POLSKA AKADEMIA NAUK — ZAKŁAD BADANIA SSAKÓW

ACTA THERIOLOGICA

VOL. VII, 5. BIAŁOWIEŻA 15.IX.1963

Janusz DYNOWSKI[1]

Morphological Variability in the Białowieża Populatian of *Mus musculus* Linnaeus, 1758

Zmienność morfologiczna białowieskiej populacji *Mus musculus* Linnaeus, 1758

[With 7 Figs. & 4 tables]

I. INTRODUCTION

The house mouse has not been, as yet, adequately studied from the morphological point of view. The variability of its populations was not investigated in detail. Systematisation of the house mouse was undertaken long ago, a series of subspecies were described and their appearance and localisation elaborated. In many cases the subspecies intercrossed (Zimmermann, 1949) producing hybrids which complicated the situation for systematisation and continue to do so.

The present work is an endeavour to investigate as great a number as possible of individuals belonging to a single population and to determine the degree of individual variability related to age, sex and season of the year. Efforts towards determining the subspeciec appurtenance of mice forming the *Mus musculus* Linnaeus, 1758, population of Białowieża could only be undertaken on the basis of an analysis carried out in such a manner.

I wish to express my sincere gratitude to Professor August Dehnel and Dr. Zdzisław Pucek for their valuable indications and advice concerning this work.

[1]) Present address: Dept. of Comparative Anatomy of Vertebrates, M. Curie-Skłodowska University, Lublin, Głowackiego 2.

II. MATERIAL AND METHOD

The material was collected in farm buildings of the village of Białowieża. The village is situated in a clearing with a surface of ca 1600 ha, surrounded by a belt of forest 12—34 km broad which renders natural migration difficult. The bringing in of mice from other terrains is possible when fodder is being transported.

Capturing was systematically though not very intensively carried out. During eight years 429 specimens were collected (Table 1). The relation between the sexes

Table 1.

List of material.

Month / Year		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	n		
														♀♀	♂♂	Σ
1947	♀♀	1									1	2		4	1	5
	♂♂									1						
1948	♀♀	2												2	2	4
	♂♂	1									1					
1954	♀♀								1	2	22	4		29	52	81
	♂♂								2		46	4				
1955	♀♀	1	4	2	18	13	3			1	20	3		65	50	115
	♂♂	3		2	12	9		1		1	17	4	1			
1956	♀♀		3	4	7	3	8	4	1	3	8	3	1	45	44	89
	♂♂		6	3	1	3	11	6		5	8	1				
1957	♀♀	1	1	6						1		2	1	12	13	25
	♂♂		1	6					1	2	3					
1958	♀♀		1	3							3	2		9	15	24
	♂♂	1	1	8	2							3				
1959	♀♀	3	1			1	2	4	12	4	3			30	56	86
	♂♂					1	2	16	28	5	3		1			
n	♀♀	8	10	15	25	17	13	8	14	11	57	16	2	196		
	♂♂	5	8	19	15	13	13	23	31	14	78	12	2		233	
	Σ	13	18	34	40	30	26	31	45	25	135	28	4			429

is of 1,19 : 1 (233 ♂♂ and 196 ♀♀). Among the individuals caught in the months of July—October the percentage of females is of 38 per cent, while in the remaining months a slight numerical predominance of females takes place.

Most of the specimens (239) are skins and skulls, the remainder (190) were preserved in alcohol. Box traps were used for capturing live mice as well as snap traps. Many skulls (38 per cent) could not be measured as they had been damaged. On each of the remaining ones eight measurements with a vernier calipers were made:

1. Condylobasal length (Cb)
2. Length of the brain-case
3. Length of the palate
4. Breadth of the brain-case
5. Interorbital constrction
6. Zygomatic breadth
7. Depth of the brain-case between the *bullae*
8. Height of the brain-case *per bullae*.

I elaborated the variability of colouring by means of the tables of Streller & Ostwald (1939). I expressed the reading of symbols ater Ridgway's (1912) scale of colours with the help of comparative tables listed by Zimmermann (1952).

For determining the relative age of separate indviduals I divided the material into six classes, on the base, in the first plice, of the state of the molar dentition of the maxilla.

Class 0. I included here individuals with a listinctly young skull with thin, soft and relatively transparent bones. The lines of the sutures are distinct in individuals of Class 0. M^3 is not, as a rule, definitely grown and does not, on the whole, take part in the grindng of food. No traces of abrasion are visible on any of the molars.

Class I. The skull still has traits characteristic for young individuals. However, the dentition is fully developed and all molars participate in the grinding of food. On M^2 and sometimes on M^3 hardly visible traces of enamel abrasion appear.

Class II. The skull is more ossified. Traits pertaining to young individuals disappear in a greater or lesser degree. On M^2 and M^3 distinct but slight traces of abrasion appear, sometimes even on M^1.

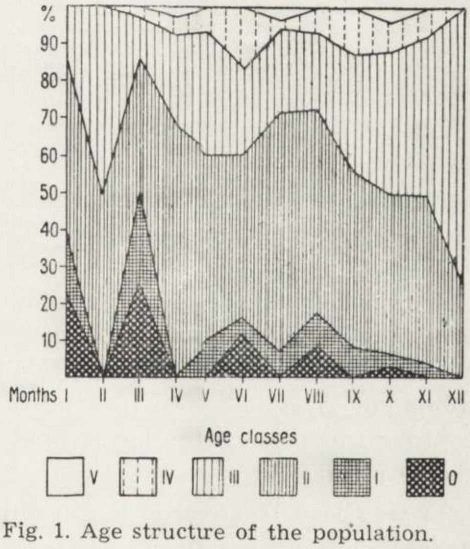

Fig. 1. Age structure of the population.

Class III. The dimensions and skeleton of the head are characteristic for old individuals. The bones are thick, more distinct osseous cristae appear on the occiput. The process of abrasion of all teeth is decidedly far advanced. The cusps on M^3 begin to disappear On both remaining molars they are still distinctly visible.

Class IV. The skulls resemble those of Class III. Abrasion of the dentition, however, is more advanced, the cusps of M^2 and M^3 disappear entirely, but the undulating shape of the surfaces that grind food is due to their remnants. M^1 conserves still visible remains or cusps. The molars seen laterally are characterised by strikingly low crowns. The bite forms a nearly straight line on the whole length of the molars.

C l a s s V. All individuals with a still more weared dentition than those of Class IV belong here. No trace of cusps on the molars is visible and the grinding surfaces are flat and even, without any folds. Only rudiments of crowns are conserved. In some places the roots become abrased.

Age structure of individuals captured in particular months is presented in Fig. 1. Composition of the material in January, February and March is slightly different than in the remaining months. A relatively large number of individuals belonging to Classes 0 and 1 (44 per cent) were captured during the first three months of the year. In the following months no age group predominated numerically. The disposition is more or less even, corresponding to the percentual quota of separate age groups.

III. VARIABILITY OF BODY DIMENSIONS

The body length (Fig. 2 a) of individuals from 0 and I age classes does not transcend in principle 72 mm, some of them only (2 out of 50) attained greater dimensions, equal to the mean figures for individuals of Classes III—V, or even higher. The mice of Class II attain a body length pertaining to fully adult specimens. As every following class is more and more extended in time, the differences between the lower and upper limit of variability in the body length measurements increase. In this class the period of rapid growth is terminated. Individuals with a length of body not exceeding 70 mm enter already into a period of relative stabilisation. This does not signify that growth processes are completely inhibited. They last until the end of the animal's life, as shown by the continual increase in the lower limit of measurement variability and the rise of mean values.

From Class II onwards a constant predominance of the mean body weight of females can be observed, and in Class III the dimensions of females, in individual cases, distinctly surpass those of males. This kind of relation is also maintained in the following age classes. I am of the opinion that the size of females in Class III corresponds to their sexual activity. The dimensions of the greater part of individuals are contained in the limits of 76—86 mm for males and 80—88 mm for females.

The length of the tail (Fig. 2 b) in Classes 0 and I does not transcend 70 mm (with two exceptions). From Class II onwards the tail grows very slowly, ending earlier its rapid development than that of the length of the body. This observation seems to correspond to the results obtained by

M o h r (1927). It appears, however, from my own material, that the taii grows during the whole life of the animal.

The relation between the length of the tail and that of the body is interesting. Polish research workers (N i e z a b i t o w s k i, 1933; S k u- r a t o w i c z, 1948) ascertained that the length of the tail, shorter as a rule than that of the body, is a characteristic trait for mice from the terrain of Poland. On this base N i e z a b i t o w s k i (1933), among others, classed

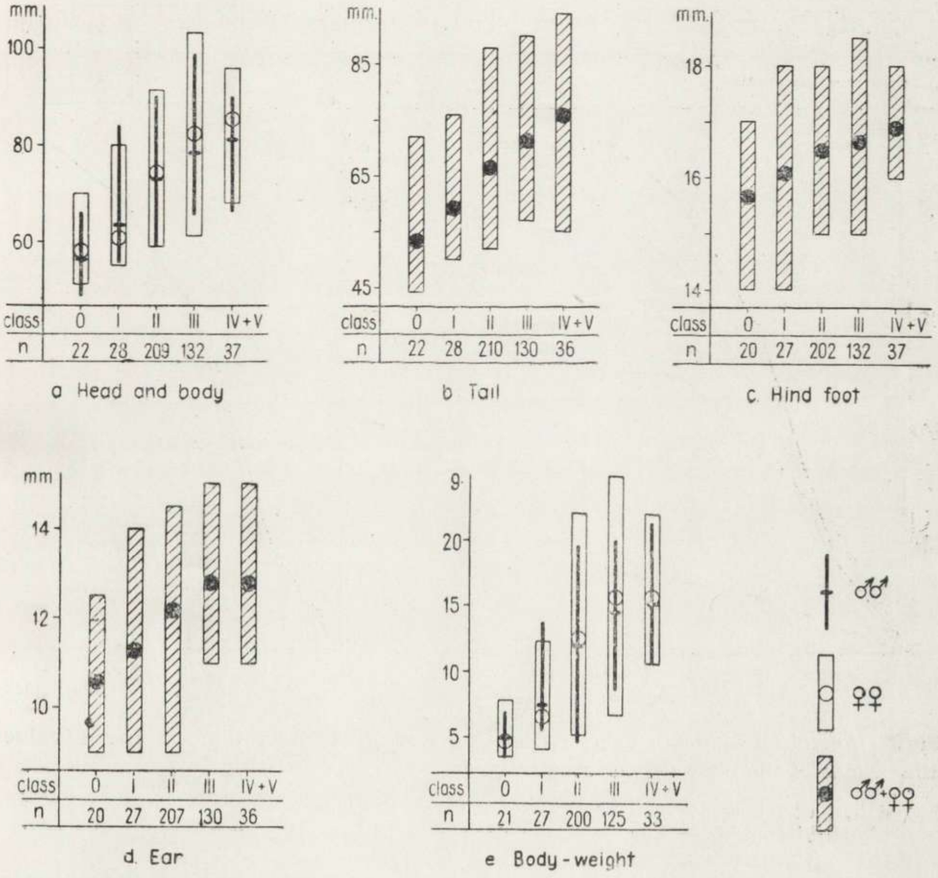

Fig. 2. Variability of dimensions and body weight in separate age classes.

the mouse appearing in our country as belonging to the species *Mus spicilegus* P e t é n y i, 1882, and even formed a separate subspecies, *Mus spicilegus polonicus* N i e z a b i t o w s k i, 1933.

The data presented in Table 2 indicate that in the Białowieża population not only young specimens from Classes 0 and I, but also older individuals (Class II—V) have tails longer that their body. Therefore this is not a transitory state, resulting from a certain discrepancy between the

Table 2.

Formation of the length of the tail in relation to the body.

Tail	Age classes												n	%
	0		I		II		III		IV		V			
	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂	♀♀	♂♂		
Shorter than the body	9	11	13	8	88	98	47	75	11	17	3	3	383	89.3
Equal to the body					2	5	3						10	2.3
Longer than the body	1	1	5	2	10	7	2	5	2			1	36	8.4

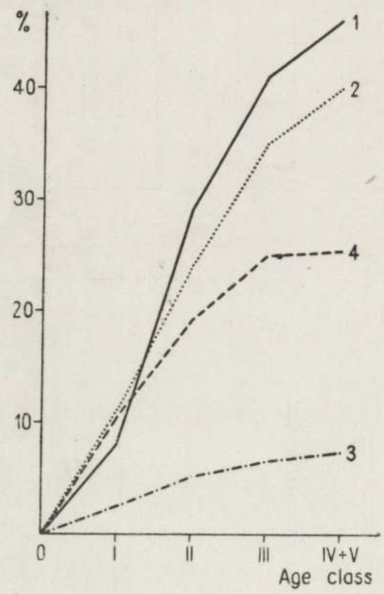

Fig. 3. Accretion of mean values of dimensions of the body (in per cent).

1 — Head and body, 2 — Tail, 3 — Hind foot, 4 — Ear.

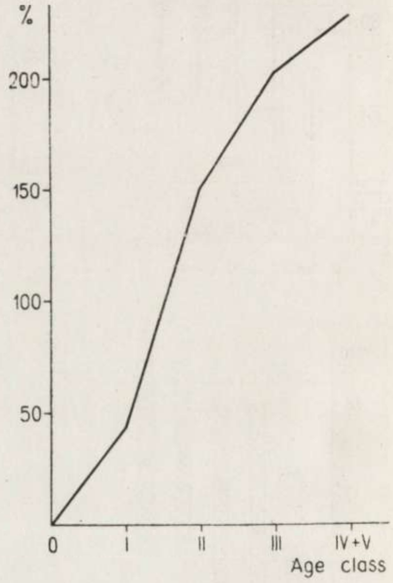

Fig. 4. Accretion of mean values of body.

growth rate of the tail and of the body. 10.7 per cent of individuals, independently of age class or sex, have a tail longer or equal to the length of the body.

In the Białowieża population the relation of the length of the tail to the body length is contained in the limits of 67.9 to 106.6 per cent. It amounts on the average to 93.0 per cent in Class 0, 96.0 in Cl. I, 89.0 in Cl. II, 87.5 in Cl. III, 87.4 in Cl. IV and 90.8 per cent in Cl. V.

The foot terminates its rapid growth already in Class I. Later, from Class II onwards, its growth is infinitesimal and can be demonstrated only on the basis of an increase in mean figures for particular classes (Fig. 2 c). The upper level of the length of the foot does not alter from Class II.

The ear grows in a manner similar to that of the foot (Fig. 2 d). A distinct growth leap in Classes 0 and I may be observed and then, from Class II onwards, the range of variability becomes stable and only the mean values increase distinctly.

The most intensive growth and of the longest duration is observed in the length of the body. The tail grows relatively more rapidly, but for a shorter space of time; its intensive increase is still seen in Classes 0, I and II. The foot and the ear grow the most rapidly. Accretions of these dimensions are not subject to alterations from the 2nd age class onwards.

The growth of a young mouse is distinctly pictured in Fig. 2 e. Weight differences in the scale of individual variability and in mean figures are very distinct in the three first age classes. Such a considerable differentiation of values between the 0, I and II classes did not appear in any of the analysed dimensions.

The weight of the body becomes stabilised only in Class III. Gravid females are distinctly heavier (even in Class II). Their weight surpasses 22 g., that is the upper limit attained by ungravid females. It must be noted that in Classes II and III males only exceptionally attain the weight of 20 g. and that of 22 g. only in Class IV.

The percentual increase of the mean figure for body weight (Fig. 4) is conform to the increase of the mean figure for the length of the body (Fig. 3). Obviously its course is proportionately more rapid.

IV. VARIABILITY OF THE DIMENSIONS OF THE SKULL

1. Length measurements

Three measurements were mainly analysed — the condylobasal length (Cb.), the length of the palate and the length of the brain-case.

The increase of the condylobasal length (Fig. 5 a) is very great in the first two classes, so that the extreme measurements (♂♂) in Classes 0 and I do not coincide. The intensive development of the skull in length can also be observed in Class II where its greatest variability is noted. The time during which individuals remain in this class is much longer than the period spent in the two preceding classes. We have thus a full scale of measurements — from individuals with a Cb. length contained in limits proper to Class I up to those which attain nearly their final dimensions. The condylobasal length increases still in Class III. This can be noticed as the lower level of its variability range is displaced in plus. The increase of this value is very slight in Classes III—V.

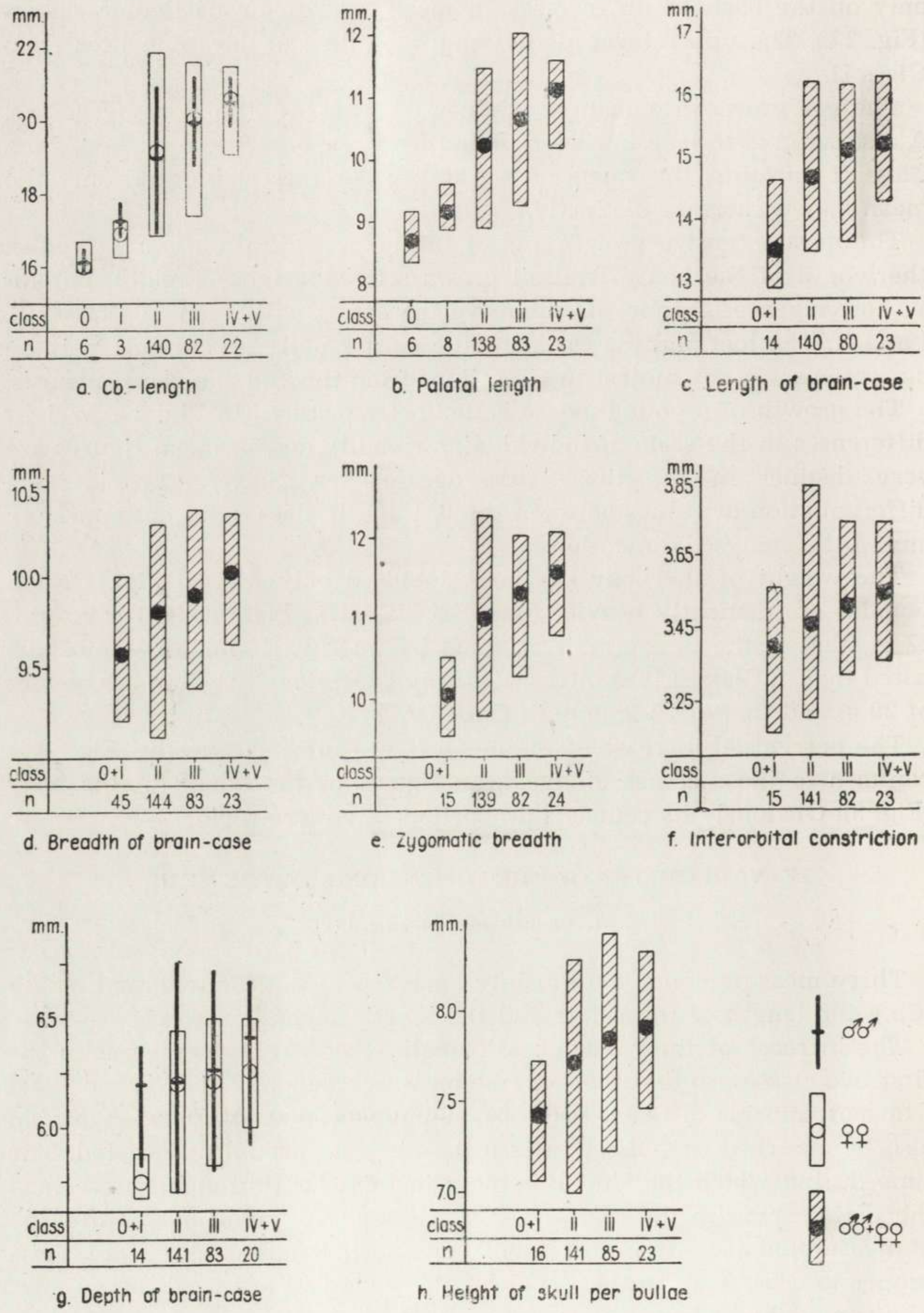

Fig. 5. Variability of skull measurements in different age classes (0—V).

The males have longer skulls in Classes 0 and I, but in Class II the skulls of females are already 0.2 mm longer on the average and 9 per cent of the females have a Cb. length longer than that of the largest males of this group. In the following classes a small predominance of females also exists.

The increase of the length of the palate (Fig. 5 b) has a similar course to that of the condylobasal length. There are however here no differences between ♀♀ and ♂♂. The impression arises that the rostral part of the skull of males grows a little more intensively in old males than in females.

Variability in the length of the brain-case has a different course. In the 2nd age class the increase of this dimension comes usually to an end (Fig. 5 c). It seems that the development of the brain-case proceeds in the first place in nest life.

The percentual increase of the mean value for the length of the brain--case is the lowest of the three dimensions mentioned above (Fig. 6).

2. Breadth measurements

As results from the already mentioned dimensions for Classes 0 and I (Fig. 5 d), the increase in the breadth of the brain-case starts at a very early period. Distinct increase can be observed already in Class I, in which the case attains dimensions approaching the final ones. It increases only slightly in Class II.

The general character of the increase of zygomatic breadth (Fig. 5 e) is the same as the Cb. measurement. Constant increase of this dimension can be observed in separate classes, up to Class V inclusively. In old individuals the upper level of the range of variability does not change (it remains virtually constant already since Class II), but the inferior level is distinctly displaced in plus. The development of the zygomas proceeds much more intensively than that of the breadth of the brain-case.

The interorbital breadth (Fig. 5 f) is formed in the house mouse in the same way as in many other mammals. It seems that, from Class II onwards, it does not vary with age. Kubik (1952), Wasilewski (1952) and Adamczewska (1959) in *Microtidae* and *Muridae*, Caboń (1958) in the Wild-boar ascertained that the interorbital breadth is constant throughout the life of the animal from the moment when it becomes independent.

3. Height measurements

The depth of the brain-case measured between the *bullae* (Fig. 5 g) attains a size equal to that stated in old specimens already in the individuals of Classes 0 and I. In the Classes 0 and I all males have a higher skull than the females. In adult animals (Class II—V) this height also demonstrates higher values for males than for females. The lower limit of dimension variability is basically the same in both sexes, the upper one, however, is 20—30 per cent higher for males than for females of the same class. The height of the brain-case measured between the *bullae* is one of the few measurements displaying sexual dimorphism in the house mouse.

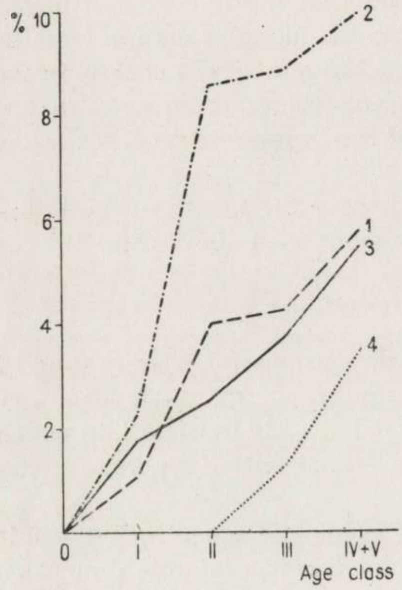

Fig. 6. Accretion of mean valnes of craniometrical measurements (expressed in per cent).
1 — Cb.-length, 2 — Palatal length, 3 — Length of brain-case, 4 — Breadth of brain-case, 5 — Zygomatic breadth, 6 — Interorbital constriction, 7 — Depth of brain-case, 8 — Height of skull per bullae.

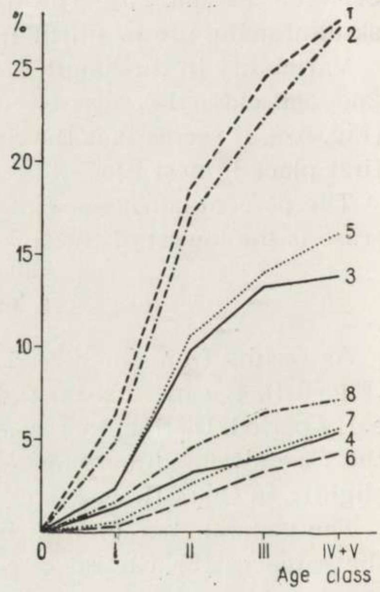

Fig. 7. Differences between males and females in the accretion ratio of mean values of the brain-case breadth and of the height of skull per bullae.
1 — Breadth of brain-case, females, 3 — Males, 2 — Height of skull per bullae, females, 4 — Males.

The value of the height of the brain-case measured *per bullae* (Fig. 5 h) increases in the first three classes (0—II) and becomes stabilised only from Class III onwards. Height measured in this manner demonstrates a dimorphic character only in a small degree. This might indicate that the *bullae* grow during the long period of life of the animal.

When observing the percentual increase of mean measurements of the skull, a certain regularity in its development can be noticed. Some of the measurements show very intensive percentual accretions during the entire life of the animal (Cb. length, length of the palate), others (length of the brain-case, zygomatic breadth) demonstrate an inhibition of the growth rate in III—V age classes. Finally, the breadth of the brain-case, the interorbital breadth and the height of the skull grow slowly during the whole life of the animal, increasing by 4—7 per cent only in the V. age class (Fig. 6).

In the first age classes greater dimensions of the skull can be observed in males. In this period females demonstrate intensive percentual accretion of mean values for particular dimensions (Fig. 7). This phenomenon is related to the majority of dimensions analysed here. It is an undeniable fact that the age corresponding to Class II constitutes a critical period for mice of both sexes. This is manifested by an alteration of the growth ratio in different elements of the body and the skull.

V. COLOURING AND MOULTING

The colouring of the house mouse varies. Specimens with nearly white bellies appear relatively often in young individuals. In these cases delimitation between the colour of the abdomen and that of the sides appears, but never so distinct as in *Apodemus flavicollis*. Even in specimens with nearly white abdomens there are places where a brownish hue appears and there this clear limit is effaced. Besides the individuals described above there are others with bellies of a rusty grey. These do not have as a rule a colour limit between the ventral side and the sides of the body. We can see such a differentiation in Classes 0 and I, and sporadically even in Class II. The character of a white contrasting abdomen is not connected with the relation of the tail to that of the body.

Grown specimens, from the 2nd age class inclusively, mostly have a rusty grey back (Brownish Olive). The sides of the body become gradually of a lighter hue towards the abdomen and are of a shade corresponding to Deep Olive-Buff. On the whole, no distinct limit is observed in the transition from the lateral sides to the ventral one. A somewhat distinctive band, 2—3 mm, as if of a more rusty colour, can be noticed sometimes. The belly is grey, with an admixture of brown, corresponding to Olive-Buff. Individuals of a light colour, but with a reddish colour of the back (Tawny Olive, Verona Brown) form about 3 per cent of the population. About 8 per cent is also composed of very light individuals, but with a distinctly smaller addition of a reddish hue (Olive Brown). The population consists also, in about 8 per cent, of specimens with a distinct dark band (Buffy Brown) running along the back. In some cases it is so strongly expressed that individuals seem to have three colours. No distinct limits can be seen between the coloured surfaces of the back, the sides and the abdomen.

We notice in the house mouse the same phenomenon as that described by K u b i k (1957) as a trait characteristic for the *Arvicola* population — and by W a s i l e w s k i (1952) for the *Clethrionomys* appearing in the vicinity of Białowieża. Besides the principal mass of typically coloured animals there are specimens of a distinctly lighter or darker hue. The scale of tones is very wide.

Z i m m e r m a n n (1949) writes that mice transported from a very cold to a warm habitat become, after moulting, more brown than they were previously. It is possible that the temperature of the milieu plays here a certain role, the more so that mice usually exist in artificial conditions which differ considerably from the thermal point of view (for instance a barn or a room).

The stiff hairs of investigated individuals are straight, thick, uniform in colour, with a very distinct protuberance on about $^2/_3$ of their length, gently narrowing towards the base and more rapidly towards the top, where they become quite sharp. The woolly hairs are two-coloured, of

Table 3.

Participation of individuals in moulting.

Months		XII - II	III - V	VI - VIII	IX - XI
N		14	51	53	99
In moult	n	4	9	17	29
	%	28.6	17.6	32.1	29.3

a different thickness, but always more slender than the stiff ones. Up to about $^3/_5$ of their height they are dark, then in the space between $^1/_3$ to $^1/_{10}$ of their length a light zone appears, which together with the darker, sharply ended extremities gives to the animal a colouring depending on the hue of the nether parts of the hairs forming a background. Obviously, the number and colour of stiff hairs play here a rather important role. The woolly hairs have on their length 1—4 narrowings in which the pigment becomes distinctly rarefied. In these narrow places, always situated beneath the light sector, the hair as a rule is bent.

In *Mus musculus* moulting processes take place during the whole year. 25 per cent, on the average, of individuals of each month demonstrate very distinct and characteristic alterations of the skin colouring or disseminated patches on the uneven pelage. The dependence of moulting upon the seasons of the year is here undoubtedly lesser than in other *Muroidea* (S t e i n 1960). The percentage of specimens moulting in spring months diminishes clearly (Table 3). Out of individuals captured in October and November about 18 per cent have on the dorsal and lateral parts of the body two distinctly marked levels formed by old woolly hairs and the newly growing ones. From the skin upwards a dark band and then a light one can be observed. (The two together form the zone of shorter hairs). Then a darker band appears which corresponds to the darkly coloured inferior part of old woolly hairs above the zone of growing hairs and, lastly, a grey band formed by their uppermost sectors. The breadth of the bands (especially of the dark ones) depends on the phase of moulting in which the mouse was caught.

Apart from the months mentioned above, the course of moulting as described does not happen in any season of the year. Moulting is usually slower. The hairs grow in such a manner that their light sectors do not form any bands ("layers"), but appear at every height in the zone of grown hairs.

VI. DISCUSSION

Having compared the measurements and descriptive data of Miller (1912), Vinogradov & Gromov (1952) and Zimmermann (1949) with my own, it must be stated that the subspecies *Mus musculus musculus* Linnaeus, 1758 appears in Białowieża.

Zimmermann (1949) presents long series of his own measurements and of those of other authors concerning the above-mentioned subspecies in the western limit of its range (Table 4). He only measured individuals with a length of body surpassing 70 mm. Without reflecting at present on the validity of such a limit, I selected in my material specimens corresponding to Zimmermann's norms in order to create conditions facilitating a comparison. As can be seen from the presented numbers, the Białowieża population of the *Mus musculus musculus* L. is relatively "long-tailed". The relation of the length of the tail to the length of the body amounts on the average to 88.4 per cent, transgressing by 2.3 per cent the highest numbers of the quoted material. The value of this relation fluctuates in the limits of 67.9—106.6 per cent, with a length of tail of 55—94 mm. As to absolute values, the difference between the cited material and my own is insignificant. The mean values for the tail lie in the scope of the mean figures presented by Zimmermann (l.c.).

Independently of the data listed according to Zimmermann's principle, I presented additionally the results of my measurements, accepting a different criterion for qualifying the material, I intended to measure (line 9 in Table 4). The principle I followed is based on age classes. I considered Class II as the limit for the ending of rapid growth and from this class, inclusively, I collected measurement data for general lists. Determin-

Table 4.

Comparative list of dimensions of *Mus m. musculus* from the western part of the geographical area

Author	n	Head & body			Tail			Hind foot			Ear			Tail : Head & body			Cb.- length		
		Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.
Zimmermann /1949/ Austria, Denmark, Germany		70	80.5--89.1	103	54	67.1--73.2	93	15	16.3--17.1	18	10	11.9--12.5	13	67	81.9--85.8	100	16.6	18.9--20.3	22.8
Gaffrey /manuscript/ Pomerania[1]	62	80	87.6	105	60	73	88	15		18	12		14.5	68	83.4	93			
Degerböl, Mohr /1936/ Denmark[1]	42	70	81.7	97	55	67.4	77	16	16.6	18				62	82.5	92	19.5	20.6	21.5
Bau Upper Silesia[1]	16	71	80	91	61	69.2	74	15	16.5	17				74	85.5	97			
Kahmann Bavaria[1]	59	70	87.2	101	62	75	84	16	17.1	19	12	13.4	14.5	76	86.1	100			
Zaleśky /1937/ Lower Austria[1]	100	70	79	92	57	67	77	15	16.5	18	11.5	13	15		85		18	19.1	20.8
Vienna Museum Austria/The Alps/[1]	24	71	83.3	93	64	70	80	16	17.4	18	12	13	14	75	83.8	100	18.1	18.7	21
Dynowski Białowieża[2]	318	70	80.4	102	55	71.1	94	15	16.9	18.5	10	12.9	15	67.9	88.4	106.6	17.6	19.6	22
Dynowski Białowieża[3]	379	58	78.3	102	52	70.1	94	15	16.8	18.5	9	12.8	15	53	89.5	106.6	17	19.6	22

1. Cited after Z i m m e r m a n n (1949)
2. Selected individuals with a body length exceeding 70 mm.
3. Individuals from II—V age classes.

ing of a "rigid" dimensional limit may be rather unfortunate and abiological as well, as a population is composed of "small", "average" and "big" individuals. A mean measurement value is the representative character of a population. The introducing of data concerning young individuals into general tables is, of course, inadmissible, as they cause decrease in mean values and produce the impression that the dimensions of a population on a given terrain are lower than in reality. On the contrary, determination of a rigid measurement limit in an artificial manner increases the mean values. In the above conception no small individuals appear, although they actually exist and take part in breeding activities. In the 2nd age class (Fig. 2) out of matured mice (which ought to be considered as being adult) about 20 per cent should be rejected after the opinion of Z i m m e r m a n n and other authors. More than 3 per cent of specimens from Class III and about 6 per cent from Class IV should also be eliminated. Young individuals from Class I (10 per cent) and even those out of Class 0, with a length of body of more than 70 mm. would occupy their place.

It is necessary, therefore, to establish a general rule which theriologists ought to follow when classifying material for measuring. This would enable a comparison of animal series from different terrains, measured by different people, without omitting serious errors. The age limit, however, should have a biological and not a mechanical character.

VII. SUMMARY

In the limits of the investigated population of the house mouse from the Białowieża Glade (n = 429) a considerable variability of dimensions in the relation of tail-body and in the colouring was observed.

Growth takes place during the entire life of the animal.

Sexual dimorphism is most distinctly evident in two dimensions: 1. the body length of adult females which, both in mean figures and individually, is greater that of males; 2. males in all age classes possess a higher brain-case, measured between the *bullae*. Moreover, males attain the period of "rapid growth" of the skull earlier than the females. Females have a greater body weight and condylobasal length.

Moulting takes place during the whole year and is slightly intensified in autumn. Its course is twofold: 1. about 25 per cent of individuals from every month are characterised by a pelt with hairs of a different length, and 2. about 18 per cent of specimens of October and November moult in such a manner that the growing hairs are uniform in length and form a distinct "layer" of colour.

The author came to the conclusion, that the Białowieża population of house mice belongs to the subspecies *Mus musculus musculus* L i n n a e u s, 1758. The mean measurement values remain in the limits of data for the western areas in which the subspecies exists, but the relation tail-body is greater than the highest hitherto known data by 2.3 per cent.

REFERENCES

1. A d a m c z e w s k a, K. A., 1959: Untersuchungen über die Variabilität der Gelbhalsmaus, *Apodemus flavicollis flavicollis* (M e l c h i o r, 1834). Acta theriol., 3, 10: 141—190. Białowieża.
2. C a b o ń, K., 1958: Untersuchungen über die Schädelvariabilität des Wildschweines, *Sus scrofa* L. aus Nordostpolen. Acta theriol., *2*, 6: 107—140. Białowieża.
3. K u b i k, J., 1952: *Micromys minutus* P a l l. w Białowieskim Parku Narodowym. Ann. Univ. M. Curie-Skłodowska, C 7, 7: 449—495. Lublin.
4. K u b i k, J., 1957: Wstępne badania nad rodzajem *Arvicola* L a c e p è d e. Ib., C *10*, 9: 245—268. Lublin.
5. M i l l e r, G. S., 1912: Catalogue of the Mammals of western Europe. British Museum: 1—1019+XV. London.
6. M o h r, E., 1927: Schwanzmessungen bei wachsenden Säugetiere. Z. Säugetierkde, *2*: 74—77.
7. N i e z a b i t o w s k i - L u b i c z, E., 1933: Klucz do oznaczania zwierząt ssących Polski. 1—124. Kraków.
8. S k u r a t o w i c z, W., 1948: Badania nad fauną ssaków Zamojszczyzny. Fragm. faun. Mus. zool. pol., *5*, 15: 233—292. Warszawa.
9. S t e i n, H. W., 1960: Zum Haarwechsel der Feldmaus, *Microtus arvalis* (P a l l a s, 1779) und weiterer *Muroidea*. Acta theriol., *4*, 3: 27—44. Białowieża.
10. S t r e l l e r, G. & O s t w a l d, B., 1939: Die kleine Farbmesstafel nach Ostwald, Ausg. C. Musterschmidt, Götingen.
11. W a s i l e w s k i, W., 1952: Badania nad morfologią *Clethrionomys glareolus glareolus* S c h r e b. Ann. Univ. M. Curie-Skłodowska, C 7, 3: 119—211. Lublin.
12. [V i n o g r a d o v, B. S. & G r o m o v, I. M.] В и н о г р а д о в, Б. С. & Г р о м о в, И. М., 1952: Грызуны фауны СССР. Инст. АН СССР: 1-297. Москва—Ле нинград.
13. Z i m m e r m a n n, K., 1949: Zur Kenntnis der mitteleuropäischen Hausmäuse. Zool. Jb. (Syst.), *78*, 3: 301—322.
14. Z i m m e r m a n n, K., 1952: Vergleichende Farbtabellen, Ostwald-Ridgway Ridgway-Ostwald. P. Schöps, Frankfurt a/M.

Polish Academy of Sciences,
Mammals Research Institute,
Białowieża, woj. Białystok.

STRESZCZENIE

W obrębie badanej populacji myszy domowej z Polany Białowieskiej (n = 429, Tabela 1) obserwuje się dużą zmienność wymiarów ciała i czaszki (ryc. 2 i 5), relacji ogon: ciało (Tabela 2) oraz ubarwienia.

Wzrost wymiarów ma miejsce w ciągu całego życia zwierzęcia.

Dymorfizm płciowy jest najwyraźniej zaznaczony w dwóch wielkościach: 1. Długość ciała dorosłych samic, zarówno w średnich jak też w wartościach skrajnych, jest większa niż u samców (ryc. 2), 2. Samce we wszystkich klasach wieku odznaczają się większą wysokością puszki mózgowej (mierzoną przez bullae) niż samice (ryc. 5 i 7). Poza tym wcześniej od samic przechodzą one okres „szybkiego wzrostu" czaszki. U samic stwierdza się jedynie nieco większy ciężar ciała i większą długość kondylobazalną niż u samców.

Linka myszy domowych trwa przez cały rok, z nieznacznym nasileniem w okresie jesiennym (Tabela 3). Proces ten przebiega dwojako: 1. Ca 25% osobników z każdego miesiąca charakteryzuje się futerkiem o różnej długości narastającego włosa; 2. Ca 18% okazów z października i listopada linieje w ten sposób, że wyrastające włosy są jednakowej długości i tworzą wyraźną „warstwę", różniącą się barwą.

Na podstawie przeprowadzonej analizy wymiarów i ubarwienia, autor dochodzi do wniosku, że białowieska populacja myszy domowej należy do podgatunku *Mus musculus musculus* Linnaeus, 1758. Średnie wartości wymiarowe utrzymują się w granicach zmienności myszy domowych z zachodnich części areału tego podgatunku. Jedynie stosunek ogon : ciało jest większy o 2,3% od najwyższych dotychczasowych danych.

PAŃSTWOWE WYDAWNICTWO NAUKOWE * WARSZAWA 1963

Nakład 1400 egz. Ark. wyd. 1,5. Maszynopis otrzymano 25.IV.1963. Podpisano do druku 30.VIII.1963. Druk ukończono 15.IX.1963. Papier druk. sat. III kl. 80 g. Format B5. Cena 6 zł.

Białostockie Zakłady Graficzne. Zam. 1638 * A-3.