Z. Säugetierkunde 56 (1991) 254–255

ISSN 0044-3468

Anomalies of the upper incisors in the genus *Microtus* (Cricetidae, Rodentia)

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Receipt of Ms. 29. 10. 1990
Acceptance of Ms. 3. 1. 1991

Tooth anomalies of the upper incisors have been reported for *Microtus richardsoni* (Russell and Anderson 1956), *M. pinetorum* (Fish and Whitaker 1971) and *M. longicaudus* (Jones 1978). In all these cases deep medial grooves on the anterior surface of the upper incisors were present, and frequencies of these aberrations within samples were low, ranging from 1.6 % in *M. richardsoni* (n = 60) to 2.5 % in *M. pinetorum* (Jaeck and Jones 1990).

The following five infrequent anomalies of the upper incisors were observed in a survey of 3765 specimens from 27 microtine species. These aberrations occurred either on both or only on one of the upper incisors:

1. double grooves: two narrow, parallel grooves slightly lateral on the anterior surface, extending the whole length of the incisor.
2. medial grooves: deep (0.5 mm in one specimen of *M. richardsoni*), narrow grooves running medial on the anterior surface of the tooth.
3. constrictions: incisor shows circular constrictions, irregularly spaced on its entire length. Constrictions are continuous around the tooth.
4. "undulations": shallow circular depressions occurring in short regular intervals along the entire length of the incisor, giving the anterior surface an undulated appearance.
5. "curled tips": cutting edge of incisor is not straight, but the outer edges are „curled" towards the lingual side of the tooth, giving it a hollowed appearance when looking down onto its tip.

Within the species *M. agrestis, M. ochrogaster, M. pennsylvanicus* and *M. richardsoni*, 22 individuals exhibited these anomalies as is summarized in the table.

Numbers of anomalies found in four species of *Microtus*

Anomaly	*Microtus*			
	agrestis	*pennsylvanicus*	*ochrogaster*	*richardsoni*
n	131	2599	160	107
Double grooves	–	5 b	1 f	2 g
Medial groove	1 a	2 c	–	6 h
Constrictions	–	2 d	–	–
Undulations	–	–	–	1 i
Curled tips	–	2 e	–	–

a: USNM 85902; b: NUVC 2215, 2216, 2217, 2218, 2229; c: NUVC 2214, 2228; d: NUVC 2224, USNM 76256; e: NUVC 2226, USNM 268327; f: ISU 4330; g: USNM 230457, 233198; h: USNM 233187, 233194, 233196, 233204, 81379, 174470; i: USNM 74261.
ISU = Indiana State University; NUVC = Northeastern University Vertebrate Collection; USNM = United States National Museum.

In one specimen of *M. pennsylvanicus* (USNM 76256), which had constrictions on the upper incisors, only the left tooth exhibited this anomaly in combination with atrophy, whereas the right incisor was not mis-shaped and of normal size. The medial groove in NUVC 2214 (*M. pennsylvanicus*) and the double groove in USNM 233198 (*M. richardsoni*) were interrupted by one or two short gaps, respectively.

Grooves on the upper incisors of *M. pennsylvanicus* and other microtines have only recently been reported to be a regular characteristic within the microtines (Jaeck and Jones 1990). The tooth anomalies dealt with in the present paper do not correspond with those regular forms of grooves, but rather are rare aberrations.

The development of these anomalies remains open to speculation. For the constrictions on the incisors, malnutrition and consequent underdevelopment of the tooth cannot be a possible cause, since some specimen exhibit one normal and one deformed tooth. If malnutrition was the cause, both incisors would be affected. Double and medial grooves are probably caused by irregularities of the alveolar cavity, impressing themselves onto the developing tooth.

It is important to note that particularly grooves not only are a key character in many rodent genera (e.g. *Zapus, Reithrodontomys, Synaptomys*), but can also occur "accidentally" in taxa not noted for exhibiting them.

Acknowledgements

The author thanks Robert Fisher, U.S. National Museum of Natural History, Washington D.C., John O. Whitaker, Jr., Indiana State University, Terre Haute, and Gwilym S. Jones, Northeastern University Vertebrate Collection, Boston, for access to their respective collections. Ralph R. Kunkel and Gwilym S. Jones critically read the manuscript and provided many helpful comments.

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