

DOES THE GORAL (*NAEMORHEDUS*) INHABIT LAOS OR VIETNAM?

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ABSTRACT

The goral (*Naemorhedus*) is sometimes taken as part of the fauna of Laos or Vietnam. We review relevant opinions and evidence, past and present, and conclude that the goral has not been biologically documented in either country. We encourage conservation personnel to be attentive to potential specimens, camera-trap records, or direct sightings.

Keywords: goral, serow, *Naemorhedus*, *Capricornis*, Laos, Vietnam

INTRODUCTION

The goral (genus *Naemorhedus*, in this case presumptively *N. griseus* for geographic reasons) is importantly installed in official and popular conception as an inhabitant of Laos, where its larger relative the ‘Indochinese serow’ (*Capricornis sumatraensis maritimus* or *C. milneedwardsi maritimus*) occurs widely (DUCKWORTH *ET AL.*, 1999). The goral is listed as completely protected by the 2008 National Wildlife Law of Laos, as it was in previous versions. It is sometimes recorded as possibly present in local conservation surveys in Laos, based on information-gathering interviews with local people rather than on specimens, camera-trap records, or direct sightings (DUCKWORTH *ET AL.*, 1999). It appeared in two recent pictorial guides for mammals of Laos aimed at the public (MATHER & THONONGTO, 2000; PARR, 2008), without caveat about occurrence. These guides provide incompatible distributions, with MATHER & THONONGTO (2000) considering the goral to occur only in the far northwest, north of 20° N, but PARR (2008) mapping it as absent from the north but widespread south of 18°30' N. Clarifying whether the goral actually occurs in Laos, and if so, where, is important for practical conservation as well as for science. If present, the goral is probably endangered.

Gorals (*Naemorhedus* spp.) and serows (*Capricornis* spp.) are Asian “goat-antelopes” of the bovid subfamily Caprinae (GROVES & LESLIE, 2011). The species *N. griseus* occurs widely but sporadically in mountainous terrain of eastern Asia (ALLEN, 1940; GRUBB, 2005; IUCN, 2011), its range extending as far south as northwestern Thailand (LEKAGUL & MCNEELY, 1977; CHAIYURAT *ET AL.*, 1999) and the adjacent Dawna Mountains of Myanmar (PEACOCK, 1933).

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We know of no records of the goral in the northeast or east of Thailand. We here critically examine possible evidence for its occurrence in Laos or Vietnam, yet further to the east.

REVIEW OF EVIDENCE

Writings about the fauna of French Indochina during the earlier part of the 20th Century usually either failed to mention wild caprines (e.g. BOUWARD & MILLET, 1920; BORDENEUVE, 1925; MILLET, 1930; DUMAS, 1944) or mentioned just one (e.g. ROUSSEL, 1913; BOUWARD, 1917; EBERHARDT, 1917; DUFOSSE, 1918; THOMAS, 1927, 1928, 1929; LEGENDRE, 1932; DELACOUR, 1940; BOURRET, 1944; DAVID-BEAULIEU, 1944; CHOCHOD, 1950). Certainly in most of the latter cases, and plausibly in all of them, this was the serow. Three writers, however, supported the presence of more than one kind of wild caprine in their hunting-oriented books:

MONESTROL (1925) gave a recognizable description of the Indochinese serow, which he considered a type of antelope and unfortunately called “L’antilope goral”. He provided as museum-derived systematic names “*Nemorhaedus sumatrensis* – *N. maritimus* – *N. Goral*”, a mixture of species-level names for serow and goral suggesting he did not understand that they are different animals. But he also noted what he considered a kind of wild goat, short-haired and fawn grey, inhabiting the mountainous coast of Ha Long Bay in what is today northernmost Vietnam. He had seen what he took to be a captured individual of the latter, very young and lacking horns. There was no mention of this type of goat in a later rewrite of his book (MONESTROL, 1952), where the coast of Ha Long Bay was noted as part of the range of his “goral” (= true serow). It is unfortunately not possible to determine, from Monestrol’s original description, whether the captive young animal he had seen was a goral, a serow, or a domestic goat.

CHEMINAUD (1939) mentioned two forms of “le goral de l’Inde” found in French Indochina: a small and short-haired form in the northeast (which he might have based on Monestrol’s wild goat), and another with a range including part of Laos. He claimed to have successfully hunted the latter form in northern Laos. Its indicated body size is large for a goral but small for an adult serow. The mention of large ears suggests the serow, but the rest of the description suggests the goral; perhaps he was conflating the two. (He also referred to a third, large type of goral in southeastern China that, from its limited description, was probably either a serow or a conflation of serow and goral.) In any event, CHEMINAUD’s (1939, 1942) hunting stories appear to be at least partly fictional (see GALBREATH, 2009; DUCKWORTH, 2011), so his description of the goral of Laos cannot be taken at face value.

FRAISSE (1955) particularly noted Monestrol among sources mentioning presence of “*Nemorhoedus Goral*” in French Indochina, not realizing that Monestrol’s “goral” was actually the serow. Fraisse stated that he had twice seen (but not killed) the goral in Laos. He did not indicate how detailed an observation he had obtained on either occasion. Fraisse also identified, with surprise, a large, black beast killed in Vietnam (of which he had seen photographs) as being “un Serow ou Capricornis”, a different animal from the goral.

The true goral was not listed as an inhabitant of Vietnam by DANG (1994), MATHER & THONONGTO (2000), KUZNETSOV (2006), DANG *ET AL.* (2008), PARR & HOANG (2008), or GROVES & LESLIE (2011). However, GRUBB (2005) included part of northernmost Vietnam in the distribution of *N. griseus*, based on a mounted specimen at the Muséum National d’Histoire Naturelle (GROVES, *in litt.* 2011). Careful consideration of the provenance of this specimen

(Fig. 1) is therefore important. The specimen has previously been listed only in a special catalog of mounted specimens, as #417, but has now been added to the main museum catalog as MHN ZM 2011-899.

An attached sign incorrectly identifies this goral specimen as a “*Capricornis maritimus* Heude” (thus, an Indochinese serow) and says “TONKIN” (a former name for what is today northernmost Vietnam). Under the base of this specimen is a note reading “1855 Exposition universelle, Paris”. So it was presumably exhibited at that extravaganza in 1855, and was thereafter moved to the museum. The sign with the mention of Tonkin, however, cannot be older than 1888, when Heude authored the name “*maritimus*”. The catalog of mounted specimens was apparently created in or before 1910, and the relevant notation therein provides no new information and might have been copied from the sign. “Tonkin” (the locality of Heude’s *maritimus*, where true serows certainly existed), on a sign presumably meant for the public, might have been a reference to a place where the species could be found, rather than to the collection locality of this particular specimen. So the specimen must be regarded as lacking acceptable geographic provenance, its history prior to the 1855 Exposition being unknown. The historical presence of the goral in northernmost Vietnam is thus unproven.

The much discussed *Pseudonovibos spiralis* was in fact suggested (HAMMER *ET AL.*, 1999) to be a Vietnam caprine relative, based on DNA sequencing data apparently resulting from contamination or other error (HASSANIN & DOUZERY, 2000). Critically examined specimens attributed to *P. spiralis* have proven to be artisan-modified horns of domestic bovines (e.g. HASSANIN *ET AL.*, 2001; GALBREATH & MELVILLE, 2003). These artefacts themselves were apparently meant to represent a creature of folklore called “khting vor” (not to be confused with the gaur *Bos gaurus*, often called “khting” in the Khmer language). Thus only the serow remains as a documented wild caprine of Vietnam.

Turning to Laos, DEUVE’s (1972) uncritical (see TIMMINS & DUCKWORTH, 1999; DUCKWORTH, 2011) summary of the mammal fauna of Laos included both the goral and the serow, without caveat but also without convincing evidence. A captive female purported goral he mentioned from Boneng (Khammouan Province) might have been a domestic goat; it reportedly produced offspring when mated with a male domestic goat.

Apart from results of local interviews, there has been only one suggestion of the presence of the goral in Laos more recent than Deuve’s: SCHALLER (1997) mentioned two caprine latrines, at the base of a cliff along the Kong River in Attapeu Province of southern Laos, for which size of faecal pellets was small (18 pellets, averaging 1.07 [range 0.9–1.5] by 0.79 [range 0.72–0.88] cm), and suggested these to be goral latrines. However, he does not regard these data as proof of the presence of the goral (SCHALLER, *in litt.* 2011), which would represent a substantial extension of the known range. An alternative explanation is that subadult serow(s) were involved.

A fairly complete goral head or skull is easily distinguished from that of a serow, but no specimen of the former has been documented from Laos. Many village trophies and trade specimens of caprines in Laos consist of a mere horn or frontlet (horns with adjacent cranial piece). Though the morphology of the nasal bones could often allow a specialist to differentiate between goral and serow frontlets, it is certainly possible that goral specimens have been seen, but not identified as such, by conservation personnel.

Local people across a wide swathe of northern Laos east or north of the Mekong River sometimes refer to two forms of “nyeung” (e.g. SALTER, 1993; SCHALLER & ROBICHAUD, 1996; DAVIDSON, 1998; DUCKWORTH *ET AL.*, 1999; unpublished data of present authors), a widely used

name in Laos for serows, and potentially for goat-antelopes in general. One is often said to be lighter in colour, as might be expectable if it were a goral. However, SALTER (1993), after a wide-ranging series of wildlife-related interviews across Laos, concluded that “reports of serow and goral could not reliably be separated during village interviews”. And, in every case of villagers reporting two sorts explored in detail by R. TIMMINS (*in litt.* 1999), traits inconsistent with the goral, but fitting the serow, were provided for both sorts.

Indochinese serows are widely distributed in southeastern Asia, where they are generally black to brindled medium grey in predominant torso coloration. A small and presumably young serow photographed (Fig. 2) in 1997 by W. Robichaud at a menagerie at Lak Xao, Bolikhhamxay Province, Laos, was even paler grey.

In March 2009, two pieces of skin with respectively black and grey pelage, said to be from different types of nyeung, were obtained at Ban Phahom, on Route 13 between Vang Vieng and Kasi in northern Vientiane Province, Laos. These skin pieces do not necessarily represent the same caprine population; Ban Phahom may well receive wildlife products from a broad geographic area. The lighter specimen (Fig. 3) was roughly 400 square cm in size, with dense pelage. Undamaged individual hairs are between 3 and 4 cm in length. The brindled pelage appears beige grey at a distance, due to a blending effect produced by admixture of black tipped and pale hairs, with varying ratios of the two hair types. Black tipped hairs predominate in relatively dark linear streaks, and there is one particularly prominent such streak. The pale hairs are off-white to pale sandy brown. The black tipped hairs typically have extensive pale bases that are not visible with the hairs of the pelage lying flat.

DNA was extracted from hair roots of both Ban Phahom specimens, and the entire 1140 base pair cytochrome b gene was sequenced. Primers used were from KOCHER *ET AL.* (1989), plus a primer with sequence CACGAAACAGGATCCAACAC, homologous with a central part of the gene. The resulting sequences from the two specimens (Genbank numbers JQ818551 and JQ818552, for the darker and lighter sequences respectively) differ from each other at only six sites, and group unambiguously with Genbank serow sequences, rather than with those of Genbank gorals. Thus both specimens (black and grey) from Ban Phahom evince serow mitochondrial DNA.

DISCUSSION

The presence of grey-coloured serows might partly or wholly explain the lighter coloured type of caprine described by local people in Laos, and might also explain the animals seen by Fraisse (in Laos) and by Monestrol (in Vietnam). Indeed, all suggestions of the goral in Laos or Vietnam can be reasonably explained in ways not invoking its presence. On the other hand, neither habitat nor biogeographic factors make its presence a priori unlikely. Lack of evidence is not proof of absence, and the goral may yet be demonstrated to occur. We must conclude that the goral has not been documented in Laos or Vietnam, but we encourage conservation personnel to be attentive to potential specimens, camera-trap records, or direct sightings.



Figure 1. Specimen MNHN ZM 2011-899 at the Muséum National d'Histoire Naturelle.



Figure 2. Young serow in captivity in Laos. Note remarkably light colour. Courtesy of W. Robichaud.



Figure 3. Piece of grey-furred serow skin from roadside market at Ban Phahom, Laos.

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