

Behaviour of Spinner Dolphin at Sha'ab Samadai, Marsa Alam, Red Sea, Egypt

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Abstract

The behaviour of the Spinner Dolphin *Stenella longirostris* was studied at Sha'ab Samadai, Marsa Alam, Red Sea. The data were collected from October 2005 until September 2006 using surface observations. Four objectives were studied: arrival and departure time of dolphins, distribution of dolphin movements within the lagoon, aerial behaviours and human effects on dolphin behaviour.

Introduction

Spinner dolphins (*Stenella longirostris*) are a highly gregarious species found throughout all tropical and subtropical oceans between 30°N and 30°S (Reeves *et al.* 2002). They may be found in pelagic high seas, but also commonly associate with islands, offshore reefs as well as inshore waters along continents. Spinner dolphins are commonly seen in the Red Sea, as well as in the Gulfs of Aden and Oman (Baldwin 2003). Within their latitudinal range, spinner dolphins occur in the Pacific and Indian Oceans, in the tropical Atlantic and also in Southeast Asia (Perrin 1998, Perrin *et al.* 1999, Van Waerebeek *et al.* 1999).

Samadai Reef, Sha'ab Samadai or the 'Dolphin House' is the name of a resting area used by Spinner Dolphins in the Egyptian Red Sea, where tourists can come to see them. When the dolphins arrive, they are in a period of rest, their behavior consists of synchronous dives and extended periods swimming in quiet formation along the shallow bottom (Norris & Wells 1994). The spinner dolphins utilize shallow coves and bays and other areas close to shore during the day to rest, care for their young, and avoid predators, before travelling to deeper water at night to hunt for food (Wursig *et al.* 1994, Norris 1994 & Perrin 1998).

In this study, dolphin behaviour and positions are recorded to help understand how the Samadai reef is used, and to study their sensitivity to disturbance factors such as the tourists. The current management plan can then be modified based on scientifically sound data to provide protection and conservation for the dolphins while maintaining tourist income.

Materials & Methods

Samadai Reef is located along the Egyptian coast in the vicinity of the city of Marsa Alam at approximately 24° 59' 15" N, 34° 59' 53" E, four nautical miles away from the nearest harbour of Tondoba bay. The reef is in the shape of a horseshoe, forming a shallow lagoon inside. Lagoon depth ranges from 6-7 m at the northern part, which is mainly sandy on the bottom except for patches of coral patches, to 12-15 m in the rest of the lagoon. The Red Sea Protectorates proposed a management plan (Notarbartolo di Sciarra 2003) with a simple subdivision into zones to simplify enforcement (Fig. 1): Zone A is exclusively for dolphins; Zone B can be used by snorkellers but not motor

boats; Zone C can be used by boats; and Zone D outside the lagoon can be used for diving activities.

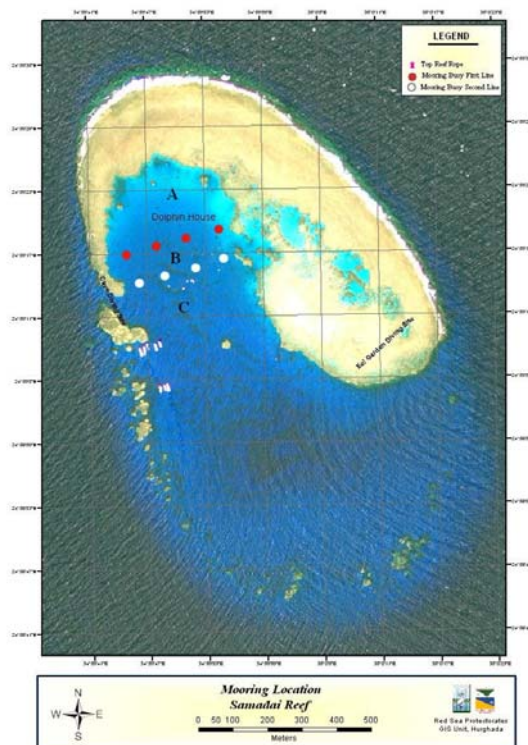


Figure 1: Satellite image for Samadai Reef with different zones

A speed boat was used to visit Samadai Reef three times per week from before sunrise (0600 h) until sunset. Once at Samadai Reef, the boat was moored at the observation point in the middle of Zone A and the engine switched off. Sunrise and sunset were the official times based at Marsa Alam. Binoculars were used to monitor the arrival and departure times of the dolphins, and their total resting time each day estimated. The position of the group of dolphins was taken every 2.5 min by taking its bearing and distance (estimated by eye) from the boat. These were later plotted on a GIS map, and the daily movements described. The number of aerial behaviour categories inside the lagoon (zones A, B and C) were counted according to a scheme adapted to the Samadai situation from Norris *et al.* (1994). Tourists visit the site from 1000 until 1400 h, with a maximum number of 100 snorkellers per day. The numbers of snorkellers with dolphins was recorded in zones B and C.

Results

The dolphins usually entered Samadai reef before or at sunrise: the earliest arrival was in spring at 0629 h, 44 min before sunrise; the latest was in autumn, 32 min after sunrise. They left the reef from 54 min (summer) to 3 h 18 min (spring) hr before sunset. Thus the dolphins rested at Samadai reef from 10 h 24 min (summer) to about 8 h (winter) per day.

Once the dolphins entered the lagoon, they went directly to Zone A to rest, and their swimming movements were slow. Before midday they remained most of the time in the north western part of Zone A. During the afternoon (1200–1630 h), the dolphins became active, moving rapidly throughout Zone A and frequently in other

zones (Fig. 2). In summer, dolphins moved in many directions in all zones during each day, but in winter they tended to stay nearly all the time in Zone A, preferring the north-western side (Fig 3).

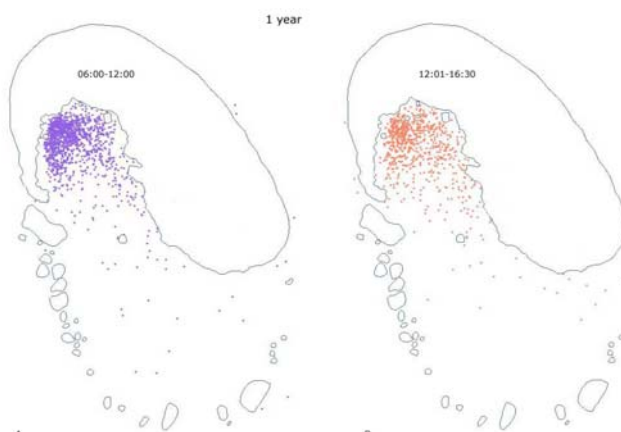


Figure 2. Dolphin group positions recorded in Samadai (summed over the entire year):
A: morning hours; B: afternoon hours

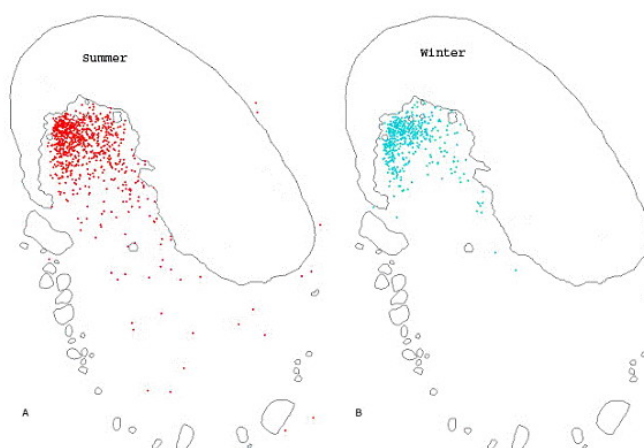


Figure 3. Dolphin group positions recorded in Samadai during mornings:
A: Summer months; B: Winter months

The maximum activity of dolphins was recorded at spring and the minimum at winter (Fig. 4). During summer, before and after the tourist visiting time period, *splash*, *tail-slap repeated* and *porpoise* were the most common aerial behaviours. During tourist visiting times, *jump* and especially *porpoise* were the commonest behaviours (Fig. 5). During winter, before and after the tourist visiting period dolphin aerial behaviour was uncommon, but during the visiting period *splash* and *porpoise* were very common aerial movements (Fig. 6).

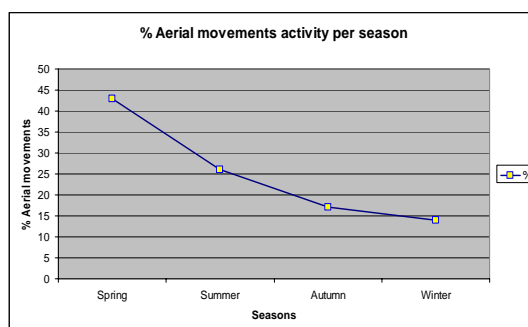


Figure 4. Dolphin aerial activity during the year

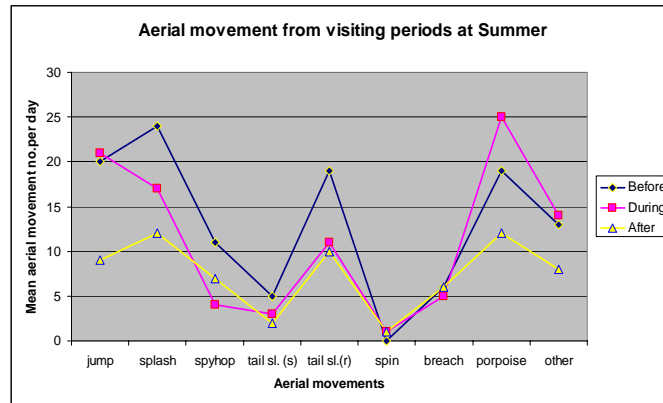


Figure 5. The various aerial movements of dolphins during summer in relation to the tourist visiting time

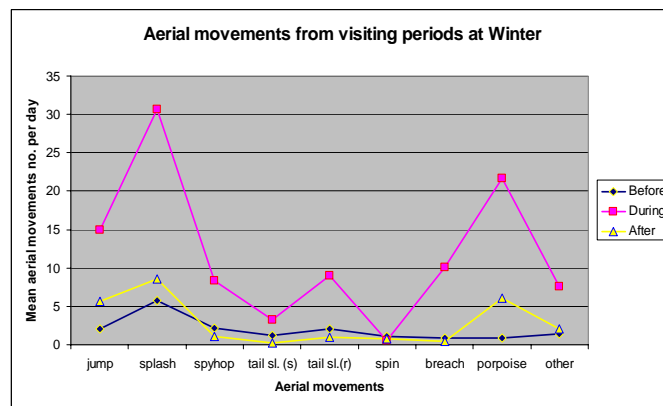


Figure 6. The various aerial movements of dolphins during winter in relation to the tourist visiting time

The daily pattern of snorkelling was similar across the year, with relatively high numbers early in the visiting period, declining rapidly after 1100 h; numbers of snorkellers peaked during summer, with the lowest numbers in winter (Fig 7). The *porpoise* behaviour was the most obvious response to the number of snorkellers in the water.

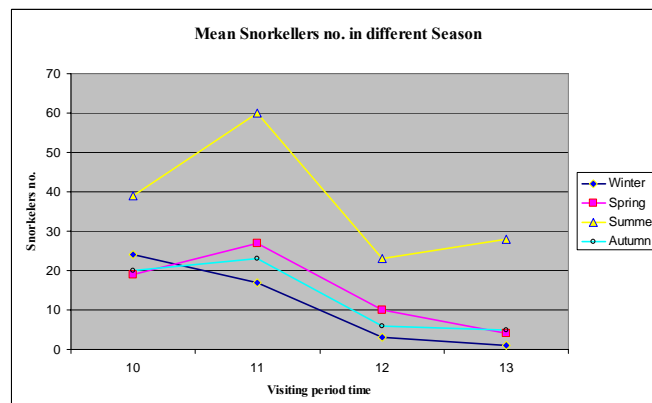


Figure 7. Mean number of snorkellers per hour during different seasons

Discussion

Variation in the arrival and departure times of spinner dolphins may be related to seasonal patterns of daylength (Notarbartolo di Sciara 2007). Some days after they entered the area, they swam outside the reef for a few minutes and then came back inside again, but with more dolphins. This may be a pattern of socializing and schooling. In summer there are other groups of dolphins that enter the place as different families with many subgroups. Increasing the resting time during summer may be due to that fact that water is very warm and the energy loss is at its minimum level, but also that mating occurs mainly during summer (Perrin 2003).

The dolphins enter the lagoon and rest, remaining relaxed more than they are active at the surface (Lammers 2004). The animals were most frequently seen slowly milling in the innermost portions of Zone A, going from west to east and vice versa (Ponnampalam 2005).

The level of dolphin activity was significantly influenced by time of day (Lammers 2004). As the dolphins began or ended their resting period, they engaged in aerial spinning and leaping behaviours easily noticeable from the shore (Wursig *et al.* 1994). The arcuate leaping movements may function in conserving energy during high-speed swimming; entire groups would suddenly become highly active aerially and make a concerted push towards offshore waters, only to double back and settle again into a resting pattern (Lammers 2004). This often was repeated several times until the group finally continued in its offshore progression.

When the dolphins were active in the afternoon and swam to zones B and C, all of the snorkellers with the assistance of zodiac boats came to the same zones. Zodiacs followed the dolphins at speed, and then dropped the snorkellers in front of them. The dolphins tried to escape from this circle created by zodiacs and snorkellers by increasing speed by the *porpoise* behaviour, which means they cannot jump because manoeuvres are limited. Most studies have indicated that dolphin behaviours can indeed be altered by frequent encounters with humans (Lammers 2004). The human disturbance was highest in mid-morning when spinner dolphins began their rest period; secondary resting areas with less vessel traffic were utilized more than had been previously observed, suggesting the dolphins have been displaced from their primary resting areas (Ostman-Lind *et al.* 2004).



Figure 8 Spinner dolphin, *Stenella longirostris*, (top) with Pantropical spotted, *Stenella attenuata*, (bottom) together. Photo credit: Ahmed M Shawky

On March 11, 2006 in the open sea northwest of Samadai reef, schools of spinner dolphin were seen swimming with other schools of Pantropical Spotted Dolphin (*Stenella attenuata*) associated to each other (Psarakos *et al.* 2003). A picture of the

two species together was taken (Fig. 8). Schools of big tuna were also recorded in front of the schools of dolphins. At the surface, a lot of birds flew over the dolphins, trying to hunt small fish at the surface (Perrin 2001). Spotted bottlenose dolphin (*Tursiops aduncus*) and common bottlenose dolphin (*Tursiops truncatus*) were also recorded with spinner dolphins both inside and outside Samadai.

Acknowledgements

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الملخص العربي

سلوك الدولفين الدوار في شعاب صمداي - مرسى علم - البحر الاحمر - مصر

أحمد شوقي و أيمن عفيفي

جهاز شئون البيئة - قطاع حماية الطبيعة - محميات البحر الاحمر - مرسى علم - مصر

تم دراسة سلوك الدولفين الدوار "ستينلا لونجيروستريس" في منطقة شعاب صمداي - مرسى علم - البحر الاحمر، تم جمع البيانات خلال الفترة من أكتوبر ٢٠٠٥ حتى سبتمبر ٢٠٠٦ باستخدام المشاهدات السطحية. حققت الدراسة اربعة اهداف رئيسية تشمل: ميعاد وصول ومغادرة الدلافين، حركة وانتشار الدلافين في البحيرة - السلوك الهوائى للدلافين بالإضافة إلى تأثير الأنشطة البشرية على سلوك الدلافين