

## A clarification of the status of Indian Chevrotain *Moschiola indica* in Nepal

HEM SAGAR BARAL<sup>1</sup>, KARAN B. SHAH<sup>2</sup> AND J. W. DUCKWOTH<sup>3</sup>

<sup>1</sup> Himalayan Nature, P.O. Box 10918, Kathmandu, Nepal  
hem.baral(at)gmail.com

<sup>2</sup> Natural History Museum, PO Box 10918, Kathmandu, Nepal  
karan(at)htp.com.np

<sup>3</sup> Wildlife Conservation Society Asia Program, 2300 Southern Blvd, New York, NY 10460, U.S.A.  
current address P.O. Box 5573, Vientiane, Lao PDR  
willduckworthdprk(at)yahoo.com

Received on June 8, 2009, accepted on August 31, 2009.

Published online at [www.vertebrate-zoology.de](http://www.vertebrate-zoology.de) on December 11, 2009.

### > Abstract

International literature generally excludes Nepal from the range of Indian Chevrotain *Moschiola indica* (Gray, 1852), despite a number of reports and records, some certainly valid, of the genus over the last 150 years. There are no records in the last few decades, reflecting major habitat loss in the terai and, perhaps, a lack of specific search.

### > Key words

Conservation status, distribution, mousedeer, overlooked records, range extension, terai.

## Introduction

Most of the recent international reviews of the distribution of the chevrotain (= 'mousedeer') genus *Moschiola* consider it to be restricted to India and Sri Lanka (ELLERMAN & MORRISON-SCOTT 1966; CORBET & HILL 1992; GROVES & MEIJAARD 2005; GRUBB 2005), and accept a northern range limit of about 24°N, as proposed by CHAMPION (1929). RAMAN (2004), however, through MITCHELL & PUNZO (1976), included Nepal, a country which lies entirely north of 24°N. PRATER (1980: 297) stated that "it has been recently reported from Nepal", and although did not give his source, it was presumably the same as Raman's. *Moschiola* is often included as an inhabitant of Nepal, without caveat, in publications within the country, e.g. BARAL & SHAH (2008). This note untangles these conflicting assessments. *Moschiola* has conventionally been seen to comprise a single species, *M. meminna* (Erxleben, 1777), but GROVES & MEIJAARD (2005) divided it into three: *M. meminna* s.s. and a new species *M. kathygre* Groves and Meijaard, 2005, both endemic to Sri Lanka, and *M. indica* (Gray, 1852), which they considered endemic to India. (In addition, ALI [2004] included Bangladesh in the range of *Moschiola*, citing SARKER

& SARKER [1984], who called it a rare or occasional species of unknown distribution and unknown habitat use, and gave no specific records; other authors have not considered this chevrotain to occur in the country [e.g. KHAN 1985; AZMAT & HANNAN 2006; MD. ANWARUL ISLAM *in litt.* 2008].)

## Historical Information

BRIAN HODGSON, a long-term resident of Nepal and the first to document extensively the country's wildlife (COCKER & INSKIPP 1988; DATTA 2004), was the first to write of chevrotains in Nepal. At first mention, in HODGSON (1841a), he proposed the name *Tragulus Memenoides*. His brief text includes "Vulgo Bijay", which has been taken to be a place (e.g. Groves and Meijaard 2005: 418) but C. & T. P. INSKIPP (*in litt.* 2008) think it more likely to be a name for the animal. In later versions of the same catalogue, HODGSON (1841b, 1844) added that the species occurred in

the terai. The species name was spelt *Mimenoides* in both of the latter, and HODGSON (1844) used the genus *Moschiola*. HINTON & FRY (1923), in a major review of the mammals of Nepal, concluded that some of Hodgson's discoveries commonly asserted to be from 'Nepal' were actually from outside the country, mostly Sikkim. They retained chevrotain as an inhabitant of Nepal, but they wrote that, "this work [triangulation of various sources relevant to Hodgson's mammal collection] has been done pretty thoroughly for all orders, with the exception of the Ungulates, which must be reserved for a future occasion" (p. 399).

Hodgson probably recorded the species only through hearsay, not with a specimen. Firstly, GRAY & GRAY (1847, 1863) noted no specimen of the animal at the British Museum (Natural History), yet the vast majority of Hodgson's Nepal's mammals went there, although some duplicates were then distributed on to other collections (DATTA & INSKIPP 2004); neither did HORSFIELD (1856) list the genus in a collation of Hodgson specimens. Nor could MITCHELL (1977) trace any Hodgson specimen of chevrotain. Secondly, Hodgson planned a comprehensive illustrated monograph on the birds and mammals of Nepal; the paintings survive and are a rich source of information on Hodgson's collections (COCKER & INSKIPP 1988). C. & T. P. INSKIPP (in litt. 2008) have reviewed all these paintings, held in the Zoological Society of London and in the Natural History Museum, London, and none depicts a chevrotain. Thirdly, and perhaps most conclusively, HODGSON (1847) himself later gave only India, not Nepal, as the geographic range of what he now called *Meminna indica*. CHAMPION (1929) considered it impossible that chevrotains could live in India north of 24°N, given the energy with which he sought, fruitlessly, records from that region, and rejected Hodgson's earlier statements because he could not believe that there could be a large gap between the occupied Indian range and a disjunct population in Nepal. One further historical association of the chevrotain with Nepal, mentioned by BLANFORD (1891), is certainly in error: BLYTH (1863: 155, footnote) wrote that "Dr. Gray separates the Indian and Malayan races; but I suspect incorrectly. The latter, he asserts, chiefly differs from the other in being darker-coloured. (Ann. M. N. H. IX, 1852, p. 425.) The darkest specimen which I have seen is from Nepál; those of Burmá resembling the ordinary Indian animal". This footnote, linked to the main text of *Moschiola* by an asterisk, is, with its apparent reference to the animal in Myanmar and Malaysia, difficult to relate to chevrotains. Reference back to GRAY (1852: 425) shows that his statements, and therefore BLYTH's footnote (which mentions the name of no animal), refer in fact to muntjacs *Muntiacus*. During the laying out of BLYTH'S (1863) text, the asterisk was evidently misplaced within the main text.

## Recent Information

Whatever the source of Hodgson's listing of chevrotain for Nepal, MITCHELL (1975, 1977) and MITCHELL & PUNZO (1976), during the Nepal Ectoparasite Program, made several unambiguous records in the country (there is some inconsistency between sources concerning numbers and dates). They observed a live wild chevrotain in tall elephant grass *Cymbopogon* at Tamispur (= Tamaspur), Nawal Parasi District (27°34'N, 83°57'E; 97 m asl) on 15 (or 18) Feb 1968, and in Mar 1969 (or 1970) they obtained a specimen (an incomplete skeleton from a three-day old carcase, supplied by hunters, reportedly from the River Rapti), and saw two (or one) live wild chevrotains in Sal *Shorea robusta* Gaertner f. forest at Mahadeva, Banke District (28°13'N, 81°56'E; 227 m asl). The specimen's current location has not been determined, if it even survives; it is not among the several hundred specimens (of the total of over 4,000 collected by the programme; MITCHELL 1975) held at the Field Museum, Chicago, USA (G. J. GALBREATH in litt. 2008). At around this time, FRICK (1969) also included the chevrotain among Nepal's fauna, but the information sources for his list were not explicit, and some species seem to have been included in error (MITCHELL 1975: 155–156).

There are only a few subsequent indications of occurrence in Nepal. The Central Zoo procured 12 animals between 1965 and 1991; although nine seem to have originated in India (SARITA JNAWALI pers. comm. 2008), three (a male, a female and a calf) were brought from Chitwan National Park (27°30'N, 84°20'E) in exchange for three porcupines *Hystrix* on 24 May 1982. These animals quite plausibly originated in the Nepalese lowlands, but this cannot now be confirmed. Two mounted specimens (numbers 19-0154 and NHM-11) displayed in the Kathmandu Natural History Museum, Swayambhu, were received from the Central Zoo, probably between 1978 and 1995; one is labelled 'West Nepal below 300 m' and was supposedly collected in Chitwan (MISHRA & MIEROW 1976). There is also a single mounted specimen at the National Museum, Chhauni, Kathmandu (specimen number 23); this was badly damaged through long-term display in an open gallery and is now kept in museum storage along with other damaged specimens. Its origin is not clear. Also relevant to evaluating status in the country is that two names are in use in Nepal for chevrotains, "Ramgai" and "Museumriga", of which the literal meanings are Lord Rama's Cow and Mouse-deer respectively. The latter is evidently a recent, direct, Nepali translation of the English name 'mouse-deer', but Ramgai appears autochthonous, and differs from any Indian vernacular/local names given in PRATER (1971). Across

mammals, distinct Nepali names exist only for species which inhabit the country.

Although Mitchell's documentation, in three sources, should have firmly installed the chevrotain in the Nepal fauna, it did not do so in the international literature (see above), and this latter swayed some sources within Nepal. For example, the influential *Biodiversity Profiles Project* (SUWAL & VERHEUGT 1995) simply repeated the caveat in CORBET & HILL (1992): that "early records from Nepal and the Himalayan foothills of NW India have not been confirmed (CHAMPION 1929)". C. P. GROVES (in litt. 2008) confirmed that the Mitchell records were merely overlooked, not deliberately rejected, by GROVES & MEIJAARD (2005), and this has been presumably the case with the other modern reviewers (such as CORBET & HILL 1992). There remain few records from India outside CHAMPION'S (1929) northern range limit of about 24°N: that of STOCKLEY (1930: 563), of a chevrotain he himself shot "10 miles north of Nowgong in Bundelkhand" (Nowgong lies at 25°03'N, 79°27'E) has been generally overlooked, while TEHSIN (1980) found the species at Udaipur, Rajasthan (24°33'N, 73°43'E). With the lack of accessible specimens from anywhere significantly north of 24°N, and the general morphological similarity of species (as recognised by GROVES & MEIJAARD 2005) it is an assumption that the animals in Nepal belong to *M. indica*.

## Current Status and Conservation Issues

While there is no doubt that chevrotains were living in at least some of Nepal's lowlands into the 1960s, and probably the 1980s, their current status is less clear. Suitable evergreen or deciduous forest habitat would always have been limited in Nepal, restricted to the lowlands, the Siwalik hills and the Bhabar area. These areas remained little disturbed until recently because of malaria infestation and the rather low quality of land for cultivation. With the quashing of malaria during the 1950s, rapid habitat destruction occurred between 1960 and 1980 with mass migration of hill people to the fertile lowlands (GURUNG 1983). Now in Nepal, natural and semi-natural terai habitat is almost restricted to protected areas (BARAL & SHAH 2008). Chevrotain numbers will have dropped sharply in Nepal with this heavy habitat conversion, and the species may now be very rare in, or even extirpated from, the country. Nonetheless, despite the lack of records since the early 1980s, it would be premature to consider it nationally extinct, because there has been no recent survey specifically for the species, and it is an inconspicuous

species readily overlooked without specific searches (RAMAN 2004). Indian Chevrotains may be among the most frequently hunted animals in the forests where they occur (MADHUSUDAN & KARANTH 2000, 2002; KUMARA & SINGH 2004; RAMAN 2004), and most of the many hunters interviewed by MADHUSUDAN & KARANTH (2002) believed that their hunting was depressing densities of chevrotains. The real effects of hunting on the species are unknown, although most forest ungulates cannot support very heavy offtakes (ROBINSON & BENNETT 2000). RAMAN (2004) traced no empirical information on chevrotain's resilience to habitat degradation and fragmentation, although the species presumably cannot survive landscape-scale conversion to field agriculture. The lower hills of the Chitwan valley and the Babai valley are the most likely places for chevrotains to persist in Nepal, because habitat here is protected and relatively little encroached.

## Acknowledgements

We thank Sarita Jnawali for information on the captive chevrotains at Nepal's Central Zoo, and Ted Tizard, Melvin Sunquist, T. R. Shankar Raman, Dr Asad Rahmani, Guy Musser, Darrin Lunde, N. Samba Kumar, Md Anwarul Islam, Carol and Tim Inskipp, Larry Heaney, Colin Groves, Gary J. Galbreath, Dan Duff and Edward Dickinson for information and assistance. The need for explicit documentation of this species's status in Nepal became apparent while we were working on its account for the IUCN/SSC Red List Global Mammal Assessment.

## References

- ALI, S. M. (2004): A note on mouse-deer. – *Tigerpaper*, **31**(4): 21–22.
- ASMAT, G. S. M. & HANNAN, M. A. (2006): Checklist of wild animals of Bangladesh. – Gazi publishers, Dhaka. 292 pp.
- BARAL, H. S. & SHAH, K. B. (2008): Wild mammals of Nepal. – *Himalayan Nature*, Kathmandu. 188 pp.
- BLANFORD, W. T. (1891): The fauna of British India, including Ceylon and Burma. Mammalia, part 2. – Taylor and Francis, London: 251–617.
- BLYTH, J. E. (1863): Catalogue of the Mammalia in the museum of the Asiatic Society. – Saville & Cranenburgh, Calcutta, India. xiii + 187 pp.
- CHAMPION, S. W. (1929): The distribution of the Mouse-deer (*Moschiola meminna*). – *Journal of the Bombay Natural History Society*, **33**: 985–986.
- COCKER, M. & INSKIPP, C. (1988): A Himalayan ornithologist. – Oxford University Press, Oxford, UK. xii + 87 pp.

- CORBET, G. B. & HILL, J. E. (1992): The mammals of the Indomalayan region: a systematic review. – Natural History Museum Publications and Oxford University Press, London and Oxford, UK. viii + 488 pp.
- DATTA, A. (2004): Brian Hodgson and the mammals and other animals of Nepal. In: Waterhouse, D. M. (ed.). Brian Houghton Hodgson in Nepal and Darjeeling 1820–1858. – Routledge Curzen, Abingdon, U.K.: 154–171.
- DATTA, A. & INSKIPP, C. (2004): Zoology ... amuses me much. In: Waterhouse, D. M. (ed.): Brian Houghton Hodgson in Nepal and Darjeeling 1820–1858. – Routledge Curzen, Abingdon, U. K.: 134–153.
- ELLERMAN, J. R. & MORRISON-SCOTT, T. C. S. (1966): Checklist of Palaearctic and Indian mammals 1758 to 1946, 2nd edition. – British Museum (Natural History), London. 810 pp.
- FRICK, F. (1969): Die Höhenstufenverteilung der nepalischen Säugetiere. – Säugetierkundliche Mitteilungen, **17**: 161–173.
- GRAY, J. E. (1852): Synopsis of the species of deer (*Cervina*), with the description of a new species in the gardens of the society. – Annals and Magazine of Natural History, (2) **9**: 413–433.
- GRAY, J. E. & GRAY, G. R. (1847, for 1846): Catalogue of the specimens and drawings of Mammalia and birds of Nepal and Thibet presented by B. H. Hodgson esq., to the British Museum. – E. Neuman, London. xi + 156 pp.
- GRAY, J. E. & GRAY, G. R. (1863): Catalogue of the specimens and drawings of mammals, birds, reptiles and fishes of Nepal and Tibet presented by B. H. Hodgson esq., to the British Museum. – Taylor & Francis, London. xii + 90 pp.
- GROVES, C. P. & MEIJAARD, E. (2005): Interspecific variation in *Moschiola*, the Indian Chevrotain. – Raffles Bulletin of Zoology, Supplement, **12**: 413–421.
- GRUBB, P. (2005): Order Artiodactyla. In: Wilson, D. E. & Reeder, D. M. (eds). Mammalian species of the world, 3rd edition. – Johns Hopkins University Press, Baltimore, USA: 637–722.
- GURUNG, K. K. (1983): Heart of the jungle: the wildlife of Chitwan, Nepal. – André Deutsch, London and Tiger Tops, Kathmandu. 197 pp.
- HINTON, M. A. C. & FRY, T. B. (1923): Bombay Natural History Society's mammal survey of India, Burma and Ceylon. Report no. 37, Nepal. – Journal of the Bombay Natural History Society, **29**: 399–428.
- HODGSON, B. H. (1841a): Classified catalogue of mammals of Nepal, corrected to end of 1840, first printed in 1832. – Calcutta Journal of Natural History, **2**: 212–221.
- HODGSON, B. H. (1841b): Classified catalogue of mammals of Nepal, (corrected to end of 1841, first printed in 1832). – Journal of the Asiatic Society of Bengal, **10**: 907–916.
- HODGSON, B. H. (1844): Classified catalogue of mammals of Nepal, (corrected to end of 1841, first printed in 1832). – Calcutta Journal of Natural History, **4**: 284–294.
- HODGSON, B. H. (1847): On various genera of the ruminants. – Journal of the Asiatic Society of Bengal, **16**: 685–711.
- HORSFIELD, T. (1856): Catalogue of a collection of Mammalia from Nepal, Sikim, and Tibet, presented to the Hon East India Company by B. H. Hodgson, esq. in 1853. – Proceedings of the Zoological Society of London, '1856': 393–406.
- KHAN, R. (1985): Mammals of Bangladesh: a field guide. – Nazma Reza, Dhaka. 92 pp.
- KUMARA, H. N. & SINGH, M. (2004): The influence of differing hunting practices on the relative abundance of mammals in two rainforest areas of the Western Ghats, India. – Oryx, **38**: 321–327.
- MADHUSUDAN, M. D. & KARANTH, K. U. (2000): Hunting for an answer: is local hunting compatible with large mammal conservation in India. In: Robinson, J. G. and Bennett, E. L. (eds). Hunting for sustainability in tropical forests. – Columbia University Press, New York, USA: 339–355.
- MADHUSUDAN, M. D. & KARANTH, K. U. (2002): Local hunting and the conservation of large mammals in India. – Ambio, **31**: 49–54.
- MISHRA, H. R. & MIEROW, D. (1976): Wild animals of Nepal. – Ratna Pustak Bhandar, Bhotahity, Kathmandu. 84 pp.
- MITCHELL, R. M. (1975): A checklist of Nepalese mammals (excluding bats). – Säugetierkundliche Mitteilungen, **23**: 152–157.
- MITCHELL, R. M. (1977): Accounts of Nepalese mammals and analysis of the host–ectoparasite data by computer techniques. – PhD thesis, Ames University, Ames, Iowa, USA. 558 pp.
- MITCHELL, R. & PUNZO, F. (1976): New mammal records from Nepal. – Journal of the Bombay Natural History Society, **73**: 54–58.
- PRATER, S. H. (1980): The book of Indian animals, 3rd edition. – Bombay Natural History Society and Oxford University Press, Mumbai, India (as updated 1998). xxiv + 324 pp.
- RAMAN, T. R. S. (2004): Mouse deer (*Moschiola meminna* Erxleben, 1777). – ENVIS Bulletin (Wildlife Institute of India, Dehra Dun), **7**: 131–140.
- ROBINSON, J. G. & BENNETT, E. L. (eds.) (2000): Hunting for sustainability in tropical forests. – Colombia University Press, New York, USA. xxi + 582 pp.
- SARKER, S. U. & SARKER, N.J. (1984): Mammals of Bangladesh: their status, distribution and habitat. – Tigerpaper, **11**(1): 8–12.
- STOCKLEY, C. H. (1930): The distribution of the Mouse-deer. – Journal of Bombay Natural History Society, **34**: 563–564.
- SUWAL, R. N. & VERHEUGT, W. J. M. (1995): Enumeration of the mammals of Nepal. Biodiversity Profiles Project Technical Publication No. 6. – Department of National Parks and Wildlife Conservation, Ministry of Forests and Soil Conservation, His Majesty's Government of Nepal, Kathmandu. x + 151 pp.
- TEHSIN, R. H. (1980): Occurrence of the Large Brown Flying Squirrel and Mouse-deer near Udaipur, Rajasthan. – Journal of the Bombay Natural History Society, **77**: 498.