Melanella aciculata, a small snail parasite of sea cucumbers, is found in the Hawaiian Islands. Four species of Melanella have been documented in Hawaii. They are usually found on the ventral side of the Holothuria atra. Campbell (2009) showed that water conditions and pollution greatly influences this gastropod’s life cycle.

This research compares the population densities of Melanella aciculata and its host Holothuria atra in two separate sites with differing water qualities.

METHODS AND MATERIALS

Kahuku Reef off the Golf Course, Kahuku, Hawaii (21° 20′ 32″ N, 157° 50′ 34″ W) was recorded as site one. All available sea cucumbers were hand collected from the reef. The cucumbers were isolated individually in labeled zip lock bags. Sea cucumber length was measured in centimeters using a ruler immediately upon collection. The cucumbers taken from Clissold’s beach, Laie, Hawaii (site two- 21° 19′ 32″ N, 157° 50′ 34″ W) were gathered in the same manner. In the laboratory, the exterior of each sea cucumber was searched for Melanella. The number of Melanella on each sea cucumber was recorded and their location was noted. Snail location on the cucumber was measured using a four-quadrant system, with the dorsal and ventral sides each having four sections. Parasites were removed from the cucumber by gently plucking them. These parasites were then measured from the posterior apex to the widest part of the 3.5 anterior lip in millimeters using a straight edge. The results were then compared using a two way ANOVA on both the snail abundance and cucumber number and a regression on the cucumber abundance and snail abundance.

RESULTS

- 97 Holothuria atra collected: 31 % host Melanella aciculata
- 16 % held single M. aciculata; 15 % held two or more M. aciculata
- 86 % inhabit the ventral surface of the H. atra (Figure 2)
- A positive relationship between the abundance of H. atra and the number of M. aciculata was significant (p=0.004)(Figure 3).
- A significant difference in the likelihood of collecting samples depended on the month and the location said collection was taken from (p=0.048).
- Snail populations were found to be remarkable higher in February, March and October (Figure 4)

DISCUSSION

Melanella aciculata are commonly found on the ventral surface of cucumbers at any depth in the Hawaiian Islands. This was consistent with the finding of this study. It is significant to note that both the number of H. atra collected and the site at which they were taken from influenced the number of M. aciculata found. The regression done to test the significance for the number of M. aciculata compared to the number of H. atra showed that the more cucumbers found gave higher probability of more M. aciculata. The regression of parasite to host was constant independent of the location they were taken from.

The method for collection of cucumbers was not always consistent. In some months collections were done at low tide making it more difficult to collect samples because they were hiding due tide. Whereas, in the months where collections were taken at higher tides it was easier to capture samples.

REFERENCES


Figure 1 and 2: Photographs of Melanella aciculata as viewed on their host Holothuria atra.

Figure 3: The regression of M. aciculata populations due to H. atra abundance.

Figure 4: The comparison of the M. aciculata populations in the Kahuku Reef versus that at Clissold's area.