

# A KEEPER'S GUIDE TO THE INTRODUCTION AND MANAGEMENT OF THE INDIAN, BLACK, AND WHITE RHINOCEROS

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Before introducing any rhinoceros to their new enclosure, both the barn stalls and the enclosure should be evaluated for animal health and environmental hazards. A number of facilities holding rhinoceros have noted the following items as possible causes of injury:

- A. Areas in the barn or enclosure where animals can get their heads or feet through and become trapped.
- B. Sharp objects or protrusions on the walls or floor, that can damage foot pads and cause medical problems. This includes cement with an overly rough finish.
- C. Tree protection in which animals can become entangled.
- D. Moats that are too steep, or are designed with a sharp drop-off.
- E. Ponds or pools that are too deep, or have sides that are too steep.

All animal introductions should be preceded by investigating the behavior of the animal(s) at their previous location. Also, note the social structure of the group in which the animal was previously housed.

When the new animal has cleared quarantine, and all results from medical testing have been analyzed, the animal should be given visual access to animals currently held at the facility. This, with the addition of tactile access through the bars or exhibit barrier, can take from one week to one month, depending on the aggressive nature of either of the animals to be introduced. Recording the behavior seen during this period will benefit your staff greatly as they proceed with the introduction of the animals. Additionally, allowing each animal access to the other's dung before introduction can often help with acclimating them to each other's scent.

## Introduction of the Greater One-horned Indian Rhinoceros (*Rhinoceros unicornis*)

Communications from facilities holding Indian rhinoceros show that most young male Indians tend to be very aggressive during introductions. They become highly excited when first encountering the female, at which point she takes a defensive posture or starts to vocalize. As a result, the male immediately becomes aggressive towards her. As they mature, and introductions or copulations become more routine, the intensity of the behavior lessens.

Unlike the black or the white rhinoceros, the Indian rhinoceros rarely uses its horn during an intense altercation. The incisors are their weapons of choice for true aggressive confrontations. During less intense pushing or ritual skirmishes the horn is used. Managers and keepers should note that, as mentioned previously, rhinoceros introductions can be somewhat aggressive, and it is important not to separate the animals at the first sign of a confrontation. As a species, rhinos are extremely sturdy, and much more capable of enduring physical stress and trauma than one would think.

The Indian rhinoceros breeds well in both pair or group situations. They are easily kept in single or multi-species exhibits, and are kept in almost every climate conceivable. This species is a browser and should be fed copious amounts of different browse species.

Keepers should never underestimate the strength, speed, and agility of rhinoceros. Indian rhinoceros are more territorial than the African rhinoceros, which should not be forgotten when introducing them to new enclosures or enclosure mates.

Introducing the male to the new enclosure first allows different options. After the male is aware of all aspects of the new area, he can be moved back into the holding area, providing the opportunity to give the female access to her new enclosure. Once she has explored the area and is comfortable in her new surroundings, the introduction of the male can commence. It is better if the female is more familiar with the enclosure, so that she can use it to her advantage during the introduction process. Also, if she has been given more time out in the larger yard, she will have more stamina, allowing her to elude an excessively aggressive male. Some animal managers attempt introductions only when the female is in estrus. This is an excepted practice within the zoo industry. However, good animal management, coupled with knowledge of the animals' behavior and their enclosure, has allowed rhinos to be introduced at any time with positive results.

#### **Estrus behavior:**

Recognizing estrus behavior is critical to the success of a breeding program, particularly when the breeding male is housed separately from the females.

Following are behavioral characteristics to look for in the male when a female is in estrus:

1. Walking around with his nose to the ground, following a scent trail, occasionally lifting his head to catch a scent in the air.
1. Testing the female's urine (flehmen).
2. Restless or agitated behavior.
3. Dribbling urine.
4. Vocalizations in a whistle/snort pattern.
5. Being chased by the female/chasing the female.
6. Semi-erection.
7. Chin resting.
8. Mounting the female.

Behavioral characteristics to look for in the female:

1. Vocalizing in a whistle/snort pattern.
2. Wet rear legs, due to urine dribbling.
3. Squirted urine in short periodic blasts.
4. Agitation with increased activity level while male is present.
5. Decreased appetite.
6. Pink, slightly dilated vulva.
7. Observation of pre-mating bond.

8. Female allowing male to chin rest.
9. Female allowing male to mount.

Through years of observation, two types of behavioral estrus have become apparent: *full estrus* and *partial estrus*. Females have been impregnated while exhibiting each of these behaviors. A third category has also been included, *hidden or unobserved estrus*, in which no changes in behavior have been observed but the male Indian rhino has been able to impregnate the female. The female may appear to cycle during the first few months of her pregnancy, and may even allow the male to mount her.

**Full Estrus:** The female has reached full estrus when she becomes active and agitated, starts vocalizing with varied snorts and whistles, and spray-squirts urine. Typically, the female will exhibit one or all of these behaviors in a mild form, gradually escalating to the "height" of her estrus when she actively pursues the male, abandoning her calf if she has one, vocalizing several times a minute, and spraying or squirting urine every few minutes. Duration of the "height" generally lasts from two to six hours, although she may be receptive for up to 24 hours. Occasionally, the female will abruptly reach full estrus without the typical build-up of other behaviors.

The cow can exhibit estrus behaviors up to five days before the peak. The behaviors occurring in advance of peak estrus may only last several hours, then stop suddenly. On one occasion, a female had been bred five days before her peak and then again during her peak.

**Partial Estrus:** As in full estrus, the female may display one or more of the previously mentioned behaviors, but in a mild form, lacking the intensity and build-up of full estrus. She will not actively pursue the male, and may rebuke his advances, especially if she has a calf. Occasionally, successful copulations occur. It is often difficult to discern partial estrus without the presence of an adult male to exhibit breeding behaviors in the female's presence.

**Hidden or Unobserved Estrus:** In full or partial estrus, copulations have been observed. In hidden or unobserved estrus, only the evidence of copulation is seen. This evidence includes scuff marks or semen stains on the female's back, vaginal discharge, and very lethargic behavior characteristic after copulation. In these cases, it is possible that estrus behavior, a mounting, and/or copulation has occurred, though nothing has been observed.

#### General Information:

Estrus cycle	27 to 42 days
Peak estrus	12 to 24 hours
Gestation	470 to 531 days
Calf interval in the wild	3 to 5 years
Calf interval in captivity	2 to 3 years
Age at first birth	5 years, 10 months
Number of captive births from 1824 to 1994	79.55.3 = 137
Number of recorded stillbirths	12.13.3 = 28
Longevity record	40 years, 4 months

## **Breeding Introductions:**

Due to limitations of available space and facilities, breeding males are often separated from the females or from the rest of the rhino herd. This usually requires the transfer of rhinos from the exhibit to holding areas, and vice versa, to ensure successful breeding with minimal risk to individual rhinos.

As previously stated, the keeper should watch young females for signs of estrus at approximately two-and-a-half to three years of age. Typically, if a cow in estrus has a very young calf, the calf should be held in an off-exhibit area away from the introduction, although calves as young as four months have been left with cows during introductions. Any rhinos that have been observed to be incompatible with the breeding male should be taken off-exhibit.

Before an introduction, the staff should discuss their procedures for separating the rhinos, should the animals become too aggressive.

When introducing animals for breeding purposes, remember that females are in estrus for 12 to 24 hours. Wait until the female is in a heightened state of arousal before introducing the male to her. This will decrease the aggression and running seen during courtship. During the first encounter, the male will act uninterested and the female will pursue him, nuzzling his abdomen and genital area, and presenting to him. During this time, she will also exhibit the typical estrus behaviors of urine spraying and frequent whistle/snort vocalizations. As the male becomes more interested, he may start to follow her and perform flehmen. He may also spray and/or dribble urine. They may then take turns pursuing each other throughout the exhibit, and may even seem to lose interest in each other for several hours before meeting up again. If the introduction becomes too aggressive, the staff may opt to separate them for fifteen to twenty minutes before reintroducing them. This often helps break the male's aggressive advances towards the female.

Just before copulation, the male will lay his head on the female's back in preparation for mounting her. She may walk away several times before allowing him to mount. If he doesn't already have an erection, he will develop one quickly after mounting. The male is usually able to penetrate the female after only a few attempts. Copulation usually lasts for about 30 minutes to one hour, although pregnancies have resulted from copulations as short as fourteen minutes and as long as 95 minutes. Upon withdrawal, the pair usually go their separate ways. Both the male and the female will generally show signs of fatigue for the next 24 to 48 hours. At this point, the female's estrus behavior customarily stops, though there have been occasions when several copulations have been observed. Recreational breeding has been seen in this species, even after pregnancy has been confirmed.

## **Labor and Birth:**

Udder development generally occurs several weeks prior to parturition. Development of the udder is usually not as dramatic in females giving birth for the first time. As the cow gets closer to calving, the udder will fill and the teats will elongate and swell slightly. Up to 48 hours before birth, the udder will become tight, pushing the teats apart toward the sides of the udder. Milk will start staining the insides of her rear legs; walking may cause the teats to rub

against her legs, causing more discharge. Milk may start flowing freely within 24 hours of giving birth. A mucous plug can be found 12 to 24 hours before the female gives birth.

Just before parturition, the cow commonly loses her appetite, acts restless and agitated, and may vocalize frequently. She may press her head against a wall, stretch, lie down and get back up frequently. Labor may last from 12 minutes to several hours. Posterior as well as anterior presentations have been observed; posterior presentations have not posed difficulties for animals during the birth process. Keepers should not become overly anxious when posterior presentations are witnessed unless the birth has not progressed for a period of time.

When the calf is born, the cow will nuzzle and push the calf to encourage it to rise. The calf can stand after 30 to 45 minutes, and will attempt to nurse right away. The first successful nursing should occur within the first two to three hours. The calf will rapidly gain proficiency in finding the teat and suckling. As the calf grows stronger, nursing will increase in duration but lessen in frequency.

It is common practice in some institutions to separate the calf from its dam within 24 hours of birth for a quick physical check and weight measurement. The time of separation should be kept to a minimum to reduce stress on the mother. Birth weights have ranged from 89 to 200 pounds. A constant watch should be kept for the first 24 hours to monitor the calf's progress, and to ensure sufficient nursing bouts are occurring (see monitoring sheet).

A room can be set up next to the birthing room that allows the calf access, but not the dam. The calf's natural curiosity will lead it into this room, giving the keeper the opportunity to make the calf more tractable by rubbing the calf's belly and the inside of its rear legs. Calves seem to vary greatly in tractability; some seem to relish attention, while others accept the keeper's attention more slowly, while still others never become tractable. Future weight measurements and health checks are dependent upon the tractability and health of the calf. If the calf is very tractable, weights can be taken frequently. If the calf is not tractable and appears healthy, weight measurements need not be taken, which will help avoid undue stress on both the calf and the dam.

#### **Release of Dam and Calf Into the Exhibit:**

It can be difficult to decide when to release the rhino calf into the exhibit with the rest of the rhino herd. The calf is vulnerable at this time to a variety of factors, including aggression from other rhinos, or perhaps the calf's curiosity leading it to areas in the exhibit it is not able to negotiate. The main factors to be considered are the age and vitality of the calf, weather, and exhibit conditions. Just before releasing the calf into the enclosure, the decision should be made as to which rhinos will be left on exhibit with the calf and its dam, depending on the dam's relationships with the other rhinos.

As competence with rhino management has increased, calves are being introduced to exhibit elements or other rhinos at a much younger age. At the San Diego Wild Animal Park, calves were initially held off-exhibit for long periods of time; as an example, one of the first calves produced was held off-exhibit for one year and eight months. Currently, calves are introduced at two months of age.

## Medical Problems:

Following are common medical problems encountered with Indian rhinoceros:

1. **Cracked toenails:** For a variety of reasons, Indian rhinos have a tendency to get cracked toenails. Usually a daily application of Koppertox for a period ranging from two to six weeks is sufficient to improve this condition. Occasionally, the cracks may deepen and widen, and an abscess may form. When this occurs, it may be necessary to soak the foot daily in a Betadine solution until improved.
2. **Cuts, scrapes, and soreness:** During introductions or confrontations, Indian rhinos can inflict fatal injuries. Fortunately, the injuries inflicted are usually not severe. They typically consist of minor cuts and scrapes in the hindquarters, on the flanks, and on the head. Left alone these cuts have a tendency to fester and can become insect ridden; the rhinos can be treated daily by spraying a Nitrofurazone solution mixed with fly spray on the affected areas. After an aggressive encounter, often including extensive running, the rhinos may be sore when walking. Depending on the severity of the encounter, they may be given Banamine to lessen the severity of the soreness.

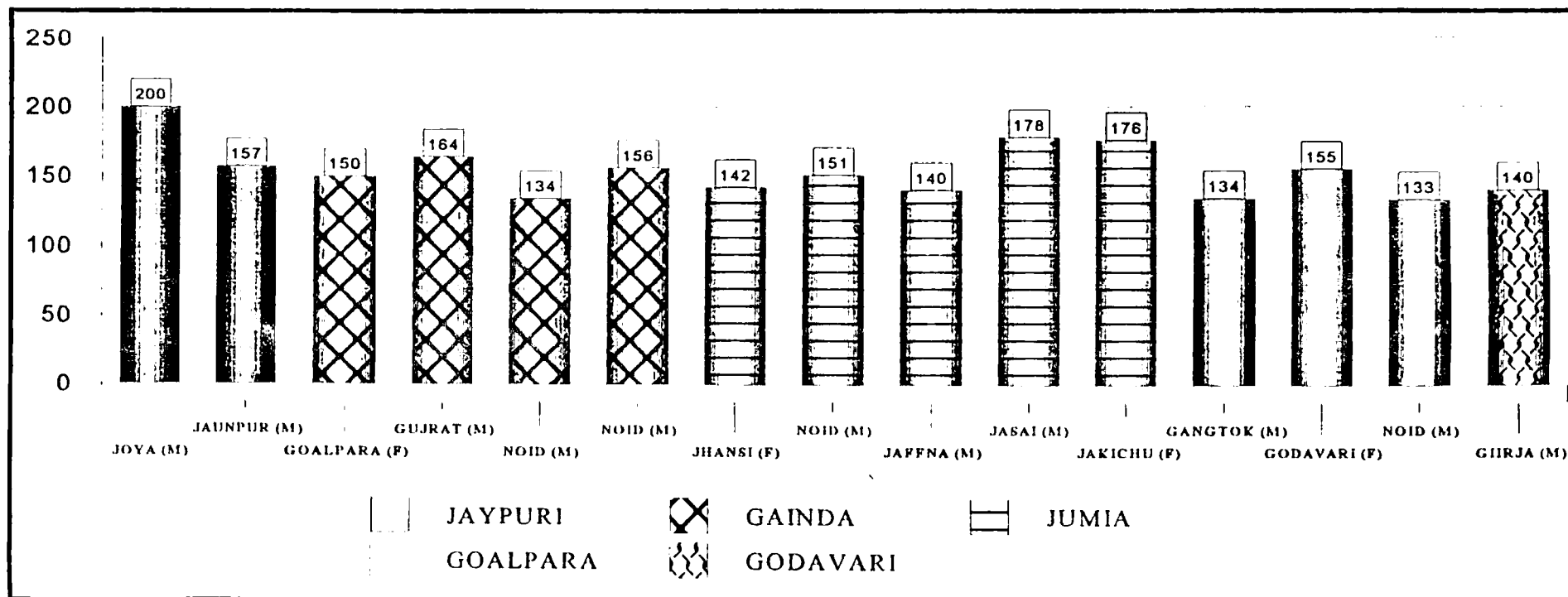
# INDIAN RHINO BIRTH WEIGHTS

## INDIVIDUAL DAM AVERAGES

(All weights listed in pounds; only weights from full term pregnancies have been included)

JAYPURI	178.5	n=2	JUMIA	157.4	n=5
GODAVARI	140.0	n=1	GAINDA	151.0	n=4
GOALPARA	140.7	n=3			

Group Average = 154 n=15  
Range = 133-200



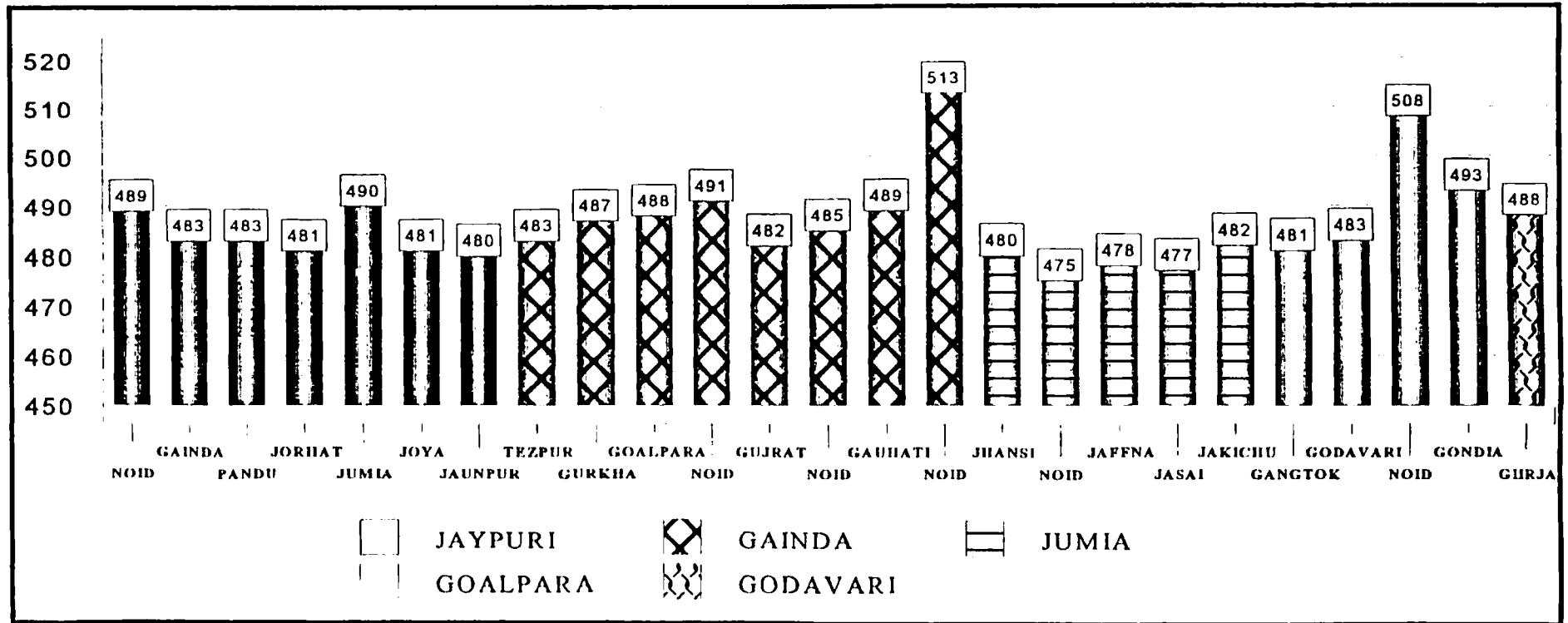
# INDIAN RHINO GESTATION PERIODS

## INDIVIDUAL DAM AVERAGES

(Gestation periods listed are full term pregnancies. Premature births not included)

JAYPURI 483.9n=7 JUMIA 478.4n=5  
 GODAVARI 488.0n=1 GAINDA 489.8n=8  
 GOALPARA 491.3n=4

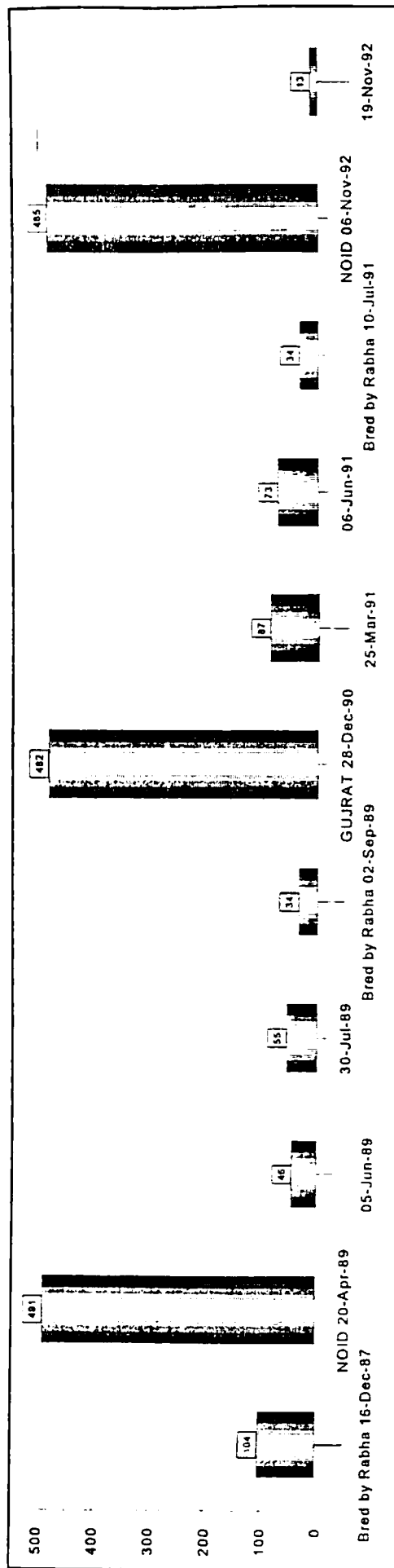
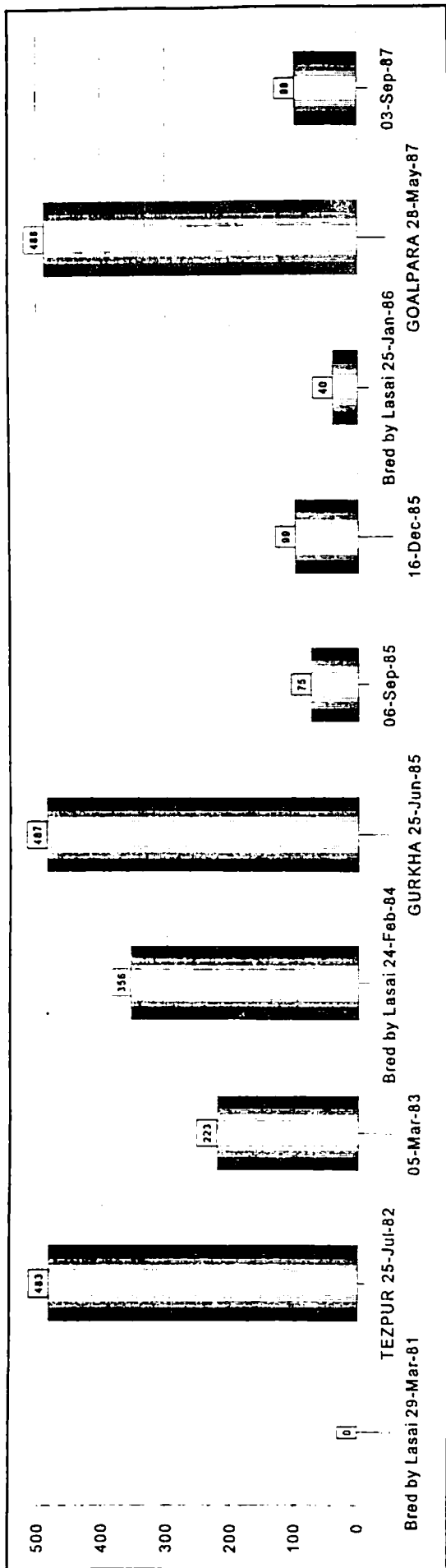
Group Average = 486.2





# INDIAN RHINO - GAINDA

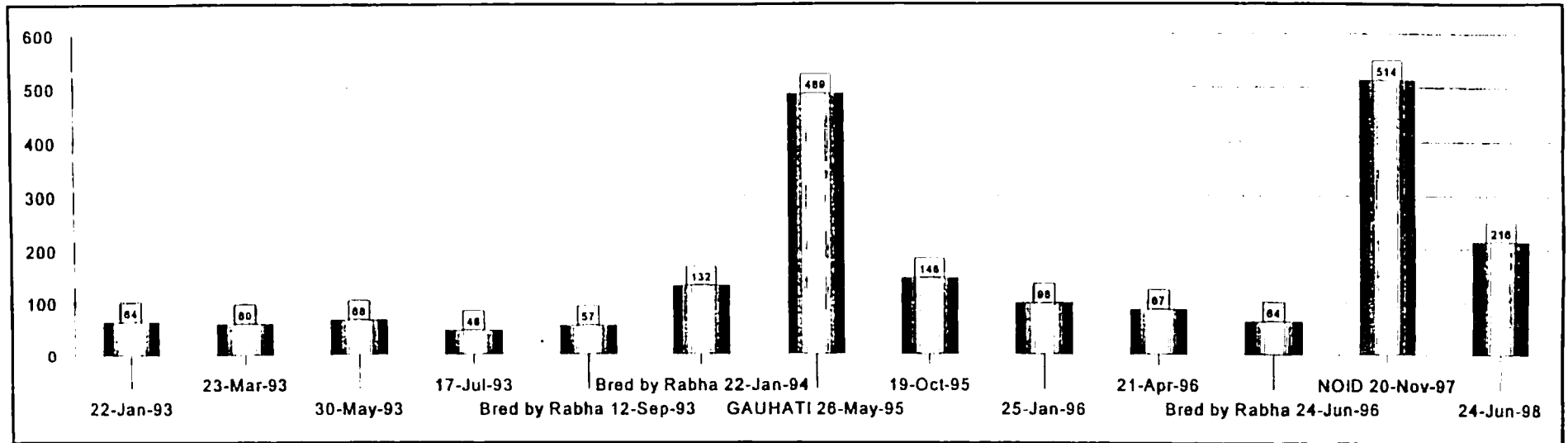
Number of days between behavioral cycles 29 March 1981 - 19 November 1992



# INDIAN RHINO - GAINDA

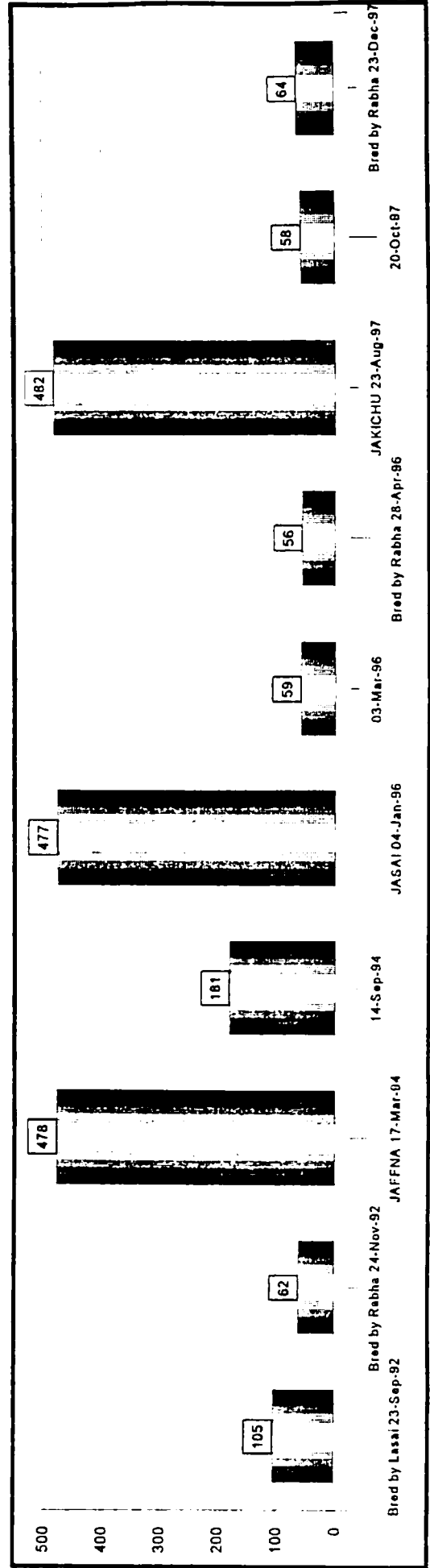
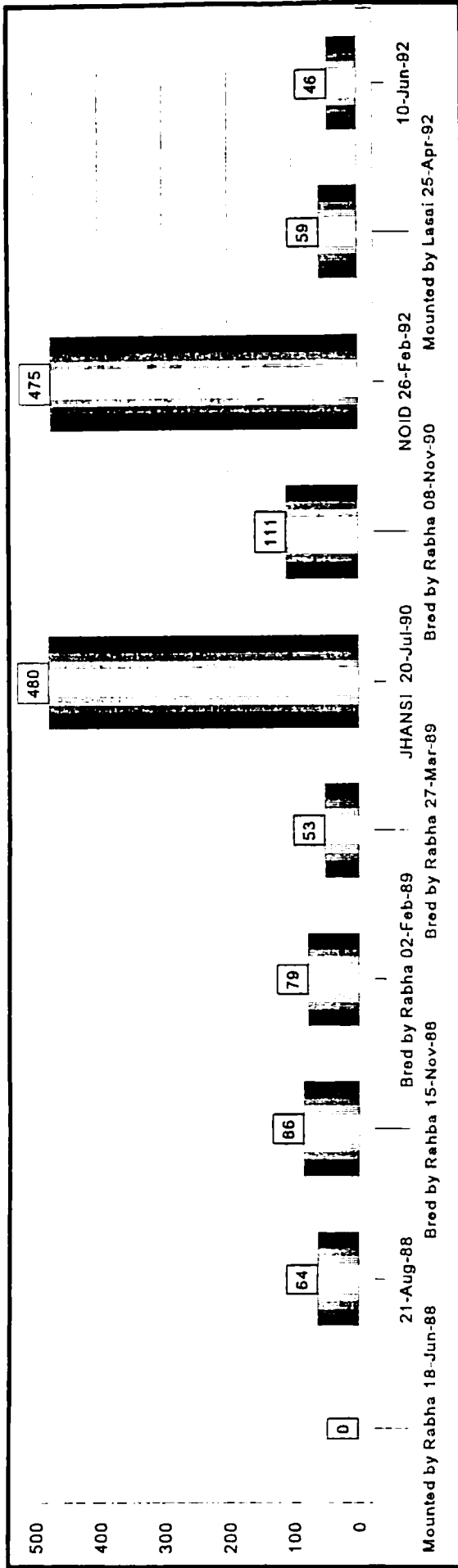
## Number of days between behavioral cycles

22 January 1993 - 24 June 1998



# INDIAN RHINO - JUMIA

Number of days between behavioral cycles



## Introduction of the Black Rhinoceros (*Diceros bicornis*)

Unlike the white rhinoceros, the black rhinoceros is not gregarious. Even so, black rhinoceros introductions are not usually as aggressive or problematic as Indian rhinoceros introductions; most of the aggression occurs between breeding males and females.

Almost all of the institutions holding black rhinoceros house them in pair situations, although they have also been exhibited in trios (1.2). If this is being considered, animal managers should watch the behavior of the dominant female closely, as female suppression has been recorded in select cases. Unlike other taxa of rhinoceros, black rhinoceros have been semi-problematic in mixed species exhibits. Both sexes have attacked and killed neonate and adult ungulates.

Of all of the rhino taxa reproduced in captivity, the black rhinoceros is one of the most problematic. Poor reproduction rates, survivability and continual health problems have plagued this species, regardless of different management techniques used by animal managers. It is my theory that with this particular species, visual barriers in the enclosure and copious quantities of browse play a large part in eliminating some of the problems seen. This species is a browser, and should be fed large amounts of browse on a daily basis.

### **Ritual Behavior:**

Following is a list of ritual behaviors seen in this species:

1. Dung pile investigation
2. Ritual defecation
3. Ritual urination
4. Foot dragging
5. Horn scraping
6. Scent marking
7. Threat posturing
8. Face-to-face staring
9. Open-mouth threat
10. Fencing or sparring
11. Horn strikes
12. Mock charge

### **Éstrus Behavior:**

Following are behavioral characteristics to look for in the male when a female is in estrus:

1. Walking around with his nose to the ground, following a scent trail.
2. Testing the female's urine (flehmen).
3. Observation of a pre-mating bond (can be seen up to five days prior to mating).
4. Restless or agitated behavior.
5. Horn swiping.
6. Proximity to female.
7. Semi or full erection.

8. Chin resting.
9. Mounting the female.

Behavioral characteristics to look for in the female:

1. Urine squirting.
2. Agitation with increased activity level while male is present, or searching for the male.
3. Vocalizations have been observed, however not witnessed in all females.
4. Wet rear legs due to dribbling urine.
5. Decreased appetite.
6. Pink, slightly dilated vulva.
7. Observation of pre-mating bond.
8. Female allowing male to chin rest or mount.

General Information:

Estrus cycle	21 to 31 days
Peak estrus	24 to 48 hours
Gestation	438 to 552 days
Calf interval in the wild	2.5 to 3.5 years
Calf interval in captivity	31 months to 3 years
Age at first birth	5 years, 8 months
Number of captive births from 1941 to 1994	145.134.13 = 292
Number of recorded stillbirths	16.6.11 = 33
Longevity record	44 years, 9 months

Breeding Introductions:

It bears repeating that the staff should inspect the holding areas and the enclosure for any hazards. Investigating the behavior of the animal in its previous situation will help the staff make better informed decisions during the introduction process. They should also discuss procedures for separating the animals to be introduced in case the introduction becomes too violent. All introductions should be preceded by the animals having visual and tactile access to one another. After the new animal has been given the opportunity to explore and become comfortable in the new facility, introducing the animals can commence. Many options are available, and all should be discussed by the managers and keepers to make sure that all of the current information about the enclosure and the animals is utilized. In this species, animals have been introduced at all different times, with excellent results.

When introducing animals during estrus, careful evaluation of the female's behavior is key. The female has reached full or peak estrus when most of the previously mentioned behaviors have been observed. The male will start pursuing the female relentlessly, attempting to nuzzle her vaginal area. When the female no longer rebuffs the male, he will attempt to chin rest. When she routinely allows him to do so, he will mount. Copulation will follow with intromission lasting from ten minutes to one hour. Mountings can be observed two to ten times during a single estrus, which can last for 24 to 48 hours.

As stated in the section discussing Indian rhino introductions, the amount of aggression during breeding introductions can be decreased by allowing the female to reach peak estrus before releasing the male into the yard or enclosure.

### **Labor and Birth:**

The udder will begin to develop one to two weeks prior to parturition. As the udder fills out, the teats will become engorged, no longer appearing flaccid, and will start to separate, pointing outwards. The cow's vulva will become distended, dilated, and pink in color. A mucous plug can sometimes be found up to 24 hours prior to birth.

The birthing area should be bedded to keep the calf warm and dry when born. If the barn stall has a concrete floor, sand or decomposed granite should be spread to give the newborn a surface that is not too slippery when attempting to stand. The surrounding area should be kept quiet, without distractions for the female if possible. Just prior to birth, the female will lose her appetite and become quite agitated. The birth process can last from 25 minutes to one hour.

If a calf does not attempt to rise shortly after being born, the female will attempt to help it to its feet. Calves will usually attempt to stand within 20 to 30 minutes, sometimes taking up to an hour. Nursing has been observed within 30 minutes, and in other instances has not been seen for up to 24 hours. Nursing bouts will last from two to six minutes in length. Frequency is sporadically recorded at 13 bouts in six hours to 26 bouts in the first 19 hours. Calves will nurse for a period of one to one-and-a-half years, or until the female gives birth to her next calf. She will normally drive her older offspring away one to two weeks prior to parturition.

Weights for black rhinoceros calves vary from 65 to 137 pounds at birth, averaging a weight gain of 50 to 80 pounds per month. Calves will start to pick up solids as early as two to three weeks of age. Unlike the white rhinoceros, the black rhinoceros calf follows the mother when moving about.

### **Release of Dam and Calf Into the Exhibit:**

When introducing the cow and calf into the enclosure for the first time, several items should be considered: The vitality of the calf; pools, ponds or moats; exhibit hazards where calves can become trapped; aggression from exhibit mates; adequate shade for the newborn calf (very young calves can become sunburned); and the mother-calf bond.

### **Medical Problems:**

Following are some of the common medical problems encountered with black rhinoceros:

1. Ulcerative dermatitis: This is probably due to the lack of mud wallows, or dry conditions.
2. Parasitic skin ulcers.
3. Gastrointestinal torsion or impaction.
4. Creosote toxicity: Creosote poles must never be used in or around rhinoceros enclosures.

5. Hemolytic Anemia.
6. Toenail Cracks: Soak in a foot bath and apply Koppertox to cracked areas.
7. Constipation: Administer oral laxatives or mineral oil.
8. Diarrhea: Administer Tribissen paste
9. Tuberculosis.

### Introduction of the White Rhinoceros (*Ceratotherium simum*)

As stated with the other taxa of rhinoceros, all introductions should be preceded by evaluating the enclosures and holding areas for environmental hazards. Separation options should also be discussed in case animal aggression becomes too intense or animal damage is observed. A fire hose or fire extinguisher staged in several areas outside the enclosure will help to break up an altercation that has escalated to the point where separation is being considered. In most enclosure designs, a round-robin situation works well for animal introductions, as the animals always have the opportunity to get away from one another without becoming trapped. Sufficient time should be allocated for the new animal to become familiar with its new surroundings. Also, visual and tactile access should be given to its new enclosure mates to facilitate an easier introduction.

The white rhinoceros is the most gregarious of all taxa of rhinoceros. Crashes of up to twelve or more animals have been described in the wild. In captivity, large numbers have been kept together with little or no problems observed. In larger areas, young males can be kept in the herd up to 18 to 20 months before intense aggression by the adult male occurs. Young females are seldom aggressed against, unless a female is driving her young calf away before giving birth to her next offspring. This is usually seen two weeks prior to parturition.

As females mature, they often form pair bonds or alliances with other females that do not have calves at their side. Allowing a new female to bond with females currently at your facility may give her allies during the introduction of the male. Successful introductions usually occur when the female is able to defend her position in the enclosure, or to utilize alliances she has formed with the other females to help defend against the male. Females that remain solitary will often need more room to escape aggressive advances by the male, or the male's advances during courtship. As stated previously, rhinos are quite aggressive during introductions of enclosure mates or in breeding situations, and they should not be separated at the first sign of a confrontation resulting in blood being observed by staff. This species is extremely tolerant to physical contact, stress, and trauma. Some institutions housing multiple males observe aggressive encounters on a daily basis. Horn clashing, vocalizing and intense pushing or mock charging may be tolerated without adverse problems noted. Trimming or removal of the horn can in most instances reduce or eliminate aggression in both males and females. Introducing a female in estrus may alleviate some of the male's aggressive tendencies, as he may become more interested in mating than chasing her.

#### Ritual Behavior:

Following is a list of ritual behaviors seen in this species:

1. Dung pile investigation

2. Urine investigation
3. Ritual defecation
4. Ritual urination or spraying
5. Foot dragging
6. Horn scraping
7. Scent trail investigation
8. Scent marking
9. Threat posturing
10. Mock charging

### **Estrus Behavior:**

Following are behavioral characteristics to look for in the male when a female is in estrus:

1. Walking around with his nose to the ground, following a scent trail
2. One to six days prior to estrus the male will attempt to be in closer proximity to the female than normal
3. The male will be seen pressing the female or the female coalition to cull out the estrus female
4. Urine spraying increases
5. Stiff-legged dragging of rear feet is observed after the male has tested urine or fecal matter
6. Vocalizing in a wheezing or hiccup manner
7. Increased flehmen behavior
8. Horn swiping
9. Observed with semi- or full erection
10. Nudging the female's hind quarters
11. Chin resting
12. Attempts to mount
13. Mounting and copulation

Behavioral characteristics to look for in the female:

1. In the 24 hours of her estrus, the female is much more tolerant of the male's presence, and allows him in close proximity, exhibiting less aggression towards him
2. Periodically squirts urine in short bursts
3. Urine staining down rear legs
4. Allows chin resting
5. Decreased appetite
6. Can be more irritable
7. Allows mounting and copulation

### **General Information:**

Estrus cycle	27 to 44 days
Peak estrus	24 to 48 hours
Gestation	485 to 555 days
Calf interval in the wild	3 to 5 years



Calf interval in captivity	19 to 24 months (the norm is 3 years)
Age at first birth	4 years, 4 months
Number of captive births from 1967 to 1994	C.s.s. 253.217 = 479
	C.s.c. 1.3 = 4
Number of recorded stillbirths	19.13.3 = 35
Shortest birth intervals	409 days
Reproduction record	14 live calves in a captive situation
Longevity record	44 years, 9 months

### Breeding Introductions:

When breeding males are housed separately, recognizing estrus behavior is paramount. Even the most observant keeper can miss a subtle estrus. Housing the male with the female at all times can ensure that every breeding opportunity is maximized.

Two different types of cycles can occur: "normal", occurring in approximately 30-day intervals, or "Extended Luteal Phase" or ELP cycles, ranging from 40 to 90-day intervals. Acyclic females exhibit none of the normal cycling signs, and are not bred by the male. Behavior of cycling females can range from the very obvious to the most subtle of signs. Females will be much more tolerant of the male's presence during a normal cycle. Females will often have wet staining between their thighs indicating possible previous mountings by the male. Scuff marks on her back and hips may be indications of chin resting and dismounts.

If the female has a young calf, it will remain with her during the courtship. If the female is part of a social pair or alliance, the other female may follow the couple or may not stay near at all.

The male will test urine and feces within the enclosure to help identify which females are approaching estrus. As he identifies a female in estrus, he begins to follow her, approaching her with a hiccupping vocalization. He may also spray urine as he approaches her. He then patiently follows, vocalizing, urine spraying and chin resting until the female allows him to mount. Copulation will follow shortly. However, several mountings may be required before the male can successfully copulate with the female. Copulation may last as long as a half-an-hour to an hour, taking place many times over a period of 24 hours, or more rarely, two days. After copulation, the female's thighs and legs may be stained with semen. Both the male and female may seem tired, resting or sleeping much of the following day. The female will usually search out her social partner or female alliance after breeding.

Females born in captivity appear to start cycling earlier than wild females. Wild-caught females usually cycle at about five to six years of age, where captive born females have cycled as early as 26 months. This early estrus has resulted in pregnancies and viable full-term offspring.

### Labor and Birth:

After a 16- to 17-month gestation, the female gives birth to a single calf weighing approximately 125 to 165 pounds. A day or two before the birth, she isolates herself from her social partner or group. Females that have previously given birth may leak milk as the udder

becomes engorged. On occasion, females that were close to term have been observed to steal another cow's young calf, rejecting her own offspring when born.

Breathing may become labored as the birth approaches. Vocalizations are not unusual. She will usually lie on one side, resting between contractions. After 30 minutes to two hours, the calf is delivered. The normal presentation is front feet and nose first, however, numerous posterior presentations have been observed. The mother will nuzzle the calf clean and occasionally help it to stand by nudging it with her horn. The calf will attempt to nurse within 30 to 60 minutes. Nursing bouts of three to five minutes will occur every two to four hours. Females have been known to eat the placenta, which is believed to have nutritional value.

She may remain separated from the rest of the females for several weeks until she feels comfortable with the other animals being around her calf. Unlike the black rhinoceros, the white rhinoceros calf leads its dam, who will guide her newborn with her horn, which she places on one side or the other, depending on the direction she wishes to go. She will nurse this calf until her next calf is born, driving the older calf away two to three weeks prior to parturition. The normal birth interval in this species is two and a half to three years.

#### Medical Problems:

Following are some of the common medical problems seen in white rhinoceros:

1. Toe nail cracks
2. Foot pad cuts or abscesses
3. Post copulatory wounds around face or vaginal area on the female
4. Weeping eyes due to dust, heat or dry environment
5. Skin problems due to lack of a wallow
6. Cancerous tumor in aged females
7. Constipation
8. Diarrhea

SAN DIEGO WILD ANIMAL PARK  
SOUTHERN WHITE RHINOCEROS

GESTATION PERIODS/BIRTH INTERVALS

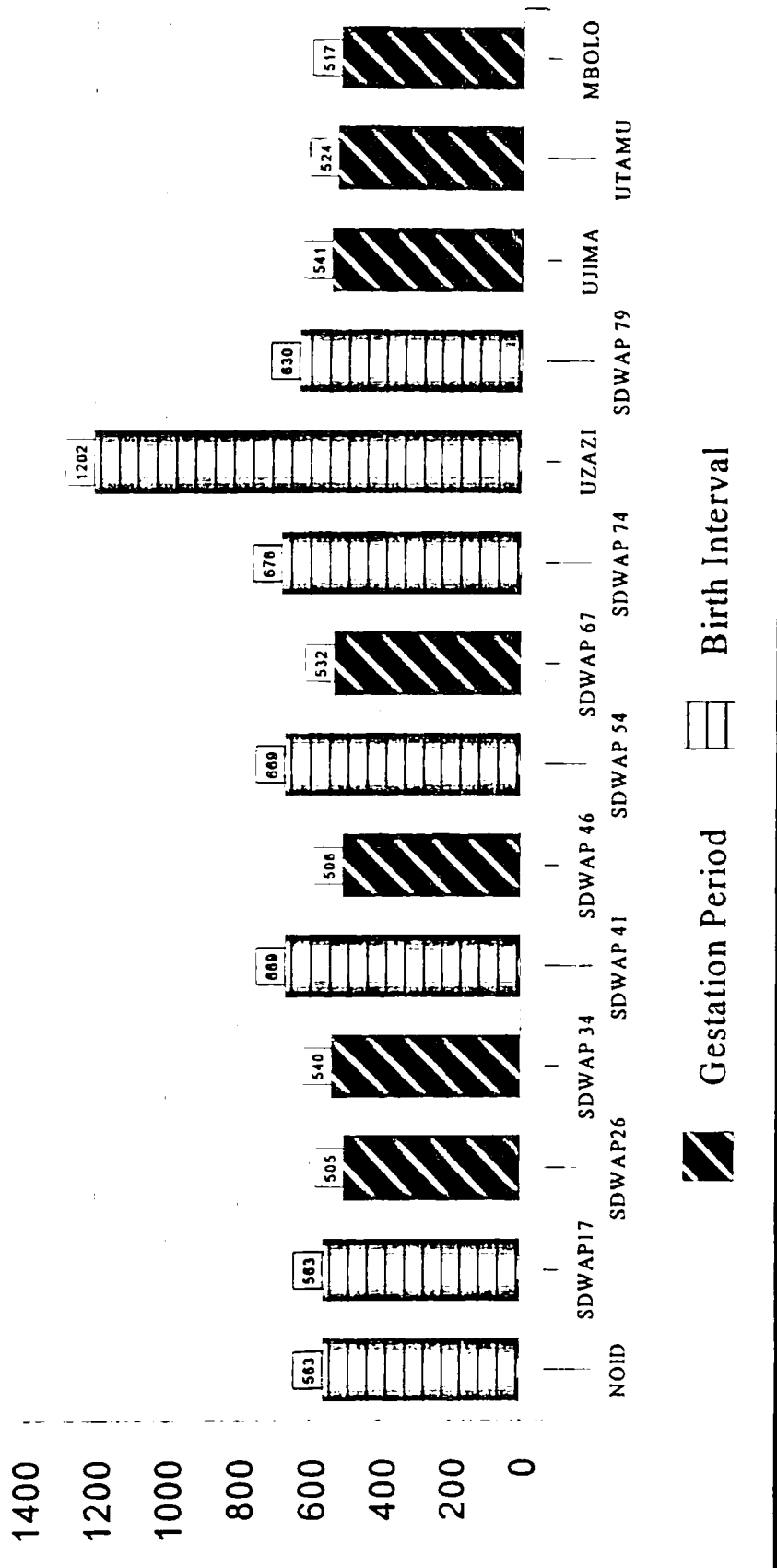
<u>KOMAAS</u>		<u>MFOLOZI</u>		<u>NTHOMBI</u>		<u>UJIMA</u>	
SDWAP 23	1186 days	NO ID	563 days	NO ID	522 days	<i>Uhuru</i>	<i>511 days</i>
<i>SDWAP 29</i>	<i>492 days</i>	SDWAP 17	563 days	<i>WAP 02</i>	<i>514 days</i>		
SDWAP 35	578 days	<i>SDWAP 26</i>	<i>505 days</i>	<i>SDWAP 31</i>	<i>497 days</i>		
SDWAP 39	517 days	<i>SDWAP 34</i>	<i>540 days</i>	SDWAP 38	730 days		
NO ID	608 days	SDWAP 41	669 days	<i>SDWAP 43</i>	<i>513 days</i>		
<i>Karibu</i>	<i>502 days</i>	<i>SDWAP 46</i>	<i>508 days</i>	<i>SDWAP 50</i>	<i>540 days</i>		
<i>SDWAP 61</i>	<i>496 days</i>	SDWAP 54	669 days	<i>SDWAP 57</i>	<i>532 days</i>		
<i>SDWAP 68</i>	<i>483 days</i>	<i>SDWAP 67</i>	<i>532 days</i>	SDWAP 65	578 days		
SDWAP 73	526 days	SDWAP 74	678 days	SDWAP 71	563 days		
Kusini	1408 days	Uzazi	1202 days				
<i>Kisiwa</i>	<i>539 days</i>	SDWAP 79	630 days				
Kutu	745 days	<i>Ujima</i>	<i>541 days</i>				
<i>Kengele</i>	<i>493 days</i>	<i>Utamu</i>	<i>524 days</i>				
		<i>Mbolo</i>	<i>517 days</i>				

Note: Gestation periods are indicated in *bold*. If gestation period is unknown, birth interval is listed.

5-May-1999

# SOUTHERN WHITE RHINO MFOLOZI - GESTATION PERIODS

(Gestation Period OR (if unknown) Birth Interval)







## Crate Training Rhinoceros

At some point in working with this species, animal managers will need to move an animal from one zoo to another. To make it as easy as possible on the animal, it should be acclimated to the shipping crate it will be transferred in. To accomplish this, you must first make sure that the crate is the correct size for the animal. One size does not fit all!

A general rule of thumb is to have a foot of space available in front of the animal, and a foot of space available behind the animal while the animal is in a standing position. There should be 10 inches of space to either side of the animal while lying down. With rhinoceros, having too much room can be extremely hazardous as it may allow the animal to turn around and become stuck. Always make sure the width of the front bars are such that the animal can not fit its muzzle between them. If this happens, the sinus cavities can be badly damaged, and if the animal's head goes through to the eyes, permanent eye damage can result.

Most crate doors are split, and open independently of one another. You should never open the bottom door first, as several rhinoceros have broken their horns off, catching them on the closed upper door. The same holds true for the rear door; if the lower door is opened with the top door closed, an agitated animal may slip its leg between the bars, striking its hocks on the bottom of the upper door.

The transfer crate should be set up two to three weeks prior to shipping. More time may be necessary if the animal is particularly high strung. Food should slowly be changed from its normal location into the crate. Eventually all of the animal's food should be given in the crate. As the animal becomes more relaxed, the keeper should start walking in front of and around the crate while the animal is inside. The most important, and, unfortunately, the most neglected aspect of crate training is closing the crate door while the animal is inside, several times prior to the day of shipment. (While I realize that this is traumatic, it is more so on the keeper than on the rhino, and must be done.) Animals can be shipped without fully acclimating them to the crate, and have been shipped without any crate training. However, the more time spent at the outset, the higher probability of good results during and after the transfer.

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