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Territorial behaviour of kiang (*Equus kiang* Moorcroft, 1841) in Ladakh (India)

N.V. Paklina & C. van Orden

Abstract

The observations of kiang behaviour were made in Navokar valley northeast from Tso Kar Lake (Ladakh, India) between 30 July and 22 November 2001. In breeding season (end of July - end of August) adult kiang males kept not overlapped, protected territories (about 10 km²), and marked by single defecation and urination marks. There were adult females with and without offspring on the territories (up to 12 animals, including the male). A distance between male and females on the territories was usually hundred times bigger, then a distance between stallion and his harem in horses. Females with foals didn't take part in mating, but stood on territories approximately till mid September, when foals became 1.5 - 2 month old. From this time adult females started to join in bigger group and bachelor groups came down to the valley from the plateau. In October - November we registered groups of adult females with offspring (up to 37 animals), accompanied by one adult male; bachelor groups of different age males, including old ones (up to 25 animals) and groups of young (2 - 3 years old) females (up to 9 animals). The number of kiangs in Navokar valley increased in two times in autumn in comparison with the breeding season and reached 78 animals. The maximal numbers of kiangs sighted in one day in the surrounding of Tso Kar was recorded in October (151 animals).

Key words: behaviour, breeding, kiang, Ladakh, territory

Introduction

In 1998-2001 we visited a significant part of kiang range, including South-West Tibet, Ladakh and Sikkim and came to conclusion that the best conditions for studying kiang behaviour, which is still not well known and require additional observations (SCHALLER, 1998) are in Ladakh. The kiang range in Ladakh is limited by western edges of Tibetan Plateau named Chang Tang. Numbers of kiang in Ladakh is around 500 –1500 ((FOX, NURBU & CHUNDAWAT 1991; DENZAU & DENZAU 1999). According to IUCN/SSC Equid Specialist Group classification (DUNCAN 1992), kiangs of Ladakh population belong to the western subspecies (*Equus kiang kiang*).

The first suggestion about territorialism in kiangs in breeding season was made by Schaller (1998), based on many years of observations in Chang Tang Reserve (northwest Tibet, China).

Gertrud and Helmut Denzau made first observations of kiang behaviour in Ladakh near Tso Kar Lake in June-July 1995 and in August 1996 (DENZAU & DENZAU 1999).

We were prepared to do our investigation in 2001 at the same area as Denzau later in season (from the end of July till the end of November), but didn't find a single kiang around Tso Kar Lake. There were many tourists and much traffic in August near Tso Kar. So, we started our observations in Navokar valley, where we found kiangs. Later we realized, that Denzau observed kiangs in the surrounding of Starsubuk Lake. The big salt lake Tso Kar is connected on the south with the small sweet water lake Starsubuk by a narrow canal. Because there were not good maps at that time, Denzau called Starsubuk Lake by mistake as Tso Kar Lake. They wrote, that they observed only territories, situated around sweet water and can't say anything about territories, situated around salt water. The map made by them supported our suggestion.

Material and methods

Tso Kar Lake (32.80 N; 78.20 E) is situated on Chang Tang, about 150 km from Leh (34.16 N; 77.58 E) behind Tanglang La Pass. Between 30 July and 22 November 2001 we visited this area five times. The observation time was about 200 hours. First (30.07 - 4.08) and second (12.08. - 23.08) observation periods cover the breeding period (birth and mating seasons).

Most observations were made in Navokar valley (4260 - 4500 m altitude), northeast from Tso Kar Lake. An old road about 10 km long went along the valley to Kiere La Pass. This road crossed three adjoining kiang territories, which we gave numbers 1, 2 and 4. The animals of these territories became our main studying subject. Periodically we made also a 34 km route around Tso Kar Lake. Big distances and bad road condition requested to use 4wd car.

We used the method of individual identification of key animals. Description of colour variations (dark and light), drawing of "wings" (dark spots of a different form on shoulders) and scratches from bites and beats helped much for an individual identification. Most kiangs had erected manes, but manes some of them were lying to the left or to the right side, what was a reliable distinctive mark too. Some kiangs had no tails, but their ears were not damaged or bitted off as Indian wild asses or (*Equus hemionus khur*) in Little Runn of Kutch (Gujarat, India).

The age of animals we determinate by a complex of distinctive marks, tail length was one of it. Despite of adult kiangs were ready with moult before August, one-three years old animals still had parts of old hair on their bodies (fig. 1). Old animals had thin mane and tail, were dull coloured and couldn't move fast. Sex of animals we usually determinate by urination pose. We made detail description of 23 adult and young animals: 10 males and 13 females.



Fig. 1: Female with a foal from last year in Navokar valley (Ladakh, India, 13.08.2001).

Results

At the beginning of our observations the extensive Navokar valley was already divided by adult males in seven territories. There was no fighting between males. Each territory was more than 10 km² and included a part of valley, a mountain slope and a fragment of high plateau. Territories had relief where kiangs could find shields to escape from sight and bad weather conditions, especially from sand and snowstorms. There were enclosures for the livestock on the territories 1 and 2, but empty in this time of the year.

Study territories (1, 2 and 4) had good vegetation: *Stipa*, *Ceratoides*, *Astragalus*, and *Carex* around mountain springs. On low places small bushes of *Caragana sp.* were grown. Each territory had at least one water source. On territories 1 and 2 kiangs drank from springs, and kiangs from the territory 4 went to drink to the pools with sweet water in marsh coast of the Tso Kar Lake. Drinking of salt water was not sight. Each territory had more than one place without vegetation (for instance, on the road), where kiangs, who have not a mutual grooming, liked to roll in calcium soil.

In the first observation period there were not only adult male and adult female (s) on the territories, but sometimes also groups of young (two-three years old) animals, males and females in separate groups. Size of groups varied from 2 up to 8 animals. For instance, on 1 August we found territorial male 2 resting on the hill slope on a small distance from 14 young kiangs. Young animals were in 3 groups of 3, 5 and 6 individuals. When our car came closer all kiangs joined in one group without aggressive reactions, but with mutual sniffing. We tried to come still closer, but then kiangs galloped down from the hill. After that the territorial male 2 left the group, drift away and disappeared out of view. Groups didn't follow him.

Next day we found 1 adult female with foal together with another 2 females on territory 2. Male 2 trotted to the group of 7 young kiangs, who were grazing on the edge of his territory. Young males saw him coming and trotted just over the border to the territory 1 and stopped there. Territorial male 1 at that time was on another side of his vast territory and did not react on young males (probably he even didn't see them).

At the same day we met 2 young males crossing territory 4, but also out of view of the territorial male, who was near the only female with newborn foal. Except of that a group of 5 females crossed territory 4 by the way to the lake without problems.

In the next days territorial males were more aggressive to the groups of young males. On 3 August we found two groups on the territory 1. One consisted of 5 adult females with 3 foals and the second one was a group of 8 young kiangs. The territorial male 1 trotted to young kiangs with retract ears. He repeated this behaviour three times and each time the young ones were chased a little bit away, but stopped as soon as the territorial male stopped. At last male 1 galloped to them on full speed with retract ears in clouds of dust and looked very aggressive. We believe, in such moments territorial males can bite off the tail of one of the young ones.

But coming closely to the edge of his territory male aggressiveness was decreasing. Near the border (invisible for us, but, it seems, well known by kiangs) he stopped and began to sniff the earth. Young males stopped on the other side of the territorial border and also sniffed the earth. After sniffing territorial male had flemen and marked the territory by defecation and urination.

When territorial males saw on their territory (or nearby) moving kiangs, domestic asses, people or transport, they made demonstrative marking (one, more seldom two defecations) in any place inside of their territory. Demonstrative marking included: sniffing earth, scratching earth by hoof, step over the scratched place and defecation (without sniffing the excrements).

The borders of territories 2 and 4 didn't change during whole breeding season, but along the perimeter of territory 1 and even on the edges we saw from 14 till 23 August from 1 up to 3 single adult males, who didn't mark the territory. Groups of young kiangs were not registered on studying territories during second observation period.



Fig. 2: Adult male herding females and foals in Navokar valley near Tso Kar Lake (Ladakh, India, 20.11.2001).



Fig. 3: Running young female in Navokar valley (Ladakh, India, 19.10.2001).

On the territory 4, situated closer than others to the lake and to the small nomad village Samad Rokchen, from 2 up to 4 domestic horses (castrated males) were regular grazing, and on the territories 1 and 2 argali (*Ovis ammon*) regular used water springs, but we didn't observe any aggressive or positive interspecies contacts.

The numbers of adult females on the territories in August change from 2 up to 7. As a rule, there were females with foals, females with yearlings and females without offspring. One old female with 2-3 year old daughter and the female with 2 foals (foal and yearling) were exceptions. The total numbers of animals on one territory, including territorial male and foals, changed from 5 up to 12 (without counting animals, crossing the territories). The numbers of foals on each territory was not more, then 3.

Territorial males tried to keep females on their territories and far from the borders (fig. 2). Only the old mare and her daughter were exceptions: they could cross free the territorial borders and join different female groups. Usually they took a side from a group when male started to herd it, because the old mare could not move fast.

For herding females territorial males used the typical for all horses pose: trot or gallop with neck horizontal to the earth, retracted ears and tail straight behind. Sometimes herding was accompanied with loud sounds, which we, nevertheless, could hardly hear because of the vast space. When one of the territorial males crossed the territorial border following females, the owner of the neighbour territory at first run to him and chased him away, and only after that he followed the females. Territorial males mated only inside of their own territories with females, which stay on that territory or just crossed it (fig. 3).

During grazing and rest territorial males usually kept a distance about 400-600 m. or even more from females. Once the territorial male (No. 4) went alone to the lake for drinking, and left females on a distance more then 2 km.

In moments of danger males gave a signal (short but loud breathing out) and started to run by specific trot, so called "wooden steps", with raised head and turned it a little bit to the side, to keep eye on the potential danger. If danger was behind him, he runs by zigzag, turning the head to the left and to the right. The foal from the territory 4 was able to trot in this way already in age of 40 days, running away from a car.

The stability of the situation on the territories was very different. The most stable situation was on the territory 4, were from 3 till 23 August were permanently the same animals - one female with foal and one female with yearling. On the territory 1 in breeding season numbers of animals (including females, yearlings and foals) varied from 5 up to 8, and on territory 2 - from 3 up to 11. Females with yearlings were more movable, then females with foals.

In the third observation period (9-15 September) territories still existed, but mating period was over. On territory 1 were three females with foals, one female with yearling and the old mare with her daughter. On territory 2 during all days we met only male 2, who continued to mark and protect his territory. Male groups (7-9 animals) were again seen in the valley. There were young and adult males, including an old one in the bachelor group of 9 animals.

The fourth observation period was very short (18-20 October). We had no time to look for our key animals. There was still no livestock in Navokar valley, and the groups of adult females of kiangs became bigger (up to 23 animals, including offspring). Bachelor groups (up to 25 animals) kept separate, but were not chasing by adult (territorial) males. So, we can say, protected territories didn't exist any more.

In last, also very short observation period (19-22 November) in Navokar valley we found big groups (up to 50 animals). There were 7 foals in a group of 17 animals with one adult male. South of Tso Kar Lake the group of 37 kiangs with 11 foals had only one adult male too (fig.4). Bachelor groups and groups of young females were separate.



Fig. 4: Group of females with offspring and one old male on the southern coast of Tso Kar Lake (Ladakh, India, 20.11.2001).

In breeding season (in August) we counted a maximum of 39 kiangs during one visit of Navokar valley. In September this number increased up to 51, and in October-November we counted two times more kiangs, then in August (78 animals). The maximal numbers of kiangs (151 animals) sighted in one day in the surrounding of Tso Kar was registered in October.

Discussion

Kiangs demonstrated territorialism in breeding period (birth and mating seasons) in Navokar valley. Breeding season in kiangs starts at the end of July and continues about one month. So, it starts two months later and it is two times shorter, then in kulans (*Equus hemionus*) in Mongolia (ŽIRNOV & ILINSKY 1985). Breeding period covers the warmest time of a year. Period without night frost in 2001 was between 31 of July and 10 September.

Adult males kept not overlapped, marked and protected territories. It gave them a priority in mating with females who stood or crossed these territories. Adult females could move from one territory to another, but males tried to prevent such movements. Females with foals were less movable, then females with yearlings or females without offspring. One female with foal didn't change the territory from the birth of her foal till the time he became 1.5 month old.

Only females with yearlings and females without foals took part in mating. Mating with female with a foal can happen only as exception. It means that territorial males have not a clear "profit" from females with foals, but they try to get and to keep females with foals on their territories too. Territorial males continued to protect the territories from other males after the end of rut (end August), till the time, when females with foals left the territories and joined in bigger groups (mid September).

A distance between male and females on the territory in kiangs was usually up to hundred times bigger, then a distance between stallion and his harem in horses. We sighted also some differences in marking behaviour of kiangs from horses with harem social organization, for instance, from feral horses (*Equus caballus*) and Przewalsky horses (*Equus przewalskii*), which we observed earlier. Territorial males of kiangs:

- a) didn't make big defecation piles, but marked the territorial borders by single defecation and urination marks;
- b) didn't sniff own excrements after defecation;
- c) didn't mark urination and defecation marks of females.

We were not so lucky to see fights between males, although according DENZAU (1999) long and hard fights can happen in August. But we registered single adult males at the edges of the territories during the rut, probably attracted by females in oestrus and looking for the chance to mate. It looked that territorial males were so busy with females, that they couldn't control the borders of their vast territories well.

One of the reasons of low fight activity of males can be the decreased numbers of kiangs. According to local people there were a lot of dead livestock and kiangs in winter 1997/98, because of unusually deep snow cover was on Chang Tang from the beginning of September till end December 1997.

Decreasing of kiang numbers can be also the reason of bigger territory size. In 1995/96 the size of the territories was at least half from the size in 2001 and varied from 0.2 up to 4.9 km² (DENZAU & DENZAU 1999). But it can be also, that territory size is very changeable and depends, for instance, from the distribution and abundance of food and water. There were many water sources (springs) in Navokar valley, but near Starsubuk kiang males had to conquer with each other to approach the only one water source - the sweet lake.

We registered increasing of kiang numbers in Navokar valley and around Tso Kar Lake in general in autumn. From mid September we met again bachelor groups in the valley. We suggest they had to stay on the high plateau (about 5000 m altitude) during breeding season. In mid October number of kiangs in the valley was double in comparison with August, and this continued till the end of November, when we stopped the investigation.

In October - November we met groups of adult females with offspring (up to 37 animals), accompanied by one adult male; bachelor groups (up to 25 animals), formed by males of different age, including old ones; and groups of young females (up to 9 animals).

According to local people nomads with their livestock come to Navokar valley only for two months - January and February. But nobody could say were the kiangs go for this time and when they return back.

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