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Representatives of the family *Bovidae* included in the Red Book of Kazakhstan

Transcaspian urial (*Ovis vignei arkal* Eversmann, 1850; fig. 1 [1])



Figure 1 – Transcaspian urial

Taxonomy:

Kingdom (*Animalia*)

Phylum Chordates (*Chordata*)

Class Mammals (*Mammalia*)

Order Even-hoofed mammals (*Artiodactyla*)

Family Hollow-horned ruminants (*Bovidae*)

Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: rare (Category III). It is the lowest-mountainous representative of the genus Sheep (*Ovis*). In Kazakhstan, this subspecies located in the northern, the largest part of its natural habitat. *Distribution.* The Kazakhstan part of the areal of Transcaspian urial is entirely located within the Manghystau Region. It is mainly distributed in the hills and mountains of the Ustyurt Plateau and the Mangyshlak Peninsula. Currently, it occurs here in almost all suitable habitats, the main of which is the Western Chink of Ustyurt Plateau. Modern geographic isolation of this subspecies has developed between its populations groups in North-Western Turkmenistan, Karakalpakstan and Kazakhstan. In this case, the sheep inhabiting the Chagala-Sor Hollow and the Kaplankir Chink in the territory of Kazakhstan are more correctly considered as part of the population of this subspecies of North-Western Turkmenistan. *Habitat.* The habitat area of this subspecies are limited. It is the steep slopes of drainless hollows, mountain ranges, low mountains, chinks. *Magnitude of population.* The population of this subspecies are limited. The total population in Kazakstan is about 6,000 individuals. Almost 40% of this population is in the Western Chink of Ustyurt Plateau, and another 20% – in the North Aktau Mountains. *The main limiting factors.* The main limiting factors are poaching and agricultural development within principal habitat areas. Climatic factors (droughts, jutes, etc.) only limit the reproduction or survival of young animals.

Biology. These sheep lead a semi-migratory lifestyle with limited, but regular seasonal migrations. In the hot season, when the number of watering places is limited, a certain territoriality is characteristic of these sheep. The gregariousness level changes throughout the year, reaching a maximum in winter, and a minimum – in summer. Sexual maturity is reached at the age of 2.5 years; at that, females of this age already entering into reproduction, while males are in 4.5-5.5 years old. Rutting – in October-December, lambing – in March-May. Females give birth to 1-2 lambs. One male have 2-3 females. The average duration of life is 4 years, maximum – 12 years. The death of young animals in the first year of life can reach 70%. Feeding is varied by season. The general list of plant used in feeding includes at least 88 species. These sheep drink water of different salinity, but prefer to drink a less mineralized water. *Breeding.* In captivity, breeding of this sheep has been successful in the Ashgabat, Kharkov (in 1978) and Almaty (in 1989-1990) Zoos [2, 3]. *Present protection measures.* Transcaspian urial is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. It is protected in the Ustyurt, Aktau-Buzachi and Karagie-Karakol Preserves, where is concentrated about 30% of its population in Kazakhstan. *Necessary protection measures.* The Ustyurt Reserve territory should be expanded to the optimal size. A network of reserves should be also established in the Manghystau Region. *Proposals for further research.* It is necessary monitoring of individual populations of Transcaspian urial and development of measures for their further protection.

Karatau argali (*Ovis ammon nigrimontana* Nasonov, 1914; fig. 2 [5])



Figure 2 – Karatau argali

Taxonomy:

Kingdom (*Animalia*)
 Phylum Chordates (*Chordata*)
 Class Mammals (*Mammalia*)
 Order Even-hoofed mammals (*Artiodactyla*)
 Family Hollow-horned ruminants (*Bovidae*)
 Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: endangered (Category I). It is endemic to Kazakhstan. Its population size is declining. It is one of five subspecies of the mountain sheep in the fauna of Kazakhstan. *Distribution.* This sheep is distributed only in the Karatau Mountains. In the southwestern Karatau, this sheep

has hybridized with the Tian Shan argali that migrated from Talas Alatau. Consequently, pure sheep of this subspecies has remained only in the northwestern part of the Karatau Mountains. *Habitat.* It is smoothed steppe areas of the mountains. From such places, domestic animals increasingly replace these sheep. Therefore these sheep often stay in the heavily indented rocky canyons that overgrown with shrubs. In winter, thanks to a little snow, here the conditions for sheep habitat are favorable. *Magnitude of population.* The total population of this species has gradually declined from approximately 150 individuals in 1976 to about 27 at present [5]. *The main limiting factors.* The limiting factors are poaching, predation by wolves and cattle grazing in the main habitat areas of these sheep.

Biology. This sheep leads no migratory lifestyle, i.e. it do not makes distant migrations. In the winter, sheep actives mostly daytime, in other seasons – a round the clock. Rutting – in October-November, the birth of the lambs – in late March-May. Females give birth to 1-2 lambs. The feed of this sheep is practically not studied. Its competitors are domestic sheep, enemies – a wolf and a man. *Breeding.* No information. It is not kept in the zoos of Kazakhstan [2, 3, 6]. *Present protection measures.* Karatau argali is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. *Necessary protection measures.* Protection of the Karatau argali should be strengthened in its habitats. To protect this species, the territory of the Karatau Reserve should be expanded to the optimal size. *Proposals for further research.* To preserve this species in Kazakhstan it is necessary (1) to create a map of habitats and migration routes for Karatau argali, (2) to develop a methodology for monitoring of its population and (3) to create a nursery for the breeding of these sheep.

Tian Shan argali (*Ovis ammon karelini* Severtzov, 1873; fig. 3 [7])



Figure 3 – Tian Shan argali

Taxonomy:

Kingdom (*Animalia*)

Phylum Chordates (*Chordata*)

Class Mammals (*Mammalia*)

Order Even-hoofed mammals (*Artiodactyla*)

Family Hollow-horned ruminants (*Bovidae*)

Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: vulnerable (Category II). Its areal and population size are rapidly decreasing. It is one of five subspecies of the mountain sheep in the fauna of Kazakhstan. *Distribution.* This sheep is distributed in the Tian Shan, Chu-Ili Mountains and Dzhungarian Alatau. *Habitat.* This sheep inhabits in the smoothed steppe areas of mountains at altitudes of 200 to 4,000 meters above sea level. In winter, it prefers to inhabit snowless slopes with a sufficient supply of fodder. In summer, it often rises above the forest boundary. The habitats are reduced due to intensive grazing, primarily sheep. *Magnitude of population.* The total population in Kazakhstan is about 1,200-1,500 individuals [8]. *The main limiting factors.* Basic limiting factors are poaching, large predators and displacement from natural pastures by domestic animals.

Biology. The sheep makes seasonal vertical migrations depending on the condition and availability of feed. Usually it is active in the morning. In winter, it often feeds during the day. Sexual maturity is occurred at the age of 2.5 years. Rutting – in October-November. Lambing – in April-May. Females usually give birth to one lamb. In different years, females can give birth from 1.9 to 33.3% of twins. It feeds on motley grass, leaves and shrub shoots. Its competitors are domestic sheep, enemies – a wolf and a man. It often suffers from itchy scabies (causative agent – *Sarcoptes scabiei ovis*). *Breeding.* This sheep was successfully kept and bred in Almaty Zoo and other zoos. By cross breeding Tian Shan argali with domestic sheep, a highly productive sheep breed – archaromerinos – was bred [2, 3]. *Present protection measures.* This sheep is protected in the Aksu-Dzhabagly Reserve, in the Altyn Yemel National Park Reserve, in the Almaty, Andasai, Koksus and Tohtinsky Preserves. It is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. *Necessary protection measures.* To preserve this species in Kazakhstan it is necessary (1) to join adjacent areas of the Dzhabaglytau Ridge with the Aksu-Dzhabagly Reserve, (2) to accelerate the creation of a reserve in the Dzungarian Alatau and (3) to strengthen the protection of these sheep in existing reserves, preserves and hunting farms. *Proposals for further research.* The top-priority task is to specify the subspecies' status of the mountain sheep living in the Dzungarian Alatau, monitoring of the individual populations of argali and development of measures for its protection.

Kyzylkum argali (*Ovis ammon severtzovi* Severtzov, 1873; fig. 4 [8])



Figure 4 – Kyzylkum argali

Taxonomy:

Kingdom (*Animalia*)

Phylum Chordates (*Chordata*)

Class Mammals (*Mammalia*)

Order Even-hoofed mammals (*Artiodactyla*)

Family Hollow-horned ruminants (*Bovidae*)

Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: endangered (Category I). This subspecies may have already disappeared from Kazakhstan, but in Uzbekistan its population has been partially restored. It is one of five subspecies of the mountain sheep in the fauna of Kazakhstan. *Distribution.* In the past, this sheep inhabited the area between the Amudarya and the Syrdarya Rivers, as well as all the relict mountains of the central and western regions of the Kyzylkum. Currently, it can be found in the western part of the Nuratau Mountains and in the Central Kyzylkum on the Aktau Mountains in the territory of Uzbekistan. Now, apparently, it does not inhabit in the territory of the Republic of Kazakhstan. However, this sheep can enter the territory of Kazakhstan from the Nuratau and Aktau Mountains. *Habitat.* The Kyzylkum argali is a typical mountain animal. The habitat area of this subspecies are limited. It is the Nuratau Mountains (at altitudes of 2,169 meters above sea level) and the relict mountains in the Kyzylkum (at altitudes of 992 meters above sea level). Presently, in these areas it is found in all parts of the middle and upper parts of the mountains. *Magnitude of population.* The total population of this sheep in the Nuratau State Reserve is about 1,000 individuals. *The main limiting factors.* Basic limiting factors are poaching and cattle grazing in the main habitat areas of these sheep.

Biology. In the spring, this sheep is eating the bluegrass, sedge, brome grasses and shallow grass from ephemerals; at the beginning of summer, it is feeding the desert-steppe perennials, motley grass; in autumn and winter – dry cereals and wormwoods. In summer, during a hot time of the day, sheep hides in the shade of rocks or in sparse bushes; these sheep come out for feeding only in the evening. Sexual maturity is occurred at the age of 2 years. In the Nuratau Mountains, the rutting lasts from late October to early December. Lambing - in April and early May. The pregnancy of females is about 5 months. Females give birth to 1-2 lambs. *Breeding.* No information. It is not kept in the zoos of Kazakhstan [2, 3, 9]. *Present protection measures.*

Kyzylkum argali is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. In Uzbekistan, it is protected in the Nurata Reserve. *Necessary protection measures*. To save the existing population of this species in the central part of the Kyzylkum Desert it is necessary (1) to create a nature reserve in the Aktau Mountains, (2) to intensify protection of these sheep in the existing habitat areas and (3) to create a nursery for the breeding of these sheep. *Proposals for further research*. It is necessary to collect the separate information about the entry of the Kyzylkum argali into the Kazakh part of the Kyzylkum.

Kazakhstan argali (*Ovis ammon collium* Severtzov, 1873; fig. 5 [10])



Figure 5 – Kazakhstan argali

Taxonomy:

Kingdom (*Animalia*)

Phylum Chordates (*Chordata*)

Class Mammals (*Mammalia*)

Order Even-hoofed mammals (*Artiodactyla*)

Family Hollow-horned ruminants (*Bovidae*)

Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: rare (Category III). It is one of five subspecies of the mountain sheep in the fauna of Kazakhstan. Its areal and population size are increasing in some areas. *Distribution*. This subspecies of sheep inhabits the Kazak uplands, the northern shore of Balkhash Lake and the Kalbin Altai, Tarbagatai, Monrak and Saur Mountains. *Habitat*. This subspecies of sheep inhabits steppe sections of the mountains. In the 1980 years, habitat areas were significantly reduced due to the intensive grazing of domestic animals. Now, an increase in the area of their habitats is observed, as in a number of areas the number of domestic animals, especially sheep, is declining. *Magnitude of population*. The total population of this subspecies has increased from 7,000 in the 1970 years to 11,800 at the present. *The main limiting factors*. Limiting factors are poaching, severe winters and the reduction of forage due to cattle grazing.

Biology. These sheep make insignificant seasonal movements. However, when drought and in snow winters these sheep move on a long distances. Sheep are usually active in the morning and in the evening, in the winter it often feed in the daytime. Rutting – in October-November, lambing – in April-May. Males (no younger than 7.5 years old) have harems (2-17 females). Females give birth to one, less often two lambs.

Lactation lasts until the rutting. Males is reached sexual maturity at the age of 2.5 years, some females – at the age of 1.5 years. The basis of nutrition – motley grass. These sheep are less often eaten leaves, shoots and fruits of bushes and some trees. Its competitors are domestic sheep, enemies – a wolf and a man. *Breeding*. This sheep is found in Karaganda and Almaty Zoos, where it successfully reproduces [2, 3]. *Present protection measures*. Kazakhstan argali is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. It is protected in some nature reserves, including the Tarbagatai and Yermentau Republican Preserves, local subordination preserves (Kyzyltau, Arkalyk and Karkaralinsky Preserves), as well as in experimental hunting areas – Myrzhyk, Edrey, Konyr-Temirshi and Koshubay. *Necessary protection measures*. To preserve this species in Kazakhstan it is necessary (1) to intensify protection of this sheep in the existing reserves and (2) to create new reserves in the Kalbin Altai Mountains and the Kazak uplands. Reacclimatization of this sheep in the Ulytau Mountains will also contribute to restoration of the population of this subspecies. *Proposals for further research*. It is necessary monitoring the large populations of the Kazakhstan argali.

Altai argali (*Ovis ammon ammon* Linnaeus, 1758; fig. 6 [11])



Figure 6 – Altai argali

Taxonomy:

Kingdom (*Animalia*)
 Phylum Chordates (*Chordata*)
 Class Mammals (*Mammalia*)
 Order Even-hoofed mammals (*Artiodactyla*)
 Family Hollow-horned ruminants (*Bovidae*)
 Genus Sheep (*Ovis*)

The value of the taxon for the preservation of the gene pool: endangered (Category I). It is one of five subspecies of the mountain sheep in the fauna of Kazakhstan. Its areal and population size are decreasing. *Distribution*. Altai argali is a traditional subspecies of argali, a wild sheep that roams the highlands of the Altai Mountains. This sheep previously inhabited the southern and western Altai Mountains, but by the beginning of the 20th century, it had disappeared from the Western Altai. Currently, it can be found only in the Kurchum Range of the Altai Mountains. In the territory of the Republic of Kazakhstan, there is an insignificant peripheral western part of the areal of this subspecies of sheep. *Habitat*. This sheep lives in alpine tundra and in mountainous

steppe at an altitude of 800 to 3,000 meters. In the snowless period, these sheep inhabit the alpine meadows in the highlands, in the winter – the little snow-covered steppes on the southern slopes of the mountains. *Magnitude of population.* The population of this subspecies are limited. The total population in Kazakhstan is estimated at 50-60 individuals. *The main limiting factors.* Factors contributing to its disappearance are poaching and cattle grazing in natural habitat areas of this sheep.

Biology. Altai argali are the largest of all sheep. It is active mainly in the morning and evening, although in cloudy weather it feeds during the day. In the Kazakh part of Altai, these mountain sheep make insignificant seasonal movements. In the Southern Altai, sheep are more often found in groups of 5-8 animals. Rutting – in October-November. Males (no younger than 5 years old) have harems (4-9 females). Lambing – in April-May. Females give birth to one, less often two lambs. Lactation lasts until the rutting. Animals reach sexual maturity at the age of 3 years. The main food source – cereals and sedges. In winter, these sheep are often feeding by branches of bushes. Its competitors are domestic sheep; enemies are large predators (such as wolves), sheepdogs and stray dogs, and man. *Breeding.* In Kazakhstan, this species is not bred. It is kept in the experimental farm of the Biological Institute of the Siberian Branch of the Russian Academy of Sciences in the Cherga village (Altai Region), where it reproduces since 1989 [2, 3]. *Present protection measures.* Altai argali is listed in Annex II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora [4]. *Necessary protection measures.* To preserve this species in Kazakhstan it is necessary (1) to develop the Markakol Reserve in the southern spurs of the Kurchum Ridge and (2) to limit grazing of livestock in the habitats of these sheep. *Proposals for further research.* The top-priority task is to study the distribution and numbers of this sheep.

Persian gazelle (*Gazella subgutturosa* Guldenstaedt, 1780; fig. 7 [12])



Figure 7 – Turkmen gazelle

Taxonomy:

Kingdom (*Animalia*)

Phylum Chordates (*Chordata*)

Class Mammals (*Mammalia*)

Order Even-hoofed mammals (*Artiodactyla*)

Family Hollow-horned ruminants (*Bovidae*)

Genus Gazelles (*Gazella*)

The value of the taxon for the preservation of the gene pool: rare (Category III). Its areal and population size are decreasing in some areas. It is the exclusive representative of the genus Gazelle and subfamily Antelope in Kazakhstan, where the northern part of its areal is located. *Distribution.* This subspecies of sheep is distributed on the Ustyurt Plateau, in the Mangyshlak area, in the Ili River basin, and in the Kyzylkum, Taukum and Moiyunkum Deserts. *Habitat.* It is the fixed hilly sands, gravelly and clayey deserts intersected by dry riverbeds, covered with thickets of saxaul, zhuzgun, boyalych, teresken; or open gravelly areas with saxaul or tasbiurgun pastures. This sheep is found in the low dry mountains and on the gently sloping sections of chinks. The main requirement for its habitats is availability of watering points, minimum snow cover in winter and good protective properties of the area. *Magnitude of population.* The total population of this species in Kazakhstan is estimated at 30,000 to 50,000 individuals, 20,000-25,000 of which live in the Manghystau Region. *The main limiting factors.* The basic limiting factors affecting this species are anthropogenic (poaching, cattle grazing), biotic (predators, epizootics) and climatic (severe, snowy winters, jutes, droughts) factors.

Biology. These sheep lead a semi-migratory lifestyle with limited, but regular seasonal migrations. In the period of the rutting (November-December), the males are characterized by territoriality. Some females can participate in reproduction at the age of 6-7 months, the rest females – at the age of 1.5 years, males – at the age of 2.5 years. The lambs are born in April-July, the mass lambing – in May. The species composition of the plants consumed in the food depends on the region and changes during of the year. Competitors of these sheep are domestic sheep, saigas, desert rodents; enemies – a wolf, as well as sheepdogs and stray dogs. The foxes, jackals, spotted and reed cat, large predatory birds are dangerous for young animals. *Breeding.* In captivity, breeding of this sheep has been successful in nurseries of Uzbekistan and Turkmenistan. In Kazakhstan, these sheep was kept in Almaty Zoo [2, 3]. *Present protection measures.* The Persian gazelle is protected in the Ustyurt and Barsa-Kelmes Reserves, the Altyn Yemel National Nature Park and the Aktau-Buzachi Reserve. *Necessary protection measures.* To preserve this species in Kazakhstan it is necessary (1) to create an additional reserves in the Buzachi, Taukum and Kyzylkum regions and (2) to provide

the extension of the Ustyurt Reserve to the optimal size. *Proposals for further research*. It is necessary monitoring the large populations of the gazelle.

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