Caprinae

Newsletter of the IUCN/SSC Caprinae Specialist Group

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In this issue

Editors Comment

Apologies for no newsletter for 2006. I was finishing a 5-year term in an administrative position at my university, and then went on leave. I'm still on leave but temporarily back on Canada.
This issue is expanded beyond the usual and includes an article on argali and a revised range map for one subspecies of argali in China, both of which are not in the usual newsletter format. I felt that the images were best shown larger than normal and hence placed them at the end of the issue.
Please continue to submit material for possible inclusion in the newsletter.

Wild Goat and Mouflon Surveys in Turkey

Surveys of wild Caprinae were a part of a NATO Science Programme partnership grant "Genetic resources and origins of endangered European sheep and goats". Locations for the surveys were outlined by Prof. A. Kence of Middle East Technical University, Ankara. The actual organization was provided by Deniz Özüt with much help from local officials in the Ministry of Forestry General Directorate of National Parks and Game-Wildlife. All the surveys were carried out in 2002 and 2003. The 2002 surveys were carried out in the end of July to the beginning of August; more than one month after the parturition period in wild goat. Results have not been published because of supposed continuation of the research. However, nothing has occurred and we consider it timely to present the results.

The Gidengelmez are limestone mountains, part of the Taurus chain, in north-eastern Antalya, rising up to appr. 3000 m, but usually below 2500 m. They are very rugged and eroded, with well developed karst structures and no open water sources on the ranges, but with water accessible down in the deep karst holes. South-western slopes harbour Mediterranean-type forest with tree-like juniper, maple and evergreen narrow-leafed oak. Closer to timberline maple is replaced by fir. Foothills of the north-eastern slopes are covered with pine forest with admixture of cedar. Herbaceous cover closer to timberline and above it is distinctly semiarid with *Tragacantha*, *Prangos* and various grasses. The large mammal fauna, besides wild goat (*Capra aegagrus*), includes wild boar and bear. The Gidengelmez Wildlife Protection Area is also open for trophy hunting, with proper warden service. At places, it is even separated from village lands by a wire fence.

We observed 155 wild goats: 6 2-3-year old males, 62 females, 11 yearling males and 13 yearling females, and 63 juveniles. There were at least 12 pairs of twins (19 % of all females, or 24 % of females with kids). Kid (juv/? = 1.0) and yearling (yearlings/? = 0.4) indices were rather high indicating a high reproduction rate and good kid survivorship (see e.g. Schaller 1977; Edge & Olson-Edge 1990; Weinberg 2001). Wardens told us that there were more kids in 2000, but these data are not measurable and thus not quite reliable.

We saw animals on both slopes of the range within the forest zone; though the absence of males >3 yrs among encountered animals should be noted, and suggests a marked ecological and/or spatial segregation of males from females with offspring. Only 2-year old males were associated with females. That is why analysis of sex structure is pointless. Average size of a female group was 5.1 (n=32).

The Aladaglar are limestone mountains on the border of Konya plain, not far from the town of Nigde. They are high (up to 3700 m), with conspicuous traces of glaciation and snow patches present in mid-summer, perhaps even permanent snow on the peaks. Reportedly, winters are snowy, with snow cover reaching about 1 m at 1700 m elevation. Altitudinally, the Aladaglar at the lower elevations looks like an eroded narrow plateau dissected by deep canyons and the higher alpine level. Fir forest survives in just one valley. No other wild ungulates besides the wild goat are present. Higher elevation is also evidenced by the presence of Caspian snow-cock.

The Aladaglar is partly a national park, partly a trophy hunting area, and like Gidengelmez boasts a reliable warden service. This range is probably the most popular mountaineering and hiking area in Turkey, while the foothills, the lower level plateau and, to a lesser extent, alpine zone is used for livestock pasturing.

Altogether, 142 animals were seen: 20 mature males > 6 yrs, 38 young males, 37 females, 11 yearling males and 9 yearling females, and 27 juveniles. In Aladaglar, all age and sex classes were encountered,

but since data were not collected during the rut, the figures may not be proportionate. That is why sex ratio should not be regarded as adequate. The kid index (juv/? = 0.7) was considerably lower (presumably only one set of twins), while the yearling index (yearlings/? = 0.5) was higher than in Gidengelmez. Wardens told us that low kid index might be due to deep snow cover last winter, but high yearling index contradicts this explanation. The 2-year old male association pattern with females was similar to that in Gidengelmez. All yearling females were associated only with females, while 18% of yearling males were associated with older males. Fifty-five % of yearling males were met in groups of mostly barren females. This pattern probably explains the slight numerical dominance of yearling females in Gidengelmez where just 3 male groups were met. Mean sizes of groups in the Aladaglar were: 4.7 (n=6) for adult male groups, 2.6 (n=10) for young male groups, and 7.0 (n=12) for female groups.

Ecological and spatial separation of females with offspring from males was very conspicuous in Aladaglar. With female groups almost exclusively on lower elevations – on precipices and in canyons of the first level, and males confined to subalpine and alpine zones.

On the whole, wild goat populations of both Gidengelmez and Aladaglar looked quite healthy. Unfortunately, the follow-up survey in the end of May 2003 turned out unlucky. Weather was rainy and unstable. We did a 2-day route on Tahtali mountain west of Antalya just at the seashore. This limestone area resembles Gidengelmez (being also a part of Taurus chain) – with pine forests at lower elevations getting replaced higher up by cedar, tree-like juniper, narrow-leafed oak and *Spiraea*. We saw only a 2-year old male, a yearling male and a female with a kid. Unlike the areas described above, this one harbored free-ranging, maybe even feral, domestic goats.

A survey in the Eastern Anatolia, where we were looking for mouflon (*Ovis gmelini*), was totally fruitless. During the previous visit to the area it was decided, based on information from local hunters, that the Cat (Sürdüz) Mountains (3100 m high, south-east of the Lake Van, in Gurpinar district) would be the most promising place for field survey (Kence, 2002). This mountain has been praised in Turkish hunting literature for abundance of mouflon.

Mountains around Van are completely tree-less, but one steep slope of the Sürdüz Mountain unexpectedly harboured mighty stumps of tree-like junipers cut down several years ago. Our guide told us that juniper stands used to be almost common for these mountains several decades ago and that a couple of such stands are still preserved on other mountains. Overall, the vegetation was semiarid; vertebrate fauna included grey hare, red fox, Caspian snow-cock, and chukar. The guide showed us places where mouflon were successfully hunted some years ago. Nevertheless, during a 4-day survey having examined the whole mountain, we saw no animals, not even traces of their presence (e.g. old faeces); just old permanent resting sites without any signs of being used during the last couple of years at least.

When asked, other local people started telling about mouflon lambs been raised in their villages, but afterwards it turned out that these things actually happened at least more than 5 years ago. Also local people invariably explained the absence of mouflon by their migration to Iran. However, during our previous visit to this area in November 2001, they told us that animals have already left for Iran but should be back before spring, before the lambing season. Considering at least 100 km distance between the given area and Turkish-Iranian border, the comparatively dense human population and no definite data of occurrence of sheep between Cat (Sürdüz) Mountain and Iran, information about contemporary seasonal mouflon migrations to Iran seems rather vague. Young gendarm officers were surprised when being asked about wild sheep. They were familiar with wild goats which were fairly common in the more precipitous places of the area, but knew of no wild sheep there.

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Update on Yeniugou (Wild Yak Valley), Qinghai, China

As part of their series called “Planet Earth”, the BBC Natural History Unit obtained permission to film wildlife in Qinghai’s Yeniugou during autumn 2005. Because I was familiar with the area and its wildlife, I was contracted to accompany the film crew during the first part of the expedition, and to provide guidance. Because my primary task was assisting the film crew, I only spent 10 days in the field, and field work occurred later in the year than during earlier surveys, I was not able to obtain data that is directly comparable with earlier reports (Harris and Miller 1995; Harris et al. 1996, 1999, 2005; Harris and Loggers 2004). However, because Yeniugou is one of the most important regions within the entire Qinghai-Tibet plateau for native fauna, and because I have been following the area since 1991, I provide some information to those interested here. The film-makers concentrated on obtaining high-quality video footage of wild yaks, pikas, and Tibetan foxes; secondary objects of filming were Tibetan wild ass and Tibetan gazelles. Thus, we spent most of our time in relatively lower elevations (generally below 4400m), although as a “scout”, I often climbed to higher elevations in search of wildlife. Weather was clear most days, allowing for excellent observation conditions; temperatures ranged from about 0°C

during afternoons to about -20° in early mornings. Snow covered north-facing slopes from about 4500m and up, but most south-facing slopes were snow-free. The main river was frozen-over in the western-most portions, but was still flowing in most of the valley.

Wildlife observations and general impressions of species' status

Argali (*Ovis ammon*)

We observed argali at 4 locations, a total of less than 50 animals (9 males, all others in maternal groups). Only one location was a low-elevation grassland; all locations were far from pastoralists and other disturbance. We were camped near where I'd observed numerous argali in the early 1990s (and some in 1997), but most such areas had no argali in October/ November 2005. We were not able to survey all possible locations that might have supported argali so it is difficult to compare these observations with previous surveys. I did, however, prioritize searching for argali whenever we had the chance. In sum, this short visit to Yeniugou provided no reason to alter conclusions reached after my 2002 survey that argali had declined from the early 1990's abundance, most likely due to increased disturbance from pastoralism.

Other ungulate species

Without formal distance sampling methods, obtaining an unbiased estimate of Tibetan gazelle (*Procapra picticaudata*) abundance is not possible. That said, my subjective impression was that Tibetan gazelles were relatively abundant, with no evidence of a decline since my formal estimate of their abundance in the early 1990s. We observed wild yaks (*Bos grunniens*) in most all areas I would have expected to find them, given our previous surveys and the time of year. As expected, yaks had begun to vacate the north-facing sedge meadows, although some mixed-sex herds and isolated bulls were still using these meadows through the end of October. Unlike what we generally found earlier in the fall (e.g., September 1991, 1997, 2002) , we found moderate-sized mixed-sex herds (20-80 individuals) on low elevation, south-facing, *Stipa*-dominated grasslands. It being quite dry this time of year, yak spatial distribution appeared related to water: most were located where yaks could either drink from creeks or the river, or eat snow. The largest single group numbered 170 individuals, and large groups were less common than we observed during earlier autumns. Probably because of the time of year (but perhaps because of increased disturbance, see below), yak groups appeared more mobile than earlier, and it was more difficult to determine which groups we observed were duplicates. I cannot estimate the total number of yaks we observed (and we also did not investigate all possible yak habitats), but we certainly observed no less than 500 individuals. It is not possible to compare this with our most recent count (~ 1,700 unique individuals observed in September 2002).

We did not count Tibetan wild ass (*Equus kiang*), and they move frequently and widely enough that counts are difficult to compare in any case. We observed ~ 200, mostly in the wide, south-facing, grassy valleys to the north of the main river. I saw a single white-lipped deer (*Cervus albirostris*), but we could easily have failed to find others (in 2002, most of the 110 or so white-lipped deer we observed were in a single, large group, which we might not have seen this time). I saw groups of blue *sheep (Pseudois nayaur*) on 3 different mountains (all in places where I expected to find them), totaling approximately 250 individuals. Because the filming was focused on lower habitats, we did not prioritize finding (or counting) blue sheep. We saw no chiru (Tibetan antelope, *Pantholops hodgsoni*), despite my spending 1 day extensively scanning the Jiazutashi Valley where most chiru were congregated in autumn 1991 (and which local guides believe acted as a winter range for chiru prior to the 1990s). They appear to remain extirpated from Yeniugou.

Human presence

We noted the presence of 15-20 pastoral encampments with herds of sheep/goats (with only 1, noted above, having domestic yaks). The number of pastoral encampments was similar to those observed during summer/autumn from the early 1990s through 2002. However, contrary to my expectation, encampments during late October and early November 2005 were not primarily located in the lower elevation, easterly portions of Yeniugou, but rather were dispersed widely, including a number in high (> 4,200m) elevation pastures. Whereas during the 1990s, all herds had moved at least as far east as Wulu Gou by late September, most encampments we observed in 2005 were west of Wulu Gou, including 2 in Jiazutashi (the western-most north valley), and 3 wintering near Hongshanbao. I observed new winter sites in almost all south-facing valleys, and also, for the first time, noted a number of spring lambing sheds (indicating that these herds wintered over, and used nearby pastures for spring lambing). (In the early 1990s, legal Mongol herders moved their herds out of Yeniugou during winter, although there was some trespass herding by Tibetans who summered south of Yeniugou). I also saw evidence in at least 2 places of temporary summer encampments in very high (> 4,500 m), fragile alpine sedge meadows, where I'd not previously seen pastoral camps. Some of these fragile areas had evidently lost vegetation cover entirely.

In short, although the number of pastoralists appeared similar to earlier years, by 2005 all pastoralists appeared to be living year-round in Yeniugou, using very high elevation pastures for summer grazing, and what I would earlier have assumed to be summer grazing areas for winter encampments. Many locations that in the early 1990s were used only by wildlife had, by 2005, become seasonal or year-round pastures for livestock. I did not document herd size, but they seemed large: the 3 pastoralists we had a chance to speak with reported flock sizes of 700, 1,000, and 1,400 sheep (including goats, which generally appeared to be < 10%). In contrast to the early 1990s, most pastoralists had either a tractor or a jeep for transportation. I hypothesize that easier camp movements allowed by the availability of motorized transport has facilitated these pastoralists moving to what earlier had been considered remote pastures. It is also possible that pastures used in the 1990s are now considered overgrazed, and a form of "pasture mining" is taking place.

I was unable to interview pastoralists (or officials in Golmud) to determine if these grazing patterns are sanctioned, or alternatively, represent extra-legal movements. I had been informed in 2002 that all pastoralist locations were being

regularized, and that winter homes were being built, primarily in the valley's lower elevations. Thus, in late October, I expected to see more grazing in lower elevations but less in higher elevations. It is possible that Golmud grazing officials have sanctioned these new pastures; alternatively, pastoralists may be using the newly regularized boundaries to "save" their mapped territories for reserve, and using "unclaimed" pastures when conditions permit. If so, this is clearly contrary to the intent underlying boundary rectification, which was to rationalize herd size by providing a known (but limited) amount of pasture for each family. Regardless, these year-round and increasingly high-elevation grazing patterns are of great concern for the future of such sensitive species as wild yaks, white-lipped deer, and argali. We were also told that plans exist to remove all pastoralists within 3 years' time (evidently as part of the larger, provincial "retire livestock, restore grassland" [tuimu huancao] program). Time will tell whether this occurs, and if so, whether the relocation program is sustainable.

Concluding comments

Yeniugou remains an important area for Tibetan plateau fauna, particularly wild yaks. With the exception of chiru (which have evidently not yet returned), it still retains all native species. However, argali seem to be increasingly rare, and other species would seem to be at risk of being increasingly marginalized as pastoral activities have expanded to include almost all habitats. Yeniugou is evidently still treated as "just another" grazing area by authorities in Golmud and Xining. A proposal to designate Yeniugou (along with Xiugou, a similar valley to the east) as the Kunlun Nature Reserve has not been approved by provincial authorities, but the tourism promoted by the proposal seems to be occurring anyway, encouraged by the Golmud Foreign Affairs Bureau. Considerable losses to biodiversity values have already occurred in Yeniugou, and the overall trend is toward additional loss. There is still time for management in favor of biodiversity in this unique and important area to reverse the trend, but a longer wait will make the job that much more difficult.

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Conservation News

Armenian Mouflon on Kabudan Island, Iran

Lake Urmia, the largest inland body of water in Iran, is situated in the northwest part of the country. Its name is taken from the city of Urmia located nearby, and the lake itself is a National Park due to its biodiversity value. The Lake contains 102 islands of various sizes, and on e of the largest (3125 ha) and most important is Kabudan island in the southwest part of Urmia lake. Kabudan is important mainly because it is home to 2000 – 2500 Armenian Mouflon (*Ovis orientalis gmelini*). This population probably represents the largest population in this mouflon's distribution which is in western and northwestern Iran, but the animals on the Island were introduced about 100 years ago.. Kabudan island has many mountains and hills that provide suitable habitat for these wild sheep. The highest mountain on the island is 1,500 m above sea level but only 225 m above the Lake's surface.

The Armenian mouflon on Kabudan island represent a unique population in comparison with other Iranian populations. This is due to the isolated provided by the island. The island is uninhabited by humans and so there are no competing livestock unlike most areas that wild Caprinae exist. Also there are no other human activities on this island that can destroy the mouflon's habitats. Further, because Kabudan is an island surrounded by an expanse of water, it is not easily accessible for hunters and poachers. As a result, the population is protected from most human activities. This island is visited by officials of Department of the Environment to protect the sheep and to deter poachers from landing by boat. Despite this protection, the Island's mouflon are smaller and lighter in weight than conspecifics in other parts of country, and this same condition is seen in Goitred gazelle (*Gazella subgutturosa*) in Khark and Kish islands in the Persian Gulf, as well as in other island ungulate populations around the world. However, because mouflon cannot migrate off the island to other areas, should the population increase, vegetation will be depleted and eventually this population will decline.

Due to the above limitations, Armenian mouflon on Kabudan have been managed in different ways over the years. Many years ago, two leopards (*Panthera pardus*) were introduced for natural control. This appeared to work for 10 years, but then the leopards died and population control was taken over by officials in the Department of the Environment. In addition, hunters are also allowed to legally hunt mouflons whenever the population is considered to be too large.

The Armenian mouflon on Kabudan can also be used to supplement other populations of this wild sheep in Iran or be used for re-introductions to areas of its natural habitats where it has been extirpated. The benefits of such management methods are that it both reduces the Kabudan population and at the same time provides animals to conserve the species in other areas of its native habitat.

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HIMALAYAN TAHR IN NEW ZEALAND

The Himalayan tahr (*Hemitragus jemlahicus*) was first introduced into the New Zealand Alps from Woburn Abbey, Bedfordshire, England in 1904, when the Duke of Bedford presented this country's government with 6 animals, 3 of each sex. Shipped from Plymouth in the month of April, they arrived at Wellington during May.

During the voyage, 1 male escaped and was lost overboard. The remaining 5 were quarantined on Somes Island in the Wellington Harbour, then liberated in the Mount Cook region, declared a national park.

By 1918 the herd was increasing considerably and one experienced alpine guide sighted one herd of 50 head. By this time, however, the herd had been supplemented by 8 animals, also from Woburn in 1909. A further 3 animals were purchased by the New Zealand Government Tourist Department and released in the Hot Lakes District in the North Island, an attempt to establish a second herd that ended in complete failure.

From all accounts the original animals introduced to Woburn Abbey were purchased from a wildlife agency and delivered there from India in 1897. Those animals dispatched to New Zealand 7 years later, however, were all born at Woburn.

The expanse of the New Zealand Southern Alps and the suitability of the habitat were responsible for the rapid increase in the population and as a consequence, the resulting spread to the north and south. Once hunting licences were issued, the remoteness and relative difficulty of access presented by the rugged rangeland, contributed to an increase of a population unaffected of course by predation.

All protection afforded introduced species was lifted in 1930. Over the next 3 or 4 decades, professional hunters employed by the government reduced the numbers in concert with a philosophy of eventual eradication. From 1939 until 1946, herds of wild animals increased and the environment, particularly certain native flora, suffered considerably. It has been estimated that between 50 and 70,000 tahr existed over this period and extended well into the 1960's.

My own hunting experience with Himalayan tahr commenced during this period of high population over the post war period. It was obvious to me that the numbers on the ground were far too high and both the environment and the animals themselves were not benefiting from the situation.

From the final few years of the last millennium to the present day, a much reduced population has evolved. The current population is between 8,000 and 10,000. The gene pool in New Zealand is the only remaining wild reserve outside the natural range of the Himalaya.

The Department of Conservation has declared exclusion zones to the north and south of the established range. The use of "Judas" animals carrying radio collars ensures that animals wandering beyond the designated range are shot from helicopters. The main body of the herd is controlled by both professional hunters and volunteer culling parties drawn from local hunting organisations, that concentrate on the removal of females.

Recently, commercial hunting concerns, with the goal of generating revenue, are cropping trophy males from the herd at an increasing rate. This may severely lower the required male gene pool.

The future of this important "reserve" gene pool of tahr is dependant on the application of good management principles. In New Zealand, the tahr is an important source of recreational value.

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Debilitating skin disease in Blue in Khunjerab National Park, Northern Area, Pakistan

In early December 1996, a Shimshali yak herder noticed that the wild Blue sheep (*Pseudois nayaur*), which share the high altitude winter grazings with the Shimshali herd of about 1000 yaks, near Sherlik on the Pakistan-Chinese border, were suffering from a debilitating and often fatal skin disease. The Blue sheep is classified as Vulnerable by IUCN.

In July 2000, a Canadian social geographer Dr David Butz, on a visit to Shimshal village on the southern edge of the Khunjerab National Park (KNP), was told "that many Blue sheep were dying at high altitudes of some as yet undiagnosed disease." The Shimshali herdsmen said that they had seen an estimated several hundred Blue sheep carcasses on some of the more remote high altitude meadows near Sherlik during the early summer of 2000. While healthy Blue sheep are very shy, sick Blue sheep become indifferent to human approach and Dr Butz was able to take some photographs of affected Blue sheep on the Pamir.

The herdsmen said that the disease did not appear to be seasonal and that it affected equally both sexes and all age groups. They considered that the Blue sheep population, which they estimated to be +/- 1,500, was declining as a result of the disease. The herdsmen suspected that the disease had originated several years previously among the Blue sheep population living across the Shaksgam river in China with which there is said to be some seasonal, cross-border interchange. They were very concerned that the disease would spread southwards in the Blue sheep population on their side of the international border and would infect their domestic animals at their summer settlements, south of the Shimshal Pass. Sympatric populations of Asiatic ibex (*Capra ibex sibirica*) and the Shimshali domestic sheep and goats (+/- 5000) and yaks (+/- 1000) do not as yet appear to be clinically affected.

Dr. Butz passed on this information to the then chairman of the IUCN/SSC Veterinary Specialist Group, Dr. M.H.

Woodford, who, in April 2001, visited Shimshal village with the help of the Aga Khan Rural Support Project (AKRSP) in order to discuss the implications of the Blue sheep disease syndrome with the Shimshali villagers.

For a variety of reasons it was not politically possible at that time to visit the Khunjerab National Park in order to carry out a diagnostic investigation. However in early 2005 it became possible to arrange for a sick Blue sheep to be shot by a Shimshali hunter and to be buried in a glacier to await the arrival on the Pamir of a diagnostic team.

In May 2005 two veterinarians (M. Woodford and K. Powell) accompanied by Dr. David Butz, and supported by 8 porters, made the difficult 4-day trek from Shimshal village (10,500ft asl) to the Blue sheep areas at Arbob Purien, Shuijerab and beyond (12,500 to 14000ft asl). Here, the previously shot Blue sheep, safely in "deep freeze", was exhumed and diagnostic specimens collected. The party then trekked back to Shimshal village and on by Land Rover to Gilgit and finally by bus to Islamabad, where the specimens were examined by kind permission of the Pakistan National Veterinary Laboratory. With the assistance of Dr Qurban Ali, a diagnosis of Sarcoptic mange was made.

Several possible veterinary interventions have since been considered for the possible treatment of the wild Blue sheep for their sarcoptic mange infestation. However, in view of the difficulty of access, the extremes of climate and the lack of biodata for the Blue sheep population, these possible interventions have been rejected for the present.

Since sarcoptic mange in wildlife is often associated with malnutrition, it is now proposed to arrange for an environmental study of the herbivore carrying capacity on the high altitude Shimshali Pamirs in the Khunjerab National Park. Concurrently the Shimshali herdsmen are being advised to inject their livestock biannually with ivermectin, an intestinal parasiticide and sarcopticide. It is hoped that this treatment will result in a marked improvement in the productivity of the domestic livestock.

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The beginning of the recovery of the Iberian wild goat *Capra pyrenaica* in the Pyrenees

In spite of the general increase in numbers and distribution of the Spanish Ibex also known as the Iberian wild goat or "bucardo", *Capra pyrenaica* (Granados et al. 2002), its Pyrenean subspecies *Capra p. pyrenaica* went extinct in 2000 (García-González & Herrero 2002) when the last individual was killed by a falling fir tree *Abies alba* (Fernández de Luco et al. 2000). Since then a project for the reintroduction of the species has been developed by the Fish & Game section of the Regional Government of Aragon, on the Aragonian Pyrenees in Spain, beginning in 2002 (Herrero & Prada 2002) with the identification of potential areas for its recovery. The main area suggested for a reintroduction is Guara Natural Park which was selected based on experiences of successful recoveries of the species elsewhere in Spain, where size, habitat suitability and level of protection had been found to be key to success. In 2003, the first inventory of large mammals in this area discovered the presence of free-ranging Pyrenean wild goats in the natural park (Herrero et al. 2006). These wild goats were coexisting with a large number of feral domestic goats *Capra hircus*, whose number was estimated to be around 697 in 1996 (Ebronatura 1996). During 2006, four total counts were made in the entire area occupied by the wild goats by the park rangers and ourselves, combining fixed points and walking surveys, during mornings and evenings, when wild goats are more active. A minimum of 54 wild goats were identified, although this is likely an underestimation. The origin of these animals is a fenced hunting enclosure from which animals escaped and established themselves outside. They were originally from the Sierra de Cazorla, in Andalusia, so belonging to the *hispanica* subspecies. Today the population seems to reproduce normally as indicated by the sex and age structure, and is slowly spreading to neighbouring areas. This population is now isolated from others, even if some solitary animals have been seen in other parts of the Pyrenees as a result of escapes or have been released originally to recover genetically the extinct Pyrenean subspecies. The population will be monitored as part of the ecological monitoring program of Guara Natural Park, so this preliminary information will be improved in the next few years.

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Abstracts

Maternal effects on post-weaning physical and social development in juvenile mountain goats (*Oreamnos americanus*)

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Abstract Little is known about maternal effects on post-weaning development, yet maternal effects may be important because maternal care could have long-term consequences only evident when offspring approach adulthood. We assessed the effects of maternal age, current reproduction (presence of a kid of the year) and social rank on the body mass, horn length and social rank of 1- and 2-year-old mountain goats (*Oreamnos americanus*). Maternal reproductive status and social rank did not affect the mass or horn length of either yearlings or 2-year-olds. Maternal age was positively correlated with yearling body mass for males but not females. We could not detect any maternal age effects on body mass of 2-year-olds. Maternal age and spring forage quality were positively correlated with horn length of yearlings of both sexes, but not for 2-year-olds. Juvenile females showed compensatory growth in mass between 1 and 2 years of age, but males did not. Neither sex showed compensatory growth in horn length. None of the maternal characteristics we examined affected directly the social rank of juveniles, which increased with body mass. Social rank in female mountain goats seems to be established early in life and maintained to adulthood. By affecting yearling development, maternal age could affect the reproductive success of males.

Behavioral Ecology and Sociobiology (2005) 58 : 237-246.

Characterization of 29 polymorphic artiodactyl microsatellite markers for the mountain goat (*Oreamnos americanus*)

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Abstract We report the results of a cross-species amplification test of 156 bovine, ovine, and cervid microsatellite markers in a wild population of mountain goats, *Oreamnos americanus*, inhabiting Caw Ridge, Alberta, Canada. Twenty-nine markers were found to be low to moderately polymorphic with between two to nine alleles per locus. Observed heterozygosity ranged from 0.14 to 0.85 for a sample of 215 mountain goats. This set of markers will be used in parentage analyses to construct the pedigree of the long-term studied population and to investigate the effects of individual genetic variability on life-history traits.

Molecular Ecology Notes (2005) 5: 809-811.

Population dynamics and harvest potential of mountain goat herds in Alberta

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Abstract: The understanding of population dynamics is a central issue for managing large mammals, and modelling has allowed population ecologists to increase their knowledge about complex systems and to better predict population responses to diverse perturbations. Mountain goats (*Oreamnos americanus*) appear sensitive to harvest, but the relative influence of survival and reproductive rates on their population dynamics are not well understood. Using longitudinal data on age- and sex-specific survival and reproduction from a marked mountain goat population in Alberta, we built a stage class matrix model and used it to predict short-term numerical changes for 11 other goat populations in Alberta for which the only data available were from annual aerial surveys. Overall, the model provided an acceptable fit to changes in population size for 8 populations out of 12. Temporal trends in population size were underestimated in 2 populations and overestimated in another 2, suggesting that these populations had different vital rates than those of the intensively studied population. Sensitivity analyses revealed that the survival of mature females (aged 5 years and older) had the greatest elasticity for population growth. Modelled management scenarios indicated that non-selective yearly harvest rates above 1% of goats aged 2 years and older were not sustainable over the short-term for some populations. The simulations also revealed that small (n = 25) and medium-size (n = 50) populations, which correspond to the majority of goat populations in Alberta, had high extinction risk (18 to 82% over 40 years) even in the absence of harvest. Our results confirm that mountain goat populations are very sensitive to harvest, indicate that female harvest should be prevented, and suggest that even though there is a high demand for goat hunting in Alberta, most populations in this province, and probably small populations elsewhere too, cannot withstand any exploitation.

Journal of Wildlife Management, in press.

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Editorial Note

Views expressed in the articles in this newsletter, do not necessarily reflect those of the Caprinae Specialist Group

The role of peripheral populations in a strategy for the conservation and restoration of argali

[This article is a summary of a longer unpublished manuscript by the same authors, August, 2006]

Field research of northern peripheral populations of argali (*Ovis ammon ammon*) in Russia (1991, 1997, 2000, 2002-2006) and Mongolia (1995, 1997), and analysis of published (1972-2005) indicates a difference in the sex structure between the number of adult males in what we term "island" and "mainland" populations (Figures 1, 2). In "island" populations (1,017 individuals observed), the ratio of adult males:adult females was 50.6% and in the "mainland" (881) 32.6%. Populations from Mongolia, investigated by others (Shanyavskii 1976, Dzieciolowski et al. 1980, Davaa et al. 1983, Zhirnov & Ilyinsky 1986, Amgalanbaatar 1993, Valdez & Frisina 1993, Lushchekina 1994, Reading et al. 1997 - all cited in Reading et al., 1997; and Maroney 2003), show the predominance of "island" populations with the proportion of males from 43.5-56.4% in the Gobi Altai, and 34.5-45.8% in the Mongolian Altai. There are only 2 "mainland" populations, one studied by Reading et al. (1997) in the Southern Gobi (males 6.9-29.0%), and another by Maroney (2003) in the northern Mongolian Altai (males 21%).

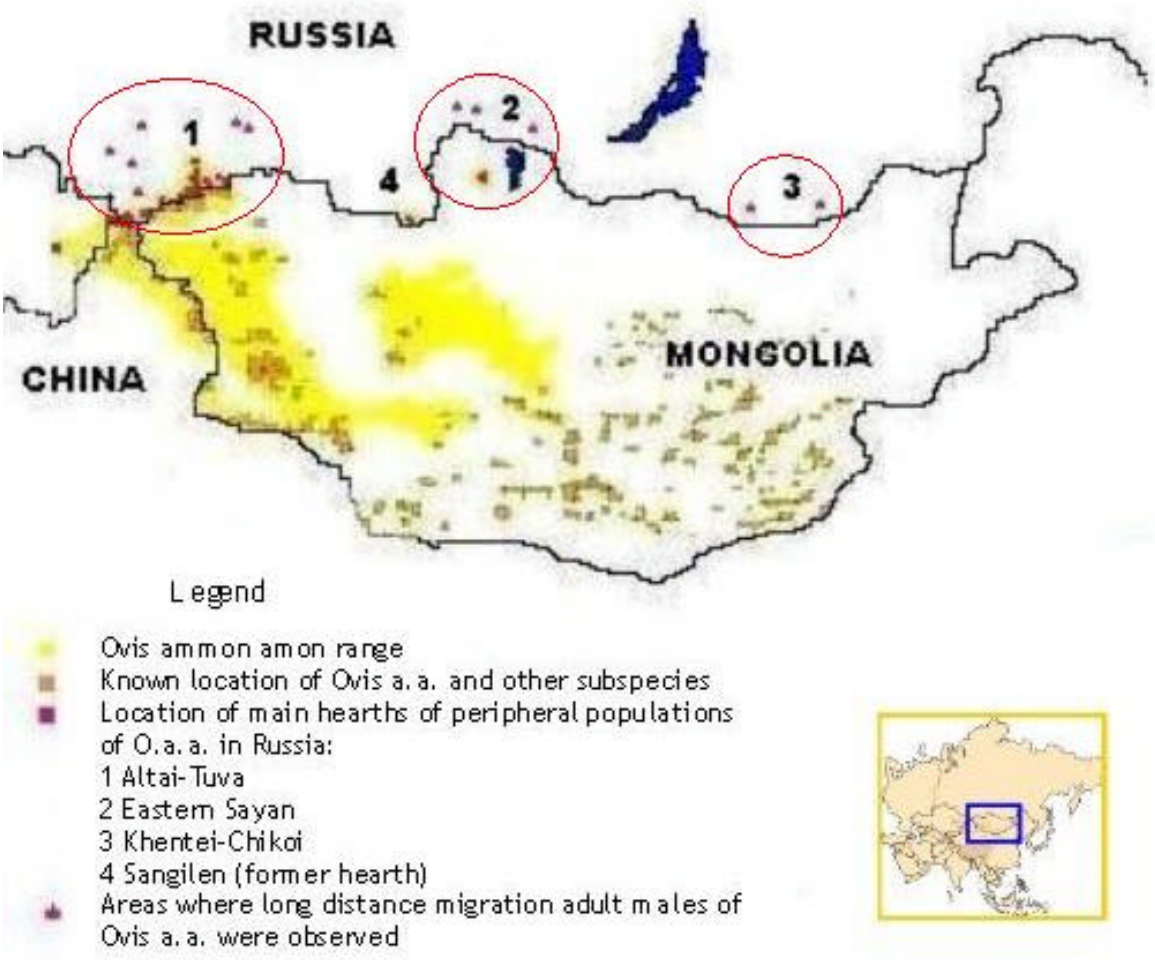

Figure 1 Present argali range and location of northern peripheral populations (modified from Maroney 2003, 2005 with our additions)

In Russian territory, only the "core" of the Sailyugem population from the basin of the Chagan-Burgazy and Ulandryk rivers, belongs to the "mainland" type; the winter population is between 80-140, and in summer 300-400 individuals (Figure 2). The other populations in the northern periphery of the range, we consider to belong to the "island" type and believe that they represent peripheral populations (*sensu* Lomolino & Channell 1995, Altukhov 2003, and Bunnel et al. 2004). Their winter number range between 310-420 individuals and display a latitudinal direction distribution:

- 112-165 (average proportion of all "island" populations = 38.2%) between 49^0 - $49^0 50'$ N – on borders of Russia, Mongolia, Kazakhstan, and China
- 137-183 (44.3%) – along 50^0 N.
- 57-70 (17.5%) – along $50^0 30'$ N (Figure 2).

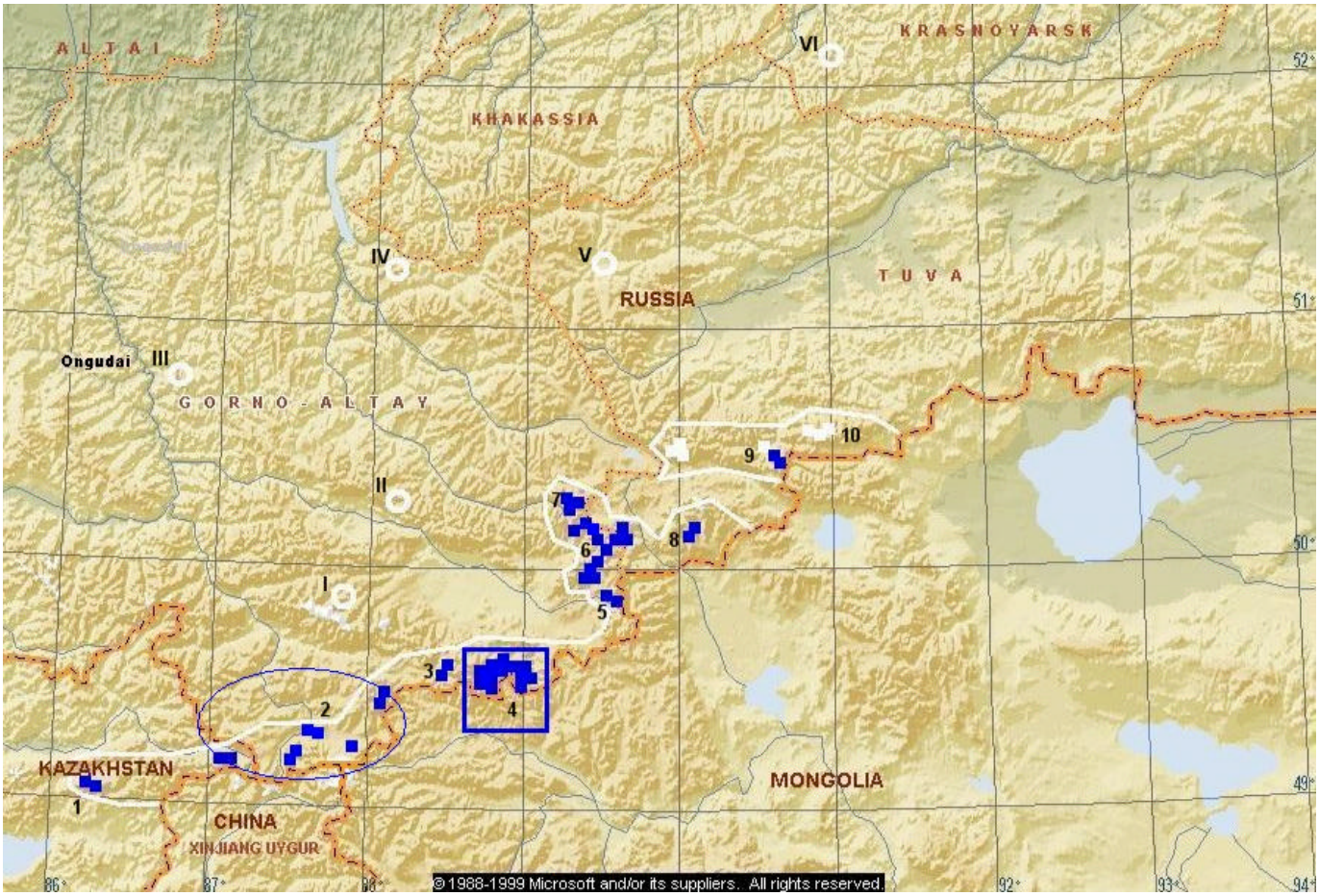

Figure 2 Peripheral populations of argali and areas of long distance migrations of adult males in Russia
Legend: White line - boundaries of the northern periphery of the range. White circles – areas of long-distance movements of adult males (accompanied by Roman numerals). White squares – disappeared groups, Blue squares – existing (accompanied by Arabic numerals). One square is equal to average number of argali in ten individuals.

"Island"populations:
1 – Kazakhstan: Kurchumsky and Azutau Mountains; **2** – Ukok Plateau: all groups countured by ellipce and include one group in boundary territory of Kazakhstan; **3** – basin of Tarkhata River; **5** – Boguty Plateau near southern edge of Chikhachev Mountains; **6** – Chikhachev Mountains and Talduair Massiff; **7** – Chulyshman Plateau (basin of Bogoyash River, Altaisky zapovednik) near northern edge of Chikhachev Mountains; **8** – Mongun-Taiga Massiff; **9** – Tsagan-Shibetu Mountains (population in eastern part supports, probably, by immigrants from Mongolia); **10** – western Tanu-Ola Mountains.

"Mainland" populations:
4 – the only "mainland" population of argali in Russia; has the strongest connection with Mongolian core (Chagan-Burgazy - Ulandryk – Bor-Burgazy-Gol);
I – southern Chuisky Mountains: two groups of argali were observed here in August 2003;
II – Kuyuktalar River in Kuraisky Mountains: male argali were observed in Spring 2002;
III – approximate area near the Ongudai village: a male argali was poached here in December 2003;
IV – area near Teletsky Lake: argali were observed in 1962 and 1991;
V –Khemchik River basin;
VI – basin of Kantegir and Urbun Rivers.

The average diameter of 10 "island" core areas of the northern periphery is 23 km, and the average distance between them, 48 km (Figure 2). Another 3 core areas (Sangilen Mountains in Tuva; Western Hovsgool Mountains in Mongolia; and Khentei-Chikoi Plateau in Russian-Mongolian boundary territories) are located 300-600 km from the nearest centers of potential argali immigration in the Khangai Mountains (Figure 1).

From to 1960s to 2000s, individual argali that migrated long distances were observed far to the north of the previously known boundary of their range; in central and eastern parts of the Altai Mountains, south of the western Sayan Mountains, west and south of the eastern Sayan Mountains, and south-west of Transbaikal (Figures 1, 2). The assumed distances of migrations is 200-600 km. Migrating individuals were predominantly adult males (N=20), and half were single individuals. The number of single-males argali, observed in last decades in most northern "island" core in Chulyshman Plateau (Altaisky zapovednik, Russia) is equal to 1% (derived from data of Irina Filus, 1992); in the "mainland" population in Mongolia, 0.1% (derived from data of Alexander Fedosenko, 2000) – Figures 1, 2. This difference could be due to the fact that most migrating argali are males attracted to the small "islands".

The assumption that the peripheral populations of argali in Russia have higher sustainability is confirmed by available data. From 1970s to the present, the number of argali in the "mainland" core in Mongolia declined by a factor of ten: from between 40- 30,000 to 5-3,000 individuals or less (Reading et. al., 1999; Fedosenko, 2000; Abaturov et. al., 2004; Tserenbataa et. al., 2004). However, the number of peripheral "island" populations in Russia declined by a factor of two (Figure 3): from 700 to 350 individuals (Sopin, 1975, 1977; Sobansky, 1990; Kashkarov et al., 2006, unpublished data). There is no Russian management plan for the conservation and restoration of these northern populations Altai Mountain Sheep, so they continue to be under a threat of extermination.

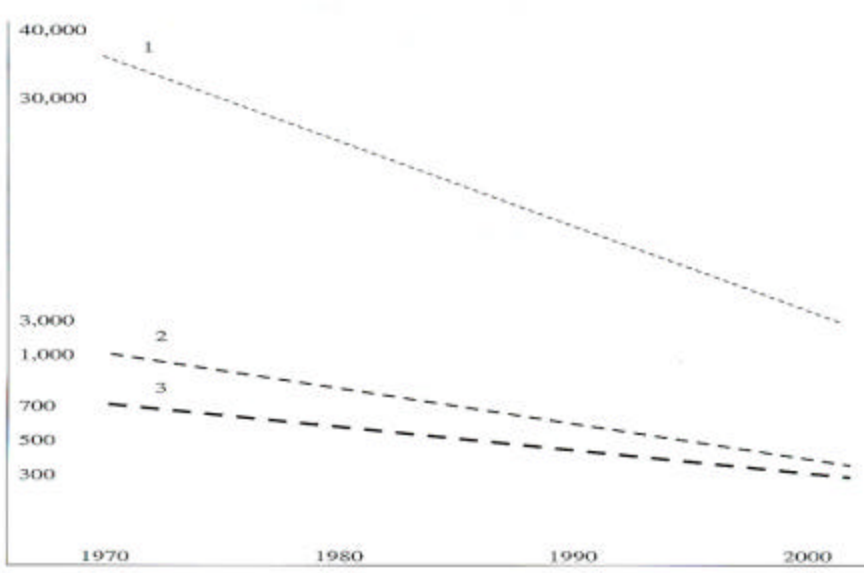

Figure 3. General decline of the argali population in Mongolia (1), Russia (2), and in northern, marginal part of the species' range in Russia, Mongolia, and Kazakhstan (3). There are no accurate data to reflect population dynamic by year (see references in text).

A clearly negative condition exists for argali in the main part of its range in Mongolia where it is highly fragmented (Mallon et al., 1997; Reading et al., 1997; Maroney, 2005) (Figure 3). We assume that the higher number of migrating adult males from Mongolia to Russia is not only due to an intra-population mechanism, but also to pressure from intensive trophy and illegal hunting along with by higher densities of livestock. Despite their higher sustainability, peripheral populations have only adapted to resist extreme changes in nature, not to human pressures. The pressure of both natural and anthropogenic factors is probably currently too high for the peripheral populations. We suggest that the main goal of an argali conservation strategy is to stop range fragmentation in all 4 countries within the subspecies' distribution (Russia, Mongolia, Kazakhstan, China). With low numbers of both "island" and "mainland" populations and the growing isolation between groups, fragmentation will lead to extermination.

It is important to note that peripheral populations in general often contain the most genetically pure lines, have the smallest "genetic burden", and harbor the highest adaptation potential to extreme ecological conditions (Chetverikov, 1926/1961; Altukhov, 2003; Lomolino & Channell, 1995; Bunnel et al., 2004). In the recent past, it was just such peripheral populations that more than once permitted many species to rebound after passing through a "genetic bottleneck" caused by various geological or climatic events (Kurtén B. 1968; Dynamics of Extinction, 1986; Quaternary Extinctions, 1986) or recently – from human influence (Ustinov, Dvoryadkina, 1989; Smirnov, 1994; Koshkarev, Vyrypaev, 2000; Couvet, 2002; Koshkarev, 2002; Altukhov, 2003; Baranov, 2005). Clearly peripheral populations have an important role in any conservation strategy for rare taxa.

Critical conditions for selecting "pure lines" can be traced to Russia at its borders with Mongolia, Kazakhstan, and China (Figure 1). These areas coincide with the natural boundaries of steppe and taiga communities, and with them, the range boundaries of characteristic steppe and taiga species. Along the southern boundaries of Russia, other species that have declined to the edge of

extinction are: Mongolian gazelle (*Procapra gutturosa*), saiga (*Saiga tatarica*), Asiatic ibex (*Capra* [*ibex*] *sibiricia*), musk deer (*Moschus moschiferus*), snow leopard (*Uncia uncia*), common leopard (*Panthera pardus*), Amur tiger (*P. tigris*), red wolf or dhol (*Cuon alpinus*), Himalayan (*Ursus [arctos] thibetanus*) and brown bear (*U. arctos*), marten (*Martes flavigula*), sable (*M. zibellina*), Pallas' cat (*Otocolobus manul*), Tolai hare (*Lepus tolai*), Mongolian and gray marmots (*Marmota sibirica* and *M. baibacina*), and many others. The threat of the loss of genetic diversity from animals along Russian border areas has increased sharply over the past decades> During this period, numbers of not only rare, but also common species of animals, have decreased by 70-90 %, while demand for these species has grown dramatically on black markets in China and neighboring countries (Ustinov & Dvoryadkina, 1989; Koshkarev & Vyrypaev, 2000; Koshkarev, 2002; Danilkin, 2003; Mamontov, 2005; Khramtsov, 2005). At the same time, sustainable captive populations of argali, dhol, Caucasian leopard, Sailyugem bear, Mongolian gazelle, saiga, ibex, and others do not exist, so reintroductions are not occurring. We are in danger of losing peripheral populations of argali in Altai, Tuva, and western Hovsgul in exactly the same way as we already lost them in the Transbaikal, Eastern Sayan, Sangilen Plateau, Tannu-Ola, and Tsagan-Shibetu (all of last 4 areas are in Tuva). Argali living in the eastern part of Tsagan-Shibetu (Abaturov et al., 2004; see Figure 2) have probably recently emigrated from Mongolia.

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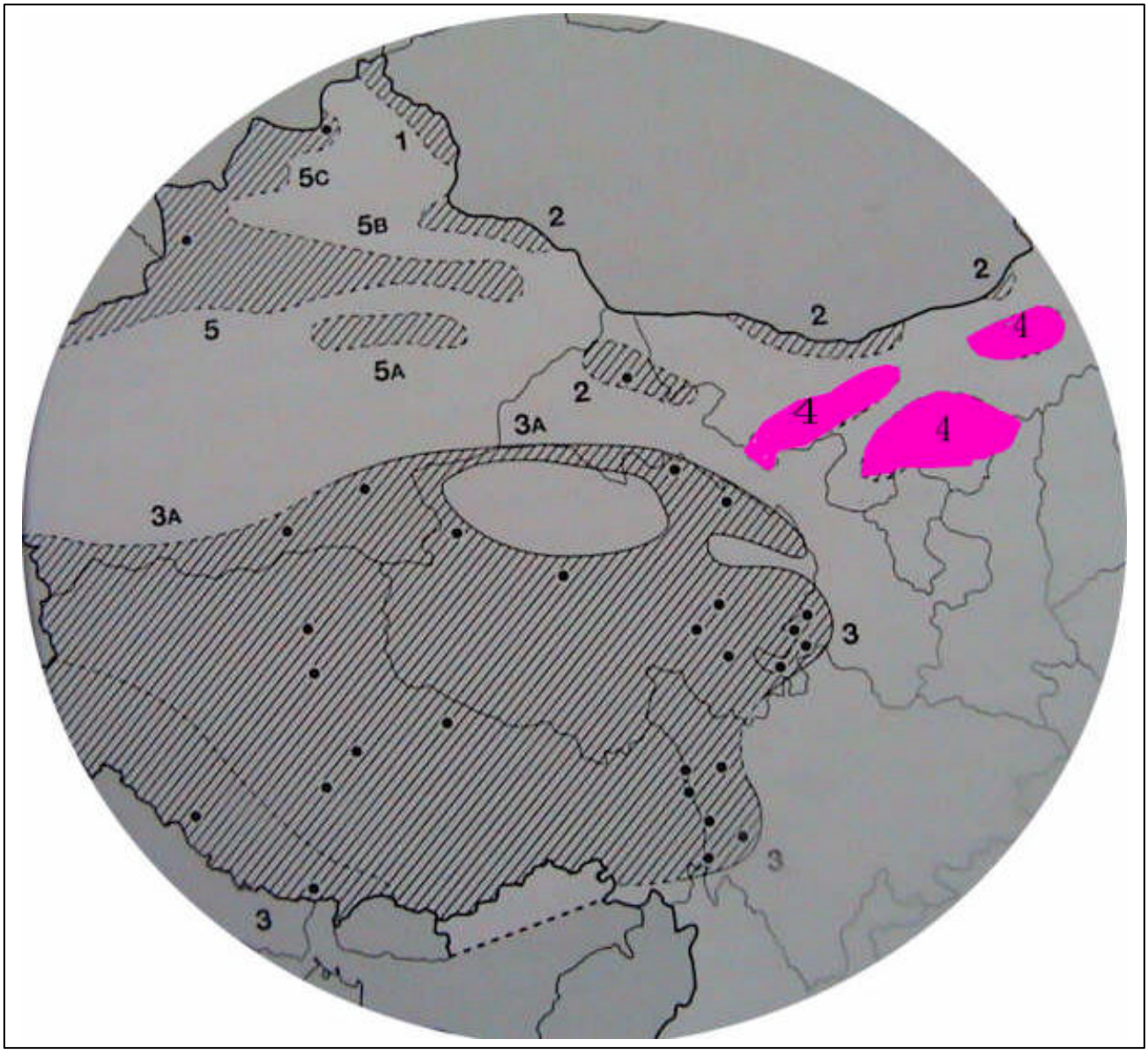
A documentary film about argali in Russia, 2006, is available at: Igor' Ishchenko skarabei05@mail.ru



Revised map of distribution (4) of *Ovis ammon jubata* in China (from A. Abutalip, Wildlife Protection Office Akhsay Khazakh Autonomous County, Gansu Province, P.R..China; E-mail: abutulip_ali@hotmail.com) For additional details please see IUCN Caprinae Action Plan.