



## Malaysia's Last Seabird Refuge

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**The only breeding colony of the brown booby *Sula leucogaster* in Malaysia is declining steadily due to predation, mainly by fishermen who take eggs and young birds for food. However, if the predation could be controlled, a crop could be taken each year without endangering the colony.**

In March 1973, a small party of ornithologists visited the only remaining seabird breeding station in Malaysian waters, the first such visit in 16 years. A small treeless, rocky island, 550 by 400 yards, Pulau Perak lies at the northern entrance to the Malacca Straits ( $5^{\circ} 42' N$ ,  $98^{\circ} 56' E$ ) about 75 miles WNW of Penang, the nearest sizeable fishing port. Gibson-Hill first reported on this seabird population in 1949,<sup>2</sup> followed by Madoc in 1954<sup>8</sup> and again with Allen in 1956.<sup>9</sup>

Gibson-Hill and Madoc established that at least three seabird species, and possibly a fourth, were breeding on the island. The main one was the brown booby *Sula leucogaster*, of which at least 5000-6000 adults were on the island. From the density of nests, Gibson-Hill estimated 4500-5000 pairs had nested, although nest counts may be unreliable unless they contain eggs or young. They also found one nesting pair of the white, masked or blue-faced booby *Sula dactylatra* breeding, the first record for Malaysia.<sup>9</sup> Common noddy terns *Anous stolidus* were estimated to number about 300-400 pairs, and several pairs of bridled terns *Sterna anaethetus* present were also suspected to be breeding in some of the less accessible crevices.

In March 1973, on our first visit, we estimated brown booby numbers as not more than about 700 pairs with about 450 occupied nest sites. It was possible that not all the breeding birds had arrived, as it appeared to be early in the season, but subsequent visits in July 1973 and August 1974 showed that our March 1973 count was the highest. However, the occurrence of eggs at these late dates did not rule out the possibility of a larger population with an extended breeding season. With the assistance of the Royal Malaysian Navy, we made further visits in December 1975 and January, February, March, July and

## Brown boobies on nest sites on Pula Perak, Malacca Straits, 1975-76<sup>5</sup>

Date	No. sitting (contents unknown)	No. where contents recorded					Total pairs
		1 egg	2 eggs	1 egg/ 1 young	1 young	2 young	
22/12/75	39	23	14	0	0	0	76
23/1/76	85	45	28	1	6	0	165
28/2/76	137	25	49	0	56	3	270
29/3/76	19+	7	4	0	19	0	50+
14/7/76	82	21	24	0	3	0	130
19/11/76	9	5	3	1	9	0	27

November 1976, to see whether the breeding had a definite seasonal pattern. Counts made on these visits are shown in the table. The count for February 1976 suggests that the decline continues. The table shows the need for caution in comparing counts made at tropical colonies, even at the same time of the year.

The common noddy breeds later in the year. In July 1973, about 500 pairs were occupying nest sites, and a count made in August 1974 produced a similar estimate.<sup>6,7</sup> Unfortunately the 1976 visits did not coincide with the peak breeding, but the colony appears to be thriving. In July 1973, about 20 pairs of bridled terns were seen but no eggs were found. In July 1976, 30 pairs were seen and one bird was disturbed off a single egg in a vertical rock fissure. Black-naped terns *Sterna sumatrana*<sup>9</sup> and sooty terns *Sterna fuscata*,<sup>7</sup> also occur, but neither has been observed to be breeding.

The estimates indicate that while the brown booby population has declined drastically, that of the common noddy has remained fairly stable, suggesting that the noddies are not affected by the factor(s) responsible for the boobies' decline. Food shortage seems unlikely, as there were no dead or starving chicks in the nests, and this would anyhow not explain the almost complete absence of young boobies during all our visits. It seems more likely that the present population represents a true decline, due primarily to a vast reduction in the recruitment of young birds over the past 10-15 years.

What has caused this massive drop in recruitment? On our first visit, it was soon apparent that the island contained a population of black rats *Rattus rattus*, the commonest species on the adjacent mainland and a common predator in seabird colonies, both of eggs and young. These could have got across in fishing boats, but there were no booby eggs or carcass remains such as rats would leave; moreover, an incubating brown booby would soon repulse any rat even if the nests were readily accessible.

This left the most likely predator to be man. Recent years have seen a substantial improvement in the fishing boats in this region, and trawlers frequently cross the straits towards Sumatra to search an area already seriously overfished. Frequently, these boats tie up at Pulau Perak for a rest, or to shelter from a squall in the lee of the island; the crew come ashore to collect booby eggs and young for food, and occasionally some of the young are brought to West Malaysia as pets. Most boobies' nests are readily accessible, whereas the common noddy, being prone to rat predation, nests on narrow inaccessible



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ledges. The predation on the boobies must have been going on for a considerable number of years to have produced the observed decline, since the mortality of large adult seabirds is quite low, probably around 10 per cent a year.

Although about half the brown booby nests hold two eggs, Dorward has shown that normally only one chick is successfully raised, the second egg providing an insurance against the loss of the first.<sup>1</sup> However, the fact that a substantial proportion of the birds lay two eggs strongly suggests that in some years of abundant food two young can be raised. The high mortality of young birds after fledging, shown by Nelson to be about 80 per cent for the gannet *Sula bassana*<sup>10</sup> and likely to be similar in tropical species, may be reduced in this case by the post-fledging parental care of up to two months. Predation on eggs and young has to be very high if it is to bring about a change in colony size. On Ascension Island in the tropical Atlantic, Dorward found that brown boobies which failed would re-lay about eight months later; probably the eggs we found late in the year were laid by birds that had lost their eggs or small young. In fact, except on Gibson-Hill's initial visit in April 1949, eggs have been reported on all visits so far—January, February, March, June, July, August, November and December. It appears that the breeding season was more synchronous when the population was high and that man's predation in subsequent years has prolonged it. The breeding season for the noddy, where nest predation is negligible, is still at discrete annual intervals.

The evidence from our 1976 visit indicates two peaks of breeding activity, the main one in February and a smaller one in July. The presence of eggs and young points to a laying peak at the end of January followed by a second in July, so that the two laying periods are about six months apart. Marked nests examined at each visit in 1976 showed that 20 nests (out of 30) lost eggs or young; 13 of these birds laid again, but only two were probably successful in rearing chicks (Langham, in press).

Tropical members of the Sulidae family have long incubation and nestling periods: the brown booby's incubation period is 45 days and the pre-fledging 120 days,<sup>14</sup> which means that, to be effective, wardens or patrols would have to operate for a minimum of six months. From the sample of nests examined,

breeding success was estimated at about 10 per cent. In two seasons on Ascension Island, Dorward found breeding success up to four months after the peak to be 20 per cent and 26 per cent respectively, although the former was reduced to 10 per cent later, the result, he presumed, of food shortage.<sup>1</sup> It appears that breeding success is much lower on Pulau Perak, mainly due to human predation.

The brown booby is not a rare species in worldwide terms, but the Pulau Perak colony is the only remaining colony in this region, since the extinction of the one on the Aroa Islands, about 250 miles to the South. The Wildlife Protection Act for West Malaysia 1972 gave the brown booby total protection, but this is only token protection at the moment. Wardening on such an inhospitable island, with no water or shade, would be very costly and beyond the means of the Game Department. People on the mainland keeping boobies as pets have been prosecuted, but only by stopping predation on the island itself will the colony be able to recover.

There is an urgent need to educate the local population on the importance of conservation of wildlife, and in particular the trawler fishermen of West Malaysia who regularly visit the island when crossing the Malacca Straits. At the moment, there is widespread ignorance of the Wildlife Protection Act. If the boobies were adequately protected it might be possible eventually to allow fishermen to collect a fixed proportion of the eggs, so that protection could be shown to be to their advantage. Meanwhile, they should be made aware of the consequences of infringing the Act. The possibility that some of the worst offenders may come from neighbouring countries could provide an opportunity to gain the fishermen's support for enforcing the law, if the Navy can deter such offenders.

At the present, there seems to be little hope for the brown booby breeding colony in the Malacca Straits, even with the intention to declare Pulau Perak a nature reserve. It is debatable whether, if human predation continues, any boobies will cling to the more inaccessible sites. The only hope, if Malaysian conservationists are to achieve any measure of success, is through the co-operation of the trawler fishermen.

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