

# Photographic Records Showing Color Variation in the Capped Langur *Trachypithecus pileatus*

Anwaruddin Choudhury

*The Rhino Foundation for Nature in North East India, Guwahati, Assam, India*

**Abstract:** The capped langur (*Trachypithecus pileatus*) is distributed in South Asia, including parts of India, Bhutan, Bangladesh, Myanmar and Tibet, China. In 2014, I described hitherto unrecorded differences in facial hair patterns (especially the cap) that differentiate its three subspecies (A. Choudhury, *Primate Conserv.* (28): 143–157). Till then, the subspecies had been distinguished based on differences in coat color. The hair patterns have been found to be more dependable than the color patterns that vary individually and with age, sex, and season. Here, I report on new observations that further confirm that color patterns cannot be considered a dependable criterion. The nominate subspecies and the form *durga* are the same, and two color phases in the same group have been photographed using camera traps for the first time. Such photos taken of the same group on the same day indicate that differing coat color is not acquired by all the group members at the same time. These langurs assume different coat colors, and no individual or group can be exclusively assigned as belonging to any particular color phase. I also clarify some confusion on different color phases illustrated by photographs in Beauséjour *et al.* (2021, *All Asian Primates*, Re:Wild, Austin, and Lynx Edicions, Barcelona) labelled as “cream-and-white form,” “golden form,” “grey-blue form” and “grey-brown form.” The variation and seasonality in coat color patterns within groups and within each of the designated subspecies disqualifies their use in identifying them. The facial hair patterns and the cap remain as the characters that most clearly segregate the *Trachypithecus pileatus* subspecies.

**Key Words:** Capped langur, *Trachypithecus pileatus*, color variation, hair pattern, seasonal color changes

## Introduction

The capped langur, *Trachypithecus pileatus* (Blyth, 1843) occurs in South Asia. Its main distribution is in India’s northeastern region. Elsewhere, it is found in Bhutan (Choudhury 1990), Bangladesh (Khan 1981), north-western Myanmar (west of the Chindwin River), and a small area of Tibet, China (Choudhury 2012, 2021; Groves 2001; Groves *et al.* 2013). In India, the species occurs in the states of Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, and Tripura (Choudhury 1989, 2013).

In the past, five subspecies were recognized—*Trachypithecus p. pileatus* (Blyth, 1843), *T. p. durga* (Wroughton, 1916), *T. p. brahma* (Wroughton, 1916), *T. p. shortridgei* (Wroughton, 1915), and *T. p. tenebricus* (Hinton, 1923) (see Pocock 1939; Ellerman and Morrison-Scott 1951; Napier and Napier 1967; Corbet and Hill 1992). The subspecies *shortridgei* was upgraded to a full species by Groves (2001, 2005; see also Groves *et al.* 2013), and *durga* has been synonymised with *pileatus* (see Choudhury 2012, 2013, 2014). Ranges of the three remaining subspecies, *pileatus*,

*brahma*, and *tenebricus*, are separated by the wide Brahmaputra River and its tributary, the Jia-Bhoreli. *Trachypithecus p. pileatus* occurs to the south of the Brahmaputra, and *T. p. brahma* and *T. p. tenebricus* to the east and west of its northern tributary, the Jia-Bhoreli River, respectively. There is no barrier, however, between *brahma* and *tenebricus* in the upper reaches of the Jia-Bhoreli–Kameng (in the higher Himalaya), and there are possible intergrades. Choudhury (2014) described in detail, with photographs, the seasonal color variation in capped langurs. He described hitherto unrecorded differences in facial hair patterns, especially the cap, to clarify further the differences between the subspecies. The earlier segregation was based on pelage coloration that was always somewhat confused due to significant seasonal variations. The new features added by Choudhury do not change with season, making them more comprehensible and consistent than the earlier characteristics used. This arrangement has also been used for the assessments of the species in the IUCN Red List of Threatened Species (Das *et al.* 2020, 2021a, 2021b).

In this article, I corroborate my earlier observations published in 2014 (Choudhury 2014) with more photos, and also clarify the various “forms” based on coat color mentioned in Beauséjour *et al.* (2021). They are not distinct and cannot be exclusively assigned to any individual or group. Since my publication of Choudhury (2014), I have made further field visits to different parts of Assam (the latest observations were on 20 February 2023), Meghalaya (latest field work in January 2023), Arunachal Pradesh, Manipur and Tripura. Areas mentioned in the text, especially where photographs were taken, are shown in Figure 10.

## Results and Discussion

Seasonal changes in coat color were not considered in the descriptions of the subspecies *pileatus* (Blyth, 1843), *durga* and *brahma* (Wroughton, 1916), and *tenebricus* (Hinton, 1923). They were distinguished only on the basis of specimens obtained as they were at the time of collection. Although Choudhury (2014) has been followed in the IUCN Red List assessments (Das *et al.* 2020, 2021a, 2021b) there is still some confusion on different color phases that is evident from Beauséjour *et al.* (2021), where different color phases were treated as “forms.” Some more photos were obtained including camera trap photos that further confirm the findings of Choudhury (2014). The photos also show different individuals in different color shades in different seasons. Interestingly individuals also show different colors in the same group photographed on the same day, indicating that some may acquire brighter colors earlier while some later.

Besides digital cameras that facilitate taking large number of photographs, camera-trap photos can also provide a more discerning identification of consistencies in subspecific variation in capped langurs. Choudhury (2014) showed that the seasonal variation in pelage could be so significant that photos of the same group of langurs (Figs. 1a, 1b, 1c, 2a and 2b, and 4a and 4b), or langurs from the same locality (Figs. 2a, 2b and 3) could well be described as two distinct races if based on a few specimens deposited in a museum. Even in the same group at the same time of year, color can be markedly different, with, for example, darker or lighter gray backs in different individuals (Figs. 2a and 2b).

The distinguishing features of the *T. pileatus* forms, especially the facial hair patterns (Table 2 in Choudhury, 2014), clearly and consistently distinguish *T. pileatus* north of the Brahmaputra River (*tenebricus* and *brahma*) from those to the south (the nominate subspecies *pileatus*). To the north of the Brahmaputra, this is also true for *tenebricus* and *brahma* along the lower reaches of the Jia-Bhoreli River, but forms intermediate between them appear as the river narrows in the upper reaches.

In Beauséjour *et al.* (2021) the capped langur has been shown in different color forms while maintaining the subspecific arrangements as per hair pattern following Choudhury (2014). They considered color phases as “forms”,

indicating that such langurs might be separable from others depending on coat coloration. In the nominate subspecies two color forms have been shown as the “cream-and-white form”, i.e., the earlier and present nominate subspecies (p. 279) and as “golden form”, i.e., the earlier subspecies *durga* (now synonymised) (p. 281). The present study clarifies that there are no such forms that can exclusively be assigned to any form or subspecies. The langurs of the “cream-and-white-form” would themselves acquire a “golden form” at some time of the year. Some may retain one color phase for a longer period than others and there is much individual variation. Figure 1a (left) of the present study shows *T. p. pileatus* in Garbhanga Wildlife Sanctuary, Assam on 4 November. While the langur on the left has largely retained the “cream-and-white form”, the coat in the right photo has the “golden form” coat, with its side-whiskers, arms, thigh and lower back golden. Figure 1b (right) also shows *T. p. pileatus* in the Garbhanga Wildlife Sanctuary, Assam taken on 20 February, and Figure 1c in the Inner Line Reserved Forest, Assam, taken on 29 December which shows further color change with different shades—somewhat transitional as such.

Very interestingly, camera traps placed by me in the Nongkhylllem Wildlife Sanctuary, Meghalaya revealed (Figs. 2a and 2b) for the first time, *T. p. pileatus* in the “cream-and-white form” coat and “golden form” coat together, both in winter (18 February) and summer (23 June). This clearly shows that “cream-and-white” and “golden” forms are not distinct forms as such. The same individuals would acquire these color phases at some time. This further tells us that coat coloration may or may not have much seasonal bearing, at least in nominate subspecies as indicated by presence of both color phases in winter and summer photos in Nongkhylllem.

Beauséjour *et al.* (2021) also indicated two color forms for the subspecies *tenebricus*: a “grey-blue form” (p. 287) and “grey-brown form” (p. 287). I again clarify here that there are no such forms that can be assigned exclusively to any individual or population. All the animals acquire both color phases, although not in such an erratic fashion as is found in the nominate subspecies. Unlike the nominate subspecies, *tenebricus* have not, so far, been found in different color phases together in a group indicating that most individuals may change color more quickly over a shorter time. There are, of course, transitional color phases, as can be seen between the August and September coats in Figures 5a and 5b and 6a and 6b). The different coat-color phases in *tenebricus* are quite contrasting, from a gray to a very dark gray dorsum and a buff-creamy and light reddish-orange to a reddish or orange-red ventrum (Figs. 5a and 5b and 6a and 6b). The langurs living at higher elevations develop relatively thicker fur as an adaptive modification for survival in the colder climates (Figs. 7a and 7b).

In the case of the subspecies *brahma* two color phases occur in the same group as they do in the nominate subspecies. Figures 8a, 8b and 9 are indications of that (further



**Figure 1a (left).** *Trachypithecus p. pileatus* in Garbhanga Wildlife Sanctuary, Assam on 4 November. The langur on the left has retained a “cream-and-white form” coat while the right one has a “golden form” coat with its side-whiskers, arms, thigh and lower back golden yellow. **Figure 1b (right).** *Trachypithecus p. pileatus* in Garbhanga Wildlife Sanctuary, Assam on 20 February. Note further color change (golden-yellow to creamy-buff) in its coat, indicating transition.



**Figure 1c.** *Trachypithecus p. pileatus* near Gharmura in the Inner Line Reserved Forest, Hailakandi district, Assam on 29 December. It still has prominently golden yellow but not as bright as that in Figure 1a on the right but has more golden yellow coat than the individuals in Figure 1b. An example of a transitional phase.

details in photo captions). Here also the color forms cannot be exclusively assigned to any population. The adult female langurs in Figure 8a look different from those in 8b in having buff-white with orange, lacking in the latter. The adult female in Figure 9 also lacks orange. The photos of the subspecies *brahma* suggest a nominate-subspecies-like confusion, but these color changes do not make them different subspecies or forms.

It is not unexpected to think of different color shades of capped langurs as separate subspecies, races or forms owing to the significant variations in pelage in their descriptions as and when collected and deposited as museum specimens. Those descriptions were based upon specimens as they were at the time. Pocock (1928), however, did write that “the colour, however, varies in different individuals assigned to this race” but he did not elaborate as he based his observations largely on museum specimens. It was because of long-term observation of more than four decades and the advent of relatively smooth wildlife photography firstly through SLR and subsequently DSLR cameras that the complexity of color variations could be ascertained. With DSLR a large number of photos can be taken with no extra cost, which facilitated a more discerning identification of consistencies in variations in capped langurs. In fact, the finding that hair pattern is the most reliable tool was practicable owing to the availability of large numbers of photographs that too could be played back immediately in the field itself (earlier one had to wait days for development and printing).

The capped langur continues to be widespread but owing to habitat loss and, to some extent poaching, its numbers are slowly on the decline. Choudhury (2014) mentioned that *Trachypithecus pileatus* occurs in at least 53



**Figures 2a (left) and 2b (right).** *Trachypithecus p. pileatus* in the Nongkhylllem Wildlife Sanctuary, Meghalaya. Langurs at a mineral lick. Both photos show the “cream-and-white form” coat and the “golden form” coat and they belong to same group. Photo on left was taken on 18 February (winter) while right on 23 June (summer). The golden form *durga* is not a subspecies, not even a form. This further reveals that coat color may or may not have much seasonal bearing as indicated by the winter and summer photos above. Both are camera-trap photos.



**Figure 3.** *Trachypithecus p. pileatus* in the Nongkhylllem Wildlife Sanctuary, Meghalaya. Langurs at a mineral lick. I once assumed that the bright color could have a bearing on breeding season. The photo above shows two female langurs with infants – members of the same group. The one on the left has a “golden form” coat and the one on the right a “cream-and-white form” coat. Photo taken on 18 February (winter). Camera-trap photo.

notified protected areas in Northeast India. A few more protected areas have been decreed, and they are listed here in an appendix.

## Conclusions

1. Coat color among capped langur is variable.
2. It is not possible to assign any form or subspecies of a certain individual or group by coat color.

3. The facial hair patterns, including the cap, remain as the more clear-cut indication of the respective subspecies rather than the variable pelage colors.

4. “Cream-and-white form” and “golden form” are color phases, which all of the nominate subspecies acquire at some time or other during the year and do not represent distinct “forms”. Similarly, two color phases named the “grey-blue form” and “grey-brown form” are the same subspecies, *tenebricus*, with color phases appearing at different times of the year.

5. Besides the color phases, there are transitional phases when an individual may look somewhat different.

6. The camera trap photos from Nongkhylllem revealed that coat color change can take place any time of the year in the nominate subspecies as both the color phases were seen in both summer and winter. Observations of this are lacking in the case of *tenebricus*, as it seems that all the langurs in a group show a similar color phase, which could also be seasonal.

7. Photos taken of the same group on the same day but with different color phases indicate that separate coat color is not acquired by all the group members at the same time at least in the case of the nominate subspecies.

## Acknowledgments

I am most grateful to a large number of forest officials for their assistance during the study. I also thank bureaucrats, villagers, local guides and family members for their help and encouragement. Thanks are also due to H. Lato, N. Laloo (both DFO, wildlife at Jowai), A. Datta (DFO, Hailakandi), Bhuvaneshwar Sarma, Pravin Dunai (Range Officer,



**Figures 4a (left) and 4b (above).** *Trachypithecus p. pileatus* in West Kalajari Reserved Forest, Tripura on 1 January. The langur in 4a has a more or less “cream-and-white form” coat while those on the right (4b), in Langting-Mupa Reserved Forest, Assam, 4 October, have a “golden form” coat, with their side-whiskers, arms, thigh and lower back golden yellow. The Figures 2a and 2b confirmed the assumption that such variably-colored coats may not occur at the same time in all the individuals.

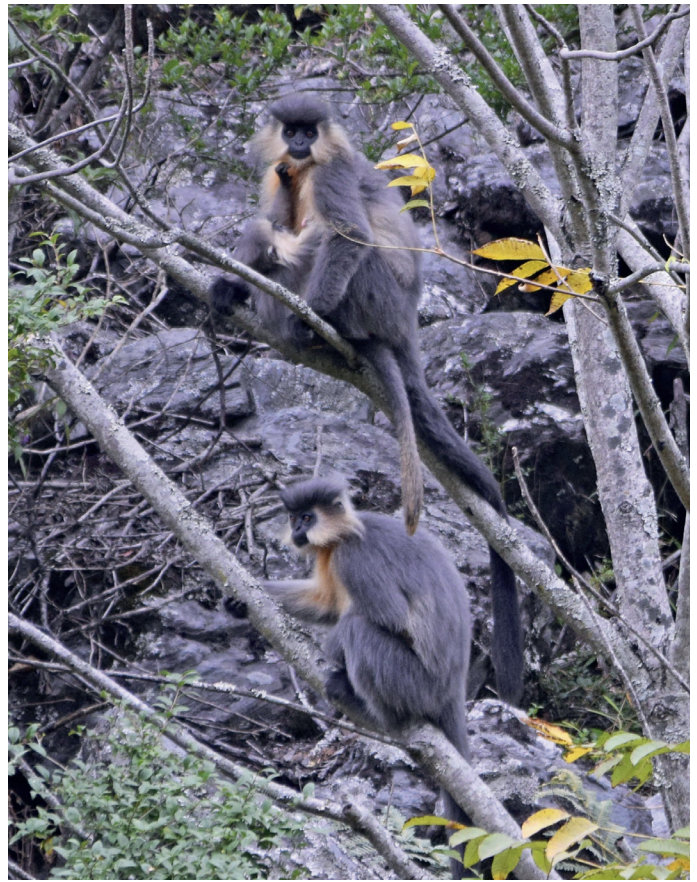


**Figures 5a (left) and 5b (right).** *Trachypithecus p. tenebricus* in Manas National Park, Assam. Photo on the left was taken on 12 April (grey-brown form). On the right on 19 September (grey-blue form). These two individuals belong to the same group in front of Mora Giati anti-poaching Camp. This clearly shows that these are seasonal coat colors and do not suggest any distinct form. During transition, the group may have individuals of both colors.

Nongpoh), Jim and other staff at Lailad, Aftab Ahmed, Amir Sohail Choudhury, M. Khairuzzaman Mazumder, Hasimuddin Choudhury and Bikash Singh. I am also grateful for the helpful comments of an anonymous reviewer.



**Figures 6a (left) and 6b (right).** *Trachypithecus. p. tenebricus* in Royal Manas National Park, Bhutan. Figure 6a on the left was taken on 26 August (transitional between ‘grey-brown’ and ‘grey-blue’ forms with the latter more prominent). Figure 6b on the right in Manas National Park, Assam on 11 December (gray-blue form; dorsum looks dark grey or blackish). These color variations were shown by all the individuals at certain times and, hence, they are not distinct forms. No animal retains the same coat color year-round.



**Figures 7a (left) and 7b (right).** *Trachypithecus. p. tenebricus* on the slopes of Great Himalaya near Dirang, Arunachal Pradesh on 11 November. They have the same hair and color pattern but the only difference with *tenebricus* in Figures 5 and 6 is the thicker and longish fur owing to adaptation to cooler, higher altitudes. These langurs’ home ranges start from 1500 m and extend up to 2100 m elevation and are located far to the north. The elevation of the *tenebricus* langur in Figs. 5 and 6 is less than 130 m.



**Figures 8a (left) and 8b (right).** *Trachypithecus p. brahma* in Pakke Tiger Reserve, Arunachal Pradesh. Both the photos of females were of the same group taken on the same day, 4 March. On the left the langurs have golden-yellow side-whiskers and ventrum (visible areas), while the langur on the right has creamy replacing golden-yellow. This further clarifies that individuals do not change their coat colors at the same time.



**Figure 9.** *Trachypithecus p. brahma* in Pakke Tiger Reserve, Arunachal Pradesh; male on the left and female on the right. Photographed on the same day, 4 March but a different group. In comparison to Fig. 8a, these langurs do not have golden-yellow side-whiskers or ventrum. They would, however, assume that color at some time sooner or later.

## Literature Cited

- Beauséjour, S., A. B. Rylands and R. A. Mittermeier. 2021. *All Asian Primates*. Re:wild, Austin, TX and Lynx Editions, Barcelona.
- Blyth, E. 1843. Memorandum from the Zoological Curator. *J. Asiatic Soc. Bengal* 12: 166–182.
- Choudhury, A. U. 1989. Ecology of the capped langur in Assam, India. *Folia Primatol.* 52: 88–92.
- Choudhury, A. U. 1990. Primates in Bhutan. *Oryx* 24: 125.
- Choudhury, A. U. 2012. Capped langur. In: *Mammals of South Asia*, Volume 1, A. J. T. Johnsingh and N. Manjrekar (eds.), pp.296–314. Universities Press (India) Pvt Ltd., Hyderabad.
- Choudhury, A. U. 2013. *The Mammals of North East India*. Gibbon Books and The Rhino Foundation for Nature in Northeast India, Guwahati, India.
- Choudhury, A. U. 2014. Distribution and current status of the capped langur *Trachypithecus pileatus* in India, and a review of geographic variation in its subspecies. *Primate Conserv.* (28): 143–157.
- Choudhury, A. U. 2021. A short note on the occurrence of capped langur *Trachypithecus pileatus* in Tibet, China. *Asian Primates J.* 9(1): 41–46.
- Corbet, G. B. and J. E. Hill. 1992. *The Mammals of the Indomalayan Region: A Systematic Review*. Oxford University Press, Oxford.
- Das, J., D. Chetry, W. Bleisch, and A. U. Choudhury. 2020. *Trachypithecus pileatus* ssp. *tenebricus*. The IUCN Red List of Threatened Species 2020: e.T39870A17988202.
- Das, J., D. Chetry, A. U. Choudhury and W. Bleisch. 2021a. *Trachypithecus pileatus* (errata version published in 2021). The IUCN Red List of Threatened Species 2020: e.T22041A196580469.
- Das, J., D. Chetry, A. U. Choudhury and W. Bleisch. 2021b. *Trachypithecus pileatus* ssp. *brahma*. The IUCN Red List of Threatened Species 2021: e.T39867A17988125.
- Ellerman, J. R. and T. C. S. Morrison-Scott, 1951. *Checklist of Palaearctic and Indian Mammals, 1758 to 1946*. British Museum (Natural History), London.
- Groves, C. P. 2001. *Primate Taxonomy*. Smithsonian Institution Press, Washington, DC.
- Groves, C. P. 2005. Order Primates. In: *Mammal Species of the World: A Taxonomic and Geographic Reference*,

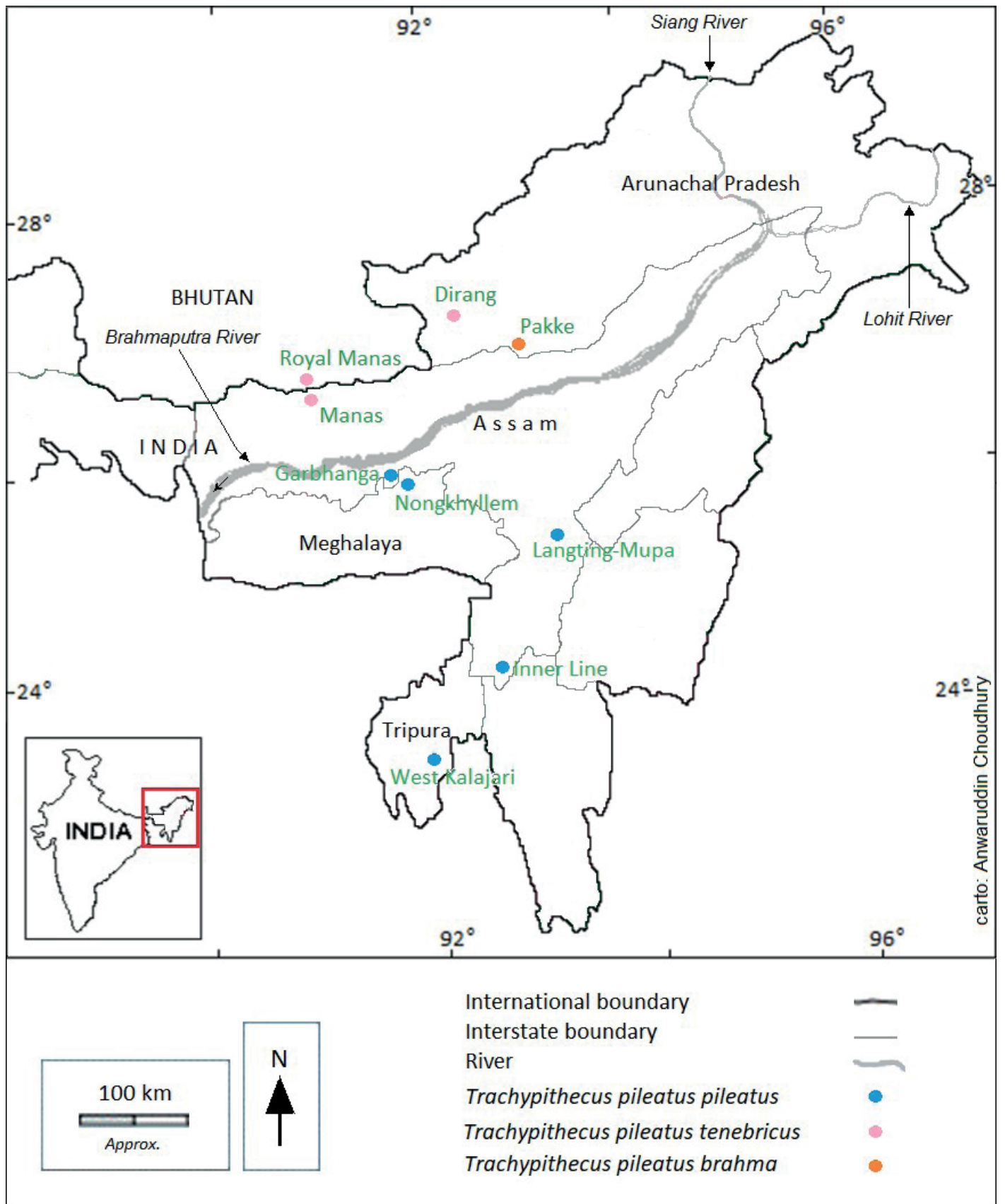


Figure 10. The main areas mentioned in the text and the locations where the photographs were taken of the three subspecies, Map by Anwaruddin Choudhury.



- Volume 1, D. E. Wilson and D. M. Reeder (eds.), 3rd Edition, pp.111–184. Johns Hopkins University Press, Baltimore, MD.
- Groves, C. P., M. Richardson and C. Roos. 2013. Capped langur *Trachypithecus pileatus*. In: *Handbook of the Mammals of the World*. Volume 3. *Primates*, R. A. Mittermeier, A. B. Rylands and D. E. Wilson (eds.), pp.741–742. Lynx Edicions, Barcelona.
- Hinton, M. A. C. 1923. Scientific results from the mammal survey no. XXXVI. On capped langurs (*Pithecus pileatus*, Blyth and its allies). *J. Bombay Nat. Hist. Soc.* 29: 77–83.
- Khan, M. A. R. 1981. The non-human primates of Bangladesh. *Tigerpaper* 8: 12–15.
- Napier, J. R. and P. H. Napier. 1967. *A Handbook of Living Primates*. Academic Press, London.
- Pocock, R. I. 1928. The langurs, or leaf-monkeys, of British India. 2 Parts. *J. Bombay Nat. Hist. Soc.* 32: 472–504, 660–677.
- Pocock, R. I. 1939. *The Fauna of British India, including Ceylon and Burma: Mammalia. I. Primates and Carnivora (in part), Families Felidae and Viverridae*. 2nd edition. Taylor & Francis, London.
- Wroughton, R. C. 1915. A new monkey from the Chindwin River. *J. Bombay Nat. Hist. Soc.* 24: 55–57.
- Wroughton, R. C. 1916. The langurs of Assam. *J. Bombay Nat. Hist. Soc.* 24: 653–655.

Submitted for publication: 27 February 2023

Revision: 14 September 2023

## Appendix

	Area (km <sup>2</sup> )	Subspecies
<b>Assam</b>		
Barak-Bhuban Wildlife Sanctuary	320	<i>pileatus</i>
Behali Wildlife Sanctuary	140	<i>brahma</i>
Garbhanga Wildlife Sanctuary	117	<i>pileatus</i>
<b>Meghalaya</b>		
Narpuh Wildlife Sanctuary	60	<i>pileatus</i>
<b>Nagaland</b>		
Singphan Wildlife Sanctuary	23.6	<i>pileatus</i>