

**THE JAVAN RHINO (*Rhinoceros sondaicus* Desm.)  
CENSUS IN UJUNG KULON NATIONAL PARK**

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**ABSTRACT**

The Javan rhino census was carried out in Ujung Kulon National Park on April 14 - 18, 1984. It involved 47 people including 11 students from the Fakultas Biologi of the Universitas Nasional. The basic methods put forward by Schenkel & Schenkel (1969) were used in the field and in the tabulation of the results of the census. The census was carried out along 11 trails throughout the Ujung Kulon area. At the end of the census, the population size of Javan rhino was estimated to be 50 - 54. The footprints of three newly weaned rhino calves were also found. The most commonly encountered foot prints were those classified as young male/female adult category (74.83%). The composition of the footprint classess found in the census suggests that the population of Javan rhino in Ujung Kulon can be expected to grow further, provided no serious limitations arise. The results of the census also show the range and distribution of the rhinos. The distribution of the rhino in Ujung Kulon is obviously uneven. The biggest concentration of individuals occurs in the central part of the park. From the west of Gunung Payung complex to the tip of Tanjung Layar, relatively very few footprints were seen. The distribution extends eastwards to the Karang Ranjang area. This shows that the area that was empty after the death of five animals in 1981 - 1982 (PPA 1982, Sadjudin 1983) has been re-established as a range. In addition to the Javan rhino, a variety of other wildlife was also recorded from sightings during the census. Of the large mammals, the ones most frequently encountered were the Banteng (*Bos javanicus*) and a number of monkeys. The birds observed include fruit-eating species such as the Rhinoceros hornbill or Rankong (*Buceros rhinoceros*), the Wreathed hornbill or Julang (*Rhyticeros undulatus*) and the Indian pied hornbill or kangkareng (*Anthracoceros coronatus*). However, their numbers are unknown. A more comprehensive survey of the Ujung Kulon National Park is recommended.

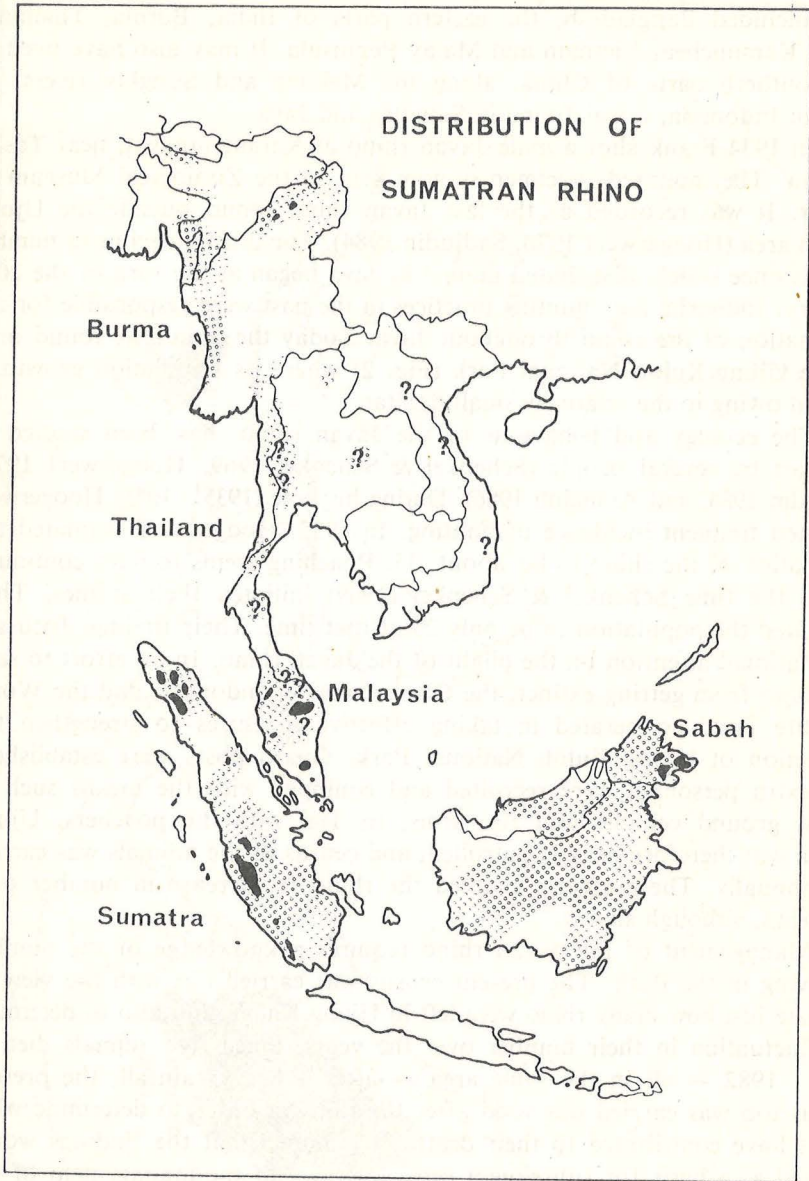


Fig.1. Map showing the past (stippled areas) and present (shaded areas) distribution of the Sumatran rhinoceros (*Dicerorhinus sumatrensis*).

Sources : Nico J. van Strien. 1985. The Sumatran Rhinoceros — *Dicerorhinus sumatrensis* (Fisher, 1814) — in the Gunung Leuser National Park, Sumatra, Indonesia; its distribution, Ecology and Conservation. Doorn.



## 1.0 Introduction

In the past, the distribution of the Javan rhino covered a wide area that included Bangladesh, the eastern parts of India, Burma, Thailand, Laos, Kampuchea, Vietnam and Malay Peninsula. It may also have lived in the southern parts of China, along the Mekong and Songkoi rivers. In ancient Indonesia, it was found in Sumatra and Java.

In 1934 Frank shot a male Javan rhino at Karangnunggal, near Tasikmalaya. The mounted specimen is now kept in the Zoological Museum in Bogor. It was recorded as the last Javan rhino found outside the Ujung Kulon area (Hoogerwerf 1970, Sadjudin 1984). The drastic decline in number of this once widely distributed animal in Java began at the turn of the 20th century. Indiscriminate hunting practices in the past were responsible for the elimination of the rhino throughout Java. Today the animal is found only in the Ujung Kulon National Park (Fig. 2) where its population growth is limited owing to the relatively small habitat.

The ecology and behaviour of the Javan rhino has been studied in the past by several people (Schenkel & Schenkel 1969, Hoogerwerf 1970, Sadjudin 1984, and Ammann 1986). During his time (1935 - 1955) Hoogerwerf reported frequent incidence of hunting. In 1955, Hoogerwerf estimated the population of the rhino to be about 35. Poaching seems to have continued up to the time Schenkel & Schenkel (1969) initiated their studies. They estimated the population to be only 25 at that time. Their findings focussed international attention on the plight of the Javan rhino. In an effort to save the rhino from getting extinct, the Government of Indonesia and the World Wildlife Fund cooperated in taking effective measures to strengthen the protection of Ujung Kulon National Park. Guard posts were established, and extra personnel were recruited and equipped with the means such as boats, ground vehicles and fire arms, to deal with the poachers. Ujung Kulon was therefore heavily patrolled, and census of the animals was carried out annually. These efforts enabled the rhino to increase in number over the years, although slowly.

Management of the Javan rhino requires a knowledge of the number surviving in the Park. The present census was carried out with the view to estimate just how many rhino were left in Ujung Kulon, and also to determine the fluctuation in their number over the years. Since five animals died in 1981 - 1982 — all in the same area — after a heavy rainfall, the present census too was carried out soon after the rains in order to determine what might have contributed to their death. It is hoped that the findings would be used as a basis for subsequent census as part of the management of the rhino in Ujung Kulon.

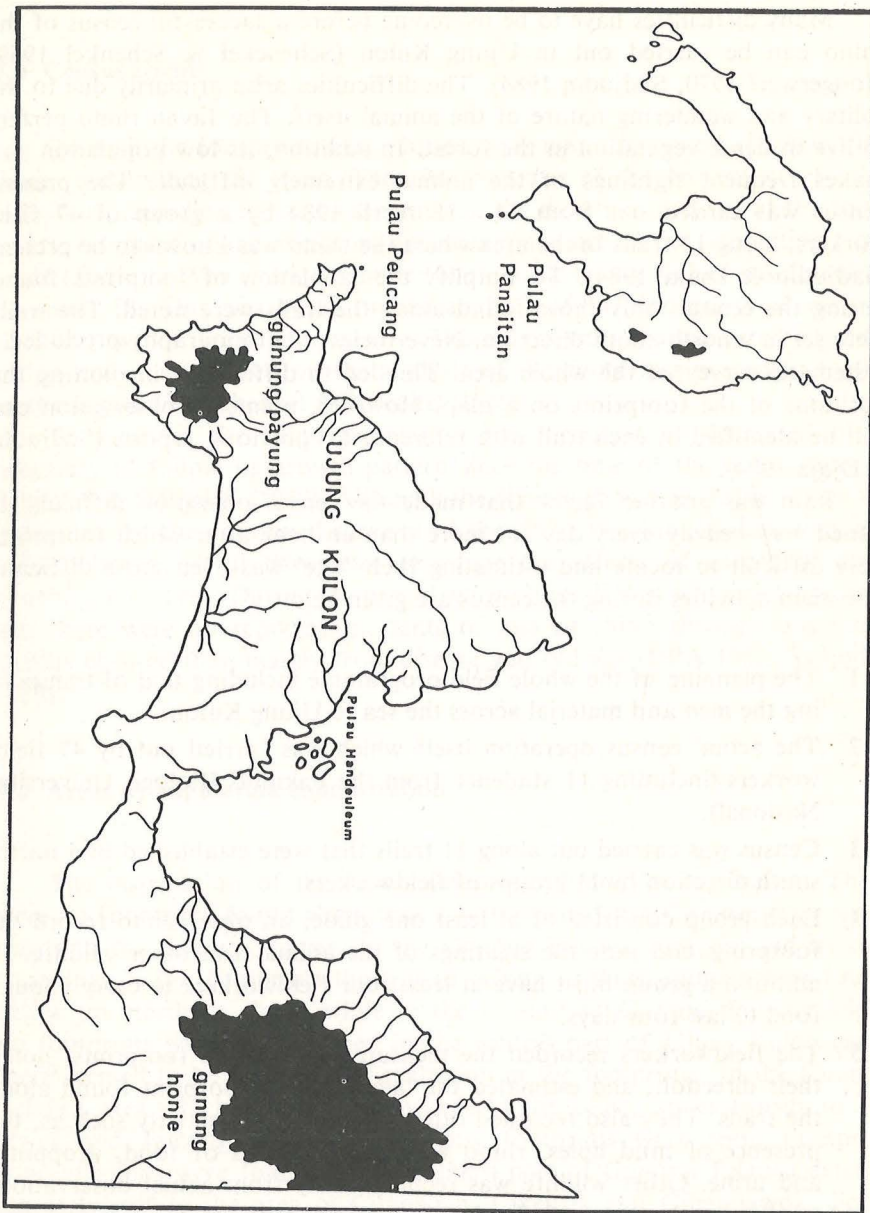


Fig. 2. Map showing the Ujung Kulon peninsula and the islands of Pulau Peucang and Pulau Panaitan. Shaded areas represent the 500 m altitude.



## 2.0 Methods and Constraints

Many difficulties have to be overcome before a successful census of the rhino can be carried out in Ujung Kulon (Schenkel & Schenkel 1969, Hoogerwerf 1970, Sadjudin 1984). The difficulties arise primarily due to the solitary and wandering nature of the animal itself. The Javan rhino prefers to live in dense vegetation in the forest. In addition, its low population size makes frequent sightings of the animal extremely difficult. The present census was carried out from 14 - 18 April 1984 by a group of 47 field workers, along 11 trails in the area where the rhino was known to be present (Sadjudin & Djaja 1984). To simplify the tabulation of footprints found during the census, only those found along the trails were noted. The trails were set in a north-south direction. Nevertheless the topography precluded a systematic survey of the whole area. This led to difficulties in plotting the positions of the footprints on a map. However, points of observation can still be identified in each trail with reference to previous reports (Sadjudin & Djaja 1984).

Rain was another factor that made the census operation difficult. It rained very heavily every day for more than an hour after which footprints were difficult to locate and estimating their 'age' was even more difficult. The main activities during the census are given below :

- 2.1 The planning of the whole field programme including that of transporting the men and material across the sea to Ujung Kulon.
- 2.2 The actual census operation itself which was carried out by 47 fieldworkers (including 11 students from the Fakultas Biologi, Universitas Nasional).
- 2.3 Census was carried out along 11 trails that were established in a north-south direction by 11 groups of fieldworkers.
- 2.4 Each group consisted of at least one guide, an observer to record the footprints and note the sightings of the animal and other wildlife. In addition a group must have at least four fieldworkers to carry enough food to last four days.
- 2.5 The fieldworkers recorded the measurements of the footprints, noted their direction, and estimated the 'age' of each footprint found along the trails. They also recorded other signs of rhino activity such as, the presence of mud holes, rhino wallows, remnants of food, droppings and urine. Other wildlife was recorded only from actual observations (except in the case of the leopard where only its foot prints were observed).
- 2.6 All field data were compiled. Footprints of the Javan rhino of all sizes were then plotted on a 1 : 75,000 scale map and were analysed. It was assumed that all footprints of the same measurement and found occurring in the same direction belonged to the same individual. It provided

an estimate of the minimum and maximum numbers in addition to the average number in the area.

### 3.0 Census results

Once all the footprints were plotted on a map, they were checked with those found along the trails. Then on the basis of the movement of each individual according to the measurements, the direction and age of the footprints, estimates of the minimum and maximum size of the population were made (Table 1). The average number of rhino in Ujung Kulon was found to be about 52. This was based on the analysis of 147 footprints of various sizes and two of underdetermined size. Table 2 provides the age group classification and it was based on the analysis of the footprints according to the methods given by Schenkel & Schenkel (1969).

To know if the rhino population has increased or decreased, it is necessary to follow its growth pattern since the time of the publication of Schenkel & Schenkel (1969). Although the figures shown in Table 3 give no guarantee for the continued survival of the rhino in Ujung Kulon, they are nevertheless a useful barometer to gauge the effects of successful anti-poaching measures. During the period when Ujung Kulon was strictly patrolled, there were no reported incidents of loss of rhino through poaching. Deaths occurred then mainly from disease and old age (PPA 1982, Sadjudin 1983).

### 4.0 Areas of population concentration

The distribution of the Javan rhino was found to be uneven. There were no footprints found along trail I — the area from Ciramea river westwards to the Tanjung Layar. In the Gunung Payung complex and its surroundings, a few footprints thought to belong to three animals were found below the northern slope, while in the summit of Gunung Payung itself, no footprints were found. Even in the central part of Ujung Kulon cape, there seemed to be an uneven distribution in the footprints. In the Gunung Telanca area which extends northwards to the coast, an eastwards to the Nyiur and Jamang swamps, not many footprints were seen. Footprint concentrations were found in the southern part of Gunung Telanca extending eastwards to the area of Citadahan, Cikeusik and Cibandawok. Footprints were also found in the north i.e. near Tanjung Balagadigi, Cigenter and Cihandeuleum, and in the east to points beyond the Karang Ranjang area. In the easternmost area, footprints were found in Pangarok, close to Kalejetan. In addition, footprints of four animals were found in Tanjung Tereleng area.



## 5.0 Conclusion

Talbot (1960) reported that the population of Javan rhino in Ujung Kulon in 1958 was about 12 - 14. In 1937, it was estimated to be about 25 (10 males and 15 females), while in 1955 it was thought to have increased to about 30 - 35 (Hoogerwerf 1970). These two reports were not made on census carried out simultaneously and in a short time interval, but rather were based on long-term field observations. The first reliable estimate of the population was made by Schenkel & Schenkel (1969). After their first census, the number was thought to be between 21 and 28. Subsequently, tighter measures were taken to control hunting and so the population increased to 50 - 54. Looking at the figures from the annual census since 1980 (Table 3), the number of Javan rhino appears to have declined recently. This decline can be attributed to the six animals that died between 1980 and 1983 (PPA 1982, Sadjudin 1984).

A more important aspect of the census was to determine the occurrence of reproductive activity on the basis of the number of rhino calf footprints observed. During the census, footprints of three newly weaned calves were noted. According to Sadjudin & Djaja (1984) these calves were still with their mothers. In 1981 there were seven calves categorised as being under two years of age (Sadjudin 1984). They are expected to be in the 'mature young' category today. On the basis of the census, the Javan rhino population in Ujung Kulon appears to have a good age composition. The most predominant age class (74.83%), is the adult female or young adult male category (Table 2). This raises the expectations for a high reproductive performance. However, studies carried out by Sadjudin & Djaja (1984) indicate that the reproductive rate was rather low in 1980 - 1983, about 3 - 4%.

Compared to the 1967 figures, the population today has doubled. This means about half the Javan rhinos are 17 years old (or older, counting out the possibility of age-induced mortality of rhinos in 1967 - 1983). Whith the death of the five rhinos in 1981 - 1982, all in the same area, it was thought that the population had reached its optimal limit (Schenkel as quoted in PPA 1982, Sadjudin & Djaja 1984). However, the exact cause of their death still remains unresolved. Therefore there is a need to carry out regular census studies in Ujung Kulon so that fluctuations in numbers can be documented and appropriate measures taken in time to save the Javan rhino. Along with the conditions of the population, it is also necessary to determine the range and distribution of the rhino in Ujung Kulon. This is important as it enables us to find areas preferred by the animals. Since the time of Schenkels' (1969) and Hoogerwerf's (1970) publications the distribution of rhino has been studied and reported by Sadjudin & Djaja (1984) whose major finding is the unevenness of the rhino in Ujung Kulon. This uneven distribution is caused by a number of factors such dry topography, vegetation, and the alternation of wet and dry seasons. The uneven distribution of the footprints supports the findings of Sadjudin & Djaja (1984), who divided Ujung Kulon



cape into four areas of rhino concentration. Each area has a different population density. The present census found no footprints in area I, the western part of the cape (Trail I). In Trail II, only a few footprints were found thought to belong to three animals. Javan rhino was thought to be concentrated in Areas II and V of Sadjudin & Djaja's report (1984).

After the death of rhinos in the eastern part around the Karang Ranjang region, only recently footprints of rhino have been found once again. An adult female was seen along Trail X, and an adult male was observed in Trail IX (Tanjung Balagadigi). This indicates that the areas once avoided by the rhino are once more being utilized by them. The observation is important since it raises the question as to whether range expansion is a sign of increased population size and therefore necessitates the provision of more feeding grounds within the Park itself. It has been stated that the Javan rhino prefers flat lands and gentle slopes (Sadjudin & Djaja 1984), which is confirmed by the present census findings. On Hommel's vegetation map (1983), the Javan rhino concentration areas appear to coincide with areas of vegetation of the types preferred by the animals. Other factors such as deep swamps and steep hills in the Gunung Payung complex also limit the distribution of the animals (Sadjudin & Djaja 1984).

In addition to the Javan rhino, wildlife such as birds, reptiles and other mammals were also recorded. More detailed studies are needed to establish if there is indeed any serious competition between the banteng (*Bos javanicus*) and the rhino since they are sympatric in Ujung Kulon. They are known to feed on at least some of the common vegetation (Djaja *et al.*, 1982).

## 6.0 Recommendations

- 6.1 Population stabilization needs to be observed. Special studies on the ecological competition between banteng and rhino must be carried out. The next census must estimate the population size of the banteng too.
- 6.2 All the available data must be collated and studied carefully in order to carry out the management of Ujung Kulon more effectively and along sound ecological lines.
- 6.3 A more comprehensive record of the Park's wildlife should be made.
- 6.4 Census work in Ujung Kulon must be carefully planned in advance, especially its timing. The most appropriate times are the end of the rainy season and the beginning of the dry season. At other times, it would be difficult to measure the footprints on the substrate.



Table 1. Estimates of the minimum and maximum numbers of Javan rhino in Ujung Kulon. April 14 - 18, 1984 (Based on the size of footprints of fore and hind legs).

No :	Footprint size (cm.)	Minimum	Maximum
1	20/21	1	1
2	21/22	2	2
3	23/24	3	4
4	24/25	6	7
5	25/26	11	11
6	25/27	2	3
7	26/27	10	10
8	27/28	8	9
9	28/29	4	4
10	28/30	1	1
11	29/30	2	2
Total		50	54

Table 2. Population composition of Javan rhino at the time of the census (April 14 - 18, 1984). It is based on the various estimated age-classes.

Footprint classes	I	II	III	IV	V	Total
Forefoot size	20	20 - 23	24 - 25	26 - 28	29 - 30	—
Estimated age (yrs)	½	½ - 1	1 - 2	♂ adult ♀ subadult	♂ adult largest ♀	
Minimum number estimated	—	3	9	31	7	50
Recorded number of footprints	—	3	20	110	14	147
Percentage	—	2.04	13.61	74.83	9.52	100
Maximum number estimated	—	3	11	33	7	54

Table 3. Population growth of Javan Rhinoceros in Ujung Kulon from census results (1967 - 1984)

Year	minimum	maximum	average	source
1967	21	28	24.5	Schenkel & Schenkel (1969)
1968	20	29	24.5	idem
1969	22	34	28.0	PPA
1970	—	—	—	no census
1971	33	42	37.5	PPA
1972	40	48	44.0	PPA
1973	38	46	42.0	PPA
1974	41	52	46.5	PPA
1975	45	54	49.5	PPA
1976	44	42	48.0	PPA
1977	44	52	48.0	PPA
1978	47	57	52.0	PPA
	46	55	50.5	Ammann (1980)
1979	—	—	—	no census
1980	54	62	58.0	PPA
	57	66	61.5	Ammann (1980)
1981	51	77	64.0	PPA
	54	60	57.0	Sadjudin <i>et al</i> (1981)
1982	53	59	56.0	PPA
1983	58	69	63.5	PPA
1984	50	54	52.0	Sadjudin & PPHA (1984)

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## DISCUSSION

**BLOUCH** : wanted to know if there was any evidence of serious competition between the banteng and the Javan rhino since the former was said to be numerous ?

**WIDODO** : commenting on the information given in Table 3 of Haerudin Sadjudin's paper, pointed out that since 1980, the number of Javan rhino appeared to be either stable or on the decline and therefore wanted to know if there were any signs that the habitat was deteriorating ?

**HAERUDIN** : attributed the decline in number to the sudden death in 1981 - 1982 of five animals plus the one killed by poachers in 1983. He also mentioned that the rhinos were seen up to Kalejetan — an area where even the water buffalo from the nearby kampung wander into.