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EXTRA UPPER PREMOLARS IN A SPECIMEN OF *MYOTIS BLYTHII* (CHIROPTERA, VESPERTILIONIDAE)

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Extra Upper Premolars in a Specimen of *Myotis blythii* (Chiroptera, Vespertilionidae). Ghazali M. A. — A case of extra upper premolars is described in a specimen of *Myotis blythii* from Kerch peninsula (Ukraine, Crimea). Additional teeth are situated near the third premolars from both sides of the jaw. Giving into account their size and position it was supposed that they appear as a result of complete splitting of the third premolar primordium.

Key words: Microchiroptera, *Myotis blythii*, polydonty, Ukraine.

Дополнительные верхние премоляры у *Myotis blythii* (Chiroptera, Vespertilionidae). Гхазали М. А. — Описан случай наличия дополнительных зубов у одной особи остроухой ночницы (*Myotis blythii*), обнаруженной на Керченском полуострове (Украина, Крым). Дополнительные зубы расположены лингвальнее третьего премоляра, одинаково с обеих сторон верхней челюсти. Учитывая размер и положение этих зубов, можно предположить, что наблюдаемое явление связано с полным раздвоением зачатка третьего премоляра.

Ключевые слова: Microchiroptera, *Myotis blythii*, полидонтия, Украина.

Introduction

Dental abnormalities are rare in mammals. As dentition is one of the diagnostic traits for animal identification, especially in the fossils, dental abnormalities could be of great interest for taxonomists. Besides, they may help in the detection of evolutionary trends in the skull and teeth transformations. Anomalies in teeth of Microchiroptera appear to be infrequent. B. W. Wołoszyn (1992) examined 23 species of two European families and found that 8 species and 2.29% of all specimens have dental anomalies. The most frequent deviations in the teeth number were olygodonty (47.5%) and polydonty (12.5%).

The dental formula of *Myotis* is 2 x (I3/3, C1/1, P3/3, M3/3) = 38, that is the maximum known number of teeth for bats. Decrease in the number of small premolars has been observed in many *Myotis* species — *M. lucifugus* (Frum, 1946), *M. dasycneme* (Wołoszyn, 1963), *M. mystacinus* (Strelkov, 1983), *M. daubentonii*, *M. frater* (Rossina, 2002). But the presence of extra premolars is much rarer event; it was recorded for *M. nattereri* (Wołoszyn, 1963) and *M. fortidens* (Hill, Topál, 1973).

Material and methods

Extraordinary case of the anomalous dentition was observed in a specimen of *Myotis blythii* Tomes, 1857 from the limestone quarry of Kerch Peninsula (Ukraine, Crimea) (collector's number 19). The investigated skull was among other *M. blythii* remains that were gathered from the ground near the maternal colony place by L. Godlevska in winter, 2002. Despite poor state of preservation, all of the material is recent. Twenty skulls and six mandibles were gathered on the whole. The mandible of the investigated skull was not found.

Standard methods of the skull material processing were used in the article (Sigé, 1968). Condylobasal length and zygomatic breadth were measured with the calliper (with accuracy 0.01 mm). The teeth were measured with the binocular microscope MBS—10 and ocular micrometer (ocular x8 and objective x4). Height, maximal length and width of the premolars and supernumerary teeth were taken from both sides of the skull. Height of the premolars (P2, P3, P4) was measured from the labial side. Height of the supernumerary teeth (P*) was measured from the anterior side at placing the skull in the rostrum-up position.

Results

The skull of the investigated specimen is intact and allows taking measurements: condylobasal length – 20.27 mm, zygomatic breadth – 13.70 mm. Left and right canines, right incisors and second premolar are lost from their alveoles. So, maxillary tooth row length is measured from the alveole of canine – 9.1 mm. The measurements lie within the limits of intraspecific variability of *M. blythii* (Strelkov, 1972). Since the fourth premolar and molars are slightly worn, the skull was attributed to the adult specimen.

Supernumerary teeth are found on both sides of the maxilla in the identical position: both additional teeth are crowded beneath the lingual anterior border of the large premolar (fig. 1). They do not share their roots with the adjacent teeth. Height, width and length of the premolars and extra teeth are in table 1. If judge from the height of the P*, these teeth were covered with the gum, so they do not influence the occlusion. No other abnormalities were detected in the skull.

Discussion

Three hypotheses are proposed to explain polydonty (Wolsan, 1984; Abbott, Verstraete, 2005). Extra teeth may occur as the result of (1) persistent deciduous teeth; (2) activation of the ancestral silent genes or (3) tooth germ splitting.

Bats are diphyodont animals. In most of the species deciduous teeth appear in the first days of postnatal development and remain for about 2 months. Eruption of the adult teeth begins around the first month after birth (Kovtun, Likhotop, 1994). So, deciduous and adult teeth coexist for about one month. I reject the first hypothesis, because deciduous teeth of all bats are hook-like and long (Gunnell, Simmons, 2005). Obviously, the analyzed extra teeth in *M. blythii* resemble permanent small premolars, because they are one-rooted and simple. Furthermore, their crowns are oval with distinct distal crest and continuous cingulum. So, their shape and sizes (tabl. 1) are similar to the adjacent small premolars.

In the course of evolution bats lost some of their teeth. The initial dental formula for placentals is 2 x (I3/3, C1/1, P4/4, M3/3) = 44 (Romer, Parsons, 1992). Therefore, appearance of the lost first premolars could be expected for *Myotis* (Slaughter, 1970). Atavistic teeth should be small, simple in shape, occupy the ancestral position and formed in accordance with the gradients in their tooth class (Wolsan, 1984; Dzeverin, 2007). In bats atavistic premolar should appear between canine and second premolar. Since the third premolars of *M. blythii* tend to displace lingually from the tooth row (Strelkov, 1972), the teeth can be named in the following way: the first premolar (atavistic, adjacent to canine), the second premolar, the third premolar (lingually displaced), and the fourth premolar. But size relations between small premolars in the studied specimen do not support this hypothesis – P2 of *M. blythii* is always bigger than P3, both in width and length (Strelkov, 1972). Consequently, the second hypothesis is not supported.

Most likely the splitting of the tooth germ is the only hypothesis that can explain the discussed anomaly. When dichotomy of the teeth primordium occurs, the supernumerary teeth occupy any position, their shape is similar to the adjacent teeth, and their size does not follow the gradient in their tooth classes (Wolsan, 1984). The germ splitting can be partial or complete that generates united or fully separated alveoles and teeth

Table 1. Measurements of the upper premolars and supernumerary teeth
Таблица 1. Промеры верхних премоляров и дополнительных зубов

Measurements, mm	Left side				Right side			
	P2	P3	P*	P4	P2 alv.	P3	P*	P4
Length	0.75	0.63	0.78	1.55	(0.54)	0.61	0.90	1.51
Width	0.87	0.71	0.63	1.40	(0.63)	0.66	0.73	1.35
Height	0.90	0.66	0.64	1.64	—	0.52	1.00	1.65

Fig. 1. Ventral view of the rostrum part of the skull of *Myotis blythii*. Two additional teeth are seen from both sides of the jaw.

Рис. 1. Ростральная часть черепа *Myotis blythii* с вентральной стороны. Два дополнительных зуба хорошо видны с обеих сторон челюсти.

(for examples see Philips, Jones, 1968). Since the third premolars are vestigial teeth in *Myotis* species, their variability is increased (Dzeverin, 2007) and the various anomalies in their development are quite expectable. In our opinion the described above case of the supernumerary teeth in *M. blythii* is an example of complete splitting of the third premolar primordium. Primary causes of those developmental deviations are unknown, but they may be connected with insufficient parental diet, infections, and random mutations (Wolsan, 1984).

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