

THE CRUSTACEAN WOOD-BORER *SPHAEROMA TEREBRANS* BATE FROM KARACHI MANGROVES (PAKISTANI BORDER OF THE NORTHERN ARABIAN SEA)

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A crustacean wood borer, *Sphaeroma terebrans* Bate, is recorded for the first time from mangroves of Karachi, northern Arabian Sea. Seasonal changes in the occurrence of *S. terebrans* in three localities of Karachi mangroves are described. Ecology and environmental variables of the study sites and their relevance to the distribution pattern of the borer is discussed.

Key words: Borers, Crustacea, Mangrove

Introduction

Studies on wood borers of Pakistan mangroves are meagre. Recently Barkati *et al.* [1] provided information regarding the seasonal occurrence and species composition of molluscan wood borers of the Sind mangroves, knowledge about crustacean wood borers of mangroves is totally lacking.

The crustacean borers of the Indian mangroves are adequately studied; a number of authors documented the occurrence of sphaeromatid wood borers in mangrove trees. Literature on sphaeromatids from mangroves of India is reviewed by Santhakumaran [2]. A comprehensive coverage of the literature on mangrove borers of India is recently published by Santhakumaran [3]. While listing the marine biodeteriogenic organisms found submerged in the sea, Jones *et al.* [4] presented information on the distribution of wood boring sphaeromatids of the world. Iyer *et al.* [5] recently presented information on population densities of two species of sphaeromatids in three lakes of Kerala, India.

The crustacean wood borer, *Sphaeroma terebrans* Bate, is reported here for the first time from Karachi, northern Arabian Sea. The present communication forms a part of the comprehensive investigation in invertebrate fauna of the Sind mangroves [6-8].

Materials and Methods

About eighty-seven regular sampling trips were made to a number of mangrove sites all along the Sind coast during the period Jan. 1984 and Oct. 1985, however it was on twenty-five occasions (Tables 1, 2) that mangrove wood infested with crustacean borers was found. Individuals of *Sphaeroma terebrans* were collected from three localities of the Karachi mangroves, namely, Sandspit (14 km north west of Karachi), Clifton (6 km north east of Karachi) and Port Qasim (30 km north east of Karachi) (Fig. 1). Infested mangrove wood, live and dead branches, were obtained from various parts of the intertidal area. In the laboratory, borers were taken out of the live wood,

TABLE 1. SEASONAL ABUNDANCE OF *SPHAEROMA TEREBRANS* FROM SANDSPIT
DATA OF WATER SALINITY AND TEMPERATURE ARE ALSO GIVEN).

Date	Number of individuals	Carapace length	Mean Carapace length (Range; mm)	pH	Temperature (°C)	Salinity (0/00)
Jan. 1984	5	4 - 8	5.0	7.76	21.0	33.0
Feb. 1984	9	6 - 12	9.0	8.61	24.0	33.5
Mar. 1984	18	5 - 12	9.0	7.05	28.0	34.5
Apr. 1984	9	6 - 10	8.0	7.45	29.0	35.0
May 1984	2	8 - 10	9.0	7.64	30.5	35.0
Oct. 1984	748	2 - 12	7.0	7.00	32.0	35.0
Nov. 1984	135	2 - 12	8.0	7.87	26.0	34.0
Dec. 1984	249	-	6.0	7.15	23.0	32.0
Jan. 1985	28	6 - 11	8.0	7.93	19.0	32.5
Feb. 1985	19	7 - 11	10.0	8.66	25.0	32.0
May. 1985	42	3 - 12	7.0	-	-	-
July. 1985	134	3 - 11	6.0	7.86	27.0	34.0
Aug. 1985	297	2 - 12	7.0	7.98	28.5	33.0
Sep. 1985	313	2 - 12	7.0	7.76	28.5	34.5

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TABLE 2. SEASONAL ABUNDANCE OF *SPHAEROMA TEREBRANS* FROM CLIFTON AND PORT QASIM.
(DATA OF WATER SALINITY AND TEMPERATURE ARE ALSO GIVEN.).

Date	Number of individuals	Carapace length	Mean Carapace length (Range; mm)	pH	Temperature (°C)	Salinity (0/00)
<i>Clifton</i>						
Aug. 1984	40	5 - 11	9.0	-	27.5	32.0
Nov. 1984	431	3 - 12	7.0	7.87	25.5	33.5
Jan. 1985	150	6 - 10	8.0	7.82	21.0	32.5
Feb. 1985	3	10 - 11	10.0	7.87	22.0	32.0
May 1985	29	8 - 11	9.0	7.74	27.5	34.5
Jun. 1985	236	1 - 12	8.0	7.55	28.0	33.0
July. 1985	209	5 - 12	7.0	7.04	29.0	33.5
Aug. 1985	201	3 - 11	7.0	-	-	-
Sep. 1985	59	4 - 11	8.0	-	-	34.0
<i>Port Qasim</i>						
Sep. 1984	1	10	10.0	7.66	25.5	38.0
Oct. 1985	72	3 - 12	8.0	7.88	30.0	39.5

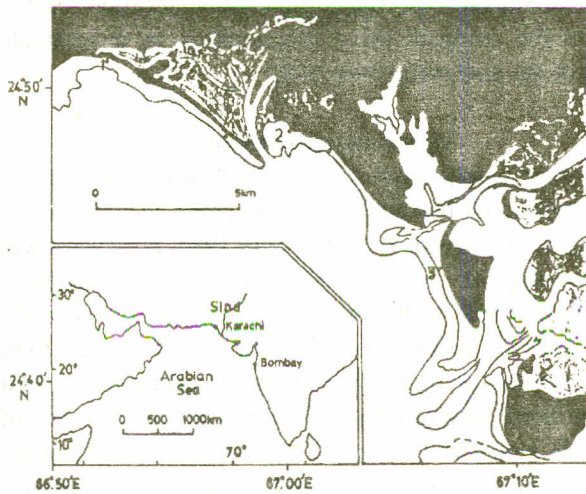


Fig. 1. Map of Sind showing study sites; (1) Sandspit; (2) Clifton; (3) Port Qasim.

identified, counted and the carapace length measured. No borers were found in dead branches. In order to quantify the borers, the length and breadth of the infected wood was measured and the number of borers are noted per cm² of wood. Data on environmental variables were obtained from Tirmizi [7,8].

Results and Discussion

Since there are no marked differences in the ecology of the three study sites:- Sandspit, Port Qasim and Clifton, a brief account of their ecological characteristics is given below.

Sandspit. A moderately wide belt of mangrove swamps ranging between 10 and 60 meters stretches all along the coast from Hawkesbay to Manora. The soil of Sandspit swamps is composed of fine sand particles, dark in colour and has a pungent odour near high water mark.

The substratum varies in character from place to place depending partly on the soil texture and, to some extent, on the sewerage entering the mangrove areas.

Gharo-Phitti Creek (Port Qasim). Mangroves in this region flourish over a vast area. Water having a high saline content covers the mangrove plants, even in the peripheral areas, to a height of one meter. Tidal flats are composed of a greyish mud at Bakran Creek. The substratum is harder due to the presence of sand.

Clifton. Relatively less extensive mangrove swamps are found at Clifton. Contrary to the slopeless tidal flats of Sandspit and Port Qasim, the Clifton flats are characterised by an uneven substratum crossed with tidal channels. Instead of forming a continuous belt, the mangroves grow in pockets of various sizes. The vegetation is not dense and, therefore, there is less shade. Discharge of domestic sewerage creates environmental conditions similar to the Sandspit area.

Mangrove forests of the Sind coast are as a whole predominantly populated by *Avicennia marina* which occupies about 99.0% of the total mangrove forest area [9].

Environmental variables. The pH values of the collection sites in the Sind mangroves ranged between 7.5 and 8.0. The yearly averages of Sandspit, Port Qasim and Clifton were 7.85, 7.76 and 7.75, respectively [8]. Water temperature ranged between 19 and 33°; there was not much variation at any one period irrespective of the localities. The lowest temperatures were recorded in Dec., Jan. period. There were two peaks of high temperature values. One in April - May and other in Sept. - Oct. (Table 1). Salinity in the Port Qasim area ranged between 34 and 41 ppt during most of the year, decreasing to 28 ppt in Aug./Sept. depending upon the monsoon rains [10]. Salinity of other areas ranged between 25 and 31 ppt.

Individuals of *Sphaeroma* normally occur intertidally, normally in waters of low salinities. *Sphaeroma terebrans* is relatively more abundant in landward areas compared to seaward directions where trees are attacked mostly by teredinid borers. A total of 3439 individuals were collected from Jan. 1984 to Oct. 1985. The carapace length of individuals ranged between 1 and 12 mm. The average size of individuals in most samples was from 7 to 9 mm. Gravid females having a carapace length of less than 9 mm were not found. This may be taken as evidence that sexual maturity in females was reached at about 9 mm carapace length. The number of larvae per female averaged 35 (SD \pm 14.8)[8].

Seasonal variation in the occurrence of *Sphaeroma terebrans* is shown in Tables 1 and 2. It is evident from the tables that *S. terebrans* is fairly abundant in Clifton and Sandspit mangroves but was found only on two occasions in the Port Qasim area. In Sept. 1984 only one specimen was found whereas in Oct. 1985, 72 individuals were recorded from a single piece of wood from Port Qasim. *Sphaeroma terebrans* is markedly seasonal in occurrence, being most abundant during Aug. to Dec. when 2546 individuals were found. Conversely, only 1142 individuals were obtained during the rest of the study period i.e. over a span of 7 months.

Sphaeroma terebrans is a species with a fairly worldwide distribution. It has been reported from Africa, western coast of India, Ceylon, Australia, U S A, and the Mediterranean Sea [4]. Recently reports of its occurrence from the east coast of India (Port Novo) have also been published [11]. Sphaeromatids are found in timber as well as in living mangrove trees [4]. In Talapady mangroves they also live boring into living prop roots [11]. Five species and one variety of sphaeromatids have been reported from Indian waters [2]; of these 2 species and 1 variety are found in the mangrove areas. While describing the marine wood borers in mangroves of Goa, India, Santhakumaran [2] summarized the literature on distribution of wood borers along the Indian coast. He mentioned that sphaeromatids caused severe damage to several mangrove trees.

Sphaeroma terebrans was found to concentrate mainly in the peripheral areas of mangroves. It is to be noted that these areas are also characterized by the presence of hydrogen sulphide gas. The infested trees are usually of smaller heights with branches weakened considerably due to borer attack. The molluscan borers, on the contrary, concentrate more in the seaward areas where the trees are taller [1]. As far as the effect of salinity on the distribution of sphaeromatids is concerned, our observations are in

conformity with those of Dharmaraj *et al.* [11] that *S. terebrans* cause damage in low saline areas. The low rate of borers attacks in the Port Qasim area may be correlated with the prevailing high saline water. Damage to timber in the estuarine and other brackish areas by *Sphaeroma* is also emphasized by Dharmaraj *et al.* [12]. Iyer *et al.* [5], have also attributed high salinity and low turbidity as factors favouring highest population density of *S. terebrans* in Lake Ashtamudi. They further stated that high nutrient levels and turbidity seems to be responsible for the lowest population density in Lake Vembanad.

The pH values did not deviate significantly throughout the study period. Exceptions were, however, noted in Port Qasim area in Jan. 1984 and April 1985 when the pH values were 6.08 and 5.55, respectively. Preliminary observations indicate that pH values seems to have no significant effect on the distribution of crustacean wood borers in the study sites.

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