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## ***Ochotona daurica* Pallas, 1776: modern and past distribution area in Mongolia and the Transbaikal region**

M.A. Erbajeva, N.V. Alexeeva, T.V. Kisloschaeva

### **Abstract**

*Ochotona daurica* Pallas, 1776 is one of the ancient species among modern taxa having an origination in Transbaikalia possible at the end of Pleistocene. Review on the Late Pleistocene-Holocene-Recent area of distribution of this species is given on the base of new evidences and detail analysis of the previous data.

**Key words:** *Ochotona daurica*, distribution, Mongolia, Transbaikalia, Holocene, Late Pleistocene

### **1. Introduction**

*Ochotona daurica* PALLAS, 1776 is steppe-dwelling species among 28 extant taxa of the genus *Ochotona* (Ochotonidae, Lagomorpha, Mammalia), the formation of which occurred as far as the Late Miocene of the Central Asia, in particular of Inner Mongolia. At that time ochotonids were represented by a number of taxa such as *Ochotona lagrellii*, *Ochotona minor*, *Ochotona gudrunae*, *Ochotona chowmincheni*, *Ochotona magna* and *Ochotona guizhongensis*.

Judging from the cranial and postcranial skeletons of both extinct and extant taxa ochotonids in total are remarkably homogeneous and morphologically conservative group. From the Late Miocene ~6 Ma to the Recent time the main features of skull and common morphology of the teeth remained invariable for a long time (fig. 1) which allow us to suggest that in the past extinct ochotonids had similar ecologic requirements as modern forms and they could inhabit the same biotopes as the modern species.

At present time the area of distribution of *Ochotona daurica* occupies steppe zone of the whole Mongolia from the western to eastern boundary, and isolated territory occurred in southern edge of the Gobi Desert and limited area in open part of forest steppe in northern part of the region (SOKOLOV & ORLOV 1980). *Ochotona daurica* inhabits as well vast plain territories in

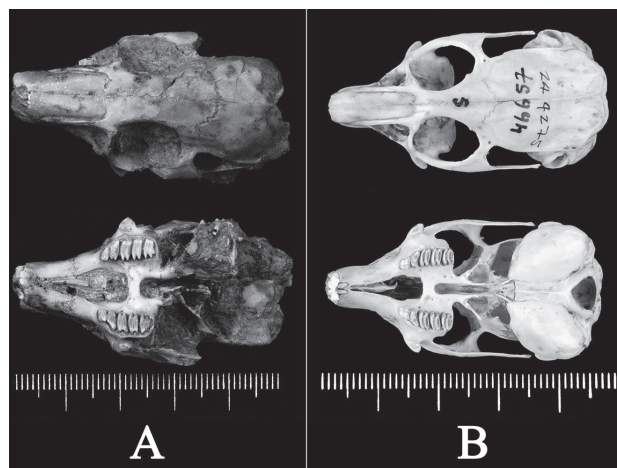


Fig. 1: Skulls of *Ochotona chowmincheni* (A) and *Ochotona daurica* (B).

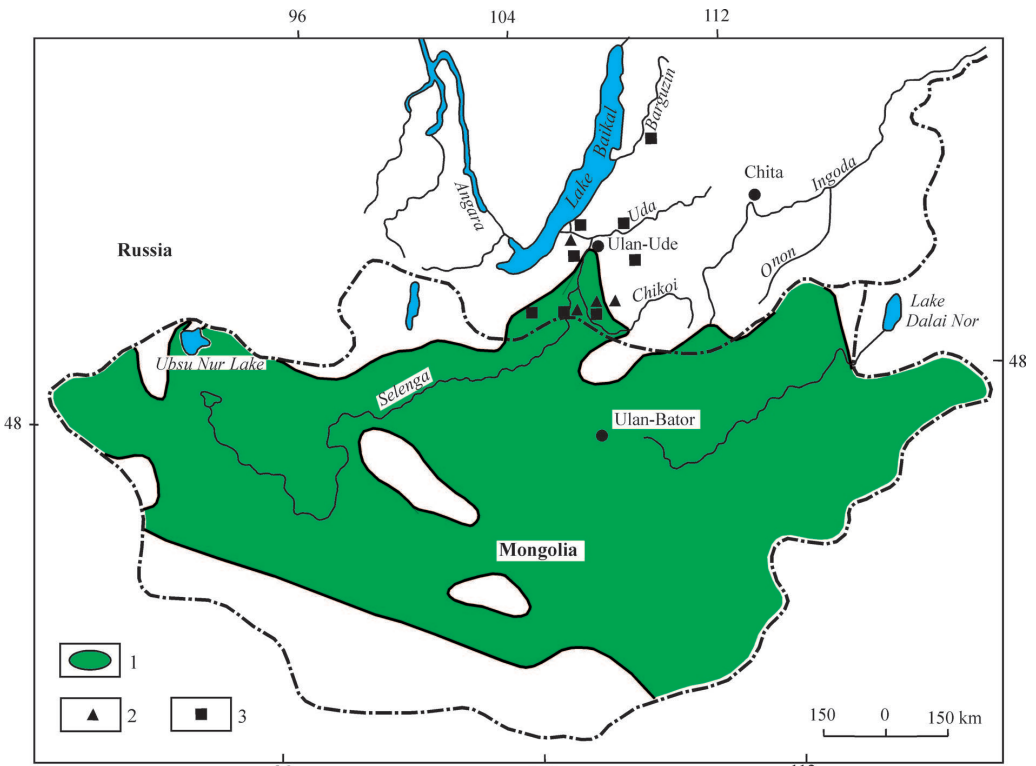
south-eastern Russia (fig. 2) and northern part of China (NEKIPELOV 1954, POTAPKINA 1975, SCHVETSOV et al. 1984, GROMOV & ERBAJEVA 1995).

The Recent small mammalian fauna of the Transbaikalian area includes three taxa: *Ochotona daurica* PALLAS, 1776; *O. hyperborea* PALLAS, 1811 and *O. alpina svatoshi* TUROV, 1924.

## 2. Material and methods

The study of living *Ochotona daurica* was provided during the last decades in the Western Transbaikalia which is located in the interior of the Central Asia. It was examined modern distribution area, some data on biology and ecology, i.e. population density, behavior, vocalization etc. (Kisloschaeva). The teeth structure, morphology of skull and postcranial skeleton were examined in detail (ERBAJEVA 1970, 1988; POLYAKOVA & ERBAJEVA 1974).

Fossil specimens of *Ochotona daurica* are housed at the Geological Institute Siberian Branch, RAS, Ulan-Ude. They were discovered from a number of sites at the vast plain territory of the Transbaikalian area, some of them are located much far from the recent area of distribution. They are represented by the fragments of skull, mandibles (fig. 3), postcranial skeleton and mostly by isolated teeth. No fossil data on this species are known yet from Mongolia.



Sketch-map: *Ochotona daurica*: past and recent area of distribution  
1 - Recent; 2 - Holocene; 3 - Late Pleistocene. (After Alexeeva, 2005).

Fig. 2: Sketch map of the distribution area of *Ochotona daurica* in Mongolia and in the Transbaikalian area in the past and at present time.

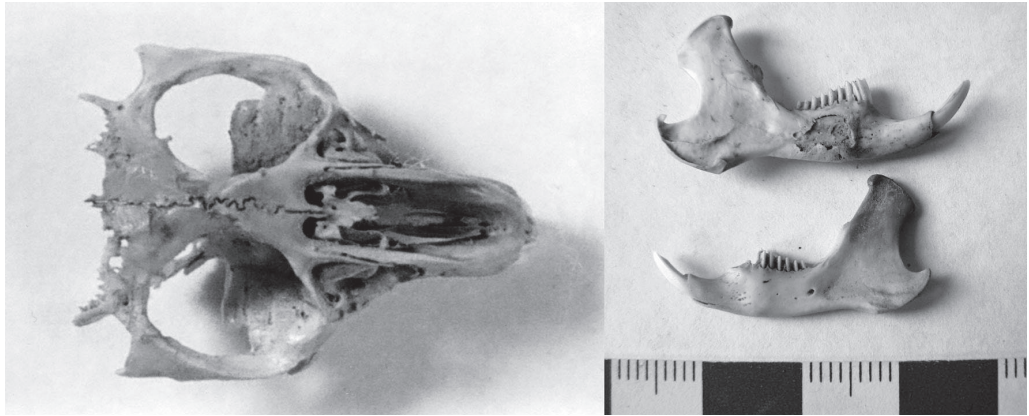


Fig. 3: *Ochotona daurica* foss., fragments of mandibles and skull from Tologoi VIII site.

### 3. Discussion

#### 3.1. Origin area

*Ochotona daurica* PALLAS, 1776 is steppe-dwelling species. Among the recent taxa it would be recognized as a rather ancient ochotonid except of steppe pika *Ochotona pusilla*. The earliest fossil record of daurian pika is known in the Western Transbaikalia from the end of Middle – beginning of the Late Pleistocene (*Ochotona* cf. *daurica*) in Ivolginian fauna (ALEXEEVA 2005). With reasonable confidence we can say that this region might be cited as the daurian pika formation area. At that time herbaceous steppes, meadow steppes and in part desert steppes being a favourable biotopes of *Ochotona daurica* were widely distributed in the region due to gradual changing of the paleoenvironment towards cooler and arid conditions.

#### 3.2. Recent habitat, distribution area and short characteristic of *Ochotona daurica*

Living species differ from the other taxa of the genus *Ochotona* by their body size, coloration of pelage in addition to the teeth structure, especially of main diagnostic teeth, such as upper P<sup>2</sup> and P<sup>3</sup> and lower – P<sub>3</sub>. Summer pelage of *Ochotona daurica* varies from pale to deeper gray, and winter pelage significantly lighter and longer. This species differs from other taxa by peculiar teeth pattern (fig. 4<sub>1-4</sub>), however which is close to one of *Ochotona curzoniae* (fig. 4<sub>5,6</sub>).

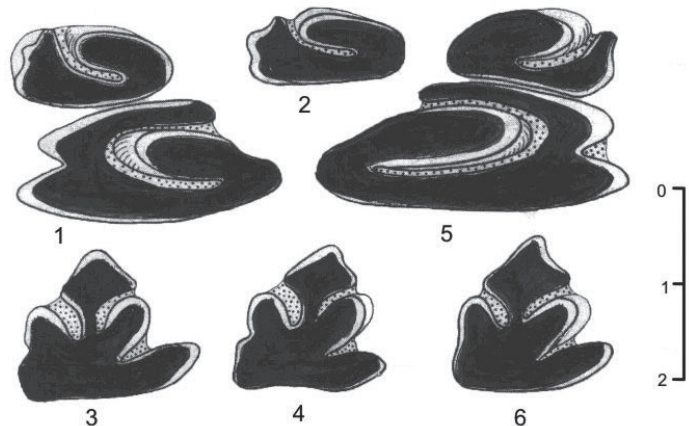


Fig. 4: Cheek teeth of extant *Ochotona daurica* (1-4) and *Ochotona curzoniae* (5, 6).

At present time the modern area of distribution of *Ochotona daurica* corresponds to the steppe zone of Mongolia, moreover it inhabits in part open area of forest steppe in the northern part and restricted area in southern part of desert zone. (BANNIKOV 1954, SOKOLOV & ORLOV 1980).

It occupies as well vast plain territories in south-eastern Russia – Western (Buryatia) and Eastern Transbaikalia (Chita region), south-eastern Altai and Tuva (fig. 2) and in northern and north-eastern China – Nei Mongol, eastern Qinghai, Gansu, Shaanxi, northern Hebei ERBAJEVA 1988, SMITH et al. 1990, GROMOV & ERBAJEVA 1995, HOFFMANN & SMITH 2005).

In mountain areas they inhabit steppes in high elevation and in hill slopes as it evidenced in Altai region and in Mongolia, however they avoid of rocky biotopes which is a favourite habitat of the recent Mongolian pika (*Ochotona pallasi*).

In the Western Transbaikalia *Ochotona daurica* occupies steppic areas of intermontane depression, they inhabit ravines, and territories with shrubs, wormwood and gramineous vegetation along river valleys and mountain slope (fig. 5).



Fig. 5: Steppe with *Caragana* shrubs inhabited by *Ochotona daurica*. Vicinity of Kudara Somon village in Southern part of the Western Transbaikalia, close to the border with Northern Mongolia (photo: M. ERBAJEVA).

### 3.3. Past distribution area

As a whole, fossil remains of *Ochotona daurica* are rather abundant in the Transbaikal area (ERBAJEVA 1966, 1970, 1988). Few data are known in Northern China (TEILHARD DE CHARDIN 1942). However, no fossil evidences of this species are known in Mongolia yet. In connection with this, the fluctuation of the past area of distribution is possible to trace only on the territory of the Western Transbaikalia on the base of study extinct *Ochotona daurica* dispersion.

At the end of the Middle Pleistocene and beginning of the Late Pleistocene the climate of the Northern Asia became much more colder and dryer under influence of Global and regional events and the periglacial landscapes distributed widely throughout Northern Asia. At that time zonal steppes of Siberia, including Transbaikalia, were distributed as far to the north as the southern part of Yakutia that is evidenced by paleovegetation (GITERMANN & GOLUBEVA 1968).

The intensive cooling of the climate led to the significant reorganisation of the mammal community and vegetation in the Transbaikal area. It indicates that the inhabitants of “cold” periglacial wormwood steppes and grass steppes with open woodlands flourished in the region during the Late Pleistocene. The most of Transbaikalian small mammals were represented by modern species, however the distribution area some of them, such as *Ochotona daurica*, *Lasiopodomys brandti*, *Lagurus lagurus* and *Allactaga sibirica* were much more far beyond of their present limits, extending far to the North-East, to Barguzin valley, 54° N (fig. 2) (ERBAJEVA & ALEXEEVA 1999).

At the beginning of the Holocene the paleoenvironment have been gradually changed towards humid and the climate became warmer. The expansion of forest landscapes occurred, arid periglacial steppic territories gradually became vanish. The distribution area of all steppe dwellers, in particular of *Ochotona daurica* reduced much southward (fig. 2). At the Holocene daurian pika still had restricted area somewhat far to the north than the recent boundary, 51°20' N, 107°30' E which is evidenced by fossil discovered from a number of sites: Klochnevo 1.4. on the Itantsa river, sandy deflation settlements such as Dubinino, Inkino, Tvorogovo, Baikalo-Kudara. Rather abundant fossils of daurian pika were discovered in vicinity of Kyakhta, Kiran, Naushki, Khara Busun, Dureny, Dyrestui and Mikhailovka on sand deflation settlements.

At present time the distribution area gradually became reduce mostly due to the anthropogenic factors. We could trace significant decreasing habitat area for very short time. So, in 1960–1965 during our field work in the area surrounding of the Tologoi Key locality (fig. 6) located on the left bank of the Selenga River, 14 km south-west of Ulan-Ude *Ochotona daurica* was a common species. Population density of pika was rather high.

Later cattle and sheep settlements were constructed by the farmers close to this area and due to livestock the habitat area of *Ochotona daurica* was destroyed and ochotonids population gradually decreased and they disappeared completely. Since 1966 daurian pika no more is found in this place. The distribution area decreased slightly southwards. However, at present time they are rather common on the territory of the right bank of the Selenga River directly in opposite side of the Tologoi Key locality. In this place *Ochotona daurica* occupies natural open landscapes and the current population of pika is rather high.



Fig. 6: Warmwood and herbaceous steppe around Tologoi Key section, left riverbank of Selenga inhabited in 1960–1965 by *Ochotona daurica* (photo: M. ERBAJEVA).

## Conclusions

- *Ochotona daurica* is steppe-dwelling species distributed widely in the south-eastern part of Russia, in Mongolia and in north of China.
- According to fossil evidences from the Late Pleistocene of Western Transbaikalia it is possible to suppose that this species was originated in the Transbaikal area at that time.
- During the Late Pleistocene the distribution area was much more far beyond of their present limits, extending far to the North-East, to Barguzin valley of Transbaikalia.

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## References

- ALEXEEVA, N.V. (2005): Late Cenozoic Environmental Evolution of West Transbaikalia (based on small mammal faunas). – GEOS Press. – Moscow, 141 pp. (in Russian).
- BANNIKOV, A.G. (1954): Mammals of Mongolia. Transactions of Mongolian Commission, Vol. **53**. – Academia Nauk Press. – Moscow, 669 pp. (in Russian).
- ERBAJEVA, M.A. (1966): New data on the biostratigraphy of anthropogene deposits of the Western Transbaikalia. – Quaternary Commission of the USSR Bulletin **31**: 93–103 (in Russian).
- ERBAJEVA, M.A. (1970): The history of the Anthropogene Lagomorphs and Rodents of Selenigian Midland. – Nauka Press. – Moscow, 132 p. (in Russian).
- ERBAJEVA, M.A. (1988): Cenozoic pikas (Taxonomy, Systematics, Phylogeny). – Nauka Press. – Moscow, 224 p. (in Russian).
- ERBAJEVA, M.A.; ALEXEEVA, N.V. (1999): Pleistocene-Holocene area of distribution of the Transbaikalian threatened species. – In: ARI STOV, A. (Ed.): The threatened mammalian species of Russia and adjacent territories. Proceedings of International Conference. – Moscow, 83–88 (in Russian).
- GITERMANN, R.E.; GOLUBEVA, L.V. (1965): The history of the Anthropogene vegetation development in the East Siberia. – In: The fundamental problems of the Quaternary study. – Nauka Press. Moscow, 221–227 (in Russian).
- GROMOV, I.M.; ERBAJEVA, M.A. (1995): The Mammals of Russia and Adjacent Territories. Lagomorphs and Rodents. – St. Petersburg, 522 pp. (in Russian).
- HOFFMANN, R.S.; SMITH, A.T. (2005): Order Lagomorpha. – In: WILSON, D.E.; REEDER, D.M. (eds.); Mammal Species of the World, 1. The Johns Hopkins University Press. – Baltimore: 185–211.
- NEKIPELOV, N.V. (1954): Alteration of the quantity of daurian pika in South-East Transbaikalia. Proceedings of Irkutsk Antiplague scientific research Institute of Siberia and Far East. **12**. – Irkutsk: 171–180 (in Russian).
- POLYAKOVA, R.S.; ERBAJEVA, M.A. (1974): The differences in the ochotonid skeleton of extinct dodogolian and extant daurian species and their adaptation to habitat. Functional morphology of mammals. – In: KLEBANOVA, E.A. (ed.): Transactions of Zoological Institute **17**. – Leningrad, 180–189 (in Russian).

- POTAPKINA, A.F. (1975): Distribution and biology of ochotonids (Ochotonidae) in the south of Western Siberia. Systematics, fauna, zoogeography of mammals and their epizoic **23**. – Novosibirsk, 92–103 (in Russian).
- SHVETSOV, JU.G.; SMIRNOV, M.N.; MONAKHOV, G.I. (1984): Mammals of Baikal basin area. – Nauka Press., Novosibirsk, 258 p. (in Russian).
- SMITH, A.T.; FORMOZOV, N.A.; HOFFMANN, R.S.; ZHENG, CH.; ERBAJEVA, M.A. (1990): Pikas. – In: CHAPMAN, J.A.; FLUX, J.E.C. (eds.): Rabbits, Hares and Pikas: Status Survey and Conservation Action Plan. IUCN. – Gland, Switzerland: 14–60.
- SOKOLOV, V.E.; ORLOV, V.N. (1980): Determination of mammals of the Mongolian People Republic. – Nauka Press. – Moscow, 351 p. (in Russian).
- TEILHARD DE CHARDIN, P.; LEROY, P. (1942): Chinese fossil mammals. – Peking, 142.

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