

STUDY REGARDING THE ASSESSMENT OF MORPHO – PHYSIOLOGICAL HARE POPULATIONS

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Abstract

Romania is geographically situated in the middle of the temperate zone, central crossed by the Carpathian arch and grafted onto a highly heterogeneous landscape, facts that favored a large animal biodiversity.

Because this country is located in a temperate zone in which are found various relief forms beginning with the lowland till the alpine hollow facilitates the existence of very different species of hunting interest.

In Romania the cynegetic potential is an important place caused by the recreational and sportive interest and also alimentary one that it is represented by the hare.

Characterization of his biological species reflects its ability of adaptation and spreading on very large areas. By studying the hare herds from Romania we can observe an unjustified decrease of this herds that exist on all cynegetic funds from our country.

The motivation of this study is a necessity for multifactorial identification of the species status in interrelations conditions between various activities and the ecosystems changes that have an impact over hare populations.

This paper is intended to be a detailed study of the anatomical and technological characterization of populations of hares from Romania.

The study focused on hare herds that come from various hunting funds from our country territory located on three altitudinal floors: lowland, hill and mountain.

The determination were made on corporeal clues (height at withers, height at rump, head length, body weight, circumference of the neck, trunk length, trunk circumference, length of the legs) and gravimetric determination of organs and tissues percentage from the carcasses.

Following the analyzes it can be concluded that the exploiting of hare carcasses is extremely profitable in terms of yields of meat that can be obtained from them.

Key words: cynegetic, hare, ecosystems

INTRODUCTION

Although there have been researchers who have argued that there are several subspecies of hare, recently it was concluded that there is a single species with several varieties of dimensions as adaptations to environmental conditions [1]. In Romania there is the same variety regarding the sizes and shapes of hares which can be observed in Tables. 1 and 2. The only species of rabbits

similar to the hare, in Romania is rabbit burrow (*Oryctolagus cuniculus*) brought and colonized in our country in the nineteenth century in Iasi County. But the hare is larger in size (almost double) and lighter in color than the rabbit burrow. At hares, ear tip has a dark streak longer, the ears are longer that exceed the tip of the muzzle while at the rabbit burrow only get on the tip of the muzzle. They also are different because the hare it makes their nests on the ground surface, while the rabbit burrow digs underground shelter, from where only comes out to feed.

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At hares, sexual dimorphism can not be observed in the field.

MATERIAL AND METHODS

The hare morphology and anatomy were investigated by observations and measurements made on a number of 118 specimens collected by shooting in which 62 males and 56 females and through dissections performed on a total of 24 specimens of which 11 females and 13 males. Research on anatomical descriptions were made in the anatomy laboratory of the Faculty of Veterinary Medicine of Cluj. The methods used were dissections, observations, measurements, weighing and descriptions.

RESULTS AND DISCUSSIONS

Morphological characters of the common rabbit were determined by measurements and weighings made on 118 specimens collected with the gun, of which 62 males and 56 females. Males weights from 3.200 to 6.000 kg and an average weight of 4.300 kg, while females have weights from 3.250 to 5.500 kg with an average weight of 4.447 kg. It should be noted that the harvesting of specimens was carried out during the 2006-2007 hunting season, in a mild winter, with snow almost throughout the country, except the mountains, where snow cover was brief and 2007-2008 hunting season with snow cover in the second part of January and February. This explains the higher weight average determination, both in males and females, to those found in the literature (3.800 – 4.000 kg) [2]. The weight average of male hare established for the plain area is 4.29 kg, for the hill area is 4.26 kg and for mountain area is 4.413 kg.

The weight average of female hares for the plain area is 4.55 kg, for the hill area is 4.15 kg and for the mountain area is 4.575 kg.

Average weights on the altitudinals storey determined in this paper, in two exceptional winters from climate perspective, do not increase only in part with altitude in accordance with Bergmann's theory, because in winters without snow from plain area,

hares had access to food and in these conditions had higher weights than those in the hill and mountain [3].

Otherwise, the highest weight was determined at an specimen from plain area, 6.000 kg on the 31 Ciornuleasa hunting fund from Călărași county.

The hare length is between 51 – 69 cm in male, with an average length of 59.7 cm, and in females is between 53.5 to 72.5 cm with an average length of 61.3 cm.

Analyzing the data in tab. 1 and 2 it follows that average height of the female rabbits is smaller than that of the male rabbits, both at the rump and the withers.

Wither height ranges from 21.0 to 42.0 cm with an average value of 33.04 cm in males and females is between 27.0 to 40.0 cm with a mean of 32.3 cm.

Rump height is between 32.0 to 48.0 cm with an average value of 41.1 cm for males and females ranged from 32.0 to 47.0 with an average value of 40.4 cm.

The rump height average is about 8 cm higher than withers due to the stronger development of the posterior part of the body as an adaptation to displacement mode of hare jumping.

The head length is between 9.0 to 15.0 cm with an average value of 11.7 cm for males and females ranged from 10.0 to 16.0 cm with an average value of 12.1 cm.

The head weights is between 145.0 to 285.0 g with an average value of 204.8 g in males and females is between 135.0 to 210.0 g with an average value of 185.2 g.

From the analyses of females and males rabbits distribution depending on the length and weight of the head, the females are closer to the average than males. The head, with the characteristic aspect of a rodent, presents a extremely mobile upper lip, which leaves at sight almost permanently the pair of incisors on the upper maxillary. On the upper lip, under the nose, on both sides presents thick long hair called whiskers.

On the head are inserted pointed long ears with high mobility, that can move independently, adaptation for a specie that its

survival depends on senses such as hearing and smelling. The upper edge of the ears presents a black hairy border.

The average length of the males ears is between 11.0 – 16.0 cm with an average of 13.6 cm, while for females is between 10.7 – 15.0 cm with an average of 13.4 cm. The distance between the ears is between 2.0 – 4.2 cm, with an average of 2.9 cm, in males and for females the values are between 2.0 – 4.5 cm, with an average of 3.1 cm. The outer and inner face of the ear are covered with hair, thicker and shorter on the exterior and longer and rare on the interior.

The neck is short, with length values between 4.2 – 9.0 cm, with an average of 6.2 cm in males, and in females the values are between 4.0 – 10.0 cm, with an average of 6.7 cm.

The circumference of the neck is between 14.0 – 23.0 cm, with an average of 16.2 cm in males, and in females is between 12.5 – 20.0 cm, with an average of 16.6 cm.

The trunk is asymmetrical developed, stronger in the posterior, with a section called rump with values between 8.0 – 17.0 cm, with an average of 11.1 cm in males, and values between 7.0 – 17.0 cm with an average of 11.1 cm, for females. The trunk length (including the rump) is between 32.0 – 50.0 cm, with an average of 40.9 cm in males, and in females the values are between 36.0 – 50.0 cm, with an average of 42.5 cm.

The distribution of males and females hares according to the length of the trunk and rump indicates an average greater in females than in males, values that are reflected in the average lengths of the two sexes. The circumference of the trunk in the thorax is between 27.0 to 44.5 cm, with an average of 36.9 cm for males, and in females is between 32.0 to 40.0 cm, with an average of 37.5 cm. In the abdominal area, the trunk circumference is between 24.0 to 40.0 cm, with an average of 32.1 cm for males and females is between 25.0 to 38.0 cm, with an average of 31.4 cm.

From the data analysis results that the average length of the anterior and posterior limbs is higher in males than in females.

The anterior limbs are shorter than the posterior limbs. The anterior limbs have lengths between 22.0 to 39.0 cm, with an average length of 30.5 cm for males, and in females are between 20.5 to 34.0 cm, with an average length of 29.7 cm. The anterior limbs have lengths between 22.0 to 39.0 cm, with an average length of 30.5 cm for males, and in females are between 20.5 to 34.0 cm, with an average length of 29.7 cm. During the displacement, because of this limbs conformation, the posterior limbs exceeds the anterior ones. Only when standing still the pattern of the anterior limbs lies before the pattern of the posterior limbs.

On the ventral side, the paws of the anterior and posterior limbs presents hair that protect and relieves the displacement on soil and snow. Both anterior and posterior limbs shows each 4 fingers.

Males paws widths are between 2.8 to 4.7 cm, with an average width of 3.3 cm, and females paws widths are between 3.0 to 4.5 cm, with an average width of 3.5 cm. Posterior paws have widths between 3.0 to 6.0 cm, with an average of 4.4 cm in males, and females posterior paws average width between 3.5 to 6.0 cm, with a 4.5 cm average.

Anterior paws length in males is between 4.1 to 8.5 cm, with an average value of 5.8 cm, and the value of the posterior paws is between 5.7 to 12.0 cm, with an average of 7.2 cm. The anterior paws length in females is between 4.5 – 8.0 cm, with an average value of 5.5 cm, and for posterior paws is between 6.0 – 11.0 cm, with an average of 7.7 cm.

Each finger presents unretractable claws, which are used for seeking food, but also for defense.

The tail length from 7.0 to 14.0 cm, with an average value of 10.3 cm for males, and in females ranged from 6.0 to 14.0 cm, with an average value of 11.2 cm. The tip of the tail presents a black tuft. The subterminal tail is white.

The fur shows different colors from summer until winter and from one item to another, sometimes within the same hunting found going from gray to red, or towards

black. The hare may present albinism or melanism phenomena. Hares that live in forested areas have darker colors, while rabbits living in the plains areas have lighter colors as adaptations to living environment. The hair is basically gray, in the middle white - yellow or shades to reddish, with a black top. The hair on the ventral side of the body has a white color as well as the inferior part of the legs. On the chest and lateral edges the hair is red while the back hair is dark. The moult takes place in spring and autumn, and in winter the hair thickens in response to lower body temperature. In young rabbits, on the forehead appears a spot of white hair but sometimes this also occurs in mature specimens, so it is not a reliable indicator of age.

Baby hares are born with fur and eyes open. At birth weighs about 120 g, after a month reaches about 1 kg and at 4 months reaches the adult size and weighs such as one, about 3.5 to 4 kg.

Freshly skinned fur length, measured from tip of snout to tail insertion site is between 50.0 to 84.0 cm, with an average value of 67.6 cm for males, and in females is between 64.0 - 84.0 cm, with an average value of 72.1 cm.

Freshly skinned fur width is between 26.0 to 42.0 cm, with an average value of 32.3 cm for males, and in females is between 27.5 to 42.0 cm, with an average value of 32.9 cm, measured at the narrowest part.

Hare testicles are abdominal and are palpable and visible only in the period in which is sexually active, sideways from the penis. Analyzing data on the weight of the muscular system also skeletal system and their correlation with total weight for females in tab. no. 1, shows that the muscular system is on average 66.58% and bones represents on average 32.17% of the weight of eviscerated rabbits. This data shows that muscle mass as a percentage of the total

weight of eviscerated females is higher than in males by about 4% in weight detriment of skeletal system, which is explained by the many tasks that females produce annually, which results in considerable loss of mineral component from bone structure. However, given that in both females and males, as shown by the data given in Tab. No. 1 and Tab. No. 2 the muscular system and skeletal systems in the two sexes, weights of the two systems increases in proportion to the total weight for each specimen, confirm that the characteristics of the specie is that females are larger than males. Skeletal system in females represents on average about 32% by weight of specimens drawn. In females muscular system represents on average about 67% by weight of specimens eviscerated

Table 1 Results regarding assessment of anatomical regions from hare

Nr. crt	Hunting fund	Sex	Eviscerated total weight (Kg)	Head weight (Kg)			Posterior average weight (Kg)			Anterior average weight (Kg)		
				TOTAL	MUSCLE	BONES	TOTAL	MUSCLE	BONES	TOTAL	MUSCLE	BONES
1	2	3	4	5	6	7	8	9	10	11	12	13
1	11 Ileana/c/Ci	F	2.81	0.17	0.04	0.13	0.4	0.3	0.1	0.2	0.14	0.06
2	1 Frumusen/i/c/Ar	F	2.87	0.16	0.04	0.12	0.46	0.35	0.11	0.21	0.15	0.06
3	39 Greaca/c/Ci	F	2.93	0.2	0.03	0.17	0.5	0.4	0.1	0.2	0.15	0.05
4	15 Cernavoda/c/Ct	F	2.64	0.2	0.03	0.17	0.4	0.3	0.1	0.15	0.1	0.05
5	15 Colibasi/c/Gr	F	3.3	0.19	0.04	0.15	0.5	0.4	0.1	0.23	0.16	0.07
6	45 Fauresti/d/VI	F	4.18	0.21	0.05	0.16	0.7	0.57	0.13	0.24	0.17	0.07
7	13 Cozia/m/VI	F	4.25	0.2	0.04	0.16	0.6	0.5	0.1	0.24	0.18	0.06
8	39 Boldur/c/Tm	F	3.29	0.18	0.04	0.14	0.5	0.4	0.1	0.21	0.16	0.05
9	11 Braila/c/Br	F	3.26	0.22	0.05	0.17	0.45	0.35	0.1	0.19	0.14	0.05
10	8 Casolt/d/Sb	F	3.46	0.18	0.04	0.14	0.6	0.48	0.12	0.24	0.17	0.07
11	17 Calui/c/Ot	F	2.99	0.21	0.04	0.17	0.45	0.35	0.1	0.26	0.18	0.08
Total			35.98	2.12	0.44	1.68	5.56	4.4	1.16	2.37	1.7	0.67
Arithmetic average			3.27	0.19	0.04	0.15	0.51	0.40	0.11	0.22	0.15	0.06
Standard deviation			0.53	0.02	0.01	0.02	0.09	0.09	0.01	0.03	0.02	0.01
Coef. of variation			16.14	9.59	15.81	11.75	18.38	21.33	9.82	14.29	14.86	17.15

Table 2 Results regarding assessment of anatomical regions from here (continue)

Neck weight (Kg)			Trunk weight (Kg)			Weight of the skeletal system (Kg)	Weight of the muscular system (Kg)	Weight of the adipose tissue (Kg)	Weight of the skeletal system / Weight of the muscular system	Weight of the muscular system/ Total weight	Weight of the skeletal system/ Total weight
TOTAL	MUSCLE	BONES	TOTAL	MUSCLE	BONES						
14	15	16	17	18	19	20	21	22	23	24	25
0.1	0.06	0.04	1.3	0.8	0.5	0.99	1.78	0.04	55.6	63.3	35.2
0.12	0.06	0.06	1.22	0.84	0.38	0.9	1.94	0.03	46.4	67.6	31.4
0.19	0.1	0.09	1.1	0.7	0.4	0.96	1.93	0.04	49.7	65.9	32.8
0.18	0.08	0.1	1	0.6	0.4	0.97	1.65	0.02	58.8	62.5	36.7
0.2	0.11	0.09	1.4	0.9	0.5	1.08	2.17	0.05	49.8	65.8	32.7
0.24	0.14	0.1	1.8	1.2	0.6	1.26	2.87	0.05	43.9	68.7	30.1
0.23	0.12	0.11	1.9	1.3	0.6	1.19	3.02	0.04	39.4	71.1	28.0
0.16	0.08	0.08	1.5	0.9	0.6	1.12	2.14	0.03	52.3	65.0	34.0
0.17	0.09	0.08	1.5	1	0.5	1.05	2.17	0.04	48.4	66.6	32.2
0.15	0.08	0.07	1.4	0.9	0.5	1.09	2.32	0.05	47.0	67.1	31.5
0.1	0.06	0.04	1.2	0.9	0.3	0.87	2.06	0.06	42.2	68.9	29.1
1.84	0.98	0.86	15.32	10.04	5.28	11.48	24.05	0.45	533.55	732.35	353.82
0.17	0.09	0.08	1.39	0.91	0.48	1.04	2.19	0.04	48.50	66.58	32.17
0.05	0.03	0.02	0.28	0.20	0.10	0.12	0.42	0.01	-	-	-
28.43	29.46	30.17	19.82	21.96	20.83	11.48	19.29	27.77	-	-	-

CONCLUSIONS

Analyzing the data regarding the dimensions and weights of male and female hare have resulted the following:

- on the same floor altitude (plains, hills, mountains) hare female have higher weights and lengths than male hares – a characteristic of the species;

- both males and females weights increases with altitude increasing (with one exception – hill area);

- body size in males increase with altitude (except the mountains area);

- body size in females increase with altitude (except the hill area).

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