

theriol., 6, 8: 239—255. Kahmann H., 1953: Die Bestimmung der Brandmaus (*Apodemus agrarius*) aus Eulengewöllen. Ornith. Mitt., 7: 121—125. Kahmann H. & Bothschafter E., 1963: Natürliche Verkreuzungen von Gelbhalsmaus (*Apodemus tauricus* Pallas, 1811) und Waldmaus (*A. sylvaticus* Linné, 1758)? Säugetierkd. Mitt., 11, 2: 83—85. Kowalski K., 1964: Gryzonia — Rodentia (In »Klucze do oznaczania kręgowców Polski. V. Ssaki — Mammalia« K. Kowalski ed.). Państw. Wyd. Nauk.: 1—280. Warszawa—Kraków. Kratochvíl J. & Zejda J., 1960: Ergänzende Angaben zur Taxonomie von *Apodemus microps*. Symp. Theriol., 188—194, Brno. Richter H., 1961: Bestimmen von *Mus*- und *Sylvaemus*-Schädelresten aus Eulengewöllen nach dem Stirnbein (Frontale). Säugetierkd. Mitt., 9, 4: 166—167. Ursin E., 1956: Geographical variation in *Apodemus sylvaticus* and *A. flavicollis* (Rodentia, Muridae) in Europe, with special reference to Danish and Latvian populations. Biol. Skrif., 8, 4: 1—46. Witte G., 1964: Introgression bei *Apodemus flavicollis* und *A. sylvaticus*. Biometrische Untersuchungen an *Apodemus*-Populationen des Monte Gargano (Südtalien). Bonn. zool. Beitr., 15, 3—4: 159—177. Zejda J., 1965: Zur Variabilität der Molarenwurzeln des Oberkiefers von vier *Apodemus*-Arten (Mammalia). Z. Morph. Ökol. Tiere, 54: 699—706. Zimmermann K., 1962: Die Untergattungen der Gattung *Apodemus* Kaup. Bonn. zool. Beitr., 13, 1—3: 198—208.

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ADDITIONAL TRIANGLE ON M² IN *MICROTUS OECONOMUS* (PALLAS, 1776)

WIEŁOPĘTLOWOŚĆ ZĘBA M² U *MICROTUS OECONOMUS* (PALLAS, 1776)

The anomalies of teeth in microtines are not rare as indicated by the reports of many authors (Rörig & Börner, 1905; Ognev, 1950; Reichstein & Reise, 1965; Reichstein, 1966 and others). The most variable molars in *Microtidae* are M₁ and M₃ (Guthrie, 1965).

Reichstein & Reise (1965) were analysing the dentition of *Microtus agrestis* (Linnaeus, 1761) from north-west Germany and Denmark and found a variation in the structure of enamel angles in the teeth M₁, M₂ and M₃ of this species. An additional salient angle in M₁ was observed in 0.5 per cent of individuals of this species. This angle is somewhat characteristic for the *Microtus agrestis exul* Miller, 1908 (see Miller, 1912, p. 670). However, this additional angle has a tendency to disappear and different stages of this process can be followed on sufficiently large material of skulls of *M. agrestis*. In M₂ Reichstein & Reise (*l. c.*) found separate phases of the disappearance of the fourth salient angle. Consequently, this tooth has only 3 triangles of enamel and approaches the *arvalis* — type. Rörig & Börner (1905) reported that in some specimens of *Microtus arvalis* (Pallas, 1779) there is a tendency to form a fourth angle in M₂, similarly to *M. agrestis*. They also reported the occurrence of individuals *M. agrestis* with more or less advanced disappearance of the fourth salient angle in M₂.

Rörig & Börner (1905) stated that in *M. oeconomus* teeth M₁ and M₂ as well as M₂ and M₃ are only slightly variable and all the variants of their form are within the limits described for *M. arvalis*. Considerable stability of M₂ structure in *M. oeconomus* was also reported by Miller (1912) and Dehnel (1946).

While analysing the owl pellets materials from the Kujawy area (collected on November 12th, 1964 in Brześć Kujawski, county Włocławek) it was found in the one pellet of *Tyto alba* (Scopoli, 1769) a skull of *M. oeconomus* with the right M² tooth markedly different from the



Fig. 1. The variability of the M² teeth in *M. oeconomus*. Subsequent variants (V₁—V₄) compared with the normal tooth of this species (N).

Table 1.

The variability of the M² structure in *M. oeconomus* in per cent. 1) from the owl pellets, 2) from trapping.

Variants M ²	n	V ₁		V ₂		V ₃		V ₄		Total	
		n	%	n	%	n	%	n	%	n	%
Kruszwica/	52	3	5.7	-	-	-	-	-	-	3	5.7
Brześć Kujawski /	75	-	-	1	1.3	-	-	1	1.3	2	2.6
Filipów /	72	2	2.8	-	-	2	2.8	-	-	4	5.6
Jazy /	307	2	0.6	5	1.6	-	-	-	-	7	2.2
Białowieża /	104	4	3.8	-	-	-	-	-	-	4	3.8
Total	610	11	1.8	6	0.9	2	0.3	1	0.1	20	3.1

typical pattern. According to the work of Rörig & Börner (l.c.) a normal M² of *M. oeconomus* has the following pattern:

$$\begin{array}{c} a \ 1 \ a \\ \hline b \ 2 \ \beta \\ \hline 3 \ \gamma, \end{array}$$

where the numbers denote subsequent fields (= anterior loop, or pairs of triangles), roman letters correspond to internal — and greek letters to external salient angles (including both angles of the anterior loop). The above described specimen with atypical dentition had the following pattern:

$$\begin{array}{c} b+b' \ 2 \ \beta \\ \hline a \ 1 \ a \\ \hline 3 \ \gamma. \end{array}$$

In this specimen (Fig. 1—V₄) the triangle b in the second field was halved. Consequently M² had an anterior loop and 4 salient angles and

differed strongly from the anomaly observed in *M. arvalis*. Additional salient angle b' is separated from the remaining angles by an enamel layer. The skull of this vole was considerably damaged, and the upper left teeth were missing. Therefore it is unknown whether the contralateral M^2 was of the same type as the described right tooth. The remaining teeth which were present in the maxilla and the mandible did not exhibit any departures from the norm.

The skulls of five different populations of *M. oeconomus* were studied. This material was from central Poland (Kruszwica, county Inowrocław and Brześć Kujawski, county Włocławek, palatinate Bydgoszcz) and eastern Poland (Filipów, county Suwałki, Jazy, county Augustów and Białowieża, county Hajnówka, palatinate Białystok). Among 610 specimens none had four complete triangles on M^2 (Fig. 1, V_4). However, specimens were found which had some degree of the triangle b division (unilaterally or bilaterally — Fig. 1, Table 1).

No geographic regularity was found in the occurrence of this anomaly. The frequency of its occurrence was ranging from 2.2 per cent to 5.7 per cent in the five studied populations of *M. oeconomus* (Table 1). Most frequent was variant V_1 (1.8 per cent of the total) and the most rare was V_4 (0.1 per cent). All forms amount to 3.1 per cent of the studied series of skulls.

Similar cases of additional triangles on M^2 in *Microtus nivalis* (Martins, 1842) has been found by Kowalski (1957).

Undoubtedly the described type of M^2 structure in *M. oeconomus* is hereditary and consequently occurs with different frequencies in different populations. The tendency to form four triangles on M^2 in this species seems exceptional and indicate the possibility of secondary complication of M^2 structure in *M. oeconomus*. This is in agreement with the idea concerning the variation and evolution of microtine molars presented by Guthrie (1965).

REFERENCES

- Dehnel A., 1946: Przyczynek do znajomości przedstawicieli rodzaju *Microtus* Schrank z Polesia i Wileńszczyzny. *Fragm. faun. Mus. zool. pol.*, 5, 1: 1—24.
 Guthrie R. D., 1965: Variability in characters undergoing rapid evolution, an analysis of *Microtus* molars. *Evolution*, 19, 2: 214—233.
 Kowalski K., 1957: *Microtus nivalis* (Martins, 1842) (*Rodentia*) in the Carpathians. *Acta theriol.*, 1, 6: 159—182.
 Miller G. S., 1912: Catalogue of the mammals of western Europe. British Museum, XV+1—1019. London.
 Ognev S. I., 1950: Zveri SSSR i prilęžičih stran. Gryzuny. *Izd. AN SSSR*, 7: 1—706. Moskva—Leningrad.
 Reichstein H. & Reise D., 1965: Zur Variabilität des Molaren-Schmelzschlingenmusters der Erdmaus, *Microtus agrestis* (L.). *Ztschr. Säugetierkde*, 30, 1: 36—47.
 Reichstein H., 1966: Abweichendes Molaren-Schmelzschlingenmuster am M_1 bei einer Erdmaus, *Microtus agrestis* (L.). *Ztschr. Säugetierkde*, 31, 6: 480—481.
 Rörig G. & Börner C., 1905: Studien über das Gebiss mitteleuropäischer recenter Mäuse. *Arb. Kaiserl. Biol. Anst. Land- u. Forstwiss.*, 5, 2: 37—89.

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