
Age	F	50	10.7000	5.13591	.72633
	M	254	10.1378	4.69554	.29462
TS	F	50	50.6460	3.82085	.54035
	M	254	54.2885	5.32642	.33421



Results

Variables: SEX, AGE, Trophy Score (TS)

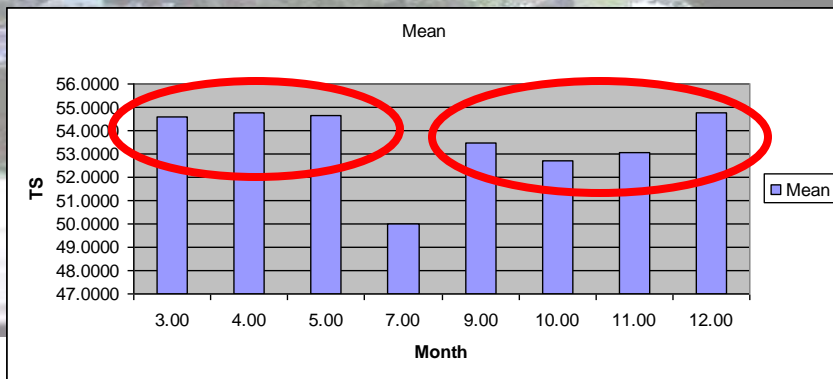


Range 2-6	10.7478 cm
Range 6-28	9.6522 cm

Results

Mean of TS based on the hunting season

Month	Mean	Std.Deviation	Range	Skewness	Variance	Median
3.00	54.5895	4.10324	15.00	-.098	16.837	53.8000
4.00	54.7700	5.15088	26.40	-1.092	26.532	55.0000
5.00	54.6217	5.22963	24.00	-.608	27.349	54.0000
7.00	50.0000	.	.00	.	.	50.0000
9.00	53.4630	5.73660	20.20	.207	32.909	53.0000
10.00	52.7300	5.13088	28.90	-.474	26.326	52.9500
11.00	53.0533	6.11992	31.60	-.864	37.453	53.7000
12.00	54.7500	4.28283	16.40	-.766	18.343	55.5500
Total	53.6894	5.28008	32.00	-.637	27.879	54.0000



Bears shot in the spring season- 113

Bears shot in the autumn season- 190

Bears shot in the summer- 1

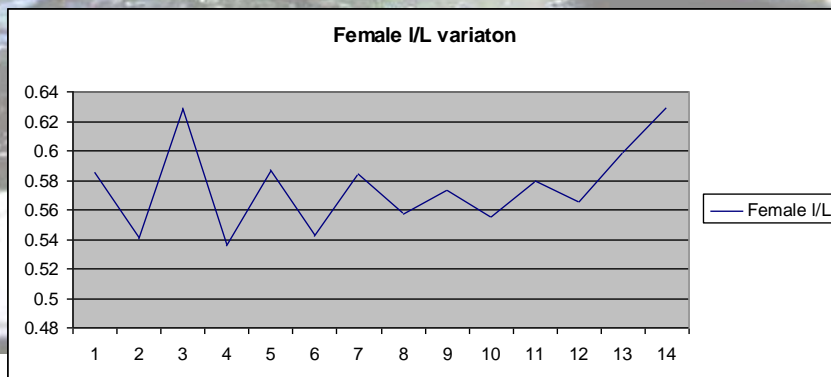
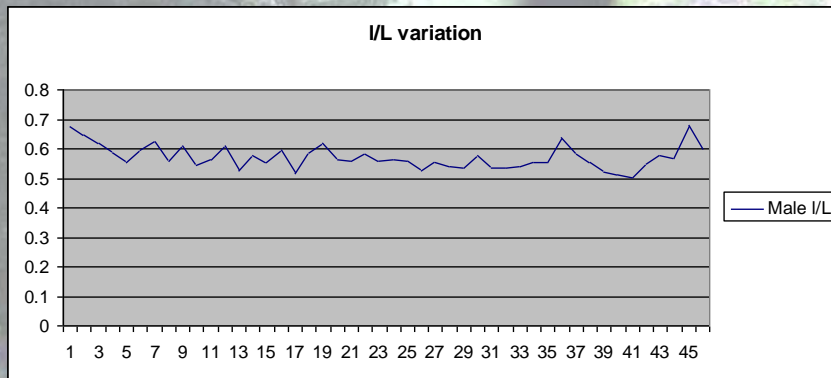
86% of the female were shot in autumn

Results

Geometric aspect of the skulls for male and females presented as I/L

For 46 males $I/L=0.57$

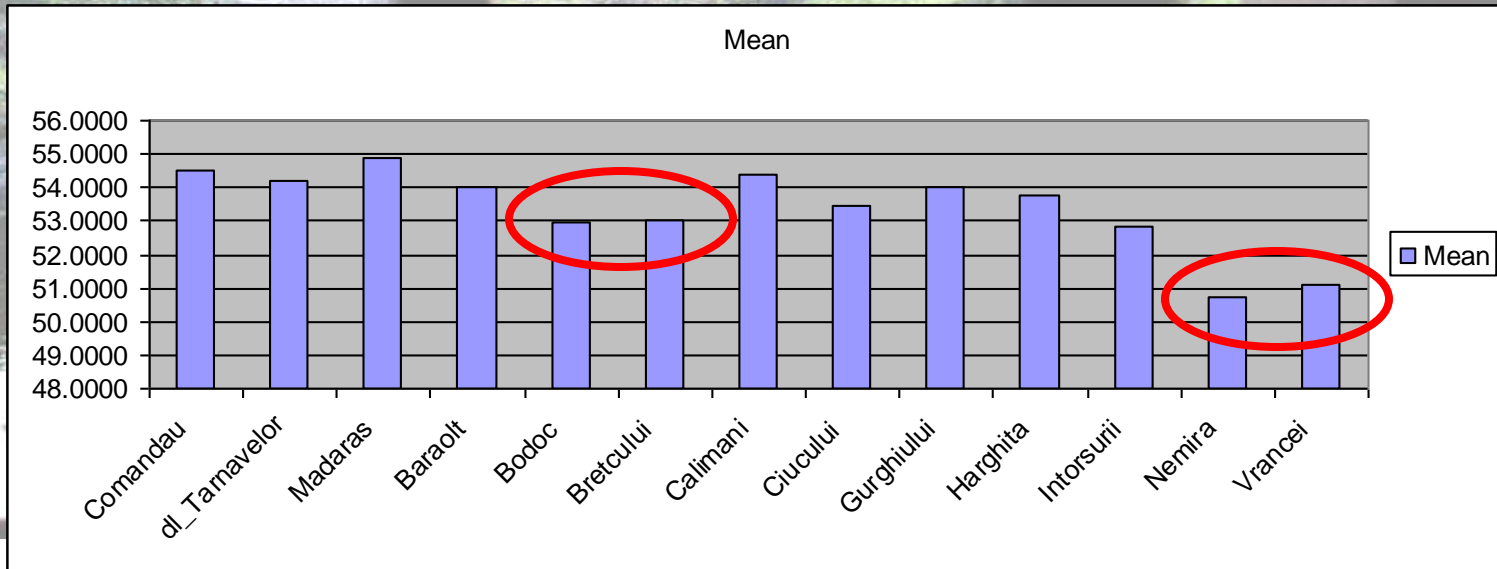
For 14 females $I/L=0.58$



Results

Mean of TS on geographical units

	Comandau	dl_Tarnavelor	Madaras	Baraolt	Bodoc	Bretcului	Calimani	Ciucului	Gurghiului	Harghita	Intorsurii	Nemira	Vrancei
Mean	54.5105	54.220	54.905	54.030	52.957	53.036	54.400	53.430	54.021	53.761	52.853	50.735	51.126
N	19	29	37	23	21	11	13	10	23	55	13	14	19
Std. Deviation	3.22437	5.05459	5.13879	5.55750	5.14942	3.23829	3.89957	6.38262	4.49979	5.02930	6.13455	9.06885	5.66812



Conclusions



- The increase of the skull is higher in the first six – seven years of life
- Female have a smaller skull than males (approx. 10% smaller)
- The increase of the skulls of male and females are similar in the first years, than the skull of the males have a bigger increase
- There are not significant differences between the geometric report Width/Length in females' and males' skull
- Hunting has a selective character in the spring oriented towards big individuals (hunting at or near feeding points) and a random character in the autumn (in relation to size and sex)
- There are no significant differences between the skull size in different geographical areas
- In relation to the TS there are differences between hunting management

Recommendations



- Brown bear hunting should be a management tool for Romanian Brown bear population, but as a management tool the random character should be reduced
- Hunting has to be oriented towards maintaining a normal structure of the population and not oriented towards trophy size (approx. 35% of the killed individuals were adults, mature individuals over 10 years old)
- Reducing the age of hunted individuals, protecting the adult and old individuals
- Shot animals should be examined and measured to extract all the useful information regarding brown bear biology and ecology
- The age should be more precisely determined to improve the derogation reports to the EU

Thank you

- www.carnivoremari.ro
- www.carnivoremari.ro/lifeursus/
- www.biodiversitate.ro