

BIOMETRICAL CHARACTERISTICS FOR *CLETHRIONOMYS GLAREOLUS* AND *MICROTUS ARVALIS* SPECIES IN THE MIDDLE BASIN OF THE SIRET RIVER

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ABSTRACT

In characterizing the rodent species, the study of the body and skull characteristics is highly valuable, clarifying certain aspects about the specific taxonomy.

The paper presents the results of the statistical analysis of 14 body and skull characters of 2 species: *Clethrionomys glareolus* and *Microtus arvalis*. The descriptive analysis of the skull characters investigated by us shows the fact that the lowest values of the variability indices for *Clethrionomys glareolus* species were recorded regarding the auditive bubble ($2,65\pm 0,06$) and the diastema length ($3,5\pm 0,02$). Of the skull characters investigated for the species *Microtus arvalis* those with the lowest variability degree are: the interorbital building ($3,54\pm 0,01$) and the auditive bubble length ($3,82\pm 0,06$).

The obtained data were compared with those from the specialty literature.

Key words: biometrical characteristics, rodent, Siret basin

Introduction

Studying the variability of the body and skull characters is of great importance in characterizing the micromammals. The skull characters weigh more than the body characters, concerning the population characterization and the study of their variability clarifies certain aspects about their intraspecific taxonomy.

We investigated 14 body and craniometric characters of the *Clethrionomys glareolus* and *Microtus arvalis* species.

Material and method

The biometric characters investigated for the 2 species are: tail length (LC), body length: body + tail (LC+T), ear length (LU), hind paw length (LP), nasal bone length, interorbital (constriction) distance, zygomatic width, candilobase length, skull width, width of the upper jugal teeth row, diastema length, the length of the lower jugal teeth row, auditive bubble length, auditive bubble width (3).

Because we worked with lots representing only a part of the general population, in order to appreciate to what extent that lot could represent the whole population, we established the possible limits of the deviations, for each character, i.e. the absolute error (m) and the relative error (m%) (6).

The biometric data for the *Clethrionomys glareolus* species were obtained on the basis of the collections made in three villages in the middle basin of the Siret river: Sănduleni, Valea Uzului and Livezi and for the *Microtus arvalis* species, on the basis of the collections made in other three villages in the middle basin of the Siret river: Poduri, Holt (Letea Veche) and Prisaca (Berești-Tazlău).

Results and discussions

Following the descriptive analysis of the skull characters investigated for the *Clethrionomys glareolus* species, we can notice that the lowest values of the variability indices were recorded for the auditive bubble width ($2,65\pm 0,06$) and the diastema length ($3,5\pm 0,02$) (table 1, fig. 1).

The values obtained in this study were compared with those obtained by V. SIMIONESCU (1965) for *Clethrionomys glareolus* species in the Moldavia territory (table 2) (5). We can notice that higher medium values in comparison with the population investigated by V. SIMIONESCU (1965) were recorded for the following characters: body length, nasal bone length, interorbital constriction, length of the upper jugal teeth row and the candilobase length; lower medium values were obtained for the tail length, hind paw length and diastema length.

Of the skull characters investigated for the *Microtus arvalis* species those with the lowest variability degree are: interorbital constriction ($3,54\pm 0,01$) and the auditive bubble width ($3,82\pm 0,06$) (table 3, fig. 2).

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Comparing the results obtained regarding the medium values of the characters investigated in the *Microtus arvalis* species with those obtained by other authors (table 4), we can notice slightly higher values for a body character (ear length) and slightly lower values for two skull characters (skull length and auditory bubble width) (1,2,4)

Conclusions

For the characterization of certain rodent species in the middle basin of the Siret river we investigated 4 body characters (body length, tail length, ear length, hind paw length) and 10 skull characters (nasal bone length, interorbital constriction, zygomatic width, condilobase length, length of the upper jugal teeth row, diastema length, length of the lower jugal teeth row, auditory bubble length, auditory bubble width) in 2 rodent species: *Clethrionomys glareolus* and *Microtus arvalis*. The data obtained by us confirm, to a great extent, the data in the specialty literature, confirming their.

Rezumat

În caracterizarea populațiilor de rozătoare studiul variabilității caracterelor corporale și craniene are o valoare deosebită, elucidând anumite probleme legate de taxonomia intraspecifică.

Lucrarea prezintă rezultatele prelucrării statistice a 14 caractere corporale și craniometrice de la 2 specii: *Clethrionomys glareolus* și *Microtus arvalis*.

Analiza descriptivă a caracterelor craniene investigate, relevă că valorile cele mai mici ale indicilor de variabilitate pentru specia *Clethrionomys glareolus* au fost înregistrate pentru

lățimea bulei auditive ($2,65 \pm 0,06$) și lungimea diastemei ($3,5 \pm 0,02$).

Dintre caracterele craniene investigate pentru specia *Microtus arvalis* cele cu gradul cel mai mic de variabilitate sunt: constricția interorbitală ($3,54 \pm 0,01$) și lățimea bulei auditive ($3,82 \pm 0,06$). Datele obținute au fost comparate cu cele din literatura de specialitate, pe care le confirmă.

References

1. BANARU, V., 1998 – *Cercetări faunistice, ecologice, biometrice și biologice referitoare la populațiile de micromamifere (Insectivora, Rodentia) din bazinul Someșului Mic*. Teză de doctorat, Facultatea de Biologie-Geologie, Universitatea „Babeș-Bolyai” Cluj, 1-368.
2. HELLWING, S., GHIZELEA, G., 1963 – Small mammals from the outskirts of Jassy. *Travaux du Muséum d'Histoire Naturelle „Grigore Antipa”*, București: 497-519.
3. PARASCHIV, D., 2011 – *Biodiversitatea mamiferelor mici (Mammalia: Rodentia) din bazinul mijlociu al râului Siret*. Teză de doctorat, Facultatea de Biologie, Universitatea „Al. I. Cuza” Iași, 50-59.
4. POPOVICI, M., 2006 – *Biodiversitatea mamiferelor mici (Mammalia: Rodentia, Insectivora) din diferite agroecosisteme din nordul Moldovei*. Teză de doctorat, Facultatea de Biologie, Univ. Al. I. Cuza, Iași, 369 p.
5. SIMIONESCU, V., 1965 – Contribuții la cunoașterea sistematiei și răspândirii geografice a faunei de rozătoare din Moldova. *Anal. Univ. St. Iași*: 127-140.
6. VARVARA, M., ZAMFIRESCU, ȘT., NEACȘU, P., 2001 – *Lucrări practice de ecologie – manual*. Edit. Univ. „Al. I. Cuza”, Iași: 2-6.

Table 1 – Biometrical characteristics for *Clethrionomys glareolus* in the middle basin of the Siret river

No.	Biometric characters	n	min.	max.	M	Ω	± m	δ	C	m%
1	Body length	28	78.2	109.3	93.46	31.1	1.22	6.44	6.89	1.31
2	Tail length	28	34.2	57.3	45.19	23.1	1.13	5.99	13.26	2.5
3	Ear length	28	11.4	14.8	13.05	3.4	0.13	0.7	5.36	1
4	Hind paw length	28	15.3	18.1	16.67	2.8	0.12	0.66	3.96	0.72
5	Nasal bone length	28	6.2	7.9	7.07	1.7	0.05	0.28	3.96	0.71
6	Interorbital constriction	28	3.8	5.2	4.46	1.4	0.04	0.23	5.16	0.9
7	Zygomatic width	28	12.2	14.4	13.14	2.2	0.1	0.52	3.96	0.76
8	Condilobase length	28	22.2	26.3	24.3	4.1	0.19	1.01	4.16	0.78
9	Skull width	28	8.6	9.9	9.31	1.3	0.05	0.25	2.69	0.54
10	Width of the upper jugal teeth row	28	5.1	5.8	5.44	0.7	0.07	0.04	0.74	1.29
11	Diastema length	28	3.4	3.6	3.5	0.2	0.02	0.08	2.29	0.57
12	Length of the lower jugal teeth row	28	4.8	5.4	5.09	0.6	0.01	0.06	1.18	0.2
13	Auditory bubble length	28	3.2	3.9	3.56	0.7	0.02	0.07	1.97	0.56
14	Auditory bubble width	28	2.2	3.0	2.65	0.8	0.06	0.16	6.04	2.26

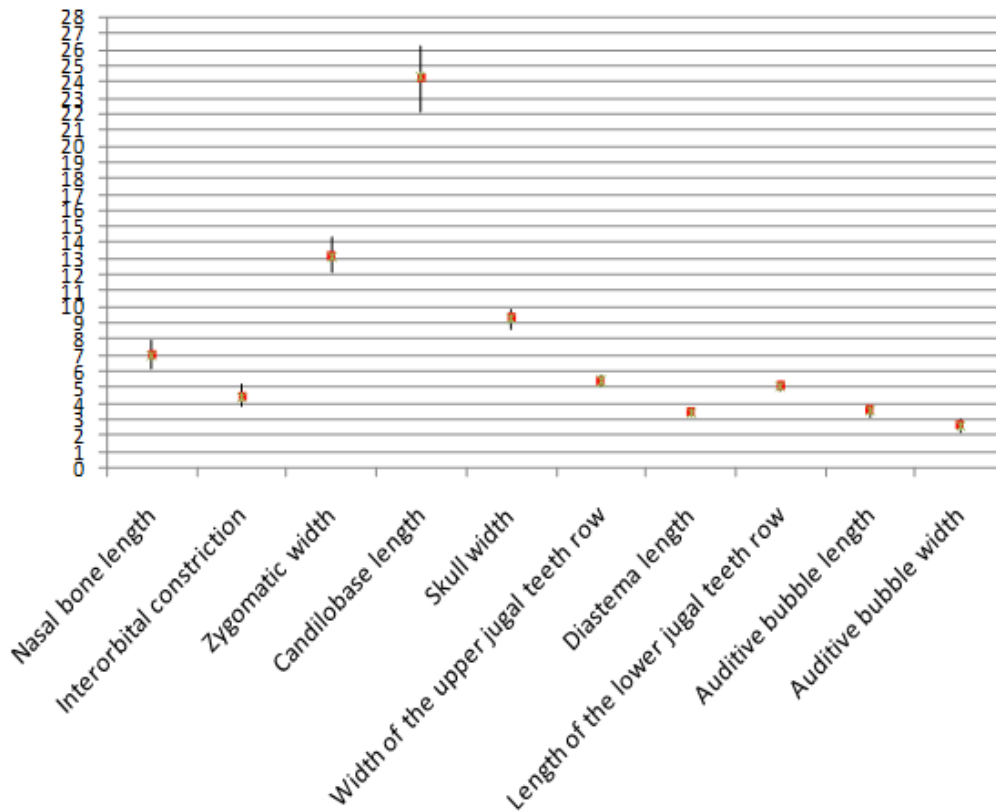


Fig. 1 - Graphical representation of the mean and variability of the skull characters for the *Clethrionomys glareolus* species

Table 2 – Values of the biometric characters for the *Clethrionomys glareolus* species compared with other previous studies

No.	Biometric characters	V. SIMIONESCU (1965) (M± m)	Personal study (M± m)
1	Body length	92.2±1.13	93.46±1.22
2	Tail length	46.25±0.9	45.19±1.13
3	Ear length	13.28±0.14	13.05±0.13
4	Hind paw length	17.24±0.08	16.67±0.12
5	Nasal bone length	6.62±0.06	7.07±0.05
6	Interorbital constriction	3.71±0.03	4.46±0.04
7	Zygomatic width	12.3±0.07	13.14±0.1
8	Candilobase length	22.89±0.11	24.3±0.19
9	Skull width	-	9.31±0.05
10	Width of the upper jugal teeth row	5.32±0.02	5.44±0.07
11	Diastema length	6.18±0.05	3.5±0.02
12	Length of the lower jugal teeth row	4.9±0.03	5.09±0.01
13	Auditive bubble length	-	3.56±0.02
14	Auditive bubble width	-	2.65±0.06

Table 3 – Biometrical characteristics for *Microtus arvalis* in the middle basin of the Siret river

No.	Biometric characters	n	min.	max.	M	Ω	± m	δ	C	m%
1	Body length	35	87.5	119.2	102.5	31.7	1.52	8.96	8.74	1.48
2	Tail length	35	31.2	45.6	37.78	14.4	0.66	3.92	10.38	1.75
3	Ear length	35	10.2	13.9	13.4	3.7	0.04	0.22	1.64	0.3
4	Hind paw length	35	15.2	17.1	16.23	1.9	0.07	0.41	2.53	0.43
5	Nasal bone length	35	6.2	8.4	7.43	2.2	0.08	0.47	6.33	1.1
6	Interorbital constriction	35	3.2	4	3.54	0.8	0.01	0.06	1.69	0.28
7	Zygomatic width	35	13.2	15.1	14.14	1.9	0.07	0.41	2.9	0.5
8	Candilobase length	35	21.2	25.4	23.33	4.2	0.18	1.05	4.5	0.77
9	Skull width	35	9.2	10.8	9.92	1.6	0.02	0.14	1.41	0.2
10	Width of the upper jugal teeth row	35	5.4	6.9	6.13	1.5	0.03	0.15	2.45	0.49
11	Diastema length	35	5.8	6.6	6.14	0.8	0.03	0.2	3.26	0.49
12	Length of the lower jugal teeth row	35	5.3	6.7	6	1.4	0.04	0.24	4	0.66
13	Auditive bubble length	35	6.5	7.9	7.22	1.4	0.04	0.26	3.6	0.55
14	Auditive bubble width	35	2.8	5	3.82	2.2	0.06	0.31	8.12	1.57

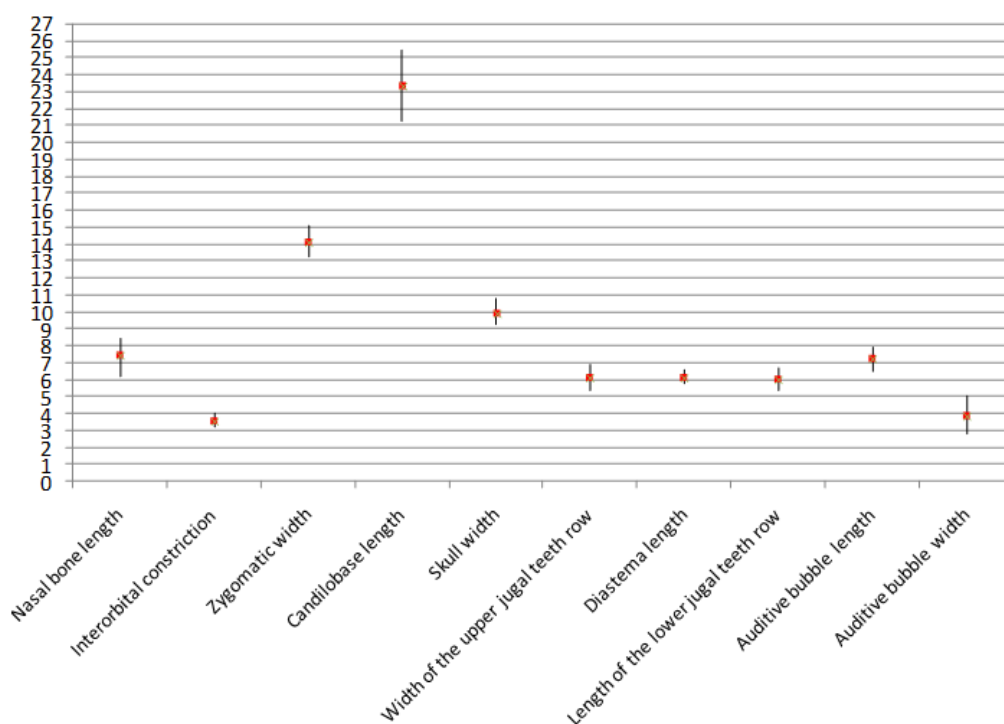


Fig. 2 - Graphical representation of the mean and variability of the skull characters for the *Microtus arvalis* species

Table 4 – Values of the biometric characters for the *Microtus arvalis* species compared with other previous studies

No.	Biometric characters	Authors				Personal study (M± m)
		S. HELWING, G.GHIZELEA (1963) (M)	V. SIMIONESCU (1965) (M± m)	V. BANARU (1998) (M± m)	M. POPOVICI (2006) (M± m)	
1	Body length	89.9	108.82±1.59	85.89±14.27	96.77±1.01	102.5±1.52
2	Tail length	34.52	41.2±0.73	30.94±7.14	45.99±0.68	37.78±0.66
3	Ear length	12.08	11.31±0.16	10.89±0.78	12.57±0.08	13.4±0.04
4	Hind paw length	15.9	16.68±0.13	16.07±1.55	16.39±0.08	16.23±0.07
5	Nasal bone length	-	6.88±0.12	-	7.72±0.03	7.43±0.08
6	Interorbital constriction	3.05	3.46±0.03	3.26±0.15	3.63±0.03	3.54±0.01
7	Zygomatic width	-	14.15±0.10	13.6±3.25	13.53±0.03	14.14±0.07
8	Candilobase length	20.4	25.10±0.15	23.02±3.52	22.23±0.09	23.33±0.18
9	Skull width	10.4	-	-	10.52±0.03	9.92±0.02
10	Width of the upper jugal teeth row	-	6.09±0.03	5.95±0.92	6.41±0.03	6.13±0.03
11	Diastema length	6.1	7±0.05	7.35±1.51	7.4±0.03	6.14±0.03
12	Length of the lower jugal teeth row	-	5.89±0.03	-	8.43±0.03	6±0.04
13	Auditive bubble length	-	-	-	7.24±0.03	7.22±0.04
14	Auditive bubble width	-	-	-	4.08±0.03	3.82±0.06