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An observational behaviour of wild Bhutan takin (*Budorcas taxicolor whitei*) in Jigme Dorji National Park, Bhutan

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ABSTRACT

Of six wild bovids occurring in Bhutan, Jigme Dorji National Park is home to four (Bhutan takin, goral, Himalayan serow and blue sheep). Of these four species, only a few studies on Bhutan takin (*Budorcas taxicolor whitei*) have been carried out but there is limited observational data on takin behaviour in Bhutan. Recording observations of animal behaviour is important to help us understand animals' environmental requirements, preferences and dislikes, and health conditions. In this paper, we report ad libitum behavioural observation from 10 different herds of takin comprising of 186 individuals that were counted from March – April 2020 in the winter grounds of Gasa district. Takins were seen resting along the hill ridge with adults at the top and the bottom of the herd, while calves and juveniles were resting in the middle. Upon detecting a threat, the adult takin produces snorting vocalizations and the group run for cover under thick vegetations. A young male was seen flehmening while the herds were moving from one place to another. At the time of moving, three to four adults lead the way with most of the calves moving in a group, followed by the juveniles and then rest of the adults in the herd. Juveniles were observed to be more playful than the calves and the adults. In one occasion, two calves were observed drinking milk from one mother at the same time. Bhutan takins are observed migrating to their alpine/summer habitats at the beginning of summer season and few herds were observed not migrating until mid or late summer.

Key words: Behaviour, Bhutan takin, *Budorcas taxicolor whitei*, herd, Jigme Dorji National park.

INTRODUCTION

Takin (*Budorcas taxicolor* Hodgson 1850) is heavily built animal with greater height at the shoulder than the hip with adults weighing over 300 kilograms with both sexes having horns (Cooper 1923; Neas & Hoffman 1987). Takin is social bovid ungulate native to temperate and alpine forests of eastern Asia (Zeng et al. 2008) and primarily distributed across Bhutan, India, Myanmar and China within the altitudinal range of 1000 – 4000 m (Neas & Hoffman 1987; Shackleton,

1997; Song et al. 2008). As of today, there are four extant takin subspecies namely the Golden Takin *Budorcas taxicolor bedfordi*, the Mishmi takin *Budorcas t. taxicolor*, the Sichuan takin *Budorcas t. tibetana* and the Bhutan takin *Budorcas t. whitei* (Neas & Hoffman 1987). Takin is categorised as vulnerable as per the Red List of International Union for Conservation of Nature (Song et al. 2008).

The Bhutan takin is one of the two smallest extant takin subspecies (other being the Golden takin) occurring in Bhutan (Sharma et al. 2015). The occurrence of Bhutan takin was reported from Sikkim and Arunachal Pradesh in India (Song et al. 2008; Groves & Leslie Jr., 2011). However, Sangay et al. (2016), reported the Bhutan takin (hereafter takin) occurrence from India as incorrect. Wollenhaupt (1990) also reported Bhutan as the westernmost range of global takin distribution. In Bhutan, the takin is found distributed between the elevation of 1200 m (warm broadleaf forests) – 3500 m (alpine meadows) with exception of observing as high as 5374 m (Wangchuk et al. 2004; NCD, 2019). The occurrence of takin is reported from three protected areas [Jigme Dorji National Park (JDNP), Wangchuck Centennial National Park, Phrumsengla National Park] and three territorial forest division (Wangdue Territorial Forest Division, Paro Territorial Forest Division, Thimphu Territorial Forest Division) with the highest suitable winter habitat in JDNP (NCD 2019). Due to the species affiliation with Buddhism, the takin is the national animal of Bhutan and is highly protected under Schedule I of Forest and Nature Conservation Act of Bhutan 1995 (RGoB 1995). As per Bhutanese legend, the takin was created by affixing head of a goat onto the body of a cow by a great Tibetan saint, Drukpa Kuenley, well-known as “Divine Madman” (Wangchuk et al. 2004; Japhu 1966 in Wangchuk et al. 2015). Takin migrates annually from alpine meadows to lower elevations in late summer and travel back again in early spring following steep river courses and traverse ridges (Wangchuk 1999). However, the current study revealed that the takins migrate to alpine meadows towards the beginning of summer with some herd not migrating until midsummer. Mating takes place in midsummer and parturition occurs in March in the winter grounds (Wangchuk et al. 2015). Only a few studies on takin have been conducted on habitat and

diet (Wangchuk 1999; Wangchuk et al. 2015), current distribution and conservation status (Sangay et al. 2016), and distribution and winter habitat use (NCD 2019). Due to steep and rugged terrain, thick forest cover and the presence of a mighty “Mochu” river (the “Mochu” joins “Phochu” river downstream to form “Punatsangchu” and the river after the exit of Bhutan boundary is known as “Sunkosh” river in India which ultimately empties into the Brahmaputra) in the winter habitats of takin, conducting detailed studies on their behaviours encompassing different aspect (for example; activity budget, foraging behaviour, courtship, mating and parturition, social behaviour, solitary behaviour) is very difficult.

Our study aimed to provide basic information on some aspects of the wild behaviour of the takins in Bhutan.

MATERIALS AND METHODS

Study Area

This study was conducted in Jigme Dorji National Park (JDNP, 27°33'N – 28°15'N and 89°14'E – 90°22'E) and with a surface area of 4,374 km², is the second-largest protected area in Bhutan (Fig. 1). The altitudinal gradient ranges from 1200 m in the south to >7000 m in the north encompassing different forest types such as warm broadleaf, cool broadleaf, mixed conifer, fir, shrubs and alpine scrub (Thinley et al. 2015). Areas beyond 6000 m are permanently covered with snow. Some of the dominant tree species include the alder (*Alnus nepalensis*), Himalayan birch (*Betula alnoides*), oak (*Quercus griffithii*), Himalayan hemlock (*Tsuga dumosa*), and the Bhutan fir (*Abies densa*). In addition to the takin, some of the wildlife present are red panda (*Ailurus fulgens*), tiger (*Panthera tigris*), common leopard (*Panthera pardus*), snow leopard (*Panthera uncia*), Himalayan black bear (*Ursus thibetanus*), and Asiatic wild dog (*Cuon alpinus*) (Thinley et al. 2015).

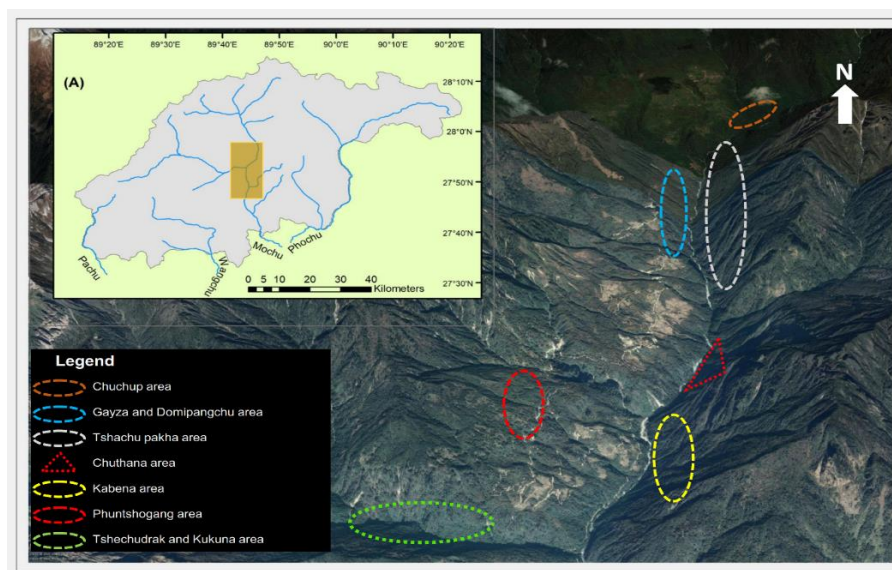


Fig. 1. Inset map (A) represents JDNP and the light-yellow rectangle showing the location of the study site. The blue lines within the map represent major rivers in JDNP. The dashed oval and triangular shapes in the google image, indicate winter grounds of takin under Gasa district.

Data collection

Counting of takin in the winter grounds was carried out between March - April 2020 and a camera trap was installed between May-August 2020 to study time of migration. Counting was carried out by 2 teams (consisting of 4 members each) who visited seven winter grounds namely Chuchup, Gayza and Domipangchu, Tshachu phakha, Chuthana, Kabena, Phuntshogang, and Tshechudrak and Kukuna areas. Each team were provided with the handheld unit of Global Positioning System (*Garmin eTrex Vista HCx*) to record animal presence location, radio handset (*Alinco DJ-CRX1*) to communicate, and standard data collection format. For observing takin, all the members

were provided with a pair of binoculars (*Nikon Aculon 8 x 42*). The team walked existing trails from 8.00 am – 5.30 pm and upon sighting takin, counted their numbers according to adult, juvenile and calf. Since it was difficult to differentiate between males and females from the far distance, we just recorded as an adult. The juveniles are identified from their body size (smaller than adults but bigger than the calves) and the presence of small straight horns (adults have laterally bent slightly downwards, then sharply recurved thickened at the base (Sharma et al. 2105)). Calve is identified from their small-sized body without the growth of horns (Fig. 2).



Fig. 2. Takin age classification. (a) takin calves, (b) takin juvenile, (c) takin adult and (d) takin adults and calf (Photo: JDNP).

Ad libitum behavioural activity was carefully observed and recorded in the field notebook. Secondary information on takin behaviour was also collected from people who most of the time see and/or deal with takins, mainly the Layaps (people of Laya living and grazing their yaks in takin summer habitat *Tsharijathang*) and officials working at Motithang takin preserve. To study the time for migration, we installed a camera trap (*Reconyx HyperFire 2™*) at Chuchup grazing ground from May - October. The Chuchup grazing ground is only winter grazing ground with the presence of mineral licks.

RESULTS

We recorded 186 individuals of takin (adults = 114, juveniles = 27, calves = 45) during the count which began from March – April 2020, in the winter grounds of Gasa district in JDNP (Table 1).

While taking ad libitum behavioural observations, as described by Powell et al. (2013), we

recorded seven behavioural categories namely, resting, vocalization, alert, moving, social play, flehmen, maternal and migration.

Table 1. Number of takins recorded as per the age class under each winter grounds of Gasa district in JDNP (March – April 2020)

Sl . #	Name of the grazing ground	Number of adults	Number of juveniles	Number of calves
1	Gayza and Domipangchu ng	40	25	21
2	Tshachu phakha	41	0	12
3	Chuchup	1	0	0
4	Chuthana	0	1	0
5	Kabena	16	1	10
6	Phuntshogang	9	0	0
7	Tshechudrak and Kukuna	7	0	2

Resting

At Gayza and Dompangchung areas, we sighted a herd of takin resting. All the individuals were resting (sternal recumbent – animal lying on stomach) along the hill ridge with calves and juveniles in the centre and the adults at the top and the bottom of the resting herd.

Vocalization

One of the adults resting at the top of the ridge made a snorting vocalization upon detecting threat (saw us approaching), quickly got up on its legs and slowly moved into the dense forest. After a few seconds, the rest of the herd followed and disappeared into the dense forest.

Alert

Takins are most of the time alert. An adult male takin after sighting our team immediately placed his forelegs onto a small rock nearby and stared at us. This posture alerted a calf and the mother nearby him. After a while, he made a snorting vocalization and then all three ran downhill into the thick forest cover. Despite their size, they are capable of running with high-speed leaving all four feet off the ground.

Moving

Takins move slowly with their head held low. While moving three to four adults lead the movement followed by calves moving in a group and then followed by juveniles and the rest of the adults. While moving they make frequent short stops looking around and checking for threats.

Social play

The social play was observed in a juvenile. While moving, the juvenile was observed running towards other juveniles and standing on its hind legs with head held high, headbutted another juvenile. At Kabena grazing area (opposite Ghathan), while all the individuals in the herd were seen foraging and feeding, four of the calves were observed climbing on the big fallen tree and stayed on it for a long period. When the whole herd came together, most of the calves congregate together.

Flehmen

A young male was observed flehmening while the herd was moving. He did after directly sniffing anogenital part of female takin. Only males have been reported to flehmen.

Maternal

Two calves were observed drinking milk from one mother at the same time.

Migration

Majority of the takin herds in Chuchup grazing ground were observed to migrate for summer grazing grounds (Tsharijathang in Laya) by the first week of June. However, a group of three (male, female and a juvenile) were found using the winter grounds until late July (Fig. 3).



Fig. 3. Three takin individuals (female, juvenile and male) camera trapped at Chuchup grazing ground until the end of midsummer (Photo: JDNP).

DISCUSSION

Although our reporting in this study was entirely based on ad libitum observation of wild takin, we are very much sure that some of our observations made here are unlikely to be reported from the behavioural studies carried on other takin subspecies from all the takin range countries. Careful observation of animal behaviour provides information on animals' environmental requirements, habitat preferences and dislikes, and internal health (Mench & Mason 1997). In the current study, though no specific time was recorded for diurnal activities such as foraging, feeding, ruminating, drinking, resting, etc., we have observed that most of the time takin herds were seen foraging and feeding. Only at one point of observation at 10.04 am along with Gayza and Domipangchu areas, a herd of takin was observed resting under the trees along the hill ridge with juveniles and calves in the middle and adults at the top and bottom of the resting herd. This pattern of resting probably means taking care of their calves and the juveniles from predators. Resting on the hill ridge provide takins with almost 270° visibility and can easily detect predators and other threats approaching. Concerning the captive Qinling golden takins, it was reported that they rested between 09:00 – 10:00 under trees and resting was observed more frequently than other diurnal behaviours due to its heavy body size (Wei et al. 2007).

Takins upon detecting any approaching threat, snorting vocalization is produced by an adult as a signal of alert. To investigate the threats closely, takin places their forelegs onto the rocks and stare continuously at the threat. A similar observation was made by Mr Yeshey Tenzin who happened to sight solitary male takin at Phuntshogang area (Tenzin *pers. comm.*) during the same study period. Placing their forelegs on the rocks help them elevate their height and may provide a vantage point to assess the approaching threats with a much broader view. After detecting and assessing threats they run at high speed with all four feet lifting off the ground and then disappear into the thick cover of the forest. Takin when moving from one place to another in a large herd (40 – 50 individuals), three to four adults lead the movement and majority of the calves follow these adults in a group. The calves are then followed by juveniles and the remaining adults. While moving, they keep their heads low and quite often, they would make a short halt to look for threats. Adults leading the movement may be related to studying their olfactory or certain landmark features to help them get to where they are going. Calves moving in a group and adults following at the very end may be related to the protection of the calves and overall safety of the herd.

The social play was observed with one of the juveniles and the juvenile was headbutting others like that of goats. Powell et al. (2013) reported that the overall social behaviour of takin resembled more of the mountain goat. Four takin calves were seen climbing on the huge fallen tree opposite Ghathana. All the four calves would climb on the fallen tree with much ease.

The easiness associated with climbing on the fallen tree might be related to hooves having soft pad which could provide good traction in both dry and wet surfaces as in the case of mountain goats (Brandborg 1955). Flehmen was only observed once when a sub-adult male sniffed anogenital part of female takin. Flehmen is said to be more common in the breeding males and no female takin is involved in flehmen (Powell et al. 2013). The act of Flehmen by this sub-adult male may be related to the probable onset of first sexual interest and the first increase in production of male sex hormone, testosterone (Rawlings et al. 1972). Another possibility could be, the female takin may have come into estrus. Generally, takin mates in midsummer at summer grounds and give birth in winter grounds in March (Wangchuk et al. 2015). However, a knowledgeable hunter from Siang valley, Arunachal Pradesh, India informed of two calving seasons in the Mishmi takin – late autumn and spring/summer (Sharma et al. 2015). In Motithang takin preserve (the only ex-situ preserve located at Motithang in Thimphu, Bhutan), as informed by Mr Chimi Dorji (erstwhile takin preserve in charge 2017 – 2018), generally the calves are born between February – March, but strangely in one occasion (2018), a calf was born in May (Dorji *pers. comm.*). The camera trap results revealed that majority of Bhutan takin within Gasa district migrate to their summer/alpine grazing ground with the onset of the summer season. Some herds are even observed to stay in their winter grounds until midsummer. The reasons for such delayed migration could be related to the easy availability of both mineral lick and enough vegetations for browsing. The herd at Kabena areas were seen using the area until late summer (mid-August).

Our team observed two calves drinking milk from one mother at the same time in Kabena area. Could this be a twin or a mother feeding offspring of another? Ali and Santapau (1959) reported the possible birth of twin calves at Lakdang Ritjawng Kung, Myanmar based on the anecdotal report. There are more chances of animals giving birth to a twin. In one rare occasion, a domestic jersey-cross cow in Tsirang (Bhutan) gave birth to triplets (Kuensel 2016). The domestic jersey-cross share the same family (Bovidae) with takin. Feeding of calves to a different born mother may not be possible in case of takins and it has never been reported before. At Tshachu phakha, we saw four calves together and one calf was found suckling the milk while other calves didn't bother to even come close. In takin preserve, an orphan calf was denied milk feeding by rest of the mothers with calf and so the preserve started to bottle feed the orphan calf (Dorji *pers. comm.*). Ap Wangyel of Laya was involved in yak rearing around Tsharijathang areas for many years and he informed that he has never seen two or more calves drinking milk from a single mother (Wangyel *pers. comm.*). Therefore, we are very much sure of takins giving birth to a twin and not feed a calf born to a different mother.

Through this study, we could document some of the important wild takin behaviours which were otherwise lacking. At the same time, we also acknowledge that many behavioural aspects are missing especially the activity time budget, mother-calf relationship, reproduction and many more.

Funding

There was no funding for this study.

Ethical standards

All required permissions for our surveys were provided by Jigme Dorji National Park, Department of Forests and Park Services, Bhutan.

Declarations of competing interests

We declare no conflict of interests.

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REFERENCES

- Ali S, Santapau H. 1959. Does the takin produce twin calves? *Journal of Bombay Natural History Society* 56: 130–131.
- Brandborg SM. 1955. Life history and management of the mountain goat in Idaho. *Idaho Wildlife Bulletin* 2: 1–142.
- Cooper HL. 1923. The Mishmi takin (*Budorcas taxicolor*). *Journal of Bombay Natural History Society* 29: 550–551.
- Groves C, Leslie Jr DM. 2011. Family Bovidae (hollowed-horned ruminants). In: Wilson DE, Mittermeier RA. (eds.) *Handbook of the Mammals of the World. Hoofed Mammals – Vol. 2*. Lynx Edicions, Barcelona, p. 712–731.
- Kuensel. 2016. Cow gives birth to triplets. <https://kuenselonline.com/cow-gives-birth-to-triplets/>. Accessed 20th April 2020.
- Mench JA, Mason GJ. 1997. Behaviour. In: Appleby MC, Hughes BO. (eds.) *Animal Welfare*, p. 127–142.
- Nature Conservation Division (NCD). 2019. Distribution and winter habitat use of Bhutan takin, *Budorcas taxicolor whitei*, in Bhutan (A National Report for the National Animal). Nature Conservation Division, Department of Forests and Park Services, Ministry of Agriculture and Forests, Thimphu, Bhutan.
- Neas JF, Hoffmann RH. 1987. *Budorcas taxicolor*. *Mammalian Species* No. 277, p. 1–7.
- Powell D, Spee B, Li S, Blumer E, McShea W. 2013. An ethogram and activity budget of captive Sichuan takin (*Budorcas taxicolor tibetana*) with comparisons to other Bovidae. *Mammalia* 77: 391–401.
- Rawlings NC, Hafs HD, Swanson LU. 1972. Testicular and blood plasma androgens in Holstein bulls from birth throughout puberty. *Journal of Animal Science* 34: 435–440.
- Royal Government of Bhutan (RGoB). 1995. Forest and Nature Conservation Act of Bhutan. Royal Government of Bhutan.
- Sangay T, Rajaratnam R, Vernes K. 2016. Current distribution and conservation status of Bhutan Takin *Budorcas whitei* Lydekker, 1907 (Artiodactyla: Bovidae). *Journal of Threatened Taxa* 8: 9630–9637.
- Shackleton DM. (ed.) 1997. Wild Sheep and Goats and their Relatives -Status Survey and Conservation Action Plan for Caprinae. IUCN/SSC Caprinae Specialist Group, IUCN, Gland, Switzerland and Cambridge, UK, p. 390.
- Sharma D, Wanghuk T, Rawat GS, Johnsingh AJT. 2015. Takin, *Budorcas taxicolor*. In: Johnsingh A. J. T. and Manjrekar N. (Eds.), *Mammals of South Asia* 2: 376–384.
- Song YL, Smith AT, MacKinnon J. 2008. *Budorcas taxicolor*. The IUCN Red List of Threatened Species 2008: Version 2020-1. <https://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T3160A9643719.en>. Accessed on 14th April 2020.
- Thinley P, Tharchen L, Dorji R. 2015. Conservation Management Plan of Jigme Dorji National Park for the period January 2015–December 2019. Department of Forest and Park Services, Thimphu, Bhutan.
- Wangchuk TR. 1999. Diet selection by Bhutan takin *Budorcas taxicolor whitei* on its summer range in Jigme Dorji National Park, Bhutan. MSc Thesis, University of Life Sciences, Norway.
- Wangchuk TR, Wegge P, Sangay T. 2015. Habitat and diet of Bhutan takin *Budorcas taxicolor whitei* during summer in Jigme Dorji National Park, Bhutan. *Journal of Natural History* 50: 759–770.
- Wangchuk T, Thinley P, Tshering K, Yonten D, Pema B. 2004. 'A Field Guide to the Mammals of Bhutan', p. 96–97.
- Wei C, Qi S, Qing-yi M, Guang-lin P, Chu-zhao L. 2007. Diurnal activity rhythms and time budgets of captive Qinling golden takin (*Budorcas taxicolor bedfordi*) in the Qinling mountains, Shaanxi, China. *Journal of Forestry Research* 18 (2): 149–152.
- Wollenhaupt H. (1990). Etho-ecological investigation of the Takin (*Budorcas taxicolor*) in Bhutan. *Tshenden* 2: 32–43.
- Zeng ZG, Skidmore AK, Song YL, Wang TJ, Gong HS. 2008. Seasonal Altitudinal Movements of Golden Takin in the Qinling Mountains of China. *Journal of Wildlife Management* 72: 611–617.