

The Conservation Status of *Satranala decussilvae* in the Ianobe Valley, Masoala National Park, Madagascar

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Satranala decussilvae H. Beentje and J. Drans. is endemic to northeast Madagascar, where it is found only in the Mananara Biosphere Reserve and on the eastern side of the Masoala peninsula. It is one of the most attractive palms in Madagascar, with a solitary trunk attaining 12 m in height bearing a crown of large palmate leaves on very long (to 2 m) thin petioles (see page 131). It is dioecious, and has fleshy fruits containing large seeds with extraordinary flanged endocarps. *Satranala decussilvae* has been known to science for only three years (Dransfield and Beentje 1995), and little is known about its biology or its conservation status. The objective of this study was to provide information on the conservation status of this palm in the Ianobe valley, Masoala peninsula (15°14'–15°20'S, 50°18'–50°29'E) by estimating its abundance, population structure, habitat, and uses.

The Ianobe valley was chosen for this study because it is relatively accessible and was considered representative of the eastern side of Masoala peninsula. The climate here is classified as warm perhumid (Morat 1969), with a mean annual rainfall of 2 750 mm distributed throughout the year and a mean monthly temperature of 24°C (National Meteorological Office, Antananarivo). The climax vegetation is classified as lowland evergreen rainforest and littoral forest (Koechlin et al. 1974).

Methods

Abundance and population structure. Populations of *Satranala* were located by systematically visiting villages and hamlets in the Ianobe valley and asking their inhabitants if they knew of populations of this palm. If they did, they were

asked to show us these plants. When a population was located, a count was made of the number of individuals in each of 11 size classes (defined in Table 1) and the number of mature male and female plants (identified by the presence of old reproductive parts).

Habitat. Three *Satranala* populations were chosen which occupied contrasting habitats (i.e. at Sahabe, Isinda, and Andranoanala), and these habitats were decided in terms of relief, soil type, vegetation type, canopy height, percentage of canopy cover, and the associated species of canopy and sub-canopy trees. The associated species were defined by identifying canopy trees (trees with dbh \geq 20 cm for Sahabe and Isinda and \leq 10 cm for Andranoanala) and sub-canopy trees (trees with dbh > 10 cm–20 cm for Sahabe and Isinda, not surveyed at Andranoanala because here the forest is too low to have a distinct sub-canopy) along transects. Three hundred canopy and 300 subcanopy trees were identified at Sahabe and Isinda, and 100 canopy trees at Andranoanala.

Exploitation. The uses made of *Satranala* by the population within the Ianobe valley were described by interviewing villagers, and the level of exploitation was estimated by counting the number of felled *Satranala* trunks in each of the sub-populations.

Results and Discussion

Abundance and population structure. Eight sub-populations of *Satranala* were located, of which six were visited and surveyed (two populations were not surveyed because of lack of time, but these were reported to contain few individuals). Fig. 2 shows the study area and the location of these sub-populations. The populations were

Table 1. Number of individuals in various size and sex classes for each of the sub-populations.

Sub-population	Size class (height in meters)							Total	Sex class (fertile plants)		Total			
	Without trunk			With trunk					Male	Female				
	0-1	1-2	>2	0-1	1-2	2-3	3-4					4-5	5-6	6-7
Sahafary N	4	3	5	2	1	1	1	1	1	1	2	3	2	5
Sahafary NW	0	0	3	0	0	0	0	0	0	0	0	0	0	0
Antsoha	21	98	106	24	15	12	12	8	6	3	2	307	16	22
Sahabe E	21	53	125	7	3	4	4	2	1	2	2	223	9	12
Isinda	0	14	9	5	4	3	2	2	1	1	1	41	2	3
Andranonala	0	10	4	2	1	1	2	0	0	0	0	20	1	1
TOTAL	46	178	252	40	23	21	21	13	9	7	5	616	31	44

scattered over an area of ca. 100 km² and were often isolated from their nearest neighbor by several kilometers. Dransfield (1996) reported a similar distribution for this palm around Masoala peninsula. Table 1 shows the number of individuals in each of the size-classes and the number of fertile female and male plants in each sub-population. The sub-populations ranged in size from three to 307 individuals. In all, 616 plants were counted, most of which were in the smallest size-classes. Only 44 mature plants were recorded, of which 70.5% were male. Just two fertile plants were seen: one with a young inflorescence (in October); and one with unripe fruit in October and then ripe fruit in December. During the survey it was noted that seedlings were always close (i.e. within a few meters) to a mature female plant (presumably their mother), suggesting that their dispersal is poor and supporting the theory that the seeds of this species were once dispersed by the now-extinct *Aepyornis* (a large flightless bird) (Dransfield and Beentje 1995).

Habitat. The habitat for three populations of *Satranala* is summarized in Table 2. For most of the parameters considered these habitats are extremely different. Their only similarities are that the forest is primary, has a high percentage canopy cover, and includes *Ravenala madagascariensis* and *Uapaca* spp. As abundant species in the canopy. Elsewhere on Masoala peninsula, *Satranala* has been recorded growing in shallow soils on steep slopes in a forest rich in *Pandanus* and palms (Dransfield and Beentje 1995).

Exploitation. The inhabitants of the Ianobe valley exploit *Satranala* for its "cabbage," which they say has a very sweet taste. In addition, the leaves are used occasionally for house roofs and for weaving into fish traps. On one occasion a child was seen playing with a young *Satranala* leaf by closing and opening it in the manner of an accordion. In order to exploit this palm it is felled. In all, 13 felled palms were recorded, 11 of which were in the Isinda sub-population (38% of the palms with trunks at this site).

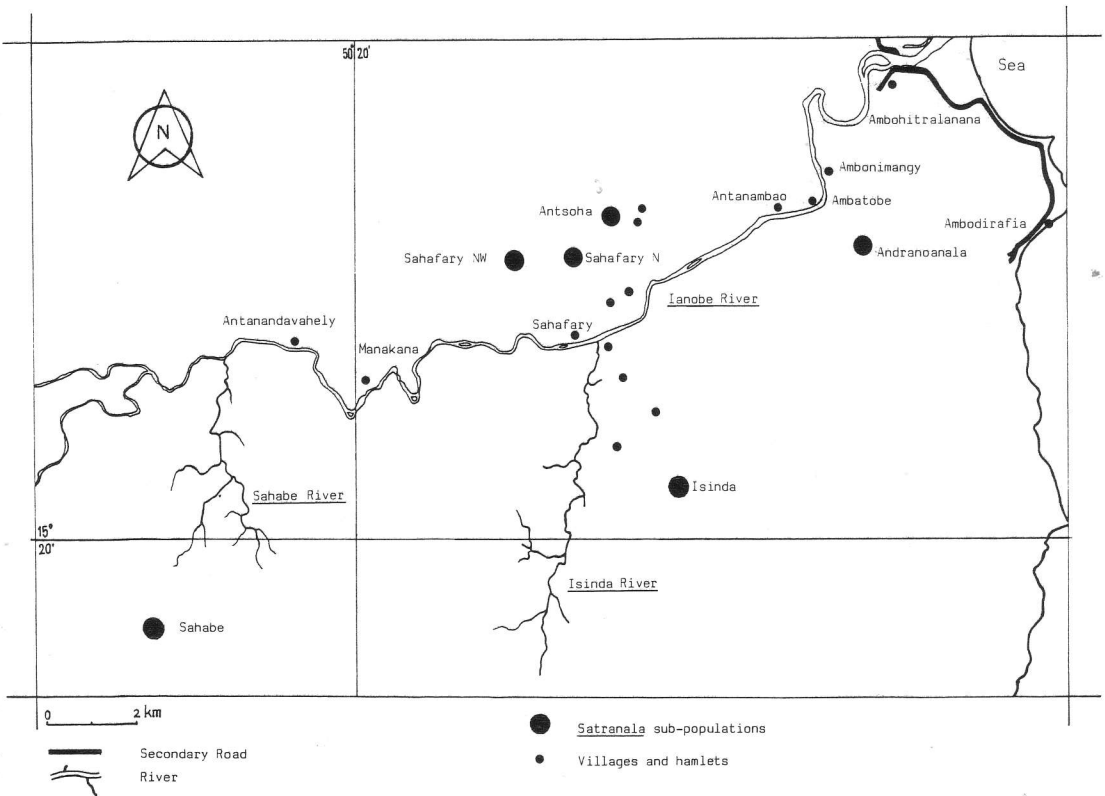
Conclusions

Satranala can be considered somewhat threatened in the Ianobe valley because, although it shows good regeneration, the population is not large and consists of small (sometimes very small) and often isolated sub-populations.

Table 2. Habitats for three *Satranala* sub-populations.

Habitat Parameters	Sub-Population		
	Sahabe	Isinda	Andranoanala
Relief	Hills with steep slopes	Flat	Flat
Soil	Clayey silt with numerous rocks and boulders	Sand	Sand
Vegetation type	Primary lowland evergreen forest	Primary lowland evergreen forest	Primary littoral forest
Canopy height	25 m	20 m	12-15 m
Canopy cover	>80%	>80%	>80%
Associated canopy species* (percentage of plants surveyed)	<i>Anthostema madagascariensis</i> (11.0) <i>Uapaca</i> sp. 2 (10.3) <i>Ravenala madagascariensis</i> (10.0) <i>Uapaca</i> sp. 1 (10.0) <i>Symphonia</i> sp. 2 (4.3)	<i>Calophyllum fibrosum</i> (15.6) <i>Uapaca</i> sp. 2 (9.3) <i>Cleistanthus</i> sp. 1 (6.3) <i>Ravenala madagascariensis</i> (6.0) <i>Anthostema madagascariensis</i> (6.0)	<i>Uapaca</i> sp. 1 (15.0) <i>Faucheria</i> sp. 1 (11.0) <i>Ravenala madagascariensis</i> (11.0) <i>Poupartia</i> sp. 1 (11.0)
Associated sub-canopy species* (percentage of plants surveyed)	<i>Uapaca</i> sp. 1 (6.7) <i>Dypsis lutescens</i> (5.7) <i>Symphonia</i> sp. 1 (5.0) <i>Symphonia</i> sp. 2 (4.7) <i>Micronychia tsiramirany</i> (4.7)	<i>Symphonia fasciculata</i> (13.7) <i>Homalium laxifolium</i> (8.7) <i>Mammea</i> sp. 1 (8.7) <i>Brochoneura</i> sp. 1 (8.3) <i>Calophyllum fibrosum</i> (4.0)	Canopy is too low for clear sub-canopy.
Comments	<i>Satranala</i> plants were restricted to the ridges and slopes, and were not found in the valley bottoms.	Some areas are periodically inundated.	Some areas are periodically inundated, and these contain <i>Nepenthes</i> .

* the five most common species



2. Study area showing the location of *Satranala* sub-populations.

In addition, there are very few mature female plants, seed dispersal is poor, some populations are over-exploited, and it is confined to primary forest.

The conservation of this palm would be assisted by a program for the sustainable harvest of seeds for sale to palm growers and other horticulturists. This would ensure that the species is well-represented in cultivation, and that living plants of this species are preserved by the inhabitants of the Masoala peninsula. In addition, palm enthusiasts should be encouraged to visit the Masoala peninsula to enjoy its rich and unique palm flora. If properly managed, such ecotourism could provide revenue for the local people and encourage them to preserve the forest.

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