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Authors

Cheng, Lanna
Schmitt, Patti D.

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Marine Insects of the Genera *Halobates* and *Hermatobates* (Heteroptera) from Neuston Tows around Lizard Island, Great Barrier Reef

Lanna Cheng^A and Patti D. Schmitt^B

^A Scripps Institution of Oceanography, University of California, La Jolla, CA 92093, U.S.A.

^B School of Biological Sciences, The University of Sydney, Sydney, N.S.W. 2006.

Abstract

Two species of *Halobates* and one species of *Hermatobates* were found in neuston tows taken at seven locations around Lizard Island, Great Barrier Reef. The open-ocean *Halobates sericeus* Eschscholtz was much more abundant than the nearshore *Halobates princeps* White. *Hermatobates weddi* China was mainly found in one location, Watson's Bay, and was more frequently caught at night than during the day. Neither *Halobates* species was caught in any of the tows taken at night.

Introduction

Australia has a rich marine insect fauna. In fact, one of the earliest papers on marine insects was presented to the Royal Society of Queensland, in which both the habitat and the insects found were discussed (Mackerras 1950). A more up-to-date account of Australian marine insects was presented by Marks (1971), who reported several species of marine bugs, beetles and flies from Low Islets. Although many species of Australian insects have been included in various taxonomic studies, there have been very few published studies of the biology or ecology of any of the species.

The marine insects discussed in this study were all collected during a survey of larval fish, carried out around Lizard Island between October 1979 and July 1980. *Halobates* and *Hermatobates* were the only insect genera found in our net tows. Although *Pontomyia* spp. have been collected around the island in previous years (Susan Talbot, personal communication), we did not find any in our samples.

Materials and Methods

Lizard Island (14°40' S., 145°27' E.) is in the Great Barrier Reef lagoon, approximately 14 km from the outer barrier reef and 21 km from the mainland of northern Queensland. Seven locations around Lizard Island were selected for regular sampling: 1, off Crystal Beach; 2, Coconut Beach; 3, the lagoon; 4, the reef flat; 5, Watson's Bay; 6, Osprey Islet; and 7, off Osprey Islet (Fig. 1). The stations included sites on both windward (1-4) and leeward (5-7) sides, some nearshore (2, 3, 4, 5, 6), others about 2 km offshore (1 and 7). The prevalent winds in the area are south-east trades.

The samples were collected by towing a neuston net from a boom alongside a 7-m boat. The net has an opening measuring 1 m by 26 cm, with a 505- μ m mesh. It was towed for 10 min each time, at a speed of c. 1.5 m s⁻¹, with the opening one-half to two-thirds immersed. A flowmeter (General Oceanic) was attached to the lower bar of the net, so that the area of sea surface sampled could be calculated. The mean area sampled was 699.3 m² (s.d., 83.2 m²; range, 530-930 m²).

Most of the samples were taken during the day (0805-1640 h). On each sampling day, one sample was taken at each of the seven stations, weather permitting. Sixty tows were made during three separate study periods: 22-23 October 1979, 24 January-9 February 1980, and 2-13 July 1980. In addition, eight samples at night (between 1951 and 2131 h) were taken on 30 January and 7 and 9 February 1980.

The insects were sorted from the rest of the neuston and preserved in either 5% seawater-formalin or 70% alcohol. They were all identified as far as possible to species, sex and developmental stage.

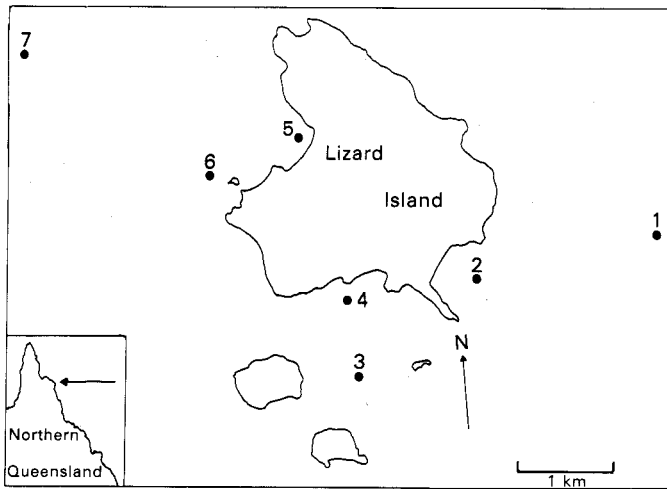


Fig. 1. Map of the Lizard Island complex, showing the sampling locations, which are numbered as in the text.

Results and Discussion

Two species of sea-skater, *Halobates sericeus* Eschscholtz and *Halobates princeps* White, and the sea-bug *Hermatobates weddi* China were collected in our tows. The seasonal distribution of insects and the sampling efforts are presented in Table 1.

Table 1. Total number of adults and nymphs of each species of marine insect caught around Lizard Island in each sampling period

Number of samples taken in each period is also shown. Numbers in parentheses are results from samples collected at night. —None taken

| Date | No. of samples | No. of <i>Halobates sericeus</i> | | No. of <i>Halobates princeps</i> | | No. of <i>Hermatobates weddi</i> | |
|----------------|----------------|----------------------------------|--------|----------------------------------|--------|----------------------------------|--------|
| | | Adults | Nymphs | Adults | Nymphs | Adults | Nymphs |
| Oct. 1979 | 7 | 4 | 19 | — | — | — | — |
| Jan.–Feb. 1980 | 28(8) | — | 1 | 8 | 11 | (6) | (3) |
| July 1980 | 25 | 42 | 122 | — | — | 3 | 1 |

Adults and nymphs of *Halobates sericeus* were collected in October and July; the species was virtually absent from samples collected in January and February. Conversely, *Halobates princeps* was present in January–February but absent at other times. *Hermatobates weddi* was present in January–February and July.

The numbers of each species collected from each of the seven locations are given in Table 2. The commonest species in our samples, *Halobates sericeus*, was found in all of the locations except Osprey Islet and Watson's Bay. This species was most abundant in the lagoon and least abundant at the nearshore leeward locations. It is an open-ocean species with wide distributional ranges in the northern and southern Pacific Ocean (Cheng 1973). Specimens of oceanic *Halobates* species are rarely found close to shore except after strong onshore winds or storms. Perhaps the presence of *Halobates sericeus* in predominantly windward locations around Lizard Island is related to south-

east winds blowing them in from oceanic waters beyond the outer barrier reef. Monthly data on wind speed and direction, collected by the Commonwealth Bureau of Meteorology at Cooktown, show that the south-east component of the wind is stronger ($>20 \text{ km h}^{-1}$) and more constant in July (occurring in 43% of the observations during the last 21 years) and October (29%) than in January–February (4–10%), which possibly explains the seasonal as well as the distributional differences seen in the abundance of this species.

The total catch of *Halobates sericeus* from the four windward locations was 176, with adults and nymphs of all stages (I–V) represented in the following proportions: I, 8.0%; II, 6.3%; III, 10.8%; IV, 29.5%; V, 22.7%; adults, 22.7%. This indicates that we were sampling a breeding population. The overall male to female ratio from all locations was 0.62, which is significantly below 1. Populations of several other oceanic species likewise show a predominance of females (Cheng and Shulenberg 1980), which probably live longer.

Table 2. Total number of adults and nymphs of each species of marine insect caught around Lizard Island, and total number of samples taken in each location

Numbers in parentheses are results from samples collected at night. —None taken

| Location and No. of station | No. of samples | No. of <i>Halobates sericeus</i> | | No. of <i>Halobates princeps</i> | | No. of <i>Hermatobates weddi</i> | |
|-----------------------------|----------------|----------------------------------|--------|----------------------------------|--------|----------------------------------|--------|
| | | Adults | Nymphs | Adults | Nymphs | Adults | Nymphs |
| Windward | | | | | | | |
| Offshore, off Crystal, 1 | 7 | 7 | 21 | 1 | 3 | — | — |
| Nearshore, Coconut, 2 | 8 | 2 | 24 | — | 3 | — | — |
| Lagoon, 3 | 9(2) | 27 | 51 | 1 | — | — | (1) |
| Reef flat, 4 | 9(2) | 4 | 40 | 4 | — | (1) | — |
| Leeward | | | | | | | |
| Offshore, off Osprey, 7 | 9(1) | 7 | 5 | — | 1 | — | — |
| Nearshore, Osprey, 6 | 9(1) | — | — | 1 | — | (1) | — |
| Watson's Bay, 5 | 9(2) | — | — | 1 | 4 | 3(4) | 1(2) |

We collected only 19 specimens of *Halobates princeps*: five adult males, three adult females, eight first-instar nymphs and three second-instar nymphs. This species was present in all seven stations, but very few specimens were collected from each station. Eight adults (four males and four females) were collected by Barry and Lois Goldman while 'night lighting' 100–200 m offshore at South Island of the Lizard Island complex. However, we still do not know where or whether this species breeds around Lizard Island. *Halobates princeps* has hitherto been reported only from the Celebes, Malaysia, New Guinea, Palau, the Moluccas, and Java (Cheng 1973). This is the first record from the Great Barrier Reef.

Hermatobates weddi was collected at four of the stations: off Osprey Islet, the lagoon, the reef flat and Watson's Bay (Table 2). Of the 13 specimens found in our samples, 10 were collected at Watson's Bay. The four specimens in the tows made during the day comprised three females and one nymph. The nine collected in tows at night consisted of five females, one male and three nymphs. Members of this genus generally live in reef areas among low intertidal coral rubble. Unlike the genus of sea-skater *Halobates*, they are not normally found on the surface of open water. They hide in crevices or under fragments of dead coral at high tides and only come out to feed at

low tide (Cheng 1977). The specimens we collected were most probably strays that were caught when the tides came in before they had time to return to their crevices (Cheng and Leis 1980). Our specimens appear to be identifiable as *Hermatobates weddi*, originally described by China (1957) from the Monte Bello Islands of Western Australia, although our specimens differ from China's description in having fewer small teeth on the front femur of the male (10–11 cf. 14).

A marked feature of our samples is that only one species of insect is present in any one sample. A very low rate of co-occurrence was found in samples from the eastern tropical Pacific Ocean by Cheng and Shulenberger (1980) in a study involving four species and a much larger sampling area. This pattern is also seen in our samples, taken from a much smaller area. It is not known whether this is due to biological interactions between species, or to different physical preferences or tolerances in conjunction with small-scale differences in water masses.

Lizard Island evidently possesses a rich and interesting marine insect fauna, of which little is known apart from the taxonomy. We hope that this short communication will interest other marine biologists and induce them to look out for and study some of these remarkable insects.

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References

- Cheng, L. (1973). *Halobates*. *Oceanogr. Mar. Biol. Annu. Rev.* **11**, 223–35.
Cheng, L. (1977). The elusive sea bug *Hermatobates*. *Pan-Pac. Entomol.* **53**, 87–98.
Cheng, L., and Leis, E. W. (1980). Notes on the seabug *Hermatobates hawaiiensis* China (Heteroptera: Hermatobatidae). *Proc. Hawaii. Entomol. Soc.* **23**, 193–7.
Cheng, L., and Shulenberger, E. (1980). Distribution and abundance of *Halobates* species (Insecta: Heteroptera) in the eastern tropical Pacific. *Fish. Bull.* **78**, 579–91.
China, W. E. (1957). The marine Hemiptera of the Monte Bello Islands, with descriptions of some allied species. *J. Linn. Soc. Lond. Zool.* **40**, 342–57.
Mackerras, I. M. (1950). Marine insects. *Proc. R. Soc. Queensl.* **61**, 19–29.
Marks, E. N. (1971). Australian marine insects. *Aust. Nat. Hist.* **17**, 134–8.