



Caprinae



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No evidence that the northern Chinese argali (*Ovis ammon jubata*) still exists

Although intra-specific taxonomy remains disputed, most international bodies currently recognize 8 sub-species of argali: *O. a. ammon*, *hodgsoni*, *polii*, *karelini*, *darwini*, *nigrimontana*, *severtzovi*, and *jubata*. Of these, *O. a. jubata*, remains the least studied, and its status has never been thoroughly investigated. Although given the common names “Northern Chinese argali” and “Shanxi argali”, *O. a. jubata* has most commonly been described as being distributed primarily within the Chinese province of Inner Mongolia, just south of the eastern-most distribution of *O. a. darwini*. There remains considerable disagreement among authors regarding the diagnosis, original geographic distribution, and even the validity of the subspecies *O. a. jubata*. Lacking information to the contrary, we accept the taxonomy and descriptions of Geist (1991).

The type locality for *O. a. jubata* is said to be “north of Peiping [Beijing]” (Geist 1991:719). The animals used by Geist (1991) in describing the subspecies originated from “Kwei Hua Ch’eng, Shansi”. However, this name is actually an obsolete reference to Hohhot (“Huhehaote” in modern pinyin), capital of

present day Inner Mongolia. The geographic coordinates (111° 30’ E, 41° N), where specimens were obtained by Roy Chapman Andrews in 1921, place this in the Daqing Shan, just north of Hohhot. These hills, as well as those further south and east in Shanxi and Hebei, are characterized by gentler topography and more mesic vegetation than the isolated ranges of the Gobi Desert. This raises the possibility that *O. a. jubata* may have represented not merely a distinct morph (Geist 1991) but a particular adaptation within *O. ammon* to conditions slightly warmer and more mesic than habitat to the north and west.

Prior to our surveys, information on the recent status of argali in Inner Mongolia was limited to the reports of Wang and Schaller (1996) and Bu *et al.* (1998). The first authors observed no argali themselves, but reported that remnant populations probably existed in the Mazong Shan, Yabrai (Yabulai) Shan, Helan Shan, Zhuozi Shan, and Lang Shan ranges. They considered the species endangered in Inner Mongolia, guessing that less than 500 existed. Bu *et al.* (1998) reported on a combination of direct observations and interviews made during the 1990s, suggesting the continued presence of small, isolated groups of argali in various ranges throughout northern Inner Mongolia. More recently, Gong Minghao (Department of Wildlife Management, State Forestry Administration, Beijing) conducted a survey in the Yabulai Shan area where government officials hope a future trophy-hunting program can be established. He did not observe argali directly, but interviews with local staff and photographic evidence indicated the presence of a small argali population there (Gong 2009).

These reports have shed no light on whether some or all of these animals are appropriately considered *O. a. jubata*. Maps produced by scientists with the Chinese Academy of Sciences (reproduced in Shackleton 1997: 166) suggest that argali in extreme northern Inner Mongolia (adjacent to the Mongolian border) are considered *O. a. darwini*, but those in central Inner Mongolia are *O. a. jubata*. (This map was mislabeled in Shackleton 1997, and later corrected by Ali 2007). A website of China International Forest Travel states that “Shanxi Argali (*Ovis ammon jubata*)...is found in an arc across northern China from Hebei and Shanxi west through Shaanxi and Inner Mongolia to Gansu.” However, Yu (2001), in a comprehensive report on argali in China, did not recognize *O. a. jubata* as a valid subspecies. Although some recent accounts (e.g., Cai 1985) mention argali as occurring south and/or east of Inner Mongolia (in Shaanxi, Shanxi, or Hebei), we know of no reports of argali persisting in these provinces; provincial officials in Shanxi confirmed that they knew of no reliable reports of argali in that province for at least 20 years (Zhu Jun, Shanxi Forestry Bureau, pers. comm., March 2009). Gong (2009) considered argali of western Inner Mongolia’s desert mountain range Yabrai (Yabulai) Shan to be *O. a. jubata*. However, a photograph of adult males in breeding pelage (taken in December 2005) suggested that these animals were *O. a. darwini*, not *O. a. jubata* (V. Geist, pers. comm., April 2009).

Though a combination of literature review, examination of official documents, interviews with officials and local residents, examination of museum specimens, and limited direct field work, we investigated the status of argali within

Inner Mongolia generally, and more specifically, the status of *O. a. jubata*.

During November 15-25, 2008, we visited five areas in north-central Inner Mongolia: Saihantawei township (~42° 44'N, 112° 38' E), Erenuo'ersumu (~43° 24'N, 111° 25'E), Erenhot (~43° 44'N, 112° E), Hada Shan in Sunitezuo (44° 20'N, 111° 26'E), and Abaga (44° 37'N, 114° 08'E). During March 16-21, 2009, we visited the suspected last remaining argali distribution area within the Lang Shan region of the Yin Shan (range) in Bayan Nuo'er. We interviewed local officials and pastoralists, assessed habitat conditions, and made direct surveys in the most promising areas.

We observed (and photographed) argali only within the Hada Shan area of Sunitezuo Banner, at approximately 44°20'N, 111°25'E. We found a group of 7 females at the international border where few pastoralists are permitted to live (although limited, seasonal livestock is permitted). Photographs were inconclusive as to subspecies, but based on them as well as proximity to animals in Mongolia considered to be *O. a. darwini*, we have no reason to doubt that these animals are appropriately considered *darwini*.

The Lang Shan are the southwestern portion of the larger (but less rugged) Yin Shan mountains of western Inner Mongolia. Most vegetation is currently desert scrub, with few grasses and even fewer trees. Elevations of peaks are mostly in the 2000-2300 m range. Based on our informal observations, mining activity appears to be ubiquitous surrounding the mountain range. Forestry and nature reserve officials based in the city of Linhe had no knowledge of argali anywhere in the region, but were able to direct us to knowledgeable and long-term local residents. All that we interviewed agreed that argali no longer inhabited any part of the Lang Shan. They differed slightly on when they believed the last argali had been observed, some suggesting that it had been > 30 years.

All pastoralists we interviewed could accurately identify photographs of argali, blue sheep (*Pseudois nayaur*), and ibex (*Capra sibirica*), and all were in agreement that blue sheep remained numerous. We thus had no reason to doubt the veracity of their reports.

Pastoralists we interviewed differed in their explanation of the loss of argali. One

pastoralist blamed poor vegetation conditions caused by a combination of climate change and overgrazing, while another blamed poaching entirely, believing that if even a single argali was known to be present that people at the time would have made all efforts to find and kill it. Poaching was said to be primarily for meat consumption.

As of 2009, we conclude that the reduction and fragmentation of existing argali populations reported by Wang and Schaller (1996) and Bu *et al.* (1998) during the 1990s have continued since then. Argali within Inner Mongolia are currently restricted to extremely small populations in 3 areas: the Yabrai (Yubulai) Shan range, the Hada Shan area and the Erenuo'ersumu region of Sunitezuo Banner. In all three, remnant argali appear to *O. a. darwini*. Argali have been lost from at least two areas considered to contain remnant populations during the 1990s by Wang and Schaller (1996): the Helan Shan and the Lang Shan mountain ranges. Disturbance and habitat degradation in a third area, the Mazong Shan range, has likely caused the disappearance of argali there as well. The future of argali within Inner Mongolia appears tenuous, most likely dependent on the ability of dispersing individuals from Mongolia to supplement existing groups or colonize new areas. Very little habitat capable of sustaining argali populations remains within Inner Mongolia.

Based on the information available to us, we believe that *O. a. jubata* as a subspecies with unique adaptations has become extirpated. We lack evidence that argali remaining within Inner Mongolia differ in any way from those inhabiting the Gobi ranges of Mongolia (which are generally considered *O. a. darwini*). Although proving absence is very difficult and further genetic work shedding light on differentiation among putative subspecies is desirable, we conclude that *O. a. jubata* no longer exists.

A more detailed version of this report, including photographs and maps, is available in Adobe pdf format from the senior author: rharris@montana.com.

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Agrimi on Lefka Ori, Crete: population status, threats and conservation.

The agrimi *Capra* sp. is, most likely, the feral descendant of an ancient domestic breed of the goat *Capra hircus* which externally resembles its wild ancestor *Capra aegagrus* (e.g. Bar-Gal *et al.* 2002). This animal was treated until recently as a subspecies (*C. a. cretica*) and was considered Vulnerable by IUCN (CSG 1996) because of its low population size and small distribution range. International conservation interest in these animals now mainly lies in it being a repository of important genetic diversity, with a potential to contribute to modern domestic breeds (Shackleton 1997). For this reason, conservation measures were proposed in the 1997 IUCN Action Plan for Caprinae; one recommendation was a population census in its remaining native ranges in the Lefka Ori (White Mountains) of Crete. Others involved the total elimination of feral goats and their hybrids from agrimi ranges (Adamakopoulos, Hablützel and Hatzirvassanis 1997).

During my Ph.D. research on the behavior, ecology and population dynamics of Agrimi, I spent much of a 4-year period (2004-2007) in Lefka Ori, and especially, in the National Forest Park of Samaria. Between April and December 2004, 2006 and 2007 I conducted 45-, 21- and 36-day surveys, respectively, in various sites in the Park throughout its altitudinal range. A few field trips were made also to the rest of Lefka Ori, between 2005 and 2007, in sites reputed to hold agrimi. My survey method used either transect routes (traversed on foot), or fixed point scanning (with telescope), and depended on season, terrain accessibility and forest cover. Field signs were used only as a proof of presence. Following a brief visit to the region in September 2008, when I saw fewer agrimi than I had expected followed by some alarming news about the population

earlier this year (2009), I decided to make my preliminary findings known and outline the key targets of proposed conservation action.

The Samaria National Forest Park (48.5 km²) is a UNESCO Biosphere Reserve which includes much of the second longest (16 km) European gorge (Samaria), and two shorter adjacent gorges (Kalokambos and Pentachteni); the sides of all being interspersed with multiple ravines. It is characterized by steep and often overhanging cliff walls, with elevations rising from 80 m (southern entrance) to 2134 m asl (Melindaou Peak). There are extensive and dense conifer forests (Calabrian pine *Pinus brutia cretica*, Italian cypress *Cupressus sempervirens horizontalis*, *C. s. pyramidalis*) up to ~1500 m, and rocky grasslands in the sub-alpine zone. Important features are the springs (> 22), the Tarraios river and smaller streams. Access is open to visitors from 1st of May to 31st of October annually, while hunting or collection of any animal or plant is strictly forbidden.

Survey data (not including unverified local reports of sightings) revealed differences in abundance with altitude for agrimi, which, nevertheless, is spread throughout the park, with very rare presence at daylight below 200 m asl. Adult males (>4 years old; Schaller and Laurie 1974) were mainly concentrated above 900 m asl, whereas adult female densities and numbers were highest below 700m asl; and there was evidence of spatial segregation between these two sex-age classes. The herd type recorded most often was the family group [adult (≥3⁺) female with male and female offspring up to 2 years of age; Nicholson and Husband 1992; pers. obs.] which had a crude mode size of 2. The largest aggregation I observed was of 34 animals of all sex-age classes excluding adult males.

In 2007, 92 agrimi (5 adult males, 42 adult females, 33 kids and 12 yearling and sub-adult ones) were observed, and I estimated the total park population at 887 animals (including those that died in that year). The total estimated size was 12.5 % higher in 2004 and ca. 16 % lower in 2006, indicating population fluctuations, although most sex-age ratios remained generally stable (Samaria gorge, 2007: 46 adult males, 122 kids, 36 yearlings and 15 sub-adults per 100 adult females). In a high population density site between 2006

and 2007, female kid mortality rate was estimated at ca. 33 %, while overall reproductive capacity in the park was high in every year with more than 95% of recorded adult females lactating. In the Samaria gorge ranges below the sub-alpine zone, the observed mean rate of twinning/year was 13.4%.

Based on limited data (<10 sightings) but mainly on unverified information from local people, I estimated that no more than 70-100 agrimi survived by late 2007 outside the Park, and that this number and local abundance had been more or less the same over the last 50 years. These individuals mainly frequented some almost inaccessible ravines, cliff walls and rocky peaks, but regularly used a total area of about 26.5 km² of the Western and Central Lefka Ori. According to local people, in the last few years, some agrimi entered cultivated land, possibly due to a relative decline in natural food resources.

On average therefore, during the 4-year study period, the total agrimi population in Crete was about double that of the 1985 estimate (500; Adamakopoulos *et al.* 1997). In spite of this, and despite the fact that the biological potential for population increase is particularly high compared to lowland Wild Goat populations in Asia (e.g., Kirthar Range, Pakistan; Edge and Olson-Edge 1990), the agrimi population appears to be in a slow decline in the SNFP since at least 2005 (personal unpublished calculations). This could be due to a combination of limiting factors including hybridization and resource competition with feral goats, poaching, disease, and, perhaps, food shortage (if the Park has reached its carrying capacity).

Of the conservation measures proposed in 1997, the only one that had been adequately undertaken by 2007 is control on tourism development in the Park. According to National Park regulations in Greece, any technical constructions that do not support the park's management are forbidden. Fortunately, it is also extremely dangerous for anyone to cross the Park between November and May, so access is not allowed during this sensitive time for agrimi (reproduction - rut and gestation periods). In addition, important achievements have been made in the area of fire safety in the last 5 years, with works that aesthetically fit in with the environment.

The major threats to agrimi (domestic goats and poaching) were out of control during 2004-2007. The NP administration (Forestry Service) was unable to eliminate feral goats which were seen everyday at various points between the southern entrance and the center of Samaria gorge, always below 250 m. Fewer occurred at the NE corner of the Park between 900 and 1500 m. Goat numbers must not have exceeded 40 in any year because, like agrimi, they were exterminated by poachers (local informants, pers. comm.; pers. obs.). Nevertheless, they exploited resources that could have been used by agrimi (see Appendix). Almost all goats seemed to be recent escapees (e.g., bell on neck) from extensively farmed domestic herds in the vicinity of the Park, but some were 2nd or 3rd generation feral animals and in a few cases, F1 or F2 generation hybrids with agrimi. Hybrids were also observed in other areas of the Park, but these had very few distinguishing traits (e.g., united eye-nose and bridge of nose stripes). All these individuals, if still present, must be removed from the Park immediately.

Another topic that requires investigation is the possibility of agrimi natural mortality (especially of < 3 year olds) due to diseases transmitted by feral animals. If so, veterinary examinations of livestock in the areas surrounding the Park must become more comprehensive.

Poaching, which takes place daily outside the tourist period, is the most difficult problem to solve. There are few Forest Officers in the County of Canea in which the Park is located and their transfer to inaccessible areas to make arrests whenever poachers are detected is extremely difficult. Moreover, poachers possess very effective military weapons (e.g. Kalashnikov, silencers, etc.), usually move very secretly, and refuse to surrender unless trapped (Park Wardens, pers. comm.; Anon. 2009). According to the Forest Directorate of Canea, since 1983, only a few of the arrested poachers have been sentenced (M. P. 2009). I heard of 7 poaching events, of which in only one case was there an attempt to stop it. The rest were in very remote areas, and the necessary number of personnel and equipment for an appropriate operation was not available.

Agrimi is mainly killed for its meat which is valued very highly on the Cretan

and Athenian “black” markets (50€/kg; Haralambakis 2002; Anon. 2009), and according to authorities of Lefka Ori municipalities, around 150-200 animals are killed each year in the Park mainly for this reason (Anon. 2007). This seemingly large number agrees approximately with my calculations.

Another motive for poaching is trophy hunting. An agrimi trophy (horns, head and fleece) is particularly expensive, and besides solitary poachers who bring their friends for a “hunt” (locals, pers. comm.), there are also well organized enterprises which, although illegal, are even advertised on the internet (Mpogatsos 2009). It seems, nevertheless, that Lefka Ori people are little involved in this “business”. This year there was a €10.000 reward offered by the Ministry of Rural Development and Food for information that will lead to the arrest of certain poachers, self-advertised on a website (Mpogatsos 2009). Meanwhile, there is a new move on behalf of some local people who have persistently demanded the prevention of agrimi poaching (M. P. 2009). In the end of course, this is a matter of political will, which also depends on how the Park’s budget priorities are classified.

In September 2008 at the main Warden Post, I observed the fleeces and heads of a young male and an aged (10+) female left hanging by poachers, having been killed before the tourist season. According to Wardens, the same persons had also vandalized certain Forestry Service installations. During a brief Park survey in that month, many of the 2007 animals were unaccountably missing, while there were also fewer signs of agrimi presence (droppings).

Clearly, improved anti-poaching measures are urgently required. One aspect that must be kept in mind with respect to any relevant conservation plans is that agrimi hunting has very old roots with the animal having likely been introduced or released into the wild 8 millennia ago (Bar-Gal *et al.* 2002) most probably for this reason. Its hunting has always been part of the historically known Cretan culture, while there are, albeit usually neglected, ethical empirical rules that traditionally aimed at a sustainable harvest. In fact, the first conservation moves in the previous century were initiated by some perceptive Lefka Ori

residents. Furthermore, agrimi is protected as a game species by Hellenic Legislation, which means that there was never the perceived need for a permanent hunting ban on it. In any case, in the absence of any relevant risk assessment plan, total protection would inevitably lead at some point to overpopulation with consequent damage to the surrounding agricultural communities (already faced in the NW borders of its range outside the Park, see above). That, in the absence of enough natural predators sometimes requires some form of population control by humans.

My suggestions to solve the problem of poaching and ensure the survival of this important breed or race involve:

- 1) Official designation of areas outside the Park where agrimi are totally protected and others where it can be legally hunted (controlled hunting zones). Such a plan must: a) be flexible and depend on local abundance and trends (i.e., agrimi numbers in some areas may change over the years); b) take into consideration the hunting tradition of local communities, and private land ownership, and c) consider the fact that, once protected, the population will likely expand its range.
- 2) It must be ensured that there are no reintroductions, and recolonisation of historical range (e.g., Mt. Ida) should be by natural spread only. In this way, recolonisation will have more chances of being successful because agrimi social structure will not be negatively influenced by an unnatural mixture of original founders chosen by humans.
- 3) The total protection status currently provided by the Park may also need to be examined after the effects of a hypothetical agrimi increase on endangered flora are evaluated. Some scientifically approved population regulation management action might be needed in the future.
- 4) The conservation measure of patrolling against poachers suggested in the 1997 IUCN Action Plan (Adamakopoulos *et al.* 1997) should be implemented through the creation of a special Body of Forest Officers, Game Keepers and Guards who will also be responsible for monitoring and regulating hunting

in all Park and non-park designated areas.

- 5) In all the above there must be active participation of the local societies and communities.
- 6) Hunting permits must be issued only to native residents of Lefka Ori who hold voting rights there. They must be allowed to sell them, through formal agreements, for standard prices set according to analogous legal ones for wild goats and at no less than 5.000€ each.

Fortunately, tourism does not currently cause any major disturbances to the animals. Visitors keep to a narrow trail along the floor of Samaria gorge from dawn until around 1700h, and are not allowed to make loud noises as this can create avalanches in winter. Some animals have become accustomed to humans and even take food from their hands; a feeding tactic that the young learn beside their mothers. I have observed that individuals which take food from tourists show less tolerance of humans (increased flight distance) under certain circumstances (e.g. away from regular visitor areas, outside the tourist season and after visitor hours). Such behaviour is probably not a problem, but there might be concern over the increased degree of dependence on humans for food for some individual agrimi.

On the other hand, a relatively recent custom of many visitors, which is often encouraged by certain travel guide authors and visitor escorts (through web sites), is the creation of so-called stone cairns, usually 20-40cm high with at least a 10 cm base diameter. The average density of these constructions (5/m²) results in much of the dry river bed parts close to trail being covered each year. These structures can impede the agrimi’s ability to run across such terrain when they need to, increase the risk of injury. Cairn making is an activity that must be stopped not only for agrimi safety but also because it alters the natural landscape and the habitats of smaller organisms. Both hand feeding and stone removal are not allowed by National Park Legislation because they are “interventions with the geological formations and the fauna” and there are legal penalties for such acts.

In conclusion, the Cretan Agrimi although still Vulnerable D1+2 (IUCN 2001

version 3.1 criteria), was in a much better state in the mid 2000s than at about a quarter of a century ago. Conservation efforts must, nevertheless, not be relaxed because conditions can deteriorate significantly due to various and constant threats. It should be noted that agrimi has served as an “umbrella” species in conservation management in the Park. The SNFP was established in 1962 mainly for its protection, but many other taxa threatened with extinction find refuge there.

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Conservation News

President of Bulgaria kills an endangered Severtzov's argali in a supposedly protected area in Uzbekistan

According to information provided by the Deputy Director of the Nuratau State Strict Reserve (Nuratsinskiy Zapovednik) in Uzbekistan, on 7 November 2008, the President of Bulgaria visited the reserve. At the central mountain peak Hayat Bashi

he waited for 2 argali which were chased towards him by rangers of the reserve, then he shot one ram. Over the last 2 years, Uzbek authorities have not issued any export permits for this endangered wild sheep (listed in CITES Appendix 2 as an urial, *Ovis ammon severtzovi*). Thus, it is possible that the Bulgarian president exported the trophy without a CITES permit. A hunting permit was issued by the Cabinet of Ministers, but likely for the forestry area (leskhoz), not for the territory of the reserve, where hunting is generally prohibited. It should be noted that Bulgaria is a member of the European Union and as such is a signatory to numerous wildlife conventions including CITES.

Under appropriate circumstances, trophy hunting can generate substantial funds and provide incentives for the protection of endangered species and the ecosystems they inhabit. In the Nuratau reserve, however, trophy hunting has negative impacts on the argali population and its habitat, far beyond the impact of the take off of a single old ram. The only remaining viable population of this subspecies (last estimates about 1,500 animals) is restricted to the reserve and it is under pressure from poaching, habitat degradation and competition by livestock. No funds from international trophy hunting are allocated for protection of Severtzov's argali and/or for local development in the communities suffering from land-use restrictions by the reserve. Poaching and illegal grazing are rampant and trophy hunting by outsiders in the past motivated local poachers to increase hunting intensity, an activity which is broadly accepted by other local people. It is said that international trophy hunting is organized by the Agency for hunting, protected areas and national parks under the Main Department for Forestry, belonging to the Ministry of Agriculture and Water Management of the Republic of Uzbekistan. Before any hunting tourism and CITES permits for Severtzov's argali are accepted, it should be necessary that the Uzbek authorities made significant efforts that result in real improvements in the protection of the Nuratau reserve and initiate a sustainable hunting management scheme outside the reserve, ideally involving local community members.

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Abstracts & recent publications

Combining genetic and ecological data to assess the conservation status of the endangered Ethiopian *Walia ibex*

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Abstract

Knowledge about the phylogenetic history, genetic variation and ecological requirements of a species is important for its conservation and management. Unfortunately, for many species this information is lacking. Here we use multiple approaches (phylogenetics,

population genetics, and ecological modelling) to evaluate the evolutionary history and conservation status of *Capra walie*, an endangered flagship species of wild goat endemic to Ethiopia. The analysis of mitochondrial cytochrome b and Y chromosome DNA sequences suggests that *C. walie* forms a monophyletic clade with *C. nubiana*, but has been isolated for about 0.8 million years from this closely related species. Microsatellite DNA analyses show that *C. walie* has very low genetic variation (mean heterozygosity = 0.35) compared to other endangered mammals. This reduced variation likely derives from a prolonged demographic decline and small effective population size. Ecological niche modelling using the bioclimatic features of habitats occupied by *C. walie*, suggests ecological differences between *C. walie* and *C. nubiana*, and identifies the areas most suitable for future reintroductions of *C. walie*. The genetic and bioclimatic data suggest that *C. walie* is distinct and requires immediate conservation actions including genetic monitoring and reintroductions to establish independent populations. This study illustrates how combining noninvasive sampling along with genetic and ecological (bioclimatic) approaches can help assess conservation status of poorly known species.

Keywords: conservation unit, demography, genetic diversity, microsatellites, mitochondrial DNA, Y chromosome, noninvasive sampling, phylogeny, population decline, realized niche.

This article will be published as the Featured Paper in **Animal Conservation, Volume 12 Issue 2 (April 2009)**. To read the article in full, please use the following link <http://www3.interscience.wiley.com/journal/117969966/home>"

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Submissions of articles, including **research reports, conservation news, recent publications, etc., on wild or feral Caprinae**, are welcome from any professional biologist. A potential author does not have to be a member of the Caprinae Specialist Group. Please send submissions to the Editor for consideration, preferably via e-mail attachment – to: shac@interchange.ubc.ca.

CSG Web Site

<http://pages.usherbrooke.ca/mfesta/iucnwork.htm>

Editorial Note

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

