

## ŠILUTĖ REGION SEACOAST ROE DEER *CAPREOLUS CAPREOLUS* L. POPULATION QUALITY

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Quality of Šilutė seacoast region roe deers population was determined according to the data, collected during the last four hunting seasons in Lithuanian University of Agriculture Forestry and ecology Faculty science and education game area „Tulkiaragė“. The main morphometric data of roe deer body, cranium and antlers, were measured as well as the selective group and antlers trophy value were evaluated. After comparative analysis were performed, it was determined that roe deers living in the seacoast region, general body weight is marginally lower than the average in all Lithuania Republic, described in 1988 and field – brushes ecotype roe deers. After accomplishing roe deers cranium morphometric data analysis, conclusions were made: along with the age increasing all cranium morphometric data, and developing tooth attrition (2nd molar) also antler stumps are getting thicker. After evaluating hunted roe deers antlers, selective group and trophy value it was identified that roe deers population quality in Šilutė seacoast region is good.

Key words: Population quality, morphometric data, selective group.

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### INTRODUCTION

Roe deer is smallest and the most numerous ungulate animal in Lithuania. It is widely spread in all the country and has very important ecological and social value. In Lithuania as in many European countries two roe deer ecotypes can be distinguished: “forest” roe deer and “field” roe deer. These populations vary in many important traits. The “field” roe deer is recognized as the ecological form of the adaptation of a species to living in an open agricultural landscape. The creation of this ecotype was possible due to the high adaptability of these species.

The weight and body morphological measurements of roe deer show a considerable variation under various environmental conditions. The phenotypic manifestation of the weight and body measurements is a result of interaction between a genotype and the environment. Because the organism of roe deer is very sensitive then the value of those traits is determined to a higher degree by the kind of food, rainfall and snowfall, low temperature, wind, population density, availability of food supply in summer and winter, predators, diseases, parasites and hunting interference (Brzuski et al. 1997).

The skull is the most complex bone structure in the body and is high variable in shape, reflecting

variable in genetic origin. Performed craniometrical data analysis in Southwest Lithuania has confirmed that cranium is growing through all life span of roe deer (Petelis, Brazaitis 2002). Antlers are autosomal trait and according to Darwinian opinion serve mainly towards natural selection. This thesis seems to be confirmed by the fact that together with growth and development, a male rebuilds stronger and stronger antlers, in middle age the best developed antlers are built and also that the cyclic process of antler development is connected with cyclically increased spermatogenesis. There is a strong relationship between the level of hormones, size and the structure of antlers. The great sensitivity of antlers to external and internal factors resulted that considerable variety of antler shapes is found. In extreme cases they are very twisted and bent. These deformations could be caused by: disturbances in the metabolism, lesions or diseases of the testicles, serious external or internal injuries, incorrect development of pedicles, mechanical damage of the antlers during growth, lesions of the pedicle or the skull fragment, frost bite of growing antlers (Brzuski et al. 1997). Thus, size, shape and development of antlers are perfect factors describing roe deer population quality.

The quality of roe deer antlers correlates with their physical condition and inheritance traits, thus, morphometric data of antlers is one of the main indicators, determining the condition of population. Size, weight and other factors of antlers development relies on age of individual. Appropriate antlers shape shows only on third – fourth year of existence. In each separate area there usually dominate typical shape of antlers. In Lithuania field ecotype roe deer mainly has light color antlers with thick stumps, big pearls and comparatively short points. (Beleisis et al. 2002). The area of research is located in Southern part of Lithuanian seacoast, Šilutė region, in the delta of Lithuania's largest river Nemunas. Here forest cover is comparatively low and water-meadows suffer by yearly spring affluent. No agricultural activities are performed here.

The aim of this work is to identify if Šilutė seacoast roe deer population can be verified as

field ecotype.

## MATERIAL AND METHODS

The material for the research was collected during the last four hunting seasons (2007/2008 – 2010/2011) in Lithuanian University of Agriculture Forestry and Ecology Faculty game area „Tulkiarage“, located in Šilutė region, near the river Nemunas delta and Baltic sea coast. This area has unique landscape with water-meadows suffering by yearly spring affluent by the Lithuania's largest river Nemunas and low forest coverage (2,9 %). The area of investigation is 4797,5 hectares.

Roe deer population was evaluated according to qualitative population management features, using the bioindicative guidelines: structural – reproductive (sexual and age population structure), morphophysiological (body and cranium size, animal body condition, wellness, age of hunted roe deers) and trophies (antlers development during the age span, animals with well developed antlers share in all population).

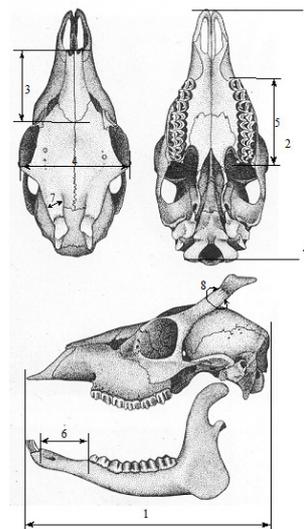


Fig.1. Measurements of roe deer cranium: 1 – total cranial length; 2 - condylobasal cranial length; 3 - length of nasals; 4 - zygomatic width; 5 - length of teeth row in maxilla; 6 - length of diastema in mandible; 7 - diameter of burr; 8 - circumference of burr. Prūsaitė 1988.

In accomplishing the investigation of body morphological data it was measured 35 bodies of culled roe deers during the last four hunting seasons in the area. They were divided into 4 groups: adult males (n = 8), adult females (n = 12), juvenile males (n = 7) and juvenile females (n = 8), considering that juveniles are younger than 12 months old. Different morphological features of culled roe deers were measured: body weight, body length, ear length, breast scope, length of shin.

Based on J. Prusaitė's (1988) cranium investigation methodology (Fig. 1), it was measured 29 craniums of culled roe deers. Craniums were separated out into 3 groups: juveniles (n = 4) males and female fawns up to 12 months old, adult females (n = 6) and adult males (n = 19). The parameters of craniums measured were total cranial length, condylobasal cranial length, zygomatic width beside jowl, inter-orbital width, over-orbital width, length of nasal, medullary width, mastoidic width, length of teeth row in maxilla and length of diastema in mandible. For a comparison of Šilutė seacoast roe deer males cranial size with field ecotype and forest ecotype roe deers cranium from Southwest Lithuania described by Pėtelis and Brazaitis in 2002 as a criterion we took these dimensions total cranial length, condylobasal length, length of nasal, length of teeth row in maxilla and length of diastema in mandible.

Roe deers population quality was also determined by evaluating culled roebucks antlers morpho-

metric data, quality and trophy value according to (CIC) international trophy evaluation criterions. Measured dimensions were: antlers color, pearls, points length, antlers weight, span and trophy value.

## RESULTS AND DISCUSSION

### Population size structure

One of the most important feature, describing population quality is the abundance – number of individuals in population. In the area of observation, population size of roe deers was measured for many years. Currently, the abundance of roe deers is high and continuously increasing, especially during the last five years, then population size has increased twice. In “Tulkiarage” game area, after spring monitoring, in a year 2007 it was found 104 roe deers (♂38 ♀66) and now, in a spring of 2011 there are 210 individuals in population (Fig. 2). The reasons for rapid population growth could be milder winters, absence of natural enemies (wolves), lower intensity of hunting.

Fig. 2 shows that share of males and females in population is nearly the same during all five years (3♂ : 7♀). Males contains only 32,2 % (29,7 % - 36,5 %) in population.

### Body morphometry

Body and cranium size, animal wellness and body condition are very important traits, defining

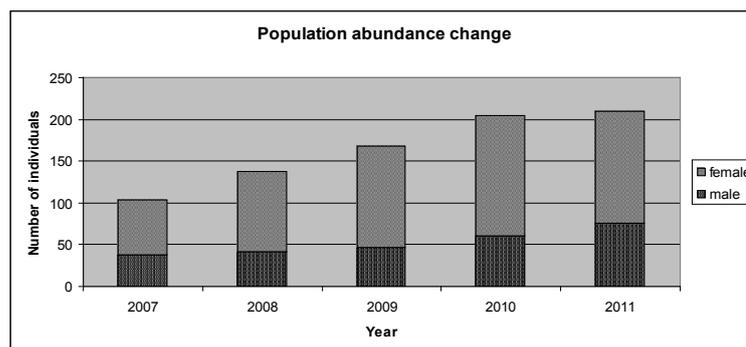


Fig. 2. The changes in population abundance in five years period.

Table 1. Average body size traits of 4 different roe deer groups with minimum and maximum values

Age and sex class	Body weight, kg	Body length, Cm	Ear length, cm	Shin length, cm	Breast scope, cm
♀ adult (n = 12)	27,78 min 19,5 max 37,0	110,00 min 96,0 max 122,0	15,71 min 14,0 max 19,0	27,04 min 25,0 max 29,5	68,96 min 59,0 max 79,0
♂ adult (n = 8)	28,19 min 24,0 max 31,0	113,38 min 102,0 max 122,0	15,75 min 14,5 max 17,5	27,44 min 25,0 max 29,0	75,57 min 69,0 max 84,0
♀ juvenile (n = 8)	15,80 min 12,0 max 20,0	101,63 min 93,0 max 109,0	15,44 min 13,5 max 18,0	24,56 min 22,0 max 28,0	61,19 min 54,0 max 69,0
♂ juvenile (n = 7)	20,21 min 16,5 max 22,7	106,86 min 99,0 max 113,0	15,64 min 13,0 max 17,0	25,07 min 22,0 max 26,0	64,29 min 59,0 max 68,0

Table 2. The comparison of roe deer body weight

Age and sex class	Šilutė, kg (n = 35)	Southwest Lithuania, kg (n = 111)	All Lithuania, kg (n ~ 1000)
♀ adult	27,78	27,70	26,10
♂ adult	28,19	31,00	29,20
♀ juvenile	15,80	20,10	12,70
♂ juvenile	20,21	20,40	13,70

Table 3. Šilutė region seacoast roe deer's cranium morphometric data

Craniometrical data, cm	Juvenile (n = 4)	Adult ♀ (n = 6)	Adult ♂ (n = 19)
Total cranial length	17,08	19,93	19,85
Condylbasal cranial length	16,52	19,18	18,87
Zygomatic width beside jowl	7,80	8,90	10,17
Inter-orbital width	4,61	5,08	5,37
Over-orbital width	5,92	6,59	7,09
Length of nasal	4,65	6,05	5,78
Medullary width	5,49	5,95	6,05
Mastoidic width	4,12	4,44	4,78
Length of teeth row in maxilla	4,78	5,62	5,69
Length of diastema in mandible	3,54	4,45	4,20
Diameter of burr	0,82	-	9,08
Circumstance of burr	3,10	-	25,80
2 <sup>nd</sup> molar tooth height	0,80	0,63	0,70

population quality and condition. Also, body and cranium size is the most important instrument to distinguish two separate roe deer ecotypes. Field ecotype roe deers are adopted to live in open landscape and are larger and heavier than forest

ecotype roe deers (Naruskaitė & Pėtelis 2010).

As the main criterions describing the size of culled roe deer we took body weight (not eviscerated), body length, ear length, breast scope,

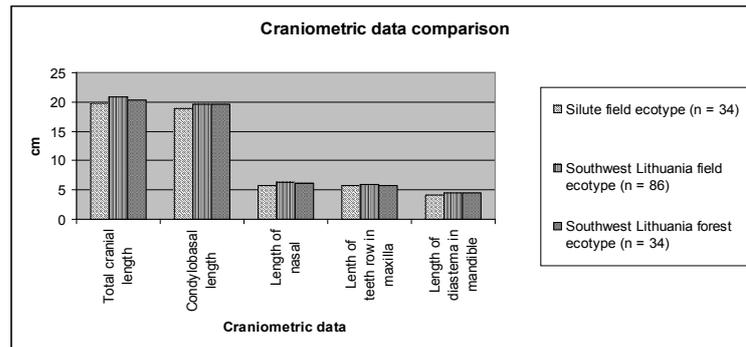


Fig. 3. Comparison of craniometrical data.

and length of foot shin. The average data of 35 measured roe deers is shown in a table 1.

As it could be predictable, males of roe deers has larger bodies and bigger morphometric data then females in both juvenile and adult age classes. Big differences between minimum and maximum values, shows that there is a big variation in body size at the same class.

For a characterization of Lithuanian roe deers, measurements were taken from about 1000 culled individuals from different parts of the country (Kontrimavičius 1988). As it is shown in table 2, Šilutė region seacoast roe deers has relatively smaller body weight than the average measured in all the country and bigger than field ecotype roe deers living in Southwest of Lithuania (Petelis, Brazaitis 2003). The reason for big differences in juvenile average weight can be time and exact age (by months) when they were culled.

### Cranium morphometry

Analysis of data measurements of the cranium revealed that it gradually enlarges during the whole lifespan of the roebuck (Petelis & Brazaitis 2003). Morphometric data of measured craniums of roe deers from Šilutė region seacoast is presented in table 3. From the obtained results of average cranial dimensions we have observed that there are tendentious differences between male and female craniums. Roebuck has shorter, but wider cranium than doe. Roebuck has shorter total cranial length, condylbasal cranial length, length of nasals and length of diastema, but much

wider zygomatic width beside jowl, wider inter and over-orbital width and wider medullary than doe. Along with the age increasing all cranium morphometric data, and developing tooth attrition (2<sup>nd</sup> molar) also antler stumps are getting thicker. Dominating color of dentin is dark brown.

Šilutė seacoast roe deer males cranial dimensions comparison with field ecotype and forest ecotype roe deer's from Southwest Lithuania is shown in figure 3. Šilutė seacoast roebuck's cranial dimensions are slightly smaller than field and forest ecotype roebuck's in Southwest Lithuania.

### Antlers trophy value

All measured antlers had non-perspective selective group, because according to Lithuanian game legislation it is not allowed to hunt roebucks with perspective antlers. Nevertheless, most of antlers were normally developed considering their age. Antlers shape differs a lot, but dominant shape is parallel and crooked. The most usual color of antlers is light brown. There are many pearls, specially on the base of antlers, but they are not large. Points of antlers are comparatively short.

### CONCLUSIONS

1. Šilutė seacoast population size has increased twice during last five years and it is continuously growing. The share of males in population is 32,2%.
2. Seacoast field ecotype roe deers of Šilutė region have relatively smaller body weight than the

average measured in all the country and bigger than field ecotype roe deers living in Southwest of Lithuania.

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3. Along with the age increasing all cranium morphometric data, and developing tooth attrition (2nd molar) also antler stumps are getting thicker.

4. Roebucks has shorter, but wider cranium than does.

5. Šilutė seacoast roebuck's cranial dimensions are slightly smaller than the field and forest ecotype roebucks in Southwest Lithuania.

6. Roe deers population quality in Šilutė seacoast region is good.

7. Life environment conditions, body and cranium size and antlers development provides to assign Šilutė seacoast roe deer population to field ecotype.

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