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Orang-utans in Sumatra

John MacKinnon

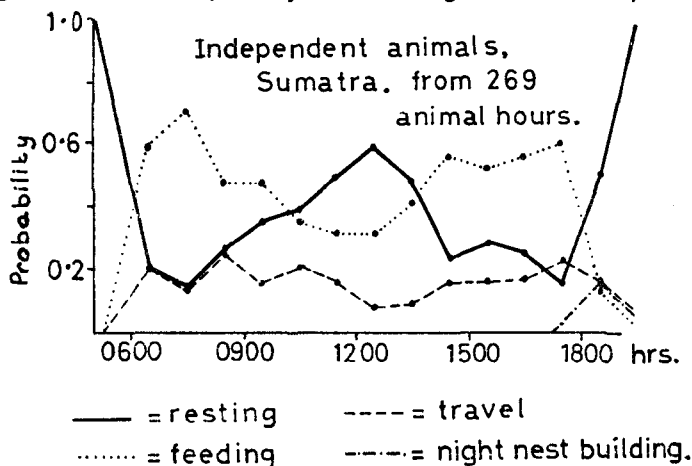
In 1971 John MacKinnon spent seven months in Sumatra studying orang-utans in the wild. This report compares his findings with those of his earlier and much longer study in Sabah, the report of which was published in *Oryx* September 1971, and also comments on some other mammals in his study area, including the Sumatran rhino.

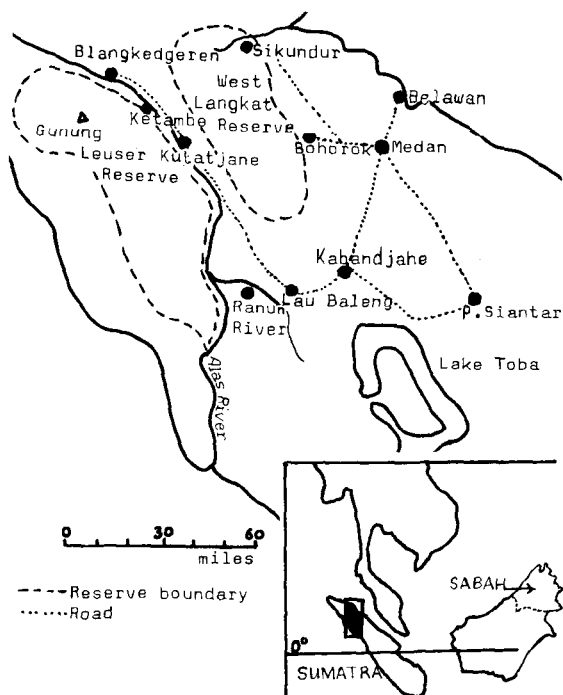
I began work in May with a survey of conditions in both the West Langkat and the Ranun river areas in Sumatra Utara. Both had healthy orang-utan populations, but I chose the Ranun river area for more detailed study because of its geophysical advantages.

From a base camp beside a small ladang half way between the village of Lau Djohar and Kedai Ampunguan on the Alas river, I was able to investigate an area of about 5 sq km. Working alone and keeping hidden wherever possible, I spent 280 hours observing 45 orang-utan sub-groups involving more than fifty individual animals. These included animals seen in West Langkat and on both sides of the Ranun river. I collected information on their daily activity, ranging patterns, diet, grouping and social organisation, and also information about other animals, especially the distribution and numbers of other primates and on elephant movements. At the end of the Ranun study I visited briefly two other areas where wild orang-utans occur: Ketambe in the Gunung Leuser Reserve, west of the Alas river, some 30 km north of Kutatjane, and Sikundur, an area of low-lying forest at the north end of the Langkat Reserve.

It was not possible to make accurate determinations of orang-utan densities, owing to their erratic movements and the short time

Figure 1 Probability of major activities against time of day





available. The rough estimates in Table 1 are based on comparisons of rate of encounter with animals, nest abundance and other signs of their presence in these areas with the same parameters as for the Segama area of Sabah, Borneo, where I know more about orang-utan density.

Table 1 **Orang-utan densities in North Sumatra**

West Langkat (Berkail river)	sq. km.
Ranun south	c. 1 per sq. km.
Ranun north	1 per sq. km.
Sikundur	1 per sq. km.
Ketambe	1 per sq. km.

Activity and Diet

Figure 1 gives the probability of occurrence, at different times of day, for the major activities of feeding, travel, resting and night resting for those undisturbed independent animals observed. The picture corresponds closely to that found for the Bornean orang-utans in the fruit season of the Segama area, except that Sumatran animals spent more time feeding per day. This is interpreted as reflecting the greater abundance of fruit during the period of the Ranun study.

Orang-utans ate a wide variety of fruits as well as leaves, shoots, bark, lianas and insects. Fruit species eaten belonged to the same genera as those eaten in Borneo but there were no shared species. The range of foods being taken in any month was considerably less than in the Bornean study, animals becoming specialised on common favoured types. The fruit of *Dracontomelum edule*

List of Food Plants

Anacardiaceae—mango family	
<i>Dracontomelum edule</i>	Pestri (K)*
<i>Mangifera foetida</i>	Ebatjang (K)
Annonaceae—custard apple family	
<i>Canangium</i> sp.	Kenanga (M)
<i>Canangium</i> sp.	
<i>Polyalthia</i> sp.	Bakbaken (K)
<i>Goniothalmus</i> sp.	
Bombaceae—durian family	
<i>Durio</i> sp.	Durian hutan (M)
Euphorbiaceae—rubber family	
<i>Baccaurea</i> sp.	Balek angin (M)
<i>Mallotus</i> sp.	
Fagaceae—oak family	
<i>Lithocarpus</i> sp.	
<i>Lithocarpus</i> sp.	
Guttiferae—mangostean family	
<i>Garcinia griffithii</i>	Kandis assam (M)
<i>G. parvifolia</i>	Manggis hutan (M)
Leguminosae—pea family	
<i>Adenanthera pavonina</i>	Sasaga (K), Saga (M)
<i>Parkia speciosa</i>	Ronding (K), Petai (M)
<i>Sindora</i> sp.	Sepetir (M)
Meliaceae—mahogany family	
<i>Aglaia argentea</i>	Kuagi (K)
<i>Dysoxylon</i> sp.	Kuagi (K)
Moraceae—fig family	
<i>Artocarpus tamaran</i>	
<i>Ficus benjamina</i>	Beringin (M)
<i>F. elastica</i>	Rambung (M)
<i>F. indica</i>	Hari-ara (M)
<i>F. aff. retusa</i>	Djawi jdawi (M)
<i>F. aff. religiosa</i>	
<i>F. sp.</i>	
<i>Paractocarpus venenosus</i>	Nanka hutan (M)
Myrtaceae—eucalyptus family	
<i>Eugenia</i> sp.	
Rhamnaceae	
<i>Zizyphus</i> sp.	
Sapindaceae	
<i>Nephelium aff. mutabile</i>	Usoh (M), Kelia (K)

* K—Karo, M—Malay

accounted for 26 per cent of all feeding bouts observed between May 12th and September 1st, while several species of *Ficus* accounted for another 30 per cent and two species of *Canarium* for 10 per cent.

Ranging Behaviour

For several months two different groups of orang-utans ranged in the 3-sq-km area of lowland forest on the south side of the Ranun river, while another group ranged in the 2-sq-km area to the north. These animals remained mostly within this relatively small area whilst the *Ficus*, *Dracontomelum* and *Canarium* trees were in fruit. At the end of the summer (September) all animals moved back out of my research areas into the highest hills in the region (c. 1000m above sea level), where figs and several species of *Lithocarpus* were available. Daily ranging was similar to that shown by Bornean orang-utans, averaging half a kilometre a day, but Sumatran animals were using fewer food trees, and these were frequently revisited.

Mineral Caves

Elephants had excavated a series of deep caves into a particular rock strata of the hillsides. The rock was white, powdery and light, apparently related to pumice, and alkaline, in contrast with the acid soils in other parts of the forest; it contained quantities of sodium and potassium. Five sets of caves had been made in the south area, and the elephants' regular use of these, and the broad animal tracks linking them, suggest that they are very important to mammals in the area. Orang-utan footprints and teethmarks were found in the caves, and the high nest-densities in surrounding trees indicated that they also form focal points of orang-utan ranging patterns. Other animals using the caves were porcupines, squirrels, rats, muntjac, sambur deer, leaf-monkeys and gibbons.

Groupings and Social Organisation

Table 2 gives the composition of all sub-groups observed in Sumatra. The average size of 1.8 is identical with that found in Borneo (MacKinnon, 1971). The population's dispersal into small

Table 2 Composition of Sub-groups in order of Frequency

Adult male	11 times
Adult female	5 times
Adolescent	5 times
Adult female plus juvenile	5 times
Adult female plus infant plus sub-adult male	5 times
Adult female plus infant plus adult male	2 times
Adult female plus adult male	2 times
Adult female plus adolescent	2 times
Adult female plus infant plus juvenile	2 times
Adult female plus infant plus juvenile plus adult male	2 times
Sub-adult male	2 times
Adolescent plus sub-adult male	1 time
Female plus infant	1 time

sub-groups is interpreted as an adaptation to enable these large, slow-moving animals to forage efficiently the dispersed food supply offered by isolated and rare tree species.

Like the Bornean animals males form consortships with adult females, and dependent young remain with their mothers, but otherwise animals behave in a solitary fashion. One difference noticed, however, was in the relative permanence of the male-female bond, which in Sumatra seemed often to last after an infant's birth. Possibly the presence of aggressive, competitive siamangs *Hylobates syndactylus* and more ground predators, including leopards and tigers (all absent in Borneo), makes the female-infant grouping vulnerable and favours the retention of a protective male.

A second important difference from the Bornean situation is that encounters between the sub-groups occurred more often (33 times in 280 hours' observation compared with only 45 times in 1200 hours of observation in Borneo). On one day thirteen different orang-utans were encountered in a small area of forest, and over a four-day period fourteen different animals were seen feeding in a single fig-tree. The clumping of subgroups to form dispersed but discrete groups seemed to be centred around single large dominant males, characterised by their broad cheek flanges and loud vocalisations or long-calls (MacKinnon, 1971). The long-calls seemed to have a group-co-ordinating function as well as maintaining spacing between different groups. Sumatran long-calls were shorter but with a faster rhythm than the Bornean, and recorded mostly at night rather than in the daytime. The elongation of these calls in Borneo may reflect the wider dispersion of the Bornean animals.

Two factors may have encouraged the greater cohesion of the Sumatran orang-utan group: the greater clumping of food sources, which was evident and confirmed by tree inventories, and the greater competition for food, due to the much higher densities of other primates especially siamangs, whose diet considerably overlapped with that of the orang-utans. The siamangs lived in small territories and vigorously defended their fruit trees. On one occasion a siamang family attacked an adolescent orang-utan, driving him off a fig-tree, and another time siamangs swooped down on an infant orang-utan only to be chased away again by its enraged mother. The lower ratio of adult females to adult males (1:1 in Sumatra compared with 3:2 in Borneo) and the ratio of juveniles to adult females (1:3 in Sumatra compared with 3:4 in Borneo) seem to reflect the heavy poaching of Sumatran orang-utans in recent years, females being shot for their babies and juveniles trapped for sale as pets.

Social Behaviour

As in Borneo animals showed little interest in other sub-groups when they met at food sources. There was also very great tolerance of other animals feeding at the same site. Social interaction was largely confined to behaviour between courting males and females; embracing and allo-grooming were seen between male and female and embracing and kissing between male and infant, which were not seen in the Bornean study. One male on encountering a female

briefly examined her genital region before moving away again; this sort of greeting was not seen in Borneo. A sub-adult male meeting a female, played with her and gave her a swaying, hair-waving display also not previously seen. Subordinate adult and sub-adult males were tolerated feeding close to a dominant male—again quite different from Borneo where tolerance among males was very low—although aggressive chases were seen among males of similar size. These brief observations on social interaction confirm the view drawn from grouping data that Sumatran orang-utans have greater social cohesion and interaction than Bornean animals. In the Bornean animals no instance of friendly greetings or allo-grooming were seen apart from that between mothers and their young. All vocalisations of Sumatran orang-utans closely corresponded with those in Borneo (MacKinnon, 1971).

Physical Differences

The two insular forms are usually given sub-specific status, the Bornean animals referred to as *Pongo pygmaeus pygmaeus* and those from Sumatra as *P. p. aberlli*. They are not easy to distinguish on appearance and, as many animals in zoos are of unknown origin, it is worthwhile listing those differences that do exist so that captive animals can be allocated to the correct race.

Young Bornean animals usually have bright orange hair, which darkens quickly with age to a chocolate or maroon colour and may become almost black in old animals. The hairs are stiff and shiny, brittle and usually broken at the ends. Sumatran young are paler orange becoming cinnamon with age, with white or yellow hair on the face, in the beard and in the groin. Their hair, especially in adult males, is longer on the arms, in the beard and on the back, less shiny, and finer and fleecier both in appearance and to the touch. Viewed under a microscope the Bornean hair is flattish, with a thick column of black pigment down the centre; Sumatran hair is thinner, rounder, has a fine and often broken column of dark pigment down the centre, is usually clear near the tip and sometimes tipped externally with black.

The foot of the Sumatran orang-utan is more plantigrade and Sumatran animals in captivity spend more time in bipedal postures than do Bornean animals. A type of bipedal strutting with chest thrown forwards is particularly common among adolescent and sub-adult Sumatran males, but was not seen in Bornean animals.

Sumatran animals have long, oval faces; Bornean animals have broader faces, more compressed under the jugals to give a figure-of-8 shape (Bemmel, 1968). In adult Sumatran males the angle between the centre of the eyes and the middle of the nose septum is more acute (37° – 51° , av. 45° , n=11, as measured from head-on photographs) than in Bornean animals (48° – 66° , av. 57° , n=10). The cheek flanges also show characteristic differences: those of Sumatran animals extend laterally, parallel to the face, with a pronounced angle at their extremities which gives the face a diamond shape, and papillated by tufts of short white or yellow plumose hairs. The flanges of Bornean animals are heavier and less

rigid; they develop laterally from both the top and the side of the face, giving a square overall shape, and usually swing forwards like 'blinkers'; rounded and lumpy in shape, the skin is black with sparse, short, red hairs. In captivity Bornean animals become very obese; this is less common in Sumatran animals.

In view of the differences in physical appearance and in social organisation, grouping and calling, I feel the separation of the species into two sub-species is justified.

Other Primates

Primate densities in the Ranun river and West Langkat areas were comparable, and much higher in both than in Borneo. In the more mountainous Langkat area there were mainly siamangs *Hylobates syndactylus* and gibbons *H. lar*, whereas in the Ranun area it was mainly leaf monkeys *Presbytis aygula* and macaques *Macaca nemestrina* and *M. irus*. Table 3 gives estimates per sq km for the different species.

Table 3 Ranun Langkat

<i>Pongo pygmaeus</i>	1	2
<i>Hylobates syndactylus</i>	6	26
<i>Hylobates lar</i>	8	20
<i>Presbytis aygula</i>	64	20
<i>Macaca nemestrina</i>	51	27
<i>Macaca irus</i>	50	5
Total	180	100

Elephants *Elephas maximus* were common on both sides of the Ranun river. Eight different animals visited my southern area, ranging as far east as Lau Djohar and coming through about every six weeks. One group of two adult cows, two calves and a young bull was seen together, but sometimes split into two. The other three animals were usually alone. Tracks of a very large bull were found near Lau Djohar but the animal was not seen; on the north side of the river I was charged by a large-tusked bull and had to climb a tree. Elephants were absent from the West Langkat area which was too mountainous, but we found fresh tracks in Sikundur further north.

Rhinoceros *Dicororhinus sumatrensis*. In 1970 Dr Fred Kurt found rhino tracks near Lau Djohar (Kurt, 1971) but villagers say that no rhinos have visited the area since. I found no traces anywhere, although twice during my stay villagers reported seeing rhino beside the Alas river north of Kutatjane, and Dr Hermann Rijksen has found tracks there.

Tiger and leopard *Panthera tigris* and *P. pardus* A tiger that had killed a cow near Lau Djohar in April 1971 was shot at though missed by a policeman. I once heard one roaring in the Ranun river area, and remains of a recently-killed pig and half-eaten snake were found. A villager from Lau Djohar complained to me that a tiger was regularly eating birds caught in his line of snares. One night I saw by torchlight a large dark cat, either leopard or golden cat *Felis temmincki*, that was attracted to our camp where we had two

domestic piglets and several chickens. Tigers were reported as rare in the Langkat area but quite common in North Atjeh.

Wild goats *Capricornis sumatrensis* are still quite abundant on the higher rocky hills where forest becomes sparse. Tracks and faeces of animals were found in both Ranun and Langkat areas.

Hunting dogs *Cuon javanicus* were last seen in the Ranun area in 1968. One of the men claimed to have heard a pack yapping on the north side of the Ranun river while I was away from camp.

Flying lemur *Galeopithecus variegatus*. I saw these delightful creatures three times in the Ranun area and once in Sikundur.

Pangolin *Manis javanica* and **Slow loris** *Nycticebus coucang*, both nocturnal, are frequently caught by villagers and killed to make medicines despite legal protection. Both species appear to be more abundant in cleared secondary forest than in primary forest.

Sikundur

I visited Sikundur, a low-lying area of acid forest, because, although within the reserve boundaries, considerable selective timber felling has been and still is going on. In the worked areas about half the trees of the upper canopy have been removed and wide lorry tracks have broken the forest up into small blocks. There were grey leaf monkeys, *Presbytis aygula*, silver leaf monkeys *P. cristatus*, both species of macaques, gibbons, siamangs and orang-utan, but all were at lower densities than in undamaged forest. Orang-utan seemed to have avoided areas actually being cut, but nests clearly indicated that they had returned soon after felling ceased. Gibbons and siamangs seemed the most seriously depleted, presumably because their arboreal pathways had been destroyed. Nevertheless gibbons were seen in areas already felled; siamangs were heard calling from uncut areas.

The opening up of the forest had allowed a greater growth of secondary species which had attracted large numbers of small birds, including the beautiful racket-tailed drongos. Both flying lemurs and flying squirrels were seen on our brief visit, and it may well be that the destruction of the arboreal routes has favoured flying and gliding animals at the expense of running, leaping squirrels and monkeys.

Ketambe

Following the success of the Sepilok rehabilitation centre for orphan orang-utans in Sabah (see G.S. de Silva in *Oryx*, December 1970), the Netherlands Gunung Leuser Committee have started up a similar scheme at Ketambe, some twenty miles north of Kutatjane. This started in November 1971, organised by Dr Herman Rijksen, in an area of tall thick rainforest, quite undisturbed by man, on the opposite side of the Alas river from the main road to Blangkedjeren. Herman Rijksen has seen quite a lot of wild orang-utans there, and we saw nests. About twenty captive animals have already been released, and a good deal of interaction between the released animals and the wild population has been observed.

The Conservation Situation

Considering the enormous human population the amount of natural forest remaining in North Sumatra is surprising and gratifying. This is largely due to two factors: the steepness and difficulty of the terrain and the relatively primitive and disorganised fashion in which timber felling has been conducted. But because of the unstable political situation over the past thirty years very large numbers of men are under arms in the country, and the result has been heavy poaching both for food and for sport. Since the police and military have been the worst transgressors the staff of Dinas Perlindungan dan Pengawetan Alam (Nature Conservancy) have been unable to enforce game laws and have become greatly discouraged.

Greater political stability and increased foreign interest in Indonesian wildlife in the past few years have enormously helped the situation. The World Wildlife Fund and the Netherlands Gunung Leuser Committee have given large-scale financial and personnel assistance, and the DPPA staff within Indonesia has been greatly revitalised. The existence of the orang-utan rehabilitation centre means that illegally-owned animals can be confiscated; it also serves as an outward and visible sign that something is being done to safeguard Sumatran wildlife. Co-operation from military and police leaders in the provinces should help a good deal in reducing the incidence of poaching. Greater checks of the export of animals from Indonesia and the purchase of animals within Indonesia should also cause a large drop in the value of young orang-utans and other animals and make it unprofitable to capture them.

The wildlife in North Sumatra is still endangered, but the country still contains a very great wealth of natural life and the prospects of preserving a large portion of this seem very hopeful.

Acknowledgments

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Poland's High Score

The Polish League for the Protection of Nature has a million members, out of a population of nearly 30 million. The combined membership of the nearest British equivalent, the Royal Society for the Protection of Birds plus the county naturalists' trusts is still only between 200,000 and 250,000, or little more than 10 per cent of what the Polish example suggests the potential to be.