

Observations on the Sumatran Rhino (*Dicerorhinus sumatrensis*) at Copenhagen Zoo

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With 6 Figures

Introduction

The Sumatran Rhinoceros is a very rare species. Probably around 100 specimens survive (SINAGA 1970, letter to the author). Literature on the species hardly exists, and therefore the behaviour of the species was investigated in connection with a course in ethology. Because of limited time the investigation was superficial. I intended to continue my studies later, but meanwhile the animal has died. This contribution is therefore purely preliminary. It is published because so little is known about the topic and in memory of "Subur".

Material and Methods

"Subur" (♀) was captured in 1959 on Sumatra (ANDERSEN 1961). She was probably born in 1956, and from 4/12 — 1959 she was at the Copenhagen Zoo where she died 24/2 — 1972. Apart from occasional visits the observations were carried out from 20/3 to 10/4 — 1970, 9 a.m. to 5 p.m. each day. As the behaviour was rather uniform from one day to another, this time-factor is largely ignored.

The organization of the cage was considered, because it limits the biological possibilities of the animal.

Limitations placed on the collection of data presented here, were the opening-hours of the Zoo as well as the time of the year.

Apart from direct observations made by the author persons having direct knowledge about the animal have been interviewed. Measurements were made with 2 m rule and wrist-watch.

Results and Discussion

General information

The weight of the rhino was ~900 kg. She was 200 cm long from the nose to the base of the tail, about 135 cm over the shoulders, and the head was about 60 cm long. Her footprint was 20—25 cm across and 25—30 cm long when measured in loose snow. The distance between her ipsilateral footprints varied between 40—80 cm. When walking she sometimes ambled and sometimes she moved her legs forward in the sequence: left foreleg-right hind leg-right foreleg-left hindleg etc. Two legs generally moved at the same time. It was observed that the legs were raised high, probably as a result of adaptation to a

swampy habitat. This adaptation to a swampy habitat is emphasized by the smooth underside of the hooves, which spread when she walked. She slid a little on the cement floor of the indoor cage. It was therefore suggested that floors in such cages have rough surfaces.

"Subur's" diet usually consisted of the following: mainly beets, some apples, a few bananas, a loaf of rye bread cut to pieces and an orange served in two



Fig. 1. "Subur" walking in her outdoor cage. Notice the worn front horn. Phot.: ERIK PARBST

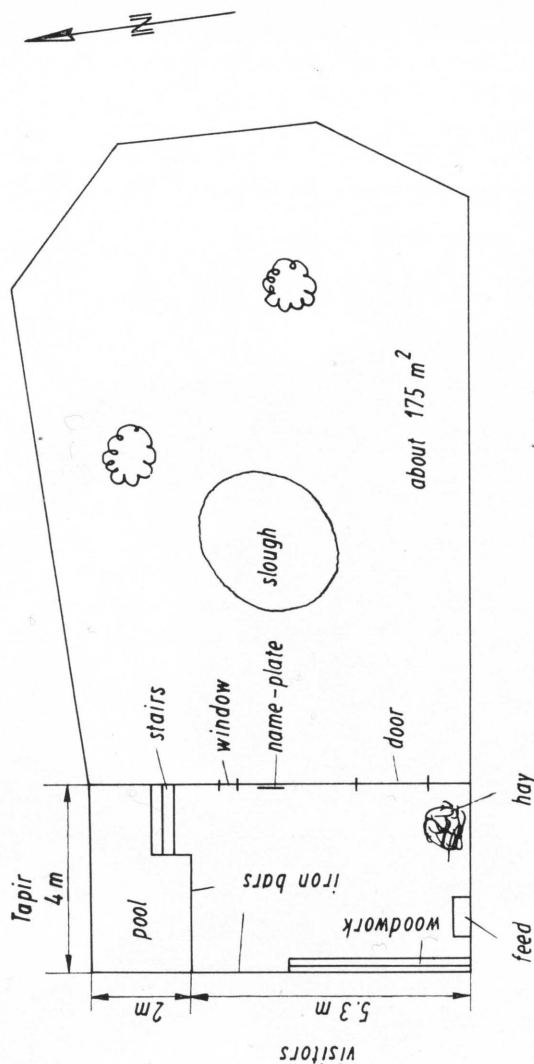


Fig. 2. Outline of the indoor and outdoor cage. In winter "Sabur" spent most of her time in the indoor section to the left

buckets (~ 15 L per bucket) around noon. Furthermore she ate about 10 kg alfalfa-hay of the 25 kg daily provided. She had a rather long nose (proboscis). From an ecological point of view this species is equivalent to the Black Rhinoceros being a browser, mostly eating young leaves, twigs and bark (HANSTRÖM 1960, SINAGA 1970, letter to the author). In the Zoo it seemed a little difficult for her to consume the slices and lumps of loaf and beets. The lower jaw was placed below the food, then the upper lip (proboscis) pushed it in. A bucket of beets was consumed in approximately half an hour. When drinking the mouth was close to the surface of the water, and the water was sucked and or lapped up.

Before describing more complex behaviour an outline of the cage is given (Fig. 2).

Diurnal rhythm

In nature the species is active by night (DYHRBERG 1970, personal communication). In the Zoo there was much noise during daytime, but "*Subur*" slept for several periods each lasting from 30—60 min. She slept particularly around noon and in the afternoon. She often slept with her back against the public and in the hay cock (Fig. 3). When it was getting dark she whimpered more rarely

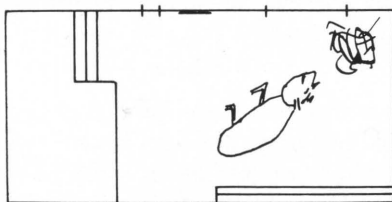


Fig. 3. "*Subur*" often slept with her back to the public or in the hay

and ate a lot while walking around in the cage. The ears stood perpendicular out from their base and turned in different directions. Unfortunately it was not possible to visit her by night, but according to the night-watchman she was very active.

Pendulation

These movements are extremely stereotyped and have arisen or at least hypertrophied in captivity. The pendulation has not been observed in wild animals (DYHRBERG 1970, personal communication). It was weakly developed when the animal arrived at Singapore (SCHIÖTZ 1970, personal communication), and has grown more and more intense since then.

The head was lowered so that the nose was about 30 cm above the floor, and the head moved laterally from one side to the other (pendulation). These movements mainly took place in the forenoon, in the afternoon only rare sequences of 2—6 pendulations were noted. Furthermore the pendulation was localized to a specific place in the indoor cage. It always occurred with the head directed towards the public and the tail towards the little window to the left of the name-plate (Fig. 4). When not interrupted pendulation occurred 74—78 times a minute for about 4 hours daily.

The Sumatran Rhino is a browser, so this movement could possibly have developed from feeding movements. In the Zoo the pendulation was never ob-

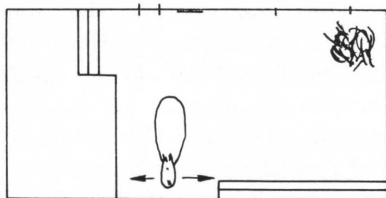


Fig. 4. Pendulation took place with the head directed towards the public and the tail towards the little window. She often urinated in this position

served in the outdoor cage, where there is room for exercise. So need of exercise may be a factor in the cause and effect complex. On the other hand pendulation may be regarded as a pathological behaviour because of "boredom" (space-confinement, lack of occupation, lack of a social companion). If you pulled "*Subur*" in the ears, she didn't stop pendulating. Pendulation ceased upon entry into the cage. Perhaps the pendulation could be reduced with suitable company and more space.

When pendulating the foremost horn often pushed against the vertical iron bars of the cage.

Rubbing

The animal rubbed her head and foremost part of her body against the bars. The front horn was placed between the bars towards the public or the pool and moved vertically. The front horn was much worn and once broke off (2/8 — 1964) (Fig. 4). Rubbing may have a beneficial effect on the skin condition, but could be caused by social needs. Furthermore the skin may have been too dry in winter-time, because the animal never used the indoor pool for bathing. A shower was recommended for the sake of her skin, and wooden bars would have been preferable to the iron bars of the cage to minimize injury.

Gathering of hay

More than half of the 25 kg of hay she got a day was placed on the horns, so that the eyes were covered. In this condition she walked about the cage once or twice. This behaviour may have a "play-function" or perhaps a sexual one (?). She often pitched the hay in the pool. This was perhaps too sterile.

Bathing

The conditions indoors and out of doors are different. In winter "*Subur*" only had the indoor pool which contained 10–50 cm of water. The indoor pool is about 8 m², so that she could hardly turn around. She entered the pool 2–5 times a day, but she never lay down. Maybe the water was too cold or too sterile. In nature the species spends hours bathing in mud. The indoor pool is not equivalent to natural sloughs. In summer she had the outdoor slough. Here the temperature may be rather high, and she spent a lot of time just lying here.

Urination and defaecation

Urination might take place everywhere in the indoor cage, but was most frequent with the tail directed towards the window to the left of the nameplate (Fig. 4). She had two patterns of urination. Most frequently she send a jet of urine right backwards about 15° above horizontal level. Immediately before urination she moved the tail away. The wall around the name-plate clearly showed that she mostly hit here when pendulating. Out of doors urination was not localized. The jet of urine was about 3 m long, and she urinated 1–4 times in succession. She urinated 10–24 times hourly. Only on

one occasion I observed her urinating like a cow. In this case the urine fell right down. Whether this difference has relation to hormonal cycle, demarcation of territory or something else is not known.

Indoors defaecation took place at the stairs to the pool or in the pool. Like the Tapir (*Tapirus indicus*) next door she had "localized excretion" (HEDIGER 1920). This localized excretion may be adaptive in several ways. She will leave no track of faeces behind her for predators to follow. And perhaps the sloughs are demarcated with faeces and pheromones, so that opposite sexes may find each other. Out of doors the slough was filled with faeces to a certain extent.

Paths

The indoor cage is so little (21 m²) that "Subur" walked everywhere now and then. She preferred one path, however (Fig. 5). Of the two possible directions in the stereotyped route, she mostly walked in the direction of the great arrow-

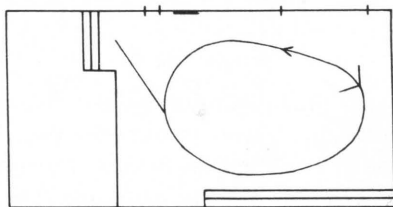


Fig. 5. Indoors "Subur" most often followed this circular route. Predominantly in the direction of the great arrow

head seen in Fig. 5. She mostly walked the direction of the little arrow when leaving the pool. These paths were not followed strictly, among others because of stimuli from the public.

Out of doors I only observed her on three occasions because of the winter. On all occasions, each of one half hour duration, there was snow. This situation

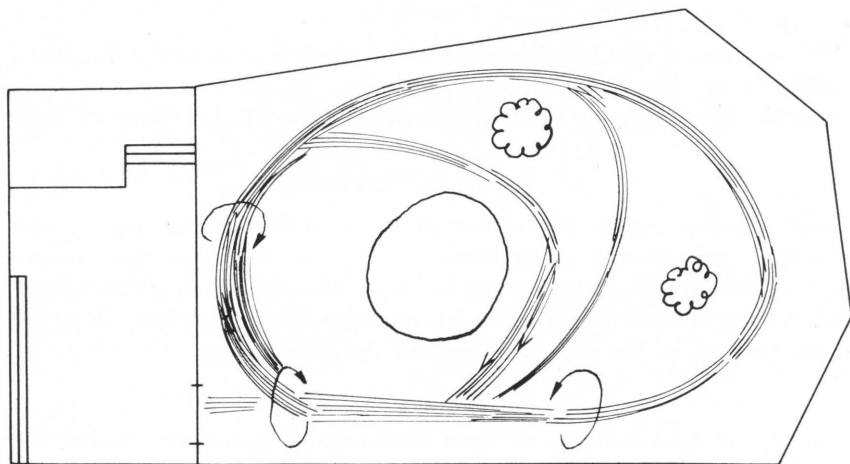


Fig. 6. In the outdoor section "Subur" (in winter) followed circular routes. The thickness of the routes indicate their relative importance.) means that she often turned around here

is of course not natural for the species, but she nevertheless followed round, stereotyped paths, easy to see in the snow. Furthermore one could read the relative importance of the different paths (Fig. 6). This pattern may partly result because of the uneven ground with different snowdepth. For instance the slopes of the slough is covered with 15 cm of snow when the rest of the area is covered with 8 cm. One could see that she mostly followed the long sides and walked in circles. The arrowheads seen in Fig. 6 indicate that she walked in the respective directions. The fat path she followed in both directions, and she often turned around choosing this instead of one of the secondary paths. Whether this pattern will be the same in summer is not known. She walked very cautiously in snow, and probably preferred well-known paths.

In nature the species is said to follow specific paths related to specific food-plants (HANSTRÖM 1960, DYHRBERG 1970, personal communication). The zoo-pattern could be a reminiscence of natural habits, on the other hand circular figures are common among captive animals (HEDIGER 1950).

Social needs

In nature the species is probably solitary, but live in pairs at least part of the time (DYHRBERG 1970, personal communication). Stereotyped behaviour may have arisen because of social needs. Several observations indicate need of contact: a) she rubbed herself as already mentioned; b) she immediately came when guests wanted to feed her; c) she now and then stood for a long time when touched between the folds of the skin; d) she intensively sniffed to the Tapir living next door, when they met in the indoor pool at rare intervals; e) once a cow went into her cage, and she seemed to be very interested, unfortunately this companion was removed again! She probably ought to have a companion either of the same or another species.

Squeaking

"Subur" had a specific, short squeak. Sometimes she rarely squeaked and sometimes very often. One day she squeaked incessantly from 3 p.m. to 5 p.m. Usually she squeaked once every half hour. Did she call for companions?

Raising of hind legs

When pendulating she alternately raised one of the two hind legs. Sometimes one of the hind legs was raised when she was just standing. She changed leg after 2—3 minutes. Out of doors all legs were in use, and they functioned perfectly. Whatever the reason may be, leg-raising is also known from other animals in captivity. One of the Zoo's gorillas had the same habit.

There may be a relation between pendulation, squeaking, raising of hind legs and need of social contact. This description is partly common to a lot of zoo-animals.

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Summary

A Sumatran Rhinoceros (♀) was observed for a short period. The behaviour was described in general and stereotyped behaviour was emphasized. Outstanding among stereotyped movements was the pendulation of the head from one side to another, the tracks connected with movements from place to place and that she raised her hind legs alternately when pendulating.

Zusammenfassung

Im Frühling 1970 wurde das Verhalten eines Sumatranashorn-♀ (*Dicerorhinus sumatrensis*) beobachtet. Das Nashorn war ungefähr 14 Jahre alt und hatte 11 Jahre davon im Zoologischen Garten Kopenhagen verlebt. Es war hauptsächlich in der Nacht aktiv. Am Vormittag pendelte es mit dem Kopf von links nach rechts (Abb.4). Es rieb besonders den Kopf gegen die Stäbe des Käfigs. Es badete nicht im kleinen, reinen Wasserbecken im Hause, dagegen in der Schlammputze außerhalb des Hauses (Abb.2). Es urinierte auf zwei verschiedene Weisen. Es konnte entweder einen Strahl 3 m rückwärts spritzen oder wie eine Kuh das Wasser einfach fallen lassen. Die Defäkation war entweder am Wasserbecken im Hause oder in der Schlammputze außerhalb des Hauses lokalisiert. Es ging bestimmte Pfade (Abb.6). Es winselte auf ganz bestimmte Weise, ab und zu sehr lange. Wenn es pendelte, hob es die Hinterbeine abwechselnd an.

Schrifttum

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