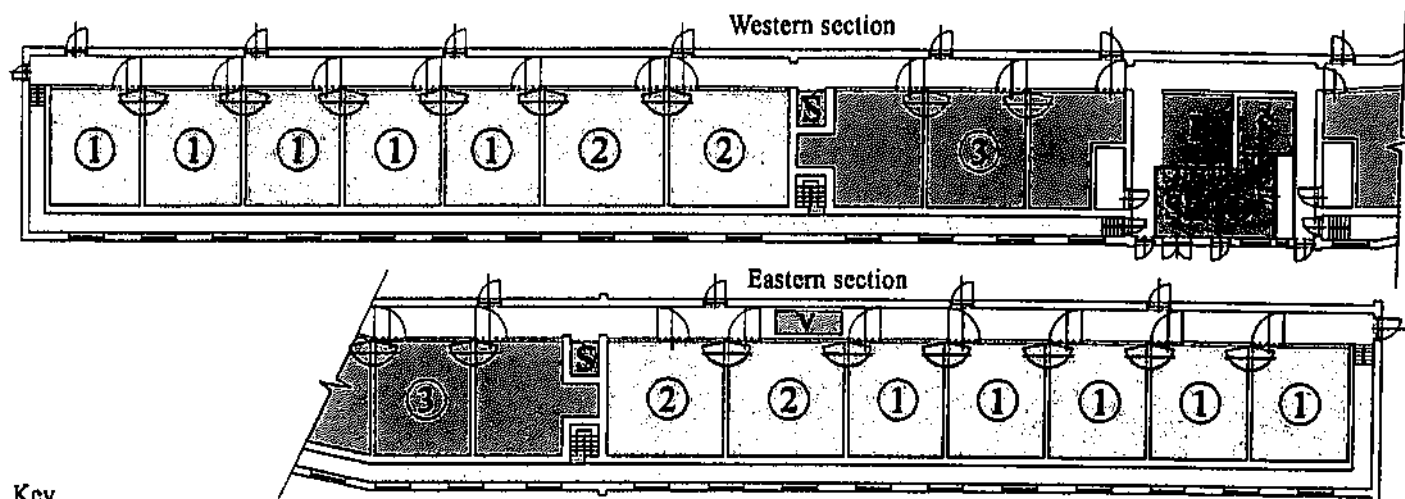


### The new rhino house, numbered 3 (Ing P Jiricka)



#### Key

- |  |   |                                    |
|--|---|------------------------------------|
| ① Box - size: 5.0 x 5.9 m, surface area: 29.5 m <sup>2</sup> | P Food preparation room - area: 13.3 m <sup>2</sup> | Š Changing room 8.1 m <sup>2</sup> |
| ② Box - size: 6.0 x 5.9 m, surface area: 35.4 m <sup>2</sup> | Sk Store - surface area: 9.5 m <sup>2</sup>         | S Hay supply chute                 |
| ③ Triple box, surface area: 85.8 m <sup>2</sup>              | O Keeper room - surface area: 12.7 m <sup>2</sup>   | ■ Triple box                       |
|  |   | ▣ Scale                            |

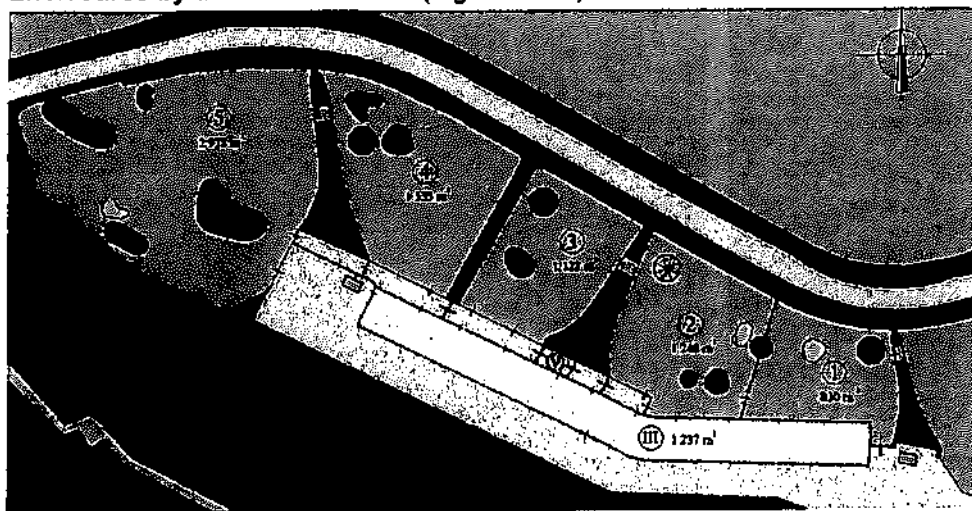
The first black rhinos were brought into the house from the new quarantine in October 1990. This involved male Eli and pregnant female Jessi that on 23 June gave birth to her first offspring and the first calf born in the facility. In 1990, all white and Indian rhinos from the zoo's collection were moved into the new house.

In 2009, this facility termed a new rhino house provided housing to 2 Indian rhinos, 6 northern white rhinos and 9 black rhinos - males Isis, Mweru, Jamie DK 29, Jabu DK 31 and female Jimmi, Jola DK 21, Jane Lee DK 22, Deborah DK 27, Maisha DK 28 and Etosha DK 30. The black rhinos reside mainly in the eastern wing, where they normally have available 7 to 10 stalls. The total surface area of the facility is 1,237 m<sup>2</sup>, from which 608 m<sup>2</sup> are indoor boxes, while enclosures cover 7,733 m<sup>2</sup>. The enclosures are furnished with shelters; in three of them, there are mature trees protected with sandstone blocks, three enclosures contain mud baths and two of them used in particular as Indian rhino enclosures have natural pools. The enclosures also contain means of separating - a planted area lined with brickwork termed a droplet or a wall or also U-shaped ditch, that in addition is used for separating the enclosures from the visitor area except for the largest enclosure, where a gradually sloped ditch was constructed in 1994-1996; in the same period, gates to interconnect all enclosures were installed and shelters erected. In 1994, an outdoor scale was installed in the external corridor by the house in front of the enclosure 3, followed by a scale placed in the internal corridor of the eastern wing in 2008, which allows for rhino weighing.

The rhino house parameters are in line with established and recommended husbandry standards, as following the recommendations of the Central Animal Welfare Commission to the Czech Ministry of Agriculture (HOLECKOVA and DOUSEK 2000), as the area of an enclosure for two rhinos and an indoor stall for a single animal should not be lesser than 500 m<sup>2</sup> and 20 m<sup>2</sup>, respectively. Recommended indoor temperature should 18 °C.

According to the black rhino husbandry recommendations (GOLTENBOTH *et al.* 1995), the area of an indoor box for a single black rhino should be at least 30 m<sup>2</sup>, with the wall length at least 5 m and stall clearance at least 3.5 m, while the separating walls should be 2 m in height. Stall temperature should range from 18° to 20° C. Each adult animal should have its own box. Two adult black rhino pairs should have three enclosures available, at least 200 m<sup>2</sup> each. Each adult male should have its own enclosure, while females can be held in an outdoor enclosure both separately or by two.

### Enclosures by the rhino house 3 (Ing P Jiricka)



#### Key

- III House 3
- I - 5 Enclosures
- Mud bath
- Shelter
- Dry moat
- Dung container
- Greenery
- Natural pool
- Outer corridor
- V Scale

I Rhino house 2

II Rhino house 3



Aerial view of Dvur Kralove Zoo (dh)

## The new rhino house



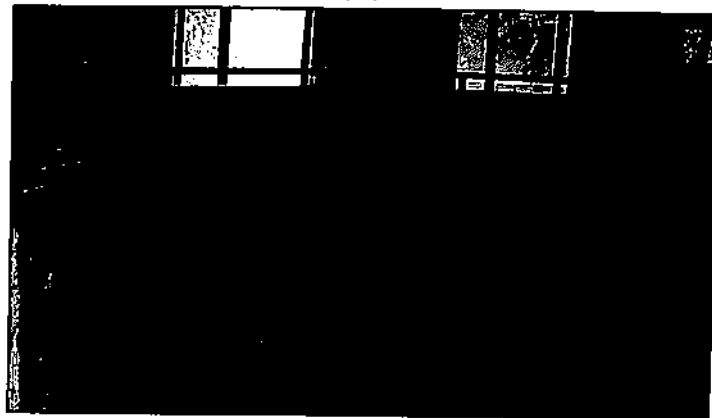
*Rhino house No. 3, 2009 (dh)*



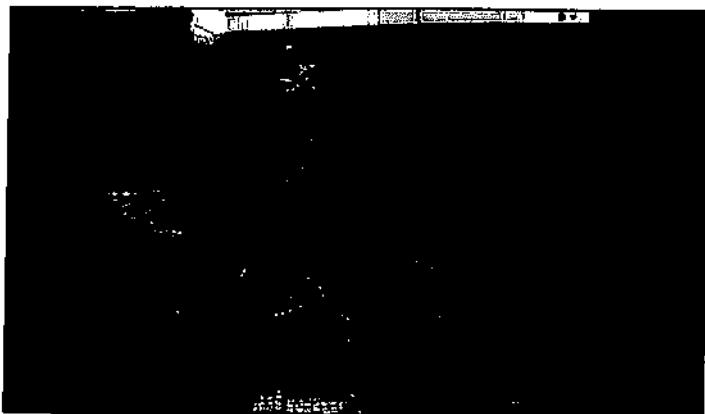
*Outer corridor of the rhino house 3 (dh)*



*Food preparation area at the rhino house 3 (dh)*



*A box in the eastern wing - black rhinos Jola and Jabu (dh)*



*Three young in one of the triple box sections, 2008 (dh)*



*The enclosure #5 by the new rhino house with northern white rhinos, 2009 (dh)*

**Enclosures by the new rhino house**



*The enclosure #1 of the rhino house 3 (dh)*



*The enclosure #4 with the enclosure #3 (in the back) of the rhino house 3 (dh)*



*The enclosure #2 of the rhino house 3 (dh)*



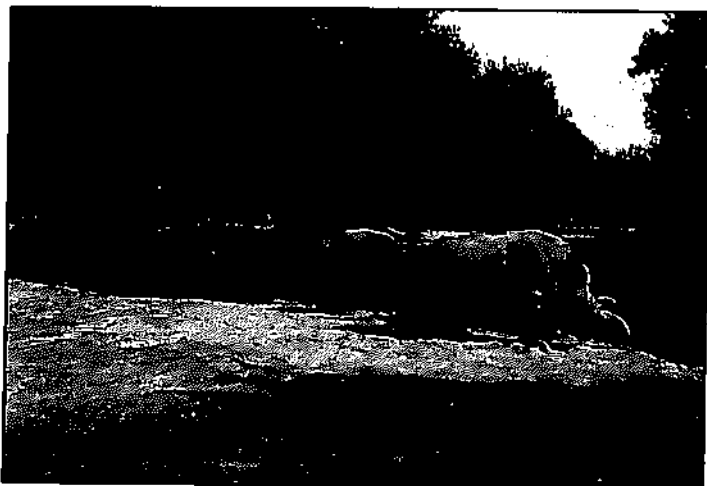
*A female northern white rhino by a rubbing structure, enclosure #5 (dh)*



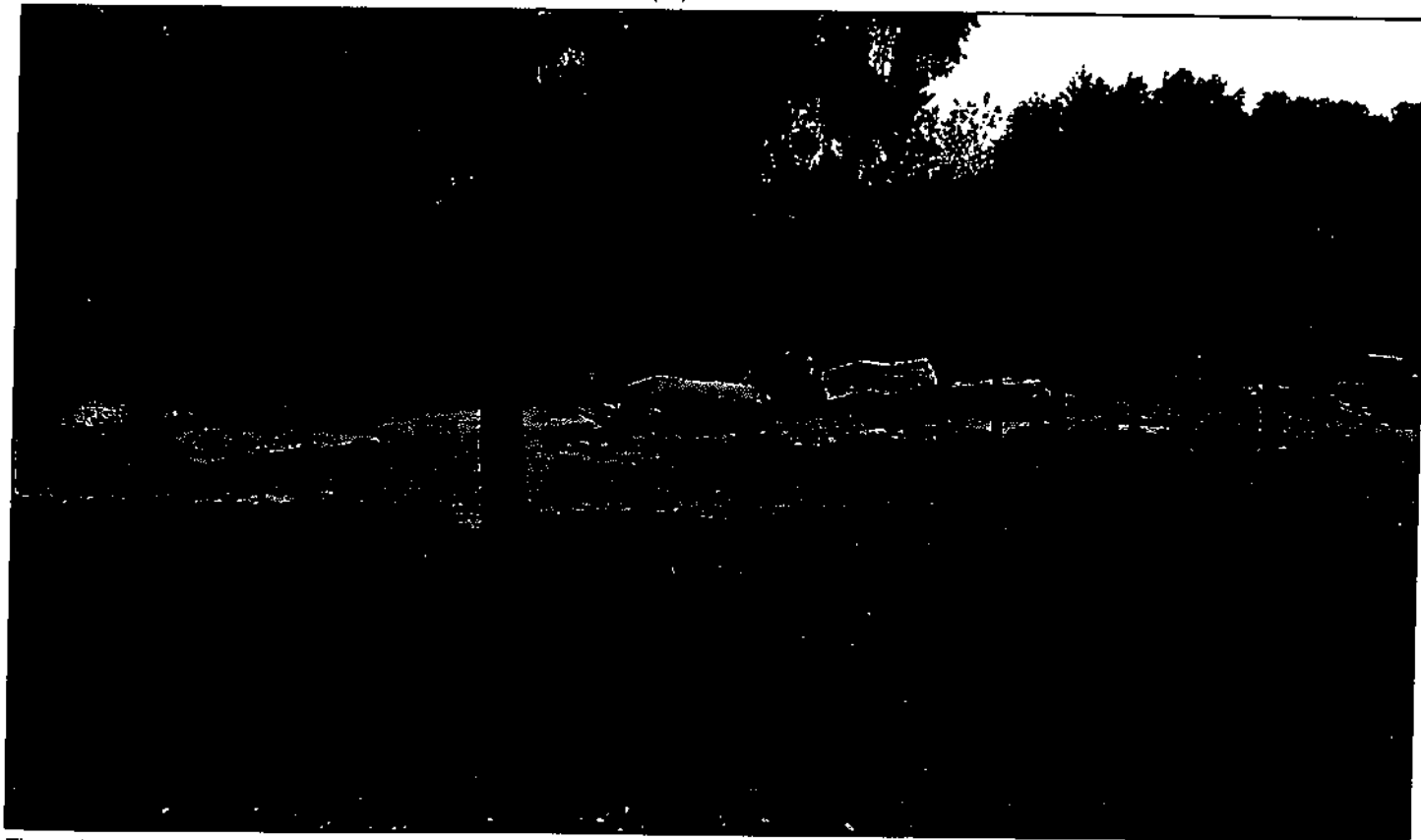
*There is a U-shaped ditch between the enclosure 3 and 4 by the new rhino house (dh)*



*Dung containers by the new rhino house (dh)*

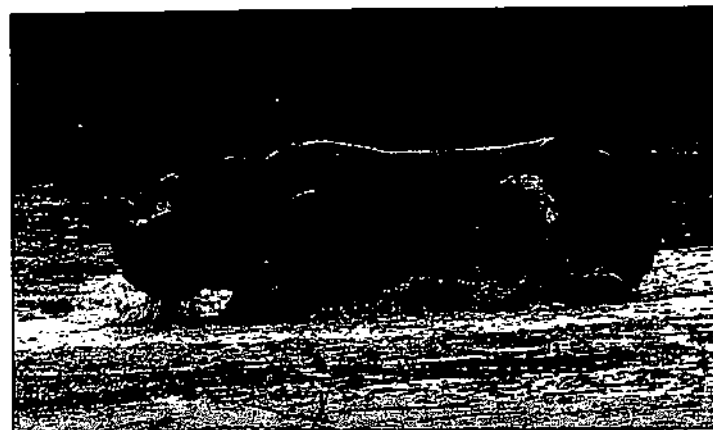


*The enclosure #5 by the new rhino house with northern white rhinos (dh)*



*The enclosure #3 (dh)*

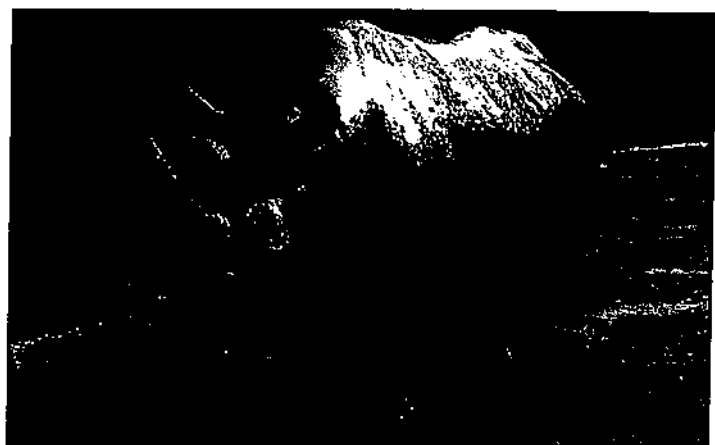
**A mud-bathing black rhino in the enclosure #2 by the rhino house 2**



*Elba, a black rhino female, taking a mud bath in the enclosure #2 by the old rhino house (th)*



Male Mweru mud bathing in the enclosure #2 by the new house (dh)



Rhinos in the snow



*Black rhinos in the snow (th)*



*Black rhinos enjoying the snow (dh)*





## BLACK RHINO STOCK HISTORY

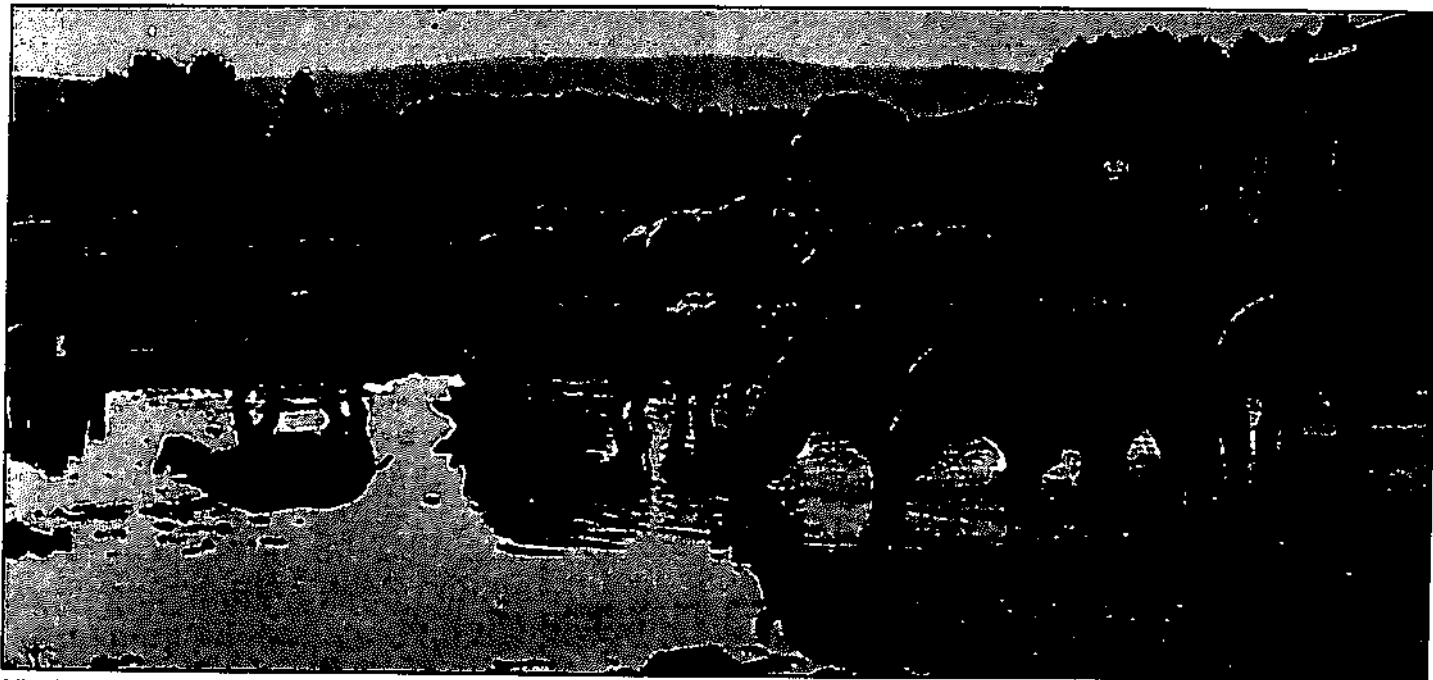
### The quarantine

Once imported from Kenya, black rhinos were placed in the so-called old quarantine (BEDNAR personal communication), today's wintering facility for East African ungulates. The ten (4.6) animals caught in Tsavo National Park were imported in 2 transports: 27 July 1971 (2.0 - Ken and Lord) and 23 August 1971 (2.6 - King, Murray, Zina, Lenka, Elsa, Jimmi, Tuty and Jarca) and initially divided into 2 groups (2 and 8 animals). Afterwards, all the animals stayed together within a single group both indoors and outdoors, prospering and growing despite the relatively primitive housing and in particular temporary enclosures. The basis of the diet was a milk-based polenta supplemented with various kinds of cereals, vegetables, fruits and browse. In 1972, two (1.1) individuals from the group - Lord and Lenka - were sold to Jacksonville Zoo, the U.S., where Lord later became the father of 4 young and lived to be 29 years. Lenka lived 12 years and died without offspring. The rhinos were housed in the quarantine facility until 1973.

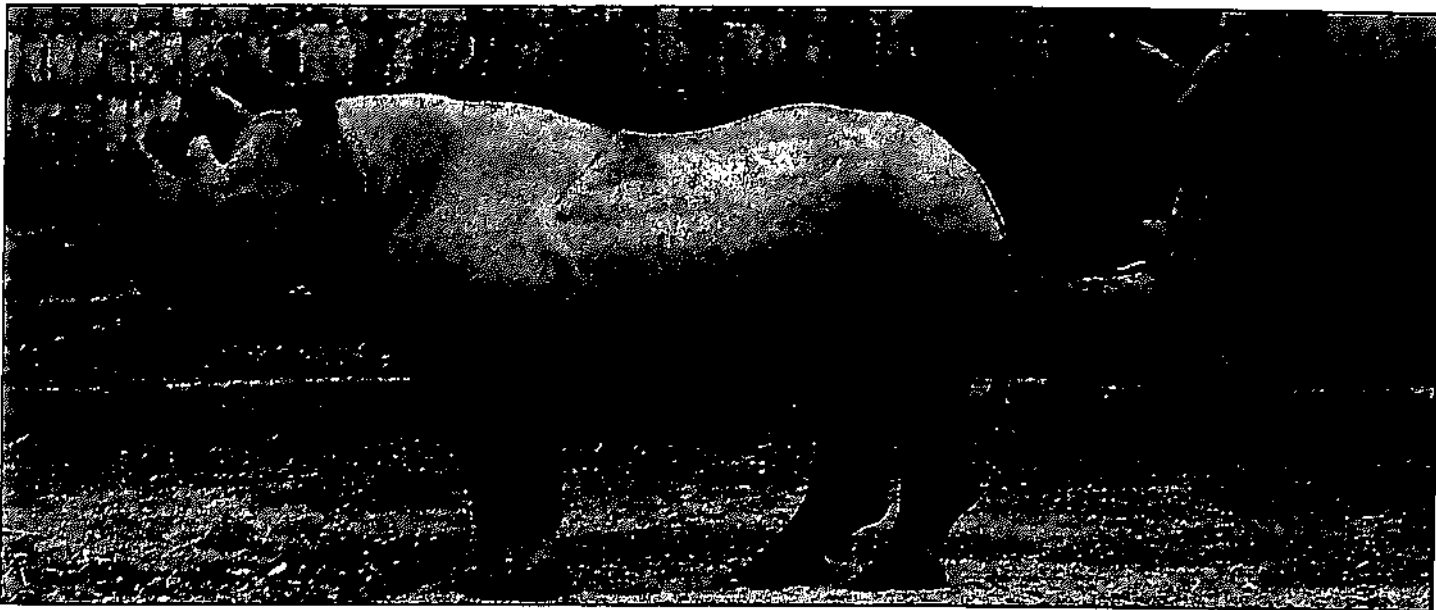
### Rhino house 1 (later on: the white rhino house, today the black rhino house)

In 1973, all of the eight (3.5) black rhinos were moved into the premises of the new rhino house that was then under development (today known as the black rhino house), where the whole group lived in a box of size 6 x 6 m. In other 2 boxes, there lived two groups of southern white rhinos - a total of 10 (2.8) animals. In summer, all the three groups of rhinos went together into a single enclosure, while in winter they alternated each other, staying outdoors only during the cleaning. At that time, the first attempt of mating was recorded in black rhinos (Ken and Elsa - 18 March 1973). In July 1973, another pair of southern white rhinos was introduced (a new import from Africa), enlarging the group of rhinos staying together outdoors to 20 animals - 8 black rhinos and 12 white rhinos, structured as follows:

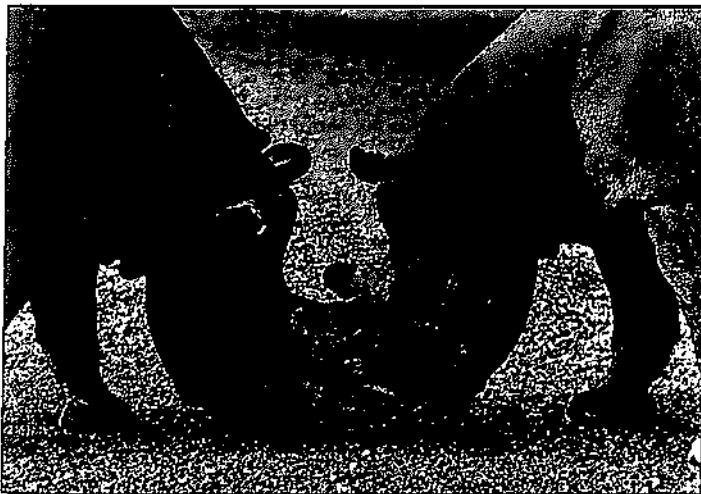
- 8 (3.5) black rhinos
- 7 (2.5) older southern white rhinos
- 5 (1.4) younger southern white rhinos



*Mixed stock of black rhinos and white rhinos; on the right top of the picture: the rhino house 1 under construction, 1973 (jh)*



*A black rhino with a white rhino by the rhino house 1, 1974 (lh)*



*Black rhinos in the enclosure of the rhino house 2 (lh)*

#### **Rhino house 2 (then the black rhino house; originally built for zebras) - 1973**

As the indoor rhino housing was insufficient for the growing young animals, a part of the animal house built originally for zebras was put into operation in the late 1973, to which black rhinos were moved in December 1973. In this facility, the condition of skin improved in all individuals. Because the boxes inside the house were smaller than those in the previous facility, mutual aggressiveness of animals increased, with Jimmi being attacked in particular. All 8 (3.5) individuals (King, Ken, Murray, Elsa, Zina, Tuty, Jimmi and Jarca) stayed there permanently together. Already on 30 October, mating was first observed.

### Central wintering facility, barn III

In 1974, additional black rhinos were imported from Kenya. First, it was female Sabi (imported on 26 June from the Isiolo region) and then two animals (1.1) - Addo and Satara (imported on 2 July from unspecified locations). These animals were quarantined in the barn III at the central wintering facility. All were transferred to the rhino house 2 already on 31 August 1974.

### Rhino house 2 (then the black rhino house; now the zebra house) - 1974 to 1978

On 31 August 1974, the black rhino group was enlarged by adding 3 (1.2) individuals imported from Kenya the same year and quarantined in the central wintering grounds. Subsequently, the herd of black rhinos consisted of 11 (4.7) individuals. On 29 October 1974, male Murray from this group was sold to Wrocław Zoo in Poland. The rest of the herd was split into two groups held separately in two boxes as follows: 3 (1.2) - Addo, Sabi and Satara and 7 (2.5) - Ken, King, Zina, Elsa, Jimmi, Tuty and Jarca. All these animals still went together into a single enclosure shared additionally with white rhinos; in winter, the groups alternated each other, staying outdoors only during the cleaning.

In January 1975, the trio became restless and Sabi was often attacked, so was separated into a separate box on 13 January. Nonetheless, all black rhinos still walked outdoors together. From June 1975, Sabi stayed in the house within a larger group made up of 8 (2.6) individuals.

At that time, the beginning process of sexual maturation started to show through mating attempts observed (Elsa and King, Satara and Addo), as well as through mutual struggles and injured animals. This led to additional splitting of the herd indoors in the early 1976, into 3 groups as follows:

- 2 (1.1) - Addo, Satara
- 5 (1.4) - Ken, Zina, Elsa, Tuty and Sabi
- 3 (1.2) - King, Jimmi, Jarca

All animals still walked outdoors together and continued attempts at mating were observed (Tuty and King, Elsa and King, Tuty and Ken). During the spring 1976, the outdoor area was converted into 3 separate enclosures. At the time of construction of enclosures, rhinos could not walk out for several weeks, which resulted in stiffening their fighting with each other, associated with numerous injuries, especially those of mouth. As of May 1976, the black rhinos started walking in their own enclosure and stopped being united with white rhinos. The first mating was recorded on 20 July, 1976, when female Elsa was first mated by Ken, and then by King still on the same day. As subsequently proved, Elsa became pregnant on that day; the father of the young (Elvira) is still unknown. In the later half of 1976, continued mating was observed (Tuty and Ken - repeatedly, Zina and Ken, Sabi and King - attempts).

In 1976, aggression among the rhinos escalated, with beginning maturity of the animals being responsible without doubts. Jimmi became the most attacked female with her nasal septa broken from the attacks of the males, so had to be permanently separated from the group as of 12 July 1976 and stayed indoors.

King became another seriously wounded animal (17 February 1977), when the other male Ken injured male's groin and broke his spermatic cord. From that day on, King was separated leaving the number of black rhinos going out together on 6 (1.5) - Ken, Zina, Elsa, Tuty, Jarca and Sabi. Subsequently, Ken repeatedly mated Tuty and Sabi.

As in the late March 1977 Elsa who had been staying with the group appeared to be pregnant, she was put aside into a separate box on 22 March 1977. Consequently, solo living Jimmi had to be moved into the central wintering grounds to make space for Elsa. On 15 July, the female was followed by King who had been held apart from others.

In the meantime, Sabi got pregnant on 15 April 1977 following mating with Ken. After separating Elsa, the herd consisted of 5 (1.4) animals - Ken, Zina, Tuty, Jarca and Sabi. The only female who had not been mated was Jarca. This rhino was repeatedly attacked by Ken, hurting the female in the groin (10 August and 6 September 1977). Ken tried to mate the female for the first time on 12 September, with no attempts recorded any later; however, Jarca's injuries in the groin continued (28 November and 15 December 1977). Tuty was last mated by Ken on 9 October 1977.

On 2 October 1977, Elsa gave birth to the first black rhino calf - a female - at Dvur Kralove Zoo (Elvira DK 1). The female's ration was enriched with vegetables, fruit and milk powder. Despite the positive developments within the stock, problems began to appear with male Ken losing weight extremely. On 10 December 1977, this male had to be separated from the females. His diet was improved and the rhino subsequently almost broke through the separating wall to the box with Elsa and her calf inside on 14 December. Therefore, the male was reunited with the females (Zina, Jarca, Tuty and Sabi). In the late December 1977, only four females went out together. Elsa shared the box with her daughter Elvira, as did Ken and Tuty, and the remaining 2 boxes were inhabited by 3 females (Zina, Jarca and Sabi). From 27 Jan-



*Elsa with the 27-day-old Elvira DK 1, 29 Oct 1977 (lh)*



*Elvira at the age of 7 months, 21 May 1978 (lh)*

uary, Sabi was separated into a single box because of showing strange behaviour from time to time, which probably was due to pregnancy. At the same time, the majority of animals exhibited health problems. Ken was still rather lean, with Zina and Jarca bleeding once their mouth was injured, because the wounds were constantly renewed. In addition, it was clear in March 1978 that Elsa was in a very poor condition as well. In early April, it became apparent that the female had stopped lactating (dried milk was removed from the female's diet on 22 November 1977, then served over a short period in December and displaced again in January 1978). Despite the treatment employed as well as increased and diversified diet, Elsa died on 7 April, which for Elvira meant losing her mother at the age of 6 months. Consequently, this infant rhino began to suffer from diarrhoeas. The calf was treated with antibiotics and was given rice porridge and varied diet containing amongst others powdered milk, bananas, oat flakes, fruit and vegetables. She was also fed milk from a bottle and received Glukopur.

From today's perspective, oversimplification of feeding, inadequate to dietary requirements of a lactating female and those of adult animals appears to have been the most likely cause of death of Elsa and decondition of other rhinos, because from July 1975, the summer diet was altered (simplified) to concentrated food, browse and green fodder and similarly, from July 1976, the diet over the summer season was again reduced to concentrated feeds, green fodder and browse.

Because the health of Ken and Tuty was still not satisfactory, both animals were crated and carried to the central wintering house (19 April 1978) and male King brought on 20 April from the same facility to join the rest of the females (Zina, Jarca and Sabi). Unfortunately, King was anaesthetised using Immobilon due to the transport and his condition was not very good after the operation; consequently, the male died on 22 April of entangled intestines as a result of the narcotising, loading and transporting.

In May and June 1978, Zina continued to suffer bleeding from the mouth. This situation had been lasting for several months due to injury after the attack of Ken. In June, her health deteriorated. This animal was repeatedly investigated and then treated from 21 June. Despite all efforts, Zina died on 26 June. Even though haemolytic anaemia appeared to be the cause, the death might have been associated with prolonged bleeding, weakening the body.

Sabi began lactating on 30 June, giving birth to a female on 5 July 1978 (Sali DK 2), which the female reared without any problems. Elvira, already a 10 months old rhino at that time, was still kept on her own. Since July 1978, this female rhino was joining Jarca outdoors; subsequently, both females walked out together on a regular basis and as of October, Jarca became Elvira's permanent

babysitter as there was no adult black rhino, with which this adult female could be united. Therefore, both female rhinos continued to be kept together not only outdoors, but also inside the house. On 17 November 1978, male Isis was imported (born on 3 November 1977 in Cincinnati, the USA) to become a future stud male.

#### **Central wintering facility, barn IV - 1977 to 1978**

On 22 March 1977, female Jimmi was moved to the barn IV at the central wintering facility, joined by male King moved about 4 months later (15 July 1977) into the same building following his recovery from injuries suffered in February of that year. King and Jimmi were united and continued to be kept together permanently indoors and outdoors. Both animals prospered on that location, even though enjoying dismounting their fencing both indoors and outdoors almost every day, as the fences were good enough to hold antelopes or zebras but not adolescent rhinos. There the pair was kept fully undisturbed, particularly in summer, the animals could range outdoors and indoors and vice versa not only during the day but even at night. The first mating of King and Jimmi was recorded on 19 August 1977 and at the end of 1977 Jimmi became pregnant. Because the animals kept at the central wintering grounds did very well, it was decided in April 1978 that Ken, being a problematic animal in terms of health, and female Tuty would be moved into the house and King relocated to the rhino house in order to mate the remainder of the females. While the two animals with disorders (Ken and Tuty) were crated without problems at the rhino house, which took place on 19 April, the similar action involving King full of power failed; breaking the crate door and forcing the gate of the house, the male had to be left in the outdoor enclosure from the 19 to 20 April. Therefore, the rhino was anaesthetised (darted by Immobilon) on 20 April and then loaded in a very complicated manner and transported to the rhino house. Unfortunately, this animal subsequently died as a result of the transfer. The blood test proved that Ken and Tuty were suffering from haemolytic anaemia, which began to be treated on 20 April 1978. Because the health of Tuty improved, the treatment was stopped in case of the female and continued only in the male. Tuty got suddenly worse and died literally from day to day on 24 May. Testing Ken's blood samples confirmed that the male was still not in good health, so the treatment continued in the subsequent months.

#### **Rhino house 2 (then the black rhino house; now the zebra house) - 1979 to 1980**

On 6 April 1979, the 17-months-old male Isis was united with Jarca (9 years) and Elvira (1.5 years); this trio was kept together until 12 October, when Jarca was separated and the juveniles joined Sali, a young female separated from the mother when 15 months old. As Sabi and Jarca had skin and condition problems, they were examined and Sabi was re-treated. In summer 1980, Sabi was repeatedly apathetic, as did Jarca. These females were not treated, only carefully monitored and given diverse food. From October 1980, Jarca and Sabi walked out together. In January 1977, the basic ration composed of hay, concentrated food, browse and dried twigs and shoots, sometimes supplemented with carrots, apples and beets. In the second half of 1978 (after the death of Elsa and Zina), the diet was completely changed and the concentrate served until that time replaced by other types of feedstuffs that had worked upon the arrival of black rhinos at the zoo in the early 1970s.

#### **Central wintering facility, barn IV - 1979 to 1981**

At the beginning of 1979 (on 18 March), Jimmi gave birth at the wintering facility to her first calf - a male (Jimm DK 3) that was reared by his mother without any problems. Jimm is the only descendant of the wild-caught male King provided Ken was the father of Elvira. On 13 July 1979, female Satara from Lesna Zoo, where their male Addo had died, was transferred to the wintering grounds and subsequently united with Ken on 8 August. Mating attempts were recorded as early as August in the case of this pair, but confirmed mating took place on 27 September. However, diarrhoea occurred in both rhinos and thus they had to be treated, which for Satara continued in November. Ken, however, was not treated at that time and suddenly died (8 November 1979). Before the male died, he was breathing with great difficulties, so the question is whether the cause of death was pneumonia or haemolytic anaemia. After Ken's death in November 1979, there was another change in the black rhino diet, which from that time on comprised of oats, hay, vegetables, browse and soil with sea salt and Plastin. During the 1980, Jimmi and Jimm did well at the wintering facility, but Satara experienced health problems from time to time including black urination deemed a conclusive effect of haemolytic anaemia. In April 1981 (13 Apr), 25 months old Jimm was separated from his mother Jimmi, crated and transported to the oldest rhino house. The same was scheduled for Satara on that day, who however broke the gate and crating failed. On 17 April, Jimmi was successfully immobilised and transferred to the black rhino house where she was subsequently kept alone, i.e. without Jimm. Similarly, Satara was anaesthetised on 24 April; sadly, this rhino died of cardiac collapse at the wintering facility in the course of immobilisation. Since that time black rhinos were never kept in the central wintering grounds again.

**Rhino house 1 (then the white rhino house, now the black rhino house) - 1980 to 1981**

Early in the 1980s, the black rhinos were kept at the rhino house 2 (now the zebra facility), while the rhino house 1 with its larger number of stalls was used for holding white rhinos. From time to time, black rhinos were located in this bigger building as well. Since the zoo lacked an adult male to join the rhino females following the deaths of King (1978) and Ken (1979), a wild-caught male Murray was imported on 2 October 1980 from Wroclaw Zoo in Poland, to which this rhino had been supplied by Dvur Kralove in 1974. After the male arrived, he repeatedly vomited. Upon arrival, Murray was placed at the white rhino house and moved into that of the black rhino by driving via outdoor enclosures on 27 April 1981.

**Rhino house 2 (then the black rhino house; now the zebra house) - 1981 to 1983**

The year 1981 was marked by constant improvement and monitoring diet of black rhinos. In April, the young male Jimm was brought into the house from the central wintering facility, followed by his mother Jimmi. On the day of transfer (13 Apr), Jimm was immediately united with the trio consisting of Isis, Elvira and Sali, but had to be separated at night. Socialising Jimm, when the male was gradually getting familiar with other rhinos, was an extensive procedure that lasted until 22 May. Once completed, the four young rhinos born from 1977 to 1979 continued staying together both indoors and outdoors. From April 1981, all black rhinos were kept only in the house 2, in five stalls, with females Jimmi, Jarca and Sali as well as male Murray kept separately, and four juveniles - Isis, Jimm (DK 3), Elvira (DK 1) and Sali (DK 2) grouped together. Murray was repeatedly united with Jimmi since May, with mating attempts observed in this pair already since June. At the end of 1981, the rhinos were split into 3 groups that stayed together permanently, with the first of these formed by Murray and Jimmi, the second comprising females Sabi and Jarca and the third group made of four (2.2) calves. During 1982, Murray and Jimmi alternated each other in refusing to walk outdoors for many months. The situation improved in 1983, when the pair already walked out on a regular basis; however, only mating attempts were observed from February to April instead of real mating as such. On 22 April 1983, Murray and Sabi were sold to Zurich Zoo, Switzerland, where both rhinos subsequently reproduced. Sabi lived in Zurich for 36 years and died in 2008. Murray was sent to Tallinn Zoo in 1988, where this rhino died in 2009. Because the four rhino calves (males Isis and Jimm and females Elvira and Sali) had reached maturity and mating attempts were observed at the end of 1981 (Isis and Elvira, Jimm and Elvira), the group was split in pairs as of March 1982 (Elvira and Isis, Jimm and Sali). Since only 5 stalls were available inside the house, the pair consisting of Isis and Elvira was moved to the house of the white rhino.

**Rhino house 1 (then the white rhino house, now the black rhino house) - 1982 to 1983**

On 18 March 1982, a young pair Isis and Elvira (DK 1) was relocated into the house inhabited by white rhinos from the neighbouring facility. From April 1982, Elvira and Isis regularly mated until Elvira became eventually pregnant on 20 February 1983. Elvira was 5 years and 4.5 months, and Isis was even one month younger. These rhinos were transferred back to the rhino house 2 (the black rhino house) in April 1983.

**Rhino house 2 (then the black rhino house; now the zebra house) - 1983 to 1984**

In April 1983, a pair (Murray and Sabi) was sold to Zurich Zoo, Switzerland. Because of the vacancy inside the house following the pair's departure, the pair made of Isis and Elvira was relocated into the facility from the white rhino house. On 5 May 1983, Jimmi was added to the couple above, being first mated by Isis as early as 10 days (15 May) and then on a regular basis until 6 September, when Jimmi got pregnant. Interestingly, Isis was trying to continue mating the pregnant Jimmi over the following 3 months. At that time, pregnant Elvira was kept in a separate box on her own (without Isis). The black rhino herd consisted of 6 (2.4) animals (males Isis and Jimm, females Jimmi, Jarca, Elvira and Sali). Due to a lack of space, Jimm and Elvira were moved at the beginning of 1984 to the rhino house next door (the rhino house 1).

**Rhino house 1 (then the white rhino house, now the black rhino house) - 1984 to 1986**

On the last day of January 1984, Jimm was forced into the outbuilding of the house 1 via enclosures, followed by pregnant Elvira a few days later (on 6 February); there the female gave birth to a male on 15 May 1984 (Eli DK 4). Eli was weaned from his mother on 18 August 1986, i.e. when 27 months old, and moved into the new quarantine facility along with Jimm (DK 3) and subsequently female Elvira (DK 1).

**Rhino house 2 (then the black rhino house; now the zebra house) - 1984 to 1990**

As of 15 May 1984, Isis and Sali were periodically introduced to each other and subsequently began to mate, which took place from 23 May 1984 until 21 April 1985, and might have continued even in May, when however mating was not observed. At that time, Sali became pregnant for the first time at the age of 6 years and 1.5 months.

Meanwhile, Jimmi bore its second calf at the house on 12 December 1984 - a female (**Jessi DK 5**). Jessi stayed with her mother until 9 September 1986, was weaned at month 21, and almost 2 years later (06 Apr 1988) carried away to the new quarantine, where this rhino replaced female Elvira.

On June 28 1986, Sali gave birth to her first calf - a male (**Sado DK 6**), whose father was Isis. Subsequently (on 9 September), Jimmi was introduced to Isis on 19 September once separated from her daughter Jessi, with the first mating taking place already 21 days after the weaning (on 30 September), but Jimmi became pregnant as late as 1.5 years after in February 1988 (13 Feb). Jimmi's third calf - a male (**Jos DK 7**) was born on 21 May 1989. This rhino was weaned from the mother at 11 months of age (19 April 1990) and Jimmi was subsequently forced via the outdoor enclosure to the rhino house 3 (New rhino house).

The young Sado was separated from the mother Sali in the late 1987 when he was 14 months, because Sali suffered erosions in the mouth and lost milk. Sali was introduced to Isis on 23 March 1988, with the first mating recorded on 18 April. Sali got pregnant on 28 June 1988 and on 1 October 1989 gave birth to her third calf - a female (**Sany DK 8**).

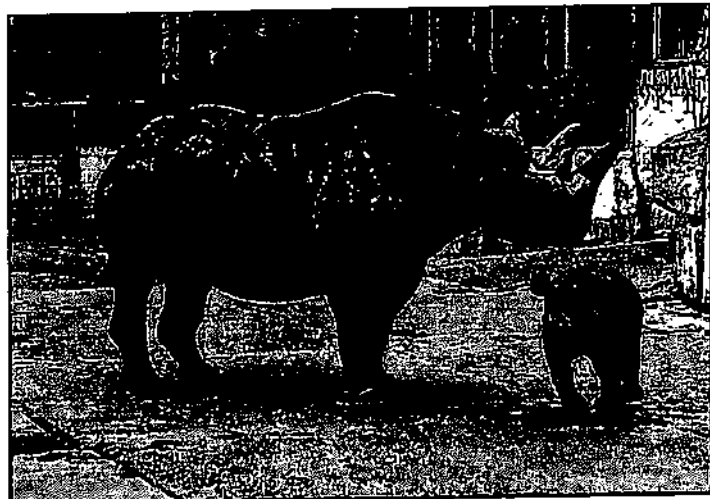
Elvira was transferred into the house from the new quarantine facility on 6 April 1988 and was since kept alone or united with Isis together with female Jarca; however the male was very aggressive towards the females, so the introduction process was always stopped after some time. This took a year, and Elvira began eventually walking outdoors with Isis on a regular basis as of 4 May 1989. Mating followed on 23 and 29 May, where Elvira became pregnant upon the second mating event and bore her second descendant on 24 August 1990 - a female (**Eimi DK 9**). Once the 11 months old Eimi was weaned (on 31 July 1991), Elvira was transferred by driving via enclosures from the house 2 into the house 1.

Jarca's experience with males in the female's adolescence period was very negative; after the death of King and Ken, this rhino was long kept as a companion to the young Elvira, who had lost her mother at the early stage (in 1978), and later also with the young male Isis who came to Dvur Kralove from the U.S. as a yearling. Once Isis reached maturity, this male began repeatedly attacking Jarca, and therefore this female rhino stayed alone for many years until intensive efforts on the reproduction of this female began around 1989 (VAHALA *et al.* 1995). Throughout 1989, urine was collected from females, including Jarca, and tested in London in order to identify hormonal cycles. Jarca was anaesthetised on 5 May 1989 and underwent the gynaecological examination. To facilitate the introduction to Isis, Jarca was first united with Elvira (on 16 August 1989) and subsequently with Isis (18 August 1989). However, the whole process had to be stopped for permanent Isis attacks. In November 1989, Jarca was hormone-stimulated for the first time, receiving Regumate - 37.5 ml/day over a 12-day period.

Since putting together with Isis failed, Jimm (DK 3) was transferred to the adjacent white rhino house from the new quarantine on 21 December 1989, and subsequently Jimm started the first contacts with Jarca in the outdoor enclosure as of 26 December. Both rhinos were sniffing each other through the enclosure fence and taking turns in walking into the same enclosure. In March (on 5 Mar), Jimm was



*Elvira mating with Isis, 3 May 1989 (lh)*



*Jimmi and two-month-old Jos DK 7, 17 July 1989 (lh)*

moved by driving into the box adjacent to that of Jarca at the black rhino house, so both rhinos stayed next door to each other. On 15 March 1990, Jarca was anaesthetised and re-examined. Until the end of month, the female received the second batch of hormonal stimulation to induce oestrus (Regumate, 50 ml/day over the period of 14 days). Jimm and Jarca were tranquilised using Diazepam and introduced to each other for the first time on 1 April 1990 and as it went quite smoothly, the process continued, with the first attempt at mating observed on 2 April. The first actual mating took place on 22 April 1990, when Jarca was 20 years old. The pair continued to mate on a regular basis, but Jarca still could not get pregnant. Therefore, 60 ml of TPGS (vitamin E dissolved in fat) per day was administered to the female over the period of 10 days in February 1991. In April, Jarca was darted with Supergestron; however, only mating attempts followed. As the white rhino house had been vacated by relocating the white rhinos to a new house, the trio consisting of Jimm, Sali (who was pregnant at that time) and Jarca was driven in July 1991 to the rhino house 1 that has since been used for housing black rhinos.

#### **New quarantine facility - 1986 to 1990**

The rhino section at the new quarantine facility began to be used for black rhinoceroses from 18 August 1986, when two young males (Jimm - 7 years and Eli - 27 months) were moved there from space reasons. Shortly after, female Elvira was added into the facility, who was however relocated to the rhino house 2 (black rhino house) about 1.5 years after (on 6 April 1988), replaced by a young female Jessi (3 years and 4 months old) transferred to the new quarantine facility on the same day. On 23 August 1989, Jessi was put together with Eli; this pair stayed there together permanently, both indoors and outdoors. In December (21-12) 1989, Jimm was moved out of the new quarantine grounds and taken to the rhino house 1 (white rhino house). Mating of Jessi and Eli was observed as early as 14 September 1989, and the female became pregnant for the first time on 8 April 1990 at the age of 5 years and 4 months. As the quarantine facility was too far from the rhino house, animals were monitored especially during cleaning. In the late October the same year, Jessi (24-10) and Eli (25-10) were moved one by one to the new rhino house. Subsequently, the rhino section at the new quarantine was cancelled; currently, it serves as wintering grounds and breeding facility for pelicans.

#### **Rhino house 1 (then the white rhino house, now the black rhino house) - from 1990 on**

During 1990, all white rhinos were moved into the new house (rhino house 3) and their former facility, having undergone a process of renewal in 1990-1991, has since been used solely for housing black rhinos. Some of the black rhinos were kept permanently only in this house, while others, especially males and juveniles, used to be moved in crates to the new rhino house and back. The operations of black rhino moving between the facilities was motivated by spatial and breeding reasons and proved well in weaning. Weaned calves departed to other zoos over time. Breeding females that were held at the rhino house 1 from 1990 until the death comprised Elvira, Sali and Jarca. Elvira lived in the house after having weaned her daughter Eimi (31 July, 1991). As this female had not yet finished lactation, her milk was collected and frozen for potential artificial rearing. On 15 August, Elvira was put together with Jimm and female Jarca. Mated as early as 31 August, this female rhino got pregnant a month later and subsequently bore her third calf on 12 August 1992 - a female (**Etna DK 13**). Etna was weaned at the age of fifteen months (10 March 1994). Elvira became pregnant once again in 1995 (3 Jun) following mating with male Cody, but aborted after 2 weeks (21 June 1995), when she was 17 years. Since then this female rhino was never pregnant again and died on 25 February 1995 when less than 18.5 years old.

On 7 July 1991, Jimm and females Jarca and Sali were moved into the reconstructed rhino house 1; Sali was already pregnant and gave birth to her third calf on 24 February 1992 - a female (**Sara DK 12**, fathered by Jimm). Sara was weaned when aged 14 months (5 April 1993) and immediately moved into the new rhino house. As Sara was reared, milk was collected from Sali and frozen for potential artificial rearing of other rhinos in future. These preliminary arrangements for possible artificial rearing were carried out in connection with the successful efforts to get Jarca pregnant.

On 10 December 1992, male Cody born at Sydney Zoo, Australia, was brought into the house. Highly valuable in terms of genetics, this 17-year-old male rhino however never bred before that time. From April 1993 on, efforts of bringing this rhino together with female Sali DK 2 were underway, which was followed by uniting the animals outdoors; unfortunately, Sali was attacking the male, even knocking Cody to the ground (21 April). Subsequently, both rhinos were held together only for short periods, until Cody attempted to mate Sali on 11 May. Since then, the pair shared the enclosure in an already calm manner. On 29 May, Cody repeatedly tried to mate Sali, but could not insert the penis due to a lack of experience. Assistance from a keeper was necessary and then brief mating followed. The next day Cody already mated without keeper's help, but yet fell from the female sideways on the ground in one case. Mating repeated in the subsequent months until Sali got pregnant on 16 July and bore her fourth calf - a male (**Sauron DK 16**) the following year (24 October 1994). Sali gave two else births - first it was a female born on 20 August 1997 (**Ssang Yong - Musso**



**DK 20**, fathered by Jimm), while the second time (25 January 2000) it was a female again (**Salome DK 23**, with Jimm as the father again). Sali reared all of her calves successfully, and died in 2006 at the age of 28 years.

As already mentioned, Jarca was moved into the rhino house 1 on 7 July 1991, accompanied by Sali and Jimm. The female continued being put together with Jimm, with the first mating following the move taking place on 7 August 1991. Within the next oestrus period Jarca became pregnant (1 September 1991) and gave birth to a female (**Jaga DK 14**) on 14 December 1992. Despite weighing only about 26 kg, the calf was vital. Jarca had relatively little milk - this female gave the first birth at age 22. In addition, Jaga herself was unable to suck, so was initially bottle-fed by horse milk and then by rhino milk. However, to avoid losing contact with the mother, who was quiet and did not maltreat the calf, Jaga was separated only for the feeding. Later on, the calf was fed through the bars in the presence of the mother. The history of the artificial rearing is described on page 132. Jaga was weaned on 10 March 1994, i.e. when 15 months old and immediately put together with Eina, a female of the same age weaned from her mother (Elvira) the same day. After weaning Jaga, Jarca started being put together with Cody in the outdoor enclosure as of 3 April, accompanied by Elvira. This took place in a relaxed manner every day, with Cody first mating Elvira (9 April 1994) and subsequently Jarca (24 April). In May (29 May), Cody mated Elvira during the day, attempting to mate Jarca as well; on 14 July, he demonstrably mated both females in a single day. Jarca got pregnant on 2 September 1994 and bore a male (**Jonas DK 18**) on 4 December 1995, who however was unable to stand up and weighed only 23 kg. Jonas was hand-fed like Jaga, but died after 6 days. This male was the only live-born black rhinoceros in the history of Dvur Kralove's collection that was not reared with success. Jarca was never pregnant again and died in 1996 at the age of 26.

Female Eimi (a daughter of Elvira DK 1 and a granddaughter of wild-caught Elsa) lived from her birth in 1990 at the rhino house 2. Weaned from the mother when 11 months old (on 31 July 1991), this female rhino was left without the mother at the rhino house 2, from which she was moved into the house 1 on 12 Oct 90. In April 1994, preparations for putting Eimi together with Cody began, and thus both rhinos were kept next to each other inside the house (from 16 April on). Cody was trying to mate Eimi as early as 2 May, which met with success on 23 May 1995. Eimi got pregnant on 8 May 1996 and gave birth to her first calf - a female (**Elba DK 19**), which was reared by the mother without any problems.

Eight days upon weaning Elba, Eimi joined Jimm DK 3 (8 August 1997), with several mating attempts registered in this pair until the end of the year. Eimi failed to get pregnant even in 1998, and in May 1999, she began to suffer health problems manifested with black urine. Although the female was treated, similar problems occurred in 2000. In June of the same year, Eimi joined Jiddah (DK 17), a nearly six-year-old female, and both were subsequently put together with male Sauron (DK 16). In August, Sauron tried to mate Eimi, but eventually became very aggressive. Mating attempts were recorded also in the following oestrus periods; the first real mating occurred on 28 November 2000. The pair continued mating in 2001, when Eimi (DK 9) became pregnant again on 10 June. On 24 August 2002, this female gave birth to a stillborn calf - a female (**DK 25**); later on, Eimi suffered health problems again during 2003 and died suddenly and unexpectedly in 2004, aged just 14 years. Possible causes of death could include the excess of iron in the diet and subsequently in the body. Iron was administered to each of black rhinos following problematic deaths that occurred in the late 1970s as a precaution against haemolytic anaemia. As iron deposits in organs were demonstrable in several dead animals, this supplement was subsequently removed.

Female Elba that became a breeding female following mating with Jimm in 2001 has been living at the house since her birth in 1996. After a single mating session on 8 April 2001, this female became pregnant and bore a female on 2 November 2002 (**Emma Elsa DK 26**). Subsequently, this female got pregnant again with the same male and gave birth to another female on 2 September 2006 (**Etosha DK 30**). Etosha was weaned from the mother in spring 2008 at the age of 21 months and joined the newly imported male Davu; then both of them were relocated to the new rhino house in the mid-2009.

Elba was introduced in the summer 2008 to a new male Baringo II imported from Port Lympne while in oestrus and immediately bred by the male (on 26 July). Getting pregnant a month later (20 August 2008), this female rhino bore her third descendant on 8 December 2009 - a female (**Eva DK 34**).

In 1996, a 1.5-year-old female Jiddah (DK 17) weaned from her mother Jessi was moved into the house from the rhino house 3 (new rhino house), joining there Sauron (DK 16) of the same age and 3.5-year-old female Jaga (DK 14) the next day (15 May). The assumption that the pair would become a breeding pair in the future did not work out, because Sauron got very aggressive with his adult age getting near, attacking Jiddah repeatedly until the female became scared of the male. As involving the young female in breeding was necessary, Jiddah was eventually put together with Jimm (DK 3), although both animals were partly related. The calm male Jimm got familiar with Jiddah very quickly thanks to the assistance of Sali as experienced female; the animals were first put together on 9 May 2003 and mating took place for the first time on 12 May 2003. A month later, Jiddah got pregnant and bore a female on 11 November 2004 (**Deborah DK 27**). Three years later, on 24 November 2007, the same female bore a second descendant - a male (**Dzanty DK 33**, fathered by Jimm).

On 6 June 2008, a 16-year-old stud Baringo II was imported from Port Lympne Zoo, England, and was immediately placed in the house. During the year 2009, Jiddah was continuously separated from her son over a part of the day and put together with Baringo for a short period, who mated the female on 18 May. The animals were held together over the next several days, but then the male attacked the female very aggressively (on 21 May) and without any reason, throwing her into the ditch. The uniting process was then stopped and restored only during the oestrus period. The pair subsequently mated on 12 July. Throughout the stock history, Baringo II has been the first male introduced to the females only during their oestrus time since outside this period he is unpredictably a highly aggressive animal. Other breeding males used to walk out with females even several months after the female became pregnant and permanent separation occurred only after the pregnant female had begun to be aggressive towards the male.

Since 1998, Jessi (DK 5) has been kept at the rhino house 1, where this female was paired with Jimm (DK 3) and bore a male (**Jeremy DK 24**) on 21 December 2000. Another partner of this female was Sauron (DK 16) in 2004. Jessi got pregnant and bore another male on 2 January 2006 (**Jamie DK 29**). Having weaned Jamie, then almost an 18 months old animal, Jessi was introduced when in her oestrus period with the new breeding male Baringo II in September 2008; the male had stayed three months in Dvur Kralove at that time, mating female Elba (DK 19) as early as July and August. After mating that took place on 4 September 2008, Jessi became pregnant and bore its sixth calf - a female (**Jasmina DK 35**). Currently, i.e. at the end of 2009, the following animals are kept at the rhino house 1: breeding males Jimm (DK 3) and Baringo II, and breeding females Jiddah (DK 17), Jessi (DK 5) and Elba (DK 19) with their latest offspring (**Dzanty DK 33**, **Jasmina DK 35** and **Eva DK 34**). More information about births of each female, including dates of conception and places of birth are summarised in tables on page 110 - 113.

#### **Rhino house 2 (now the zebra house) - from 1990 on**

Upon the completion of the new rhino house in 1990, the earlier black rhino facility has not been in use for permanent rhino housing, with the only exemption of providing temporary housing for weaned animals in the early 1990s (Jaga and Etna, 1995).

#### **Rhino house 3 (new rhino house) - from 1989 on**

The first black rhino kept in the new rhino house was Jessi, who was moved into the house from the new quarantine facility when this female had already been pregnant on 24 October 1989. On 23 June 1991, this female gave birth to her first descendant - a male (**Jacob DK 10**, fathered by Eli), whom she reared successfully.

After Jacob was weaned at the age of 13 months on 31 July 1992, Jessi was kept alone until introduced in the late 1992 to Mabú, a newly imported male (1 Oct 1992), who mated the female for the first time on 17 December 1992. Jessi got pregnant in August 1993, giving birth to a female (**Jiddah DK 17**) on 15 November 1994. Jessi was also mated by Mabú following weaning of Jiddah, then a 1.5-year-old animal (weaned on 14 May 1996, introduction on 17 May); then this female became pregnant on 1 July 1996 and bore another daughter (**Jola DK 21**) on 25 October 1997. Jola was weaned when 19 months old on 17 March 1999. The projected process of putting together Jessi with Cody was terminated by the male's pre-mature death (19 May 1999, 24 years old) and thus Jessi was relocated to the rhino house 1 (the black rhino house) on 30 June 1999.

Jimmi was separated from her son Jos at the rhino house 1 on 19 April 1990 and transferred by driving to the new house where she subsequently underwent a process of putting together with Isis. The female became pregnant immediately when entered the heat (53 days upon weaning), giving birth to her fourth descendant - another male (**Jasper DK 11**) on 13 September 1991. In the new rhino house, Jimmi got pregnant again two more times, which for the first time was with male Mabú (08 Feb 1993); however, this mating produced a stillborn male (**DK 15**) delivered on 11 April 1994. Jimmi entered oestrus already 11 days upon the recent birth and was mated by Mabú again, which took place on a regular basis almost until the male's death on 15 October 1996, with the last mating session on 30 May 1995). As the female failed to get pregnant, she was put together with Isis in 1996 and then conceived later in the year (4 Oct 1996). Jimmi bore her last calf (the sixth in the row) - a female (**Jane Lee DK 22**) - on 24 January 1998 when she was 28.

Jane Lee was weaned on month 14 (17 Mar 1999) and Jimmi was mated by Isis repeatedly from April to September 1999. Isis tried to mate Jimmi on a regular basis until spring 2002, but Jimmi got never pregnant again. This could be, amongst others, due to the poor health of the male who continued to lose weight and his condition was critical in the 1999/2000 winter. As the male's behaviour remained unchanged, it was suggested that his diet might be an issue, so the male's ration was reviewed and modified largely, and colloid minerals were applied subsequently with the aim of eliminating iron from the male's body. Isis then fully recovered over time. A single mating attempt was registered even in July 2005, which could probably stem at that time from the situation when Jimmi was assist-

ing the process of socialisation of Isis and the young female Jola, and the male was showing interest in Jimmi despite the fact that it was inexperienced Jola that had her oestrus period. Even though Jimmi was no longer able to reproduce, this rhino shared the outdoor enclosure with male Isis without troubles for years, assisting repeatedly in putting the male together with young females lacking experience (Musso and Jola). Jimmi lived to be 39.5 years and was euthanised due to her old age on 21 August 2009, when she could not stand up any longer. In 2001, male Mweru was imported into the new house from Port Lympne, England, as a genetically unrelated potential stud; this rhino was six years old at that time. Mweru was put together with females Musso, Jola and Jane Lee, which however turned out to be a difficult and time-consuming process due to the male's aggressiveness; therefore, Musso and later also Jola were put together with Isis, while Mweru was being united only with Jane Lee towards whom the male was showing the least signs of aggression. Musso (DK 20) became united with Jimmi as of June 2003; once both females got together well in the outdoor enclosure, the process of putting them together with Isis was launched. The state of mutual tolerance between Isis and Musso was slowly getting better; mating first took place as late as a year after, i.e. on 25 August 2004, and repeated the next month (20 Sep). Musso became pregnant, giving birth to a female (Maisha DK 28) on 25 December 2005, who was reared by Musso without problems. During the years 2006 and 2007, Musso started showing health problems and her condition deteriorated. When Maisha was 19 months old, her mother Musso died of pneumomycosis aged just 10 years. Subsequently, Musso was found to have iron deposits in her organs, which apparently was a result of administering the mineral in the early years of the female's life. Further, female Jola (DK 21) kept at the house since her birth (25 Oct 1997) was also socialised with Isis under the assistance of Jimmi during 2005, when Jola was fruitfully mated. Jola first gave birth on 1 February 2007 - to a male (Jabu DK 31). Once Jabu was weaned (on 1 November 2008, aged 21 months), Jola was put together with Jane Lee and both females were subsequently introduced to male Mweru (15 May 2009), who first mated Jola on 8 June 2009, during which the female became pregnant as was later confirmed by testing the hormonal derivatives in the female's faeces at the University of Vienna in October 2009. Mweru had however mated Jane Lee earlier in 2008, who then gave a pre-mature birth on 22 September 2007 to a stillborn calf (DK 32) on pregnancy day 393. Since then this female repeatedly mated with Mweru (on 3 and 28 Nov 2007, 12 Aug, 21 Oct and 12 Dec 2008, 14 Apr 2009), but could not get pregnant. Therefore, Jane Lee was anaesthetised and examined by IZW Berlin on 5 July 2009 and found to be of good health; it was hypothesized that problems could have been caused by a negative response to the male's semen in connection with the premature birth of a calf fathered by the same stud. Thus, it was decided that if the female fails to get pregnant in 2009, she would be paired with a different male (Baringo); Jane Lee subsequently mated with Mweru on 22 August and 2 November 2009. Since 1990, the new rhino house has been home to male Isis; in addition, the wild-caught female Jimmi lived there until her death. Additionally, male Mweru has been staying there since he arrived at the zoo (2001), as well as females Jola DK 21 (born 1997, a daughter of Jessi), Jane Lee DK 22 (born 1998, the last calf of Jimmi) and Maisha DK 28 (born 2005, a daughter of Musso) who have lived at the house since birth. In May 2009, a trio of young animals left the rhino house for a reintroduction project in Tanzania; the group consisted of female Deborah DK 27 (born 2004, a daughter of Jiddah) and males Jamie DK 29 (born 2006, a son of Jessi) and Jabu DK 31 (born 2007, a son of Jola); for more details, see page 153. In the summer 2009 (4 Aug), a young pair of rhinos - male Davu and female Etosha DK 30 - was transferred to the house from the rhino house 1 (the black rhino house), with subsequent first mating of this pair observed on 22 August, when Davu was only 3.5 years and Etosha 3 years old. On 9 September, female Maisha DK 28 was added to the pair above, being surprisingly mated by Davu very early (10 and 12 September). Mating of both couples continued in the following months as well. For more details on births and mating, refer to the table on page 112.

### **Nane and Bashira**

Details on all black rhinos ever held at Dvur Kralove Zoo are included in the summary on page 148, showing that the zoo also owned female Nane born on 4 April 1991 at Berlin Zoo; this rhino was acquired based on exchange for male Jacob (DK 10) on 1 October 1993, but subsequently sold to Krefeld Zoo on 23 May 1994, and thus never arrived in Dvur Kralove. Much later - in 2008, Nane's son Davu came from Krefeld to Dvur Kralove Zoo. In addition, an agreement was signed with Chester Zoo, based on which the first daughter of Erna Elsa DK 26 is expected to come to Dvur Kralove once weaned - female Bashira born in Chester on 15 May 2009, studbook number 992 (FRESE 2009).

As per 31 December 2009, Dvur Kralove had available 11 (5.6) black rhinos, either proven or potential breeders, as follows:

Males: Isis - 32 years, Jimm DK 3 - 30 years, Baringo II - 17 years, Mweru - 13 years, Davu - 4 years

Females: Jessi DK 5 - 25 years, Elba DK 19 - 13 years, Jola DK 21 - 12 years, Jane Lee DK 22 - 12 years, Maisha DK 28 - 4 years, Etosha DK 30 - 3 years

## BREEDING INDIVIDUALS

23 (10.13) individuals were involved in reproduction. Females were giving birth 35 times. The number of young in the respective females counts 1 to 6. Males became fathers once up to ten times. The most successful males included Isis and Jimm with 10 calves born and raised. Isis fruitfully mated with five females (Elvira, Jimmi, Sali, Musso and Jola), while Jimm with six (Sali, Elvira, Jarca, Jess, Elba and Jiddah). Sali and Jessi are the most successful females, with six born and raised calves, followed by Jimmi with six born and five raised calves, where Jessi is still in her breeding period and so far have had young with five males (Eli, Mab, Jimm, Sauron and Baringo II), while Jimmi with three males (King, Isis and Mab), and Sali with three males (Isis, Jimmy and Cody) as well.

### Offspring of particular females and males of black rhinos at Dvur Kralove Zoo prior to 31 December 2009

F / M	Ken	King	Isis	Jimm DK 3	Eli DK	Mabu	Cody	Sauron DK	Mweru	Baringo II
Elvira	Elvira DK 1									
Sali	Sali DK 2									
Jimmi		Jimm DK 3	Jessi DK 7 Jos DK 7 Jasper DK 11 Jane Lee DK 22			† DK 15				
Elvira DK 1			Eli DK 4 Eimi DK 9	Etna DK 13			Abortion			
Sali DK 2			Sado DK 6 Sany DK 8	Sara DK 12 Salome DK 23 Musso DK 20			Sauron DK 16			
Jessi DK 5				Jeremy DK 24	Jacob DK 10	Jiddah DK 17 Jofa DK 21		Jamie DK 29		Jasmina DK 35
Jarca				Jaga DK 14			† Jonas DK 18			
Eimi DK 9							Elba DK 19			
Elba DK 19				Ema Elsa DK 26 Etosha DK 30						Eva DK 34
Jiddah DK 17				Deborah DK 27 Dzany DK 33						
Musso DK 20			Maisha DK 28							
Jola DK 21			Jabu DK 31						Pregnancy	
Jane Lee DK									† DK 32	

## BREEDING MALES

Overview of breeding male black rhinos at Dvur Kralove Zoo prior to 31 December 2009

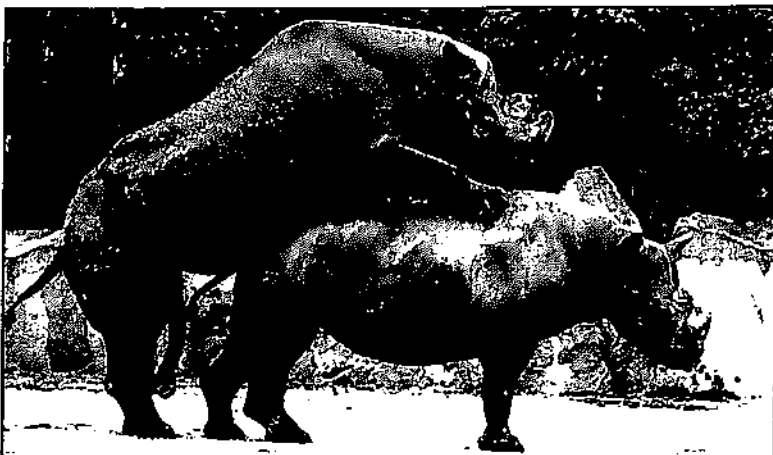
No.	Stdbk #	Name	No. of calves born	No. of calves raised	Success scoring
1	170	Ken	2 (0.2) approx	2 (0.2)	3.
2	172	King	1 (1.0)	1 (1.0)	5.
3	268	Isis	10 (5.5)	10 (5.5)	1.
4	386	Eli DK 4	1 (1.0)	1 (1.0)	5.
5	283	Jimm DK 3	10 (2.8)	10 (2.8)	1.
6	277	Mabu	3 (0.3)	2 (0.2)	2.
7	260	Cody	3 (2.1)	2 (1.1)	2.
8	541	Sauron DK 16	2 (1.1)	1 (1.0)	4.
9	659	Mweru	1 (1.0)	0	6.
10	483	Baringo II	2 (0.2)	2 (0.2)	2.
<b>TOTAL</b>			<b>35 (13.22)</b>	<b>31 (11.20)</b>	

**Ken - born January 1970, Tsavo NP, Kenya; Stdbk #170 († 8 Nov 1979)**

Ken became a father of Sali DK 2, but maybe of Elvira DK 1 as well, because he mated Elvira's mother Elsa on the same day as male King. He died as a result of haemolytic anaemia when less than 10 years old.

**King - born 1970, Tsavo NP, Kenya; Stdbk #172 († 22 Apr 1978)**

As with Ken, King mated with Elsa the same day on which Elsa conceived. Therefore, it is uncertain who was the father of Elvira DK 1. Subsequently, King became the father of male Jimm DK 3. This male died after immobilisation in 8 years.



*Elvira DK 1 mating with Isis, 3 May 1989 (lh)*



*Isis on 29 March 2009, 32.5 years old (dh)*

**Isis - born 3 Nov 1977, Cincinnati, the USA; Stdbk #268**

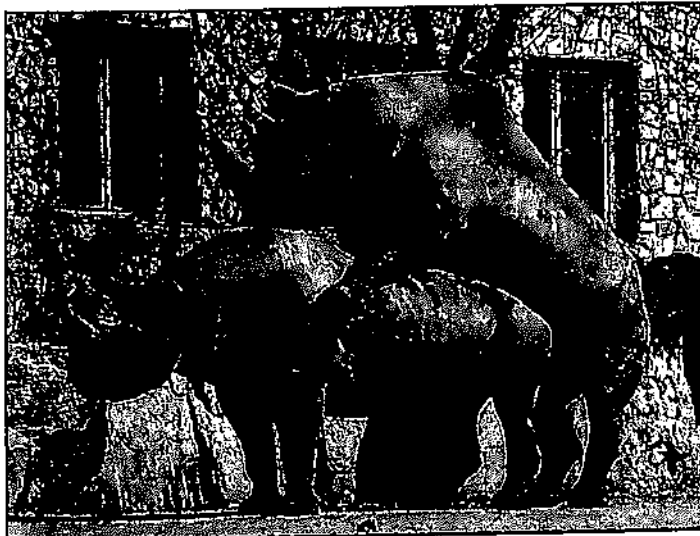
Isis was imported after the death of King and Ken when he was less than a year in 1978, to become a breeding male. His first mating attempts were recorded at age 4, his first mating in 4 years and 5 months (16 April 1982), and the first fertile mating in 5 years and 3.5 months (20 February 1983). In 1999, the condition of this male significantly deteriorated and everything seemed to indicate that the male would die. Because it was suspected that the health problems were associated with feeding, the ration was recalculated and it turned out that it had a small but long-term deficit of nitrogen. After changing the composition of the diet and several curing periods to flush iron from the organs, male's condition came to a normal level, his condition improved and the male began to mate again. The above mentioned health complications and the weakness of Isis could be the reason why female Jimmi, with which the male had been paired in 1999 to 2001, never got pregnant despite entering oestrus regularly and lacking any obstacles for pregnancy according to hormonal testing. After recovery, Isis mated female Musso in 2004 in a fertile manner and was last introduced to the breeding female Jola, who was mated by this male on 7 October 2005 in the age of 22 years and 11 months. In total, male Isis has had 10 descendants with five different females and his offspring sex ratio is 1:1.

**Eli DK 4 - born 15 May 1984, Dvur Kralove; Stdbk #386 († 26 Feb 1995, Magdeburg)**

Eli was the first male from Dvur Kralove collection that was involved in reproduction. In 1990, he was held continuously, i.e. indoors and outdoors, with female Jessi DK 5 in the quarantine premises, where the female was fruitfully mated by the male at the age of 5 years and 11 months (8 April 1990). Eight year old, the male left for Magdeburg Zoo, Germany, in 1992, because of an exchange for male Mabu of Magdeburg collection. Eli died in 1995 when he was less than 11 years. In Magdeburg, he became father for the second time.

**Jimm DK 3 - born 18 Mar 1979, Dvur Kralove; Stdbk #283**

Jimm is the third black rhinoceros and the first male born in Dvur Kralove. The first time he tried to mate was the age of 2 years and 10 months (24 January 1982), but then lived for several years on his own. In 1990, he was grouped with two females (Jarca and Sali), which he began to mate regularly. Jimm's first fertile mating occurred with Sali at male's age of 11 years and 8 months (22 November 1990). The male last became a father in 2007 after fertile mating (20 August 2006) with female Jiddah DK 17. when he was 27 years and 5 months. In 2007, Jimm was loaned to Zurich Zoo, Switzerland, to replace the breeding male that died. At first everything went well, and Jimm was already trying mate a female. After 3 months, he began having health problems that were exhibited by a strange behaviour accompanied with attacks, unwillingness to move and production of unusual sounds (he seemed to have

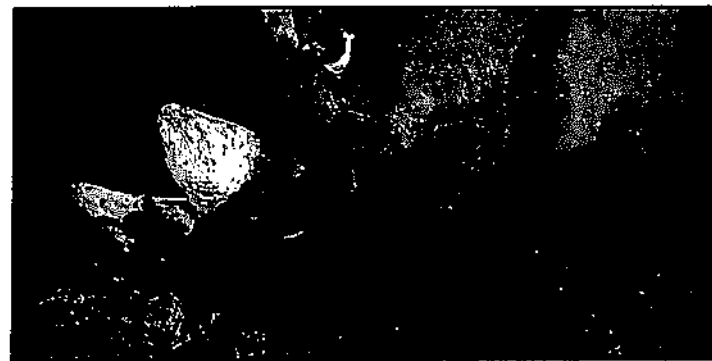
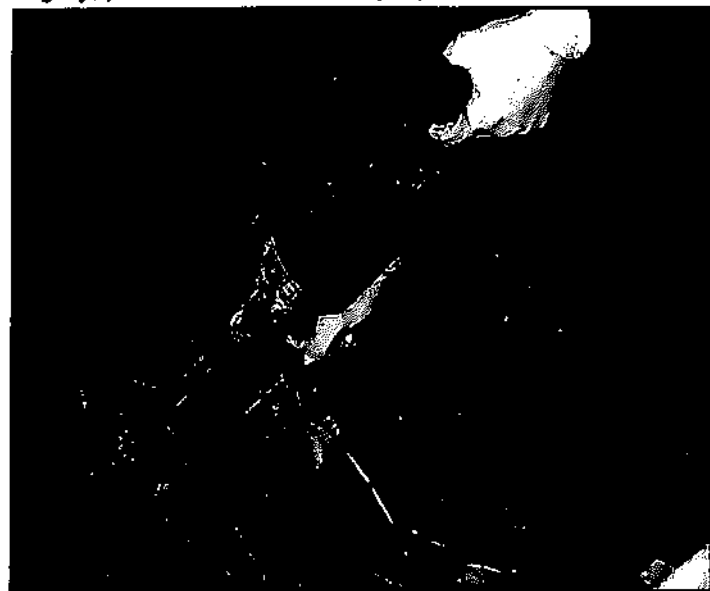
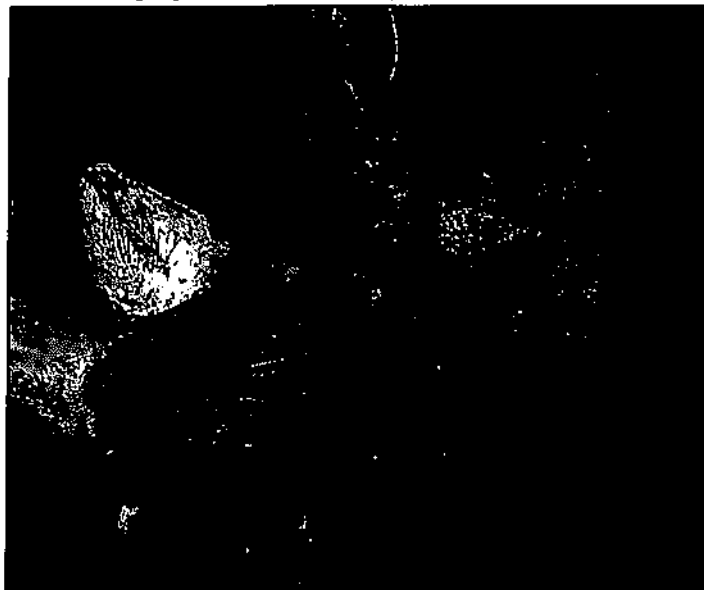


*Jimm DK 3 mating Elvira DK 1, 1990 (az)*



*Jimm DK 3 having arrived from Zurich on 12 August 2008 (dh)*

Tooth surgery, Jimm DK 3, May 2008 - prior the treatment, surgery, post-treatment checks (ms)



become insane). Jimm was anaesthetised and examined, where infection was detected in the cerebrospinal fluid. Therefore, it was suspected that there is a tumour in male's head, and Jimm was seriously considered for culling. On the basis of cooperation between Zurich and Dvur Kralove and on-site consultations, it was decided to return the male to Dvur Kralove. Corticosteroids were administered to stabilize male's health. A few days after arrival in Dvur Kralove, Jimm was found to have inflammation of a molar in the upper jaw. He was anaesthetised and operated. Because rhinos cannot open their mouth as hippos do, the operation had to be carried from the outside and a drill was used to open the inflammation deposit. Jimm recovered (see page 82) and has so far fathered 10 calves from six females, where the sex ratio of his offspring is 2:8 in favour of females.

**Mabu - born 23 Jan 1979, Magdeburg, Germany; Stdbk #277 (†15 Oct 1996)**

Mabu was obtained in exchange for the breeding male Eli DK 4 in 1992 as a 13-year-old animal. Introduced to multiple females, his fertile mating occurred only with two of them (Jimmi and Jessica DK 5). Mabu left 3 descendants of whom two were raised (Jessi's descendants). The male died as a result of pneumonia in 1996 when less than 18 years old. The post-mortem examination revealed haemosiderosis of all organs.

**Cody - born 20 May 1975, Sydney, Australia; Stdbk #260 († 19 May 1999)**

Male Cody was imported from Berlin Zoo in 1992 as genetically valuable offspring of a sire captured in Anusha National Park, Tanzania (Ferdinand, Stdbk #99), who was at the same time male's grandfather on the part of Cody's mother. Male's grandmother (Peggy, Stdbk #100) was wild-caught in Kenya as well. Cody was born in Sydney, Australia, where he lived without offspring until thirteen years old. In 1988, he was moved to Berlin Zoo, where any attempts to include the male into breeding failed over the next four years. Therefore, late in 1992 this male was sent to Dvur Kralove, where he turned out to be quiet and submissive to the females, but could not mate. Coupling of this male with females was not difficult; Cody could even jump on oestrous females, but was unable to insert his penis. Therefore, keepers had to help him repeatedly. Once Cody gained experience with successful mating, he could mate females without assistance and became a breeding male. Cody gradually mated with 4 females (Elvira DK 1, Sali DK 2, Jarca and Eimi DK 9), which got pregnant. 3 calves were born plus a stillborn calf in a single case (Elvira). Only two Cody's descendants were raised, male Sauron DK 16 (mother Sali) and female Elba DK 19 (mother Eimi), who subsequently participated in Dvur Kralove breeding schemes. Cody's last fertile mating occurred



*Elvira DK 1 mating with Cody, 4 May 1994 (dh)*



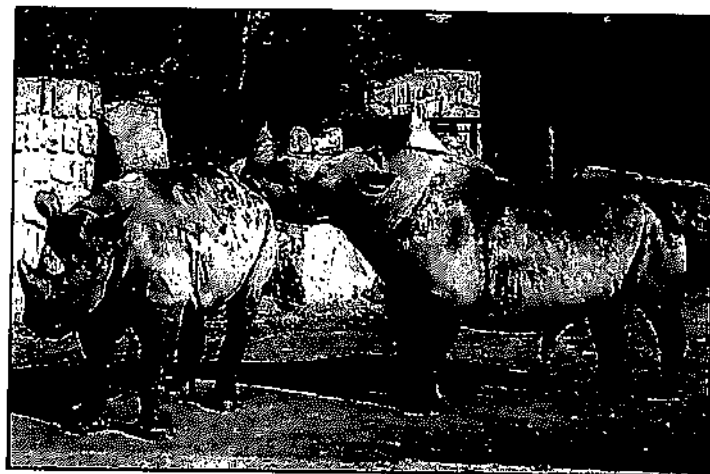
*Keeper M Kober assisting Cody in mating Sali DK 2 (jv)*



on 23 May 1995, when he was 20 years old. His worsened health could be the reason why his mating attempts in 1997 with female Jaga DK 14 failed. This male died in 24 years in 1999, probably due to pneumonia and renal plus intestinal inflammation.

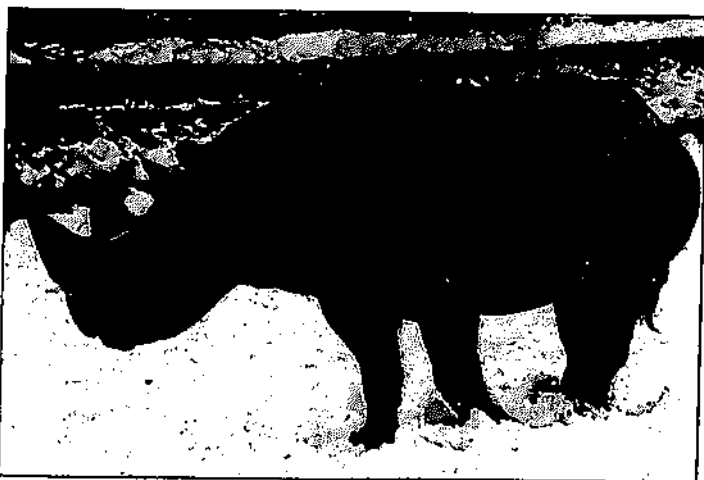


*Cody trying to mate Jaga DK 14, 19 Sep 1997 (dh)*



**Sauron DK 16 - born 26 Oct 1994, Dvur Kralove; Stdbk #541 († 24 Sep 2007)**

As a descendant of Cody, Sauron was intended for future breeding and therefore paired with female Jiddah DK 17 of the same age once weaned; the pair was expected to begin breed after reaching sexual maturity. However, Sauron has become unexpectedly aggressive to Jiddah at the age of 5 years and 4 months in early 1999, seriously attacking the female repeatedly. The pair had to be split and Sauron coupled with an experienced female Eimi DK 9 in 2000, i.e. when six years old, whom the male mated in a fertile manner on 10 June 2001, when he was 6 years and 8 months old. Unfortunately, the calf was born dead. In 2004, Sauron was paired with an experienced female Jessi DK 5. This coupling produced the only Sauron's descendant - male Jamie DK 29. Sauron suddenly died of pneumonia in 2007 when he was just 13 years old. In addition, haemosiderosis of organs was found in this animal as well.



*Sauron DK 16 (dh)*



**Mweru - born 12 Sep 1996, Port Lympne, England; Stdbk #659**

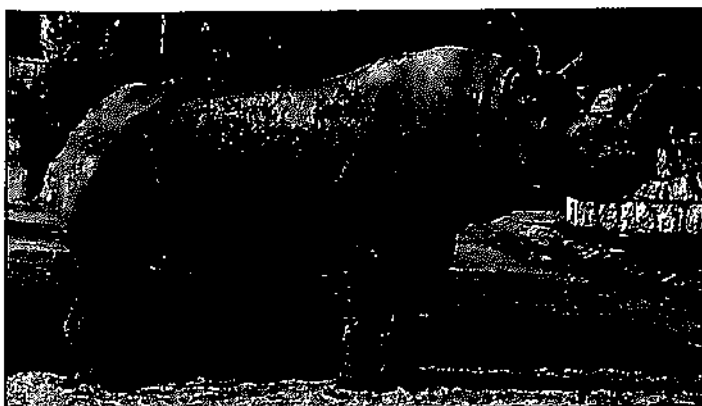
In 2001, Mweru was imported from England, a five-year animal at that time, in exchange for female Salome DK 23. Mweru's father was imported from Addo National Park in South Africa. Introduction of Mweru to three females (Jane Lee DK 22, Jola DK 21 and Musso DK 20) together began in 2002. However, the male was too aggressive and the introduction process was temporarily paused. Eventually, he got used to female Jane Lee, whom he first mated when he was less than 9 years old (30 June 2005). Jane Lee conceived on 25 August 2006, when Mweru was 10 years old, but the calf was born dead. In 2009, this male successfully mated female Jola, which is expected to deliver in September 2010; therefore, no calf has been produced by this male.



*Mweru in 2006 and 2008 (dh)*

**Baringo II - born 3 Dec 1992, Port Lympne, England; Stdbk #483**

Baringo was imported as a 15-year-old but still non-breeding male from UK-based Port Lympne Zoo on 6 June 2008. Previously, he also lived at Chester Zoo, England. Baringo was introduced to female Elba DK 19 already on 26 July, i.e. about 6 weeks upon male's arrival, mating the female successfully. Elba conceived a month later, just like Jessi DK 5 who got pregnant after a single mating in



*Baringo (dh)*

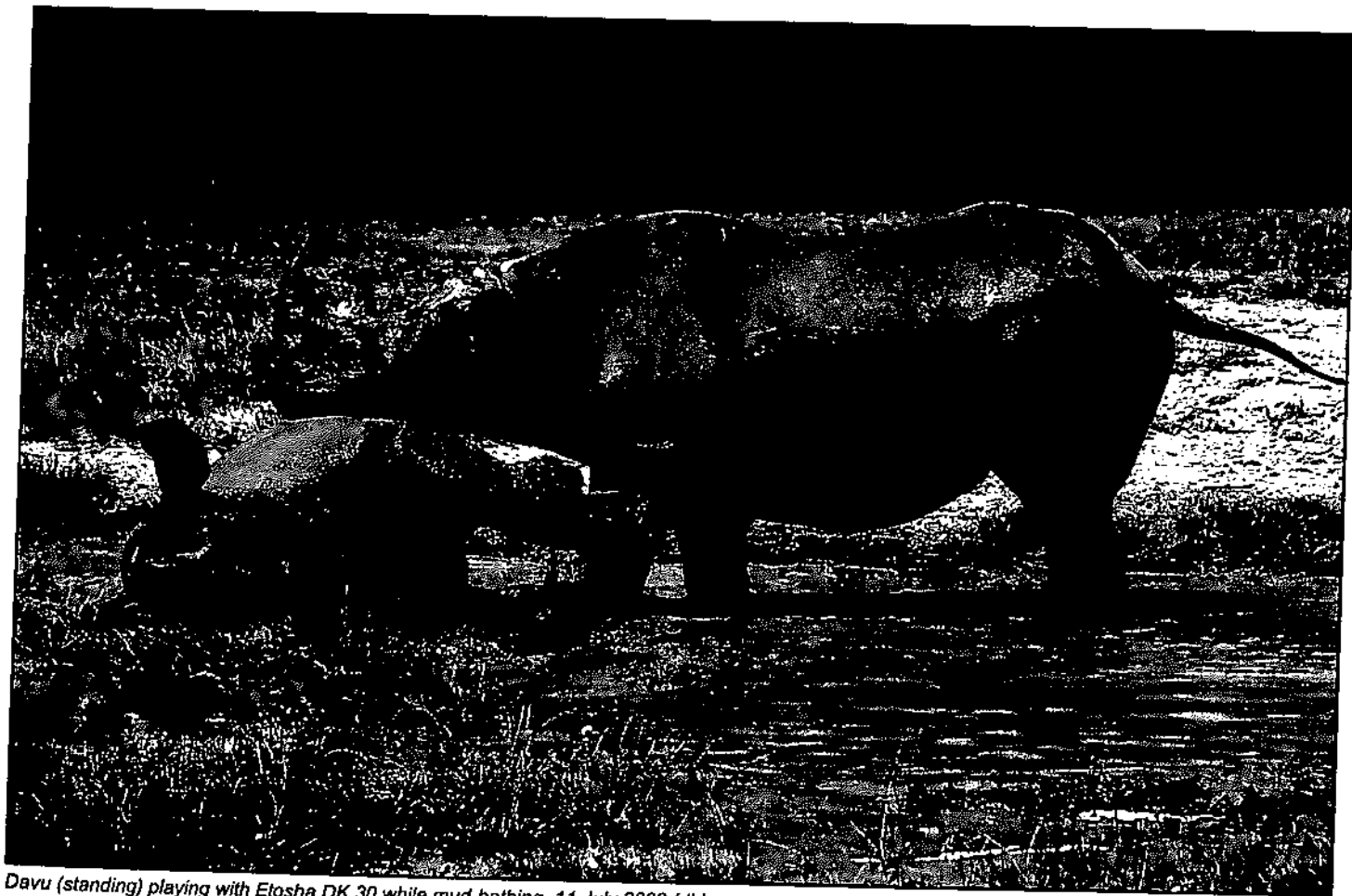


*Baringo features a third horn on the forefront (dh)*

September 2008. So far, Baringo has become a father to 2 young while in Dvur Kralove. Baringo has turned out to be suitable for joining with females only during oestrus. According to Dvur Kralove experience, other breeding males have always been able to live with females many months without problems; even following fertile mating they could go outdoors with the females and coupling was terminated only after the pregnant female had become aggressive to the male. Baringo's treating the females is unforeseeable; this male sometimes performs unexpected and aggressive attacks. Female Jiddah DK 17 mated by Baringo in 2009 was even thrown down into a ditch by the male. This behaviour may be the reason why this male has had such a low number of offspring considering his age.

**Davu - born 19 Feb 2006, Krefeld, Germany; Stdbk #970**

Two-year Davu was imported immediately after weaning from his mother from Germany's Krefeld Zoo in April 2008. His mother is Nane who had been a property of Dvur Kralove Zoo from 1993 to 1994; exchanged for male Jasper DK 11, this female never lived in Dvur Kralove, but remained in Germany because it was sold to Krefeld Zoo. Shortly after the arrival, Davu was coupled with female Etosha DK 30; since that time, these rhinos have been living together. Davu first mated Etosha on 20 August 2009, i.e. at the age of 3.5 years. In the summer of 2009, female Maisha DK 28 was added to the couple; this animal was over 3.5 years. Davu first mated Maisha on 10 September 2009, but pregnancy did not occur until the end of 2009.



*Davu (standing) playing with Etosha DK 30 while mud-bathing, 11 July 2008 (dh)*

## BREEDING FEMALES

Overview of breeding female black rhinos at Dvur Kralove Zoo prior to 31 December 2009

No.	Stdbk #	Name	No of calves born	No of calves raised	Success scoring
1	174	Elsa	1 (0.1)	1 (0.1)	6.
2	217	Sabl	1 (0.1)	1 (0.1)	6.
3	175	Jimmi	6 (3.3)	5 (3.2)	2.
4	244	Elvira DK 1	3 (1.2)	3 (1.2)	3.
5	282	Sali DK 2	6 (2.4)	6 (2.4)	1.
6	387	Jessi DK 5	6 (3.3)	6 (3.3)	1.
7	178	Jarca	2 (1.1)	1 (0.1)	5.
8	431	Elmi DK 9	2 (0.2)	1 (0.1)	5.
9	619	Elba DK 19	3 (0.3)	3 (0.3)	3.
10	540	Jiddah DK 17	2 (1.1)	2 (1.1)	4.
11	678	Musso DK 20	1 (0.1)	1 (0.1)	6.
12	685	Jola DK 21	1 (1.0)	1 (1.0)	6.
13	689	Jane Lee DK 22	1 (1.0)	0	7.
<b>TOTAL</b>			<b>35 (13.22)</b>	<b>31 (11.20)</b>	



Davu (far left) playfully chasing Etosha DK 30, 11 Jul 2008 (dh)

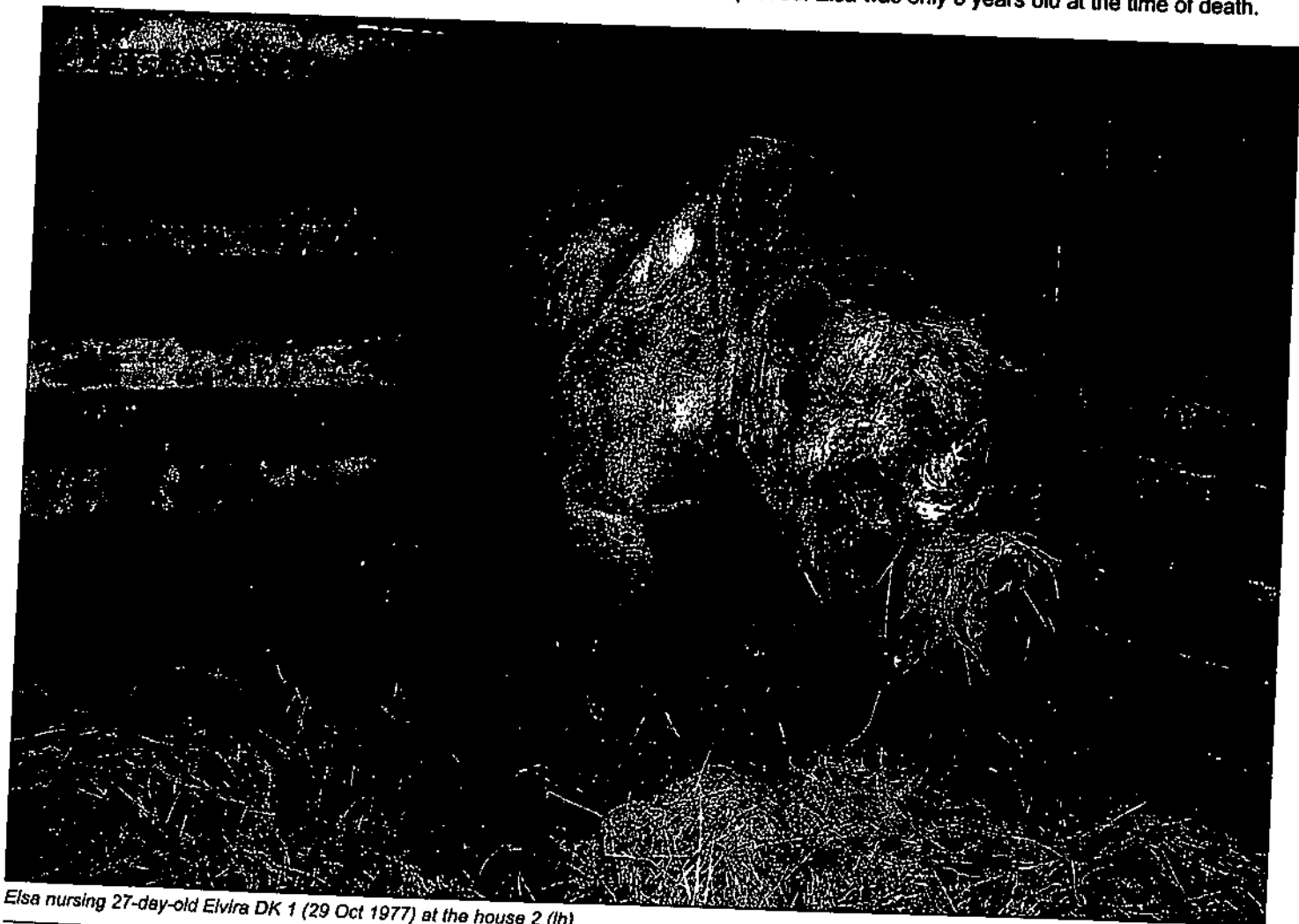


Young Elvira DK 1 (lh)

Elsa - born 1970, Kenya; Stdbk #174 († 7 Apr 1978)

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Elvira DK 1	Elsa	Ken?King?	20 Jul 1976	2 Oct 1977	439 days	House 2, Elsa died on 7 Apr 1978 - Elvira weaned

As Elsa was unexpectedly mated by two males on the same day when she got pregnant, it is not clear whether the father of her daughter Elvira DK 1 is King or Ken. Elsa began to lose weight and died suddenly when Elvira was only a half of the year old. The deteriorating condition and death could be affected by the simplification of the diet and exhaustion by milk production, which can be suggested by two facts: Elsa had lost milk before her death and the young Elvira never suffered health problems after her mother died and the calf was successfully reared. Subsequently, the ration for all animals was improved. Elsa was only 8 years old at the time of death.

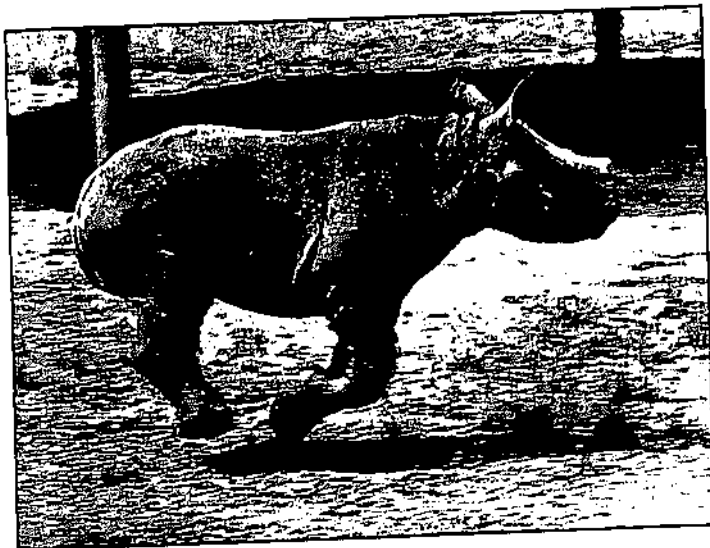


Elsa nursing 27-day-old Elvira DK 1 (29 Oct 1977) at the house 2 (lh)

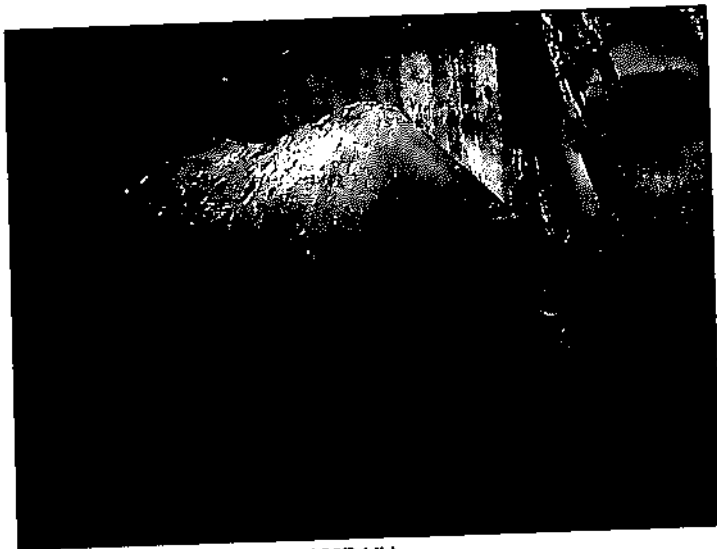
Sabi - born 1972, Kenya; Stdbk #217 († 13 Apr 2008, Zurich)

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Sali DK 2	Sabi	Ken	15 Apr 1977	5 Jul 1978	456 days	House 2; Sabi lived with the calf till 12 Oct 1979, Sabi left for Zurich on 22 Apr 1983

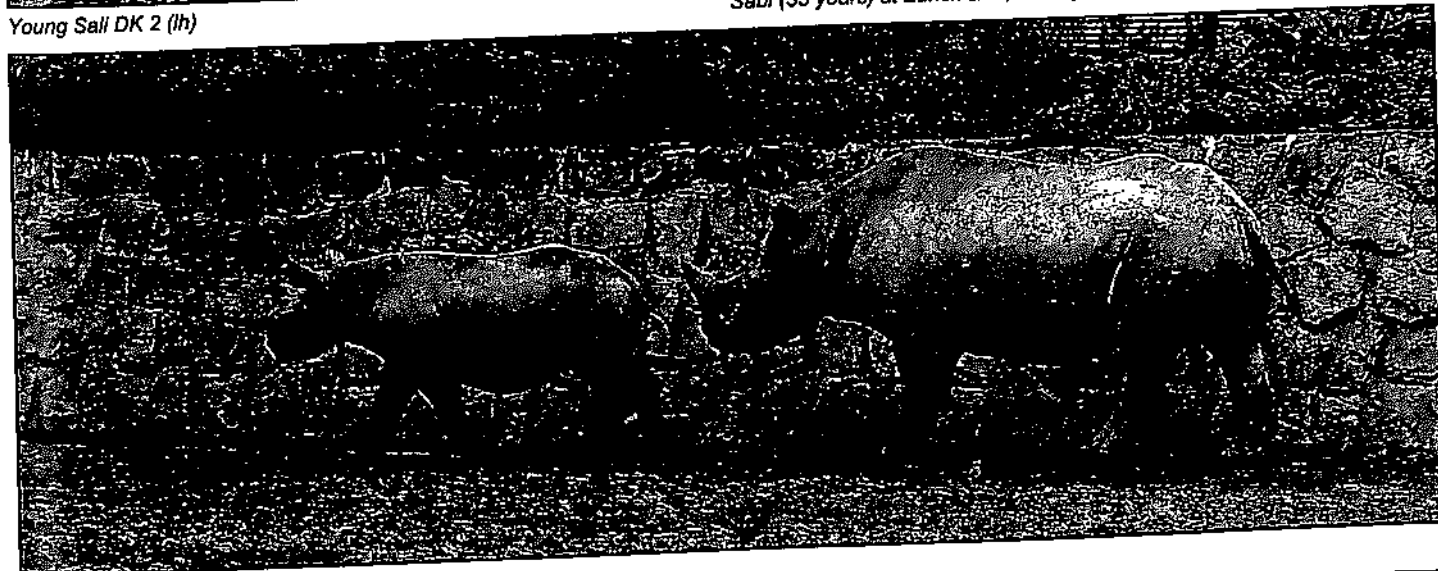
Sabi got pregnant following mating with Ken and brought up her daughter Sali DK 2 without any problems. In 1983, this female left to Zurich Zoo, where she became a mother two times once again. In total, she delivered 2 sons and 1 daughter. Sabi died as a result of age at the age of 36 years.



Young Sali DK 2 (lh)



Sabi (35 years) at Zurich Zoo, 2007 (dh)



Sabi and Sali DK 2 (lh)

**Jimmi - born February 1970, Kenya; Stdbk #175 († 21 Aug 2009)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	M	Jimm DK 3	Jimmi	King	6 Dec 1977	18 Mar 1979	467 days	Winter facility IV
2	F	Jessi DK 5	Jimmi	Isis	4 Aug 1983	8 Dec 1984	462 days	House 1
3	M	Jos DK 7	Jimmi	Isis	13 Feb 1988	21 May 1989	463 days	House 2; 28 kg
4	M	Jasper DK 11	Jimmi	Isis	11 Jun 1990	13 Sep 1991	459 days	House 1
5	F	— DK 15	Jimmi	Mabu	8 Feb 1993	11 Apr 1994	427 days	House 3; stillborn, 24 kg
6	F	Jane Lee DK 22	Jimmi	Isis	4 Oct 1996 (?)	24 Jan 1998	441 days	House 3

Jimmi gave birth six times and became a mother of 3 females and 3 males. The next to her last young was stillborn. After weaning of the last calf in 1999, Jimmi was introduced to male Isis, who had mated the female, or at least was trying to. Although the female was in order according to hormonal results, she never got pregnant again. It could be related to the fact that at that time Isis was of very poor health. After several years, Isis completely recovered, but Jimmi had already not cycled properly. She was mated by the male for the last time on 23 September 1999, but occasional interest of the male lasted until 2001. Subsequently, she still lived with this male in the enclosure, assisting the socialisation of other females, more specifically Musso DK 20 and Jola DK 21, with Isis. Jimmi died due to high age when over 39 years old.



*Jimmi and 52-day-old Jos DK 7 (17 Jul 1989) (lh)*



*Jos DK 7 at London Zoo, 1998 (dh)*



*Jimmi with two-month-old Jos DK 7, 17 July 1989 (lh)*



*Jimmi on 17 July 1989, 19 years old (lh)*



*Jimmi on 22 Oct 1986, 16 years old (lh)*



*Jimmi (left) and Isis, 9 May 1994 (lh)*



*Isis laying his head on the back of oestrous Jimmi (lh)*

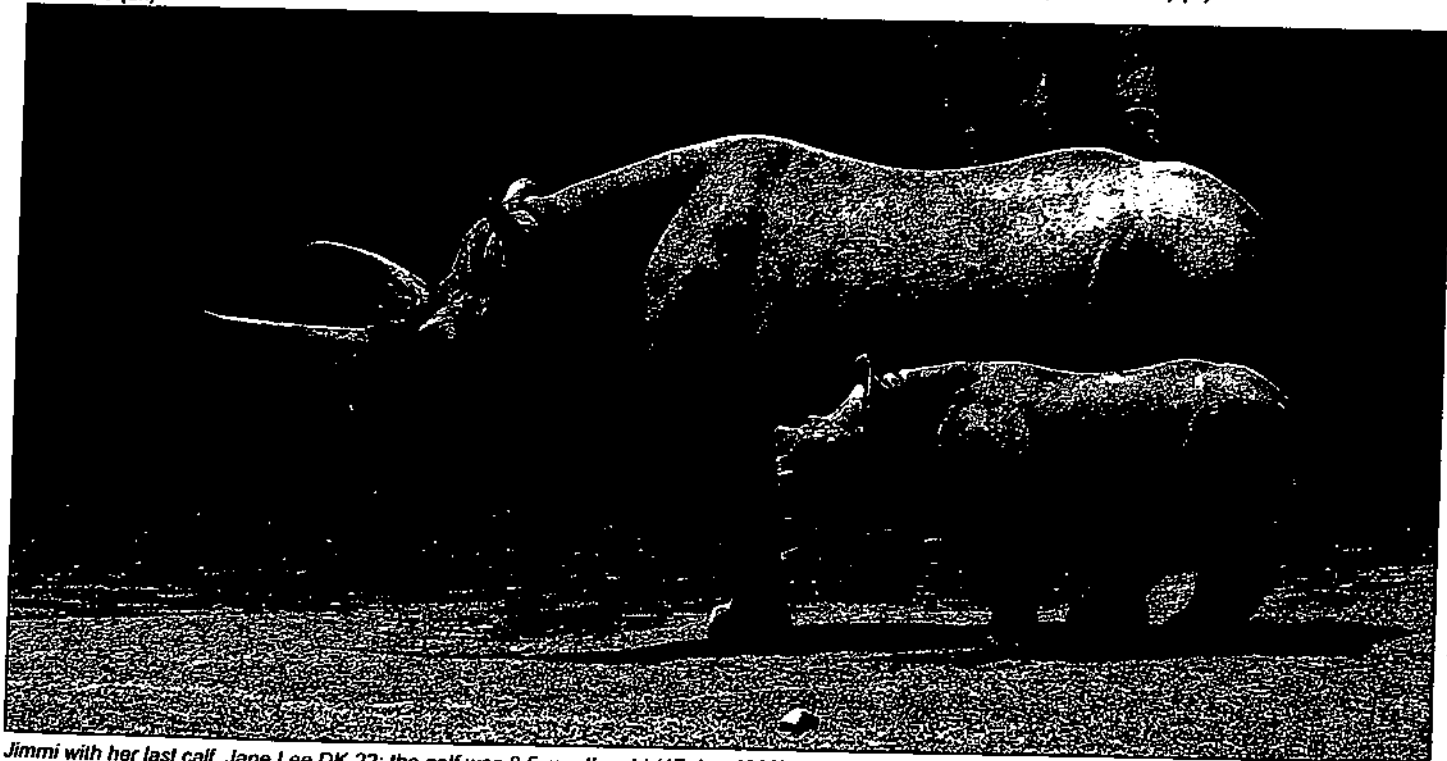




*Jimmi following the delivery of the last calf, Jane Lee DK 22 on 24 Jan 1998 (dh)*



*Jimmi and 48-day-old Jane Lee DK 22 (13 Mar 1998) (lh)*

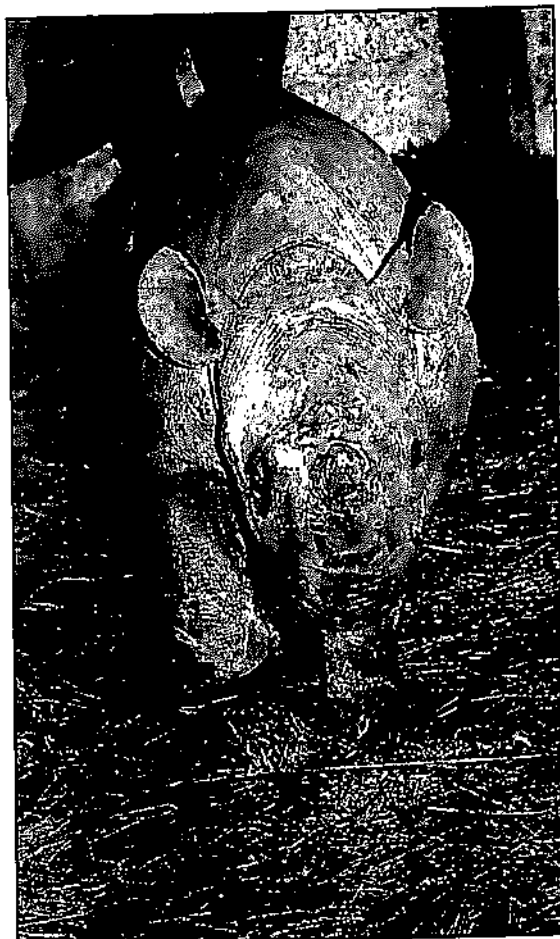


*Jimmi with her last calf, Jane Lee DK 22; the calf was 8.5 months old (17 Jun 1998) (lh)*

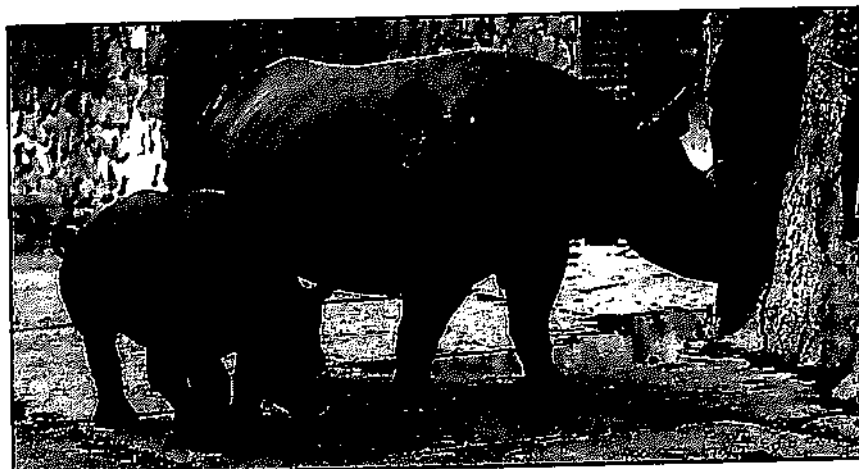
**Elvira DK 1 - born 2 Oct 1977, Dvur Kralove; Stdbk #244 († 25 Feb 1996)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	M	Eli DK 4	Elvira	Isis	20 Feb 1983	15 May 1984	450 days	House 1
2	F	Elmi DK 9	Elvira	Isis	29 May 1989	24 Aug 1990	452 days	House 1
3	F	Etna DK 13	Elvira	Jimm	21 Sep 1991	8 Dec 1992	444 days	House 1
4	?	Abortion	Elvira	Cody	3 Jun 1995	21 Jun 1995	18 days	House 1; abortion

Elvira became not only the first black rhino raised in Dvur Kralove park, but also the first breeding female reared within the stock. It bred 3 young; the last calf was aborted on day 18 following the conception. The female died at 19.5 years, probably due to haemosiderosis and fungi in the lungs. The factors involved in the disease may have included an imbalanced ration.



The first Elvira's calf - male Eli DK 4, age: 5.5 months (3 Nov 1984) (lh)



Elvira DK 1 and Etna DK 4 (29 Jul 1993) (lh)

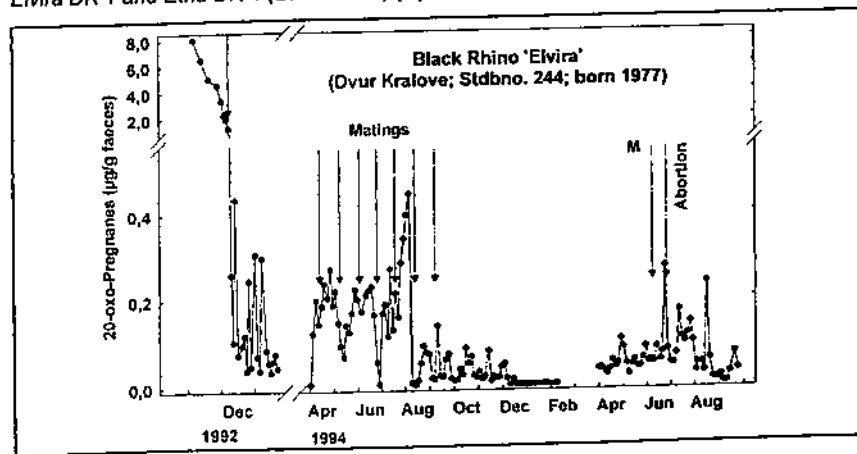
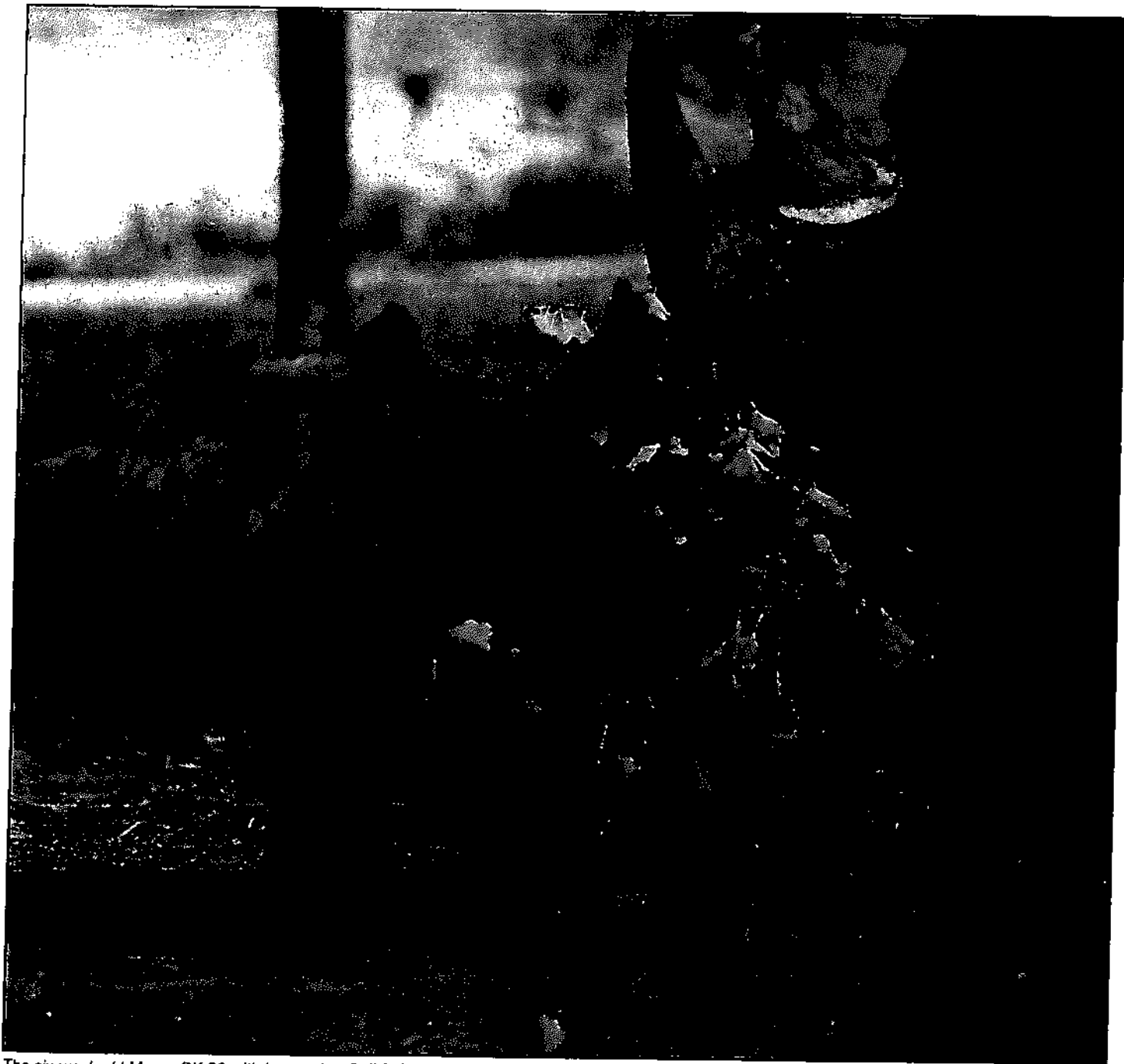


Chart documenting the abortion of female Elvira, 1994



*The six-week-old Musso DK 20 with her mother Sali DK 2 on 30 September 1997 (th)*

**Sali DK 2 - born 15 Jul 1978, Dvur Kralove; Stdbk #282 († 25 Feb 2006)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	M	Sado DK 6	Sali	Isis	21 Apr 1985	26 Aug 1986	492 days	House 2
2	F	Sany DK 8	Sali	Isis	28 Jun 1988	1 Oct 1989	460 days	House 1
3	F	Sara DK 12	Sali	Jimm	22 Nov 1990	24 Feb 1992	459 days	House 1
4	M	Sauron DK 16	Sali	Cody	16 Jul 1993	26 Oct 1994	467 days	House 1; 48 kg on day 3
5	F	Musso DK 20	Sali	Jimm	25 May 1996	20 Aug 1997	452 days	House 1
6	F	Salome DK 23	Sali	Jimm	13 Oct 1998	25 Jan 2000	441 days	House 1

Sali successfully bred all of her six offspring - she gave birth to 2 males and 4 females. She conceived for the first time in almost 7 years, and the last time when she was twenty. All of her life she suffered from bleeding erosions in the mouth, which were treated in various ways, of which high doses of vitamin C proved to be the most effective one. Sali died as a result of evidenced haemosiderosis at the age of 28. Her calves were fathered by 3 different males.



*Sali with its first offspring - male Sado DK 6 (22 Oct 1986) (lh)*



*Sali with its last offspring - female Salome DK 23 (lh)*



*Sali's second calf - female Sany DK 8 (lh)*



*Sali DK 2 and Sauron DK 16 on day 16 after the birth (dh)*

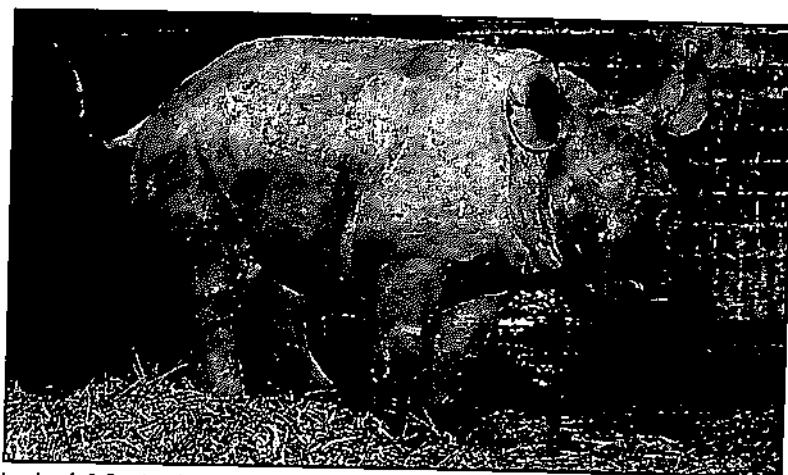
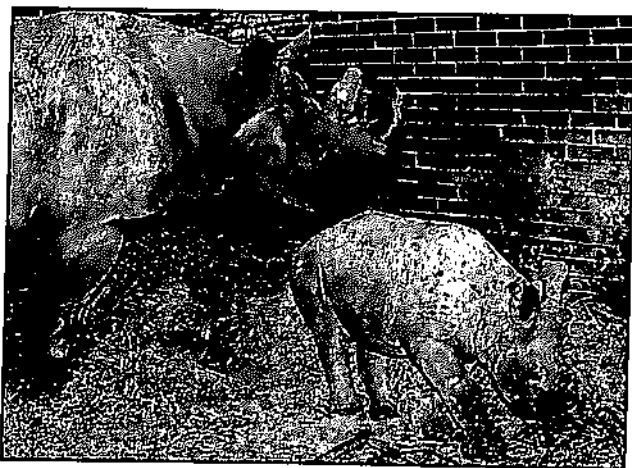


*Sali DK 2 with Musso DK 20 (dh)*

**Jessi DK 5 - born 8 Dec 1984, Dvur Kralove; Stdbk #387**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	M	Jacob DK 10	Jessi	Eli	8 Apr 1990	23 Jun 1991	443 days	House 3
2	F	Jiddah DK 17	Jessi	Mabu	17 Aug 1993	15 Nov 1994	455 days	House 3; 37 kg
3	F	Jola DK 21	Jessi	Mabu	1 Jul 1996	25 Oct 1997	481 days	House 3
4	M	Jeremy DK 24	Jessi	Jimm	16 Sep 1999	21 Dec 2000	461 days	House 3
5	M	Jamie DK 29	Jessi	Sauron	6 Oct 2004	2 Jan 2006	452 days	House 1
6	F	Judy DK 35	Jessi	Baringo	4 Sep 2008	13 Dec 2009	465 days	House 1

Jessi conceived for the first time when 5 years and 4 months old; most recently it was at the age of 24 years. So far, this female has bore six rhinos - 3 males and 3 females, all of which have been bred. Sires of her pups involved 5 different males.



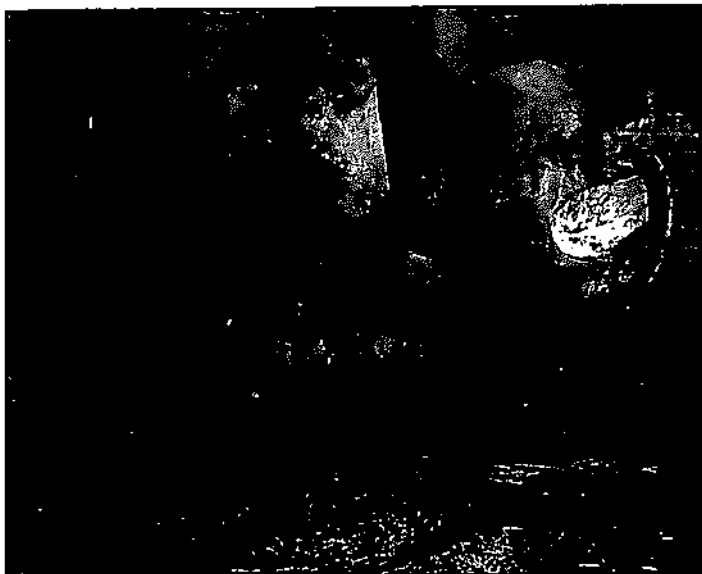
*Jessi DK 5 with its first offspring - male Jacob DK 10, a 2.5-month-old animal, 6 September 1991 (lh)*



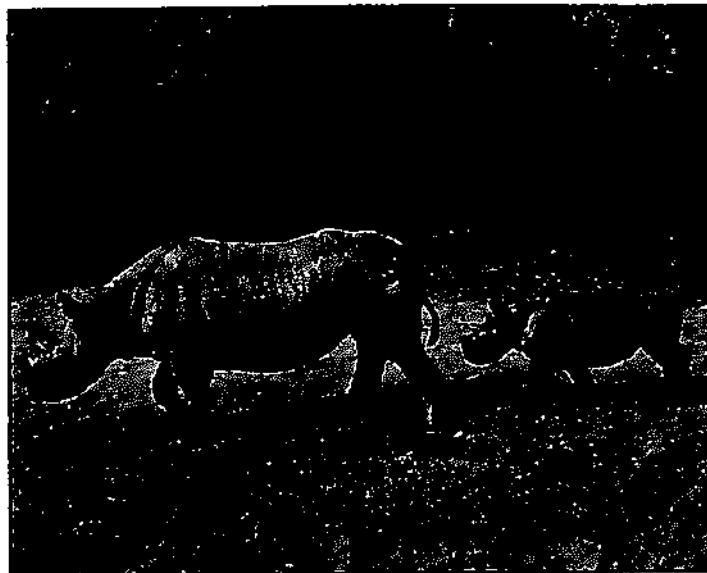
*Jessi DK 5 (9 May 1994) at the age of 10 years (lh)*



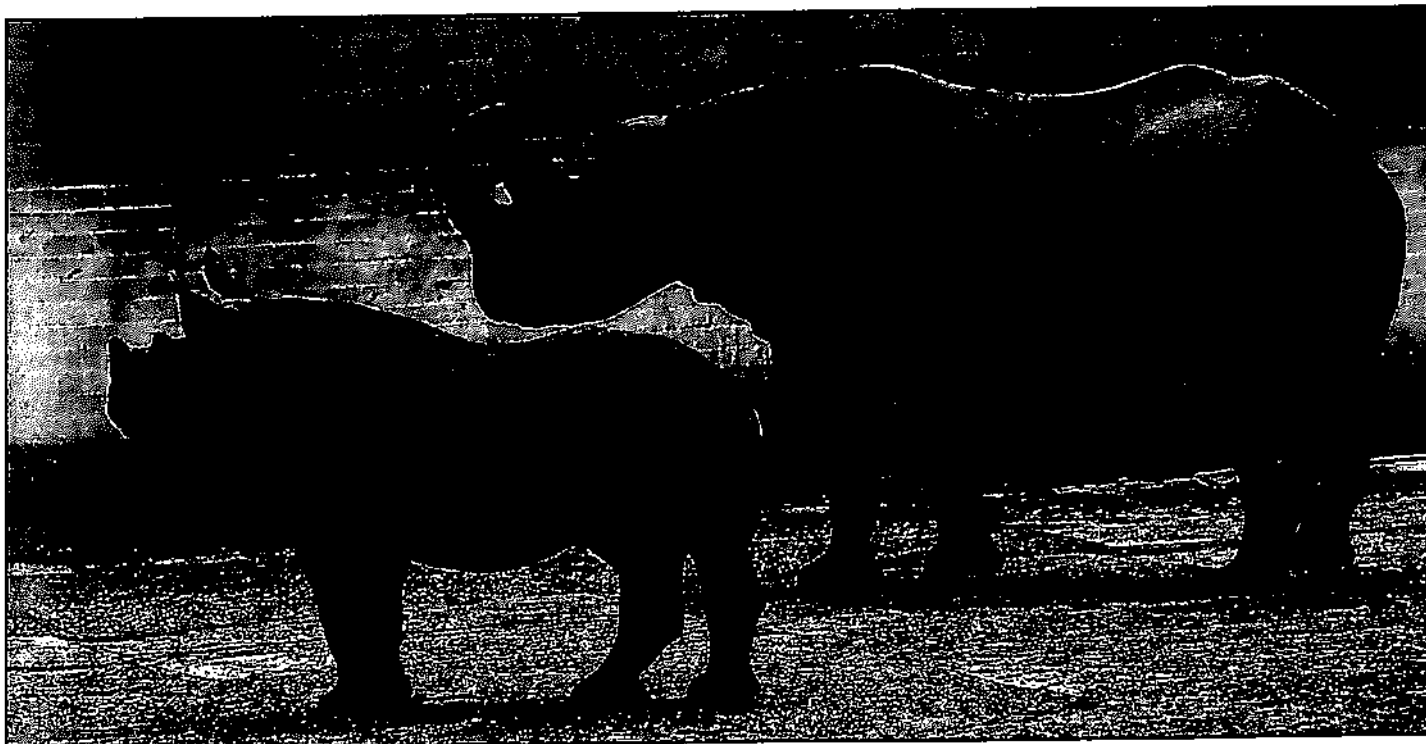
*Jessi DK 5 and Jeremy DK 24, 2001 (dh)*



*Jessi DK 5 and Jola DK 21 at the day of birth, 25 October 1998 (lh)*



*Jessi DK 5 and Jeremy DK 24 (mp)*



*Jessi DK 5 with Jola DK 21 at the age of 8 months (17 Jun 1998) (lh)*



*Jessi DK 5 with Jamle DK 29 at the age of 7 months, 2 May 2005 (dh)*



*Jessi DK 5 and her one-day-old calf Jasmina DK 35, 14 December 2009 (dh)*



*Jessi DK 5 and Baringo following mating (Jessi with signs of mating on her back), 4 September 2008 (dh)*

Jarca WB - born 1970, Kenya; Stdbk #178 († 8 Sep 1996)

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Jaga DK 14	Jarca	Jimm	1 Sep 1991	14 Dec 1992	470 days	House 1; 26 kg on day 2
2	M	Jonas DK 18	Jarca	Cody	2 Sep 1994	4 Dec 1995	458 days	House 1; died in hand-raising

Jarca was repeatedly attacked by males (Ken and King) when young; after the males died, she was raised together with Elvira DK 1 and Isis imported from the U.S. as a young animal when only 11 months old. All of this had an impact on the fact that she was the only rhino female that was virtually not mated. Since 1989, intensive efforts to make this female pregnant were launched, including re-examination of her genitals, beginning of research in hormonal activities - first using the urine, and later on faeces - as well as application of the vitamin and hormonal stimulation. Introduction of this female to Isis, who was highly aggressive towards her, failed; eventually, Jarca became the first partner to the already 11-year-old male Jimm DK 3, with which the female was coupled with the help of female Sali DK 2. Mated for the first time at the age of 20, Jarca got pregnant after repeated mating attempts a year later. This rhino's first calf - female Jaga DK 14 - was very weak, weighing about 25 kg; therefore, she had to be bottle-fed. Nonetheless, she stayed with her mother, drinking some milk from her as well. The second baby - Jonas DK 18 - was even weaker when born; he was unable to stand and died within a few days despite all the efforts and bottle-feeding. At that time, Jarca was already in a very bad condition and died soon afterwards, less than 27 years old. The cause of this female's death was pneumonia, probably in combination with haemosiderosis of organs.



Jarca (dh)



Jaga DK 14, a 7.5-month-old animal, with her mother Jarca (29 Jul 1993) (lh)



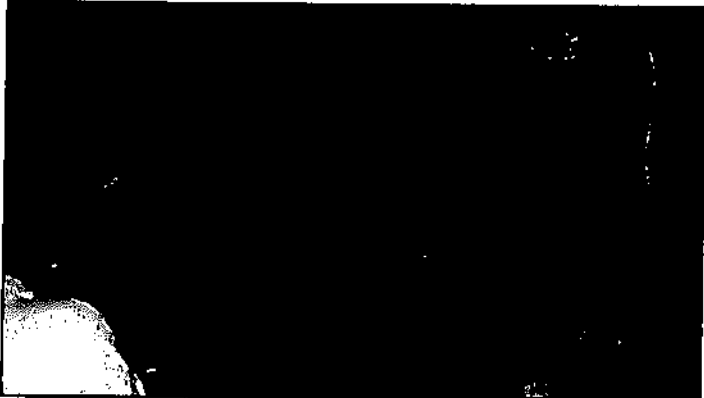
Hand-rearing and feeding Jonas, 6 December 1995 (dh)



Jarca (dh)



**Rearing female black rhino Jaga DK 14, 1993-1994**



*Dr Vahala examining Jarca in 1990 (zc)*



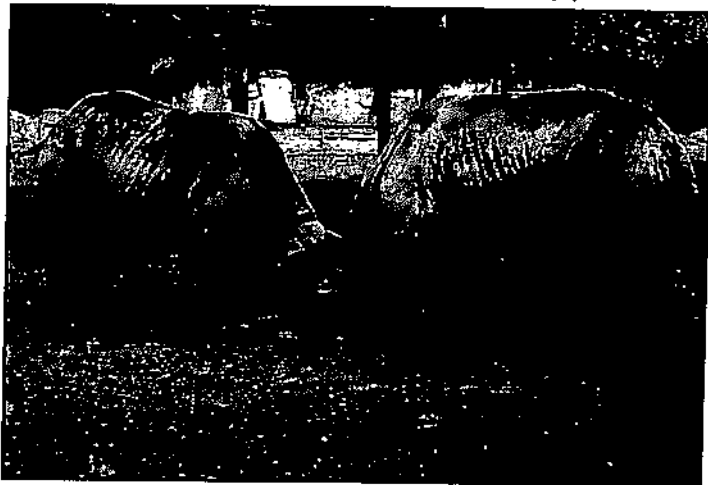
*Keeper M Kober assisting in establishing contacts between Jaga and Etna with Elvira through the bars, January 1993 (zc)*



*Jaga being fed outdoors by Pavel Petrzilek, 29 July 1993 (lh)*



*Jarca with the half-year old Jaga outdoors, 19 June 1993 (lh)*



*Jaga DK 14 (left) and Etna DK 13 (rh)*

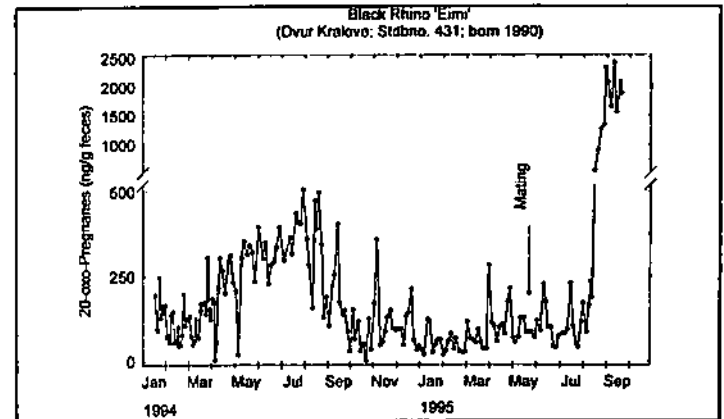
**Eimi DK 9 - born 24 Aug 1990, Dvur Kralove; Stdbk #431 († 14 May 2004)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Elba DK 19	Eimi	Cody	23 May 1995	5 Aug 1996	440 days	House 1
2	F	— DK 25	Eimi	Sauron	10 Jun 2001	24 Aug 2002	450 days	House 1; stillborn, 33 kg

Female Eimi got pregnant for the first time when she was 4 years and 9 months, after a single mating. After weaning her first daughter, this female was mated by Sauron; however, her second daughter was born dead. Since then Eimi was not coupled with any male; later on, she began to have unusual health problems, even though she was in a very good physical state. Eimi died suddenly as a result of haemosiderosis and liver disease, less than 14 years old.

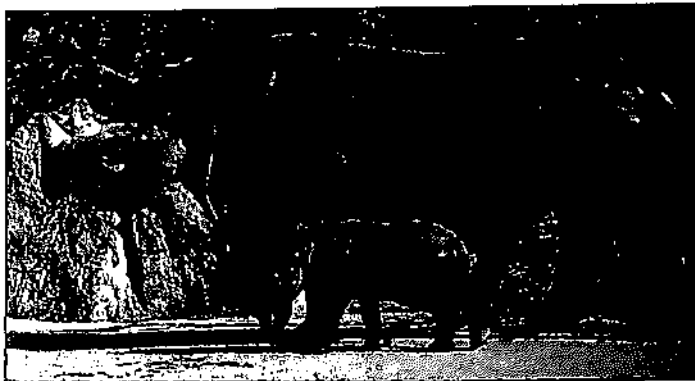


*Eimi DK 9 being mated by Cody on 23 May 1995 (th)*



*Diagram showing that Eimi became pregnant following mating (Schwarzenberger, 2005)*

The chart below (SCHWARZENBERGER 1995) captures the cycle of female Eimi obtained by testing regularly collected faeces. This method was developed by Dr Franz Schwarzenberger, Veterinary University of Vienna, in cooperation with Berlin and Dvur Kralove zoos supplying him faeces of black rhino females (SCHWARZENBERGER *et al.* 1993a, 1993b, 1994, 1995a, 1995b, 1995c, 1996). Within three months after fertile mating, a significant increase in the reference hormonal metabolite can be captured in female faeces, which allows for determining whether the female is pregnant or not using this fully non-invasive method. It is even possible to find that a very low foetus or abortion had been absorbed in the female, as happened in 2004 in females Elvira DK 1 and Jimmi. The charts for Elvira and Jimmi also record a change in the production of this hormone derivative after birth and launch of the cycle.



*Eimi DK 9 with Elba DK 19, 1996 (dh)*



*Eimi with Elba, 1996 (dh)*

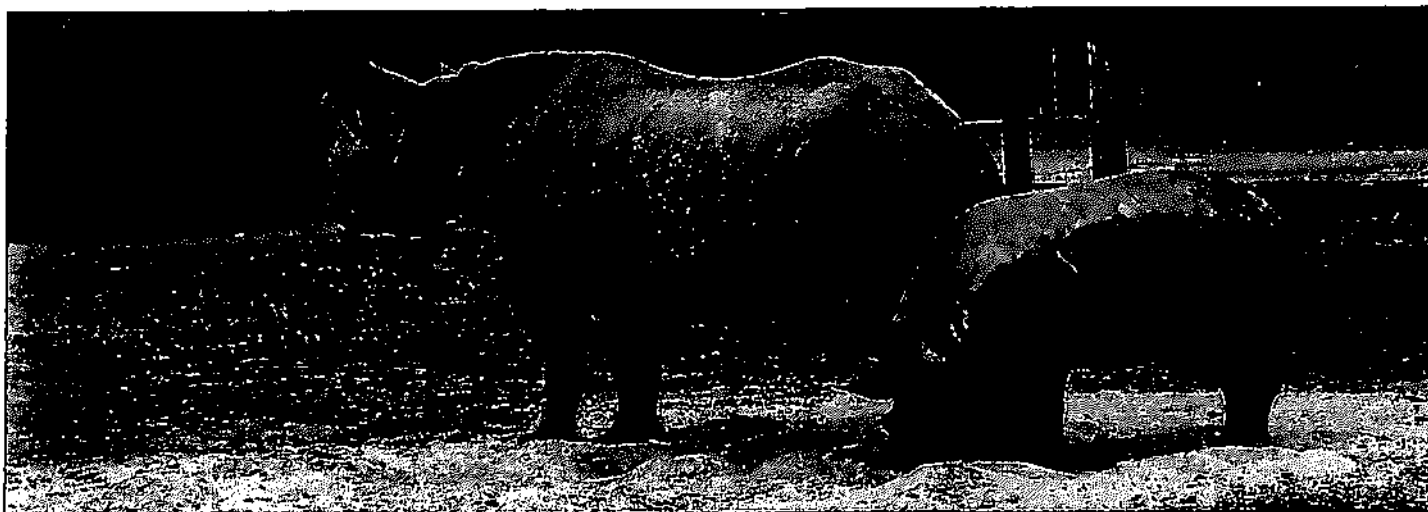


*Little Eiba DK 19 in the mud bath (dh)*

**Elba DK 19 - born 5 Aug 1996, Dvur Kralove; Stdbk #619**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Ema-Elsa DK 26	Elba	Jimm	4 Aug 2001	2 Nov 2002	455 days	House 1
2	F	Etosha DK 30	Elba	Jimm	17 Jun 2005	4 Sep 2006	444 days	House 1
3	F	Eva DK 34	Elba	Baringo	20 Aug 2008	8 Dec 2009	475 days	House 1

Elba is the first daughter of Eimi DK 9, while also a granddaughter of Elvira DK 1 and great-granddaughter of the wild-caught Elsa. Her father was the genetically valuable male Cody; therefore, this female was retained for breeding. She conceived for the first time when 5 years old. So far, she gave birth three times; each time the calf was a female and fathers involved two different males.



*Elba DK 19 with Ema-Elsa DK 26, 2003 (dh)*



*Elba DK 19 mating with Baringo on 26 July 2008 (jm)*



*Elba DK 19 with her daughter Etosha DK 30, 2006 (dh)*



*Elba DK 19 with Ema-Elsa DK 26 1.5 month old, 18 December 2002 (lh)*



*Elba DK 19 with her daughter Etosha DK 30, 7 June 2008 (dh)*



*Elba DK 19 with 6-day-old Eva DK 34, 14 December 2009 (dh)*

**Jiddah DK 17 - born 15 Nov 1994, Dvur Kralove; Stdbk #540 († 25 Dec 2009)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Deborah DK 27	Jiddah	Jimm	5 Jun 2003	11 Nov 2004	464 days	House 1
2	M	Dzanty DK 33	Jiddah	Jimm	10 Aug 2006	24 Nov 2007	471 days	House 1

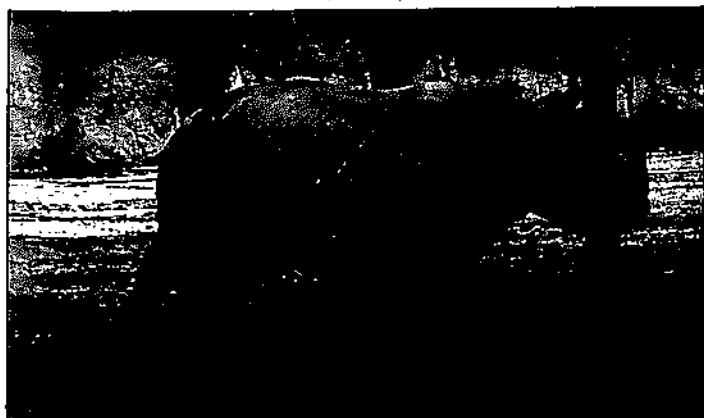
For Jiddah, Sauron DK 16 was chosen, with which the female was coupled once weaned from her mother. For subsequent male's aggression, Jiddah gained a very bad experience and did not trust males. Thus, she was eventually coupled with calm Jimm, even if this male was in part female's relative. Jiddah bred and gave birth to two calves so far. She did not get pregnant for the first time before she reached 9 years. While rearing her last calf, female's physical condition continued to deteriorate, despite the carefully fixed and nutritionally rich ration. In the summer 2009, she was separated from the calf during the day, introduced to Baringo II, who mated her. Female's health condition fluctuated and gradually worsened until she had to be euthanised in agony, just 15 years old. The cause of her condition was kidney failure.



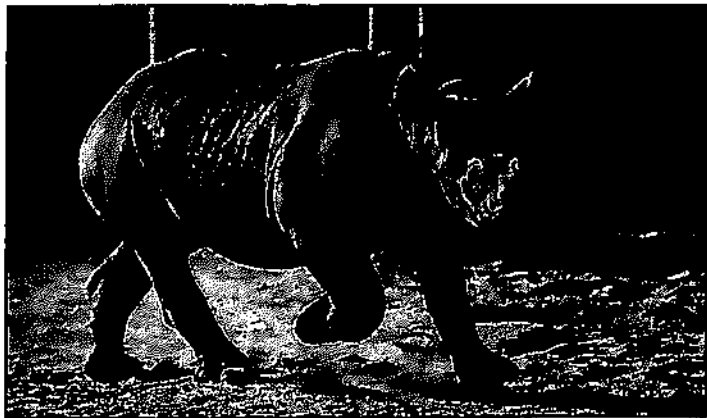
*Jiddah DK 17 with Deborah DK 27, a half-year old female (dh)*



*Jiddah DK 17 and her nine-month-old son Dzanty, 26 August 2008 (dh)*



*Deborah DK 27, 4 May 2005 (dh)*



*Dzanty DK 33, 13 September 2008 (dh)*

Putting Jiddah DK 17, Sauron DK 16 and Eimi DK 9 together, 2000



*Sauron (left), Eimi (middle) and Jiddah (right) being united (th)*



*Sauron has started chasing Jiddah (th)*



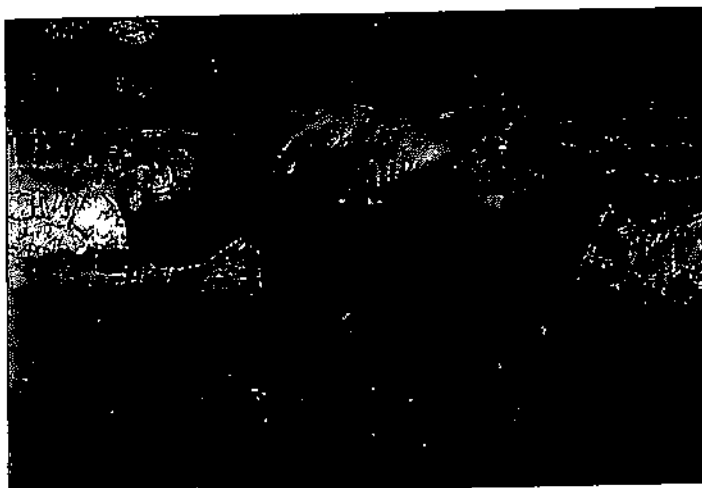
*Sauron chasing and homing Jiddah (th)*



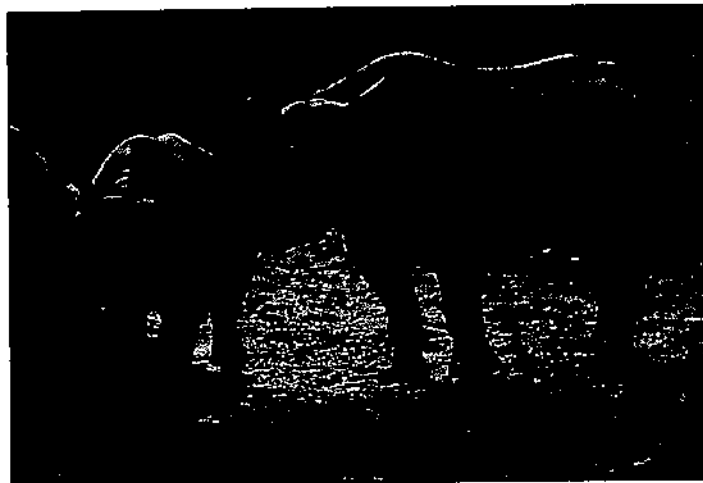
**Musso DK 20 - born 20 Aug 1997, Dvur Kralove; Stdbk #678 († 14 Jul 2007)**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	F	Maisha DK 28	Musso	Isis	20 Sep 2004	21 Dec 2005	457 days	House 3

Female Musso DK 20 (full name Ssang Yong Musso) got pregnant with Isis in 2004, when she was already 7 years and 1 month. The reason for the relatively high age at first conception was the process of unsuccessful coupling with the too much aggressive male Mweru, which took place 2 years before. Excellent character and mother, no one noticed that this female's condition had slowly deteriorated during the lactation period. She began to have problems with bleeding of the tail end and the large portion of care focused on this part of her body. She died suddenly at just 10 years of age. Partially involved in her death, caused by fungal lung disease, was probably the imbalanced ration in conjunction with the load on the organism through long breast-feeding, which lasted 19 months.



*Musso DK 20, eight years old (dh)*



*Musso DK 20 and Maisha DK 28, 5 March 2007 (dh)*



*Musso DK 20 with 5.5-month-old Maisha DK 28, 5 March 2007 (dh)*



*Maisha DK 28 at the age of 2.5 years - 23 July 2008 (dh)*



**Jola DK 21 - born 25 Oct 1997, Dvur Kralove; Stdbk #685**

No.	Sex	Name	Dam	Sire	Pregnancy date	Birth date	Pregnancy time	House ID; comments
1	M	Jabu DK 31	Jola	Isis	7 Oct 2005	1 Feb 2007	482 days	House 3
2	?	? DK 36	Jola	Mweru	8 Jun 2009	Sep 2010	Pregnancy underway	House 3

Jola got pregnant for the first time when 8 years old. The reason was failure to become coupled with the young male Mweru who was too aggressive. Therefore, this female came to be introduced to female Jimmi and later on to Isis, who successfully mated Jola in 2005. Having weaned her first calf, Jola was united with female Jane Lee, and both females together were grouped with Mweru in 2009; then this rhino got pregnant after a single mating (8 June).



Jola DK 21 (dh)



Jola DK 21 and 1.5-year-old Jabu DK 31, 12 August 2008 (dh)



Jola DK 21 and Mweru, 2009 (dh)

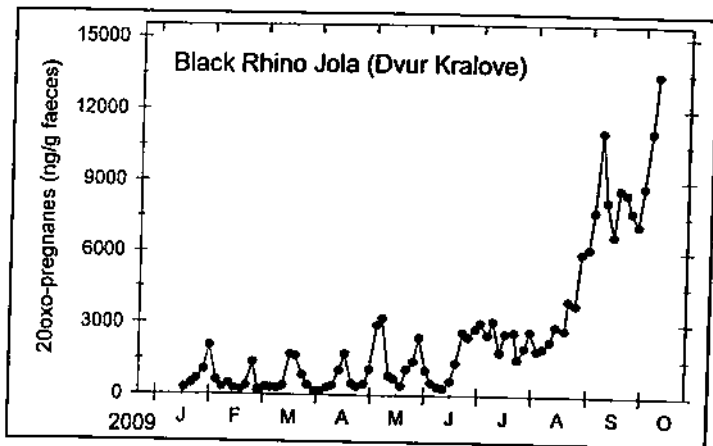


Chart confirming Jola's pregnancy, 2009