ON THE STATUS AND BIOLOGY OF THE WILD GOAT IN DAGHESTAN (RUSSIA)

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Abstract - Wild goat (*Capra aegagrus*, Erxleben 1777) was studied in Daghestan,which includes about 2/3 of the isolated North Caucasian part of the species range. The species distribution covers the upper halves of the Avar Koisu and Andi Koisu riverbasins. Wild goats inhabit montane forests partly sharing them with the East Caucasian tur (*Capra cylindricornis*, Blyth 1841). Population density averages 8-10 animals per km^2. Not less than 1500 wild goats live in Daghestan and presumably have been in decline during the last decennaries. Overall mean group size is only 3.3 (± 0.2 s.e.). Rut lasts from mid-December till the end of January, while birth season takes place from mid-June till mid-July. Both reproductive periods are the latest ones all over the species range and partly overlap with those of the sympatric tur. Twins are common and fecundity is noticeably higher than in other conspecific populations and in tur. Wild goats live in close and constant neighbourhood with people in Daghestan and undergo heavy anthropogenic impact which could have shaped the biology of the local wild goat population characterized by intensive reproduction, preference of dense forest stands and secretiveness.

Key-words: Wild goat, *Capra aegagrus*, Daghestan, distribution, fecundity, population density, reproduction, anthropogenic impact.

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1. Introduction

Daghestan is *terra typica* of the wild goat (*Capra aegagrus*, Erxleben 1777), but, despite this fact, wild goat remained almost unstudied in this country. Basic data on distribution, morphology and biology of wild goat in Daghestan were provided by Dinnik (1910) and Heptner & Formosov (194 1). Prilutskaya & Pishvanov (1989) presented more recent material on distribution and population density, though evidently based on poll information. The only contemporary research on this species in neighbouring Chechnya was conducted by Batkhiyev (1989).

My aim was to add knowledge on the status and biology of wild goat in the North Caucasus.

2. Methods

Six trips to the riverbasins of Avar Koisu and Andi Koisu Rivers were accomplished in 1990 and 1995-97. The total duration of field studies was 64 days, during which 500 animals were encountered (many of them repeatedly). I used 12x40 field binoculars and a 30-60x spotting scope for respectively finding and observing animals that could be seen from dawn till 9h00 and after 18h00. in summer and spring. Wild goats usually quickly crossed forest meadows and other openings, barely leaving time for spotting them, and for determining age and sex classes. In winter, goats were active all day long with peaks in the morning and afternoon, less secretive, and easier to observe.

The following age and sex classes were distinguished: kids, yearlings of each sex, adult females, young males 2-3 years old, young males 4-6 years old, and fully adult males older than 6 years.

Often it was possible to tell the age of males to an approximation of a year thanks to knobs on the front keel of the horns which developed from the second year onwards and were situated at the boundaries of the annual segments. These knobs usually merged together and got indistinguishable from 8-9th segments onwards.

3. Results and Discussion

3.1. Description of the animals

i. Kids

Kids are grey in summer, greyish-yellow in winter. They have dark stripes on the face (along the forehead and stretching from eyes to nose), and on the frontal surfaces of the legs. The underside of the body and the inner sides of the legs are white or dirty-white in all animals, regardless of sex, age and season. Even in winter, horns of the kids are hardly longer than the ears.

ii. Females
Yearling and adult females are sandy-chesnut or fawn in summer and greyish-fawn in winter. In addition to head and leg stripes, females have also a narrow stripe along the spine in all seasons. Yearling females are smaller than adults and their horns are only slightly longer than the ears.

iii. Yearling males
Yearling males are redder or darker than females in summer, with the same pattern of stripes. They turn greyer in winter and display a vague flank stripe. Other stripes in the winter coat are the same as in the summer coat. The beard of yearling males is inconspicuous. Yearling males are smaller than adult females. In winter, the horns of yearling males are twice as ong as the ears, and are more sharply bent and wider at the base than in females.

iv. Males 2-3 years old
Young 2-3-year-old males are fawn in summer; the stripes on the face are indistinct, while those on the legs are more distinct and contrasting than in the previous classes. In winter, these males are greyish-fawn, while the head gets darker; they display narrow and distinct stripes on the legs, along the spine, and broad and less definite stripes on the flanks and across the shoulders. The flank and shoulder stripes are lacking in the previously described classes, as is a small but noticeable beard.

v. Males 4-6 years old
Young 4-6-year-old males are greyish-fawn in summer, with stripes on the legs, flanks and along the spine. In winter, they are sandy-grey, with black stripes and there is a black mane on the neck and the withers. The head and the conspicuous beard are black in all seasons.

vi. Adult males
Adult males are sandy-grey in summer, with leg, flank, shoulder and dorsal stripes. They are silvery-grey in winter, with a contrasting pattern of connected black stripes on the legs, shoulders, flanks, along the spine (mane) and throat. The chest and the head are black too.

Thus, the coloration pattern develops with age in males, adding new stripes, and getting more contrasting. Adult wild goat males in winter coat are the most contrastingly coloured and conspicuous ones of all age classes. This regularity is quite general for all *Capra* (Veinberg, 1993). On the whole, wild goats of the North Caucasus practically do not differ in coat coloration from Turkmen (collection of Zool. Institute in St. Petersburg) and even Sind (Schaller & Laurie, 1974) conspecifics.

3.2. Distribution
My data support information presented by Dinnik (1910) and Prilutskaya & Pishvanov (1989) indicating that wild goats inhabit upper parts of the Avar Koisu and the Andi Koisu riverbasins (Fig. 1), forming practically the only population in highland Daghestan, where considerable forest areas still remain. Avar Koisu and Andi Koisu flow from the northern slope of the Greater Caucasus and join with Karakoisu and Kazikumukh Koisu rivers into Sulak River. draining into the Caspian Sea.Wild goat distribution encompasses the northern slope of the Watershed Range and the Side Range, both composed of crystalline rocks. Wild goats do not inhabit the southern slope of the Watershed Range. The western part of the Andi Koisu population occurs outside Russia, on the Georgian territory. The whole range covers about 2000 km^2 between 45°45' and 46°40' E, 42°00' and 42°30'N, but the actual area populated by the animals is much smaller due to peculiarities of the habitat (see below). Nevertheless, Daghestan includes about 2/3 of the species range at the North Caucasus, the rest being in Georgia and Chechnya. All this range is totally isolated from the Transcaucasian one.

3.3. Habitat and Habitat use
i. Habitat
The valley bottoms lie at 1000-1500 m a.s.l., and some ridges rise up to 4000 m a.s.l. Ridges are often composed of shale, so they are usually broad and quite rolling, whereas the valleys of

the rivers and bigger brooks are narrow and canyon-like. However, the upper ends of the valleys are wider and less steep. At the altitude of 1500 m a.s.l., the mean monthly temperature is about –6°C in January and + 16°C in July, and the total yearly precipitation is about 600-750 mm. Most of the precipitations (up to 60%) occur in spring and early summer (Himmelreich, 1967). Spring and summer are thus warm and quite rainy, autumn and winter being dry and mild. The precipitations increase towards the Watershead Range, and usually only there forms a stable and thick snow cover on the lower portions of the slopes in winter.

Wild goats inhabit only montane forests (not shrubbery) from the valley bottoms up to the timberline (2600-2700 m a.s.l.). The forest zone is represented by narrow stripes (up to 1.5-2 km wide) along the rivers and bigger brooks due to the steepness of the slopes. Therefore, the wild goat distribution generally follows the fluvial net. Animals prefer steep, precipitous slopes and avoid tall, dense stands on gentle slopes or tree-less areas. These peculiarities of habitat use have probably caused the present actual isolation of local populations inhabiting different riverbasins separated by high ridges (Fig. 1).

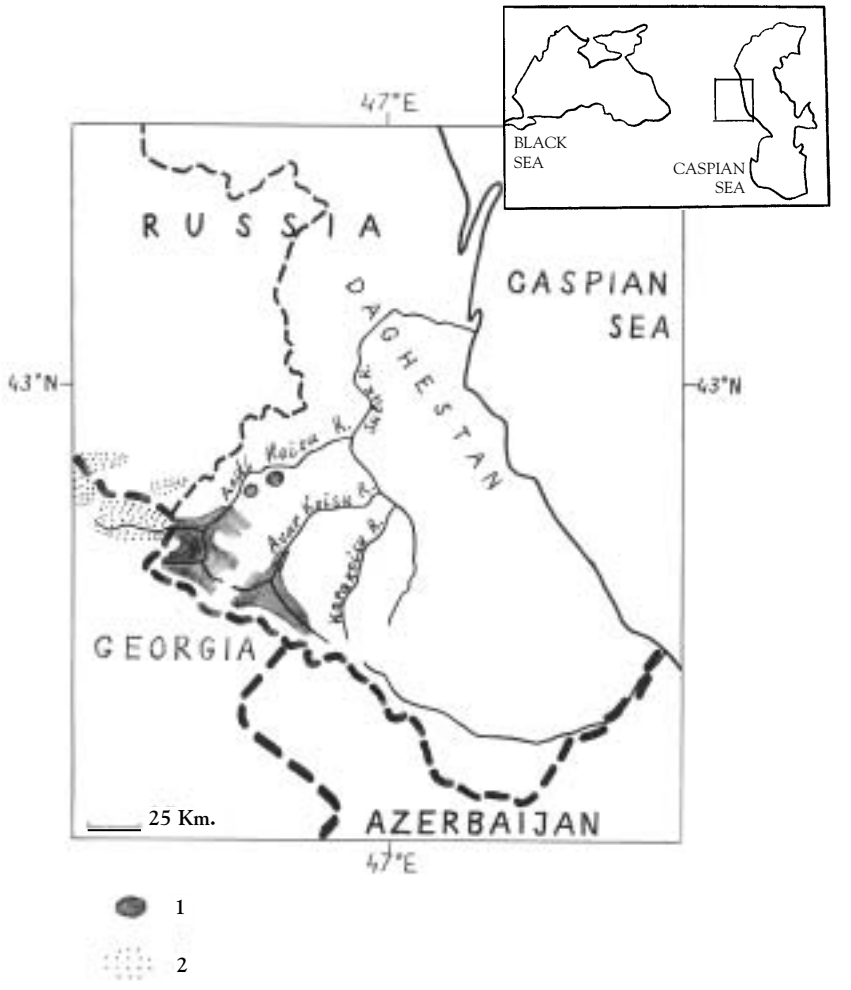

Fig.1 Distribution of the wild goat in the North Caucasus (1 - in Daghestan, 2 - in Chechnya and Georgia, presumable)

The montane forests are composed of pine *(Pinus kochiana= P. sosnowskyi)* and birch *(Betula litwinovii)*, with a mixture of aspen *(Populus tremula)*, beech *(Fagus orientalis)*, hornbeam *(Carpinus caucasica)*, lime-tree *(Tilia cordata)* and oak *(Quercus macranthera)*. The forest floor is of grasses, sedges, and herbs. *Spiraea crennata* shrubbery usually covers openings on sunny slopes. Precipitous southern slopes near valley bottoms often harbour small patches of xerophytic open stands of oak, pine and tree-like juniper (*Juniperus communis up* to 6 m high) in various combinations with understorey of *Berberis vulgaris, Paliurus spina-christi, Rosa sp.*, and *Spiraea sp*. Spikey cushions of *Tragakantha sp*. are very characteristic of such stands.

ii. Habitat use

Observations in different seasons indicate that animals do not perform altitudinal migrations, remaining within the same and relatively narrow forest area throughout the year. Even in summer, wild goats were only twice observed rising above the timberline, while in winter they do not approach it at all. Nevertheless, local hunters informed me that males do wander in subalpine and even alpine areas, occasionally even crossing some ridge in search of females. Even if they inhabit high mountains, wild goats lead a life which is typical of *Capra* sp. in low mountains or hills, such as conspecific populations in some places of Turkmenistan (Heptner, 1956) or such as Siberian ibex (*Capra sibirica* Pall.) in the Western Sayan (Fedosenko *et al.*, 1992). Winter movements to sunny slopes are not evident either, because these places are populated by humans. In these areas, wild goat habitat has been destroyed to a great extent.

Sexual differences in ecological distribution, so readily displayed by the East Caucasian tur (Veinberg, 1981), are weak in the wild goat, due to the peculiarities of the habitat shown above, but they do exist nevertheless. In spring and summer, 84.1 % of adult males (N= 44) and only 20.0% of females (N= 90) were observed closer to the timberline, than to the valley bottoms ($P<0.001$, Chi-squared test). Consequently, males avoid places where man has lowered timberline. Human settlements and agricultural lands have often replaced the upper part of the forest zone, and merely a narrow stripe, 300-500 m wide, has remained along the bottom of the valley. Only females and young inhabit these forests, while adult males apparently visit them during the rut season. Thus, there does exist a partial ecological and, occasionally, even a spatial segregation between the sexes.

Wild goats share their habitat with several ungulate species, namely the East Caucasian or Daghestan tur, the roe deer (*Capreolus capreolus* L.), and the wild boar (*Sus scrofa* L). Tur are the main and most numerous ungulates in montane Daghestan and they live mostly above the timberline, but somewhere they dwell in forest all around the year, and not only during the winter season. They usually use the upper parts of the forest area, preferring more open and precipitous sites or more humid slopes. Nevertheless, wild goat and tur sometimes use the same area for feeding and they can be observed at close distances from each other. On the whole, wild goats outnumber tur substantially in the forest area (Tab. 1), and the ecological segregation between these species reminds that described in markhor (*Capra falconeri* Wagn.) and Siberian ibex (*C. sibirica* Pall.), in the northwestern spurs of the Himalaya (Schaller, 1977). No overlap between chamois (*Rupicapra rupicapra* L.) and wild goat distribution is recorded in Daghestan. The two species seem to be sympatric only in the northern slope of the Watershed Range, but chamois inhabit this area in small numbers. Nevertheless, I have never seen chamois there.

3.4. Population density

As a forested precipitous slopes dweller, wild goat cannot be censused by traditional methods. This explains the very rough estimates and the absence of any data about population density in Daghestan. In December 1995, dur-

Tab. 1 - Number of observed wild goats and tur in montane forests of Daghestan

Season	Number of animals observed		Wild goat/ Tur
	Wild goat	Tur	
May - Aug.	380	56	6.8
Oct. - Jan.	291	40	7.3

ing the pre-rut and rut seasons, I performed semi-stationary (2-3 days long) observations on short sections of Avar Koisu canyon. As a result, 133 animals were counted in a 9 km long part of the canyon, quite representative of the typical wild goat habitat, that harboured several villages, small farmhouses and agricultural lands. Since the mean width of the forest stripe along the canyon was about 1.8 km (*see § 3.3.i*), the censused area covered approximately 16 km^2, and this involves a population density of about 8 goats/ km^2 (including human landscape). Thus, the total length of the canyon (24 km) may harbour about 350 goats. These data should not be extended over the whole riverbasin, because the ecological conditions along Jurmut and Khsanor Rivers, joining into Avar Koisu River, are different and probably worse. Therefore, I estimate that only about 300 animals lived along the Jurmut and Khsanor rivers, even if the length of these rivers and those of their main tributaries more than twice exceed that of the Avar Koisu canyon. So, the total number of goats in the Avar Koisu riverbasin may be estimated around 650-700 individuals.

In May 1996, 183 animals were counted in 5 areas of the Andi Koisu riverbasin. Total area of the plots was 15 km^2, and the average population density reached 12 animals/km^2. Following this data and considering that only one side of each valley was forested and inhabited by wild goats, the valley of lower Motmota River, the biggest tributary of Andi Koisu, might harbour about 250 goats. About the same population might inhabit a similar section of the Koisu valley, stretching from the Georgian border to the joining with Motmota.

Considering that the total number of wild goats in the Daghestan part of Andi Koisu riverbasin were presumably just below 800 animals, the whole Daghestan population can be estimated to be of about 1500 goats in 1995-96, and this estimate is a rather cautious one.

According to Prilutskaya & Pishvanov (1989), there were 800-1,000 wild goats in Daghestan in the second half of the 1980s. These data are the closest ones to my estimates.

If we consider that, according to unanimous opinion of local highlanders, wild goats were clearly more abundant 10-15 years ago, it should be admitted that these animals are really hard to see and therefore seem to be very rare. Actually, wild goats are quite common within their range, and the relatively restricted size of the total population is the consequence of the limited extension of the suitable areas.

3.5. Reproduction, sex and age structure of the population

i. Reproductive periods

According to my observations, carried out in 1995, in Avar Koisu riverbasin males started courting females as late as the half of December, but, in this period, they were quite inactive.

It is a common notion that the peak of rut begins just before the end of the year, but unfortunately, during two years, I could not do any observations in this period. In 1997, the rut ranged until January 21 (Tab. 2) but it was as slack as the previous one, and many males (adult ones too) did not keep their tales lifted, though even yearling males occasionally courted females. The peak of rut might have been missed in both seasons, but weak courting could be possibly caused by a weak competition between males, due to the low number of adult males in the population of the Avar Koisu canyon (Tab. 3).

The courtship repertoire did not differ from that recorded in other Caprinae (Schaller,

Tab. 2 - Rutting and birth seasons of the wild goat in different parts of the species range

Location	Rutting season	Birth season	References
Daghestan	Nov./ Dec. Mid-Dec./Jan.	May/June Mid-June/mid-July	Dinnik,1910 This study
Chechnya	Mid-Dec./ beginning of Jan.	-	Batkfflyev, 1989
Tushetia (Georgian part of Andi Koisu riverbasin)	Mid-Nov./mid-Jan. (varying through the years)	Mid-April/end of June (varying through the years)	Ekvtimishvili, 1954
Caucasus Minor (Armenia and Azerbaijan)	Nov./Dec.	End of Apr./May	Dahl, 1954; Kuliev, 1981
Kopet-Dagh (Turkmenistan)	Nov./ mid-Dec.	End of Mar./early May	Korshunov, 1994
Sind (Pakistan)	Aug./Oct.	Jan./Apr.	Shaller, 1977

1977; Veinberg, 1984; Fedosenko *et al.*, 1992) and included: guarding, low-stretch, naso-nasal and naso-genital contacts, kick, twist, jerk, urination (or ejaculation), tongue-flick. No behavioural analysis is presented because of the lack of data, due to low activity of the animals during the observed rutting season.

Corresponding to the late rut, the birth season was late too. In 1995, I observed pregnant females on June 24-25 and first new-born kids on June 30. Thus, in Daghestan, the birth season probably ranges from mid-June to mid-July. Both rut and births are the latest ones all over the whole of the species range (Tab. 2). Late reproduction in this area, which is the northernmost limit of the range of wild goats, may be due to the sensibility of new-borns to low temperatures and snowfalls in spring. On the other hand, a long vegetative period, ranging from April to September, allows late births, since kids have enough time for growing up and gaining weight before winter.

ii. Fecundity and other demographic parameters

Females wild goat may give birth at the age of 2 years, but the evidence of this fact is slight. Twins are common and triplets may occur. Twinning is common in wild goat all over the species range (Schaller, 1977; Kuliev, 1981; Korshunov, 1994). It is characteristic of taxa inhabiting arid and warm environments, with low and unpredictable vegetation production (Schaller, 1977). In most of the Caprinae populations inhabiting boreal mountains, females give birth to singletons, like tur in Daghestan, (Couturier, 1962; Kotov, 1968; Abdurakhmanov, 1973; Veinberg, 1984; Fandos, 1989). Generally accepted explanation of this phenomenon is that twins are smaller at birth, grow slower, and have less chance surviving harsh winters. Therefore, the essentially thermo- and xerophilous wild goat is peculiar in having retained a high twinning rate in boreal mountains of Daghestan.

Regarding my observations, 4 females (out of 11 followed by new-born kids) had twins in the end of June-beginning of July 1995, and 6 females (out of 8 with offspring) had twins in August 1990 (there was one orphan). Some females manage to keep both kids till the following spring.

The high fecundity showed in the Daghestan population (Tab. 3), considerably exceeding fecundity recorded in other parts of the wild goat range (Schaller, 1977; Kuliev, 1981; Korshunov ,1994), is probably due to the fact

Table 3. Age- and sex-structure of censused wild goats in Daghestan

Date	Location	Number of censused animals						Ratios		
		adult males	young males	females	yearlings		kids	males: females	yrl : females	kids females
					males	females				
June-July 1995	Avar Koisu.	3	21	14* (18)	9	6	15	1.33	0.83	1.07*
Aug 1990	Andi Koisu	2	9	10	4		15	1.10	0.40	1.50
Dec 1995 & Jan 1997	Avar Koisu	10	37	66	20	19	55	0.71	0.59	0.83
May 1996	Andi Koisu	27	30	60	12	12	42	0.95	0.40	0.70

* Pregnant females and those who didn't show their new-borns are not included; total number of females is in brackets

that wild goat in Daghestan live in mountain forests, with a long vegetative period and comparatively mild winters. However, considering the trend of the wild goat population, a considerable pressure upon the population contrasts with this high fecundity, at least eliminating the natural increment. Impact of predators upon adult animals is low and probably it was the same during the last hundreds or even thousands of years, because of the abundance of much easier prey (*e.g.* domestic sheep and goats). The most important factor stimulating high reproduction rate in Daghestan may be the pressure of man. This pressure is convincingly displayed by the sex structure of the wild goat population. In natural and un-harvested Caprinae populations (Kotov, 1968; Schaller, 1977; Fedosenko & Savinov, 1983; Veinberg, 1984) sex ratio is usually close to 1 and adult males are more than 10% of the encountered animals during the rut. In Avar Koisu River canyon the value of sex-ratio was 0.71 and adult males were less that 48% of the animals encountered (Tab. 3). Sex-ratio and the number of adult males increased in spring and summer, but the data recorded outside the rutting season are not quite adequate for estimating population structure, due to unequal probabilities of sighting adult males and females. The lower number of adult males, shown by winter censuses in Avar Koisu canyon, is certainly due to poaching, since highlanders always try to shoot big males. It is worth noting that yearling males slightly outnumbered yearling females during the rut and outside it (Tab. 3).

The gap between the number of females and yearlings is due to the hiding behaviour of pregnant females when the births approached. The percentages of yearlings associate with females in winter and spring were, respectively, 95.5% (N= 44) and 79.0% (N= 24), whereas this percentage decrease to 4.0-8.0% (N= 31) during the birth season (Tab. 3) (Chi-squared test, $P<0.001$).

iii. Female perinatal behaviour and predation on kids

After the births and during the gestation season, females goats grouped in cliffs and, sometimes, concentrated in nursing sites as, for example, on a cliff wall with numerous ledges and clumps of trees near a village in Avar Koisu canyon. This cliff, with a surface of about 200x300 m, was surrounded by steep slopes with thin forest, and was merely 200 m above the valley bottom, with quite a busy road. During the observation period, this site harboured 7 females, 2 yearlings of both sexes and 10 new-born kids, associated in two main groups.

Hiding phase is very characteristic of wild goat. Of 13 females having new-borns, 5 hid them, and 2 females did not show the kids during my observations. In other 3 occasions the kids turned out to be very agile (supposedly 3-5 days old). This observation suggested a different perinatal behaviour between tur and wild goat: the reactive tur kids always follow their mothers, whereas wild goat females often leave their kids alone, not only when they are feeding but also when in danger. I observed a female with a kid escaping to the cliffs followed by a dog. This female left its hidden kid and escaped,

evidently trying to lead people away.
Golden eagles *(Aquila chrysaetos)* and Bearded vulture *(Gypaetus barbatus)* may prey wild goat kids. They inspect rocky massifs all day long, searching for the new-borns. In August 1990, I observed an eagle trying to catch a kid. The bird repeatedly tore it off from a cliff wall, but the kid finally was able to escape.

3.6. Grouping

Four aggregation patterns can be distinguished in wild goats, as well as in other *Caprinae:* adult male groups, that may include young males too; young male groups; female groups, including occasionally young males; mixed groups, with adult animals of both sex (Veinberg, 1984). The first three patterns were observed all year round, but the last one was almost exclusive of the rut. Only the sub-adult males can aggregate with females during the warm season: 13.8% of 2-3 years-old males (N=73) and 13.3% of 4-6 years-old ones (N=45) were observed in female groups in spring and summer.
The sexual segregation in wild goat is higher than in tur: the 46.4% of young tur males in Daghestan (N=1,186) was observed associated with females during the same seasons (Chi-squared test, P<0.001) (Veinberg, 1984).
The weak bonds between young males and females in wild goat in Daghestan could be explained by early maturation or, more possibly, by marked trend to aggregate in small groups (Tab. 4). This aggregation pattern, when population density are comparable, is characteristic of forest habitat, like this of the North Caucasus.
This pattern might also be explained by constant human disturbance. Average group size in Daghestan is almost similar to that in Chechnya (Batkhiyev, 1989), but is 4-5 times lower than in conspecific populations in the Caucasus Minor (Kuliev, 1981) and Kopet-Dagh (Korshunov, 1994) at similar population densities.
Outside the rut, adult males tended to aggregate in bigger groups. Nevertheless, in spring and summer, 62.2 % of adult males (N= 69) and only 20.8 % (N=298) of females and young males were encountered in groups consisting of 5 animals and more (Chi-squared test, P<0.001).

3.7. Human impact and conservation problems

Wild goats live side by side with human beings in Daghestan and they are constantly hunted. This neighborhood is not seasonal and is not restricted to certain professional groups (for example, shepherds, as it happens in other settlement of *Caprinae* populations). On the contrary, it is permanent and with settled people, because villages and farmsteads, agricultural land, paths and roads, main resources of timber and firewood, all occur within narrow stripes of mountain forests: the wild goat habitat. Despite emigration to plains and lowlands, highland Daghestan still displays high human population density, unlike the rest of the North Caucasus. Under such circumstances, the conservation of a wild *Capra* species is really difficult. The conservation of this species is probably due to the presence of good shelter offered by mountain forests.
More difficult is the conservation of wild goats in thin and open stands, typical of the main, more southern, and arid part of the range of the species (Caucasus Minor, Kopet-Dagh,

Tab. 4 - Wild goat group sizes in Daghestan

	Adult male groups	Young male groups	Female groups	Mixed groups	Total
Number of groups	26	50	136	10	222
Group size (mean ±s.e.)	3.0±0.5	1.8±0.2	6.9±1.4	3.7±0.2	3.3±0.2
Range	1-11	1-5	4-14	1-10	1-14

Iran, and Sind). The arid forest itself could hardly resist to human impact. Mere fragments of such open stands still survive within pine-birch forests in Daghestan, but they probably covered most of the country when the species penetrated there. Wild goat fossils, even in the Caucasus Minor, are quite late belonging to the mid-and upper Pleistocene (Baryshnikov, 1987). Absence of pronounced morphological differences between the isolated North Caucasian and southern wild goat populations and also the age of known fossils suggest a late appearance of wild goats in the Greater Caucasus. Later deforestation in lower and drier parts of Daghestan probably forced the species out from there. Climate turned cooler and more humid; it changed the forests, but wild goats managed to adapt to these changes, maybe even due to human pressure. Just this pressure can be greatly responsible for certain peculiarities in wild goat's biology in Daghestan, namely high fecundity, secretiveness, preference for closed forest, and, on the whole, the avoidance of open places.

Unlike tur, that under human pressure usually escapes to higher and less accessible areas, wild goats do not have this opportunity, remaining within their habitat. The survival strategy of the species is typical of forest ungulates.

Anthropogenic influence changed quite a lot during the last decennaries. On one hand, emigration from the highlands began after the Second World War and is still going on. Abandoned villages and farmlands overgrow with forest and the wild goat habitat restores itself; as a consequence, animals live among ruins in many occasions. Timber felling had reduced in the 1970s and 1980s but increased again in the beginning of the 1990s. It is illegal but now presents the main and sometimes the only substantial source of income for villagers. Tall stands on gentle slopes suffer the most, so the wild goat habitat remains comparatively unharmed, but, if the felling will continue, the situation may get worse.

Poaching represents the main threat and became undoubtedly more intensive during the last years. Wild goat is, in fact, the most often hunted big game within its range. It has been always hunted (shot or caught with snares and traps) all year round, despite being listed in the Red Data Book with all the accompanying prohibitions. If previously poachers used old and battered rifles from the Second World War or even the Russian Civil War (1918-1921), shotguns and small-bore rifles, now they have equally illegal automatic rifles of the newest models. Local enthusiasts of nature conservation try to influence people through Moslem priests now, but without any obvious results.

There are three sanctuaries (*zakaznik*) within the wild goat range, namely Tlyarata, Kosob-Keleb, and Bezhta. All together they cover a territory of about 1,500 km^2 and are aimed primarily at tur and wild goat protection.

Unfortunately, they do not fulfil their task. It would be natural to expect a further decrease of population under such circumstances. A nature reserve was being planned (by the author of this paper as well), but now it does not seem real because of lack of money, lack of real understanding from local people and officials, and, mainly, because of a very dense human population. According to the USSR and current Russian law, a nature reserve needs land without human population and that cannot be practically found within the wild goat range. Any institution of lower ranking than a strict nature reserve will be no more effective than that already existing, and even nature reserves cannot provide quick results in present situation. Only continuing emigration of highlanders to the plains and lowlands offer positive changes to the wild goat status in Daghestan.

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